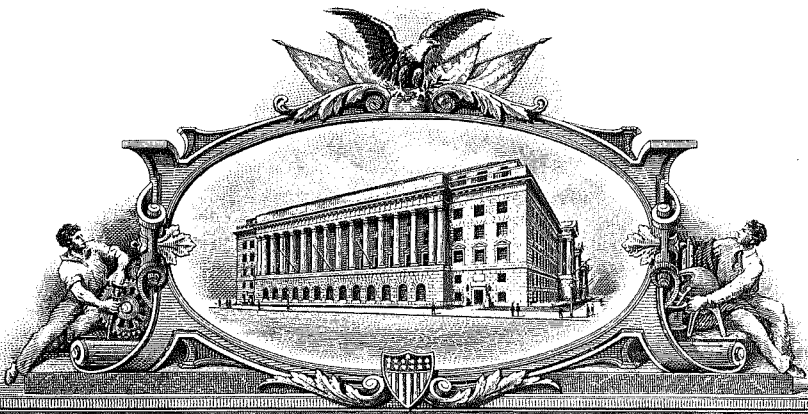


PUBLIC
EXHIBIT 4
(Part 30 of 32)

A 8147814



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

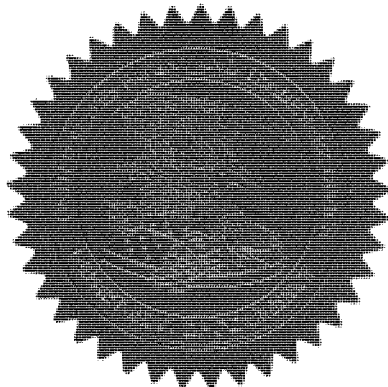
UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

August 25, 2021

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R GLOVER
Certifying Officer

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
 Stylesheet Version v1.2

EPAS ID: PAT4804407

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	SECURITY INTEREST

CONVEYING PARTY DATA

Name	Execution Date
HILCO PATENT ACQUISITION 56, LLC	01/24/2018
BELL SEMICONDUCTOR, LLC	01/24/2018
BELL NORTHERN RESEARCH, LLC	01/24/2018

RECEIVING PARTY DATA

Name:	CORTLAND CAPITAL MARKET SERVICES LLC, AS COLLATERAL AGENT
Street Address:	225 W. WASHINGTON ST., 9TH FLOOR
City:	CHICAGO
State/Country:	ILLINOIS
Postal Code:	60606

PROPERTY NUMBERS Total: 3702

Property Type	Number
Patent Number:	5888120
Application Number:	09216395
Application Number:	08700650
Patent Number:	5973767
Patent Number:	6130428
Patent Number:	6407559
Patent Number:	5897381
Patent Number:	5893952
Patent Number:	5756369
Patent Number:	5926720
Patent Number:	6239499
Application Number:	09363084
Patent Number:	6017808
Patent Number:	6117795
Application Number:	09583297
Patent Number:	6239491
Patent Number:	6486056
Patent Number:	5646073

Property Type	Number
Patent Number:	5818100
Application Number:	08566161
Patent Number:	6121159
Patent Number:	6455934
Patent Number:	6273798
Patent Number:	5990010
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Patent Number:	6300663
Patent Number:	5905381
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Patent Number:	5843813
Patent Number:	5970321
Patent Number:	5869869
Patent Number:	5955762
Application Number:	09188929
Patent Number:	5877530
Patent Number:	5670425
Patent Number:	5895261
Patent Number:	5827777
Patent Number:	5600182
Application Number:	08902507
Patent Number:	5652163
Patent Number:	5593918
Patent Number:	5644143
Patent Number:	7847285
Patent Number:	8017512
Patent Number:	6982229
Patent Number:	7129516
Patent Number:	7201633
Application Number:	11158450
Application Number:	11381409
Patent Number:	7067223
Patent Number:	6841308
Patent Number:	6998716
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Property Type	Number
Application Number:	60578890
Patent Number:	9188848
Patent Number:	8377633
Patent Number:	8057963
Patent Number:	7095483
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Application Number:	60384499
Patent Number:	6972840
Patent Number:	7151059
Patent Number:	6740912
Application Number:	10291356
Patent Number:	6919263
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Patent Number:	6806162
Patent Number:	6614097
Application Number:	12256677
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Patent Number:	6649422
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Patent Number:	6159665
Patent Number:	6864152

Property Type	Number
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Patent Number:	6521520
Patent Number:	6707114
Patent Number:	6211555
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Patent Number:	7633118
Patent Number:	7700432
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Application Number:	09956381
Patent Number:	7911006
Patent Number:	6455418
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Patent Number:	6495019
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Patent Number:	6500521
Application Number:	10306565
Patent Number:	7223677
Application Number:	10814682
Patent Number:	6737339
Patent Number:	6855991

Property Type	Number
Application Number:	09605931
Patent Number:	7081419
Patent Number:	6246095
Patent Number:	5940736
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Patent Number:	5879857
Patent Number:	5843624
Patent Number:	6103615
Patent Number:	6278129
Patent Number:	6525377
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Patent Number:	6004880
Patent Number:	6090239
Patent Number:	6057571

PATENT
REEL: 045216 FRAME: 0024

Property Type	Number
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Patent Number:	6358837
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Patent Number:	6861310
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Patent Number:	7494842

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REEL: 045216 FRAME: 0025

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Patent Number:	7064062
Patent Number:	7492049
Patent Number:	7258953
Patent Number:	6727177
Patent Number:	7413984
Patent Number:	7229923
Patent Number:	5688709
Patent Number:	6081008
Application Number:	08438614
Patent Number:	5650653
Patent Number:	5763302
Patent Number:	5770492
Patent Number:	5583062
Patent Number:	5585286
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Patent Number:	5598021
Patent Number:	5663083
Patent Number:	5858864
Application Number:	08306179
Patent Number:	5654210
Application Number:	10791337
Patent Number:	7955919
Application Number:	07754201
Patent Number:	6081004
Application Number:	07523445
Application Number:	08014084
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Application Number:	60314148
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Patent Number:	7312532
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Application Number:	07982093

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Patent Number:	8227319
Patent Number:	7714361
Application Number:	13348415
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Patent Number:	7253012
Patent Number:	7405116
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Patent Number:	6410435
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Patent Number:	8022481
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Patent Number:	6362054
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Patent Number:	7196420
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Patent Number:	7638245
Patent Number:	7018753
Application Number:	10951646
Patent Number:	7413996
Patent Number:	7220362
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Application Number:	11695169
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Application Number:	10964032
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Application Number:	11189625
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Patent Number:	6614507
Application Number:	09775223

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Patent Number:	6579371
Patent Number:	6972217
Patent Number:	7358594
Patent Number:	6885436
Patent Number:	7298458
Patent Number:	7098996
Patent Number:	6090656
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Patent Number:	6322736
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Patent Number:	7527544
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Patent Number:	5744195
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Patent Number:	6214675
Patent Number:	6627963
Patent Number:	6762457
Patent Number:	6506641
Patent Number:	7381607
Patent Number:	7075167
Application Number:	09335646
Patent Number:	6653181
Patent Number:	7345354
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Patent Number:	6040616
Patent Number:	5825073
Application Number:	10179057
Patent Number:	7169714
Patent Number:	6541394
Application Number:	10171701
Patent Number:	6432812
Application Number:	11392375
Patent Number:	7045835
Patent Number:	7239160
Patent Number:	7132840
Patent Number:	5849639
Patent Number:	6046115
Patent Number:	6284663
Patent Number:	6001741

PATENT

REEL: 045216 FRAME: 0033

Property Type	Number
Patent Number:	6670242
Application Number:	09651593
Application Number:	09651857
Application Number:	09651592
Application Number:	09651458
Application Number:	09651450
Application Number:	09651451
Patent Number:	6153920
Patent Number:	5731626
Patent Number:	6635116
Application Number:	10640530
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Patent Number:	6130117
Application Number:	08469293
Patent Number:	5736680
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Patent Number:	6794310
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Patent Number:	5844297
Patent Number:	6063672

PATENT

REEL: 045216 FRAME: 0034

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Application Number:	09476295
Patent Number:	6066560
Patent Number:	6228767
Patent Number:	6261406
Patent Number:	6852243
Patent Number:	7071094
Patent Number:	7393780
Patent Number:	6812134
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Application Number:	13443691
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Application Number:	12114589
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Patent Number:	6248180
Patent Number:	6087229
Patent Number:	6288773

PATENT
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Application Number:	60144277
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Patent Number:	6306780

Property Type	Number
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PATENT

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Property Type	Number
Patent Number:	6825546
Patent Number:	7179736
Patent Number:	7242074
Patent Number:	7284213
Patent Number:	8053824
Patent Number:	7137098
Application Number:	60002275
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Application Number:	60115717
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Application Number:	60140666
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Application Number:	60115527
Patent Number:	6939727
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PATENT

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Property Type	Number
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Patent Number:	6479404
Patent Number:	6708574
Patent Number:	6361614
Patent Number:	6439968
Patent Number:	7439146
Patent Number:	6465132
Patent Number:	6187665
Patent Number:	7556048
Patent Number:	6297063
Patent Number:	6153901
Patent Number:	6560735

PATENT

REEL: 045216 FRAME: 0041

Property Type	Number
Patent Number:	7067882
Patent Number:	6319095
Patent Number:	6576980
Patent Number:	6417570
Patent Number:	6080625
Patent Number:	7183787
Patent Number:	6548892
Patent Number:	6730588
Patent Number:	6509242
Patent Number:	7653523
Patent Number:	6013958
Patent Number:	6984869
Patent Number:	6111750
Patent Number:	6283812
Patent Number:	6218255
Patent Number:	6844236
Patent Number:	7245758
Patent Number:	6358865
Patent Number:	6153268
Patent Number:	6350659
Patent Number:	6348393
Patent Number:	6103607
Patent Number:	6940151
Patent Number:	6784478
Patent Number:	6250984
Patent Number:	6284413
Patent Number:	6686662
Patent Number:	6379868
Patent Number:	7067890
Patent Number:	6192290
Patent Number:	6197663
Patent Number:	6107684
Patent Number:	6023093
Patent Number:	6002113
Patent Number:	6865435
Patent Number:	6101371
Patent Number:	5589416
Patent Number:	5648699

PATENT
REEL: 045216 FRAME: 0042

Property Type	Number
Patent Number:	6734081
Patent Number:	7081037
Patent Number:	6890804
Patent Number:	6556703
Patent Number:	5552355
Patent Number:	6323537
Patent Number:	7137400
Patent Number:	6797525
Patent Number:	6625250
Patent Number:	5642014
Patent Number:	6492647
Patent Number:	5739562
Patent Number:	6847077
Patent Number:	7037820
Patent Number:	6322934
Patent Number:	6818516
Patent Number:	6204186
Patent Number:	5598056
Patent Number:	6566224
Patent Number:	5670376
Patent Number:	6218077
Patent Number:	6339246
Patent Number:	5620573
Patent Number:	5681763
Patent Number:	6294465
Patent Number:	5545916
Patent Number:	6436187
Patent Number:	5736749
Patent Number:	6875702
Patent Number:	5912498
Patent Number:	6200734
Patent Number:	5656510
Patent Number:	6017787
Patent Number:	5981319
Patent Number:	5659181
Patent Number:	6150271
Patent Number:	5631462
Patent Number:	6741019

PATENT

REEL: 045216 FRAME: 0043

Property Type	Number
Patent Number:	6141050
Patent Number:	5589303
Patent Number:	5489552
Patent Number:	5472562
Patent Number:	5967885
Patent Number:	5977582
Patent Number:	5623180
Patent Number:	7429749
Patent Number:	5532510
Patent Number:	5821147
Patent Number:	5625199
Patent Number:	6491732
Patent Number:	5561340
Patent Number:	5903493
Patent Number:	7442113
Patent Number:	6500729
Patent Number:	6538283
Patent Number:	6620720
Patent Number:	6404027
Patent Number:	6794304
Patent Number:	6187647
Patent Number:	6437392
Patent Number:	6329281
Patent Number:	6894524
Patent Number:	6930362
Patent Number:	6959258
Patent Number:	6986972
Patent Number:	6897673
Patent Number:	6607967
Patent Number:	6838379
Patent Number:	6527867
Patent Number:	6864141
Patent Number:	7005217
Patent Number:	6837967
Patent Number:	6586814
Patent Number:	6211517
Patent Number:	6175124
Patent Number:	6764749

Property Type	Number
Patent Number:	7149340
Patent Number:	6784102
Patent Number:	6472715
Patent Number:	6569739
Patent Number:	6707132
Patent Number:	7174281
Patent Number:	6733829
Patent Number:	6842042
Patent Number:	6458508
Patent Number:	6935933
Patent Number:	6710851
Patent Number:	6621134
Patent Number:	6528389
Patent Number:	6621146
Patent Number:	6303899
Patent Number:	6513376
Patent Number:	6549062
Patent Number:	6658361
Patent Number:	6989331
Patent Number:	6613665
Patent Number:	6528423
Patent Number:	6752916
Patent Number:	6043139
Patent Number:	6664633
Patent Number:	7160799
Patent Number:	6852648
Patent Number:	6228748
Patent Number:	6317948
Patent Number:	6264749
Patent Number:	5688634
Patent Number:	5693977
Patent Number:	6143658
Patent Number:	5710055
Patent Number:	5923524
Patent Number:	5976637
Patent Number:	5804460
Patent Number:	5918116
Patent Number:	5679589

PATENT
REEL: 045216 FRAME: 0045

Property Type	Number
Patent Number:	5982034
Patent Number:	5744403
Patent Number:	6239035
Patent Number:	5728421
Patent Number:	5798300
Patent Number:	5620907
Patent Number:	6106371
Patent Number:	5834800
Patent Number:	6346490
Patent Number:	6288453
Patent Number:	7751609
Patent Number:	6413881
Patent Number:	6544807
Patent Number:	6864563
Patent Number:	6426286
Patent Number:	6782500
Patent Number:	6180470
Patent Number:	6147012
Patent Number:	6010952
Patent Number:	6448084
Patent Number:	6464566
Patent Number:	6511925
Patent Number:	6281092
Patent Number:	6235590
Patent Number:	6090724
Patent Number:	6268224
Patent Number:	6174407
Patent Number:	6285035
Patent Number:	6206573
Patent Number:	6277707
Patent Number:	6898064
Patent Number:	6241847
Patent Number:	6080670
Patent Number:	5645736
Patent Number:	5976309
Patent Number:	6071817
Patent Number:	5821013
Patent Number:	5963828

Property Type	Number
Patent Number:	6093585
Patent Number:	7898277
Patent Number:	7479438
Patent Number:	7197723
Patent Number:	7148540
Patent Number:	6825538
Patent Number:	6683465
Patent Number:	6747445
Patent Number:	6541819
Patent Number:	6548906
Patent Number:	6737311
Patent Number:	6896583
Patent Number:	6630699
Patent Number:	6569690
Patent Number:	6367329
Patent Number:	6362094
Patent Number:	6551410
Patent Number:	6435946
Patent Number:	6251546
Patent Number:	6611729
Patent Number:	6372605
Patent Number:	6537135
Patent Number:	6401929
Patent Number:	6136615
Patent Number:	6206770
Patent Number:	6281129
Patent Number:	6815876
Patent Number:	7179148
Patent Number:	6559499
Patent Number:	6258610
Application Number:	09346754
Patent Number:	6162733
Patent Number:	6359317
Patent Number:	6384446
Patent Number:	6093944
Patent Number:	6091279
Patent Number:	6222863
Patent Number:	6075909

Property Type	Number
Patent Number:	6013556
Patent Number:	5779929
Patent Number:	5683917
Patent Number:	5855280
Patent Number:	5620253
Patent Number:	5670396
Patent Number:	5588969
Patent Number:	5712176
Patent Number:	6197375
Patent Number:	5976943
Patent Number:	5854510
Patent Number:	5882998
Patent Number:	8037771
Patent Number:	7972873
Patent Number:	7977721
Patent Number:	8105912
Patent Number:	6518619
Patent Number:	7607112
Patent Number:	8411399
Patent Number:	8318606
Patent Number:	7712066
Patent Number:	7772085
Patent Number:	7269197
Application Number:	12680017
Patent Number:	7329605
Patent Number:	7741702
Patent Number:	7247556
Patent Number:	7399648
Patent Number:	7557010
Patent Number:	7898038
Patent Number:	7111517
Patent Number:	7214568
Patent Number:	7005724
Patent Number:	7811944
Patent Number:	6906538
Patent Number:	7339274
Patent Number:	6975040
Patent Number:	7262476

Property Type	Number
Patent Number:	7573097
Patent Number:	6838213
Patent Number:	6958518
Patent Number:	6648734
Patent Number:	6703712
Patent Number:	6433628
Patent Number:	6569744
Patent Number:	6503793
Patent Number:	6825467
Patent Number:	6723581
Patent Number:	6783426
Patent Number:	6440816
Patent Number:	6828649
Patent Number:	6576563
Patent Number:	6639285
Patent Number:	6319837
Patent Number:	6659846
Patent Number:	6602758
Patent Number:	6436829
Patent Number:	6559011
Patent Number:	6706603
Patent Number:	6486075
Patent Number:	6695572
Patent Number:	6358824
Patent Number:	6750447
Patent Number:	6573183
Patent Number:	6525394
Patent Number:	6359400
Patent Number:	6585830
Patent Number:	6559062
Patent Number:	6555910
Patent Number:	6800255
Patent Number:	6558238
Patent Number:	6423149
Patent Number:	6403397
Patent Number:	6544107
Patent Number:	6579797
Patent Number:	6519542

PATENT
REEL: 045216 FRAME: 0049

Property Type	Number
Patent Number:	6519543
Patent Number:	6495474
Patent Number:	6514123
Patent Number:	7927939
Patent Number:	7927940
Patent Number:	6815302
Patent Number:	6537887
Patent Number:	6615433
Patent Number:	6235072
Patent Number:	6870950
Patent Number:	6511221
Patent Number:	6246325
Patent Number:	6156675
Patent Number:	6406999
Patent Number:	6395639
Patent Number:	6354910
Patent Number:	6616965
Patent Number:	6259764
Patent Number:	6451660
Patent Number:	6391668
Patent Number:	6596639
Patent Number:	6254454
Patent Number:	6727588
Patent Number:	6368190
Patent Number:	6680542
Patent Number:	6414383
Patent Number:	6362638
Patent Number:	6368955
Patent Number:	6303426
Patent Number:	6048664
Patent Number:	6306313
Patent Number:	6736985
Patent Number:	6746577
Patent Number:	6387817
Patent Number:	6066884
Patent Number:	6175137
Patent Number:	6309900
Patent Number:	6235560

Property Type	Number
Patent Number:	6287970
Patent Number:	6281128
Patent Number:	6307252
Patent Number:	6217427
Patent Number:	6331460
Patent Number:	6335557
Patent Number:	6317643
Patent Number:	6278105
Patent Number:	6246060
Patent Number:	6080671
Patent Number:	6121124
Patent Number:	6146975
Patent Number:	5951382
Patent Number:	6043496
Patent Number:	5897362
Patent Number:	6007685
Patent Number:	6090534
Patent Number:	5811844
Patent Number:	6001701
Patent Number:	6258241
Patent Number:	5861651
Patent Number:	5951372
Patent Number:	5894154
Patent Number:	5902504
Patent Number:	6274198
Patent Number:	5930650
Patent Number:	5735963
Patent Number:	5960302
Patent Number:	6078035
Patent Number:	5966627
Patent Number:	5654540
Patent Number:	5942775
Patent Number:	5768335
Patent Number:	5534465
Patent Number:	5538921
Patent Number:	5683758
Patent Number:	5550583
Patent Number:	5705298

Property Type	Number
Patent Number:	5764390
Patent Number:	6211539
Patent Number:	5804249
Patent Number:	6016009
Patent Number:	7071113
Patent Number:	6673721
Patent Number:	6372524
Application Number:	60273959
Patent Number:	5898478
Patent Number:	5627624
Patent Number:	6495408
Patent Number:	6034401
Application Number:	09076249
Patent Number:	5780350
Application Number:	08962420
Patent Number:	6246093
Patent Number:	6030425
Patent Number:	5948697
Application Number:	08788125
Patent Number:	5635244
Patent Number:	5525837
Patent Number:	5614437
Application Number:	08942511
Patent Number:	5674774
Patent Number:	6649219
Patent Number:	7015168
Application Number:	07954958
Patent Number:	5432333
Patent Number:	5977535
Application Number:	08017202
Patent Number:	5760834
Patent Number:	5519205
Patent Number:	5648655
Patent Number:	5340978
Application Number:	10838384
Patent Number:	6767842
Patent Number:	7365015
Application Number:	12021728

PATENT
REEL: 045216 FRAME: 0052

Property Type	Number
Patent Number:	6500740
Patent Number:	6406952
Patent Number:	6989552
Patent Number:	6500717
Application Number:	11390015
Patent Number:	6690040
Patent Number:	7033877
Patent Number:	6617251
Patent Number:	6949446
Patent Number:	6770536
Application Number:	10870834
Patent Number:	5561008
Patent Number:	5701014
Patent Number:	6225182
Patent Number:	6410974
Application Number:	12220644
Patent Number:	7414721
Patent Number:	6800940
Patent Number:	6391795
Patent Number:	6455363
Application Number:	10191107
Patent Number:	6768130
Patent Number:	6613639
Patent Number:	6557566
Patent Number:	6672320
Patent Number:	6621404
Patent Number:	6960979
Patent Number:	6927125
Patent Number:	6740922
Patent Number:	6090686
Patent Number:	6380606
Patent Number:	7960812
Patent Number:	7456716
Patent Number:	6566186
Patent Number:	6951787
Application Number:	11122375
Patent Number:	6489231
Application Number:	10268735

PATENT
REEL: 045216 FRAME: 0053

Property Type	Number
Application Number:	08752334
Patent Number:	5614428
Patent Number:	5631581
Patent Number:	5739580
Patent Number:	5707888
Patent Number:	7460211
Patent Number:	7074710
Patent Number:	5696428
Application Number:	08986681
Patent Number:	7565592
Patent Number:	7430700
Patent Number:	7203877
Patent Number:	8404960
Patent Number:	8653357
Patent Number:	7129101
Patent Number:	7420229
Patent Number:	6781151
Patent Number:	5686855
Patent Number:	5486786
Patent Number:	5631596
Patent Number:	8089130
Patent Number:	8241986
Patent Number:	5659189
Patent Number:	5650348
Patent Number:	5773854
Patent Number:	6572925
Application Number:	10397993
Patent Number:	7259462
Patent Number:	7081406
Patent Number:	7619272
Patent Number:	7956401
Patent Number:	7456076
Patent Number:	7122436
Patent Number:	7612427
Patent Number:	7397105
Patent Number:	7285840
Application Number:	11210986
Patent Number:	6967177

PATENT
REEL: 045216 FRAME: 0054

Property Type	Number
Patent Number:	7825522
Patent Number:	8384226
Application Number:	10265867
Patent Number:	6495409
Patent Number:	6905909
Application Number:	11106307
Patent Number:	7270942
Application Number:	60513780
Patent Number:	7738078
Patent Number:	6400090
Patent Number:	6232040
Patent Number:	6251543
Patent Number:	6372393
Patent Number:	6943055
Patent Number:	6627466
Patent Number:	6747318
Application Number:	10786481
Patent Number:	7329926
Patent Number:	7569445
Patent Number:	8049282
Patent Number:	8372723
Patent Number:	6288454
Patent Number:	6136662
Patent Number:	6884720
Patent Number:	7675177
Patent Number:	6753268
Patent Number:	6576981
Patent Number:	5907165
Patent Number:	6165859
Patent Number:	6107191
Patent Number:	6222255
Patent Number:	6025280
Patent Number:	6281138
Patent Number:	5462012
Patent Number:	5589693
Patent Number:	6498364
Patent Number:	7135733
Patent Number:	6333508

PATENT
REEL: 045216 FRAME: 0055

Property Type	Number
Patent Number:	7345290
Patent Number:	6534851
Patent Number:	6713409
Patent Number:	6387772
Patent Number:	6552381
Patent Number:	6271911
Patent Number:	6549322
Patent Number:	7033710
Application Number:	09106720
Patent Number:	6861864
Patent Number:	7308627
Application Number:	10909821
Patent Number:	6805338
Patent Number:	6458648
Patent Number:	6656850
Patent Number:	7276441
Patent Number:	8043968
Patent Number:	7728433
Patent Number:	6475931
Patent Number:	6329305
Patent Number:	6874510
Application Number:	11014476
Patent Number:	6553166
Application Number:	09956409
Patent Number:	6566268
Patent Number:	6451699
Patent Number:	6436845
Patent Number:	6562729
Patent Number:	6858531
Patent Number:	7285145
Patent Number:	6627556
Patent Number:	6822308
Patent Number:	6641698
Patent Number:	6461972
Application Number:	12034750
Patent Number:	7371659
Patent Number:	6486064
Patent Number:	6605846

Property Type	Number
Patent Number:	6358819
Application Number:	10026282
Patent Number:	6964924
Patent Number:	7115425
Patent Number:	7115991
Patent Number:	7829455
Patent Number:	7005703
Patent Number:	7335565
Patent Number:	6409829
Patent Number:	6727567
Patent Number:	7276767
Patent Number:	6703666
Patent Number:	5641994
Patent Number:	5561083
Patent Number:	6495875
Patent Number:	6323078
Patent Number:	7061264
Patent Number:	7388395
Patent Number:	6573149
Patent Number:	6579775
Patent Number:	6383879
Patent Number:	6465884
Patent Number:	6833286
Patent Number:	5982020
Patent Number:	6309938
Patent Number:	6153020
Patent Number:	6299703
Patent Number:	5811796
Patent Number:	5693938
Application Number:	10360276
Patent Number:	6551946
Patent Number:	7148153
Patent Number:	6215130
Patent Number:	6232157
Patent Number:	6187427
Patent Number:	5965202
Patent Number:	6320238
Patent Number:	6548854

PATENT
REEL: 045216 FRAME: 0057

Property Type	Number
Patent Number:	8097179
Patent Number:	7578883
Patent Number:	6576404
Patent Number:	6846569
Patent Number:	6541383
Application Number:	10336444
Patent Number:	6060370
Patent Number:	6424019
Patent Number:	5994211
Patent Number:	6204550
Patent Number:	6943042
Patent Number:	6787379
Patent Number:	5981352
Patent Number:	6060787
Patent Number:	5966613
Patent Number:	6157087
Patent Number:	6891219
Patent Number:	6524926
Application Number:	08861899
Application Number:	08479104
Application Number:	08641027
Patent Number:	6093936
Patent Number:	6383414
Patent Number:	6068879
Patent Number:	5895267
Patent Number:	6297555
Patent Number:	6359314
Patent Number:	6587322
Patent Number:	6201253
Patent Number:	6354908
Application Number:	09863979
Patent Number:	6287987
Patent Number:	6096625
Application Number:	08720514
Application Number:	61350494
Patent Number:	8283713
Application Number:	11230188
Patent Number:	7906407

Property Type	Number
Patent Number:	6204192
Patent Number:	6303047
Patent Number:	6114259
Patent Number:	6197456
Patent Number:	6144076
Patent Number:	6156620
Patent Number:	6185706
Patent Number:	6299723
Patent Number:	6276379
Patent Number:	6258514
Patent Number:	6130173
Patent Number:	6043539
Patent Number:	6033998
Patent Number:	6218276
Patent Number:	5953614
Patent Number:	6054062
Patent Number:	6692338
Patent Number:	5888121
Patent Number:	6093280
Patent Number:	5913715
Patent Number:	6234883
Patent Number:	5941761
Patent Number:	5923047
Patent Number:	6064220
Patent Number:	5990789
Patent Number:	5960305
Patent Number:	5863825
Patent Number:	5874342
Patent Number:	5963566
Patent Number:	5771267
Patent Number:	6198153
Patent Number:	5702957
Patent Number:	5963801
Patent Number:	5646406
Patent Number:	5994775
Patent Number:	5759921
Patent Number:	6562700
Patent Number:	5703376

PATENT

REEL: 045216 FRAME: 0059

Property Type	Number
Patent Number:	5834821
Patent Number:	5959776
Patent Number:	5877045
Patent Number:	5670393
Patent Number:	6506670
Patent Number:	5744399
Patent Number:	5681779
Patent Number:	6858195
Patent Number:	6417093
Patent Number:	7436040
Patent Number:	7571397
Patent Number:	7641776
Patent Number:	7312880
Patent Number:	7148131
Patent Number:	7198546
Patent Number:	7039556
Application Number:	60140909
Application Number:	60115762
Application Number:	60115842
Application Number:	60052440
Application Number:	60115520
Application Number:	60083547
Application Number:	60077720
Application Number:	60115604
Application Number:	60163230
Patent Number:	6588437
Patent Number:	6492712
Patent Number:	6280644
Patent Number:	7230812
Patent Number:	6893806
Patent Number:	6291848
Patent Number:	6358790
Patent Number:	6657302
Patent Number:	6146913
Patent Number:	6395611
Patent Number:	6797585
Patent Number:	6762087
Patent Number:	6621280

PATENT
REEL: 045216 FRAME: 0060

Property Type	Number
Patent Number:	6731386
Patent Number:	6286226
Patent Number:	6287952
Patent Number:	6103586
Patent Number:	6566181
Patent Number:	7181353
Patent Number:	6346222
Patent Number:	6218057
Patent Number:	5846871
Patent Number:	5985493
Patent Number:	5981403
Patent Number:	6365469
Patent Number:	6982226
Patent Number:	6087683
Patent Number:	6107117
Patent Number:	6136673
Patent Number:	5969421
Patent Number:	5885900
Patent Number:	5529051
Patent Number:	5500312
Patent Number:	5663568
Patent Number:	6110831
Patent Number:	5736281
Patent Number:	5607800
Patent Number:	6472307
Patent Number:	6954705
Patent Number:	6969621
Patent Number:	6506684
Patent Number:	7016041
Patent Number:	6319836
Patent Number:	6586332
Patent Number:	6736953
Patent Number:	6770505
Patent Number:	6767692
Patent Number:	6524957
Patent Number:	6930006
Patent Number:	5851922
Patent Number:	7547560

PATENT

REEL: 045216 FRAME: 0061

Property Type	Number
Patent Number:	7804291
Patent Number:	6365528
Patent Number:	6624048
Patent Number:	6108093
Patent Number:	6168508
Patent Number:	6355577
Patent Number:	6274395
Patent Number:	6090651
Patent Number:	6115232
Patent Number:	6316276
Patent Number:	6069048
Patent Number:	5654537
Patent Number:	6028015
Patent Number:	6032529
Patent Number:	6124143
Patent Number:	6097884
Patent Number:	5978197
Patent Number:	5957757
Patent Number:	5998853
Patent Number:	5816900
Patent Number:	6074288
Patent Number:	5660682
Patent Number:	5736418
Patent Number:	6060375
Patent Number:	5670892
Patent Number:	5904551
Patent Number:	5656850
Patent Number:	5682047
Patent Number:	6767832
Patent Number:	5795682
Patent Number:	5662768
Patent Number:	5667433
Patent Number:	6583026
Patent Number:	6559048
Patent Number:	5789783
Patent Number:	5956613
Patent Number:	5890951
Patent Number:	6747464

PATENT

REEL: 045216 FRAME: 0062

Property Type	Number
Patent Number:	5776831
Patent Number:	6346488
Patent Number:	6556021
Patent Number:	6329720
Patent Number:	7216279
Patent Number:	7094687
Patent Number:	7553772
Patent Number:	7069178
Patent Number:	7341978
Patent Number:	7327011
Patent Number:	6710616
Application Number:	60135564
Application Number:	60462504
Application Number:	60115526
Patent Number:	7482642
Application Number:	60115781
Application Number:	60075293
Patent Number:	7015569
Patent Number:	7799166
Application Number:	60165542
Application Number:	60168911
Application Number:	60158268
Application Number:	60301295
Patent Number:	7154734
Application Number:	60520265
Application Number:	60197283
Patent Number:	6365426
Patent Number:	6639298
Patent Number:	6259149
Application Number:	60141348
Patent Number:	6309932
Patent Number:	6051346
Application Number:	60115785
Patent Number:	6015644
Patent Number:	7763908
Application Number:	60088157
Application Number:	60096407
Patent Number:	6504292

Property Type	Number
Patent Number:	7601643
Application Number:	60098431
Application Number:	60174549
Application Number:	60524341
Patent Number:	7171638
Patent Number:	7638380
Patent Number:	6969472
Patent Number:	6420714
Patent Number:	7342225
Patent Number:	6249016
Application Number:	60128937
Application Number:	60144547
Application Number:	60143691
Application Number:	60106945
Application Number:	60116042
Patent Number:	5904523
Application Number:	60028049
Patent Number:	6312766
Patent Number:	6336086
Application Number:	60116122
Application Number:	60043235
Patent Number:	7190185
Patent Number:	5976625
Application Number:	60033839
Application Number:	60115718
Application Number:	60592153
Patent Number:	6403415
Application Number:	60756056
Patent Number:	6420277
Application Number:	60091896
Application Number:	60312389
Patent Number:	8119501
Patent Number:	7581203
Patent Number:	6699372
Patent Number:	6720261
Patent Number:	6537867
Patent Number:	6207510
Patent Number:	6271596

Property Type	Number
Patent Number:	7183181
Patent Number:	6680243
Patent Number:	7071563
Patent Number:	6303397
Patent Number:	6320244
Patent Number:	6294468
Patent Number:	6303940
Patent Number:	6313021
Patent Number:	6235594
Patent Number:	6440852
Patent Number:	7005375
Patent Number:	7566964
Patent Number:	6881664
Patent Number:	6169010
Patent Number:	7114143
Patent Number:	7013222
Patent Number:	6184755
Patent Number:	6430047
Patent Number:	6903411
Patent Number:	6121101
Patent Number:	7084408
Patent Number:	6008123
Patent Number:	6773994
Patent Number:	5912797
Patent Number:	6899596
Patent Number:	6958541
Patent Number:	6599837
Patent Number:	6368753
Patent Number:	6110012
Patent Number:	7087959
Patent Number:	5903037
Patent Number:	6365327
Patent Number:	6225639
Patent Number:	5955381
Patent Number:	7968859
Patent Number:	6071808
Patent Number:	7176781
Patent Number:	6982206

Property Type	Number
Patent Number:	6206054
Patent Number:	6363606
Patent Number:	6986112
Patent Number:	5989984
Patent Number:	6458669
Patent Number:	5534721
Patent Number:	5541402
Patent Number:	6838717
Patent Number:	5504385
Patent Number:	5744840
Patent Number:	6042995
Patent Number:	5936259
Patent Number:	6833557
Patent Number:	5891605
Patent Number:	6384452
Patent Number:	6720604
Patent Number:	7078337
Patent Number:	5863843
Patent Number:	6245692
Patent Number:	6448569
Patent Number:	5843827
Patent Number:	6197699
Patent Number:	5728625
Patent Number:	6313025
Patent Number:	6830942
Patent Number:	6674151
Patent Number:	6458289
Patent Number:	6180518
Patent Number:	6573818
Patent Number:	6483144
Patent Number:	5754392
Patent Number:	5559052
Patent Number:	5620909
Patent Number:	6322713
Patent Number:	5461245
Patent Number:	6242989
Patent Number:	5711891
Patent Number:	5438006

PATENT
REEL: 045216 FRAME: 0066

Property Type	Number
Patent Number:	5880022
Patent Number:	6147388
Patent Number:	5780175
Patent Number:	5521031
Patent Number:	6316950
Patent Number:	5510007
Patent Number:	6051500
Patent Number:	5728607
Patent Number:	5688704
Patent Number:	5658485
Patent Number:	5656182
Patent Number:	5948570
Patent Number:	5527425
Patent Number:	6020256
Patent Number:	5625140
Patent Number:	5559360
Patent Number:	5838033
Patent Number:	6342134
Patent Number:	6136702
Patent Number:	6406609
Patent Number:	6603119
Patent Number:	6399413
Patent Number:	6358359
Patent Number:	6429040
Patent Number:	6274409
Patent Number:	6726537
Patent Number:	6436608
Patent Number:	6815342
Patent Number:	7982286
Patent Number:	6870386
Patent Number:	6517416
Patent Number:	6383858
Patent Number:	6657281
Patent Number:	6518622
Patent Number:	6436830
Patent Number:	6586310
Patent Number:	6746925
Patent Number:	7262119

PATENT

REEL: 045216 FRAME: 0067

Property Type	Number
Patent Number:	7001695
Patent Number:	6911093
Patent Number:	6854104
Patent Number:	6254456
Patent Number:	6929532
Patent Number:	6889818
Patent Number:	6980917
Patent Number:	7171047
Patent Number:	6544829
Patent Number:	6849512
Patent Number:	6482075
Patent Number:	6869893
Patent Number:	6743701
Patent Number:	6524974
Patent Number:	6864020
Patent Number:	6870160
Patent Number:	6818365
Patent Number:	6650958
Patent Number:	7023067
Patent Number:	6645857
Patent Number:	6812158
Patent Number:	6376795
Patent Number:	6498045
Patent Number:	6608365
Patent Number:	6743669
Patent Number:	6872321
Patent Number:	6806038
Patent Number:	6566244
Patent Number:	6638776
Patent Number:	6499001
Patent Number:	6764389
Patent Number:	6750668
Patent Number:	6492731
Patent Number:	6412358
Patent Number:	6472316
Patent Number:	6423630
Patent Number:	6537896
Patent Number:	6641635

Property Type	Number
Patent Number:	7605064
Patent Number:	6574525
Patent Number:	5691110
Patent Number:	5656412
Patent Number:	7342316
Patent Number:	6869873
Patent Number:	5596208
Patent Number:	5956618
Patent Number:	5767557
Patent Number:	7067419
Patent Number:	6228750
Patent Number:	7301107
Patent Number:	6150668
Patent Number:	6211541
Patent Number:	5923056
Patent Number:	5908312
Patent Number:	6278127
Patent Number:	5633103
Patent Number:	6368979
Patent Number:	6512985
Patent Number:	7314527
Patent Number:	6223770
Patent Number:	6723653
Patent Number:	6284586
Patent Number:	6598194
Patent Number:	6316354
Patent Number:	6115233
Patent Number:	6718524
Patent Number:	6350700
Patent Number:	6375550
Patent Number:	6355532
Patent Number:	6232658
Patent Number:	6341056
Patent Number:	6648743
Patent Number:	6316817
Patent Number:	6077783
Patent Number:	6121147
Patent Number:	6348808

Property Type	Number
Patent Number:	6342734
Patent Number:	6809824
Patent Number:	6136719
Patent Number:	5861055
Patent Number:	6120607
Patent Number:	6071562
Patent Number:	5858828
Patent Number:	6649537
Patent Number:	5750312
Patent Number:	5661091
Patent Number:	8423942
Patent Number:	7332924
Patent Number:	7291849
Patent Number:	7820517
Patent Number:	7279744
Patent Number:	7116174
Patent Number:	7074628
Patent Number:	7138690
Patent Number:	6893883
Patent Number:	7199685
Patent Number:	7033931
Patent Number:	6472279
Patent Number:	6462305
Application Number:	09777470
Patent Number:	6702654
Patent Number:	6853048
Patent Number:	6329226
Patent Number:	6445206
Patent Number:	6794694
Patent Number:	6506690
Patent Number:	6364744
Patent Number:	6524872
Patent Number:	6680780
Patent Number:	6366803
Patent Number:	6225801
Patent Number:	6294447
Patent Number:	6121827
Patent Number:	6440829

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REEL: 045216 FRAME: 0070

Property Type	Number
Patent Number:	6093668
Patent Number:	6177363
Patent Number:	6037621
Patent Number:	5976331
Patent Number:	6323131
Patent Number:	6017805
Patent Number:	5894349
Patent Number:	5841333
Patent Number:	6011404
Patent Number:	5698934
Patent Number:	5588894
Patent Number:	6045977
Patent Number:	8624352
Patent Number:	8242603
Patent Number:	7923340
Patent Number:	7847666
Patent Number:	7642617
Patent Number:	7563669
Patent Number:	7141486
Patent Number:	8143696
Patent Number:	7279393
Patent Number:	7727894
Patent Number:	7768044
Patent Number:	7157365
Patent Number:	7087498
Patent Number:	7254002
Patent Number:	6910907
Patent Number:	7033257
Patent Number:	7700491
Patent Number:	7172496
Patent Number:	6828628
Patent Number:	6973637
Patent Number:	7084648
Patent Number:	6828561
Patent Number:	6738294
Patent Number:	6963215
Patent Number:	6951510
Patent Number:	7157375

PATENT
REEL: 045216 FRAME: 0071

Property Type	Number
Patent Number:	7034653
Patent Number:	6919228
Patent Number:	6548422
Patent Number:	6767797
Patent Number:	6764930
Patent Number:	6544907
Patent Number:	6458696
Patent Number:	6607927
Patent Number:	6555852
Patent Number:	6432814
Patent Number:	6879046
Patent Number:	6610464
Patent Number:	6605529
Patent Number:	6426263
Patent Number:	6730600
Patent Number:	6750528
Patent Number:	6716488
Patent Number:	6534834
Patent Number:	6506673
Patent Number:	6730603
Patent Number:	6627885
Patent Number:	6511872
Patent Number:	6508363
Patent Number:	6972083
Patent Number:	6864547
Patent Number:	6402599
Patent Number:	6448581
Patent Number:	6664800
Patent Number:	6475842
Patent Number:	6641746
Patent Number:	6471925
Patent Number:	6274490
Patent Number:	6340327
Patent Number:	6716657
Patent Number:	6250991
Patent Number:	6576522
Patent Number:	6682962
Patent Number:	6369408

PATENT

REEL: 045216 FRAME: 0072

Property Type	Number
Patent Number:	6524971
Patent Number:	6324933
Patent Number:	6989602
Patent Number:	6403454
Patent Number:	6633032
Patent Number:	6313007
Application Number:	09418078
Patent Number:	6293847
Patent Number:	6368200
Patent Number:	6410419
Patent Number:	6354928
Patent Number:	6358807
Patent Number:	6140170
Patent Number:	6169036
Patent Number:	6593151
Patent Number:	6214732
Patent Number:	6258231
Patent Number:	6299519
Patent Number:	6114234
Patent Number:	6228277
Patent Number:	6444536
Patent Number:	6362475
Patent Number:	6146909
Patent Number:	6097484
Patent Number:	6682999
Patent Number:	6124158
Patent Number:	6251697
Application Number:	09325624
Patent Number:	6365511
Patent Number:	6097195
Patent Number:	6056630
Patent Number:	6083838
Patent Number:	6140187
Patent Number:	6075273
Patent Number:	5932379
Patent Number:	6149778
Patent Number:	6156665
Patent Number:	6073476

PATENT

REEL: 045216 FRAME: 0073

Property Type	Number
Patent Number:	6410986
Patent Number:	6121624
Patent Number:	6004827
Patent Number:	6251486
Patent Number:	5844261
Patent Number:	6153078
Patent Number:	6303961
Patent Number:	5856008
Patent Number:	6576521
Patent Number:	5756887
Patent Number:	5945355
Patent Number:	5746931
Patent Number:	5877407
Patent Number:	5939742
Patent Number:	5625206
Patent Number:	5969337
Patent Number:	5793093
Patent Number:	6018272
Patent Number:	6153452
Patent Number:	5664884
Patent Number:	5670391
Patent Number:	6013934
Patent Number:	5930587
Patent Number:	5596413
Patent Number:	5686359
Patent Number:	5654903
Patent Number:	5700725
Patent Number:	5636002
Patent Number:	5866436
Patent Number:	5721445
Patent Number:	6168904
Patent Number:	5500391
Patent Number:	5607543
Patent Number:	5776551
Patent Number:	5786073
Patent Number:	5911112
Patent Number:	5793104
Patent Number:	5885855

PATENT
REEL: 045216 FRAME: 0074

Property Type	Number
Patent Number:	5952726
Application Number:	08989098
Patent Number:	5700723
Application Number:	08810304
Patent Number:	5639696
Patent Number:	5784780
Patent Number:	5637920
Application Number:	08653591
Patent Number:	5814536
Patent Number:	5869891
Patent Number:	5872026
Patent Number:	5739584
Patent Number:	6597189
Patent Number:	RE41516
Patent Number:	6771085
Application Number:	07856905
Patent Number:	5537342
Patent Number:	5663872
Patent Number:	8049340
Patent Number:	8288269
Application Number:	14045081
Patent Number:	8552560
Patent Number:	6087732
Patent Number:	6187658
Application Number:	10921497
Patent Number:	6818996
Patent Number:	6369448
Patent Number:	6558978
Patent Number:	7224047
Patent Number:	7541669
Patent Number:	6319617
Patent Number:	6306516
Patent Number:	6064113
Patent Number:	6137168
Application Number:	09618143
Patent Number:	5885848
Patent Number:	5789813
Application Number:	08427674

PATENT
REEL: 045216 FRAME: 0075

Property Type	Number
Patent Number:	5673479
Application Number:	08646014
Application Number:	08427306
Patent Number:	5410451
Patent Number:	5898575
Patent Number:	5896651
Patent Number:	5923538
Patent Number:	6008991
Patent Number:	7919354
Patent Number:	7405476
Patent Number:	6518193
Application Number:	10322974
Patent Number:	6313519
Application Number:	07914621
Patent Number:	5744084
Patent Number:	5927505
Patent Number:	6678950
Application Number:	10694486
Patent Number:	5990543
Patent Number:	6043100
Patent Number:	6492253
Patent Number:	6054767
Patent Number:	7829424
Patent Number:	7508062
Patent Number:	5300815
Patent Number:	5635424
Application Number:	08688148
Patent Number:	5399898
Application Number:	08270123
Application Number:	08015947
Application Number:	07938690
Application Number:	07400572
Patent Number:	5504035
Application Number:	08105269
Patent Number:	5834799
Application Number:	07917894
Application Number:	08382147
Patent Number:	5248903

PATENT
REEL: 045216 FRAME: 0076

Property Type	Number
Patent Number:	5284797
Patent Number:	5565385
Patent Number:	5821624
Application Number:	07993188
Patent Number:	5744856
Patent Number:	5410805
Patent Number:	5434750
Patent Number:	5744858
Application Number:	07969862
Application Number:	08331263
Patent Number:	5557150
Patent Number:	5299730
Patent Number:	5168346
Patent Number:	5569963
Patent Number:	5347162
Patent Number:	5594626
Patent Number:	5340772
Patent Number:	5341024
Patent Number:	5729894
Patent Number:	5329157
Patent Number:	5441917
Patent Number:	5532934
Patent Number:	5111279
Patent Number:	5489804
Patent Number:	5404047
Patent Number:	5262927
Patent Number:	5468681
Application Number:	13934110
Patent Number:	8507317
Patent Number:	7952206
Application Number:	08259439
Patent Number:	5700715
Patent Number:	7053639
Patent Number:	6927079
Patent Number:	7456498
Patent Number:	7550839
Application Number:	61055505
Patent Number:	8324019

PATENT
REEL: 045216 FRAME: 0077

Property Type	Number
Patent Number:	8258016
Patent Number:	7498664
Patent Number:	7646091
Patent Number:	8129759
Application Number:	10951430
Patent Number:	8013428
Patent Number:	7352062
Patent Number:	6825556
Patent Number:	8242378
Application Number:	13552266
Patent Number:	8319343
Application Number:	13656092
Patent Number:	6991147
Patent Number:	6670214
Patent Number:	6858930
Patent Number:	6680532
Patent Number:	8084857
Patent Number:	7675168
Patent Number:	6972494
Patent Number:	7541674
Patent Number:	8025201
Patent Number:	7074705
Patent Number:	6639321
Patent Number:	6806119
Application Number:	10939292
Patent Number:	6790757
Patent Number:	5986343
Patent Number:	6207547
Patent Number:	7632717
Patent Number:	7423341
Patent Number:	6617181
Patent Number:	6710453
Patent Number:	6118177
Patent Number:	6681482
Patent Number:	6077725
Patent Number:	5564617
Patent Number:	6675450
Application Number:	10742916

PATENT
REEL: 045216 FRAME: 0078

Property Type	Number
Patent Number:	6849936
Application Number:	11012838
Patent Number:	6781150
Patent Number:	6998638
Application Number:	09920144
Patent Number:	6563198
Patent Number:	6281590
Patent Number:	6465336
Patent Number:	7429502
Patent Number:	7327029
Patent Number:	7301231
Patent Number:	7115985
Patent Number:	8601683
Application Number:	10755616
Patent Number:	7443042
Patent Number:	7086148
Patent Number:	7637414
Patent Number:	6342442
Patent Number:	7009299
Patent Number:	6881613
Patent Number:	7224076
Patent Number:	6830999
Patent Number:	6441473
Patent Number:	5925827
Patent Number:	5939641
Patent Number:	7705473
Patent Number:	7056819
Patent Number:	5965903
Patent Number:	6136620
Patent Number:	5751065
Patent Number:	6335491
Patent Number:	6618938
Patent Number:	5745986
Patent Number:	5435482
Patent Number:	6088914
Patent Number:	5989937
Application Number:	08936259
Application Number:	08578049

PATENT
REEL: 045216 FRAME: 0079

Property Type	Number
Application Number:	61377171
Patent Number:	8502372
Application Number:	13344207
Patent Number:	8101871
Patent Number:	6573113
Patent Number:	6061889
Patent Number:	6266249
Patent Number:	6057594
Patent Number:	6002169
Patent Number:	6143586
Patent Number:	6861748
Patent Number:	6156676
Patent Number:	6114761
Patent Number:	6130113
Patent Number:	6445066
Patent Number:	6040632
Patent Number:	6297550
Patent Number:	6083848
Patent Number:	6117352
Patent Number:	6126063
Patent Number:	5835355
Patent Number:	6081997
Patent Number:	5909056
Patent Number:	5907189
Patent Number:	5992012
Patent Number:	5998242
Patent Number:	6114189
Patent Number:	5834839
Patent Number:	6011304
Patent Number:	6069027
Patent Number:	5972738
Patent Number:	5841191
Patent Number:	5814881
Patent Number:	5977622
Patent Number:	5940271
Patent Number:	5973393
Patent Number:	5899737
Patent Number:	5959320

PATENT
REEL: 045216 FRAME: 0080

Property Type	Number
Patent Number:	5723369
Patent Number:	6020221
Patent Number:	5731223
Patent Number:	5801072
Patent Number:	5780924
Patent Number:	5695593
Patent Number:	5719733
Patent Number:	5621616
Patent Number:	8115321
Patent Number:	7479703
Patent Number:	7298036
Patent Number:	7379836
Patent Number:	6777971
Application Number:	60147106
Application Number:	60095397
Application Number:	60714214
Patent Number:	7776648
Patent Number:	7394028
Patent Number:	6960836
Patent Number:	7157361
Patent Number:	6282100
Patent Number:	7148535
Patent Number:	6828682
Patent Number:	7082585
Patent Number:	5898223
Patent Number:	6175158
Patent Number:	6911736
Patent Number:	5918794
Patent Number:	5583285
Patent Number:	5607882
Patent Number:	6768386
Patent Number:	6867480
Patent Number:	7173328
Patent Number:	6654248
Patent Number:	7041516
Patent Number:	6433565
Patent Number:	6861343
Patent Number:	6734697

PATENT
REEL: 045216 FRAME: 0081

Property Type	Number
Patent Number:	6559670
Patent Number:	6431432
Patent Number:	6555914
Patent Number:	7566953
Patent Number:	6320127
Patent Number:	6347291
Patent Number:	6133064
Patent Number:	6397944
Patent Number:	6519844
Patent Number:	6411114
Patent Number:	6110815
Patent Number:	5981311
Patent Number:	6828643
Patent Number:	5903050
Patent Number:	6117695
Patent Number:	6459049
Patent Number:	6068727
Patent Number:	6118180
Patent Number:	5973397
Patent Number:	5949137
Patent Number:	5909057
Patent Number:	6002171
Patent Number:	6111313
Patent Number:	5841198
Patent Number:	6479319
Patent Number:	6531932
Patent Number:	5610442
Patent Number:	5644102
Patent Number:	5686764
Patent Number:	5761048
Patent Number:	5716493
Patent Number:	5786631
Patent Number:	5691568
Patent Number:	5777383
Patent Number:	5465470
Patent Number:	6518161
Patent Number:	5632437
Patent Number:	5598775

PATENT
REEL: 045216 FRAME: 0082

Property Type	Number
Patent Number:	5818102
Patent Number:	6078502
Patent Number:	5767580
Patent Number:	5672911
Patent Number:	7750460
Patent Number:	5831836
Patent Number:	8350375
Patent Number:	6586825
Patent Number:	7180011
Patent Number:	7737564
Patent Number:	7370257
Patent Number:	6396699
Patent Number:	7557303
Patent Number:	7968999
Patent Number:	6496374
Patent Number:	7804167
Patent Number:	7117467
Patent Number:	7205673
Patent Number:	7081672
Application Number:	60655816
Application Number:	60535839
Patent Number:	7235889
Patent Number:	7531442
Patent Number:	7528616
Application Number:	60435033
Patent Number:	7319272
Patent Number:	7354790
Application Number:	60719234
Patent Number:	7491579
Patent Number:	7145232
Patent Number:	6847123
Patent Number:	7096748
Patent Number:	7436060
Patent Number:	7328830
Patent Number:	6369596
Patent Number:	7098528
Patent Number:	7368326
Patent Number:	7023087

PATENT

REEL: 045216 FRAME: 0083

Property Type	Number
Application Number:	60014182
Patent Number:	7633152
Patent Number:	8222719
Patent Number:	8183698
Patent Number:	6759860
Patent Number:	7433192
Patent Number:	7030472
Patent Number:	7504728
Patent Number:	6954082
Patent Number:	7777333
Patent Number:	6838769
Patent Number:	6369444
Patent Number:	6160715
Patent Number:	6933602
Patent Number:	7791210
Patent Number:	6371665
Patent Number:	7345245
Patent Number:	6963129
Patent Number:	6178088
Patent Number:	6130141
Patent Number:	6015652
Patent Number:	7221173
Patent Number:	5696405
Patent Number:	6465882
Patent Number:	5608262
Patent Number:	6683384
Patent Number:	6043670
Patent Number:	6480657
Patent Number:	7009282
Patent Number:	6232212
Patent Number:	7132735
Patent Number:	6190940
Patent Number:	5627407
Patent Number:	5741430
Patent Number:	6075427
Patent Number:	6743979
Patent Number:	6372600
Patent Number:	6351033

PATENT

REEL: 045216 FRAME: 0084

Property Type	Number
Patent Number:	5837380
Patent Number:	5667132
Patent Number:	6199464
Patent Number:	6319450
Patent Number:	6154370
Patent Number:	6232047
Patent Number:	7023225
Patent Number:	5505367
Patent Number:	6798035
Patent Number:	6744130
Patent Number:	6251705
Patent Number:	6509642
Patent Number:	6678167
Patent Number:	6297551
Patent Number:	6790760
Patent Number:	6825563
Patent Number:	6342399
Patent Number:	6437990
Patent Number:	6836026
Patent Number:	6591410
Patent Number:	6245993
Patent Number:	6891392
Patent Number:	7190082
Patent Number:	6801437
Patent Number:	6605951
Patent Number:	6781228
Patent Number:	6943446
Patent Number:	6744081
Patent Number:	6798069
Patent Number:	6717423
Patent Number:	6963138
Patent Number:	6648064
Patent Number:	6603201
Patent Number:	6403399
Patent Number:	6951000
Patent Number:	6777314
Patent Number:	6777803
Patent Number:	6815812

PATENT
REEL: 045216 FRAME: 0085

Property Type	Number
Patent Number:	6605954
Patent Number:	6861183
Patent Number:	6700207
Patent Number:	6674176
Patent Number:	6962437
Patent Number:	6769923
Patent Number:	6671865
Patent Number:	6429534
Patent Number:	6573523
Patent Number:	6623992
Patent Number:	6706622
Patent Number:	6590409
Patent Number:	5646828
Patent Number:	5965197
Patent Number:	6074897
Patent Number:	7541220
Patent Number:	5834792
Patent Number:	6472304
Patent Number:	7817434
Patent Number:	6657870
Patent Number:	6475828
Patent Number:	6279889
Patent Number:	6373142
Patent Number:	6441499
Patent Number:	6534968
Patent Number:	6306751
Patent Number:	6425179
Patent Number:	6407462
Patent Number:	6465338
Patent Number:	6115910
Patent Number:	6449748
Patent Number:	6395097
Patent Number:	6603200
Patent Number:	6294840
Patent Number:	6166434
Patent Number:	6617866
Patent Number:	6285077
Patent Number:	6496081

Property Type	Number
Patent Number:	6225690
Patent Number:	6328347
Patent Number:	6150729
Patent Number:	6127726
Patent Number:	6225695
Patent Number:	6150175
Patent Number:	6242814
Patent Number:	6261870
Patent Number:	6759921
Patent Number:	6701270
Patent Number:	8350379
Patent Number:	5731635
Patent Number:	7993981
Patent Number:	8384205
Patent Number:	6894400
Patent Number:	7745927
Patent Number:	7041561
Patent Number:	7075174
Patent Number:	6987052
Patent Number:	6740222
Patent Number:	6313999
Patent Number:	6239382
Patent Number:	6153506
Patent Number:	5936849
Patent Number:	6057700
Patent Number:	5975408
Patent Number:	5975836
Patent Number:	5719449
Patent Number:	5672913
Patent Number:	5501777
Patent Number:	7554133
Patent Number:	8547681
Patent Number:	8134232
Patent Number:	7724023
Patent Number:	8378485
Patent Number:	8580621
Patent Number:	7787252
Patent Number:	8334467

PATENT
REEL: 045216 FRAME: 0087

Property Type	Number
Patent Number:	8869389
Patent Number:	8370777
Patent Number:	8125091
Patent Number:	8653375
Patent Number:	7671450
Patent Number:	7727781
Patent Number:	7724359
Patent Number:	8742535
Patent Number:	9613847
Patent Number:	7671436
Patent Number:	8987137
Patent Number:	7888257
Patent Number:	9054064
Application Number:	14678223
Patent Number:	8492911
Patent Number:	7982307
Patent Number:	7800879
Patent Number:	7973544
Patent Number:	7479695
Patent Number:	8664759
Patent Number:	7005880
Patent Number:	7221042
Patent Number:	7956451
Patent Number:	7408246
Patent Number:	8133799
Patent Number:	7598602
Patent Number:	7923347
Patent Number:	7242090
Patent Number:	7235422
Patent Number:	7164200
Patent Number:	7429703
Patent Number:	7367486
Patent Number:	7314781
Patent Number:	7122892
Patent Number:	7009305
Patent Number:	6628001
Patent Number:	6476472
Patent Number:	6358779

PATENT
REEL: 045216 FRAME: 0088

Property Type	Number
Patent Number:	6412680
Patent Number:	6559535
Patent Number:	6417087
Patent Number:	6309097
Patent Number:	6276593
Patent Number:	6252289
Patent Number:	6043876
Patent Number:	6140710
Patent Number:	6180241
Patent Number:	6145385
Patent Number:	6028772
Patent Number:	6110576
Patent Number:	5955683
Patent Number:	6326685
Patent Number:	5904859
Patent Number:	6034441
Patent Number:	5897333
Patent Number:	5783465
Patent Number:	5778913
Patent Number:	5747982
Patent Number:	6125042
Patent Number:	5735698
Patent Number:	5622305
Patent Number:	5773322
Patent Number:	5646451
Patent Number:	8222745
Patent Number:	5619068
Patent Number:	6651202
Application Number:	09237769
Patent Number:	5754444
Patent Number:	5568636
Patent Number:	6088519
Patent Number:	6282696
Patent Number:	5972541
Patent Number:	5900338
Patent Number:	5705301
Application Number:	08229822
Patent Number:	5870313

PATENT

REEL: 045216 FRAME: 0089

Property Type	Number
Application Number:	60236902
Application Number:	60236752
Patent Number:	6880141
Patent Number:	6543038
Patent Number:	5638288
Patent Number:	5905655
Patent Number:	6081659
Patent Number:	6078738
Patent Number:	5872718
Patent Number:	6067409
Patent Number:	6292929
Patent Number:	6026223
Patent Number:	6223332
Patent Number:	5557533
Patent Number:	5793644
Application Number:	08305217
Patent Number:	5859781
Patent Number:	7523426
Patent Number:	8863053
Patent Number:	8539407
Patent Number:	5615126
Patent Number:	5898677
Patent Number:	7434180
Patent Number:	8156454
Patent Number:	7480650
Patent Number:	7283995
Patent Number:	7568175
Patent Number:	7246336
Patent Number:	7818703
Patent Number:	7246337
Patent Number:	7548844
Patent Number:	7200785
Patent Number:	6269472
Patent Number:	5723233
Patent Number:	7146591
Patent Number:	7496870
Patent Number:	7472358
Patent Number:	8006209

Property Type	Number
Patent Number:	7996804
Patent Number:	8516425
Patent Number:	8239813
Patent Number:	7689965
Patent Number:	8181138
Patent Number:	8161447
Patent Number:	7546568
Patent Number:	8572543
Patent Number:	7302654
Application Number:	10975570
Patent Number:	7398492
Patent Number:	7290224
Patent Number:	7945878
Patent Number:	7404156
Patent Number:	8037448
Patent Number:	6946866
Application Number:	10692110
Application Number:	10448987
Patent Number:	7822099
Patent Number:	7263470
Patent Number:	6615397
Application Number:	09756561
Patent Number:	7139991
Patent Number:	6931606
Application Number:	60236903
Patent Number:	6694495
Patent Number:	5838585
Application Number:	08410049
Patent Number:	6225143
Patent Number:	6674166
Patent Number:	6134687
Patent Number:	6505316
Patent Number:	6732310
Patent Number:	5867036
Patent Number:	6108805
Application Number:	08438605
Patent Number:	5654563
Patent Number:	6502222

PATENT
REEL: 045216 FRAME: 0091

Property Type	Number
Application Number:	60236900
Patent Number:	7395478
Patent Number:	7216280
Patent Number:	5666289
Application Number:	07957672
Patent Number:	5587923
Patent Number:	5784289
Patent Number:	7086015
Patent Number:	7594201
Patent Number:	6842032
Patent Number:	6664801
Patent Number:	7539960
Patent Number:	8156466
Patent Number:	7082583
Patent Number:	5495419
Patent Number:	5636125
Patent Number:	5903461
Patent Number:	5742510
Patent Number:	5781439
Patent Number:	5745363
Patent Number:	5459085
Application Number:	08424905
Application Number:	08578050
Patent Number:	5936285
Application Number:	08925360
Patent Number:	7376541
Patent Number:	7640152
Patent Number:	7467359
Patent Number:	7017126
Application Number:	60383890
Patent Number:	7900184
Patent Number:	6174742
Patent Number:	6338972
Application Number:	60973550
Patent Number:	8230263
Patent Number:	6611951
Application Number:	60250482
Patent Number:	5578840

PATENT
REEL: 045216 FRAME: 0092

Property Type	Number
Application Number:	08756032
Application Number:	08517054
Patent Number:	5801422
Patent Number:	6097073
Patent Number:	5789770
Application Number:	08685476
Patent Number:	6407434
Patent Number:	5742086
Patent Number:	5973376
Patent Number:	5822214
Application Number:	08517582
Patent Number:	5889329
Patent Number:	5872380
Patent Number:	5777360
Application Number:	08230023
Patent Number:	5875117
Application Number:	08668084
Patent Number:	5552333
Patent Number:	5777354
Patent Number:	5629876
Application Number:	08335092
Patent Number:	5640337
Application Number:	08599107
Patent Number:	5339262
Patent Number:	7401318
Patent Number:	6988260
Patent Number:	5493508
Patent Number:	5910897
Application Number:	08603037
Patent Number:	8037432
Patent Number:	7424687
Patent Number:	7458044
Patent Number:	7493576
Patent Number:	8321826
Patent Number:	8775995
Patent Number:	8566769
Patent Number:	8245168
Patent Number:	7584442

PATENT

REEL: 045216 FRAME: 0093

Property Type	Number
Patent Number:	8499264
Patent Number:	8166441
Patent Number:	7376918
Patent Number:	7661083
Application Number:	10988087
Application Number:	60535586
Patent Number:	7189498
Patent Number:	6768958
Patent Number:	6868355
Patent Number:	6174630
Patent Number:	6532585
Patent Number:	6901573
Patent Number:	7328423
Patent Number:	7620924
Patent Number:	8484608
Patent Number:	7107558
Patent Number:	7043708
Patent Number:	7325215
Patent Number:	7747975
Patent Number:	8584068
Patent Number:	8151237
Patent Number:	7430730
Patent Number:	6894762
Patent Number:	7023530
Patent Number:	8332801
Patent Number:	7634748
Patent Number:	6900075
Patent Number:	7057261
Patent Number:	8099708
Patent Number:	7543261
Application Number:	11054879
Patent Number:	6889366
Patent Number:	7035446
Patent Number:	7376260
Patent Number:	7665058
Patent Number:	7213224
Application Number:	10135189
Patent Number:	7114133

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REEL: 045216 FRAME: 0094

Property Type	Number
Patent Number:	7058906
Patent Number:	6640333
Patent Number:	7096442
Patent Number:	7356785
Patent Number:	6314545
Patent Number:	6051027
Patent Number:	6064808
Patent Number:	7051297
Application Number:	10768588
Patent Number:	7076746
Patent Number:	5689685
Patent Number:	5537329
Patent Number:	7047470
Patent Number:	7284211
Patent Number:	7055113
Patent Number:	7430725
Patent Number:	6851098
Patent Number:	7181713
Patent Number:	5682323
Patent Number:	6425117
Patent Number:	6643832
Application Number:	60236953
Application Number:	60236589
Patent Number:	7020589
Patent Number:	7398501
Patent Number:	6751783
Application Number:	09756568
Patent Number:	6704915
Application Number:	60227132
Patent Number:	6449751
Application Number:	10974450
Patent Number:	8201032
Patent Number:	8468478
Patent Number:	7424693
Application Number:	08598155
Patent Number:	6065134
Patent Number:	6453451
Application Number:	60237737

PATENT
REEL: 045216 FRAME: 0095

Property Type	Number
Patent Number:	6625770
Patent Number:	6671846
Application Number:	13599549
Patent Number:	8281266
Patent Number:	8595668
Application Number:	14057441
Application Number:	14053194
Patent Number:	8589853
Application Number:	14093189
Patent Number:	8645888
Patent Number:	8181144
Patent Number:	7958473
Application Number:	11364142
Patent Number:	7975248
Application Number:	13658336
Patent Number:	8423933
Patent Number:	5995740
Patent Number:	6539509
Patent Number:	6083271
Patent Number:	6907586
Patent Number:	5983017
Patent Number:	6085032
Patent Number:	6542834
Patent Number:	6417562
Patent Number:	6973421
Patent Number:	6701511
Patent Number:	6634014
Patent Number:	6038385
Patent Number:	6951017
Patent Number:	6820048
Patent Number:	6182272
Patent Number:	6502230
Patent Number:	6438730
Patent Number:	6240542
Patent Number:	6412102
Patent Number:	6057169
Patent Number:	6171731
Patent Number:	6134702

PATENT
REEL: 045216 FRAME: 0096

Property Type	Number
Patent Number:	6327696
Patent Number:	6243849
Patent Number:	6385761
Patent Number:	6275973
Patent Number:	6305001
Patent Number:	6263483
Patent Number:	6687661
Patent Number:	6128757
Patent Number:	6836877
Patent Number:	6205572
Patent Number:	6289491
Patent Number:	6178541
Patent Number:	6101458
Patent Number:	6093214
Patent Number:	6173435
Patent Number:	6289498
Patent Number:	6473891
Patent Number:	6070259
Patent Number:	6334207
Patent Number:	6901571
Patent Number:	6175950
Patent Number:	6253363
Patent Number:	6154874
Patent Number:	6442738
Patent Number:	6000038
Patent Number:	6675363
Patent Number:	6075933
Patent Number:	6070108
Patent Number:	6109201
Patent Number:	6135647
Patent Number:	6968286
Patent Number:	6123736
Patent Number:	5898597
Patent Number:	6083269
Patent Number:	5886901
Patent Number:	5987239
Patent Number:	5953518
Patent Number:	5886900

Property Type	Number
Patent Number:	5956350
Patent Number:	5831993
Patent Number:	6507939
Patent Number:	5804340
Patent Number:	5875118
Patent Number:	5980093
Patent Number:	6928598
Patent Number:	5768145
Patent Number:	5835380
Patent Number:	5822226
Patent Number:	5812740
Patent Number:	5844811
Patent Number:	6030110
Patent Number:	5796625
Patent Number:	6487698
Patent Number:	6467067
Patent Number:	6513148
Patent Number:	6397117
Patent Number:	5844818
Patent Number:	5784287
Patent Number:	6845348
Patent Number:	5907494
Patent Number:	5682321
Patent Number:	5808330
Patent Number:	5661663
Patent Number:	6269469
Patent Number:	6324674
Patent Number:	6263299
Patent Number:	8166428
Patent Number:	6212655
Patent Number:	6499003
Patent Number:	7669155
Patent Number:	7676773
Patent Number:	7392496
Patent Number:	6230306
Patent Number:	7590957
Patent Number:	7389484
Patent Number:	7406669

PATENT
REEL: 045216 FRAME: 0098

Property Type	Number
Patent Number:	7739471
Patent Number:	6588003
Patent Number:	7434198
Patent Number:	7720556
Patent Number:	7409660
Patent Number:	7240264
Patent Number:	7360178
Patent Number:	7305646
Patent Number:	7260801
Patent Number:	7155688
Patent Number:	7210083
Patent Number:	7328386
Patent Number:	7206983
Patent Number:	7197735
Patent Number:	7415691
Patent Number:	7363608
Patent Number:	7467363
Patent Number:	7174524
Patent Number:	7219321
Patent Number:	7210113
Patent Number:	7042242
Patent Number:	7038257
Patent Number:	7340700
Patent Number:	7231623
Patent Number:	6931297
Patent Number:	7117475
Patent Number:	7373626
Patent Number:	7039896
Patent Number:	7065734
Patent Number:	7360133
Patent Number:	7188330
Patent Number:	6888367
Patent Number:	7269803
Patent Number:	7409602
Patent Number:	6966020
Patent Number:	5983007
Patent Number:	5966516
Patent Number:	5867416

PATENT

REEL: 045216 FRAME: 0099

Property Type	Number
Patent Number:	7107559
Patent Number:	7111269
Patent Number:	7260803
Patent Number:	7024637
Patent Number:	6988252
Patent Number:	7017096
Patent Number:	7231625
Patent Number:	7743391
Patent Number:	7174532
Patent Number:	7096440
Patent Number:	6356861
Patent Number:	7082589
Patent Number:	7185298
Patent Number:	7076759
Patent Number:	6948142
Patent Number:	7065721
Patent Number:	6728936
Patent Number:	7899659
Patent Number:	7200832
Patent Number:	7016794
Patent Number:	6898770
Patent Number:	6804811
Patent Number:	7127698
Patent Number:	6532572
Patent Number:	6675139
Patent Number:	7322021
Patent Number:	6829751
Patent Number:	7069523
Patent Number:	6961915
Patent Number:	6857108
Patent Number:	7043703
Patent Number:	7313508
Patent Number:	6735747
Patent Number:	6842750
Patent Number:	7020865
Patent Number:	6532431
Patent Number:	6810505
Patent Number:	6701503

PATENT
REEL: 045216 FRAME: 0100

Property Type	Number
Patent Number:	6813758
Patent Number:	6829754
Patent Number:	6757877
Patent Number:	6341092
Patent Number:	6550045
Patent Number:	6651239
Patent Number:	6594807
Patent Number:	6480989
Patent Number:	6745358
Patent Number:	6654946
Patent Number:	6598213
Patent Number:	6480994
Patent Number:	6507937
Patent Number:	6609238
Patent Number:	6470484
Patent Number:	6532582
Patent Number:	6546538
Patent Number:	6587990
Patent Number:	6519746
Patent Number:	6425114
Patent Number:	6766499
Patent Number:	6308292
Patent Number:	6028995
Patent Number:	6792579
Patent Number:	5995730
Patent Number:	5903577
Patent Number:	5977574
Patent Number:	6484297
Patent Number:	6028440
Patent Number:	6202196
Patent Number:	6714903
Patent Number:	6292924
Patent Number:	6189131
Patent Number:	7596483
Patent Number:	5698873
Patent Number:	6068662
Patent Number:	6186676
Patent Number:	6058254

Property Type	Number
Patent Number:	6247167
Patent Number:	5822228
Patent Number:	5930500
Patent Number:	5859782
Patent Number:	5898705
Patent Number:	5880377
Patent Number:	5974248
Patent Number:	5808900
Patent Number:	5971588
Patent Number:	5835381
Patent Number:	6463572
Patent Number:	6581194
Patent Number:	5619420
Patent Number:	5703788
Patent Number:	5812416
Patent Number:	6005264
Patent Number:	5644498
Patent Number:	5665989
Patent Number:	5990502
Patent Number:	6493658
Patent Number:	5682322
Patent Number:	5638293
Patent Number:	5898595
Patent Number:	6868535
Patent Number:	6470487
Patent Number:	6553551
Patent Number:	6453453
Patent Number:	5914887
Patent Number:	6505336
Patent Number:	7076406
Patent Number:	8539424
Patent Number:	5808899
Patent Number:	5870312
Patent Number:	5914888
Patent Number:	5963455
Patent Number:	5831863
Patent Number:	5867398
Patent Number:	5892688

PATENT
REEL: 045216 FRAME: 0102

Property Type	Number
Patent Number:	5796265
Patent Number:	6934410
Patent Number:	5787114
Patent Number:	5668745
Patent Number:	6487697
Patent Number:	5835378
Patent Number:	5712793
Patent Number:	5663017
Patent Number:	5864165
Patent Number:	6545288
Patent Number:	5699265
Patent Number:	5815403
Patent Number:	5619419
Patent Number:	6526553
Patent Number:	5568395
Patent Number:	7577928
Patent Number:	5867395
Patent Number:	5638380
Patent Number:	5903578
Patent Number:	5691910
Patent Number:	5870311
Patent Number:	6292931
Patent Number:	5909376
Patent Number:	5825659
Patent Number:	5903475
Patent Number:	5663967
Patent Number:	7849422
Patent Number:	6611953
Patent Number:	6289495
Patent Number:	7546560
Patent Number:	6637016
Patent Number:	6550044
Patent Number:	7480878
Patent Number:	7325216
Patent Number:	6155725
Patent Number:	7441210
Patent Number:	5768130
Patent Number:	8539411

Property Type	Number
Patent Number:	6260183
Patent Number:	7370309
Patent Number:	6182269
Patent Number:	6493851
Patent Number:	7469398
Patent Number:	7490307
Patent Number:	7496867
Patent Number:	7401313
Patent Number:	7380223
Patent Number:	6378123
Patent Number:	6295636
Patent Number:	7464345
Patent Number:	6421818
Patent Number:	6442737
Patent Number:	7480881
Patent Number:	6345378
Patent Number:	7313775
Patent Number:	7451426
Patent Number:	7458060
Patent Number:	7299431
Patent Number:	7478354
Patent Number:	7512918
Patent Number:	7200826
Patent Number:	7202656
Patent Number:	7207021
Patent Number:	7415687
Patent Number:	7194717
Patent Number:	7191424
Patent Number:	7617427
Patent Number:	7168055
Patent Number:	7127692
Patent Number:	7380228
Patent Number:	7149989
Patent Number:	7299446
Patent Number:	7406671
Patent Number:	7223616
Patent Number:	7181712
Patent Number:	7739639

Property Type	Number
Patent Number:	7620743
Patent Number:	7264906
Patent Number:	7178121
Patent Number:	6650139
Patent Number:	7185301
Patent Number:	7404166
Patent Number:	7036102
Patent Number:	7493519
Patent Number:	7415686
Patent Number:	7340706
Patent Number:	7328417
Patent Number:	7028274
Patent Number:	7373629
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Patent Number:	7243324
Patent Number:	7207026
Patent Number:	7299435
Patent Number:	7216278
Patent Number:	7496861
Patent Number:	7424690
Patent Number:	7290194
Patent Number:	7493577
Patent Number:	7331031
Patent Number:	7216323
Patent Number:	7181359
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Patent Number:	7380229
Patent Number:	7494752
Patent Number:	7168052
Patent Number:	7334206
Patent Number:	7979833
Patent Number:	7398489
Patent Number:	7331028
Patent Number:	7152012
Patent Number:	7272814
Patent Number:	7703059
Patent Number:	6239609

Property Type	Number
Patent Number:	7412343
Patent Number:	7181710
Patent Number:	7058909
Patent Number:	7606692
Patent Number:	7272802
Patent Number:	7228516
Patent Number:	7373622
Patent Number:	7406675
Patent Number:	7263678
Patent Number:	7213223
Patent Number:	7260814
Patent Number:	7111267
Patent Number:	7257791
Patent Number:	7231626
Patent Number:	7174526
Patent Number:	7332917
Patent Number:	7234122
Patent Number:	7106074
Patent Number:	7412678
Patent Number:	7062737
Patent Number:	7219317
Patent Number:	7325222
Patent Number:	7103858
Patent Number:	7398486
Patent Number:	7254761
Patent Number:	6175953
Patent Number:	7111264
Patent Number:	7131103
Patent Number:	7584460
Patent Number:	7003753
Patent Number:	7305634
Patent Number:	7610568
Patent Number:	6550042
Patent Number:	6874108
Patent Number:	6182270
Patent Number:	6640324
Patent Number:	7039891
Patent Number:	7003421

Property Type	Number
Patent Number:	6345240
Patent Number:	7003739
Patent Number:	7082593
Patent Number:	7703076
Patent Number:	7007259
Patent Number:	7055117
Patent Number:	6493848
Patent Number:	6301688
Patent Number:	7028276
Patent Number:	7062739
Patent Number:	6825688
Patent Number:	7117472
Patent Number:	7103865
Patent Number:	5566187
Patent Number:	6687658
Patent Number:	6591231
Patent Number:	6094735
Patent Number:	7020859
Patent Number:	5623499
Patent Number:	6321181
Patent Number:	5513122
Patent Number:	5995733
Patent Number:	7107561
Patent Number:	7032190
Patent Number:	7584437
Patent Number:	5625630
Patent Number:	6925626
Patent Number:	7062736
Patent Number:	5774477
Patent Number:	5481580
Patent Number:	6807656
Patent Number:	5606567
Patent Number:	7287238
Patent Number:	7007248
Patent Number:	6990651
Patent Number:	6922817
Patent Number:	6978428
Patent Number:	7257799

Property Type	Number
Patent Number:	6792578
Patent Number:	7069535
Patent Number:	6948139
Patent Number:	7062726
Patent Number:	6848094
Patent Number:	6868536
Patent Number:	6907588
Patent Number:	6871154
Patent Number:	6817004
Patent Number:	6898780
Patent Number:	6911285
Patent Number:	7093228
Patent Number:	6760896
Patent Number:	6810515
Patent Number:	6922823
Patent Number:	6782523
Patent Number:	7103868
Patent Number:	6757885
Patent Number:	7062731
Patent Number:	7024636
Patent Number:	6959428
Patent Number:	6823502
Patent Number:	6880142
Patent Number:	6854103
Patent Number:	6757883
Patent Number:	6701495
Patent Number:	6934929
Patent Number:	7020852
Patent Number:	6871333
Patent Number:	7212961
Patent Number:	7299427
Patent Number:	6910201
Patent Number:	6775818
Patent Number:	6782525
Patent Number:	6769097
Patent Number:	7818157
Patent Number:	6748579
Patent Number:	7016748

Property Type	Number
Patent Number:	6775811
Patent Number:	6802047
Patent Number:	6665850
Patent Number:	6587999
Patent Number:	6683476
Patent Number:	6795954
Patent Number:	7003510
Patent Number:	6785871
Patent Number:	6615401
Patent Number:	6701499
Patent Number:	6941533
Patent Number:	6842883
Patent Number:	6845495
Patent Number:	6948114
Patent Number:	6931612
Patent Number:	6747473
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PATENT
REEL: 045216 FRAME: 0110

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Application Number:	61321402
Patent Number:	8917704
Patent Number:	9118442
Patent Number:	8284819
Patent Number:	8503506
Patent Number:	8681730
PCT Number:	IB2012000507

CORRESPONDENCE DATA

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Address Line 4: WASHINGTON, D.C. 20006

ATTORNEY DOCKET NUMBER:	43172.01200
NAME OF SUBMITTER:	JAVIER J. RAMOS
SIGNATURE:	/Javier J. Ramos/
DATE SIGNED:	02/01/2018

Total Attachments: 230

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PATENT
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PATENT SECURITY AGREEMENT

THIS PATENT SECURITY AGREEMENT (this "**Patent Security Agreement**"), dated as of January 24, 2018, is made by Hilco Patent Acquisition 56, LLC, a Delaware limited liability company, Bell Semiconductor, LLC, a Delaware limited liability company and Bell Northern Research, LLC, a Delaware limited liability company (each a "**Grantor**" and collectively the "**Grantors**") in favor of Cortland Capital Market Services LLC, as collateral agent (in such capacity, together with its successors and permitted assigns, the "**Collateral Agent**") for the Secured Parties.

WITNESSETH:

WHEREAS, pursuant to the Term Loan Agreement dated as of January 24, 2018 (as the same may be amended, restated, supplemented or otherwise modified from time to time, the "**Loan Agreement**") among Hilco Patent Acquisition 56, LLC, as borrower, the guarantors party thereto, Cortland Capital Market Services LLC, as administrative agent and as collateral agent, and the lenders party thereto (the "**Lenders**"), the Lenders have agreed to make certain financial accommodations for the borrower under the Loan Agreement upon the terms and subject to the conditions set forth therein; and

WHEREAS, each Grantor is a party to a Security Agreement of even date herewith in favor of the Collateral Agent (as the same may be amended, restated, supplemented or otherwise modified from time to time, the "**Security Agreement**"), pursuant to which each Grantor is required to execute and deliver this Patent Security Agreement.

NOW, THEREFORE, in consideration of the premises and to induce the Lenders and the Collateral Agent to enter into the Loan Agreement and to induce the Lenders to make their respective extensions of credit to the Borrower thereunder, each Grantor hereby agrees with the Collateral Agent as follows:

Section 1. **Defined Terms.** Capitalized terms used herein without definition are used as defined in the Security Agreement or Loan Agreement, as applicable.

Section 2. **Grant of Security Interest in Patent Collateral.** Each Grantor, as collateral security for the prompt and complete payment and performance when due (whether at stated maturity, by acceleration or otherwise) of the Secured Obligations of each Grantor, hereby mortgages, pledges and hypothecates to the Collateral Agent for the benefit of the Secured Parties, and grants to the Collateral Agent for the benefit of the Secured Parties a Lien on and security interest in, all of its right, title and interest in, to and under the following Collateral of each Grantor (the "**Patent Collateral**"):

- (a) all of its Patents and all IP Licenses included in the Collateral, including, without limitation, those referred to on Schedule 1 hereto;
- (b) all reissues, reexaminations, continuations, continuations-in-part, divisionals, renewals and extensions of the foregoing; and
- (c) all income, royalties, proceeds and Liabilities at any time due or payable or asserted under and with respect to any of the foregoing, including, without limitation, all rights to sue and recover at law or in equity for any past, present and future infringement, misappropriation, dilution, violation or other impairment thereof.

Section 3. **Security Agreement.** The security interest granted pursuant to this Patent Security Agreement is granted in conjunction with the security interest granted to the Collateral Agent

pursuant to the Security Agreement and each Grantor hereby acknowledges and agrees that the rights and remedies of the Collateral Agent with respect to the security interest in the Patent Collateral made and granted hereby are more fully set forth in the Security Agreement, the terms and provisions of which are incorporated by reference herein as if fully set forth herein.

Section 4. **Grantor Remains Liable.** Each Grantor hereby agrees that, anything herein to the contrary notwithstanding, each Grantor shall assume full and complete responsibility for the prosecution, defense, enforcement or any other necessary or desirable actions in connection with their Patents and IP Licenses subject to a security interest hereunder.

Section 5. **Counterparts.** This Patent Security Agreement may be executed in any number of counterparts and by different parties in separate counterparts, each of which when so executed shall be deemed to be an original and all of which taken together shall constitute one and the same agreement. Signature pages may be detached from multiple separate counterparts and attached to a single counterpart. Delivery of an executed signature page of this Patent Security Agreement by facsimile transmission or by electronic transmission shall be as effective as delivery of a manually executed counterpart hereof.

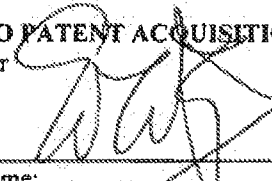
Section 6. **Governing Law.** This Patent Security Agreement and the rights and obligations of the parties hereto shall be governed by, and construed and interpreted in accordance with, the law of the State of New York.

[SIGNATURE PAGE FOLLOWS]

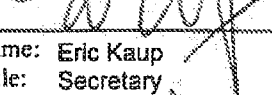
IN WITNESS WHEREOF, each Grantor has caused this Patent Security Agreement to be executed and delivered by its duly authorized officer as of the date first set forth above.

Very truly yours,

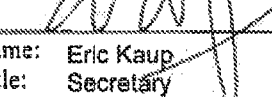
HILCO PATENT ACQUISITION 56, LLC, as Grantor

By: 
Name: Eric Kaup
Title: Secretary

BELL SEMICONDUCTOR, LLC, as Grantor

By: 
Name: Eric Kaup
Title: Secretary

BELL NORTHERN RESEARCH, LLC, as Grantor

By: 
Name: Eric Kaup
Title: Secretary

[Signature Page to Patent Security Agreement]

**PATENT
REEL: 045216 FRAME: 0126**

ACKNOWLEDGED AND AGREED as of
the date first above written:

CORTLAND CAPITAL MARKET SERVICES LLC,
as Collateral Agent

By: 

Name: **Polina Arsenyeva**
Title: **Associate Counsel**

[Signature Page to Patent Security Agreement]

PATENT
REEL: 045216 FRAME: 0127

**SCHEDULE I
TO
PATENT SECURITY AGREEMENT**

[See attached.]

I-1

#4833-4926-3706

**PATENT
REEL: 045216 FRAME: 0128**

Schedule B(1)(a) - Semic Processing A

App No	Patent No	Filed Date	Grant Date	Status	Country	Title
08936689	5888120	1997-09-29	1999-03-30	Expired	United States of America	Method and apparatus for chemical mechanical polishing
09216395		1998-12-18		Abandoned	United States of America	Method and Apparatus for Chemical Mechanical Polishing
08700650		1996-08-14		Abandoned	United States of America	Off-Axis Illuminator Lens Mask For Photolithographic Projection System
09105546	5973767	1998-06-26	1999-10-26	Expired	United States of America	Off-axis illuminator lens mask for photolithographic projection system
09089461	6130428	1998-06-02	2000-10-10	Granted	United States of America	Laser fault correction of semiconductor devices
09604865	6407559	2000-06-28	2002-06-18	Granted	United States of America	Laser fault correction of semiconductor devices
08955384	5897381	1997-10-21	1999-04-27	Expired	United States of America	Method of forming a layer and semiconductor substrate
08954791	5893952	1997-10-21	1999-04-13	Expired	United States of America	Apparatus for rapid thermal processing of a wafer
08678718	5756369	1996-07-11	1998-05-26	Expired	United States of America	Rapid thermal processing using a narrowband infrared source and feedback
08924902	5926720	1997-09-08	1999-07-20	Expired	United States of America	Consistent alignment mark profiles on semiconductor wafers using PVD shadowing
09198208	6239499	1998-11-23	2001-05-29	Expired	United States of America	Consistent alignment mark profiles on semiconductor wafers using PVD shadowing
09363084		1999-07-28		Abandoned	United States of America	Nitrogen Implanted Polysilicon Gate For Mosfet Gate Oxide Hardening
08957692	6017808	1997-10-24	2000-01-25	Expired	United States of America	Nitrogen implanted polysilicon gate for MOSFET gate oxide hardening
09022588	6117795	1998-02-12	2000-09-12	Granted	United States of America	Use of corrosion inhibiting compounds in post-etch cleaning processes of an integrated circuit
09583297		2000-05-30		Abandoned	United States of America	Use Of Corrosion Inhibiting Compounds In Post-Etch Cleaning Processes Of An Integrated Circuit
09081403	6239491	1998-05-18	2001-05-29	Granted	United States of America	Integrated circuit structure with thin dielectric between at least local interconnect level and first metal interconnect level, and process for making same
09790821	6486056	2001-02-22	2002-11-26	Granted	United States of America	Process for making integrated circuit structure with thin dielectric between at least local interconnect level and first metal interconnect level
08374193	5646073	1995-01-18	1997-07-08	Expired	United States of America	Process for selective deposition of polysilicon over single crystal silicon substrate and resulting product
08823829	5818100	1997-03-25	1998-10-06	Expired	United States of America	Product resulting from selective deposition of polysilicon over single crystal silicon substrate
08566161		1995-11-30		Abandoned	United States of America	Product Resulting From Selective Deposition Of Polysilicon Over Single Crystal Silicon Substrate
08879100	6121159	1997-06-19	2000-09-19	Expired	United States of America	Polymeric dielectric layers having low dielectric constants and improved adhesion to metal lines

Schedule B(1)(a) – Semic Processing A

AppNo	PatentNo	FiledDate	GrantDate	Status	Country	Title
09618211	6455934	2000-07-10	2002-09-24	Expired	United States of America	Polymeric dielectric layers having low dielectric constants and improved adhesion to metal lines
09362648	6273798	1999-07-27	2001-08-14	Expired	United States of America	Pre-conditioning polishing pads for chemical-mechanical polishing
08841947	5990010	1997-04-08	1999-11-23	Expired	United States of America	Pre-conditioning polishing pads for chemical-mechanical polishing
08791244	6117736	1997-01-30	2000-09-12	Expired	United States of America	Method of fabricating insulated-gate field-effect transistors having different gate capacitances
09594478	6300663	2000-06-15	2001-10-09	Expired	United States of America	Insulated-gate field-effect transistors having different gate capacitances
08701476	5905381	1996-08-22	1999-05-18	Expired	United States of America	Functional OBIC analysis
09244327	6154039	1999-02-03	2000-11-28	Expired	United States of America	Functional OBIC analysis
09109331	6071818	1998-06-30	2000-06-06	Granted	United States of America	Endpoint detection method and apparatus which utilize an endpoint polishing layer of catalyst material
09534652	6258205	2000-03-24	2001-07-10	Granted	United States of America	Endpoint detection method and apparatus which utilize an endpoint polishing layer of catalyst material
08684022	5728612	1996-07-19	1998-03-17	Expired	United States of America	Method for forming minimum area structures for sub-micron CMOS ESD protection in integrated circuit structures without extra implant and mask steps, and articles formed thereby
08748372	5843813	1996-11-13	1998-12-01	Expired	United States of America	I/O driver design for simultaneous switching noise minimization and ESD performance enhancement
08936829	5970321	1997-09-25	1999-10-19	Expired	United States of America	Method of fabricating a microelectronic package having polymer ESD protection
08595021	5869869	1996-01-31	1999-02-09	Expired	United States of America	Microelectronic device with thin film electrostatic discharge protection structure
08723140	5955762	1996-10-01	1999-09-21	Expired	United States of America	Microelectronic package with polymer ESD protection structure
09188929		1998-11-09		Abandoned	United States of America	Formation Of Gradient Doped Profile Region Between Channel Region And Heavily Doped Source/Drain Contact Region Of MOS Device In Integrated Circuit Structure Using A Re-Entrant Gate Electrode And A Higher Dose Drain Implantation
08690592	5877530	1996-07-31	1999-03-02	Expired	United States of America	Formation of gradient doped profile region between channel region and heavily doped source/drain contact region of MOS device in integrated circuit structure using a re-entrant gate electrode and a higher dose drain implantation
08552461	5670425	1995-11-09	1997-09-23	Expired	United States of America	Process for making integrated circuit structure comprising local area interconnects formed over semiconductor substrate by selective deposition on seed layer in patterned trench
08873809	5895261	1997-06-12	1999-04-20	Expired	United States of America	Process for making integrated circuit structure comprising local area interconnects formed over semiconductor substrate by selective deposition on seed layer in patterned trench

Schedule B(1)(a) - Semic Processing A

AppNo	PatentNo	FiledDate	GrantDate	Status	Country	Title
08718852	5827777	1996-09-24	1998-10-27	Expired	United States of America	Method of making a barrier metal technology for tungsten plug interconnection
08378027	5600182	1995-01-24	1997-02-04	Expired	United States of America	Barrier metal technology for tungsten plug interconnection
08902507		1997-07-29		Abandoned	United States of America	Use Of Reticle Stitching To Provide Design Flexibility
08357728	5652163	1994-12-13	1997-07-29	Expired	United States of America	Use of reticle stitching to provide design flexibility
08233607	5593918	1994-04-22	1997-01-14	Expired	United States of America	Techniques for forming superconductive lines
08454542	5644143	1995-05-30	1997-07-01	Expired	United States of America	Method for protecting a semiconductor device with a superconductive line
11286558	7847285	2005-11-23	2010-12-07	Granted	United States of America	CONFIGURABLE POWER SEGMENTATION USING A NANOTUBE STRUCTURE
12912791	8017512	2010-10-27	2011-09-13	Granted	United States of America	EFFICIENT POWER MANAGEMENT METHOD IN INTEGRATED CIRCUIT THROUGH A NANOTUBE STRUCTURE
10418375	6982229	2003-04-18	2006-01-03	Lapsed	United States of America	Ion recoil implantation and enhanced carrier mobility in CMOS device
11098290	7129516	2005-04-04	2006-10-31	Lapsed	United States of America	Ion recoil implantation and enhanced carrier mobility in CMOS device
11063384	7201633	2005-02-22	2007-04-10	Granted	United States of America	Systems and methods for wafer polishing
11158450		2005-06-21		Abandoned	United States of America	Systems and Methods For Wafer Polishing
11381409		2006-05-03		Abandoned	United States of America	Adjustable Transmission Phase Shift Mask
10972898	7067223	2004-10-25	2006-06-27	Lapsed	United States of America	Adjustable transmission phase shift mask
10039508	6841308	2001-11-09	2005-01-11	Lapsed	United States of America	Adjustable transmission phase shift mask
11016468	6998716	2004-12-16	2006-02-14	Granted	United States of America	Diamond metal-filled patterns achieving low parasitic coupling capacitance
10327283	6867127	2002-12-19	2005-03-15	Granted	United States of America	Diamond metal-filled patterns achieving low parasitic coupling capacitance
60578890		2004-06-10		Abandoned	United States of America	Vortex Phase Shift Mask Applied to Optical Direct Write
13722648	9188848	2012-12-20	2015-11-17	Lapsed	United States of America	Maskless Vortex Phase Shift Optical Direct Write Lithography
13253554	8377633	2011-10-05	2013-02-19	Lapsed	United States of America	Maskless Vortex Phase Shift Optical Direct Write Lithography
11011896	8057963	2004-12-14	2011-11-15	Lapsed	United States of America	Maskless Vortex Phase Shift Optical Direct Write Lithography
11000772	7095483	2004-12-01	2006-08-22	Lapsed	United States of America	Process independent alignment marks
09867131	6856029	2001-06-22	2005-02-15	Granted	United States of America	Process independent alignment marks
10750348	6969683	2003-12-31	2005-11-29	Granted	United States of America	Method of preventing resist poisoning in dual damascene structures
10025304	6713386	2001-12-19	2004-03-30	Granted	United States of America	Method of preventing resist poisoning in dual damascene structures
10195775	6673200	2002-07-12	2004-01-06	Granted	United States of America	Method of reducing process plasma damage using optical spectroscopy
60384499		1900-01-01		Abandoned	United States of America	Impact of F Species on Plasma Charge Damage in a RF Aher

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10680503	6972840	2003-10-06	2005-12-06	Lapsed	United States of America	Method of reducing process plasma damage using optical spectroscopy
10762788	7151059	2004-01-22	2006-12-19	Granted	United States of America	MOS Transistor And Method Of Manufacture
09597012	6740912	2000-06-20	2004-05-25	Granted	United States of America	Semiconductor Device Free Of LDD Regions
10291356		2002-11-08		Abandoned	United States of America	High-K Dielectric Gate Material Uniquely Formed
10643687	6919263	2003-08-19	2005-07-19	Lapsed	United States of America	High-k dielectric gate material uniquely formed
09408299	6323044	1999-09-29	2001-11-27	Granted	United States of America	Integrated Circuit Capacitor And Associated Fabrication Methods
09951178	6525358	2001-09-13	2003-02-25	Granted	United States of America	Capacitor Having The Lower Electrode For Preventing Undesired Defects At The Surface Of The Metal Plug
10459072	6806162	2003-06-11	2004-10-19	Lapsed	United States of America	Method for composing a dielectric layer within an interconnect structure of a multilayer semiconductor device
09164069	6614097	1998-09-30	2003-09-02	Lapsed	United States of America	Method for composing a dielectric layer within an interconnect structure of a multilayer semiconductor device
12256677		2008-10-23		Abandoned	United States of America	Method To Reduce Boron Penetration In Sige Bipolar Device
11694021	7456061	2007-03-30	2008-11-25	Granted	United States of America	Method To Reduce Boron Penetration In Sige Bipolar Device
09886780	6649422	2001-06-21	2003-11-18	Granted	United States of America	Integrated Circuit Having A Micromagnetic Device And Method Of Manufacture Therefor
09338143	6255714	1999-06-22	2001-07-03	Granted	United States of America	An Integrated Circuit Having A Micromagnetic Device And Method Of Manufacture Therefor
10234354	7126198	2002-09-03	2006-10-24	Lapsed	United States of America	Protruding Spacers For Self-Aligned Contacts
11542864	7332775	2006-10-04	2008-02-19	Granted	United States of America	Protruding Spacers For Self-Aligned Contacts
09156719	6495407	1998-09-18	2002-12-17	Granted	United States of America	Method Of Making An Article Comprising An Oxide Layer On A GaAs-Based Semiconductor Body
09093557	5962883	1998-06-08	1999-10-05	Expired	United States of America	Article Comprising An Oxide Layer On A GaAs-Based Semiconductor Body, And Method Of Making The Article
11811519	7384801	2007-06-11	2008-06-10	Granted	United States of America	Integrated circuit with inductor having horizontal magnetic flux lines
10614307	7253497	2003-07-02	2007-08-07	Granted	United States of America	Integrated circuit with inductor having horizontal magnetic flux lines
09085513	5949112	1998-05-28	1999-09-07	Granted	United States of America	Integrated Circuits with Tub-Ties
093339306	6054342	1999-06-23	2000-04-25	Granted	United States of America	Method Of Making Integrated Circuits With Tub-Ties
08562235	5773338	1995-11-21	1998-06-30	Expired	United States of America	Bipolar Transistor With MOS-Controlled Protection For Reverse-Biased Emitter-Base Junction
09050711	5949128	1998-03-30	1999-09-07	Expired	United States of America	Bipolar Transistor With MOS-Controlled Protection For Reverse-Biased Emitter-Base Junction
08347527	6445043	1994-11-30	2002-09-03	Granted	United States of America	Reverse-Biased Emitter/Imibase Junction
08620964	5763314	1996-03-22	1998-06-09	Expired	United States of America	Process for Forming Isolation Regions in An Integrated Circuit and Structure Formed Thereby
						Process For Forming Isolation Regions in An Integrated Circuit

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08777008	5830619	1997-01-07	1998-11-03	Expired	United States of America	Resist Materials
08079310	6159665	1993-06-17	2000-12-12	Granted	United States of America	Processes Using Photosensitive Materials Including A Nitro Benzyl Ester Photoacid Generator
10442533	6864152	2003-05-20	2005-03-08	Granted	United States of America	Fabrication of trenches with multiple depths on the same substrate
10931605	7189628	2004-08-31	2007-03-13	Granted	United States of America	Fabrication of trenches with multiple depths on the same substrate
09943403	6521520	2001-08-30	2003-02-18	Granted	United States of America	Semiconductor wafer arrangement and method of processing a semiconductor wafer
10321250	6707114	2002-12-16	2004-03-16	Granted	United States of America	Semiconductor wafer arrangement of a semiconductor wafer
09162407	6211555	1998-09-29	2001-04-03	Granted	United States of America	Semiconductor device with a pair of transistors having dual work function gate electrodes
09591108	6514824	2000-06-09	2003-02-04	Granted	United States of America	Semiconductor device with a pair of transistors having dual work function gate electrodes
09654689	6613651	2000-09-05	2003-09-02	Lapsed	United States of America	Integrated circuit isolation system
10383031	6831348	2003-03-06	2004-12-14	Lapsed	United States of America	Integrated circuit isolation system
10942444	7381502	2004-09-16	2008-06-03	Lapsed	United States of America	Apparatus and method to improve the resolution of photolithography systems by improving the temperature stability of the reticle
10265856	6866970	2002-10-07	2005-03-15	Lapsed	United States of America	Apparatus and method to improve the resolution of photolithography systems by improving the temperature stability of the reticle
10702165	6830943	2003-11-04	2004-12-14	Lapsed	United States of America	Thin film CMOS calibration standard having protective cover layer
10194578	6674092	2002-07-12	2004-01-06	Lapsed	United States of America	Thin film CMOS calibration standard having protective cover layer
10164909	6555475	2002-06-07	2003-04-29	Granted	United States of America	Arrangement and method for polishing a surface of a semiconductor wafer
09750639	6439981	2000-12-28	2002-08-27	Granted	United States of America	Arrangement and method for polishing a surface of a semiconductor wafer
10607353	6831022	2003-06-26	2004-12-14	Lapsed	United States of America	Method and apparatus for removing water vapor as a byproduct of chemical reaction in a wafer processing chamber
10140536	6630411	2002-05-07	2003-10-07	Granted	United States of America	Method and apparatus for removing water vapor as a byproduct of chemical reaction in a wafer processing chamber
09960765	6504219	2001-09-21	2003-01-07	Granted	United States of America	Indium field implant for punchthrough protection in semiconductor devices
09469579	6342429	1999-12-22	2002-01-29	Granted	United States of America	Method of fabricating an indium field implant for punchthrough protection in semiconductor devices
10819253	7242056	2004-04-05	2007-07-10	Granted	United States of America	Structure And Fabrication Method For Capacitors Integratable With Vertical Replacement Gate Transistors
11809686	7633118	2007-05-31	2009-12-15	Lapsed	United States of America	Structure And Fabrication Method For Capacitors Integratable With Vertical Replacement Gate Transistors

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12319603	7700432	2009-01-09	2010-04-20	Lapsed	United States of America	Method of Fabricating a Vertical Transistor and Capacitor
11809873	7491610	2007-06-01	2009-02-17	Granted	United States of America	Fabrication Method An Integratable Vertical Replacement Gate (VRG)-type Poly-Nitride-Poly (PNP) Or Metal-Nitride-poly (MNP) Capacitor
09956381		2001-09-18		Abandoned	United States of America	Structure And Fabrication Method For Capacitors Integratable With Vertical Replacement Gate Transistors
12610733	7911006	2009-11-02	2011-03-22	Granted	United States of America	Barrier For Copper Metallization
09723557	6455418	2000-11-28	2002-09-24	Granted	United States of America	Barrier For Copper Metallization
09218649	6288449	1998-12-22	2001-09-11	Granted	United States of America	Barrier For Copper Metallization
09244857	6068130	1999-02-05	2000-05-30	Granted	United States of America	Device And Method For Protecting Electronic Component
09580522	6554137	2000-05-30	2003-04-29	Granted	United States of America	Device And Method For Protecting Electronic Component
10649140	6821851	2003-08-27	2004-11-23	Granted	United States of America	Method Of Making Ultra Thin Body Vertical Replacement Gate Mosfet
10164202	6635924	2002-06-06	2003-10-21	Granted	United States of America	Ultra Thin Body Vertical Replacement Gate Mosfet
10028594	6624498	2001-12-20	2003-09-23	Granted	United States of America	Micromagnetic Device Having Alloy Of Cobalt, Phosphorus and Iron
09552627	6495019	2000-04-19	2002-12-17	Granted	United States of America	Device Comprising Micromagnetic Components For Power Applications And Process For Forming Device
09934283	6926841	2001-08-21	2005-08-09	Lapsed	United States of America	Stepped Etalon
09312386	6500521	1999-05-14	2002-12-31	Granted	United States of America	Stepped Etalon
10306565		2002-11-27		Abandoned	United States of America	A Process For Fabricating A Semiconductor Device Having A GATE Dielectric Layer With A High Dielectric Constant
10876183	7223677	2004-06-24	2007-05-29	Granted	United States of America	Process For Fabricating A Semiconductor Device Having An Insulating Layer Formed Over A Semiconductor Substrate
10814682		2004-03-31		Abandoned	United States of America	Semiconductor Device Having A Doped Lattice Matching Layer And A Method Of Manufacture Therefor
10003873	6737339	2001-10-24	2004-05-18	Granted	United States of America	Semiconductor Device Having A Doped Lattice Matching Layer And A Method Of Manufacture Therefor
10814680	6855991	2004-03-31	2005-02-15	Granted	United States of America	Semiconductor Device Having A Doped Lattice Matching Layer And A Method Of Manufacture Therefor
09605931		2000-06-28		Abandoned	United States of America	A Novel Gate Dielectric Structure For Reducing Boron Penetration And Current Leakage
10847789	7081419	2004-05-18	2006-07-25	Lapsed	United States of America	Gate Dielectric Structure For Reducing Boron Penetration And Current Leakage
09146418	6246095	1998-09-03	2001-06-12	Expired	United States of America	System And Method For Forming A Thin Gate Oxide Layer
08814670	5940736	1997-03-11	1999-08-17	Expired	United States of America	Method For Forming A High Quality Ultrathin Gate Oxide Layer
09086252	6060406	1998-05-28	2000-05-09	Granted	United States of America	MOS Transistors With Improved Gate Dielectrics
09519909	6590241	2000-03-07	2003-07-08	Lapsed	United States of America	MOS Transistors With Improved Gate Dielectrics
11821396	7800226	2007-06-22	2010-09-21	Lapsed	United States of America	Integrated Circuit With Metal Silicide Regions

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10245447	7250356	2002-09-17	2007-07-31	Granted	United States of America	Method For Forming Metal Silicide Regions In An Integrated Circuit
11827807	7632690	2007-07-13	2009-12-15	Lapsed	United States of America	Real-Time Gate Etch Critical Dimension Control By Oxygen Monitoring
10675572	7261745	2003-09-30	2007-08-28	Granted	United States of America	Real-Time Gate Etch Critical Dimension Control By Oxygen Monitoring
10978716	7642188	2004-11-01	2010-01-05	Lapsed	United States of America	Mixed Signal Integrated Circuit With Improved Isolation
09911035	6909150	2001-07-23	2005-06-21	Granted	United States of America	Mixed Signal Integrated Circuit With Improved Isolation
08150261	5467883	1993-11-27	1995-11-21	Expired	United States of America	Active Neural Network Control Of Wafer Attributes In A Plasma Etch Process
08468167	5737496	1995-06-06	1998-04-07	Expired	United States of America	Active Neural Network Control Of Wafer Attributes In A Plasma Etch Process
08446122	5653894	1995-05-19	1997-08-05	Expired	United States of America	Active Neural Network Determination Of Endpoint In A Plasma Etch Process
08848141	6054722	1997-04-28	2000-04-25	Expired	United States of America	Current Drive of TFTs in High\Speed SRAMs
08572196	5625200	1995-12-14	1997-04-29	Expired	United States of America	Complementary Devices Using Thin Film Transistors With Improved Current Drive
11385156	7282461	2006-03-21	2007-10-16	Granted	United States of America	Phase-Shifting Mask And Semiconductor Device
10655050	7053405	2003-09-04	2006-05-30	Lapsed	United States of America	Phase-Shifting Mask And Semiconductor Device
09488662	6638663	2000-01-20	2003-10-28	Granted	United States of America	Phase-Shifting Mask And Semiconductor Device
09335707	6197641	1999-06-18	2001-03-06	Granted	United States of America	Process For Fabricating Vertical Transistors
09143274	6027975	1998-08-28	2000-02-22	Granted	United States of America	Process For Fabricating Vertical Transistors
10226930	6869815	2002-08-22	2005-03-22	Granted	United States of America	Electro-Mechanical Device Having A Charge Dissipation Layer And Method Of Manufacture Therefor
10967900	7015056	2004-10-18	2006-03-21	Lapsed	United States of America	Electro-Mechanical Device Having A Charge Dissipation Layer And A Method Of Manufacture Therefor
08753859	5976623	1996-12-03	1999-11-02	Expired	United States of America	Process For Making Composite Films
09197833	6110543	1998-11-23	2000-08-29	Expired	United States of America	Process For Making Compound Films
09568265	6380083	2000-05-10	2002-04-30	Granted	United States of America	Process For Semiconductor Device Fabrication Having Copper Interconnects
09143037	6297154	1998-08-28	2001-10-02	Granted	United States of America	Process For Semiconductor Device Fabrication Having Copper Interconnects
09083168	5998099	1998-05-22	1999-12-07	Expired	United States of America	Energy-Sensitive Resist Material And A Process For Device Fabrication Using An Energy-Sensitive Resist Material
08813732	5879857	1997-03-07	1999-03-09	Expired	United States of America	Energy-Sensitive Resist Material And A Process For Device Fabrication Using An Energy-Sensitive Resist Material
08803703	5843624	1997-02-21	1998-12-01	Expired	United States of America	Energy-Sensitive Resist Material And A Process For Device Fabrication Using An Energy-Sensitive Resist Material

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09045062	6103615	1998-03-19	2000-08-15	Granted	United States of America	Corrosion sensitivity structures for vias and contact holes in integrated circuits
09464225	6278129	1999-12-15	2001-08-21	Granted	United States of America	Corrosion sensitivity structures for vias and contact holes in integrated circuits
09370501	6525377	1999-08-09	2003-02-25	Granted	United States of America	Low threshold voltage MOS transistor and method of manufacture
09107767	5985705	1998-06-30	1999-11-16	Granted	United States of America	Low threshold voltage MOS transistor and method of manufacture
09027307	6004880	1998-02-20	1999-12-21	Granted	United States of America	Method of single step damascene process for deposition and global planarization
09365440	6090239	1999-08-02	2000-07-18	Granted	United States of America	Method of single step damascene process for deposition and global planarization
09052851	6057571	1998-03-31	2000-05-02	Granted	United States of America	High aspect ratio, metal-to-metal, linear capacitor for an integrated circuit
09221023	6251740	1998-12-23	2001-06-26	Granted	United States of America	Method of forming and electrically connecting a vertical interdigitated metal-insulator-metal capacitor extending between interconnect layers in an integrated circuit
09219655	6417535	1998-12-23	2002-07-09	Granted	United States of America	Vertical interdigitated metal-insulator-metal capacitor for an integrated circuit
09052793	6358837	1998-03-31	2002-03-19	Granted	United States of America	Method of electrically connecting and isolating components with vertical elements extending between interconnect layers in an integrated circuit
09525489	6441419	2000-03-15	2002-08-27	Granted	United States of America	Encapsulated-metal vertical-interdigitated capacitor and damascene method of manufacturing same
09517150	6479857	2000-03-02	2002-11-12	Lapsed	United States of America	Capacitor having a tantalum lower electrode and method of forming the same
10228859	6861310	2002-08-27	2005-03-01	Lapsed	United States of America	Capacitor having a tantalum lower electrode and method of forming the same
09952343	6620729	2001-09-14	2003-09-16	Lapsed	United States of America	Ion beam dual damascene process
10400281		2003-03-27		Abandoned	United States of America	Ion Beam Double Damascene Process
09211024	6168502	1998-12-14	2001-01-02	Expired	United States of America	Subsonic to supersonic and ultrasonic conditioning of a polishing pad in a chemical mechanical polishing apparatus
08696445	5868608	1996-08-13	1999-02-09	Expired	United States of America	Subsonic to supersonic and ultrasonic conditioning of a polishing pad in a chemical mechanical polishing apparatus
60097750		1998-08-24		Expired	United States of America	Chemical mechanical polishing apparatus
09358606	6426131	1999-07-21	2002-07-30	Granted	United States of America	Off-Axis Pupil Aperture And Method For Making The Same
09844531	6596579	2001-04-27	2003-07-22	Granted	United States of America	Off-axis pupil aperture and method for making the same
10959868	7176082	2004-10-06	2007-02-13	Granted	United States of America	Method of forming analog capacitor dual damascene process
10409499	6822282	2003-04-08	2004-11-23	Granted	United States of America	Analog capacitor in dual damascene process
08578741		1995-12-26		Abandoned	United States of America	Integrated Circuit With On-Chip Ground Plane

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08867286	5892272	1997-06-02	1999-04-06	Expired	United States of America	Integrated circuit with on-chip ground base
08277344	5482897	1994-07-19	1996-01-09	Expired	United States of America	Integrated circuit with on-chip ground plane
08943371	5898228	1997-10-03	1999-04-27	Expired	United States of America	On-chip misalignment indication
09150076	6221681	1998-09-09	2001-04-24	Expired	United States of America	On-chip misalignment indication
08811818	5789028	1997-03-04	1998-08-04	Expired	United States of America	Method for eliminating peeling at end of semiconductor substrate in metal organic chemical vapor deposition of titanium nitride
09084027		1998-05-22		Abandoned	United States of America	Method And Apparatus For Eliminating Peeling At End Edge Of Semiconductor Substrate In Metal Organic Chemical Vapor Deposition Of Titanium Nitride
09158408		1998-09-22		Abandoned	United States of America	Deep Sub-Micron CMOS Device Exhibiting Artificially-Induced Reverse Short-Channel Effects
08761761	5874329	1996-12-05	1999-02-23	Expired	United States of America	Method for artificially-inducing reverse short-channel effects in deep sub-micron CMOS devices
08926220	6030460	1997-09-09	2000-02-29	Expired	United States of America	Method and apparatus for forming dielectric films
08653264	5710079	1996-05-24	1998-01-20	Expired	United States of America	Method and apparatus for forming dielectric films
10944995		2004-09-20		Abandoned	United States of America	Pseudo Low Volume Reticle (PLVR) Design for ASIC Manufacturing
12204290	7763414	2008-09-04	2010-07-27	Lapsed	United States of America	Pseudo Low Volume Reticle (PLVR) Design for ASIC Manufacturing
12191171	7646077	2008-08-13	2010-01-12	Granted	United States of America	Dielectric Barrier Films For Use As Copper Barrier Layers In Semiconductor Trench And Via Structures
10321938	6939800	2002-12-16	2005-09-06	Lapsed	United States of America	Dielectric barrier films for use as copper barrier layers in semiconductor trench and via structures
11131003	7427563	2005-05-16	2008-09-23	Granted	United States of America	Dielectric barrier films for use as copper barrier layers in semiconductor trench and via structures
10991107	7396760	2004-11-17	2008-07-08	Granted	United States of America	Method and system for reducing inter-layer capacitance in integrated circuits
12156281	8015540	2008-05-30	2011-09-06	Granted	United States of America	Method and System for Reducing Inter-Layer Capacitance in Integrated Circuits
10697506	7323228	2003-10-29	2008-01-29	Granted	United States of America	Method of vaporizing and ionizing metals for use in semiconductor processing
11939482	7670645	2007-11-13	2010-03-02	Lapsed	United States of America	Method of Treating Metal and Metal Salts to Enable Thin Layer Deposition in Semiconductor Processing
08502566	5543643	1995-07-13	1996-08-06	Expired	United States of America	Combined JFET and MOS transistor device, circuit
08612337	5631176	1996-03-06	1997-05-20	Expired	United States of America	Method of making combined JFET & MOS transistor device
11286546	7494842	2005-11-23	2009-02-24	Granted	United States of America	PROGRAMMABLE NANOTUBE INTERCONNECT
12354768	8415714	2009-01-15	2013-04-09	Granted	United States of America	PROGRAMMABLE NANOTUBE INTERCONNECT
11389643	7312127	2006-03-23	2007-12-25	Granted	United States of America	Incorporating dopants to enhance the dielectric properties of metal silicates

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10738761	7064062	2003-12-16	2006-06-20	Lapsed	United States of America	Incorporating dopants to enhance the dielectric properties of metal silicates
11768725	7492049	2007-06-26	2009-02-17	Lapsed	United States of America	Multi-layer Registration and Dimensional Test Mark for Scatterometrical Measurement
11046150	7258953	2005-01-28	2007-08-21	Lapsed	United States of America	Multi-layer registration and dimensional test mark for scatterometrical measurement
10035704	6727177	2001-10-18	2004-04-27	Granted	United States of America	Multi-step process for forming a barrier film for use in copper layer formation
11733673	7413984	2007-04-10	2008-08-19	Granted	United States of America	Multi-step process for forming a barrier film for use in copper layer formation
10772133	7229923	2004-02-03	2007-06-12	Granted	United States of America	Multi-step process for forming a barrier film for use in copper layer formation
08604867	5688709	1996-02-14	1997-11-18	Expired	United States of America	Method for forming composite trench-fin capacitors for DRAMS
08879341	6081008	1997-06-20	2000-06-27	Expired	United States of America	Composite trench-fin capacitors for DRAM
08438614		1995-05-10		Abandoned	United States of America	Microelectronic Integrated Circuit Including Triangular Semiconductor "Nand" Gate Device
08561107	5650653	1995-11-21	1997-07-22	Expired	United States of America	Microelectronic Integrated circuit including triangular CMOS nand gate device
08704472	5763302	1996-08-20	1998-06-09	Expired	United States of America	Self-aligned twin well process
08768845	5770492	1996-12-18	1998-06-23	Expired	United States of America	Self-aligned twin well process
08488075	5583062	1995-06-07	1996-12-10	Expired	United States of America	Self-aligned twin well process having a SiO2-polysilicon-SiO2 barrier mask
08521795	5585286	1995-08-31	1996-12-17	Expired	United States of America	Implantation of a semiconductor substrate with controlled amount of noble gas ions to reduce channeling and/or diffusion of a boron dopant subsequently implanted into the substrate to form P-LDD region of a PMOS device
08677078	5717238	1996-07-09	1998-02-10	Expired	United States of America	Substrate with controlled amount of noble gas ions to reduce channeling and/or diffusion of a boron dopant forming P-LDD region of a PMOS device
08374195	5598021	1995-01-18	1997-01-28	Expired	United States of America	MOS structure with hot carrier reduction
08695569	5663083	1996-08-12	1997-09-02	Expired	United States of America	Process for making improved MOS structure with hot carrier reduction
08939350	5858864	1997-09-29	1999-01-12	Expired	United States of America	Process for making group IV semiconductor substrate treated with one or more group IV elements to form barrier region capable of inhibiting migration of dopant materials in substrate

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AppNo	PatentNo	FiledDate	GrantDate	Status	Country	Title
08306179		1994-09-13		Abandoned	United States of America	Group IV Semiconductor Substrate Treated With One Or More Group IV Elements To Form Barrier Region Capable Of Inhibiting Migration Of Dopant Materials In Substrate And Process For Making Same
08434673	5654210	1995-05-04	1997-08-05	Expired	United States of America	Process for making group IV semiconductor substrate treated with one or more group IV elements to form one or more barrier regions capable of inhibiting migration of dopant materials in substrate
10791337		2004-03-01		Abandoned	United States of America	Spacer-Less Transistor Integration Scheme For High-K Gate Dielectrics And Small Gate-To-Gate Spaces Applicable To Si, SiGe And Strained Silicon Schemes
11960554	7955919	2007-12-19	2011-06-07	Granted	United States of America	Spacer-Less Transistor Integration Scheme For High-K Gate Dielectrics And Small Gate-To-Gate Spaces Applicable To Si, SiGe And Strained Silicon Schemes
07754201		1991-08-19		Abandoned	United States of America	Bicmos Compacted Logic Array
08410375	6081004	1995-03-27	2000-06-27	Expired	United States of America	BiCMOS compacted logic array
07523445		1990-05-14		Abandoned	United States of America	Bicmos Compacted Logic Array
08014084		1993-02-04		Abandoned	United States of America	Bicmos Compacted Logic Array
12574426	8021955	2009-10-06	2011-09-20	Granted	United States of America	Method Characterizing Materials For A Trench Isolation Structure Having Low Trench Parasitic Capacitance
11262173	7619294	2005-10-28	2009-11-17	Lapsed	United States of America	Shallow Trench Isolation Structure With Low Trench Parasitic Capacitance
09991202	7001823	2001-11-14	2006-02-21	Lapsed	United States of America	Method of manufacturing a shallow trench isolation structure with low trench parasitic capacitance
60314148		1900-01-01		Abandoned	United States of America	Process Enhancement to Prevent LI or Borderless Contact To Well Leakage
10360746	6893937	2003-02-05	2005-05-17	Granted	United States of America	Method for preventing borderless contact to well leakage
11104050	7098515	2005-04-11	2006-08-29	Lapsed	United States of America	Semiconductor chip with borderless contact that avoids well leakage
10006540	6551901	2001-11-30	2003-04-22	Granted	United States of America	Method for preventing borderless contact to well leakage
11090107	7312532	2005-03-24	2007-12-25	Granted	United States of America	Dual damascene interconnect structure with improved electro migration lifetimes
10328333	7033929	2002-12-23	2006-04-25	Lapsed	United States of America	Dual damascene interconnect structure with improved electro migration lifetimes
07982093		1997-11-24		Abandoned	United States of America	Improved Metal Oxide Semiconductors Devices And Method For Making Same
08259575	6432759	1994-06-14	2002-08-13	Granted	United States of America	Method of forming source and drain regions for CMOS devices
11258253	7582938	2005-10-25	2009-09-01	Lapsed	United States of America	I/O and Power ESD Protection Circuits by Enhancing Substrate-Bias In Deep-Submicron CMOS Process

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12506746	7948036	2009-07-21	2011-05-24	Granted	United States of America	I/O and Power ESD Protection Circuits by Enhancing Substrate-Bias In Deep-Submicron CMOS Process
13110581	8269280	2011-05-18	2012-09-18	Granted	United States of America	I/O and Power ESD Protection Circuits by Enhancing Substrate-Bias In Deep-Submicron CMOS Process
10676602	6979869	2003-10-01	2005-12-27	Granted	United States of America	Substrate-biased I/O and power ESD protection circuits in deep-submicron twin-well process
11838546	8134188	2007-08-14	2012-03-13	Granted	United States of America	Circuits And Methods For Improved FET Matching
13368985	8440512	2012-02-08	2013-05-14	Granted	United States of America	Circuits and Methods for Improved FET Matching
07591646	5123375	1990-10-02	1992-06-23	Expired	United States of America	Structure for filtering CVD chamber process gases
08979733	6113699	1997-11-26	2000-09-05	Expired	United States of America	Purging gas control structure for CVD chamber
08390329	5681613	1995-02-17	1997-10-28	Expired	United States of America	Filtering technique for CVD chamber process gases
07591587		1990-10-02		Abandoned	United States of America	Method For Performing In-Situ Etch Of A Cvd Chamber
07794780	5203956	1991-11-18	1993-04-20	Expired	United States of America	Method for performing in-situ etch of a CVD chamber
07591655		1990-10-02		Abandoned	United States of America	Apparatus For Performing In-Situ Etch Of A Cvd Chamber
07809104	5211796	1991-12-12	1993-05-18	Expired	United States of America	Apparatus for performing in-situ etch of CVD chamber
08979734		1997-11-26		Abandoned	United States of America	In-Situ Etch Of Cvd Chamber
07739773	5391394	1991-07-29	1995-02-21	Expired	United States of America	Tungsten deposition process for low contact resistivity to silicon
08851846	5853804	1997-05-06	1998-12-29	Expired	United States of America	Gas control technique for limiting surging of gas into a CVD chamber
07461959		1990-01-08		Abandoned	United States of America	Tungsten Deposition Process For Low Contact Resistivity To Silicon
07592014	5180432	1990-10-02	1993-01-19	Expired	United States of America	Apparatus for conducting a refractory metal deposition process
11937199	7660292	2007-11-08	2009-07-14	Lapsed	United States of America	Voltage Contrast Monitor for Integrated Circuit Defects
10652369	6936920	2003-08-29	2005-08-30	Lapsed	United States of America	Voltage contrast monitor for integrated circuit defects
11131705	7323768	2005-05-18	2008-01-29	Lapsed	United States of America	Voltage contrast monitor for integrated circuit defects
12890336	8527912	2010-09-24	2013-09-03	Lapsed	United States of America	Digitally Obtaining Contours of Fabricated Polygons
11182615	7827509	2005-07-15	2010-11-02	Granted	United States of America	Digitally Obtaining Contours of Fabricated Polygons
12652560	8106480	2010-01-05	2012-01-31	Granted	United States of America	Bipolar Device Having Improved Capacitance
11531477	7666750	2006-09-13	2010-02-23	Lapsed	United States of America	Bipolar Device Having Improved Capacitance
12018849	7582566	2008-01-24	2009-09-01	Lapsed	United States of America	Method and Apparatus For Redirecting Void Diffusion Away From Vias In An Integrated Circuit Design
11323400	7361965	2005-12-29	2008-04-22	Granted	United States of America	Method and apparatus for redirecting void diffusion away from vias in an integrated circuit design
10383149	6872612	2003-03-06	2005-03-29	Lapsed	United States of America	Local interconnect for integrated circuit
11058498	7081379	2005-02-15	2006-07-25	Lapsed	United States of America	Local interconnect for integrated circuit
10801310	7395522	2004-03-16	2008-07-01	Granted	United States of America	Yield profile manipulator
12117379	7930655	2008-05-08	2011-04-19	Granted	United States of America	Yield Profile Manipulator
11414902	7541238	2006-05-01	2009-06-02	Granted	United States of America	Inductor Formed In An Integrated Circuit
10953475	7068139	2004-09-29	2006-06-27	Granted	United States of America	Inductor Formed In An Integrated Circuit

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12340813	7678639	2008-12-22	2010-03-16	Granted	United States of America	Inductor Formed In An Integrated Circuit
11265062	7635888	2005-11-02	2009-12-22	Granted	United States of America	Interdigitated Capacitors
10886763	7022581	2004-07-08	2006-04-04	Granted	United States of America	Interdigitated Capacitors
12616050	8039923	2009-11-10	2011-10-18	Granted	United States of America	Interdigitated Capacitors
10454027	6880140	2003-06-04	2005-04-12	Lapsed	United States of America	Method to selectively identify reliability risk die based on characteristics of local regions on the wafer
11031564	7390680	2005-01-06	2008-06-24	Granted	United States of America	Method to selectively identify reliability risk die based on characteristics of local regions on the wafer
12728412	8227319	2010-03-22	2012-07-24	Granted	United States of America	A Bipolar Junction Treatment Having A High Germanium Concentration In A Silicon Germanium Layer and a Method for Forming the Bipolar Junction Transistor
10598213	7714361	2006-08-21	2010-05-11	Lapsed	United States of America	A Bipolar Junction Transistor Having A High Germanium Concentration In A Silicon-Germanium Layer And A Method For Forming The Bipolar Junction Transistor
13348415		2012-01-11		Abandoned	United States of America	A Bipolar Junction Transistor Having A High Germanium Concentration In A Silicon-Germanium Layer and a Method for Forming the Bipolar Junction Transistor
10669398	6784044	2003-09-24	2004-08-31	Granted	United States of America	High Dopant Concentration Diffused Resistor And Method Of Manufacture Thereof
10256466	6690082	2002-09-27	2004-02-10	Granted	United States of America	A High Dopant Concentration Diffused Resistor And Method Of Manufacture Thereof
12208929	7776678	2008-09-11	2010-08-17	Lapsed	United States of America	A Thermally Stable BiCMOS Fabrication Method And Bipolar Junction Transistors Formed According To The Method
11361430	7439119	2006-02-24	2008-10-21	Lapsed	United States of America	A Thermally Stable BiCMOS Fabrication Method And Bipolar Junction Transistors Formed According To The Method
12832110	8084313	2010-07-08	2011-12-27	Granted	United States of America	A Thermally Stable BiCMOS Fabrication Method And Bipolar Junction Transistor Formed According To The Method
10828993		2004-04-21		Abandoned	United States of America	Method For Making A Radio Frequency Component And Component Produced Thereby
09715651	6743731	2000-11-17	2004-06-01	Granted	United States of America	Method For Making A Radio Frequency Component And Component Produced Thereby
09528071	6530074	2000-03-17	2003-03-04	Granted	United States of America	Apparatus For Verification Of IC Mask Sets
10317147	7103869	2002-12-11	2006-09-05	Lapsed	United States of America	Method Of Verifying IC Mask Sets
10718536	7456064	2003-11-24	2008-11-25	Lapsed	United States of America	High K Dielectric Material And Method Of Making A High K Dielectric Material
10155173	6680130	2002-05-28	2004-01-20	Lapsed	United States of America	High K Dielectric Material And Method Of Making A High K Dielectric Material

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12506090	7981305	2009-07-20	2011-07-19	Granted	United States of America	High Density Field Emission Elements And A Method For Forming Said Emission Elements
11057690	7564178	2005-02-14	2009-07-21	Lapsed	United States of America	High Density Field Emission Elements and a Method for Forming Said Emission Elements
09901073	2001-07-09	2001-07-09		Abandoned	United States of America	Lateral High-Q Inductor For Semiconductor Devices
09416348	6292086	1999-10-12	2001-09-18	Granted	United States of America	Lateral High-Q Inductor For Semiconductor Devices
09894116	6458016	2001-06-28	2002-10-01	Granted	United States of America	Polishing Fluid, Polishing Method, Semiconductor Device And Semiconductor Device Fabrication Method
09483576	6375541	2000-01-14	2002-04-23	Granted	United States of America	Polishing Fluid, Polishing Method, Semiconductor Device and Semiconductor Device Fabrication Method
10637385	7067048	2003-08-08	2006-06-27	Lapsed	United States of America	Method to improve the control of electro-polishing by use of a plating electrode an electrolyte bath
11409377		2006-04-21		Abandoned	United States of America	Method To Improve The Control Of Electro-Polishing By Use Of A Plating Electrode In An Electrolyte Bath
10152879		2002-05-21		Abandoned	United States of America	Microstructure Control Of Copper Interconnects
09419986	6440849	1999-10-18	2002-08-27	Granted	United States of America	Microstructure Control Of Copper Interconnects
08814051	5936831	1997-03-06	1999-08-10	Expired	United States of America	Thin Film Tantalum Oxide Capacitors And Resulting Product
08918174	6075691	1997-08-25	2000-06-13	Expired	United States of America	THIN FILM CAPACITORS AND PROCESS FOR MAKING THEM
08678971	5821148	1996-07-12	1998-10-13	Expired	United States of America	Method of Fabricating a Segmented Emitter Low Noise Transistor
08484675	5723897	1995-06-07	1998-03-03	Expired	United States of America	Segmented Emitter Low Noise Transistor
096553616	6690037	2000-08-31	2004-02-10	Granted	United States of America	Field Plated Schottky Diode
10696136	6790753	2003-10-29	2004-09-14	Granted	United States of America	Field Plated Schottky Diode And Method Of Fabrication Thereof
09878657	6482694	2001-06-11	2002-11-19	Granted	United States of America	Semiconductor Device Structure Including A Tantalum Pentoxide Layer Sandwiched Between Silicon Nitride Layers
09259001	6294807	1999-02-26	2001-09-25	Granted	United States of America	Semiconductor Device Structure Including A Tantalum Pentoxide Layer Sandwiched Between Silicon Nitride Layers
11649197	7670203	2007-01-03	2010-03-02	Lapsed	United States of America	Process For Making An On-Chip Vacuum Tube Device
09651696	7259510	2000-08-30	2007-08-21	Granted	United States of America	On-Chip Vacuum Tube Device And Process For Making Device
09643784	6383923	2000-08-22	2002-05-07	Granted	United States of America	Article Comprising Vertically Nano-InterConnected Circuit Devices And Method For Making The Same
09426457	6340822	1999-10-05	2002-01-22	Granted	United States of America	Article Comprising Vertically Nano-InterConnected Circuit Devices And Method For Making The Same
11748569	7407824	2007-05-15	2008-08-05	Granted	United States of America	Guard Ring For Improved Matching
10941665	7253012	2004-09-14	2007-08-07	Granted	United States of America	Guard Ring For Improved Matching
10916322	7405116	2004-08-11	2008-07-29	Granted	United States of America	Application of gate edge liner to maintain gate length CD in a replacement gate transistor flow
12140773	8384165	2008-06-17	2013-02-26	Granted	United States of America	Application of Gate Edge Liner To Maintain Gate Length CD in A Replacement Gate Transistor Flow

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AppNo	PatentNo	FiledDate	GrantDate	Status	Country	Title
09410686	6410435	1999-10-01	2002-06-25	Granted	United States of America	Process For Fabricating Copper Interconnect For ULSI Integrated Circuits
10120707		2002-04-11		Abandoned	United States of America	Process For Fabricating Copper Interconnect For ULSI Integrated Circuits
12356600	8022481	2009-01-21	2011-09-20	Granted	United States of America	Robust Shallow Trench Isolation Structures And A Method For Forming Shallow Trench Isolation Structures
11321206	7514336	2005-12-29	2009-04-07	Lapsed	United States of America	Robust Shallow Trench Isolation Structures And A Method For Forming Shallow Trench Isolation Structures
09280103	6252245	1999-03-29	2001-06-26	Granted	United States of America	Device Comprising N-Channel Semiconductor Material
09476511	6387727	2000-01-03	2002-05-14	Granted	United States of America	Device Comprising N-Channel Semiconductor Material
11927950	7579245	2007-10-30	2009-08-25	Lapsed	United States of America	Dual-Gate Metal-Oxide Semiconductor Device
10999705	7329922	2004-11-30	2008-02-12	Granted	United States of America	Dual-Gate Metal-Oxide Semiconductor Device
09884736	6930056	2001-06-19	2005-08-16	Lapsed	United States of America	Plasma treatment of low dielectric constant dielectric material to form structures useful in formation of metal interconnects and/or filled vias for integrated circuit structure
10422270	6790784	2003-04-24	2004-09-14	Lapsed	United States of America	Plasma treatment of low dielectric constant dielectric material to form structures useful in formation of metal interconnects and/or filled vias for integrated circuit structure
11330550	7271485	2006-09-11	2007-09-18	Granted	United States of America	Systems And Methods For Distributing SiO_2 In A Semiconductor Device
11684674	7709861	2007-03-12	2010-05-04	Granted	United States of America	Systems And Methods For Supporting a Subset of Multiple Interface Types In A Semiconductor Device
09456224	6576529	1999-12-07	2003-06-10	Granted	United States of America	A Method Of Forming An Alignment Feature In Or On A Multi-Layered Semiconductor Structure
10704449	6977128	2003-11-07	2005-12-20	Lapsed	United States of America	Multi-Layered Semiconductor Structure
09867202	6706609	2001-05-29	2004-03-16	Granted	United States of America	Method Of Forming An Alignment Feature In Or On A Multi-Layered Semiconductor Structure
09804783	6586326	2001-03-13	2003-07-01	Lapsed	United States of America	Metal planarization system
10400278	6951808	2003-03-27	2005-10-04	Lapsed	United States of America	Metal planarization system
09617550	6569751	2000-07-17	2003-05-27	Granted	United States of America	Low via resistance system
10400252	6893962	2003-03-27	2005-05-17	Granted	United States of America	Low via resistance system
08718113	5804975	1996-09-18	1998-09-08	Expired	United States of America	Detecting Breakdown In Dielectric Layers
09002497	6043662	1998-01-02	2000-03-28	Expired	United States of America	Detecting Defects In Integrated Circuits
08702073	5969376	1996-08-23	1999-10-19	Expired	United States of America	An Organic Thin Film Transistor Having A Phthalocyanine Semiconductor Layer
09204002	6150191	1998-12-01	2000-11-21	Expired	United States of America	Method of Making an Organic Thin Film Transistor and Article Made by the Method
09135260	6015333	1998-08-17	2000-01-18	Expired	United States of America	Method Of Forming Planarized Layers In An Integrated Circuit

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08769717	5836805	1996-12-18	1998-11-17	Expired	United States of America	Method of Forming Planarized Layers In An Integrated Circuit
09083072	6024829	1998-05-21	2000-02-15	Granted	United States of America	Method Of Eliminating Agglomerate Particles In A Polishing Slurry
09427306	6355184	1999-10-26	2002-03-12	Granted	United States of America	A Method Of Eliminating Agglomerate Particles In A Polishing Slurry
09992135	6750145	2001-11-14	2004-06-15	Granted	United States of America	A Method Of Eliminating Agglomerate Particles In A Polishing Slurry
08344785	5576763	1994-11-22	1996-11-19	Expired	United States of America	Single-Polysilicon CMOS Active Pixel
08675026	5835141	1996-07-03	1998-11-10	Expired	United States of America	Single-Polysilicon CMOS Active Pixel Image Sensor
08872250	6118351	1997-06-10	2000-09-12	Expired	United States of America	A Micromagnetic Device For Power Processing Applications And Method Of Manufacture Therefor
09292860	6191495	1999-04-16	2001-02-20	Expired	United States of America	Micromagnetic Device Having An Anisotropic Ferromagnetic Core and Method of Manufacture Therefor
09511343	6440750	2000-02-23	2002-08-27	Expired	United States of America	Method Of Making Integrated Circuit Having A Micromagnetic Device
10387846	7021518	2003-03-13	2006-04-04	Lapsed	United States of America	Micromagnetic Device For Power Processing Applications And Method Of Manufacture Therefor
09978871	6696744	2001-10-15	2004-02-24	Expired	United States of America	Integrated Circuit Having A Micromagnetic Device And Method Of Manufacture Therefor
09109963	6163234	1998-07-02	2000-12-19	Expired	United States of America	A Micromagnetic Device For Data Transmission Applications And Method Of Manufacture Therefor
09490655	6160721	2000-01-24	2000-12-12	Expired	United States of America	A Micromagnetic Device For Power Processing Applications And Method Of Manufacture Therefor
10400279	6927494	2003-03-27	2005-08-09	Lapsed	United States of America	Local Interconnect
09966464	6576544	2001-09-28	2003-06-10	Granted	United States of America	Local Interconnect
08381375	5616368	1995-01-31	1997-04-01	Expired	United States of America	Field Emission Devices Employing Activated Diamond Particle Emitters And Methods For Making Same
08361616	5709577	1994-12-22	1998-01-20	Expired	United States of America	Method Of Making Field Emission Devices Employing Ultra-Fine Diamond Particle Emitters
09000647	5977697	1998-01-13	1999-11-02	Expired	United States of America	Field Emission Devices Employing Diamond Particle Emitters
10368760	6747358	2003-02-18	2004-06-08	Granted	United States of America	Self-aligned alloy capping layers for copper interconnect structures
10004461	6566262	2001-11-01	2003-05-20	Granted	United States of America	Method for creating self-aligned alloy capping layers for copper interconnect structures
09533428	6312565	2000-03-23	2001-11-06	Granted	United States of America	Thin Film Deposition Of Mixed Metal Oxides
09917365	6540974	2001-07-27	2003-04-01	Granted	United States of America	Process For Making Mixed Metal Oxides
10038734	6762459	2001-12-31	2004-07-13	Granted	United States of America	Method For Fabricating MOS Device With Halo Implanted Region
09523782	6362054	2000-03-13	2002-03-26	Granted	United States of America	Method For Fabricating MOS Device With Halo Implanted Region
10368811	6977400	2003-02-18	2005-12-20	Lapsed	United States of America	Silicon germanium CMOS channel
09724444	6544854	2000-11-28	2003-04-08	Granted	United States of America	Silicon germanium CMOS channel

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10641768	6987059	2003-08-14	2006-01-17	Granted	United States of America	Method and structure for creating ultra low resistance damascene copper wiring
11259965	7196420	2005-10-26	2007-03-27	Granted	United States of America	Method and structure for creating ultra low resistance damascene copper wiring
10802522		2004-03-17		Abandoned	United States of America	Interconnect Integration
10448082	6777807	2003-05-29	2004-08-17	Granted	United States of America	Interconnect Integration
11314649		2005-12-21		Abandoned	United States of America	Variable Mask Field Exposure
12167381	7638245	2008-07-03	2009-12-29	Lapsed	United States of America	Variable Mask Field Exposure
10429376	7018753	2003-05-05	2006-03-28	Lapsed	United States of America	Variable mask field exposure
10951646		2004-09-28		Abandoned	United States of America	Plasma Removal Of High K Metal Oxide
10413051	7413996	2003-04-14	2008-08-19	Granted	United States of America	High k gate insulator removal
11337460	7220362	2006-01-23	2007-05-22	Granted	United States of America	Planarization with reduced dishing
10421068	7029591	2003-04-23	2006-04-18	Lapsed	United States of America	Planarization with reduced dishing
11695169		2007-04-02		Abandoned	United States of America	Planarization with Reduced Dishing
09894117	6439972	2001-06-28	2002-08-27	Granted	United States of America	Polishing Fluid, Polishing Method, Semiconductor Device And Semiconductor Device Fabrication Method
09483785	6328633	2000-01-14	2001-12-11	Granted	United States of America	Polishing Fluid, Polishing Method, Semiconductor Device And Semiconductor Device Fabrication Method
10964032		2004-10-12		Abandoned	United States of America	Via and Metal Line Interface Capable of Reducing the Incidence of Electro-Migration Induced Voids
10400297	6875693	2003-03-26	2005-04-05	Granted	United States of America	Via and metal line interface capable of reducing the incidence of electro-migration induced voids
11189625		2005-07-25		Abandoned	United States of America	Memory Device Having an Electron Trapping Layer In a High-K Dielectric Gate Stack
10123263	7132336	2002-04-15	2006-11-07	Granted	United States of America	Method and apparatus for forming a memory structure having an electron affinity region
10698169	6989565	2003-10-31	2006-01-24	Lapsed	United States of America	Memory device having an electron trapping layer in a high-k dielectric gate stack
09879642	6495312	2001-06-12	2002-12-17	Granted	United States of America	Method and apparatus for removing photoresist edge beads from thin film substrates
10263593	6614507	2002-10-03	2003-09-02	Granted	United States of America	Apparatus for removing photoresist edge beads from thin film substrates
09775223		2001-02-01		Abandoned	United States of America	Method and Apparatus for Removing Photoresist Edge Beads From Thin Film Substrates
10196787	6787180	2002-07-17	2004-09-07	Granted	United States of America	Exhaust flow control system
0966507	6579371	2000-09-20	2003-06-17	Granted	United States of America	Exhaust flow control system
10328614	6972217	2002-12-23	2005-12-06	Lapsed	United States of America	Low k polymer E-beam printable mechanical support

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11225310	7358594	2005-09-12	2008-04-15	Granted	United States of America	Method of forming a low k polymer E-beam printable mechanical support
10243562	6885436	2002-09-13	2005-04-26	Lapsed	United States of America	Optical error minimization in a semiconductor manufacturing apparatus
11473627	7298458	2006-06-22	2007-11-20	Granted	United States of America	Optical error minimization in a semiconductor manufacturing apparatus
11075195	7098996	2005-03-07	2006-08-29	Lapsed	United States of America	Optical error minimization in a semiconductor manufacturing apparatus
09074837	6090656	1998-05-08	2000-07-18	Granted	United States of America	Linear capacitor and process for making same
09550381	6545305	2000-04-14	2003-04-08	Granted	United States of America	Linear capacitor and process for making same
10623082	7160805	2003-07-17	2007-01-09	Granted	United States of America	Inter-layer interconnection structure for large electrical connections
10272767	6642597	2002-10-16	2003-11-04	Granted	United States of America	Inter-layer interconnection structure for large electrical connections
10197956	6807655	2002-07-16	2004-10-19	Lapsed	United States of America	Adaptive off tester screening method based on intrinsic die parametric measurements
60381746		2002-05-17		Expired	United States of America	Process and Apparatus for Wafer Edge Profile Control Using Gas Flow Control Ring
10821708		2004-04-09		Abandoned	United States of America	Process and Apparatus for Wafer Edge Profile Control Using Gas Flow Control Ring
10200469	6753255	2002-07-18	2004-06-22	Granted	United States of America	Process for wafer edge profile control using gas flow control ring
10160812	6613637	2002-05-31	2003-09-02	Granted	United States of America	Composite spacer scheme with low overlapped parasitic capacitance
10458141	6737342	2003-06-09	2004-05-18	Granted	United States of America	Composite spacer scheme with low overlapped parasitic capacitance
10253158	6713394	2002-09-24	2004-03-30	Granted	United States of America	Process for planarization of integrated circuit structure which inhibits cracking of low dielectric constant dielectric material adjacent underlying raised structures
09661465	6489242	2000-09-13	2002-12-03	Granted	United States of America	Process for planarization of integrated circuit structure which inhibits cracking of low dielectric constant dielectric material adjacent underlying raised structures
10417708	7056392	2003-04-16	2006-06-06	Lapsed	United States of America	Process for planarization of integrated circuit structure which inhibits cracking of low dielectric constant dielectric material adjacent underlying raised structures
11403137	7201176	2006-04-11	2007-04-10	Granted	United States of America	Process for planarization of integrated circuit structure which inhibits cracking of low dielectric constant dielectric material adjacent underlying raised structures
09467622	6375791	1999-12-20	2002-04-23	Granted	United States of America	Wafer chucking apparatus and method for spin processor
10012847	6716364	2001-12-10	2004-04-06	Granted	United States of America	Method and apparatus for detecting presence of residual polishing slurry subsequent to polishing of a semiconductor wafer
10185537	6699766	2002-07-01	2004-03-02	Granted	United States of America	Method and apparatus for detecting presence of residual polishing slurry subsequent to polishing of a semiconductor wafer
					United States of America	Method of fabricating an integral capacitor and gate transistor having nitride and oxide polish stop layers using chemical mechanical polishing elimination

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AppNo	PatentNo	FiledDate	GrantDate	Status	Country	Title
10733034	7148146	2003-12-11	2006-12-12	Granted	United States of America	Method of fabricating an integral capacitor and gate transistor having nitride and oxide polish stop layers using chemical mechanical polishing elimination
10013572	6614093	2001-12-11	2003-09-02	Granted	United States of America	Integrated inductor in semiconductor manufacturing
10463158		2003-06-16		Abandoned	United States of America	Integrated inductor in semiconductor manufacturing
60292832		2001-05-21		Expired	United States of America	Web-Bases Interface With Defect Database To View And Update Failure Events
10128534	6775630	2002-04-23	2004-08-10	Granted	United States of America	Web-based interface with defect database to view and update failure events
10845716		2004-05-14		Abandoned	United States of America	Method And Structure For Forming Dielectric Layers Having Reduced Dielectric Constants
10180661	6774057	2002-06-25	2004-08-10	Granted	United States of America	Method and structure for forming dielectric layers having reduced dielectric constants
09968944	6472314	2001-10-02	2002-10-29	Granted	United States of America	Diamond barrier layer
10238073	6734560	2002-09-09	2004-05-11	Granted	United States of America	Diamond barrier layer
10035501	6743474	2001-10-25	2004-06-01	Granted	United States of America	Method for growing thin films
10804980	7081296	2004-03-16	2006-07-25	Lapsed	United States of America	Method for growing thin films
11906196	8631547	2007-10-01	2014-01-21	Granted	United States of America	Method Of Isolation For Acoustic Resonator Devices
09497993	7296329	2000-02-04	2007-11-20	Granted	United States of America	Method Of Isolation For Acoustic Resonator Devices
12243137	7713811	2008-10-01	2010-05-11	Lapsed	United States of America	Multiple Doping Level Bipolar Junctions Transistors And Method For Forming
12727304	7910425	2010-03-19	2011-03-22	Granted	United States of America	Multiple Doping Level Bipolar Junctions Transistors And Method For Forming
10953894	7095094	2004-09-29	2006-08-22	Lapsed	United States of America	Multiple Doping Level Bipolar Junctions Transistors And Method For Forming
13026528	8143120	2011-02-14	2012-03-27	Granted	United States of America	Multiple Doping Level Bipolar Junctions Transistors And Method For Forming
11458270	7449388	2006-07-18	2008-11-11	Lapsed	United States of America	Method For Forming Multiple Doping Level Bipolar Junctions Transistors
10955238	7345364	2004-09-30	2008-03-18	Granted	United States of America	Structure And Method For Improved Heat Conduction For Semiconductor Devices
11968693	7498204	2008-01-03	2009-03-03	Granted	United States of America	Structure And Method For Improved Heat Conduction For Semiconductor Devices
10773900	7078280	2004-02-06	2006-07-18	Lapsed	United States of America	Vertical Replacement-Gate Silicon-On-Insulator Transistor
11419356	7259048	2006-05-19	2007-08-21	Granted	United States of America	Vertical Replacement-Gate Silicon-On-Insulator Transistor
09968234	6709904	2001-09-28	2004-03-23	Granted	United States of America	Vertical Replacement-Gate (VRG) Silicon-On-Insulator (SOI) CMOS Transistor
09968388		2001-09-28		Abandoned	United States of America	Lithographically Defined CMOS Threshold Voltage

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10619058	7049199	2003-07-14	2006-05-23	Granted	United States of America	Method Of Ion Implantation For Achieving Desired Dopant Concentration
09961477	6686604	2001-09-21	2004-02-03	Granted	United States of America	Multiple Operating Voltage Vertical Replacement-Gate (VRG) Transistor
10684713	7056783	2003-10-14	2006-06-06	Lapsed	United States of America	Multiple Operating Voltage Vertical Replacement-Gate (VRG) Transistor
10409423	6821831	2003-04-08	2004-11-23	Lapsed	United States of America	Electrostatic Discharge Protection In Double Diffused MOS Transistors
09896669	6576506	2001-06-29	2003-06-10	Granted	United States of America	Electrostatic Discharge Protection In Double Diffused MOS Transistors
10777250	6873171	2004-02-12	2005-03-29	Granted	United States of America	Integrated Circuit Early Life Failure Detection By Monitoring Changes In Current Signatures
09558130	6714032	2000-04-25	2004-03-30	Granted	United States of America	Integrated Circuit Early Life Failure Detection By Monitoring Changes In Current Signatures
10147384	6683382	2002-05-16	2004-01-27	Granted	United States of America	Semiconductor Device Having An Interconnect Layer And A Semiconductor Device Method For Making An Interconnect Layer And A Semiconductor Device Including The Same
09484310	6436807	2000-01-18	2002-08-20	Granted	United States of America	Semiconductor Device Having Aluminum Contacts Or Vias And Method Of Manufacture Therefor
08820063	5913146	1997-03-18	1999-06-15	Expired	United States of America	Semiconductor Device Having Aluminum Contacts Or Vias And Method Of Manufacture Therefor
09166832	6157082	1998-10-05	2000-12-05	Expired	United States of America	Integrated Circuit Having Amorphous Silicide Layer In Contacts And Vias
09073556	6028359	1998-05-06	2000-02-22	Expired	United States of America	Integrated Circuit Having Amorphous Silicide Layer In Contacts And Vias And Method Of Manufacture Therefor
08816185	5858873	1997-03-12	1999-01-12	Expired	United States of America	Integrated Circuit Having Amorphous Silicide Layer In Contacts And Vias And Method Of Manufacture Therefor
09523210	6139995	2000-03-10	2000-10-31	Granted	United States of America	Method Of Manufacturing Schottky Gate Transistor Utilizing Alignment Techniques With Multiple Photoresist Layers
09111534	6042975	1998-07-08	2000-03-28	Granted	United States of America	Alignment Techniques For Photolithography
09049531	6033202	1998-03-27	2000-03-07	Granted	United States of America	Mold For Non-Photolithographic Fabrication Of Microstructures
09393032	6322736	1999-09-09	2001-11-27	Granted	United States of America	Mold For Non-Photolithographic Fabrication Of Microstructures
11999168	8153484	2007-12-04	2012-04-10	Granted	United States of America	Metal-Oxide-Semiconductor Device Having Trenched Diffusion Region And Method Of Forming Same
13428540	8648445	2012-03-23	2014-02-11	Lapsed	United States of America	Metal-Oxide-Semiconductor Device Having Trenched Diffusion Region And Method Of Forming Same
10953477	7338569	2004-09-29	2008-03-04	Granted	United States of America	Method And System Of Using Offset Gag For CMP Polishing Pad Alignment And Adjustment

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AppNo	PatentNo	FiledDate	GrantDate	Status	Country	Title
11968930	7527544	2008-01-03	2009-05-05	Lapsed	United States of America	System Of Using Offset Gage For CMP Polishing Pad Alignment And Adjustment
09150529	6215158	1998-09-10	2001-04-10	Granted	United States of America	Device And Method For Forming Semiconductor Interconnections In An Integrated Circuit Substrate
09631546	6503787	2000-08-03	2003-01-07	Granted	United States of America	Device And Method For Forming Semiconductor Interconnections In An Integrated Circuit Substrate
11641507	7537984	2006-12-19	2009-05-26	Lapsed	United States of America	III-V Power Field Effect Transistors
10948897	7180103	2004-09-24	2007-02-20	Granted	United States of America	III/V Power Field Effect Transistors
10926631	7109589	2004-08-26	2006-09-19	Granted	United States of America	Integrated Circuit With Substantially Perpendicular Wire Bonds
11494221	7465655	2006-07-27	2008-12-16	Granted	United States of America	Integrated Circuit With Substantially Perpendicular Wire Bonds
08752235	5811916	1996-11-19	1998-09-22	Expired	United States of America	Field Emission Devices Employing Enhanced Diamond Field Emitters
08752234	5744195	1996-11-19	1998-04-28	Expired	United States of America	Field Emission Devices Employing Enhanced Diamond Field Emitters
08331458	5637950	1994-10-31	1997-06-10	Expired	United States of America	Field Emission Devices Employing Enhanced Diamond Field Emitters
10850812	7235489	2004-05-21	2007-06-26	Granted	United States of America	Device And Method To Eliminate Shorting Induced By Via To Metal Misalignment
11738050	7675179	2007-04-20	2010-03-09	Lapsed	United States of America	Device And Method To Eliminate Shorting Induced By Via To Metal Misalignment
09246402	6214675	1999-02-08	2001-04-10	Granted	United States of America	A Method For Fabricating A Merged Integrated Circuit Device
09789254	6627963	2001-02-20	2003-09-30	Granted	United States of America	Method For Fabricating A Merged Integrated Circuit Device
10300254	6762457	2002-11-20	2004-07-13	Granted	United States of America	LDMOS Device Having A Tapered Oxide
09641086	6506641	2000-08-17	2003-01-14	Granted	United States of America	The Use Of Selective Oxidation To Improve LDMOS Power Transistors
11419252	7381607	2006-05-19	2008-06-03	Granted	United States of America	A Method Of Forming A Spiral Inductor In A Semiconductor Substrate
10646997	7075167	2003-08-22	2006-07-11	Lapsed	United States of America	A Spiral Inductor Formed In A Semiconductor Substrate And A Method For Forming The Inductor
09335646		1999-06-18		Abandoned	United States of America	A CMOS Integrated Circuit Having Vertical Transistors And A Process For Fabricating Same
10211674	6653181	2002-08-02	2003-11-25	Granted	United States of America	A CMOS Integrated Circuit Having Vertical Transistors And A Process For Fabricating Same
10918981	7345354	2004-08-16	2008-03-18	Granted	United States of America	Increased Quality Factor Of A Varactor In An Integrated Circuit Via A High Conductive Region In A Well
10454133	6825089	2003-06-04	2004-11-30	Granted	United States of America	Increased Quality Factor Of A Varactor In An Integrated Circuit Via A High Conductive Region In A Well
09652479	6373087	2000-08-31	2002-04-16	Granted	United States of America	Methods of Fabricating A Metal-Oxide-Metal Capacitor And Associated Apparatus
10080186	6730601	2002-02-21	2004-05-04	Granted	United States of America	Methods of Fabricating A Metal-Oxide-Metal Capacitor

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11116903	7297606	2005-04-28	2007-11-20	Granted	United States of America	Metal\lmiOxide\lmiSemiconductor Device Including A Buried Lightly\lmiDoped Drain Region
10675633	6927453	2003-09-30	2005-08-09	Lapsed	United States of America	Metal-Oxide-Semiconductor Device Including A Buried Lightly-Doped Drain Region
09540473	6373266	2000-03-31	2002-04-16	Granted	United States of America	Apparatus And Method For Determining Process Width Variations In Integrated Circuits
10053097	6728940	2002-01-18	2004-04-27	Granted	United States of America	Apparatus And Method For Determining Process Width Variations In Integrated Circuits
08353015	5576240	1994-12-09	1996-11-19	Expired	United States of America	Method For Making A Metal to metal Capacitor
08644086	5851870	1996-05-09	1998-12-22	Expired	United States of America	Method For Making A Capacitor
08472033	5654581	1995-06-06	1997-08-05	Expired	United States of America	Integrated Circuit Capacitor
08909563	6040616	1997-08-12	2000-03-21	Expired	United States of America	A Device and Method of Forming A Metal To Metal Capacitor Within an Integrated Circuit
08863713	5825073	1997-05-27	1998-10-20	Expired	United States of America	An Electronic Component For An Integrated Circuit
10179057		2002-06-25		Abandoned	United States of America	A Graded Grown Gate Oxide (G3) For A Vertical Replacement Gate (VRG) MOSFET.
10986984	7169714	2004-11-12	2007-01-30	Granted	United States of America	Method And Structure For Graded Gate Oxides On Vertical And Non-Planar Surfaces
09481992	6541394	2000-01-11	2003-04-01	Granted	United States of America	Method Of Making A Graded Grown, High Quality Oxide Layer For A Semiconductor Device
10171701	6432812	2002-06-14	2002-08-13	Abandoned	United States of America	Coupling Capacitance Reduction
09906331		2001-07-16	2002-08-13	Granted	United States of America	Method of coupling capacitance reduction
11392375		2006-03-29		Abandoned	United States of America	High\lmiDensity Inter\lmiDie Interconnect Structure
10638248	7045835	2003-08-08	2006-05-16	Granted	United States of America	High\lmiDensity Inter\lmiDie Interconnect Structure
11540056	7239160	2006-09-29	2007-07-03	Granted	United States of America	Method Of Electrical Testing Of An Integrated Circuit With An Electrical Probe
11138152	7132840	2005-05-26	2006-11-07	Granted	United States of America	Method Of Electrical Testing
08979297	5849639	1997-11-26	1998-12-15	Granted	United States of America	Method For Removing Etching Residues And Contaminants
09164283	6046115	1998-10-01	2000-04-04	Granted	United States of America	Method For Removing Etching Residues and Contaminants
09434424	6284663	1999-11-04	2001-09-04	Granted	United States of America	Method For Making Field Effect Devices And Capacitors With Improved Dielectrics And Resulting Devices
099060420	6001741	1998-04-15	1999-12-14	Granted	United States of America	Method For Making Field Effect Devices And Capacitors With Improved Thin Film Dielectrics And Resulting Devices
09651447	6670242	2000-08-30	2003-12-30	Granted	United States of America	Method For Making An Integrated Circuit Device Including A Graded, Grown, High Quality Gate Oxide Layer And A Nitride Layer
09651593		2000-08-30		Abandoned	United States of America	Method For Making An Integrated Circuit Device Including A Graded, Grown, High Quality Gate Oxide Layer And A Gate Electrode Layer With Improved Dopant Activation

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09651857		2000-08-30		Abandoned	United States of America	Integrated Circuit Device Including a Graded, Grown, High Quality Gate Oxide Layer
09651592		2000-08-30		Abandoned	United States of America	Flash Device w/(SiG3 (High Temperature) Oxide Grown In FTP or RTP Furnace
09651458		2000-08-30		Abandoned	United States of America	Integrated Circuit Device Including a Graded, Grown, High Quality Gate Oxide Layer And a Nitride Layer
09651450		2000-08-30		Abandoned	United States of America	Method For Making A High Quality, Graded, Grown Gate Oxide Layer Including Native Oxide Removal
09651451		2000-08-30		Abandoned	United States of America	Method For Making An Integrated Circuit Device Including A Graded, Grown, High Quality Gate Oxide Layer
09015981	6153920	1998-01-30	2000-11-28	Expired	United States of America	A Semiconductor Device Configured to Control Dopant Diffusion In the Semiconductor Device Substrate
08862226	5731626	1997-05-23	1998-03-24	Expired	United States of America	Process For Controlling Dopant Diffusion In A Semiconductor Layer And Semiconductor Layer Formed Thereby
09650164	6635116	2000-08-29	2003-10-21	Granted	United States of America	Residual oxygen reduction system
10640530		2003-08-13		Abandoned	United States of America	Residual Oxygen Reduction System
09006918	6133077	1998-01-13	2000-10-17	Granted	United States of America	Formation of high-voltage and low-voltage devices on a semiconductor substrate
09495512	6194766	2000-02-01	2001-02-27	Granted	United States of America	Integrated circuit having low voltage and high voltage devices on a common semiconductor substrate
09724225	6521549	2000-11-28	2003-02-18	Granted	United States of America	Method of reducing silicon oxynitride gate insulator thickness in some transistors of a hybrid integrated circuit to obtain increased differential in gate insulator thickness with other transistors of the hybrid circuit
10304631	6656805	2002-11-26	2003-12-02	Lapsed	United States of America	Method of reducing silicon oxynitride gate insulator thickness in some transistors of a hybrid integrated circuit to obtain increased differential in gate insulator thickness with other transistors of the hybrid circuit
10260824	7118985	2002-09-27	2006-10-10	Lapsed	United States of America	Method of forming a metal-insulator-metal capacitor in an interconnect cavity
09496971	6504202	2000-02-02	2003-01-07	Granted	United States of America	Interconnect-embedded metal-insulator-metal capacitor
09442078	6179956	1999-11-16	2001-01-30	Granted	United States of America	Method and apparatus for using across wafer back pressure differentials to influence the performance of chemical mechanical polishing
09005364		1998-01-09		Abandoned	United States of America	Method And Apparatus For Using Across Wafer Back Pressure Differentials To Influence The Performance Of Chemical Mechanical Polishing

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09427572	6174798	1999-10-26	2001-01-16	Granted	United States of America	Process for forming metal interconnect stack for integrated circuit structure
09261270	6087726	1999-03-01	2000-07-11	Granted	United States of America	Metal interconnect stack for integrated circuit structure
09454257	6297558	1999-12-02	2001-10-02	Expired	United States of America	Slurry filling a recess formed during semiconductor fabrication
08899111	6069085	1997-07-23	2000-05-30	Expired	United States of America	Slurry filling a recess formed during semiconductor fabrication
10706120	6855586	2003-11-12	2005-02-15	Granted	United States of America	Low voltage breakdown element for ESD trigger device
10055082	6710990	2002-01-22	2004-03-23	Granted	United States of America	Low voltage breakdown element for ESD trigger device
10153011	6794756	2002-05-21	2004-09-21	Granted	United States of America	Integrated circuit structure having low dielectric constant material and having silicon oxynitride caps over closely spaced apart metal lines
09425552	6423628	1999-10-22	2002-07-23	Granted	United States of America	Method of forming integrated circuit structure having low dielectric constant material and having silicon oxynitride caps over closely spaced apart metal lines
09583434	6383332	2000-05-31	2002-05-07	Granted	United States of America	Endpoint detection method and apparatus which utilize a chelating agent to detect a polishing endpoint
09212503	6117779	1998-12-15	2000-09-12	Granted	United States of America	Endpoint detection method and apparatus which utilize a chelating agent to detect a polishing endpoint
08768905	5821572	1996-12-17	1998-10-13	Expired	United States of America	Simple BICMOS process for creation of low trigger voltage SCR and zener diode pad protection
09081475	6130117	1998-05-19	2000-10-10	Expired	United States of America	Simple BICMOS process for creation of low trigger voltage SCR and zener diode pad protection
08469293	5736680	1995-06-06	1998-04-07	Abandoned	United States of America	Polymorphic Rectilinear Thieving Pad
08781992	5736680	1997-01-06	1998-04-07	Expired	United States of America	Polymorphic rectilinear thieving pad
09395507	6328802	1999-09-14	2001-12-11	Granted	United States of America	Method and apparatus for determining temperature of a semiconductor wafer during fabrication thereof
09952540	6794310	2001-09-14	2004-09-21	Granted	United States of America	Method and apparatus for determining temperature of a semiconductor wafer during fabrication thereof
09070188	5920110	1998-04-30	1999-07-06	Expired	United States of America	Antifuse device for use on a field programmable interconnect chip
08534008	5844297	1995-09-26	1998-12-01	Expired	United States of America	Antifuse device for use on a field programmable interconnect chip
09245193	6063672	1999-02-05	2000-05-16	Granted	United States of America	NMOS electrostatic discharge protection device and method for CMOS integrated circuit
09476295		1999-12-30		Abandoned	United States of America	NMOS Electrostatic Discharge Protection Device and Method for CMOS Integrated Circuit
09072705	6066560	1998-05-05	2000-05-23	Granted	United States of America	Non-linear circuit elements on integrated circuits
09467340	6228767	1999-12-20	2001-05-08	Granted	United States of America	Non-linear circuit elements on integrated circuits
09228906	6261406	1999-01-11	2001-07-17	Lapsed	United States of America	Confinement device for use in dry etching of substrate surface and method of dry etching a wafer surface

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09884805	6852243	2001-06-18	2005-02-08	Lapsed	United States of America	Confinement device for use in dry etching of substrate surface and
10893659	7071094	2004-07-16	2006-07-04	Granted	United States of America	Dual layer barrier film techniques to prevent resist poisoning
11418873	7393780	2006-05-04	2008-07-01	Granted	United States of America	Dual layer barrier film techniques to prevent resist poisoning
09896363	6812134	2001-06-28	2004-11-02	Granted	United States of America	Input/Output Core Design and Method of Manufacture Therefor
12947948	8289051	2010-11-17	2012-10-16	Lapsed	United States of America	Input/Output Core Design and Method of Manufacture Therefor
13443691		2012-04-10		Abandoned	United States of America	
2008801316818	ZL200880131681.8	2008-09-19	2013-06-19	Lapsed	China	Allotropic Or Morphologic Change In Silicon Induced By Electromagnetic Radiation For Resistance Tuning Of Integrated Circuits
14073526		2013-11-06		Abandoned	United States of America	Allotropic Or Morphologic Change In Silicon Induced By Electromagnetic Radiation For Resistance Tuning Of Integrated Circuits
098130968	1413235	2009-09-14	2013-10-21	Lapsed	Taiwan	Allotropic Or Morphologic Change In Silicon Induced By Electromagnetic Radiation For Resistance Tuning Of Integrated Circuits
13119005	8610215	2011-03-15	2013-12-17	Granted	United States of America	Allotropic Or Morphologic Change In Silicon Induced By Electromagnetic Radiation For Resistance Tuning Of Integrated Circuits
1020117008762	10-1306685	2008-09-19	2013-09-04	Lapsed	Korea, Republic of (KR)	Allotropic Or Morphologic Change In Silicon Induced By Electromagnetic Radiation For Resistance Tuning Of Integrated Circuits
08430084	5891784	1995-04-27	1999-04-06	Expired	United States of America	Transistor Fabrication Method
08587061	6498080	1996-01-16	2002-12-24	Expired	United States of America	Transistor Fabrication Method
12114589		2008-05-02		Abandoned	United States of America	Transistor Fabrication Method
10224220		2002-08-20		Abandoned	United States of America	Transistor Fabrication Method
12689749	8030199	2010-01-19	2011-10-04	Granted	United States of America	Transistor Fabrication Method
08832245	5780329	1997-04-03	1998-07-14	Expired	United States of America	Process for fabricating a moderate-depth diffused emitter bipolar transistor in a BICMOS device without using an additional mask
08823305	6211096	1997-03-21	2001-04-03	Expired	United States of America	Tunable dielectric constant oxide and method of manufacture
2000008156	4777494	2000-01-17	2011-07-08	Granted	Japan	Pyrogenic Devoid Wet Oxidation
09231265	6335295	1999-01-15	2002-01-01	Granted	United States of America	Flame-free wet oxidation
10094520	6654226	2002-03-08	2003-11-25	Lapsed	United States of America	Thermal low k dielectrics
09064802	6418353	1998-04-22	2002-07-09	Granted	United States of America	Automating photolithography in the fabrication of integrated circuits
1998287829	4555410	1998-10-09	2010-07-23	Lapsed	Japan	Apparatus And A Method For Forming An Oxide Film On A Semiconductor

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09474666	6323106	1999-12-29	2001-11-27	Granted	United States of America	Dual nitrogen implantation techniques for oxynitride formation in semiconductor devices
1998096236	4565674	1998-04-08	2010-08-13	Lapsed	Japan	Pre-Conditioning Polishing Pads For Chemical-Mechanical Polishing
87102678	115428	1998-02-25	2000-05-11	Lapsed	Taiwan	Method For Artificially-Inducing Reverse Short-Channel Effects In Deep Sub-Micron Cmos Devices
09098019	6147409	1998-06-15	2000-11-14	Granted	United States of America	Modified multilayered metal line structure for use with tungsten-filled vias in integrated circuit structures
09920890	6601008	2001-08-02	2003-07-29	Granted	United States of America	Parametric device signature
09098032	6037262	1998-06-15	2000-03-14	Granted	United States of America	Process for forming vias, and trenches for metal lines, in multiple dielectric layers of integrated circuit structure
87103103	135215	1998-03-04	2001-06-07	Lapsed	Taiwan	Insulated-Gate Field-Effect Transistors Having Different Gate Capacitances
09896958	6358806	2001-06-29	2002-03-19	Granted	United States of America	Silicon carbide CMOS channel
10014449	4381491	1998-01-27	2009-10-02	Lapsed	Japan	Insulated-Gate Field-Effect Transistors Having Different Gate Capacitances
1998094757	4996781	1998-04-07	2012-05-18	Lapsed	Japan	Process For Forming Improved Cobalt Silicide Layer On Integrated Circuit Structure Using Two Capping Layers.
1998051650	4881497	1998-03-04	2011-12-09	Lapsed	Japan	Method And Apparatus For Eliminating Peeling At End Edge Of Semiconductor Substrate In Metal Organic Chemical Vapor Deposition Of Titanium Nitride
09081337	6073361	1998-05-19	2000-06-13	Granted	United States of America	Apparatus for externally monitoring RPM of spin rinse dryer
09069027	6037233	1998-04-27	2000-03-14	Granted	United States of America	Metal-encapsulated polysilicon gate and interconnect
09063801	6061814	1998-04-21	2000-05-09	Granted	United States of America	Test circuitry for determining the defect density of a semiconductor process as a function of individual metal layers
09079413	6166422	1998-05-13	2000-12-26	Granted	United States of America	Inductor with cobalt/nickel core for integrated circuit structure with high inductance and high Q-factor
9762865	0271949	1997-11-25	2000-08-21	Lapsed	Korea, Republic of (KR)	Method For Artificially-Inducing Reverse Short-Channel Effects In Deep Sub-Micron Cmos Devices
09046113	6013952	1998-03-20	2000-01-11	Granted	United States of America	Structure and method for measuring interface resistance in multiple interface contacts and via structures in semiconductor devices
09076399	6331468	1998-05-11	2001-12-18	Granted	United States of America	Formation of integrated circuit structure using one or more silicon layers for implantation and out-diffusion in formation of defect-free source/drain regions and also for subsequent formation of silicon nitride spacers
08979733		1997-11-26		Abandoned	United States of America	Purging Gas Control Structure For Cvd Chamber

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AppNo	PatentNo	FiledDate	GrantDate	Status	Country	Title
09081403		1998-05-18		Abandoned	United States of America	Integrated Circuit Structure With Thin Dielectric Between At Least Local Interconnect Level And First Metal Interconnect Level, And Process For Making Same
09882124	6503828	2001-06-14	2003-01-07	Granted	United States of America	Process for selective polishing of metal-filled trenches of integrated circuit structures
09076502	6127286	1998-05-11	2000-10-03	Granted	United States of America	Apparatus and process for deposition of thin film on semiconductor substrate while inhibiting particle formation and deposition
09150220	6248180	1998-09-09	2001-06-19	Granted	United States of America	Method for removing particles from a semiconductor wafer
09037588	6087229	1998-03-09	2000-07-11	Granted	United States of America	Composite semiconductor gate dielectrics
09210184	6288773	1998-12-11	2001-09-11	Granted	United States of America	Method and apparatus for removing residual material from an alignment mark of a semiconductor wafer
08990315	6059637	1997-12-15	2000-05-09	Granted	United States of America	Process for abrasive removal of copper from the back surface of a silicon substrate
08915000	5865666	1997-08-20	1999-02-02	Expired	United States of America	Apparatus and method for polish removing a precise amount of material from a wafer
08887910	5902704	1997-07-02	1999-05-11	Expired	United States of America	Process for forming photoresist mask over integrated circuit structures with critical dimension control
08991397	6162714	1997-12-16	2000-12-19	Granted	United States of America	Method of forming thin polygates for sub quarter micron CMOS process
08919394	5851890	1997-08-28	1998-12-22	Expired	United States of America	Process for forming integrated circuit structure with metal silicide contacts using notched sidewall spacer on gate electrode
08914854	5882251	1997-08-19	1999-03-16	Expired	United States of America	Chemical mechanical polishing pad slurry distribution grooves
08879659	5933757	1997-06-23	1999-08-03	Expired	United States of America	Etch process selective to cobalt silicide for formation of integrated circuit structures
08351516	5627099	1994-12-07	1997-05-06	Expired	United States of America	Method of manufacturing semiconductor device
08942991	5944585	1997-10-02	1999-08-31	Expired	United States of America	Use of abrasive tape conveying assemblies for conditioning polishing pads
08918846	5931719	1997-08-25	1999-08-03	Expired	United States of America	Method and apparatus for using pressure differentials through a polishing pad to improve performance in chemical mechanical polishing
08772310	5769692	1996-12-23	1998-06-23	Expired	United States of America	On the use of non-spherical carriers for substrate chemi-mechanical polishing
08760466	5770520	1996-12-05	1998-06-23	Expired	United States of America	Method of making a barrier layer for via or contact opening of integrated circuit structure
08833597	5902129	1997-04-07	1999-05-11	Expired	United States of America	Process for forming improved cobalt silicide layer on integrated circuit structure using two capping layers

PATENT

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AppNo	PatentNo	FiledDate	GrantDate	Status	Country	Title
08730809	5717490	1996-10-17	1998-02-10	Expired	United States of America	Method for identifying order skipping in spectroreflective film measurement equipment
08592870	5953631	1996-01-24	1999-09-14	Expired	United States of America	Low stress, highly conformal CVD metal thin film
08586587	6303995	1996-01-11	2001-10-16	Expired	United States of America	Sidewall structure for metal interconnect and method of making same
08475028	5661069	1995-06-06	1997-08-26	Expired	United States of America	Method of forming an MOS-type integrated circuit structure with a diode formed in the substrate under a polysilicon gate electrode to conserve space
2000322452	3527700	2000-10-23	2004-02-27	Lapsed	Japan	Low Dielectric Constant Silicon Oxide-Based Dielectric Layer for Integrated Circuit Structures Having Improved Compatibility with Via Filler Materials, and Method of Making Same
11524107	7408227	2006-09-20	2008-08-05	Granted	United States of America	Apparatus and method of manufacture for integrated circuit and CMOS device including epitaxially grown dielectric on silicon carbide
09777996	6724404	2001-02-06	2004-04-20	Granted	United States of America	Cluster tool reporting system
989197264	69831734.3	1998-04-02	2005-09-28	Granted	Germany (Federal Republic of)	Process for Fabricating a Moderate-Depth Diffused Emitter Bipolar Transistor in a BiCMOS Device Without Using an Additional Mask
013033220	60145418.9	2001-04-09	2011-10-05	Lapsed	Germany (Federal Republic of)	Copper ICS Interconnect
2012122801	5744790	2012-05-30	2015-05-15	Granted	Japan	Damascene Capacitors For Integrated Circuits
200864008		2000-05-10		Abandoned	Japan	Damascene Capacitors For Integrated Circuits
09405805	6225215	1999-09-24	2001-05-01	Granted	United States of America	Method for enhancing anti-reflective coatings used in photolithography of electronic devices
10973851	7204920	2004-10-25	2007-04-17	Granted	United States of America	Contact ring design for reducing bubble and electrolyte effects during electrochemical plating in manufacturing
10945777	7300869	2004-09-20	2007-11-27	Granted	United States of America	Integrated barrier and seed layer for copper interconnect technology
10953322	7550236	2004-09-29	2009-06-23	Lapsed	United States of America	MULTI WAVELENGTH MULTI LAYER PRINTING
11012003	7372547	2004-12-14	2008-05-13	Granted	United States of America	Process and apparatus for achieving single exposure pattern transfer using maskless optical direct write lithography
10984286	7148556	2004-11-09	2006-12-12	Granted	United States of America	High performance diode-implanted voltage-controlled poly resistors for mixed-signal and RF applications
09426061	6756674	1999-10-22	2004-06-29	Granted	United States of America	Low dielectric constant silicon oxide-based dielectric layer for integrated circuit structures having improved compatibility with via filler materials, and method of making same
10949760	7315360	2004-09-24	2008-01-01	Granted	United States of America	Surface coordinate system

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AppNo	PatentNo	FiledDate	GrantDate	Status	Country	Title
10820494	7119432	2004-04-07	2006-10-10	Lapsed	United States of America	Method and apparatus for establishing improved thermal communication between a die and a heatspreader in a semiconductor package
60144277		1999-07-15		Expired	United States of America	Field Emitting Device Comprising Field-Concentrating Nanosconductor Assembly And Method For Making The Same
60141657		1999-06-30		Expired	United States of America	Solvent Absorption By CMP Pads And Its Relationship To Pad Chemistry
60130378		1999-04-21		Expired	United States of America	Dark Spin Rinse/Dry
60115525		1999-01-12		Expired	United States of America	Multi-Layered WSI/WSIN/Poly (Optional) Resistor for Si ICs/439,s
60110711		1998-12-03		Expired	United States of America	Semiconductor Device With Increased Gate Insulator Lifetime
60117186		1999-01-26		Expired	United States of America	Planarization Technique For HDPCVD FSG Layer
60168036		1999-11-30		Expired	United States of America	MOS Transistor And Method Of Manufacture
60378476		2002-05-07		Expired	United States of America	A Thin Film Toroidal Inductor
60167132		1999-11-23		Expired	United States of America	Electrically Measured IC Wafer Masks Version Control Indicator
09698375	6306780	2000-10-26	2001-10-23	Granted	United States of America	Method For Making A Photoresist Layer Having Increased Resistance To Blistering, Peeling, Lifting, Or Reticulation
09745236	6606371	2000-12-19	2003-08-12	Granted	United States of America	X-Ray System
10159268	6847433	2002-06-03	2005-01-25	Lapsed	United States of America	Holder, System, And Process For Improving Overlay In Lithography
08558997	5814562	1995-11-16	1998-09-29	Expired	United States of America	Process For Semiconductor Device Fabrication
09469090	6375912	1999-12-21	2002-04-23	Granted	United States of America	Electrochemical Abatement Of Perfluorinated Compounds
09519193	6331484	2000-03-06	2001-12-18	Granted	United States of America	Titanium-Tantalum Barrier Layer Film And Method For Forming The Same
1020047013135	10-979658	2003-02-24	2010-08-27	Lapsed	Korea, Republic of (KR)	Monitoring And Control Of A Fabrication Process
09967074	6727165	2001-09-28	2004-04-27	Granted	United States of America	Fabrication of metal contacts for deep-submicron technologies
10883137	7015096	2004-07-01	2006-03-21	Lapsed	United States of America	Bimetallic oxide compositions for gate dielectrics
09652571	6556409	2000-08-31	2003-04-29	Granted	United States of America	An Integrated Circuit Including ESD Circuits For A Multi-Chip Module And A Method Therefor
09956382	6759730	2001-09-18	2004-07-06	Granted	United States of America	Bipolar Junction Transistor Compatible With Vertical Replacement Gate Transistors
10693110	6927177	2003-10-24	2005-08-09	Lapsed	United States of America	Chemical mechanical electropolishing system
10929706	8685633	2004-08-30	2014-04-01	Lapsed	United States of America	Method for Optimizing Wafer Edge Patterning
10158775	6985229	2002-05-30	2006-01-10	Lapsed	United States of America	Overlay Metrology Using Scatterometry Profiling
10875029	7494888	2004-06-23	2009-02-24	Lapsed	United States of America	Device And Method Using Isotopically Enriched Silicon
10439863	6710416	2003-05-16	2004-03-23	Granted	United States of America	Split-Gate Metal-Oxide-Semiconductor Device
10659134	7138292	2003-09-10	2006-11-21	Granted	United States of America	Apparatus and method of manufacture for integrated circuit and CMOS device including epitaxially grown dielectric on silicon carbide
09310388	6750495	1999-05-12	2004-06-15	Granted	United States of America	Damascene Capacitors For Integrated Circuits

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App.No.	PatentNo	FiledDate	GrantDate	Status	Country	Title
10700791	7023230	2003-11-03	2006-04-04	Lapsed	United States of America	Method for testing IDD at multiple voltages
09298068	6191017	1999-04-22	2001-02-20	Granted	United States of America	A Method Of Forming A Multi-Layered Dual-Polysilicon Structure
09439048	6459946	1999-11-12	2002-10-01	Granted	United States of America	Method And System For Determining Operating Staffing
09437930	6424160	1999-11-10	2002-07-23	Granted	United States of America	Testing Insulation Between Conductors
09286869	6048256	1999-04-06	2000-04-11	Granted	United States of America	Apparatus And Method For Continuous Delivery And Conditioning Of A Polishing Slurry
09095468	6388290	1998-06-10	2002-05-14	Granted	United States of America	Single Crystal Silicon On Polycrystalline Silicon Integrated Circuits
08907834	6133618	1997-08-14	2000-10-17	Expired	United States of America	A Semiconductor Device Having An Anti-Reflective Layer And A Method Of Manufacture Thereof
08924730	6074933	1997-09-05	2000-06-13	Expired	United States of America	Method Of Manufacture Thereof
08941556	5972179	1997-09-30	1999-10-26	Expired	United States of America	Integrated Circuit Fabrication
11016014	7075179	2004-12-17	2006-07-11	Granted	United States of America	Silicon IC Contacts Using Composite TiN Barrier Layer
10607116	6979251	2003-06-26	2005-12-27	Lapsed	United States of America	System for implementing a configurable integrated circuit
09016475	5994221	1998-01-30	1999-11-30	Granted	United States of America	Method and apparatus to add slurry to a polishing system
09243377	6194750	1999-02-01	2001-02-27	Granted	United States of America	Device And Method Of Fabricating Vias For ULSI Metallization And Interconnect
08853582	5767561	1997-05-09	1998-06-16	Expired	United States of America	Integrated Circuit Comprising Means For High Frequency Signal Transmission
10658168	7079966	2003-09-08	2006-07-18	Granted	United States of America	Integrated Circuit Comprising Means For High Frequency Signal Transmission
08971422	5993947	1997-11-17	1999-11-30	Granted	United States of America	Method of qualifying a process tool with wafer defect maps
08346806	5549512	1994-11-30	1996-08-27	Expired	United States of America	Low Temperature Coefficient Dielectric Material Comprising Binary Calcium Niobate And Calcium Tantalate Oxides
08326444	5510230	1994-10-20	1996-04-23	Expired	United States of America	Mini environment for Hazardous Process Tools
08589229	5656399	1996-01-22	1997-08-12	Expired	United States of America	Device Fabrication Using DUV/EUV Pattern Delineation
08346810	5441614	1994-11-30	1995-08-15	Expired	United States of America	Process for Making An X-Ray Mask
08664227	5670062	1996-06-07	1997-09-23	Expired	United States of America	Method and Apparatus for Planar Magnetron Sputtering
08683291	5656515	1996-07-18	1997-08-12	Expired	United States of America	Method For Producing Tapered Lines
10452360	7332062	2003-06-02	2008-02-19	Granted	United States of America	Method Of Making High-Speed Double-Heterostructure Bipolar Transistor Devices
08413527	5663677	1995-03-30	1997-09-02	Expired	United States of America	Electroplating tool for semiconductor manufacture having electric field control
08439040	5538819	1995-04-10	1996-07-23	Expired	United States of America	Integrated Circuit Multi-Level Interconnection Technique
08351977	5599730	1994-12-08	1997-02-04	Expired	United States of America	Self-Aligned Alignment Marks For Phase-Shifting Masks
08353032	5574291	1994-12-09	1996-11-12	Expired	United States of America	Poly-Buffered LOCOS
08918781	5958654	1997-08-25	1999-09-28	Expired	United States of America	Article Comprising A Thin Film Transistor With Low Conductivity Organic Layer
08324842	6524645	1994-10-18	2003-02-25	Granted	United States of America	Lithographic Process And Energy-Sensitive Material For Use Therein
					United States of America	A Process For The Electroless Deposition of Metal On A Substrate

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AppNo	PatentNo	FiledDate	GrantDate	Status	Country	Title
08163967	5959342	1993-12-08	1999-09-28	Expired	United States of America	Semiconductor Device Having A High Voltage Termination Improvement
10410925	6739953	2003-04-09	2004-05-25	Granted	United States of America	Mechanical stress free processing method
07707365	5879997	1991-05-30	1999-03-09	Expired	United States of America	Method For Forming Self Aligned Polysilicon Contact
10423096	6722948	2003-04-25	2004-04-20	Granted	United States of America	Pad conditioning monitor
09547132	6461225	2000-04-11	2002-10-08	Granted	United States of America	Local Area Alloying For Preventing Dishing Of Copper During Chemical Mechanical Polishing (CMP)
10412867	7079963	2003-04-14	2006-07-18	Granted	United States of America	Modified binary search for optimizing efficiency of data collection time
979319175	69709934.2	1997-07-15	2002-01-09	Expired	Germany (Federal Republic of)	Subsonic to Supersonic and Ultrasonic Conditioning of Polishing Pad In a Chemical Mechanical Polishing Apparatus
89123228	NI-165325	2000-11-21	2002-10-21	Lapsed	Taiwan	Method For Making Field Effect Devices And Capacitors With Thin Film Dielectrics And Resulting Devices
91119024	NI-198062	2002-08-22	2004-07-07	Lapsed	Taiwan	Multiple Operating Voltage Vertical Replacement-Gate (VRG) Transistor Interconnections To Copper IC's
90108450	1223427	2001-04-09	2004-11-01	Lapsed	Taiwan	A Method For Reducing Dishing Related Issues During The Formation Of Shallow Trench Isolation Structures
090113472	NI-157181	2001-06-04	2002-05-11	Lapsed	Taiwan	Damascene Capacitors For Integrated Circuits
89104065	NI-144505	2000-03-07	2001-11-11	Granted	Taiwan	Integrated Circuit Capacitor And Associated Fabrication Methods
89100158	NI-134826	2000-01-06	2001-10-17	Lapsed	Taiwan	Capacitor Comprising Improved Taox-Based Dielectric
87105577	NI-132141	1998-04-13	2001-05-16	Lapsed	Taiwan	Silicon-On-Insulator (SOI) Semiconductor Structure With Trench Including A Conductive Layer
90116133	1282168	2001-07-02	2007-06-01	Lapsed	Taiwan	Metal-Oxide-Semiconductor Device Including A Buried Lightly-Doped Drain Region
093110409	1325175	2004-04-14	2010-05-21	Lapsed	Taiwan	Method For Making Field Effect Devices And Capacitors With Thin Film Dielectrics And Resulting Devices
20000064498	675988	2000-11-01	2007-01-23	Lapsed	Korea, Republic of (KR)	Process For Fabricating A Semiconductor Device Having A Metal Oxide Or A Metal Silicate Gate/Dielectric layer
1020010049568	809305	2001-08-17	2008-02-26	Lapsed	Korea, Republic of (KR)	A Metal Silicate Gate/Dielectric layer
1020000001128	699186	2000-01-11	2007-03-19	Lapsed	Korea, Republic of (KR)	Method For Making An Integrated Circuit Including Alignment Marks
1019980018520	505305	1998-05-22	2005-07-25	Lapsed	Korea, Republic of (KR)	Capacitor Comprising Improved Taox-Based Dielectric
1019980050349	495717	1998-11-24	2005-06-08	Lapsed	Korea, Republic of (KR)	Method Of Manufacturing An Integrated Circuit Using Chemical Mechanical Polishing
19990024635	0303937	1999-06-28	2001-07-16	Lapsed	Korea, Republic of (KR)	System And Method Of Manufacturing Semicustom Reticles Using Reticle Primitives
9837710	280565	1998-08-12	2000-11-10	Granted	Korea, Republic of (KR)	A Device and Method of Forming A Metal To Metal Capacitor Within an Integrated Circuit

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AppNo	PatentNo	FiledDate	GrantDate	Status	Country	Title
9723238	455640	1997-06-05	2004-10-26	Expired	Korea, Republic of (KR)	Method For Producing Tapered Lines
10335470	7014957	2002-12-31	2006-03-21	Granted	United States of America	Interconnect routing using parallel lines and method of manufacture
1020000016832	367185	2000-03-31	2002-12-23	Lapsed	Korea, Republic of (KR)	Lithographic Process For Device Fabrication Using Dark-Field Illumination
1020000035027	617894	2000-06-24	2006-08-23	Granted	Korea, Republic of (KR)	Semiconductor Device Free Of LDD Regions
1020010019270	707705	2001-04-11	2007-04-09	Lapsed	Korea, Republic of (KR)	Local Area Alloying For Preventing Dishing Of Copper During Chemical Mechanical Polishing (CMP)
1020000074125	753777	2000-12-07	2007-08-24	Lapsed	Korea, Republic of (KR)	Article Comprising A Dielectric Material Of Zr-Ge-Ti-O Or Hf-Ge-Ti-O And Method Of Making The Same
1020060012904	10-1184202	2006-02-10	2012-09-13	Lapsed	Korea, Republic of (KR)	High-Density Field Emission Elements and a Method for Forming Said Emission Elements
1020050085840	10-1215425	2005-09-14	2012-12-18	Granted	Korea, Republic of (KR)	Guard Ring for Improved Matching
1020020056476	10-918779	2002-09-17	2009-09-17	Lapsed	Korea, Republic of (KR)	Bipolar Junction Transistor Compatible With Vertical Replacement Gate Transistors
1020030034713	10-948495	2003-05-30	2010-03-12	Lapsed	Korea, Republic of (KR)	Overlay Metrology Using Scatterometry Profiling
1020020057533	10-908991	2002-09-23	2009-07-16	Lapsed	Korea, Republic of (KR)	Multiple Operating Voltage Vertical Replacement-Gate (VRG) Transistor
2001196104	49931291	2001-06-28	2012-02-24	Lapsed	Japan	Silicon-On-Insulator (SOI) Semiconductor Structure With Trench Including A Conductive Layer
2000135071	3492978	2000-05-08	2003-11-14	Granted	Japan	Improved Wehnelt Gun For Electron Lithography
11015686	3521119	1999-01-25	2004-02-13	Lapsed	Japan	Device And Method Of Fabricating Vias For ULSI Metallization And Interconnect
10227743	3321101	1998-08-12	2002-06-21	Granted	Japan	A Device and Method of Forming A Metal To Metal Capacitor Within an Integrated Circuit
2000233853	3782293	2000-08-02	2006-03-17	Lapsed	Japan	Methods And Apparatus For Testing Integrated Circuits
10313333	6897102	2002-12-06	2005-05-24	Granted	United States of America	Process to minimize polysilicon gate depletion and dopant penetration and to increase conductivity
2003180575	4386680	2003-06-25	2009-10-09	Lapsed	Japan	Capacitor For A Semiconductor Device And Method For Fabrication Therefor
2006035891	5153075	2006-02-14	2012-12-14	Lapsed	Japan	High-Density Field Emission Elements and a Method for Forming Said Emission Elements
2001168642	5239107	2001-06-04	2013-04-12	Lapsed	Japan	A Method For Reducing Dishing Related Issues During The Formation Of Shallow Trench Isolation Structures
2000372277	4358430	2000-12-07	2009-08-14	Lapsed	Japan	A Process for Fabricating Integrated Circuit Devices Having Thin Film Transistors
10245219	6855624	2002-09-17	2005-02-15	Lapsed	United States of America	Low-loss on-chip transmission line for integrated circuit structures and method of manufacture

Schedule B(1)(a) - Semic Processing A

AppNo	PatentNo	FiledDate	GrantDate	Status	Country	Title
09704200	6537923	2000-10-31	2003-03-25	Granted	United States of America	Process for forming integrated circuit structure with low dielectric constant material between closely spaced apart metal lines
983065624	69835260.2	1998-08-18	2006-07-19	Lapsed	Germany (Federal Republic of)	Embedded Thin Film Passive Components
003071784	60000174.1	2000-08-21	2002-05-22	Lapsed	Germany (Federal Republic of)	Semiconductor Device Having Regions Of Insulating Material Formed In A Semiconductor Substrate And Process Of Making The Device
993071026	69902133.2	1999-09-07	2002-07-17	Lapsed	Germany (Federal Republic of)	Method Of Making An Article Comprising An Oxide Layer On A GaAs-Based Semiconductor Body
993064708	69901142.6	1999-08-17	2002-04-03	Granted	Germany (Federal Republic of)	Process For Semiconductor Device Fabrication Having Copper Interconnects
973090285	69724972.7	1997-11-11	2003-09-17	Granted	Germany (Federal Republic of)	Electronic Apparatus
10172849	6917430	2002-06-17	2005-07-12	Lapsed	United States of America	Method to improve the control of source chemicals delivery by a carrier gas
003032737	60032051.0	2000-04-18	2006-11-29	Lapsed	Germany (Federal Republic of)	A Method Of Forming A Multi-Layered Dual-Polysilicon Structure
10078233	6830984	2002-02-15	2004-12-14	Granted	United States of America	Thick traces from multiple damascene layers
10033090	6817941	2001-10-25	2004-11-16	Lapsed	United States of America	Uniform airflow diffuser
10008170	6706583	2001-10-19	2004-03-16	Granted	United States of America	High speed low noise transistor
10053537	6673498	2001-11-02	2004-01-06	Lapsed	United States of America	Method for reticle formation utilizing metal vaporization
09970392	6647348	2001-10-03	2003-11-11	Granted	United States of America	Latent defect classification system
11368780	7476951	2006-03-06	2009-01-13	Granted	United States of America	Selective Isotropic Etch For Titanium Based Materials
08935521	5895960	1997-09-23	1999-04-20	Expired	United States of America	Thin Oxide Mask Level Resistor
09999872	6582568	2001-10-19	2003-06-24	Granted	United States of America	First stage salcidation of cobalt during cobalt deposition or subsequent Ti or Tin cap deposition using energy from a directional plasma
983079187	69832352.1	1998-09-29	2005-11-16	Granted	Germany (Federal Republic of)	Energy-Sensitive Resist Material And A Process For Device Fabrication Using An Energy-Sensitive Resist Material
09758603	6741122	2001-01-12	2004-05-25	Granted	United States of America	Routing technique to adjust clock skew using frames and prongs
08924277	6102962	1997-09-05	2000-08-15	Expired	United States of America	Method for estimating quiescent current in integrated circuits
09574771	6506678	2000-05-19	2003-01-14	Granted	United States of America	Integrated circuit structures having low k porous aluminum oxide dielectric material separating aluminum lines, and method of making same
09817642	6476497	2001-03-26	2002-11-05	Granted	United States of America	Concentric metal density power routing
10271860	4094743	1998-09-25	2008-03-14	Lapsed	Japan	A Method and Apparatus for Chemical Mechanical Polishing
09292079	6211051	1999-04-14	2001-04-03	Granted	United States of America	Reduction of plasma damage at contact etch in MOS integrated circuits

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AppNo	PatentNo	FiledDate	GrantDate	Status	Country	Title
09213847	6177305	1998-12-17	2001-01-23	Granted	United States of America	Fabrication of metal-insulator-metal capacitive structures
87103907	133913	1998-03-17	2001-10-08	Lapsed	Taiwan	Tunable Dielectric Constant Oxide and Method of Manufacture
09112222	6074517	1998-07-08	2000-06-13	Granted	United States of America	Method and apparatus for detecting an endpoint polishing layer by transmitting infrared light signals through a semiconductor wafer
09909175	6970622	2001-07-19	2005-11-29	Lapsed	United States of America	Arrangement and method for controlling the transmission of a light signal based on intensity of a received light signal
08923676	5915414	1997-09-04	1999-06-29	Expired	United States of America	Standardized gas isolation box (GIB) installation
08651018	5966599	1996-05-21	1999-10-12	Expired	United States of America	Method for fabricating a low trigger voltage silicon controlled rectifier and thick field device
08623470	5861652	1996-03-28	1999-01-19	Expired	United States of America	Method and apparatus for protecting functions imbedded within an integrated circuit from reverse engineering
1019980033782	499194	1998-08-20	2005-06-24	Lapsed	Korea, Republic of (KR)	Process For Forming Integrated Circuit Structure With Improved Metal Silicide Contacts Using Notched Sidewall Spacer On Gate Electrode, And Resulting Structure
09703616	6391768	2000-10-30	2002-05-21	Granted	United States of America	Process for CMP removal of excess trench or via filler metal which inhibits formation of concave regions on oxide surface of integrated circuit structure
09948808	6727107	2001-09-07	2004-04-27	Granted	United States of America	Method of testing the processing of a semiconductor wafer on a CMP apparatus
10304974	6867488	2002-11-26	2005-03-15	Lapsed	United States of America	Thick metal top layer
0911271	6114215	1998-07-06	2000-09-05	Granted	United States of America	Generating non-planar topology on the surface of planar and near-planar substrates
09112403	6066266	1998-07-08	2000-05-23	Granted	United States of America	In-situ chemical-mechanical polishing slurry formulation for compensation of polish pad degradation
09928570	6743725	2001-08-13	2004-06-01	Granted	United States of America	High selectivity SiC etch in integrated circuit fabrication
08979734	5914001	1997-11-26	1999-06-22	Expired	United States of America	In-situ etch of CVD chamber
08979733		1997-11-26		Abandoned	United States of America	Gas Control Structure For Cvd Chamber
09072915	5992242	1998-05-04	1999-11-30	Granted	United States of America	Silicon wafer or die strength test fixture using high pressure fluid
09054279	5998226	1998-04-02	1999-12-07	Granted	United States of America	Method and system for alignment of openings in semiconductor fabrication
08995260	6066561	1997-12-19	2000-05-23	Granted	United States of America	Apparatus and method for electrical determination of delamination at one or more interfaces within a semiconductor wafer
08960925	5961375	1997-10-30	1999-10-05	Expired	United States of America	Shimming substrate holder assemblies to produce more uniformly polished substrate surfaces
08984003	5936876	1997-12-03	1999-08-10	Granted	United States of America	Semiconductor integrated circuit core probing for failure analysis
08966637	6028014	1997-11-10	2000-02-22	Granted	United States of America	Plasma-enhanced oxide process optimization and material and apparatus therefor
08895960	6004193	1997-07-17	1999-12-21	Expired	United States of America	Dual purpose retaining ring and polishing pad conditioner

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AppNo	PatentNo	FiledDate	GrantDate	Status	Country	Title
08926590	6020242	1997-09-04	2000-02-01	Expired	United States of America	Effective silicide blocking
08874055	5985679	1997-06-12	1999-11-16	Expired	United States of America	Automated endpoint detection system during chemical-mechanical polishing
08918483	5893756	1997-08-26	1999-04-13	Expired	United States of America	Use of ethylene glycol as a corrosion inhibitor during cleaning after metal chemical mechanical polishing
08963813	5973398	1997-11-04	1999-10-26	Granted	United States of America	Semiconductor device and fabrication method employing a palladium-plated heat spreader substrate
08786695	5869395	1997-01-22	1999-02-09	Expired	United States of America	Simplified hole interconnect process
08754696	5985746	1996-11-21	1999-11-16	Expired	United States of America	Process for forming self-aligned conductive plugs in multiple insulation levels in integrated circuit structures and resulting product
08596894	5760428	1996-01-25	1998-06-02	Expired	United States of America	Variable width low profile gate array input/output architecture
08520030	5614249	1995-08-28	1997-03-25	Expired	United States of America	Leak detection system for a gas manifold of a chemical vapor deposition apparatus
08486803	5698468	1995-06-07	1997-12-16	Expired	United States of America	Silicidation process with etch stop
08396560	5539246	1995-03-01	1996-07-23	Expired	United States of America	Microelectronic integrated circuit including hexagonal semiconductor gate device
08792479	5773855	1997-01-31	1998-06-30	Expired	United States of America	Microelectronic circuit including silicided field-effect transistor elements that bifunction as interconnects
10015255	6562735	2001-12-11	2003-05-13	Granted	United States of America	Control of reaction rate in formation of low k carbon-containing silicon oxide dielectric material using organosilane, unsubstituted silane, and hydrogen peroxide reactants
09848758	6503840	2001-05-02	2003-01-07	Granted	United States of America	Process for forming metal-filled openings in low dielectric constant dielectric material while inhibiting via poisoning
08627622	5654895	1996-04-04	1997-08-05	Expired	United States of America	Process monitor using impedance controlled I/O controller
08512678	5663076	1995-08-08	1997-09-02	Expired	United States of America	Automating photolithography in the fabrication of integrated circuits
09808441	6492736	2001-03-14	2002-12-10	Granted	United States of America	Power mesh bridge
2013174500	5710714	2005-03-10	2015-03-13	Lapsed	Japan	A Bipolar Junction Transistor Having A High Germanium Concentration In A Silicon-Germanium Layer And A Method For Forming The Bipolar Junction Transistor
08283296	5474648	1994-07-29	1995-12-12	Expired	United States of America	Uniform and repeatable plasma processing
201184505		2011-04-06		Abandoned	Japan	Method And Structure For DC And RF Shielding Of Integrated Circuits
11534340	7535330	2006-09-22	2009-05-19	Granted	United States of America	LOW MUTUAL INDUCTANCE MATCHED INDUCTORS
2012105770		2012-05-07		Abandoned	Japan	Multiple Operating Voltage Vertical Replacement-Gate (VRG) Transistor

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AppNo	PatentNo	FiledDate	GrantDate	Status	Country	Title
1020127015010	10-1216580	2012-06-11	2012-12-21	Granted	Korea, Republic of (KR)	A Bipolar Junction Transistor Having A High Germanium Concentration In A Silicon-Germanium Layer And A Method For Forming The Bipolar Junction Transistor
09730704	6413151	2000-12-06	2002-07-02	Granted	United States of America	CMP slurry recycling apparatus and method for recycling CMP slurry
2012100569		2012-04-26		Abandoned	Japan	An Integrated Circuit Including ESD Circuits For A Multi-Chip Module And A Method Therefor
08475586	5637887	1995-06-07	1997-06-10	Expired	United States of America	Silicon controller rectifier (SCR) with capacitive trigger
08650476	5780347	1996-05-20	1998-07-14	Expired	United States of America	Method of forming polysilicon local interconnects
057254047		2005-03-10		Abandoned	European Patent	A Bipolar Junction Transistor Having A High Germanium Concentration In A Silicon-Germanium Layer And A Method For Forming The Bipolar Junction Transistor
011016839	60133155.9	2001-01-30	2008-03-12	Granted	Germany (Federal Republic of)	Interconnect-Embedded Metal-Insulator-Metal Capacitor and Method of Fabricating Same
08685772	5689134	1996-07-24	1997-11-18	Expired	United States of America	Integrated circuit structure having reduced cross-talk and method of making same
131550428		2005-03-10		Abandoned	European Patent	A Bipolar Junction Transistor Having A High Germanium Concentration In A Silicon-Germanium Layer And A Method For Forming The Bipolar Junction Transistor
2009246032	5404308	2009-10-27	2013-11-08	Granted	Japan	Semiconductor Device Free Of LDD Regions
001226885		2000-10-18		Lapsed	European Patent	Low Dielectric Constant Silicon Oxide-Based Dielectric Layer for Integrated Circuit Structures Having Improved Compatibility with Via Filler Materials, and Method of Making Same
09892250	6559033	2001-06-27	2003-05-06	Granted	United States of America	Processing for forming integrated circuit structure with low dielectric constant material between closely spaced apart metal lines
2009143777	4505036	2009-06-17	2010-04-30	Lapsed	Japan	A Process for Fabricating Integrated Circuit Devices Having Thin Film Transistors
09148028	6340434	1998-09-03	2002-01-22	Granted	United States of America	Method and apparatus for chemical-mechanical polishing
11140142	7106073	2005-05-27	2006-09-12	Lapsed	United States of America	Method and system for area efficient charge-based capacitance measurement
11323405	7429733	2005-12-29	2008-09-30	Granted	United States of America	Method and sample for radiation microscopy including a particle beam channel formed in the sample source
09881151	6914786	2001-06-14	2005-07-05	Lapsed	United States of America	Converter device
10035346	6825546	2001-12-28	2004-11-30	Lapsed	United States of America	CMOS varactor with constant dc/dV characteristic
10966074	7179736	2004-10-14	2007-02-20	Granted	United States of America	Method for fabricating planar semiconductor wafers
11005765	7242074	2004-12-06	2007-07-10	Granted	United States of America	Reduced capacitance resistors
11247517	7284213	2005-10-11	2007-10-16	Granted	United States of America	Defect analysis using a yield vehicle

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AppNo	PatentNo	FiledDate	GrantDate	Status	Country	Title
11397252	8053824	2006-04-03	2011-11-08	Granted	United States of America	Interdigitated Mesh To Provide Distributed, High Quality Factor Capacitive Coupling
10927802	7137098	2004-08-27	2006-11-14	Granted	United States of America	Pattern component analysis and manipulation
60002275		1995-08-14		Expired	United States of America	A Process For Semiconductor Device Fabrication
60426842		2002-11-15		Expired	United States of America	In-Situ Removal Of Surface Impurities Prior To As Doped Poly Dep
60552308		2004-03-10		Expired	United States of America	Creation of A High Ge Concentration Sige Layer In BiCMOS Processing Through Thermal Oxidation of the Sige Base Layer
60541878		2004-02-04		Expired	United States of America	Structure For Improved Heat Conduction For Semiconductor Devices
60115717		1999-01-12		Expired	United States of America	Method Of Making A Graded Grown, High Quality Oxide Layer For A Semiconductor Device
60117242		1999-01-26		Expired	United States of America	Device Comprising Thermally Stable, Low Dielectric Constant Material
10971961	7259083	2004-10-22	2007-08-21	Granted	United States of America	Local interconnect manufacturing process
60115532		1999-01-12		Expired	United States of America	Novel Methods To Fabricate MOM Capacitors
10117487	6878406	2002-04-05	2005-04-12	Lapsed	United States of America	Dynamic use of process temperature
062546304		2006-09-06		Lapsed	European Patent	Robust Shallow Trench Isolation Structures And A Method For Forming Shallow Trench Isolation Structures
60180809		2000-02-07		Expired	United States of America	Improvement Of Thick Photoresist (PR) Integrity For High-Current High-Dose High-Energy Ion Implantation Using A Novel Thermal And UV-Irradiation Treatment
60174566		2000-01-05		Expired	United States of America	An Integrated Circuit And A Method Of Making An Integrated Circuit
10867014	7013192	2004-06-14	2006-03-14	Lapsed	United States of America	Substrate contact analysis
11269275	8076779	2005-11-08	2011-12-13	Granted	United States of America	Reduction of macro level stresses in copper/Low-k wafers
09464297	6759337	1999-12-15	2004-07-06	Granted	United States of America	Process for etching a controllable thickness of oxide on an integrated circuit structure on a semiconductor substrate using nitrogen plasma and plasma and an rf bias applied to the substrate
09972481	6667536	2001-10-05	2003-12-23	Lapsed	United States of America	Thin Film Multi-Layer High Q Transformer Formed In A Semiconductor Substrate
60140666		1999-06-24		Expired	United States of America	Method Of Making A Graded, High Quality Oxide Layer For A Semiconductor Device
60096581		1998-08-14		Expired	United States of America	Process For Fabricating Device Comprising Lead Zirconate Titanate
09271084	6531751	1999-03-17	2003-03-11	Granted	United States of America	Semiconductor Device With Increased Gate Insulator Lifetime
60141656		1999-06-30		Expired	United States of America	Impact Of Post Window Etch Cleans Process On Reliability Of 0.25 (*mm Vintage Windows

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AppNo	PatentNo	FiledDate	GrantDate	Status	Country	Title
09345039	6368972	1999-06-30	2002-04-09	Granted	United States of America	Method For Making An Integrated Circuit Including Alignment Marks
09376233	6274933	1999-08-17	2001-08-14	Granted	United States of America	An Integrated Circuit Device Having A Planar Interlevel Dielectric Layer
60507335		2003-09-30		Expired	United States of America	A Spiral Inductor Formed In A Semiconductor Substrate
60005141		1995-10-12		Expired	United States of America	A Process For Device Fabrication In Which The Plasma Etch Is Controlled By Monitoring Optical Emission
09345556	6265260	1999-06-30	2001-07-24	Granted	United States of America	Method For Making An Integrated Circuit Capacitor Including Tantalum Pentoxide
09235735	6248394	1999-01-22	2001-06-19	Granted	United States of America	Process For Fabricating Device Comprising Lead Zirconate Titanate
08714909	5835221	1996-09-17	1998-11-10	Expired	United States of America	Process For Fabricating A Device Using Polarized Light To Determine Film Thickness
09113594	6372520	1998-07-10	2002-04-16	Granted	United States of America	Sonic assisted strengthening of gate oxides
60115527		1999-01-12		Expired	United States of America	Technique To Fabricate Gate Mask Photo Alignment Marks For STI
10701328	6939727	2003-11-03	2005-09-06	Lapsed	United States of America	Method for performing statistical post processing in semiconductor manufacturing using ID cells
60326050		2001-09-28		Expired	United States of America	A Resistor Located On A Semiconductor Substrate And A Method of Manufacture Therefor
10928292	7062415	2004-08-27	2006-06-13	Lapsed	United States of America	Parametric outlier detection
10020084	6686272	2001-12-13	2004-02-03	Granted	United States of America	Anti-reflective coatings for use at 248 nm and 193 nm
10799851	7299158	2004-03-12	2007-11-20	Granted	United States of America	Process control data collection
60145127		1999-07-22		Expired	United States of America	Article Comprising Aligned Carbon Nanotubes With Reduced Diameter And Method For Making The Same
2007503058	5393027	2005-03-10	2013-10-25	Granted	Japan	A Bipolar Junction Transistor Having A High Germanium Concentration In A Silicon-Germanium Layer And A Method For Forming The Bipolar Junction Transistor
60149036		1999-08-16		Expired	United States of America	Electrochemical Abatement Of Perfluorinated Compounds
60013093		1996-03-08		Expired	United States of America	An Energy-Sensitive Resist Material And A Process For Device Fabrication Using An Energy-Sensitive Resist Material
09369802	6538367	1999-08-06	2003-03-25	Granted	United States of America	Field Emitting Device Comprising Field-Concentrating Nanosconductor Assembly And Method For Making The Same
60135565		1999-05-24		Expired	United States of America	Use Of Titanium-Tantalum Alloy As A Diffusion Barrier Material For Copperinterconnects
60115881		1999-01-14		Expired	United States of America	A 3-Step Passivation-Depassivation-Passivation D 2 Annealing Process For Hot Carrier Immunity And Transistor Matching
60007002		1995-10-16		Expired	United States of America	A Process For Fabricating A Device Using Polarized Light To Determine Film Thickness
09131860	6136672	1998-08-10	2000-10-24	Granted	United States of America	Process For Device Fabrication Using A High-Energy Boron Implant

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AppNo	PatentNo	FiledDate	GrantDate	Status	Country	Title
10779966	6971944	2004-02-17	2005-12-06	Lapsed	United States of America	Method and control system for improving CMP process by detecting and reacting to harmonic oscillation
60060869		1997-10-02		Expired	United States of America	An Energy-Sensitive Resist Material And A Process For Device Fabrication Using An Energy-Sensitive Resist Material
10668875	7071811	2003-09-23	2006-07-04	Lapsed	United States of America	High performance voltage control diffusion resistor
09480224	6359339	2000-01-10	2002-03-19	Granted	United States of America	Multi-Layered Metal Silicide Resistor For Si(C8#39)s
10505197	7972440	2005-06-10	2011-07-05	Granted	United States of America	Monitoring And Control Of A Fabrication Process
60172654		1999-12-20		Expired	United States of America	X-Ray System
60082076		1998-04-17		Expired	United States of America	Process For Device Fabrication Using A High-Energy Boron Implant
60294566		2001-06-01		Expired	United States of America	Process For Controlling Alignment In A Lithographic Process And Apparatus Therefor
10713951	7166492	2003-11-14	2007-01-23	Granted	United States of America	Integrated circuit carrier apparatus method and system
10513121	7132297	2004-10-27	2006-11-07	Granted	United States of America	Multi-Layer Inductor Formed In A Semiconductor Substrate And Having A Core Of Ferromagnetic Material
1020067018437	10-1173526	2005-03-10	2012-08-07	Granted	Korea, Republic of (KR)	A Bipolar Junction Transistor Having A High Germanium Concentration In A Silicon-Germanium Layer And A Method For Forming The Bipolar Junction Transistor
09594189	6365503	2000-06-14	2002-04-02	Granted	United States of America	A Method Of Improving Electromigration In Semiconductor Device Manufacturing Processes
09879783	6765806	2001-06-12	2004-07-20	Granted	United States of America	Composition with EMC shielding characteristics
09296001	6469390	1999-04-21	2002-10-22	Granted	United States of America	Device Comprising Thermally Stable, Low Dielectric Constant Material
10690861	6909591	2003-10-22	2005-06-21	Lapsed	United States of America	Complimentary metal oxide semiconductor capacitor and method for making same
10721971	6998343	2003-11-24	2006-02-14	Lapsed	United States of America	Method for creating barrier layers for copper diffusion
09611844	6503841	2000-07-07	2003-01-07	Granted	United States of America	Oxide Etch
08703756	5877032	1996-08-27	1999-03-02	Expired	United States of America	A Process For Device Fabrication In Which The Plasma Etch Is Controlled By Monitoring Optical Emission
09472332	6290822	1999-12-23	2001-09-18	Granted	United States of America	Sputtering Method For Forming Dielectric Films
09641160	6479404	2000-08-17	2002-11-12	Granted	United States of America	Process For Fabricating A Semiconductor Device Having A Metal Oxide Or A Metal Silicate Gate Dielectric Layer
10156242	6708574	2002-05-24	2004-03-23	Granted	United States of America	Abnormal Photoresist Line(SiSpace Profile Detection Through Signal Processing Of Metrology Waveform
09510015	6361614	2000-02-22	2002-03-26	Granted	United States of America	Method And Apparatus For Dark Spin Rinse/Dry Semiconductor Processing
09514832	6439968	2000-02-28	2002-08-27	Granted	United States of America	A Polishing Pad Having A Water-Repellant Film Thereon And A Method Of Manufacture Therefor
09650604	7439146	2000-08-30	2008-10-21	Granted	United States of America	Field Plated Resistor With Enhanced Routing Area Thereover

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AppNo	PatentNo	FiledDate	GrantDate	Status	Country	Title
09483297	6465132	2000-01-14	2002-10-15	Granted	United States of America	Article Comprising Small Diameter Nanowires And Method For Making The Same
09378856	6187665	1999-08-23	2001-02-13	Granted	United States of America	A process For Deuterium Passivation And Hot Carrier Immunity In-Situ Removal Of Surface Impurities Prior TO Arsenic-Doped Polysilicon In The Fabrication Of Heterojunction Bipolar Transistor
10675575	7556048	2003-09-30	2009-07-07	Lapsed	United States of America	In-Situ Nano-Interconnected Circuit Devices And Method For Making The Same
09426453	6297063	1999-10-25	2001-10-02	Granted	United States of America	Integrated Circuit Capacitor Including Anchored Plug
09364367	6153901	1999-07-30	2000-11-28	Granted	United States of America	Methods And Apparatus For Testing Integrated Circuits
09366388	6560735	1999-08-03	2003-05-06	Granted	United States of America	High quality factor spiral inductor that utilizes active negative capacitance
10650395	7067882	2003-08-28	2006-06-27	Lapsed	United States of America	Colloidal Suspension Of Abrasive Particles Containing Magnesium As CMP Slurry
09521768	6319095	2000-03-09	2001-11-20	Granted	United States of America	Surface Treatment Anneal Of Hydrogenated Silicon-Oxy-Carbide Dielectric Layer
09451053	6576980	1999-11-30	2003-06-10	Granted	United States of America	Layered Dielectric Film Structure Suitable For Gate Dielectric Application In Sub\m10.25 ìm Technologies
09334977	6417570	1999-06-17	2002-07-09	Granted	United States of America	Method For Making Dual-Polysilicon Structures In Integrated Circuits
09140275	6080625	1998-08-26	2000-06-27	Granted	United States of America	Contact resistance device for improved process control
10723701	7183787	2003-11-26	2007-02-27	Granted	United States of America	Monitoring And Control Of A Fabrication Process
2003572051	4737933	2003-02-24	2011-05-13	Lapsed	Japan	Low K Dielectric Insulator and Method of Forming Semiconductor Circuit Structures
09653297	6548892	2000-08-31	2003-04-15	Granted	United States of America	Method of forming SiGe gate electrode
10026407	6730588	2001-12-20	2004-05-04	Granted	United States of America	Heterojunction Bipolar Transistor
09759120	6509242	2001-01-12	2003-01-21	Granted	United States of America	Method For Calculating High-Resolution Wafer Parameter Profiles
10736386	7653523	2003-12-15	2010-01-26	Lapsed	United States of America	Method For Calculating High-Resolution Wafer Parameter Profiles
09121284	6013958	1998-07-23	2000-01-11	Granted	United States of America	Apparatus and Method for Integrated Circuit With Variable Capacitor
10730554	6984869	2003-12-08	2006-01-10	Lapsed	United States of America	High performance diode implanted voltage controlled p-type diffusion resistor
09232418	6111750	1999-01-15	2000-08-29	Granted	United States of America	Electronic Apparatus
09236933	6283812	1999-01-25	2001-09-04	Granted	United States of America	Article Comprising Aligned, Truncated Carbon Nanotubes And Process For Fabricating Article
09277778	6218255	1999-03-29	2001-04-17	Granted	United States of America	Method Of Making A Capacitor
09911364	6844236	2001-07-23	2005-01-18	Granted	United States of America	Method And Structure For DC And RF Shielding Of Integrated Circuits
10644116	7245758	2003-08-20	2007-07-17	Granted	United States of America	Whole-wafer photoemission analysis
09311631	6358865	1999-05-14	2002-03-19	Granted	United States of America	Oxidation Of Silicon Using Fluorine Implant