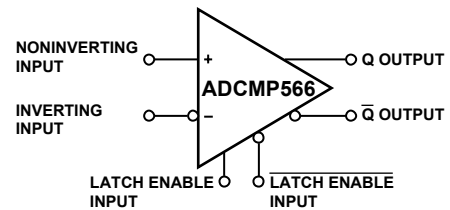


FEATURES

250 ps propagation delay input to output
50 ps propagation delay dispersion
Differential ECL compatible outputs
Differential latch control
Robust input protection
Input common-mode range -2.0 V to $+3.0\text{ V}$
Input differential range $\pm 5\text{ V}$
ESD protection $>3\text{ kV HBM}$, $>200\text{ V MM}$
Power supply sensitivity $>65\text{ dB}$
200 ps minimum pulswidth
5 GHz equivalent input rise time bandwidth
Typical output rise/fall of 165 ps

APPLICATIONS

High speed instrumentation
Scope and logic analyzer front ends
Window comparators
High speed line receivers and signal restoration
Threshold detection
Peak detection
High speed triggers
Patient diagnostics
Disk drive read channel detection
Hand-held test instruments
Zero-crossing detectors
Clock drivers
Automatic test equipment

FUNCTIONAL BLOCK DIAGRAM

03633-0-001

Figure 1.

GENERAL DESCRIPTION

The ADCMP566 is an ultrafast voltage comparator fabricated on Analog Devices' proprietary XFCB process. The device features 250 ps propagation delay with less than 35 ps overdrive dispersion. Overdrive dispersion, a particularly important characteristic of high speed comparators, is a measure of the difference in propagation delay under differing overdrive conditions.

A fast, high precision differential input stage permits consistent propagation delay with a wide variety of signals in the common-mode range from -2.0 V to $+3.0\text{ V}$. Outputs are complementary digital signals fully compatible with ECL 10 K and 10 KH logic families. The outputs provide sufficient drive current to directly drive transmission lines terminated in $50\ \Omega$ to -2 V . A latch input is included, which permits tracking, track-and-hold, or sample-and-hold modes of operation.

The ADCMP566 is available in a 32-lead LFCSP package.

Rev. 0

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REVISION HISTORY

Revision 0: Initial Version

SPECIFICATIONS

Table 1. ADCMP566 ELECTRICAL CHARACTERISTICS ($V_{CC} = +5.0\text{ V}$, $V_{EE} = -5.2\text{ V}$, $T_A = 25^\circ\text{C}$, unless otherwise noted.)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
DC INPUT CHARACTERISTICS (See Note)						
Input Common-Mode Range	V_{CM}		-2.0		+3.0	V
Input Differential Voltage			-5		+5	V
Input Offset Voltage	V_{OS}		-5.0	± 1.0	+5.0	mV
Input Offset Voltage Channel Matching				± 1.0		mV
Offset Voltage Tempco	DV_{OS}/dT			10.0		$\mu\text{V}/^\circ\text{C}$
Input Bias Current	I_{BC}		-10	+24	+42	μA
Input Bias Current Tempco				10.0		$\text{nA}/^\circ\text{C}$
Input Offset Current			-8.0	± 0.5	+8.0	μA
Input Capacitance	C_{IN}			0.75		pF
Input Resistance, Differential Mode				100		k Ω
Input Resistance, Common Mode				600		k Ω
Open Loop Gain				60		dB
Common-Mode Rejection Ratio	CMRR	$V_{CM} = -2.0\text{ V to }+3.0\text{ V}$		69		dB
Hysteresis				± 1.0		mV
LATCH ENABLE CHARACTERISTICS						
Latch Enable Common-Mode Range	V_{LCM}		-2.0		0	V
Latch Enable Differential Input Voltage	V_{LD}		0.4		2.0	V
Input High Current		@ 0.0 V	-12	+6	+12	μA
Input Low Current		@ -2.0 V	-12	+6	+12	μA
Latch Setup Time	t_S	250 mV overdrive		50		ps
Latch to Output Delay	t_{PLOH}, t_{PLOL}	250 mV overdrive		250		ps
Latch Pulswidth	t_{PL}	250 mV overdrive		150		ps
Latch Hold Time	t_H	250 mV overdrive		75		ps
OUTPUT CHARACTERISTICS						
Output Voltage—High Level	V_{OH}	ECL 50 Ω to -2.0 V	-1.06		-0.81	V
Output Voltage—Low Level	V_{OL}	ECL 50 Ω to -2.0 V	-1.95		-1.65	V
Rise Time	t_R	20% to 80%		170		ps
Fall Time	t_F	20% to 80%		140		ps
AC PERFORMANCE						
Propagation Delay	t_{PD}	1 V overdrive		240		ps
Propagation Delay	t_{PD}	20 mV overdrive		290		ps
Propagation Delay Tempco				0.5		$\text{ps}/^\circ\text{C}$
Prop Delay Skew—Rising Transition to Falling Transition				± 10		ps
Within Device Propagation Delay Skew—Channel to Channel				± 10		ps
Propagation Delay Dispersion vs. Duty Cycle		1 MHz, 1 ns t_R, t_F		± 10		ps
Propagation Delay Dispersion vs. Overdrive		50 mV to 1.5 V		35		ps
Propagation Delay Dispersion vs. Overdrive		20 mV to 1.5 V		50		ps
Propagation Delay Dispersion vs. Slew Rate		0 V to 1 V swing, 20% to 80%, 50 and 600 ps t_R, t_F		50		ps
Propagation Delay Dispersion vs. Common-Mode Voltage		1 V swing, -1.5 V to 2.5 V_{CM}		5		ps
Equivalent Input Rise Time Bandwidth	BW	0 V to 1 V swing, 20% to 80%, 50 ps t_R, t_F		5000		MHz

ADCMP566

Parameter	Symbol	Condition	Min	Typ	Max	Unit
AC PERFORMANCE (continued)						
Toggle Rate	PW	>50% output swing		5		Gbps
Minimum Pulsewidth		Δt_{pd} from 10 ns to 200 ps < ± 25 ps		200		ps
Unit to Unit Propagation Delay Skew					± 10	
POWER SUPPLY						
Positive Supply Current	$I_{V_{CC}}$	@ +5.0 V	9	13	18	mA
Negative Supply Current	$I_{V_{EE}}$	@ -5.2 V	60	70	85	mA
Positive Supply Voltage	V_{CC}	Dual	4.75	5.0	5.25	V
Negative Supply Voltage	V_{EE}	Dual	-4.96	-5.2	-5.45	V
Power Dissipation		Dual, without load	375	450	525	mW
Power Dissipation		Dual, with load		550		mW
Power Supply Sensitivity— V_{CC}	$PSS_{V_{CC}}$			68		dB
Power Supply Sensitivity— V_{EE}	$PSS_{V_{EE}}$			85		dB

NOTE: Under no circumstances should the input voltages exceed the supply voltages.

ABSOLUTE MAXIMUM RATINGS

Table 2. ADCMP566 Absolute Maximum Ratings

	Parameter	Rating
Supply Voltages	Positive Supply Voltage (V _{CC} to GND)	−0.5 V to +6.0 V
	Negative Supply Voltage (V _{EE} to GND)	−6.0 V to +0.5 V
	Ground Voltage Differential	−0.5 V to +0.5 V
Input Voltages	Input Common-Mode Voltage	−3.0 V to +4.0 V
	Differential Input Voltage	−7.0 V to +7.0 V
	Input Voltage, Latch Controls	V _{EE} to 0.5 V
Output	Output Current	30 mA
Temperature	Operating Temperature, Ambient	−40°C to +85°C
	Operating Temperature, Junction	125°C
	Storage Temperature Range	−65°C to +150°C

Stress above those listed under Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

ESD CAUTION

ESD (electrostatic discharge) sensitive device. Electrostatic charges as high as 4000 V readily accumulate on the human body and test equipment and can discharge without detection. Although this product features proprietary ESD protection circuitry, permanent damage may occur on devices subjected to high energy electrostatic discharges. Therefore, proper ESD precautions are recommended to avoid performance degradation or loss of functionality.



THERMAL CONSIDERATIONS

The ADCMP566 LFCSP 32-lead package option has a θ_{JA} (junction-to-ambient thermal resistance) of 27.2°C/W in still air.

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