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MURATA PRODUCTS
POWER SUPPLY REFERENCE GUIDE FOR ALTERA FPGAs

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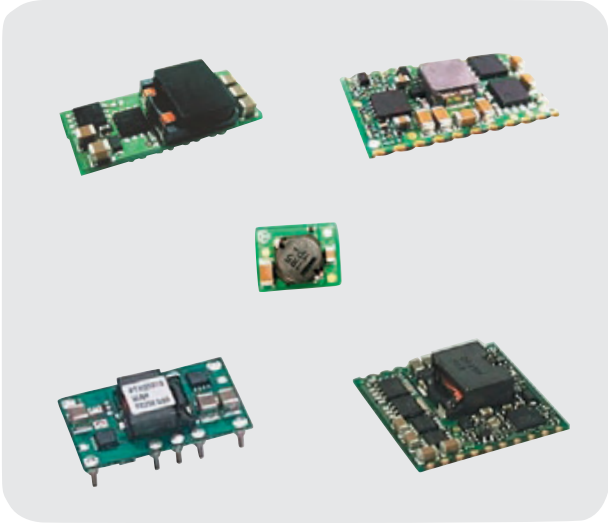
Samsung Electronics Co., Ltd.

POWER SUPPLY REFERENCE GUIDE FOR ALTERA® FPGAs

Murata offers an extensive selection of DC–DC Converters, both isolated and non-isolated. This reference guide provides access to recommended non-isolated power solutions specifically for Altera FPGA devices that lead the industry in miniaturization, efficiencies, and versatility. Each power solution represented here includes reference to the appropriate Altera FPGA family, Murata DC–DC Converter part numbers (and their features) and a suggested functional drawing.

For additional information on any of Murata's DC–DC Converter solutions, please visit www.murata.com/power, or contact your local Murata sales representative. (Visit "Contact Us" at www.murata-northamerica.com for representative locations.)



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Download data sheets for DC–DC Converters mentioned in this reference guide at www.murata.com/power/fpga/altera

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DC Voltage Specification Summary of Altera FPGAs

This table shows the DC voltage for powering each input power rail of Altera FPGAs.
To estimate current requirement for each individual application, please refer to the Altera Power Estimators, available at **www.altera.com**.

	Cyclone™ III	Cyclone™ II	Stratix® III	Stratix® II	Stratix®II GX	Stratix® GX
V_{CCINT}	1.2V	1.2V	0.9V/1.1V (VCCL)	1.2V	1.2V	1.5V
V_{CCIO}	1.2V-3.3V	1.5V-3.3V	1.2V-3.3V	1.2V-3.3V	1.2V-3.3V	1.5V-3.3V
V_{CCPD}	–	–	2.5V-3.3V	3.3V	3.3V	–
V_{CCA}	2.5V	–	2.5V	1.2V	3.3V	3.3V
V_{CCD}	1.2V	–	1.1V	1.2V	–	–
V_{CCP}	–	–	–	–	1.2V	1.5V
V_{CCR}	–	–	–	–	1.2V	1.5V
V_{CCT}	–	–	–	–	1.2V	1.5V
V_{CCG}	–	–	–	–	–	1.5V
V_{CCL}	–	–	–	–	1.2V	–
V_{CCH}	–	–	–	–	1.2V / 1.5V	–
V_{CCPT}	–	–	2.5V	–	–	–
V_{CCPGM}	–	–	1.8V-3.3V	–	–	–
V_{CC_CLKIN}	–	–	2.5V	–	–	–
V_{CCBAT}	–	–	2.5V	–	–	–

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Selection Table for Cyclone™ III FPGAs

Table 1. Cyclone™ III Device Selection Table

Altera				muRata Solutions (Vout/Iout)	
Device	**Type**	**Voltage**	**Current**	**Vin=3.3V or 5V**	**Vin=12V**
EP3C5 EP3C10 EP3C16 EP3C25 EP3C40 EP3C55 EP3C80 EP3C120	V_{CCINT}	1.2V	To determine current consumption, please use Altera's PowerPlay Power Estimation Tools, available at http://www.altera.com/support/devices/estimator/pow-powerplay/jsp.	MPD4S014S (Vo1=1-3.3V/1.3A, Vo2=1 8-3.6V/1A,Vo3=2.5V/0.3A) MPD5S025S (Vo1=1-3.3V/1.6A, Vo2=1 8-3.6V/1.6A,Vo3=2 5V/0.3A) MPD6S022S(1.1-3.6V/3A) MPDTY102S(0.8-5V/2A) MPDTY201S(0.8-2.5V/3A) MPDTY301S(0.8-3.3V/7A) MPDTY302S(0.8-2.5V/7A) MPDTY411S(0.8-3.6V/7A) MPDTY412S(0.8-2.5V/7A) MPDTH03050WAS(0.8-2.5V/6A) MPDTH05050WAS(0.8-3.6V/6A)	MPD4S014S (Vo1=1-3.3V/1.3A, Vo2=1.8-3.6V/1A,Vo3=2.5V/0.3A) MPDTY303S(0.8-5.5V/8A) MPDTH12050WAS(1.2-5.5V/6A)
	V_{CCIO}	1.5V-3.3V			
	V_{CCA}	2.5V			
	V_{CCD}	1.2V			

Selection Table for Cyclone™ II FPGAs

Table 2. Cyclone™ II Device Selection Table

Altera				muRata Solutions (Vout/Iout)	
Device	**Type**	**Voltage**	**Current**	**Vin=3.3V or 5V**	**Vin=12V**
EP2C5 EP2C8 EP2C15 EP2C20 EP2C35 EP2C50 EP2C70	V_{CCINT}	1.2V	To determine current consumption, please use Altera's PowerPlay Power Estimation Tools, available at http://www.altera.com/support/devices/estimator/pow-powerplay/jsp.	MPD4S014S (Vo1=1-3.3V/1.3A, Vo2=1 8-3.6V/1A,Vo3=2.5V/0.3A) MPD5S025S (Vo1=1-3.3V/1.6A, Vo2=1 8-3.6V/1.6A,Vo3=2 5V/0.3A) MPD6S022S(1.1-3.6V/3A) MPDTY102S(0.8-5V/2A) MPDTY201S(0.8-2.5V/3A) MPDTY301S(0.8-3.3V/7A) MPDTY302S(0.8-2.5V/7A) MPDTY411S(0.8-3.6V/7A) MPDTY412S(0.8-2.5V/7A) MPDTH03050WAS(0.8-2.5V/6A) MPDTH05050WAS(0.8-3.6V/6A)	MPD4S014S (Vo1=1-3.3V/1.3A, Vo2=1.8-3.6V/1A,Vo3=2.5V/0.3A) MPDTY303S(0.8-5.5V/8A) MPDTH12050WAS(1.2-5.5V/6A)
	V_{CCIO}	1.5V-3.3V			

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Selection Table for Stratix® III FPGAs

Table 3. Stratix® III Device Selection Table

Altera				muRata Solutions (Vout/Iout)	
Device	**Type**	**Voltage**	**Current**	**Vin=3.3V or 5V**	**Vin=12V**
EP3SL50 EP3SL70 EP3SL110 EP3SL150 EP3SL200 EP3SL340 EP3SE50 EP3SE80 EP3SE110 EP3SE260	VCCL (V_{CCINT})	0.9V/1.1V	To determine current consumption, please use Altera's PowerPlay Power Estimation Tools, which is available at http://www.altera.com/support/devices/es imator/pow-powerplay/jsp.	MPD6S022S(1.1-3.6V/3A) MPDTY201S(0.8-2.5V/3A) MPDTY301S(0.8-3.3V/7A) MPDTY302S(0.8-2.5V/7A) MPDTY311S(0.8-3.3V/16A) MPDTY312S(0.8-2.5V/16A) MPDTY402S(0.75-5.5V/16A) MPDTY411S(0.8-3.6V/7A) MPDTY412S(0.8-2.5V/7A) MPDTH03050WAS(0.8-2.5V/6A) MPDTH05050WAS(0.8-3.6V/6A) MPDTH03060WAS(0.8-2.5V/10A) MPDTH05060WAS(0.8-3.6V/10A) MPDTH03010WAS(0.8-2.5V/15A) MPDTH05010WAS(0.8-3.6V/15A) MPDTH03020WAS(0.8-2.5V/22A) MPDTH05020WAS(0.8-3.6V/22A)	MPDTY303S(0.8-5.5V/8A) MPDTH12050WAS(1.2-5.5V/6A) MPDTH12060WAS(1.2-5.5V/10A) MPDTH12010WAS(1.2-5.5V/12A) MPDTH12020WAS(1.2-5.5V/18A)
	with Large Load Transient Current	0.9V/1.1V		MPDRX002S(0.8-1.8V/16A) MPDRX312S(0.8-1.8V/16A)	MPDRX004S(0.8-1.8V/12A) MPDRX103S(0.8-1.8V/16A) MPDRX104S(1.5-3.3V/12A) MPDRX301S(0.8-1.65V/13A) MPDRX302S(1.6-3.63V/13A) MPDRX303S(0.8-1.65V/26A) MPDRX304S(1.6-3.63V/26A)
	V_{CCIO}	1.2V-3.3V		MPD6S022S(1.1-3.6V/3A) MPDTY201S(0.8-2.5V/3A) MPDTY301S(0.8-3.3V/7A) MPDTY302S(0.8-2.5V/7A) MPDTY311S(0.8-3.3V/16A) MPDTY312S(0.8-2.5V/16A) MPDTY402S(0.8-5.5V/16A) MPDTY411S(0.8-3.6V/7A) MPDTY412S(0.8-2.5V/7A) MPDTH03050WAS(0.8-2.5V/6A) MPDTH05050WAS(0.8-3.6V/6A) MPDTH03060WAS(0.8-2.5V/10A) MPDTH05060WAS(0.8-3.6V/10A) MPDTH03010WAS(0.8-2.5V/15A) MPDTH05010WAS(0.8-3.6V/15A) MPDTH03020WAS(0.8-2.5V/22A) MPDTH05020WAS(0.8-3.6V/22A)	MPDTY303S(0.8-5.5V/8A) MPDTH12050WAS(1.2-5.5V/6A) MPDTH12060WAS(1.2-5.5V/10A) MPDTH12010WAS(1.2-5.5V/12A) MPDTH12020WAS(1.2-5.5V/18A)
	with Large Load Transient Current	1.2V-3.3V		MPDRX002S(0.8-1.8V/16A) MPDRX312S(0.8-1.8V/16A)	MPDRX004S(0.8-1.8V/12A) MPDRX103S(0.8-1.8V/16A) MPDRX104S(1.5-3.3V/12A) MPDRX301S(0.8-1.65V/13A) MPDRX302S(1.6-3.63V/13A) MPDRX303S(0.8-1.65V/26A) MPDRX304S(1.6-3.63V/26A)

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