

**2008**  
**MURATA PRODUCTS**  
**POWER SUPPLY REFERENCE**  
**GUIDE FOR  FPGAs**

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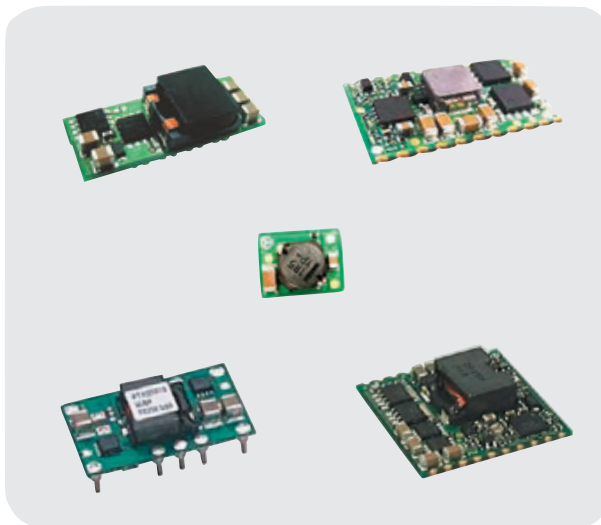
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## POWER SUPPLY REFERENCE GUIDE FOR ALTERA® FPGAs

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](http://www.murata.com/power), or contact your local Murata sales representative. (Visit “Contact Us” at [www.murata-northamerica.com](http://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](http://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](http://www.altera.com).

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

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# DC-DC Converter Selection Tables



## 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 <sub>CCINT</sub>	1.2V	To determine current consumption, please use Altera's PowerPlay Power Estimation Tools, available at <a href="http://www.altera.com/support/devices/estimator/pow-powerplay/jsp">http://www.altera.com/support/devices/estimator/pow-powerplay/jsp</a>	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) 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) MPDTH12050WAS (1.2-5.5V/6A)
	V <sub>CCIO</sub>	1.5V-3.3V			
	V <sub>CCA</sub>	2.5V			
	V <sub>CCD</sub>	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 <sub>CCINT</sub>	1.2V	To determine current consumption, please use Altera's PowerPlay Power Estimation Tools, available at <a href="http://www.altera.com/support/devices/estimator/pow-powerplay/jsp">http://www.altera.com/support/devices/estimator/pow-powerplay/jsp</a>	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) 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) MPDTH12050WAS (1.2-5.5V/6A)
	V <sub>CCIO</sub>	1.5V-3.3V			

Download data sheets for DC-DC Converters mentioned in this reference guide at [www.murata.com/power/fpga/altera](http://www.murata.com/power/fpga/altera)

# DC-DC Converter Selection Tables



## 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 <sub>CCINT</sub> )	0.9V/1.1V	To determine current consumption, please use Altera's PowerPlay Power Estimation Tools, which is available at <a href="http://www.altera.com/support/devices/lesimator/pow-powerplay/jsp">http://www.altera.com/support/devices/lesimator/pow-powerplay/jsp</a> .	MPD6S022S(1.1-3.6V/3A) MPD TY201S(0.8-2.5V/3A) MPD TY301S(0.8-3.3V/7A) MPD TY302S(0.8-2.5V/7A) MPD TY311S(0.8-3.3V/16A) MPD TY312S(0.8-2.5V/16A) MPD TY402S(0.75-5.5V/16A) MPD TY411S(0.8-3.6V/7A) MPD TY412S(0.8-2.5V/7A) MPD TH03050WAS(0.8-2.5V/6A) MPD TH05050WAS(0.8-3.6V/6A) MPD TH03060WAS(0.8-2.5V/10A) MPD TH05060WAS(0.8-3.6V/10A) MPD TH03010WAS(0.8-2.5V/15A) MPD TH05010WAS(0.8-3.6V/15A) MPD TH03020WAS(0.8-2.5V/22A) MPD TH05020WAS(0.8-3.6V/22A)	MPD TY303S(0.8-5.5V/8A) MPD TH12050WAS(1.2-5.5V/6A) MPD TH12060WAS(1.2-5.5V/10A) MPD TH12010WAS(1.2-5.5V/12A) MPD TH12020WAS(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 <sub>CCIO</sub>	1.2V-3.3V		MPD6S022S(1.1-3.6V/3A) MPD TY201S(0.8-2.5V/3A) MPD TY301S(0.8-3.3V/7A) MPD TY302S(0.8-2.5V/7A) MPD TY311S(0.8-3.3V/16A) MPD TY312S(0.8-2.5V/16A) MPD TY402S(0.8-5.5V/16A) MPD TY411S(0.8-3.6V/7A) MPD TY412S(0.8-2.5V/7A) MPD TH03050WAS(0.8-2.5V/6A) MPD TH05050WAS(0.8-3.6V/6A) MPD TH03060WAS(0.8-2.5V/10A) MPD TH05060WAS(0.8-3.6V/10A) MPD TH03010WAS(0.8-2.5V/15A) MPD TH05010WAS(0.8-3.6V/15A) MPD TH03020WAS(0.8-2.5V/22A) MPD TH05020WAS(0.8-3.6V/22A)	MPD TY303S(0.8-5.5V/8A) MPD TH12050WAS(1.2-5.5V/6A) MPD TH12060WAS(1.2-5.5V/10A) MPD TH12010WAS(1.2-5.5V/12A) MPD TH12020WAS(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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