2008
MURATA PRODUCTS
POWER SUPPLY REFERENCE GUIDE FOR XILINX® FPGAs

CATALOG No. DC-01-B

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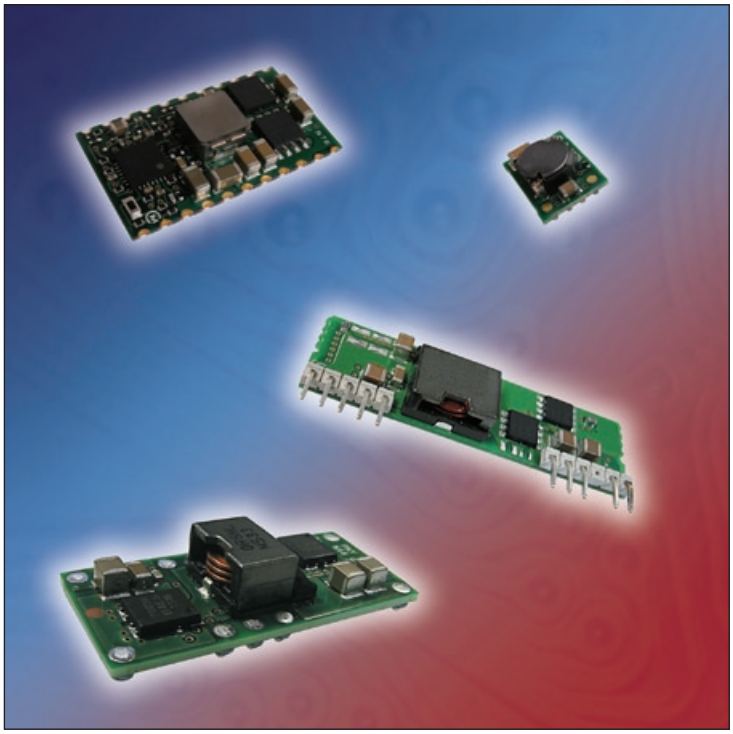

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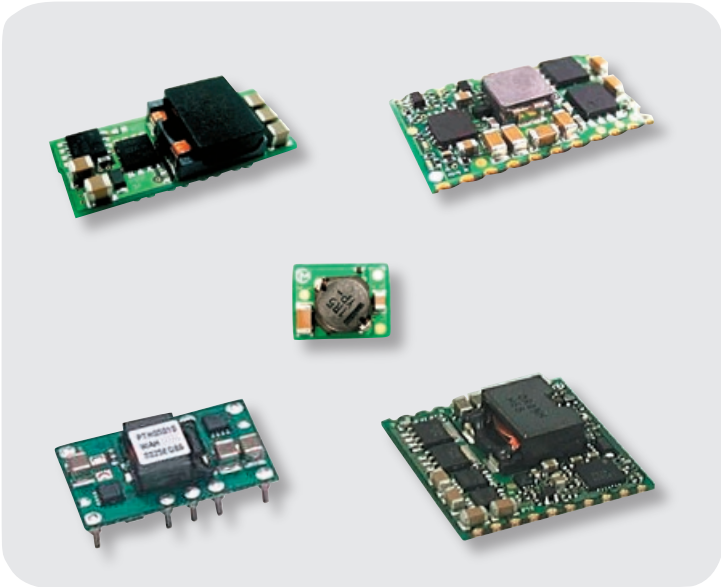
POWER SUPPLY REFERENCE GUIDE FOR Xilinx® FPGAs

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

For additional information on any of Murata's DC-DC Converter module 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/xilinx

Power Requirements of Xilinx Solutions in Typical Applications

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This information is intended to provide the designer with a general understanding of the power requirements of Xilinx FPGA families in typical applications. Simulation examples are shown in Appendix 1.
The number of logic gates, operating frequency and other factors affect the value of current consumption. Please refer to the Xilinx Power Consumption Tools, available at **www.xilinx.com/power**, for closer approximations specific to individual applications.

*** Unless otherwise specified all ICCO estimates represent the total operating current contributions of all I/O banks on the FPGAs measured at 85°C ambient temperature.**

	Spartan™-3/3E/3L/3A/3AN	Spartan™-IIE	Spartan™-II	Virtex™-5	Virtex™-4	Virtex™-II Pro	Virtex™-II
V_{CCINT}	1.2V @0.2A-5A	1.8V @0.2A-1.5A	2.5V @0.2A-1A	1.0V @0.2A-15A	1.2V @0.2A-20A	1.5V @0.2A-20A	1.5V @0.2A-20A
V_{CCO}	1.2V-3.3V @50mA-3A	1.5V-3.3V @50mA-0.5A	1.5V-3.3V @50mA-0.5A	1.2V-3.3V @50mA-5A	1.2V-3.3V @50mA-3A	1.5V-3.3V @50mA-3A	1.5V-3.3V @50mA-3A
V_{CCAUX}	2.5V @50mA-0.3A	–	–	2.5V @50mA-0.7A	2.5V @50mA-0.7A	2.5V @50mA-0.3A	3.3V @50mA-0.3A
$AV_{CCAUXTX}$	–	–	–	–	1.2V @150mA	2.5V @60mA/MGT	–
$AV_{CCAUXRX}$	–	–	–	–	1.2V @200mA	2.5V @35mA/MGT	–
AV_{TTX}	–	–	–	–	1.2V-1.575V @50mA	1.8V-2.625V @15mA/MGT	–
AV_{TRX}	–	–	–	–	1.0V-2.625V @15mA	1.8V-2.625V @30mA/MGT	–
AV_{CC}	–	–	–	1.0V @400mA	–	–	–
AV_{CC_PLL}	–	–	–	1.0V @300mA	–	–	–
AV_{TTTX}	–	–	–	1.2V @300mA	–	–	–
AV_{TTRX}	–	–	–	1.2V @50mA	–	–	–

Cautionary Note:

1. These power requirement numbers are estimated using Xilinx power tools, and, these numbers represent specific applications or implementations of FPGAs.
   Users' specific applications may run at lower or higher power consumption levels.

2. Murata is happy to provide these estimates for use by customers as a guideline, however no guarantee is offered as to the accuracy of the numbers represented herein.

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Selection Table for Spartan™-3A/3AN

Table1. DC-DC Converter Selection Table for Spartan™-3A Device

Xilinx				muRata Solutions	
Device	**Type**	**Voltage**	**Current**	**Vin=3.0-5.5V**	**Vin=10.8-13.2V**
XC3S50E XC3S200E XC3S400E XC3S700E XC3S1400E	V_{CCINT}	1.2V	0.2A-2A	MPD4S014S(1.3A/1A/0.3A) MPD5S025S(1.6A/1.6A/0.3A) MPD6S022S(3A) MPDTY102S(2A) MPDTY201S(3A)	MPD4S014S(1.3A/1A/0.3A) MPDTY303S(8A)
	V_{CCO}	1.2V-3.3V	50mA-2A		

Table2. DC-DC Converter Selection Table for Spartan™-3AN Device

Xilinx				muRata Solutions	
Device	**Type**	**Voltage**	**Current**	**Vin=3.0-5.5V**	**Vin=10.8-13.2V**
XC3S50AN XC3S200AN XC3S400AN XC3S700AN XC3S1400AN	V_{CCINT}	1.2V	0.2A-2A	MPD4S014S(1.3A/1A/0.3A) MPD5S025S(1.6A/1.6A/0.3A) MPD6S022S(3A) MPDTY102S(2A) MPDTY201S(3A)	MPD4S014S(1.3A/1A/0.3A) MPDTY303S(8A)
	V_{CCO}	1.2V-3.3V	50mA-2A		

Note : The Xilinx devices' current requirements in these tables were calculated based on intensive design. Please refer to Appendix 1 for details.

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

DC-DC Converter Selection Tables

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Selection Table for Spartan™-3E/3/3L

Table3. DC-DC Converter Selection Table for Spartan™-3E Device

Xilinx				muRata Solutions	
Device	**Type**	**Voltage**	**Current**	**Vin=3.0-5.5V**	**Vin=10.8-13.2V**
XC3S100E XC3S250E XC3S500E XC3S1200E XC3S1600E	V_{CCINT}	1.2V	0.2A-2A	MPD4S014S(1.3A/1A/0.3A) MPD5S025S(1.6A/1.6A/0.3A) MPD6S022S(3A) MPDTY102S(2A) MPDTY201S(3A)	MPD4S014S(1.3A/1A/0.3A) MPDTY303S(8A)
	V_{CCO}	1.2V-3.3V	50mA-2A		

Table4. DC-DC Converter Selection Table for Spartan™-3 Device

Xilinx				muRata Solutions	
Device	**Type**	**Voltage**	**Current**	**Vin=3.0-5.5V**	**Vin=10.8-13.2V**
XC3S50 XC3S200 XC3S400 XC3S1000 XC3S1500 XC3S2000 XC3S4000 XC3S5000	V_{CCINT}	1.2V	0.2A-5A	MPD4S014S(1.3A/1A/0.3A) MPD5S025S(1.6A/1.6A/0.3A) MPD6S022S(3A) MPDTY102S(2A) MPDTY201S(3A) MPDTY301S(7A) MPDTY302S(7A) MPDTY411S(7A) MPDTY412S(7A) MPDTH03050WAS(6A) MPDTH05050WAS(6A)	MPD4S014S(1.3A/1A/0.3A) MPDTY303S(8A) MPDTH12050WAS(6A)
	V_{CCO}	1.2V-3.3V	50mA-3A		

Table5. DC-DC Converter Selection Table for Spartan™-3L Device

Xilinx				muRata Solutions	
Device	**Type**	**Voltage**	**Current**	**Vin=3.0-5.5V**	**Vin=10.8-13.2V**
XC3S1000L XC3S1500L XC3S4000L	V_{CCINT}	1.2V	0.2A-4A	MPD4S014S(1.3A/1A/0.3A) MPD5S025S(1.6A/1.6A/0.3A) MPD6S022S(3A) MPDTY102S(2A) MPDTY201S(3A) MPDTH03050WAS(6A) MPDTH05050WAS(6A)	MPD4S014S(1.3A/1A/0.3A) MPDTY303S(8A) MPDTH12050WAS(6A)
	V_{CCO}	1.2V-3.3V	50mA-3A		

Note : The Xilinx devices' current requirements in these tables were calculated based on intensive design. Please refer to Appendix 1 for details.

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Selection Table for Spartan™-II/IIE

Table6. DC-DC Converter Selection Table for Spartan™-IIE Device

Xilinx				muRata Solutions	
Device	**Type**	**Voltage**	**Current**	**Vin=3.0-5.5V**	**Vin=10.8-13.2V**
XC2S50E XC2S100E XC2S150E XC2S200E XC2S300E XC2S400E XC2S600E	V_{CCINT}	1.8V	0.2A-1.5A	MPD4S014S(1.3A/1A/0.3A) MPD5S025S(1.6A/1.6A/0.3A) MPD6S022S(3A) MPDTY102S(2A) MPDTY201S(3A)	MPD4S014S(1.3A/1A/0.3A)
	V_{CCO}	1.5V-3.3V	50mA-0.5A		

Table7. DC-DC Converter Selection Table for Spartan™-II Device

Xilinx				muRata Solutions	
Device	**Type**	**Voltage**	**Current**	**Vin=3.0-5.5V**	**Vin=10.8-13.2V**
XC2S15 XC2S30 XC2S50 XC2S100 XC2S150 XC2S200	V_{CCINT}	2.5V	0.2A-1A	MPD4S014S(1.3A/1A/0.3A) MPD5S025S(1.6A/1.6A/0.3A) MPD6S022S(3A) MPDTY102S(2A) MPDTY201S(3A)	MPD4S014S(1.3A/1A/0.3A)
	V_{CCO}	1.5V-3.3V	50mA-0.5A		

Note : The Xilinx devices' current requirements in these tables were calculated based on intensive design. Please refer to Appendix 1 for details.

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Selection Table for Virtex™-5

Table8. DC-DC Converter Selection Table for Virtex™-5 Device

Xilinx				muRata Solutions	
Device	**Type**	**Voltage**	**Current**	**Vin=3.0-5.5V**	**Vin=10.8-13.2V**
XC5VLX30 XC5VLX50 XC5VLX85 XC5VLX110 XC5VLX155 XC5VLX220 XC5VLX330 XC5VLX20T XC5VLX30T XC5VLX50T XC5VLX85T XC5VLX110T XC5VLX155T XC5VLX220T XC5VLX330T XC5VSX35T XC5VSX50T XC5VSX95T XC5VSX240T XC5VFX30T XC5VFX70T XC5VFX100T XC5VFX130T XC5VFX200T	V_{CCINT}	1.0V	0.2A-15A	MPDTY301S(7A) MPDTY302S(7A) MPDTY311S(16A) MPDTY312S(16A) MPDTY411S(7A) MPDTY412S(7A) MPDTY402S(16A) MPDTH03050WAS(6A) MPDTH05050WAS(6A) MPDTH03060WAS(10A) MPDTH05060WAS(10A) MPDTH03010WAS(15A) MPDTH05010WAS(15A) MPDTH03020WAS(22A) MPDTH05020WAS(22A) MPDTH03030WAS(30A) MPDTH05030WAS(30A)	MPDTY303S(8A) MPDRX301S,302S(13A) MPDRX303S,304S(26A) MPDTH12050WAS(6A) MPDTH12060WAS(10A) MPDTH12010WAS(12A) MPDTH12020WAS(18A) MPDTH12030WAS(26A)
	V_{CCO}	1.2V-3.3V	50mA-5A	MPD6S022S(3A) MPDTY102S(2A) MPDTY201S(3A) MPDTY301S(7A) MPDTY302S(7A) MPDTY411S(7A) MPDTY412S(7A) MPDTH03050WAS(6A) MPDTH05050WAS(6A)	MPDTY303S(8A) MPDTH12050WAS(6A)
	V_{CCINT}/V_{CCO} with Large Load Transient	1.0V-3.3V	0.2A-15A	MPDRX002S(16A) MPDRX312S(16A) MPDTH03020WAS(22A) MPDTH05020WAS(22A) MPDTH03030WAS(30A) MPDTH05030WAS(30A)	MPDRX004S(12A) MPDRX103S(12A) MPDRX104S(16A) MPDRX301S,302S(13A) MPDRX303S,304S(26A)
	AV_{CC}/ AV_{CC_PLL}	1.0V	50mA-0.4A	*LDO is recommended*	*LDO is recommended*
	AV_{TTTX}/ AV_{TTRX}	1.2V	50mA-0.3A	*LDO is recommended*	*LDO is recommended*

Note : The Xilinx devices' current requirements in these tables were calculated based on intensive design. Please refer to Appendix 1 for details.

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Selection Table for Virtex™-4

Table9. DC-DC Converter Selection Table for Virtex™-4 Device

Xilinx				muRata Solutions	
Device	**Type**	**Voltage**	**Current**	**Vin=3.0-5.5V**	**Vin=10.8-13.2V**
XC4VLX15 XC4VLX25 XC4VLX40 XC4VLX60 XC4VLX80 XC4VLX100 XC4VLX160	V_{CCINT}	1.2V	0.2A-20A	MPDTY301S(7A) MPDTY302S(7A) MPDTY311S(16A) MPDTY312S(16A) MPDTY411S(7A) MPDTY412S(7A) MPDTY402S(16A) MPDTH03050WAS(6A) MPDTH05050WAS(6A) MPDTH03060WAS(10A) MPDTH05060WAS(10A) MPDTH03010WAS(15A) MPDTH05010WAS(15A) MPDTH03020WAS(22A) MPDTH05020WAS(22A) MPDTH03030WAS(30A) MPDTH05030WAS(30A)	MPDTY303S(8A) MPDTH12050WAS(6A) MPDTH12060WAS(10A) MPDTH12010WAS(12A) MPDTH12020WAS(18A) MPDTH12030WAS(26A) MPDRX301S,302S(13A) MPDRX303S,304S(26A)
XC4VLX200 XC4VSX25 XC4VSX35 XC4VSX55 XC4VFX12 XC4VFX20 XC4VFX40 XC4VFX60 XC4VFX100 XC4VFX140	V_{CCO}	1.2V-3.3V	50mA-3A	MPD6S022S(3A) MPDTY102S(2A) MPDTY201S(3A) MPDTY301S(7A) MPDTY302S(7A) MPDTY411S(7A) MPDTY412S(7A) MPDTH03050WAS(6A) MPDTH05050WAS(6A)	MPDTY303S(8A) MPDTH12050WAS(6A)
	V_{CCINT}/V_{CCO} with Large Load Transient	1.2V-3.3V	0.2A-20A	MPDRX002S(16A) MPDRX312S(16A) MPDTH03060WAS(10A) MPDTH05060WAS(10A) MPDTH03010WAS(15A) MPDTH05010WAS(15A) MPDTH03020WAS(22A) MPDTH05020WAS(22A) MPDTH03030WAS(30A) MPDTH05030WAS(30A)	MPDRX004S(12A) MPDRX103S(12A) MPDRX104S(16A) MPDRX301S,302S(13A) MPDRX303S,304S(26A)

Note : The Xilinx devices' current requirements in these tables were calculated based on intensive design. Please refer to Appendix 1 for details.

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Selection Table for Virtex™-II Pro

Table10. DC-DC Converter Selection Table for Virtex™-II Pro Device

Xilinx				muRata Solutions	
Device	**Type**	**Voltage**	**Current**	**Vin=3.0-5.5V**	**Vin=10.8-13.2V**
XC2VP2 XC2VP4 XC2VP7 XC2VP20 XC2VPX20 XC2VP30	V_{CCINT}	1.5V	0.2A-6A	MPD6S022S(3A) MPDTY102S(2A) MPDTY201S(3A) MPDTY301S(7A) MPDTY302S(7A) MPDTY411S(7A) MPDTY412S(7A) MPDTH03050WAS(6A) MPDTH05050WAS(6A)	MPDTY303S(8A) MPDTH12050WAS(6A)
	V_{CCO}	1.5V-3.3V	50mA-3A		
	V_{CCINT}/V_{CCO} with Large Load Transient	1.5V-3.3V	0.2A-6A	MPDRX002S(16A) MPDRX312S(16A)	MPDRX004S(12A) MPDRX103S(12A) MPDRX104S(16A) MPDRX301S,302S(13A) MPDRX303S,304S(26A)
XC2VP40 XC2VP50 XC2VP70 XC2VPX70 XC2VP100	V_{CCINT}	1.5V	0.2A-20A	MPDTY301S(7A) MPDTY302S(7A) MPDTY311S(16A) MPDTY312S(16A) MPDTY411S(7A) MPDTY412S(7A) MPDTH03050WAS(6A) MPDTH05050WAS(6A) MPDTH03060WAS(10A) MPDTH05060WAS(10A) MPDTH03010WAS(15A) MPDTH05010WAS(15A) MPDTH03020WAS(22A) MPDTH05020WAS(22A)	MPDTY303S(8A) MPDTH12050WAS(6A) MPDTH12060WAS(10A) MPDTH12010WAS(12A) MPDTH12020WAS(18A) MPDTH12030WAS(26A)
	V_{CCO}	1.5V-3.3V	50mA-3A	MPD6S022S(3A) MPDTY102S(2A) MPDTY201S(3A) MPDTY301S(7A) MPDTY302S(7A) MPDTY411S(7A) MPDTY412S(7A) MPDTH03050WAS(6A) MPDTH05050WAS(6A)	MPDTY303S(8A) MPDTH12050WAS(6A)
	V_{CCINT}/V_{CCO} with Large Load Transient	1.5V-3.3V	0.2A-20A	MPDRX002S(16A) MPDRX312S(16A)	MPDRX004S(12A) MPDRX103S(12A) MPDRX104S(16A) MPDRX301S,302S(13A) MPDRX303S,304S(26A)

Note : The Xilinx devices' current requirements in these tables were calculated based on intensive design. Please refer to Appendix 1 for details.

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Selection Table for Virtex™-II

Table11. DC-DC Converter Selection Table for Virtex™-II Device

Xilinx				muRata Solutions	
Device	**Type**	**Voltage**	**Current**	**Vin=3.0-5.5V**	**Vin=10.8-13.2V**
XC2V40 XC2V80 XC2V250 XC2V500 XC2V1000 XC2V1500 XC2V2000 XC2V3000	V_{CCINT}	1.5V	0.2A-6A	MPD6S022S(3A) MPDTY102S(2A) MPDTY201S(3A) MPDTY301S(7A) MPDTY302S(7A) MPDTY411S(7A) MPDTY412S(7A) MPDTH03050WAS(6A) MPDTH05050WAS(6A)	MPDTY303S(8A) MPDTH12050WAS(6A)
	V_{CCO}	1.5V-3.3V	50mA-3A		
	V_{CCINT}/V_{CCO} with Large Load Transient	1.5V-3.3V	0.2A-6A	MPDRX002S(16A) MPDRX312S(16A)	MPDRX004S(12A) MPDRX103S(12A) MPDRX104S(16A) MPDRX301S,302S(13A) MPDRX303S,304S(26A)
XC2V4000 XC2V6000 XC2V8000	V_{CCINT}	1.5V	0.2A-20A	MPDTY301S(7A) MPDTY302S(7A) MPDTY311S(16A) MPDTY312S(16A) MPDTY411S(7A) MPDTY412S(7A) MPDTH03050WAS(6A) MPDTH05050WAS(6A) MPDTH03060WAS(10A) MPDTH05060WAS(10A) MPDTH03010WAS(15A) MPDTH05010WAS(15A) MPDTH03020WAS(22A) MPDTH05020WAS(22A)	MPDTY303S(8A) MPDTH12050WAS(6A) MPDTH12060WAS(10A) MPDTH12010WAS(12A) MPDTH12020WAS(18A) MPDTH12030WAS(26A)
	V_{CCO}	1.5V-3.3V	50mA-3A	MPD6S022S(3A) MPDTY102S(2A) MPDTY201S(3A) MPDTY301S(7A) MPDTY302S(7A) MPDTY411S(7A) MPDTY412S(7A) MPDTH03050WAS(6A) MPDTH05050WAS(6A)	MPDTY303S(8A) MPDTH12050WAS(6A)
	V_{CCINT}/V_{CCO} with Large Load Transient	1.5V-3.3V	0.2A-20A	MPDRX002S(16A) MPDRX312S(16A)	MPDRX004S(12A) MPDRX103S(12A) MPDRX104S(16A) MPDRX301S,302S(13A) MPDRX303S,304S(26A)

Note : The Xilinx devices' current requirements in these tables were calculated based on intensive design. Please refer to Appendix 1 for details.

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Power Supply Reference Design List

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Table 1. Spartan™-3/3E/3L/3A/3AN Reference Design					
#Design	1.2V	1.2-3.3V	2.5V	Description	Page
1	1.3A	1.3A	0.3A	4.5-13.2Vinput, Triple Output MPD4S014S	10
2	1.6A	1.6A	0.3A	5Vinput, Triple Output MPD5S025S	11
3	3A	3A	0.4A	5Vinput, MPD6S022S (×2)	12
4	3A	-	0.4A	3.3Vinput, MPDTY201S	13
5	7A	7A	0.4A	5Vinput, MPDTY411S (×2)	14
6	8A	8A	0.4A	6.5-14Vinput, MPDTY303S (×2)	15

Table 2. Spartan™-II/IIE Reference Design					
#Design	2.5V/1.8V	1.5-3.3V	-	Description	Page
1	1.3A	1A	-	4.5-13.2Vinput, Triple Output MPD4S014S	16
2	1.6A	1.6A	-	5Vinput, Triple Output MPD5S025S	17
3	3A	3A	-	5Vinput, MPDTY201S (×2)	18

Table 3. Virtex™-5 Reference Design					
#Design	1.0V	3.3V/1.8V	2.5V	Description	Page
1	7A	7A	0.7A	5Vinput, MPDTY411S (×2)	19
2	12A	8A	0.7A	7-14Vinput, MPDRX302S+MPDTY303S	20
3	16A	8A	0.7A	5Vinput, MPDRX002S+MPDTY402S	21
4	16A	12A	0.7A	12Vinput, MPDRX103S+MPDRX104S	22
5	16A	16A	0.7A	5Vinput, MPDRX312S+MPDTY311S	23

Table 4. Virtex™-4 Reference Design					
#Design	1.2V	3.3V	2.5V	Description	Page
1	8A	8A	0.7A	6.5-14Vinput, MPDTY303S (×2)	24
2	12A	8A	0.7A	3-5.5Vinput, MPDRX002S+MPDTY402S	25
3	16A	16A	0.7A	5Vinput, MPDRX312S+MPDTY311S	26
4	18A	18A	0.7A	12Vinput, MPDTH12020WAS (×2)	27
5	26A	26A	0.7A	5.6-14Vinput, MPDRX304S+MPDTRX304	28

Table 5. Virtex™-II Pro Reference Design					
#Design	1.5V	3.3V	2.5V	Description	Page
1	8A	8A	0.4A	6.5-14Vinput, MPDTY303S (×2)	29
2	12A	8A	0.4A	7-14Vinput, MPDRX004S+MPDTY303S	30
3	16A	16A	0.4A	5Vinput, MPDRX312S+MPDTY311S	31
4	18A	18A	0.4A	12Vinput, MPDTH12020WAS (×2)	32

Table 6. Virtex™-II Reference Design					
#Design	1.5V	3.3V	-	Description	Page
1	12A	8A	-	7-14Vinput, MPDRX004S+MPDTY303S	33
2	16A	16A	-	5Vinput, MPDRX312S+MPDTY311S	34

Note: The current values in these tables indicate the power supply current rating.
The FPGA alone does not necessarily require these supply current levels.

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

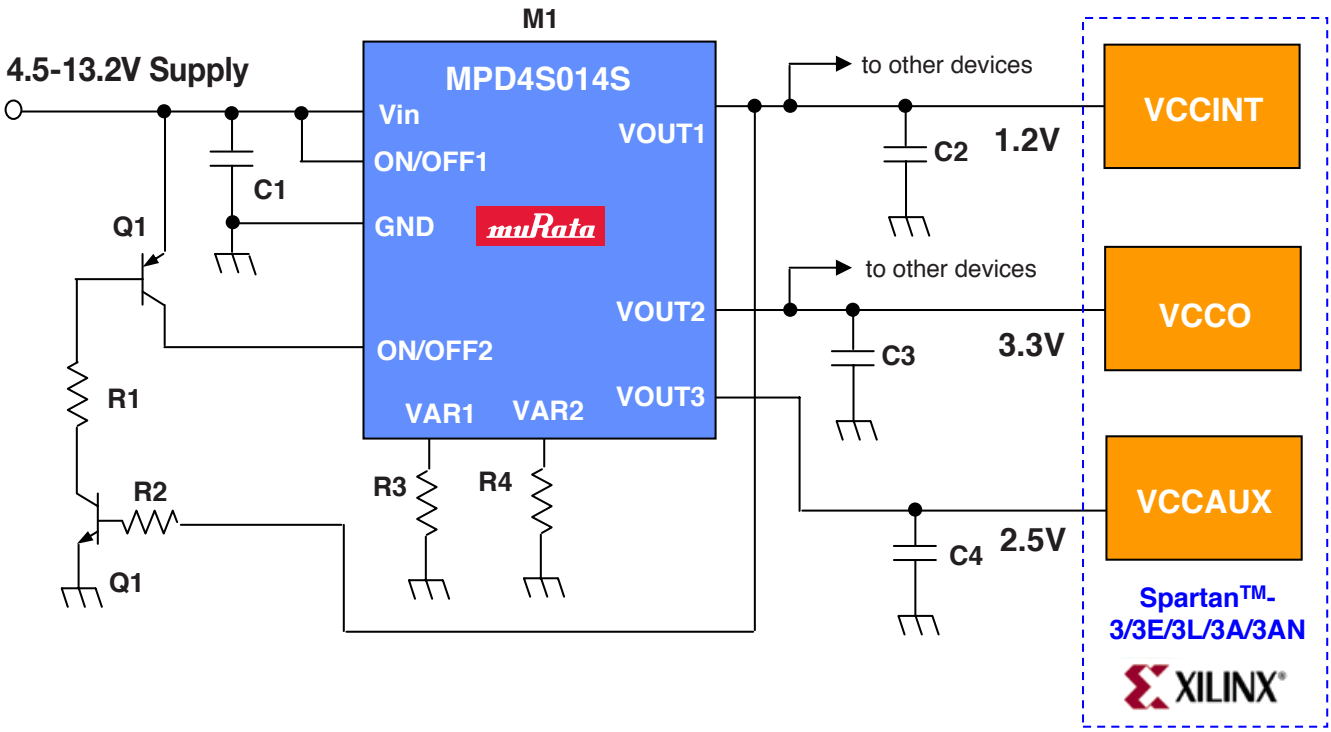
Spartan™ – 3/3E/3L/3A/3AN Design 1
4.5 - 13.2V Input, 1.3A Low Cost Solution

MURATA PRODUCTS RoHS Compliant

[Features]

- 3-Output configuration of the MPD4S014S makes it simple to use.
- Wide Input Voltage Range
- SIP configuration saves PCB space.
- Adjustable Start-up Sequence via On/Off Control Pins.
- Trimmable Output Voltages (Vout1 & Vout2)

[Schematic]



[Bill of Materials]

Reference	Qty	Description	Manufacturer	Part Number
M1	1	1.3A/1A/0.3A-Triple output DC-DC converter, SIP	Murata	MPD4S014S
C1,C2,C3,C4	4	Ceramic, 1μF, 16V, X7R, 10%	Murata	GRM188R71C105KA12L
Q1	1	Dual, 50V, 100mA	Std	Std
R1,R2	2	47 kΩ, 1/16W, 5%	Std	Std
R3	1	2.29kΩ, 1/16W, 0.5%	Std	Std
R4	1	1.8kΩ, 1/16W, 0.5%	Std	Std

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

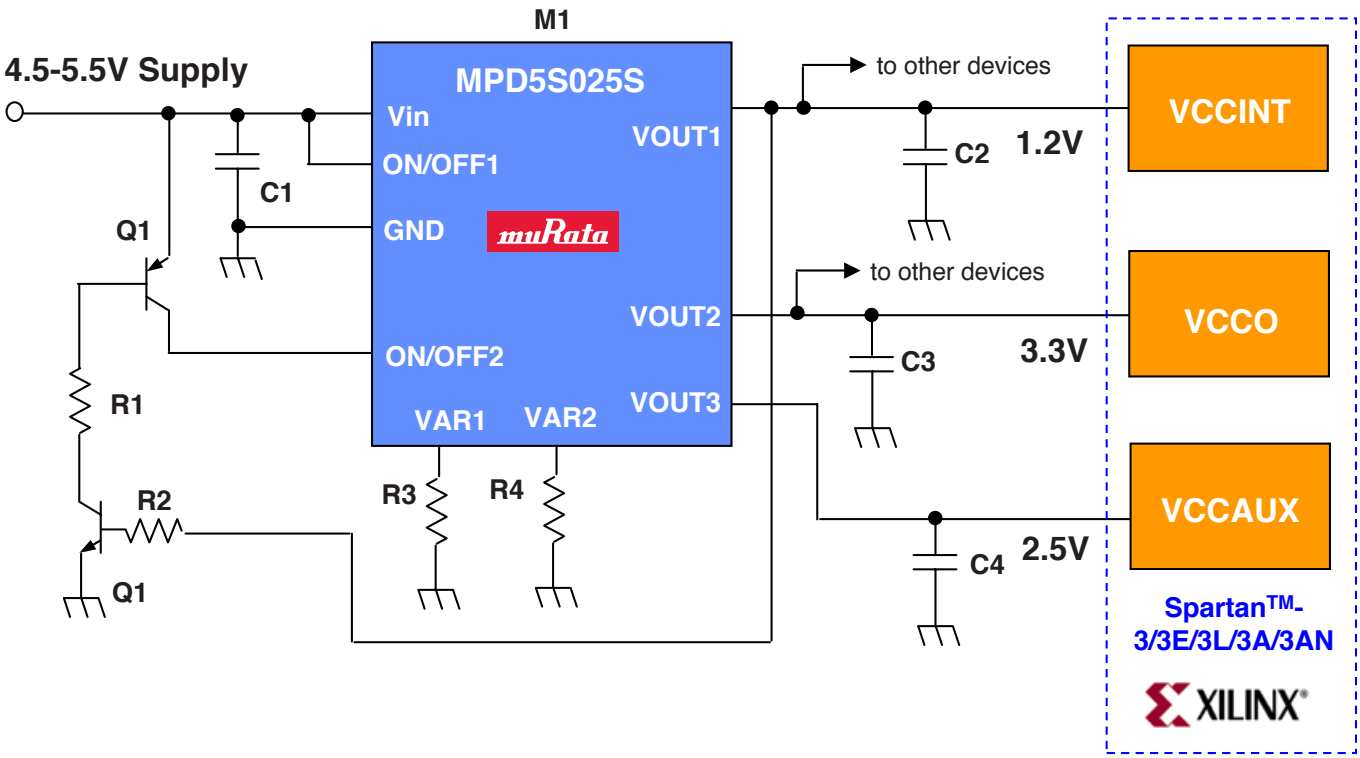
Spartan™ – 3/3E/3L/3A/3AN Design 2
5V Input, 1.6A Low Cost Solution

MURATA PRODUCTS
RoHS Compliant

[Features]

- 3-Output configuration of the MPD5S025S makes it simple to use.
- SIP configuration saves PCB space.
- Adjustable Start-up Sequence via On/Off Control Pins.
- Trimmable Output Voltages (Vout1 & Vout2)

[Schematic]



[Bill of Materials]

Reference	Qty	Description	Manufacturer	Part Number
M1	1	1.6A/1.6A/0.3A-Triple output DC-DC converter, SIP	Murata	MPD5S025S
C1,C2,C3,C4	4	Ceramic, 1μF, 16V, X7R, 10%	Murata	GRM188R71C105KA12L
Q1	1	Dual, 50V, 100mA	Std	Std
R1,R2	2	47 kΩ, 1/16W, 5%	Std	Std
R3	1	2.29kΩ, 1/16W, 0.5%	Std	Std
R4	1	1.8kΩ, 1/16W, 0.5%	Std	Std

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

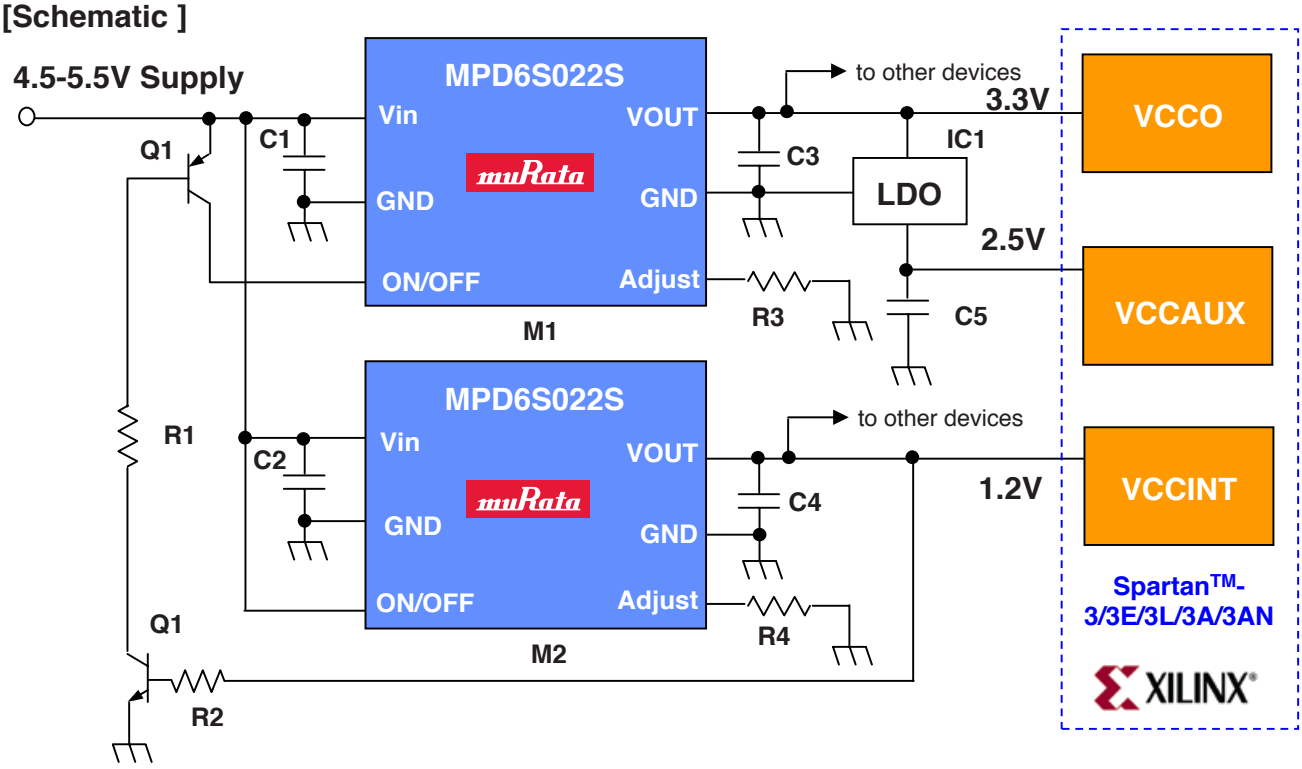
Spartan™ – 3/3E/3L/3A/3AN Design 3
5V Input, 3A Low Cost, Small Space Solution

MURATA PRODUCTS RoHS Compliant

[Features]

- SIP configuration saves PCB space.
- Adjustable Start-up Sequence via On/Off Control Pins.
- Wide input voltage range of MPD6S022S is from 3.0V to 5.5V.
- Trimmable Output Voltage (1.1V to 3.6V)

[Schematic]



[Bill of Materials]

Reference	Qty	Description	Manufacturer	Part Number
M1,M2	2	3A-out DC-DC converter, SIP	Murata	MPD6S022S
C1,C2,C3,C4	4	Ceramic, 0.1μF, 50V, X7R, 10%	Murata	GRM188R71H104KA93
C5	1	Ceramic, 1μF, 16V, X7R, 10%	Murata	GRM188R71C105KA12L
IC1	1	2.5V LDO, 400mA-out	Std	Std
Q1	1	Dual, 50V, 100mA	Std	Std
R1,R2	2	47 kΩ, 1/16W, 5%	Std	Std
R3	1	131.5kΩ, 1/16W, 0.5%	Std	Std
R4	1	750Ω, 1/16W, 0.5%	Std	Std

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

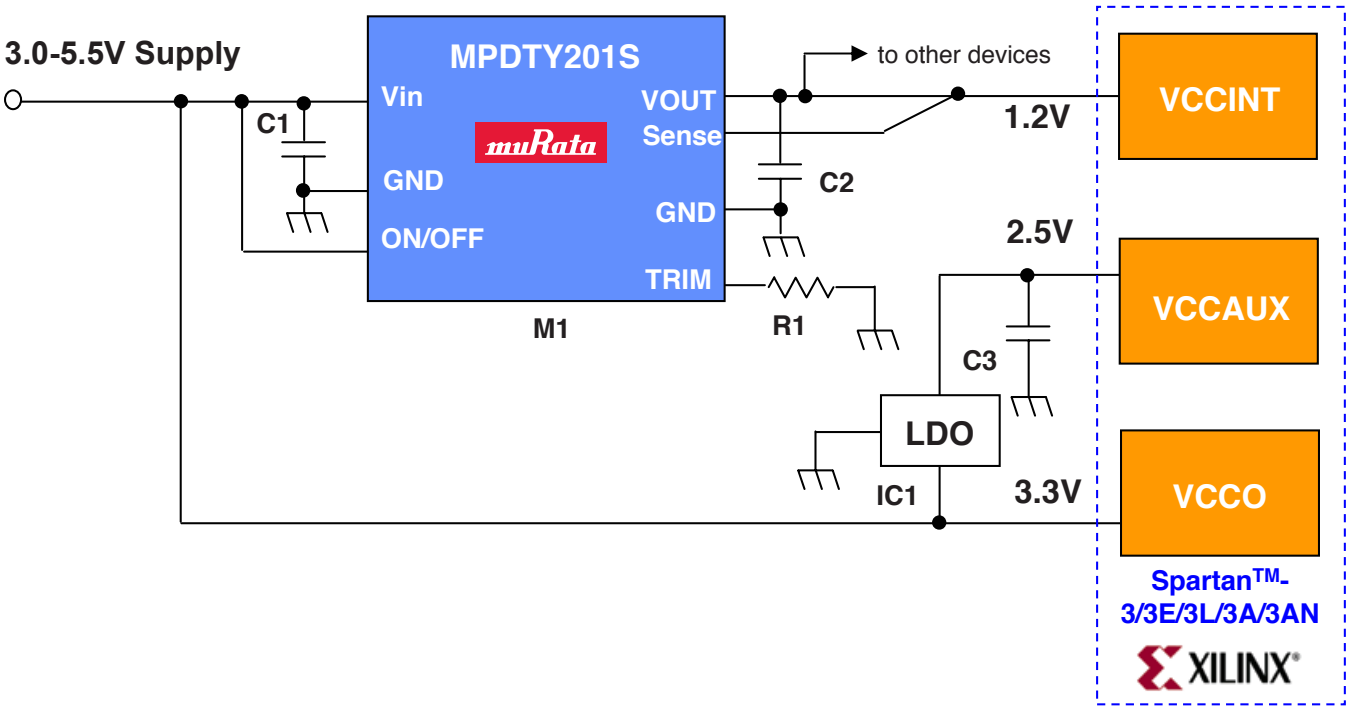
Spartan™ – 3/3E/3L/3A/3AN Design 4
3 - 5.5V Input, 3A Ultra Small
Low Cost Solution

MURATA PRODUCTS
RoHS Compliant

[Features]

- Ultra Small Package configuration saves PCB space.
- Adjustable Start-up Sequence via On/Off Control Pins.
- Wide input voltage range of MPDTY201S is from 3.0V to 5.5V.
- Trimmable Output Voltage (0.8V to 2.5V)

[Schematic]



[Bill of Materials]

Reference	Qty	Description	Manufacturer	Part Number
M1	1	3A-out DC-DC converter, SIP	Murata	MPDTY201S
C1	1	Ceramic, 47μF, 6.3V, X7R, 10%	Murata	GRM32ER70J476KE20L
C2,C3	2	Ceramic, 1μF, 16V, X7R, 10%	Murata	GRM188R71C105KA12L
IC1	1	2.5V LDO, 400mA-out	Std	Std
R1	1	1.7kΩ, 1/16W, 0.5%	Std	Std

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

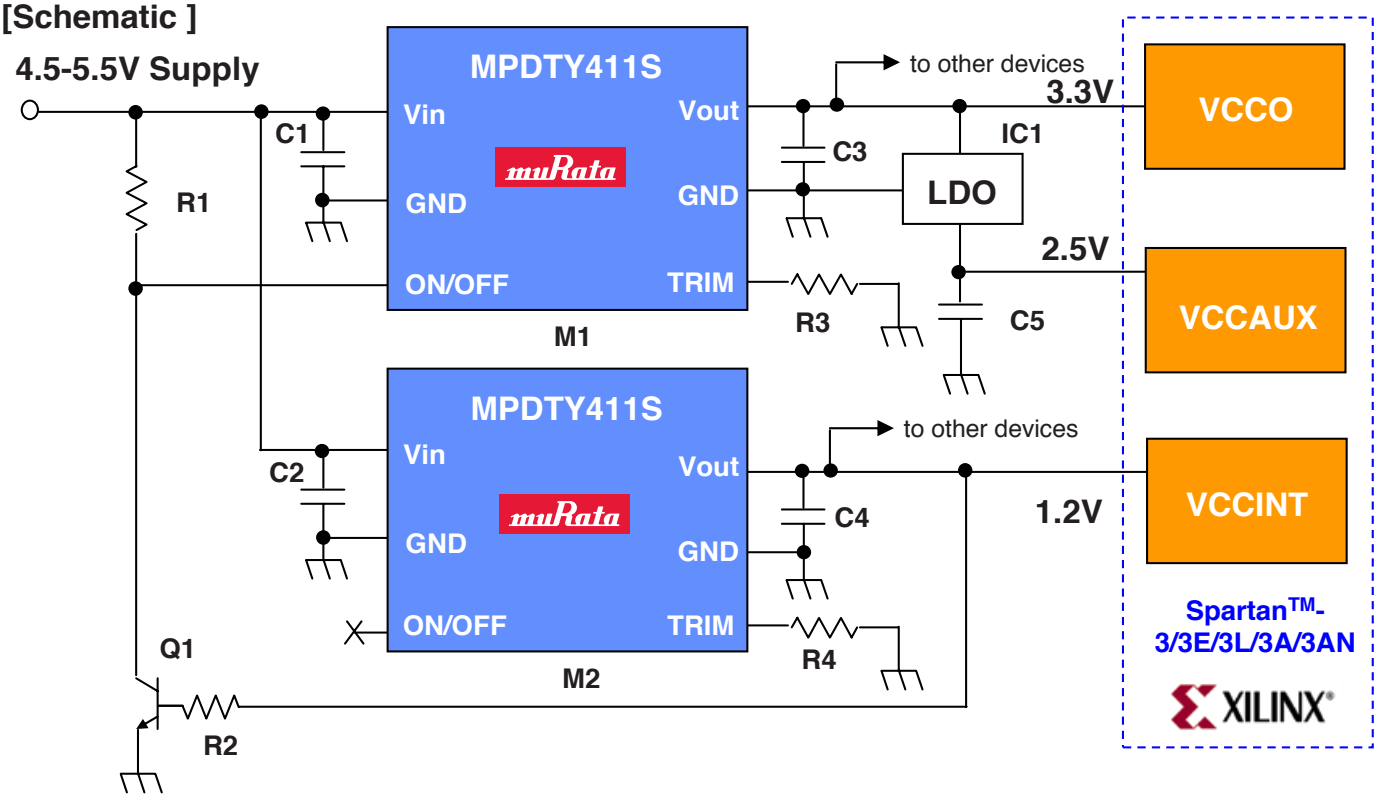
Spartan™ – 3/3E/3L/3A/3AN Design 5
5V Input, 7A Standard Package Solution

MURATA PRODUCTS RoHS Compliant

[Features]

- Industry-Standard Pin Compatibility, Small Footprint, High Efficiency
- Adjustable Start-up Sequence via On/Off Control Pins.
- Trimmable Output Voltage (0.8V to 3.3V)

[Schematic]



[Bill of Materials]

Reference	Qty	Description	Manufacturer	Part Number
M1,M2	2	7A-out DC-DC converter, SMD	Murata	MPDTY411S
C1,C2	2	Ceramic, 100μF, 6.3V, X6S, 20%	Murata	GRM32EC80J107ME20L
C3,C4	2	Ceramic, 47μF, 6,3V, X7R, 10%	Murata	GRM32ER70J476KE20L
C5	1	Ceramic, 1μF, 16V, X7R, 10%	Murata	GRM188R71C105KA12L
IC1	1	2.5V LDO, 400mA-out	Std	Std
Q1	1	50V, 150mA	Std	Std
R1,R2	2	22 kΩ, 1/16W, 5%	Std	Std
R3	1	5.46kΩ, 1/16W, 0.5%	Std	Std
R4	1	60.9kΩ, 1/16W, 0.5%	Std	Std

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

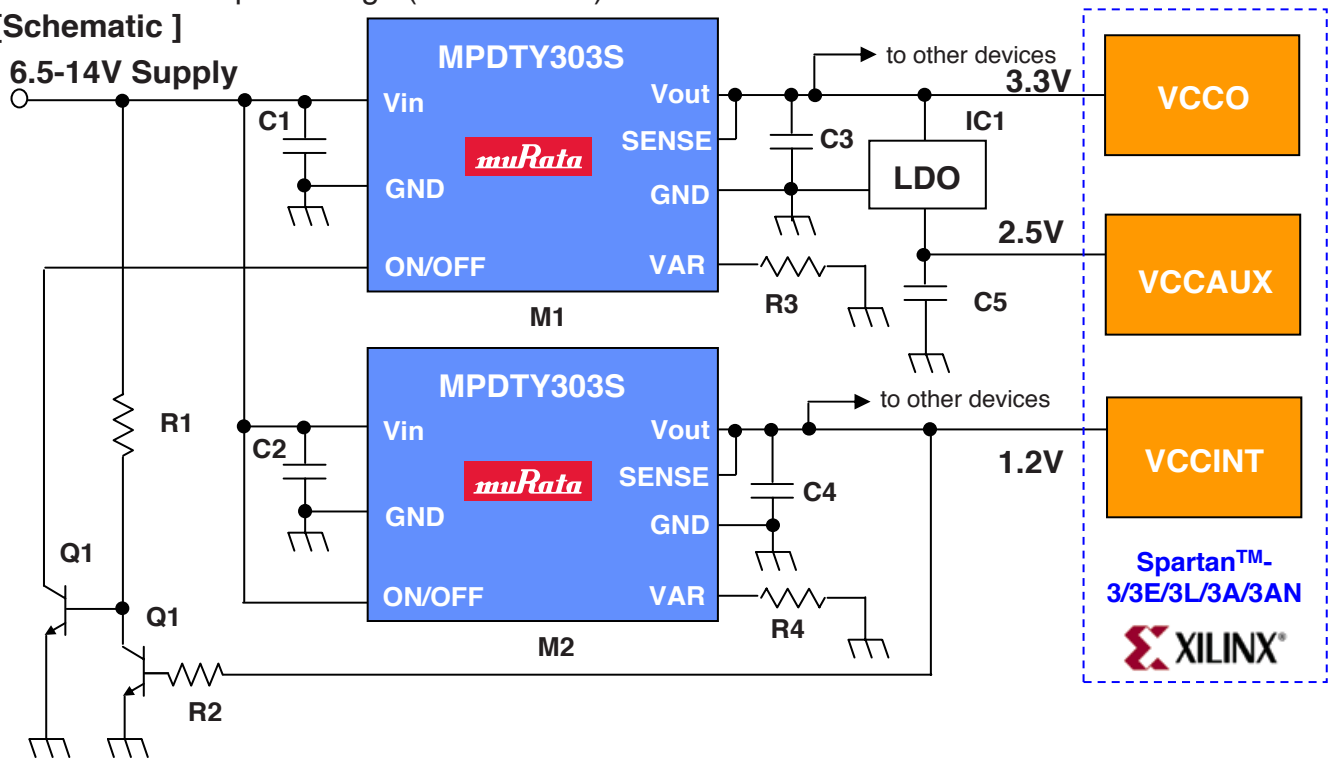
Spartan™ – 3/3E/3L/3A/3AN Design 6
6.5 - 14V Input, 8A Low Profile Solution

MURATA PRODUCTS RoHS Compliant

[Features]

- Low Profile (H<4.2mm)
- Wide Input Range
- High .Efficiency (92% @ Rated Current)
- Adjustable Start-up Sequence via On/Off Control Pins
- Trimmable Output Voltage (0.8V to 5.5V)

[Schematic]



[Bill of Materials]

Reference	Qty	Description	Manufacturer	Part Number
M1,M2	2	8A-out DC-DC converter, SMD	Murata	MPDTY303S
C1,C2	2	Ceramic,22μF, 16V, X7R, 10%	Murata	GRM32ER71C226KE18L
C3,C4	2	Ceramic, 47μF, 6.3V, X7R, 10%	Murata	GRM32ER70J476KE20L
C5	1	Ceramic, 1μF, 16V, X7R, 10%	Murata	GRM188R71C105KA12L
IC1	1	2.5V LDO, 400mA-out	Std	Std
Q1	1	Dual, 50V, 100mA	Std	Std
R1,R2	2	47 kΩ, 1/16W, 5%	Std	Std
R3	1	4.01kΩ, 1/16W, 0.5%	Std	Std
R4	1	45.35kΩ, 1/16W, 0.5%	Std	Std

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

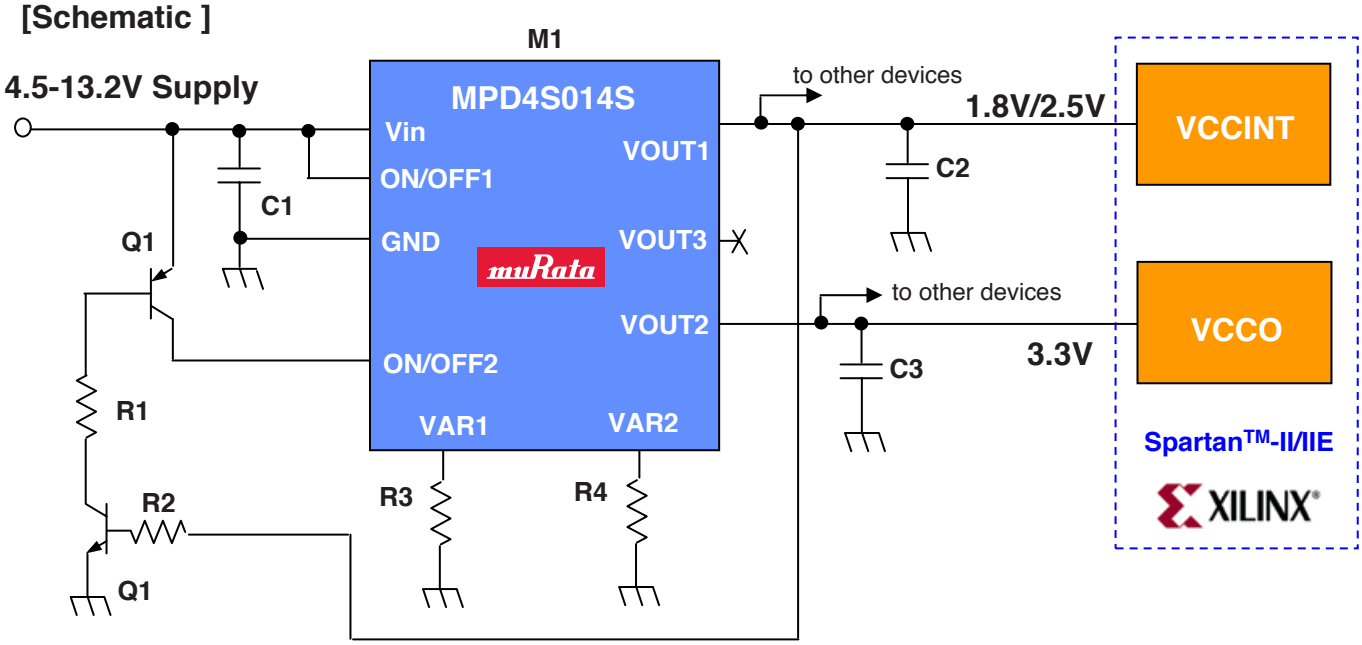
Spartan™ – II/IIE Design 1
4.5 - 13.2V Input, 1.3A Low Cost Solution

MURATA PRODUCTS RoHS Compliant

[Features]

- 3-Output configuration of the MPD4S014S makes it simple to use.
- Wide Input Voltage Range
- SIP configuration saves PCB space.
- Adjustable Start-up Sequence via On/Off Control Pins.
- Trimmable Output Voltages (Vout1 & Vout2)

[Schematic]



[Bill of Materials]

Reference	Qty	Description	Manufacturer	Part Number
M1	1	1.3A/1A/0.3A-Triple output DC-DC converter, SIP	Murata	MPD4S014S
C1,C2,C3	3	Ceramic, 1μF, 16V, X7R, 10%	Murata	GRM188R71C105KA12L
Q1	1	Dual, 50V, 100mA	Std	Std
R1,R2	2	47 kΩ, 1/16W, 5%	Std	Std
R3	1	35.51kΩ : Spartan™-II(2.5V) 10.68kΩ : Spartan™-IIE(1.8V) 1/16W, 0.5%	Std	Std
R4	1	1.8kΩ, 1/16W, 0.5%	Std	Std

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

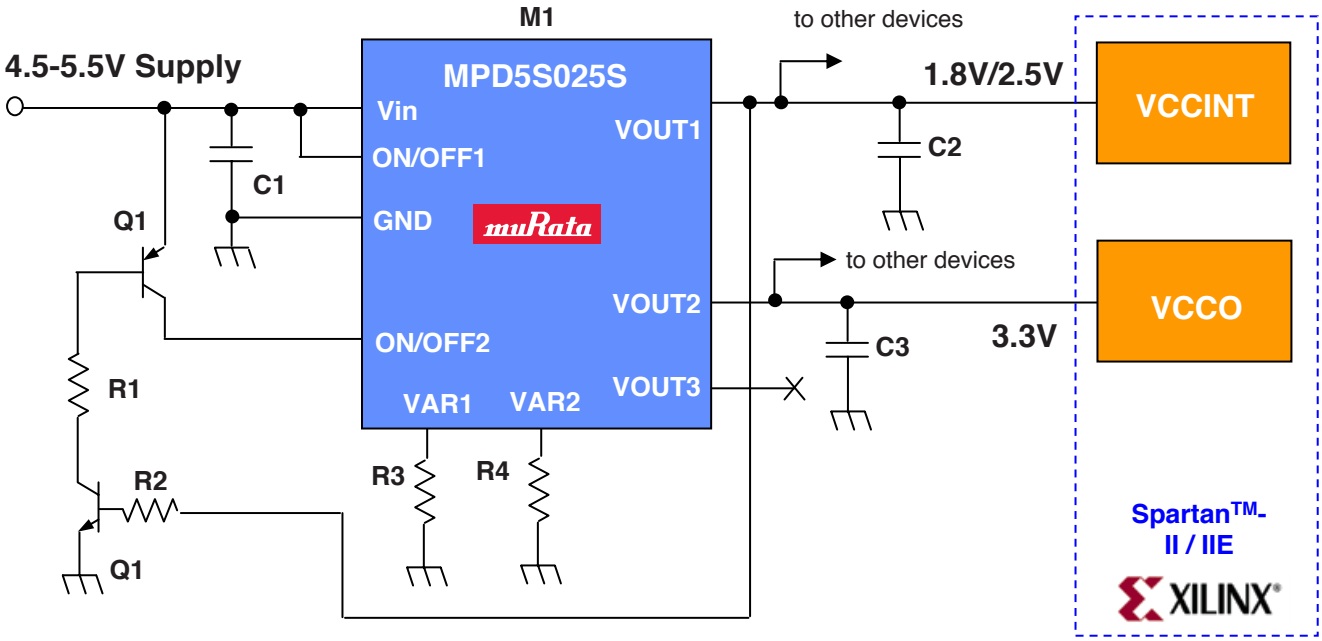
Spartan™ – II/IIE Design 2
5V Input, 1.6A Low Cost Solution

MURATA PRODUCTS RoHS Compliant

[Features]

- 3-Output configuration of the MPD5S025S makes it simple to use.
- SIP configuration saves PCB space.
- Adjustable Start-up Sequence via On/Off Control Pins.
- Trimmable Output Voltages (Vout1 & Vout2)

[Schematic]



[Bill of Materials]

Reference	Qty	Description	Manufacturer	Part Number
M1	1	1.6A/1.6A/0.3A-Triple output DC-DC converter, SIP	Murata	MPD5S025S
C1,C2,C3,C4	4	Ceramic, 1μF, 16V, X7R, 10%	Murata	GRM188R71C105KA12L
Q1	1	Dual, 50V, 100mA	Std	Std
R1,R2	2	47 kΩ, 1/16W, 5%	Std	Std
R3	1	35.51kΩ : Spartan™-II(2.5V) 10.68kΩ : Spartan™-IIE(1.8V) 1/16W, 0.5%	Std	Std
R4	1	1.8kΩ, 1/16W, 0.5%	Std	Std

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

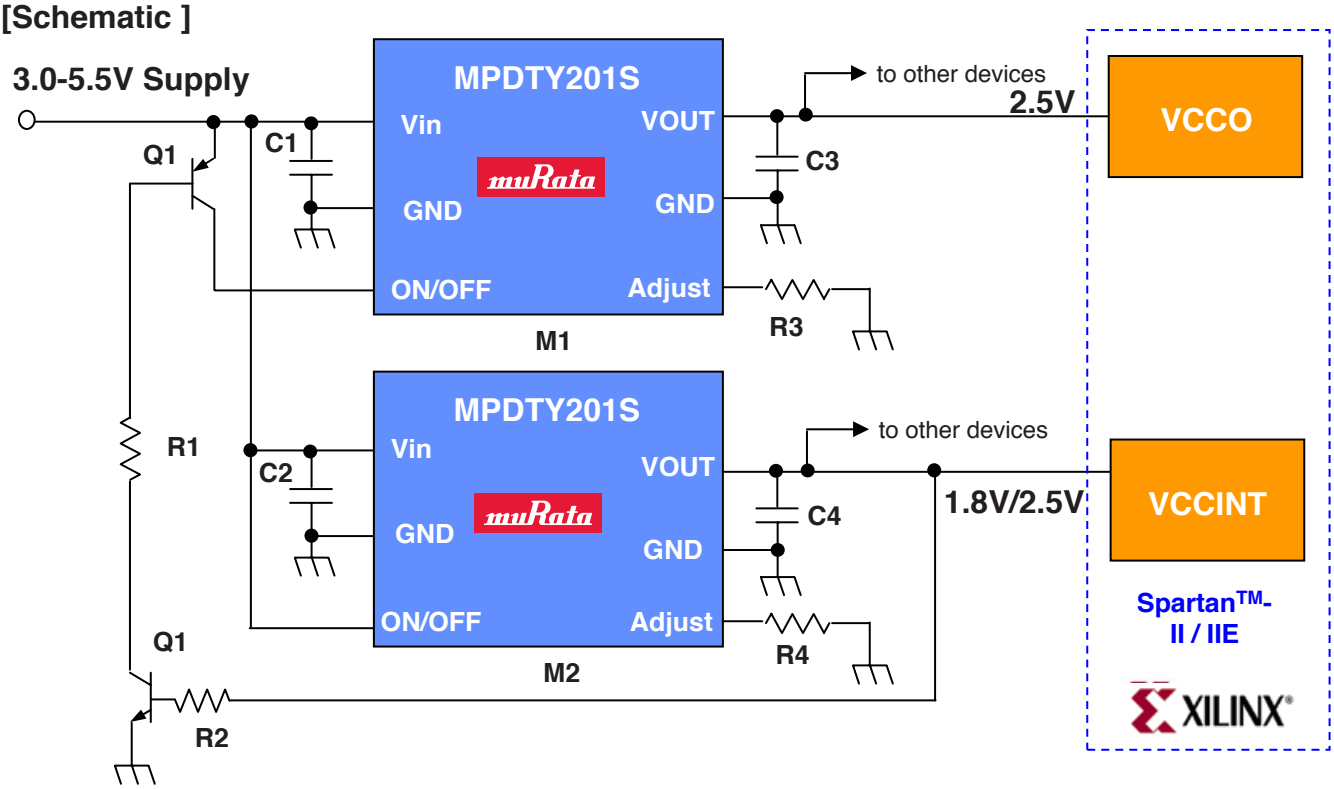
Spartan™ – II/IIE Design 3
3 - 5.5V Input, 3A Ultra Small, Low Cost Solution

MURATA PRODUCTS RoHS Compliant

[Features]

- Ultra Small Package saves PCB space.
- Adjustable Start-up Sequence via On/Off Control Pins.
- Wide input voltage range of MPDTY201S is from 3.0V to 5.5V.
- Trimmable Output Voltage (0.8V to 2.5V)

[Schematic]



[Bill of Materials]

Reference	Qty	Description	Manufacturer	Part Number
M1,M2	2	3A-out DC-DC Converter, SMD	Murata	MPDTY201S
C1,C2	2	Ceramic, 47μF, 6.3V, X7R, 10%	Murata	GRM32ER70J476KE20L
C3,C4	2	Ceramic, 1μF, 16V, X7R, 10%	Murata	GRM188R71H105KA12L
Q1	1	Dual, 50V, 100mA	Std	Std
R1,R2	2	47 kΩ, 1/16W, 5%	Std	Std
R3	1	170.6Ω, 1/16W, 0.5%	Std	Std
R4	1	1.8V: 500Ω, 1/16W, 0.5% 2.5V: 170.6Ω, 1/16W, 0.5%	Std	Std

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

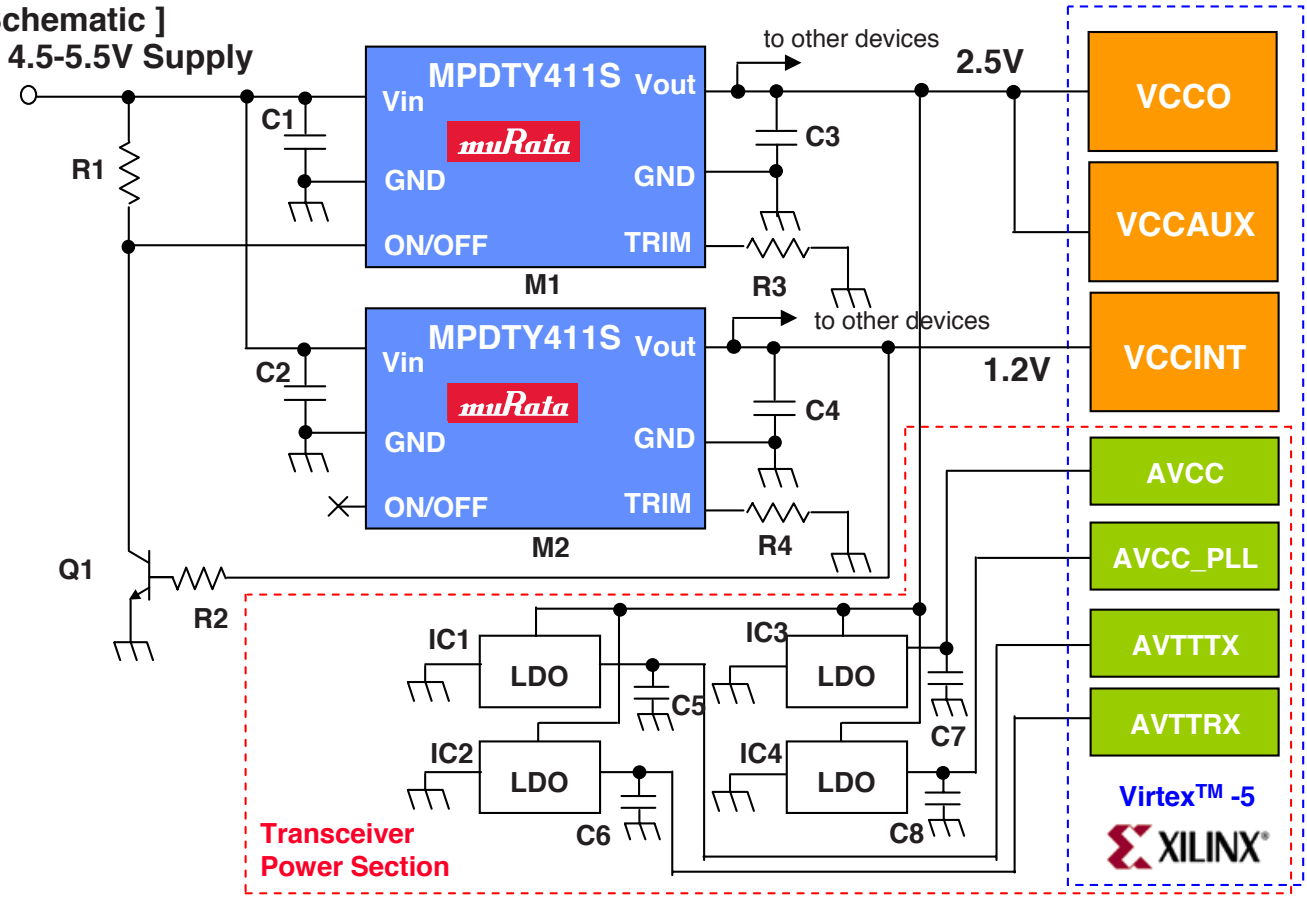
Virtex™- 5 Design 1
5V Input, 7A Standard Package Solution

MURATA PRODUCTS
RoHS Compliant

[Features]

- Industry-Standard Pin Compatibility, Small Footprint, High Efficiency
- Adjustable Start-up Sequence via On/Off Control Pins.
- Trimmable Output Voltage (0.8V to 3.63V)

[Schematic]



[Bill of Materials]

Reference	Qty	Description	Manufacturer	Part Number
M1,M2	2	7A-out DC-DC converter, SMD	Murata	MPDTY411S
C1,C2	2	Ceramic, 100μF, 6.3V, X6S, 20%	Murata	GRM32EC80J107ME20L
C3,C4	2	Ceramic, 47μF, 6.3V, X7R, 10%	Murata	GRM32ER70J476KE20L
C5-C8	2	Ceramic, 1μF, 16V, X7R, 10%	Murata	GRM188R71C105KA12L
IC1-IC2	2	1.2V LDO, 500mA-out	Std	Std
IC3-IC4	2	1.0V LDO, 500mA-out	Std	Std
Q1	1	50V, 150mA	Std	Std
R1,R2	2	22 kΩ, 1/16W, 5%	Std	Std
R3	1	10.43kΩ, 1/16W, 0.5%	Std	Std
R4	1	126.9kΩ, 1/16W, 0.5%	Std	Std

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

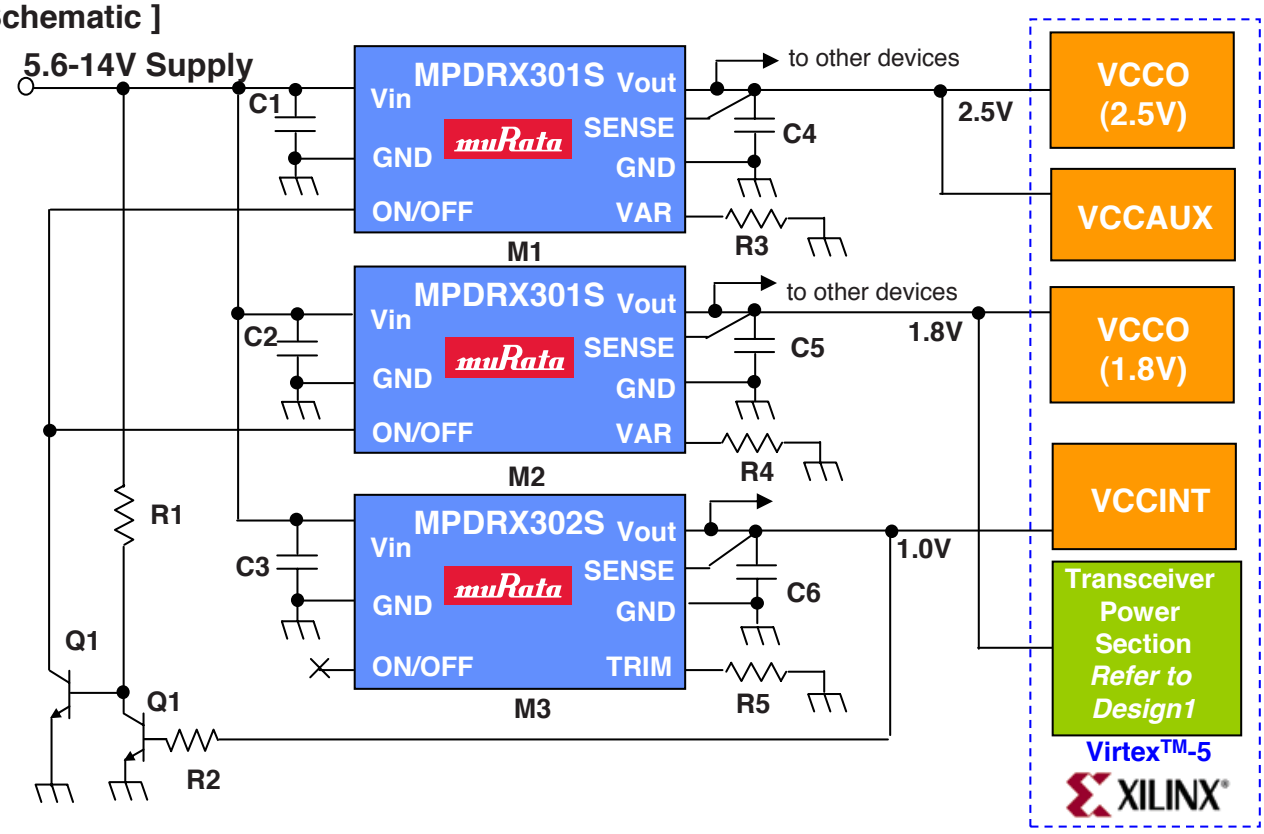
Virtex™- 5 Design 2
5.6 - 14V Input, 13A High Speed Response, Great for IBA Solution

MURATA PRODUCTS RoHS Compliant

[Features]

- Ultra High speed Transient Response, MPDRX301S,MPDRX302S.
- Adjustable Start-up Sequence via On/Off Control Pins.
- Wide input range 5.6-14V,great POL for IBA.

[Schematic]



[Bill of Materials]

Reference	Qty	Description	Manufacturer	Part Number
M1,M2	2	13A-out DC-DC converter, SMD	Murata	MPDRX301S
M3	1	13A-out DC-DC converter, SMD	Murata	MPDRX302S
C1-C3	3	Ceramic, 10μF, 16V, X7R, 10%	Murata	GRM31CR71C106KAC7L
C4-C6	3	Ceramic, 100μF, 6.3V, X6S, 20%	Murata	GRM32EC80J107ME20L
Q1	1	Dual, 50V, 100mA	Std	Std
R1,R2	2	22 kΩ, 1/16W, 5%	Std	Std
R3	1	3.6kΩ, 1/16W, 0.5%	Std	Std
R4	1	16.12kΩ, 1/16W, 0.5%	Std	Std
R5	1	10kΩ, 1/16W, 0.5%	Std	Std

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

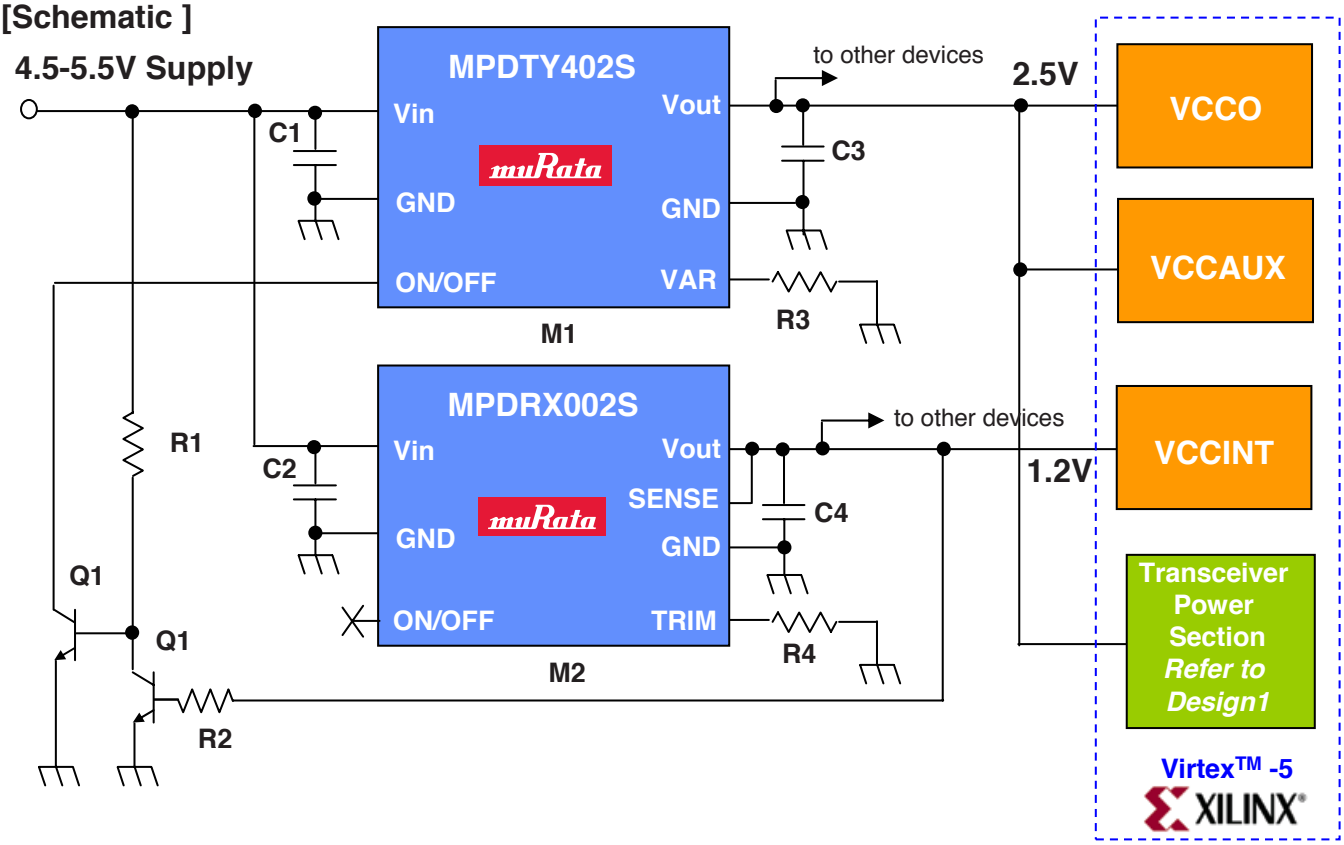
Virtex™- 5 Design 3
5V Input, 16A High Speed Response, Standard Package Solution

MURATA PRODUCTS RoHS Compliant

[Features]

- Ultra High Speed Response, High Efficiency MPDRX002S.
- Adjustable Start-up Sequence via On/Off Control Pins.
- Industry Standard Package

[Schematic]



[Bill of Materials]

Reference	Qty	Description	Manufacturer	Part Number
M1	1	16A-out DC-DC converter, SMD	Murata	MPDTY402S
M2	1	16A-out DC-DC converter, SMD	Murata	MPDRX002S
C1,C2,C4	3	Ceramic, 100μF, 6.3V, X6S, 20%	Murata	GRM32EC80J107ME20L
C3	1	Ceramic, 10μF, 16V, X7R, 10%	Murata	GRM31CR71C106KAC7L
Q1	1	Dual, 50V, 100mA	Std	Std
R1,R2	2	47 kΩ, 1/16W, 5%	Std	Std
R3	1	3.16kΩ, 1/16W, 0.5%	Std	Std
R4	1	8.5kΩ, 1/16W, 0.5%	Std	Std

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

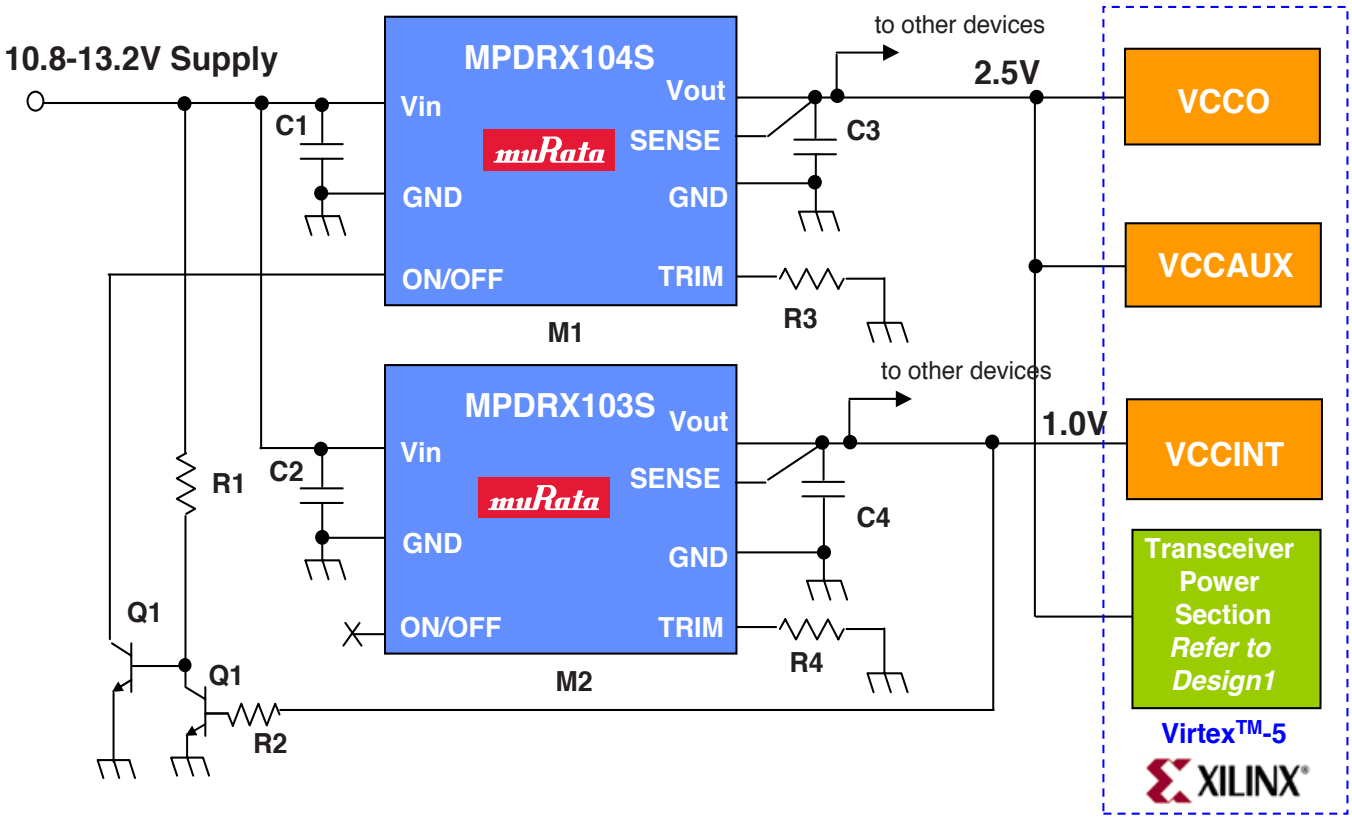
Virtex™- 5 Design 4
12V Input, 16A High Speed Response, Standard Package, Small Space Solution

MURATA PRODUCTS RoHS Compliant

[Features]

- Industry-Standard Pin Compatible, Ultra High Speed Response, MPDRX103S / 104S.
- SIP configuration saves PCB space.
- Adjustable Start-up Sequence via On/Off Control Pins.

[Schematic]



[Bill of Materials]

Reference	Qty	Description	Manufacturer	Part Number
M1	1	12A-out DC-DC converter, SIP	Murata	MPDRX104S
M2	1	16A-out DC-DC converter, SIP	Murata	MPDRX103S
C1,C2	2	Ceramic, 22μF, 16V, X7R, 10%	Murata	GRM32ER71C226KE18L
C3,C4	2	Ceramic, 47μF, 6.3V, X7R, 10%	Murata	GRM32ER70J476KE20L
Q1	1	Dual, 50V, 100mA	Std	Std
R1,R2	2	22 kΩ, 1/16W, 5%	Std	Std
R3	1	6.18kΩ, 1/16W, 0.5%	Std	Std
R4	1	22.1kΩ, 1/16W, 0.5%	Std	Std

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

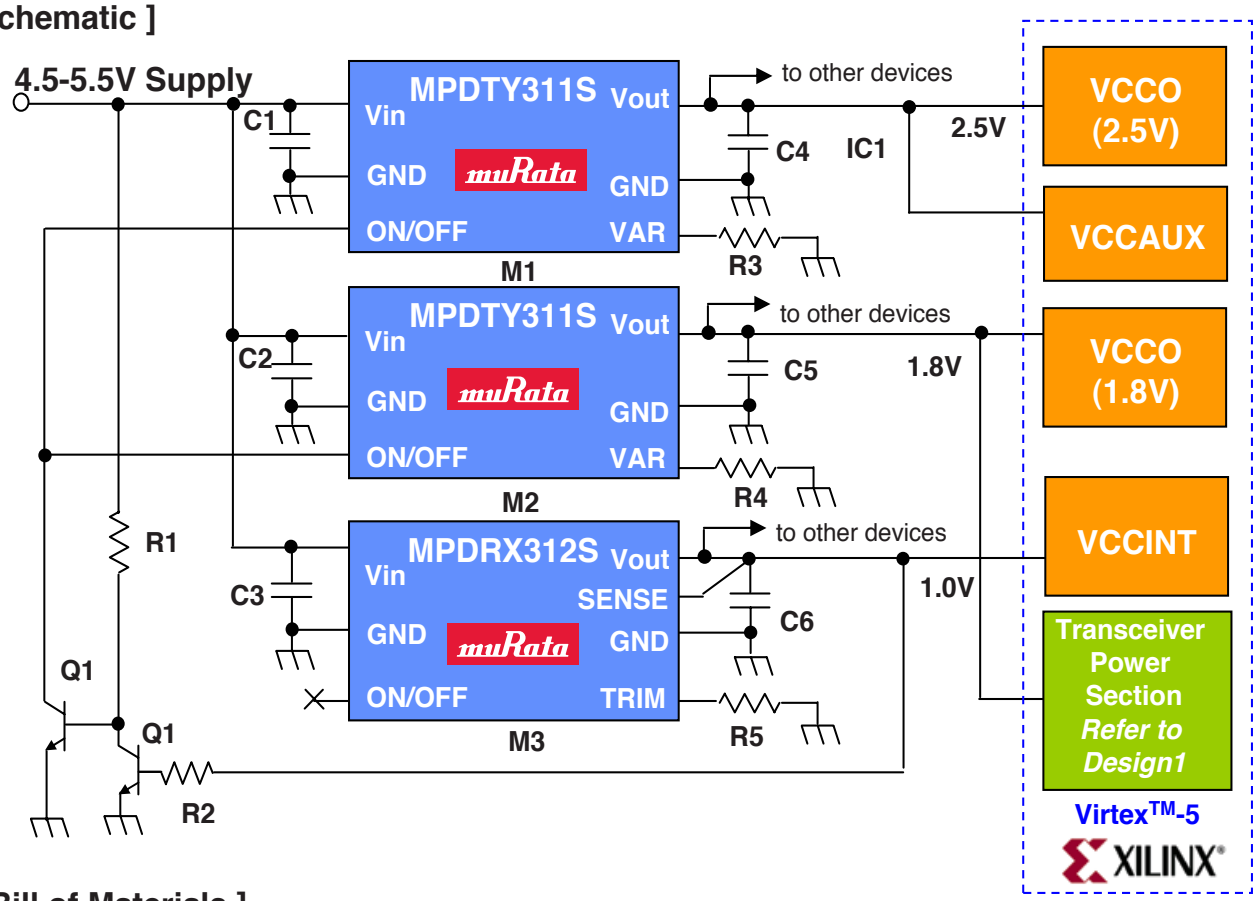
Virtex™- 5 Design 5
5V Input, 16A High Speed Response, Low Profile (t=4.2mm) Solution

MURATA PRODUCTS RoHS Compliant

[Features]

- Low Profile, Ultra High Speed Response, MPDRX312S.
- Low Profile POL MPDTY31* series.
- Adjustable Start-up Sequence via On/Off Control Pins.

[Schematic]



[Bill of Materials]

Reference	Qty	Description	Manufacturer	Part Number
M1,M2	2	16A-out DC-DC converter, SMD	Murata	MPDTY311S
M3	1	16A-out DC-DC converter, SMD	Murata	MPDRX312S
C1-C3,C6	4	Ceramic, 100μF, 6.3V, X6S, 20%	Murata	GRM32EC80J107ME20L
C4,C5	2	Ceramic, 0.1μF, 50V, X7R, 10%	Murata	GRM188R71H104KA93L
Q1	1	Dual, 50V, 100mA	Std	Std
R1,R2	2	47 kΩ, 1/16W, 5%	Std	Std
R3	1	5.53kΩ, 1/16W, 0.5%	Std	Std
R4	1	16.4kΩ, 1/16W, 0.5%	Std	Std
R5	1	52.6kΩ, 1/16W, 0.5%	Std	Std

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

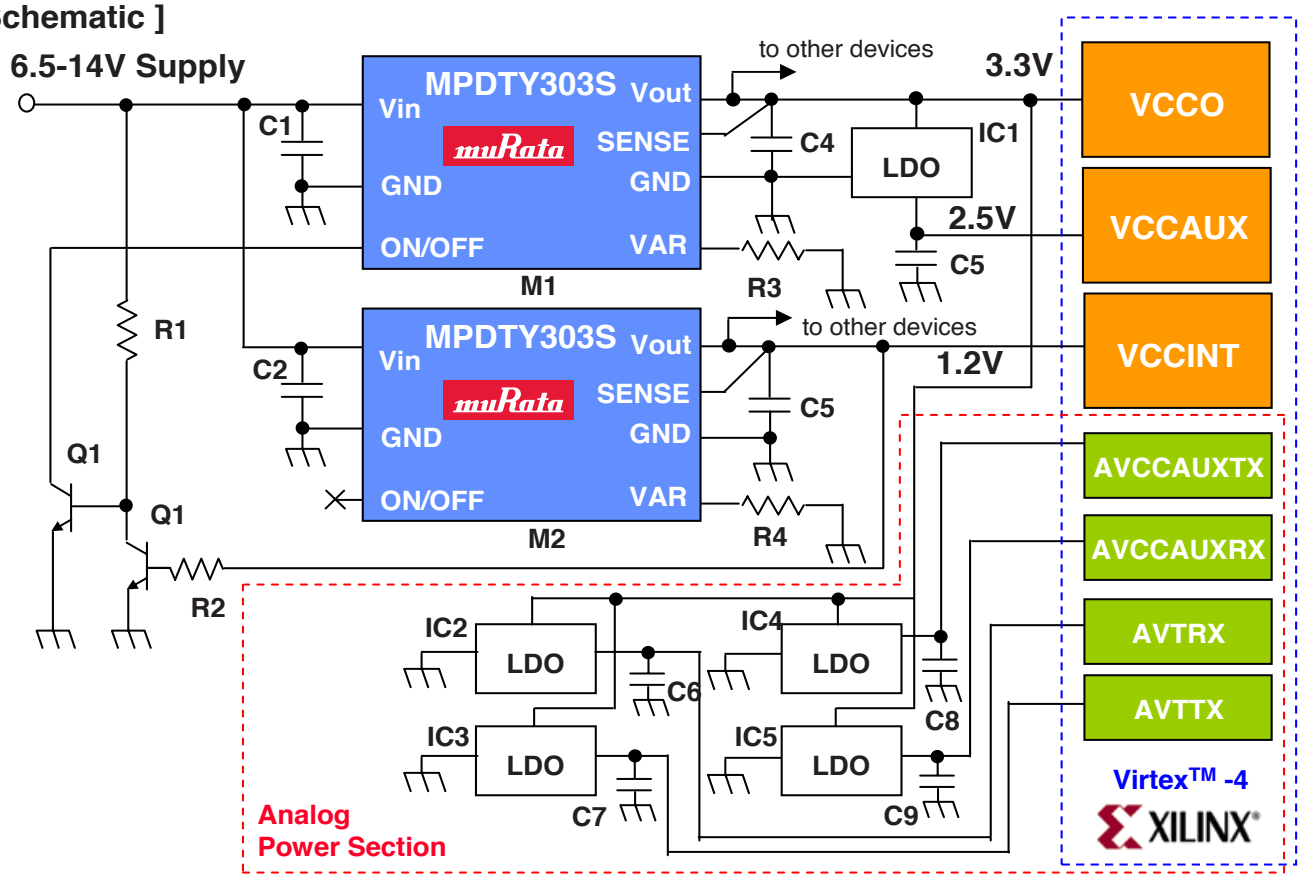
Virtex™- 4 Design 1
6.5 -14V Input, 8A Low Profile Solution

MURATA PRODUCTS
RoHS Compliant

[Features]

- Low Profile (H<4.2mm), High Efficiency MPDTY303S.
- Adjustable Start-up Sequence via On/Off Control Pins.

[Schematic]



[Bill of Materials]

Reference	Qty	Description	Manufacturer	Part Number
M1,M2	2	8A-out DC-DC converter, SMD	Murata	MPDTY303S
C1,C2	2	Ceramic,22μF, 16V, X7R, 10%	Murata	GRM32ER71C226KE18L
C3,C4	2	Ceramic, 47μF, 6.3V, X7R, 10%	Murata	GRM32ER70J476KE20L
C5-C9	5	Ceramic, 1μF, 16V, X7R, 10%	Murata	GRM188R71C105KA12L
IC1	1	2.5V LDO, 700mA-out	Std	Std
IC2-IC5	4	1.2V LDO, 700mA-out	Std	Std
Q1	1	Dual, 50V, 100mA	Std	Std
R1,R2	2	47 kΩ, 1/16W, 5%	Std	Std
R3	1	4.01kΩ, 1/16W, 0.5%	Std	Std
R4	1	45.35kΩ, 1/16W, 0.5%	Std	Std

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

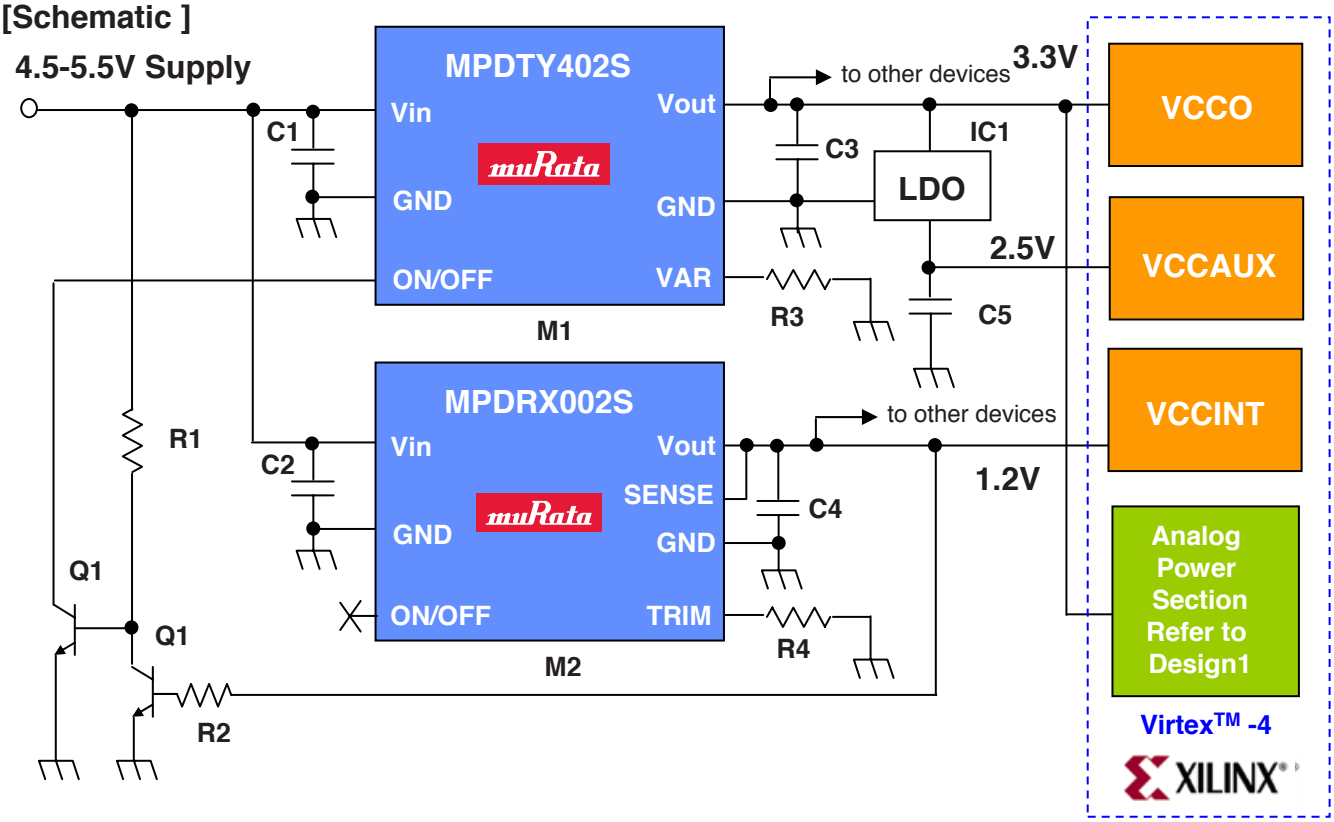
Virtex™- 4 Design 2
5V Input, 16A Ultra High Speed Response, Standard Package Solution

MURATA PRODUCTS RoHS Compliant

[Features]

•Industry Standard package, Ultra High Speed Response, High Efficiency MPDRX002S.
•Adjustable Start-up Sequence via On/Off Control Pins.

[Schematic]



[Bill of Materials]

Reference	Qty	Description	Manufacturer	Part Number
M1	1	16A-out DC-DC converter, SMD	Murata	MPDTY402S
M2	1	16A-out DC-DC converter, SMD	Murata	MPDRX002S
C1,C2,C4	3	Ceramic, 100μF, 6.3V, X6S, 20%	Murata	GRM32EC80J107ME20L
C3	1	Ceramic, 10μF, 16V, X7R, 10%	Murata	GRM31CR71C106KAC7L
C5	1	Ceramic, 1μF, 16V, X7R, 10%	Murata	GRM188R71C105KA12L
IC1	1	2.5V LDO, 700mA-out	Std	Std
Q1	1	Dual, 50V, 100mA	Std	Std
R1,R2	2	47 kΩ, 1/16W, 5%	Std	Std
R3	1	3.16kΩ, 1/16W, 0.5%	Std	Std
R4	1	8.5kΩ, 1/16W, 0.5%	Std	Std

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

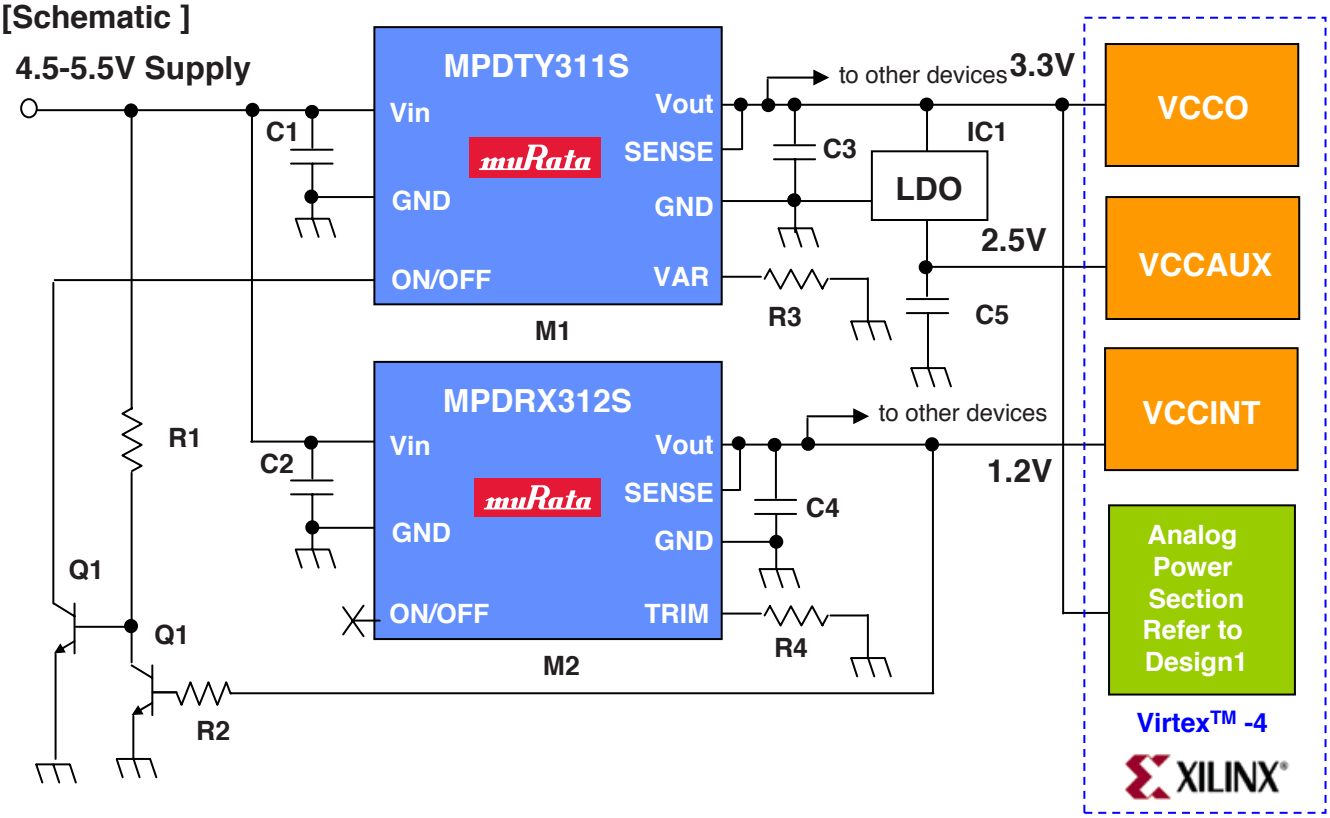
Virtex™-4 Design 3
5V Input, 16A High Speed Response, Low Profile (t=4.2mm) Solution

MURATA PRODUCTS RoHS Compliant

[Features]

•Ultra High Speed Response, Low Profile MPDRX312S.
•Adjustable Start-up Sequence via On/Off Control Pins.

[Schematic]



[Bill of Materials]

Reference	Qty	Description	Manufacturer	Part Number
M1	1	16A-out DC-DC converter, SMD	Murata	MPDTY311S
M2	1	16A-out DC-DC converter, SMD	Murata	MPDRX312S
C1,C2,C4	3	Ceramic, 100μF, 6.3V, X6S, 20%	Murata	GRM32EC80J107ME20L
C3	1	Ceramic, 0.1μF, 50V, X7R, 10%	Murata	GRM188R71H104KA93L
C5	1	Ceramic, 1μF, 16V, X7R, 10%	Murata	GRM188R71C105KA12L
IC1	1	2.5V LDO, 700mA-out	Std	Std
Q1	1	Dual, 50V, 100mA	Std	Std
R1,R2	2	22 kΩ, 1/16W, 5%	Std	Std
R3	1	4.01kΩ, 1/16W, 0.5%	Std	Std
R4	1	16.45kΩ, 1/16W, 0.5%	Std	Std

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

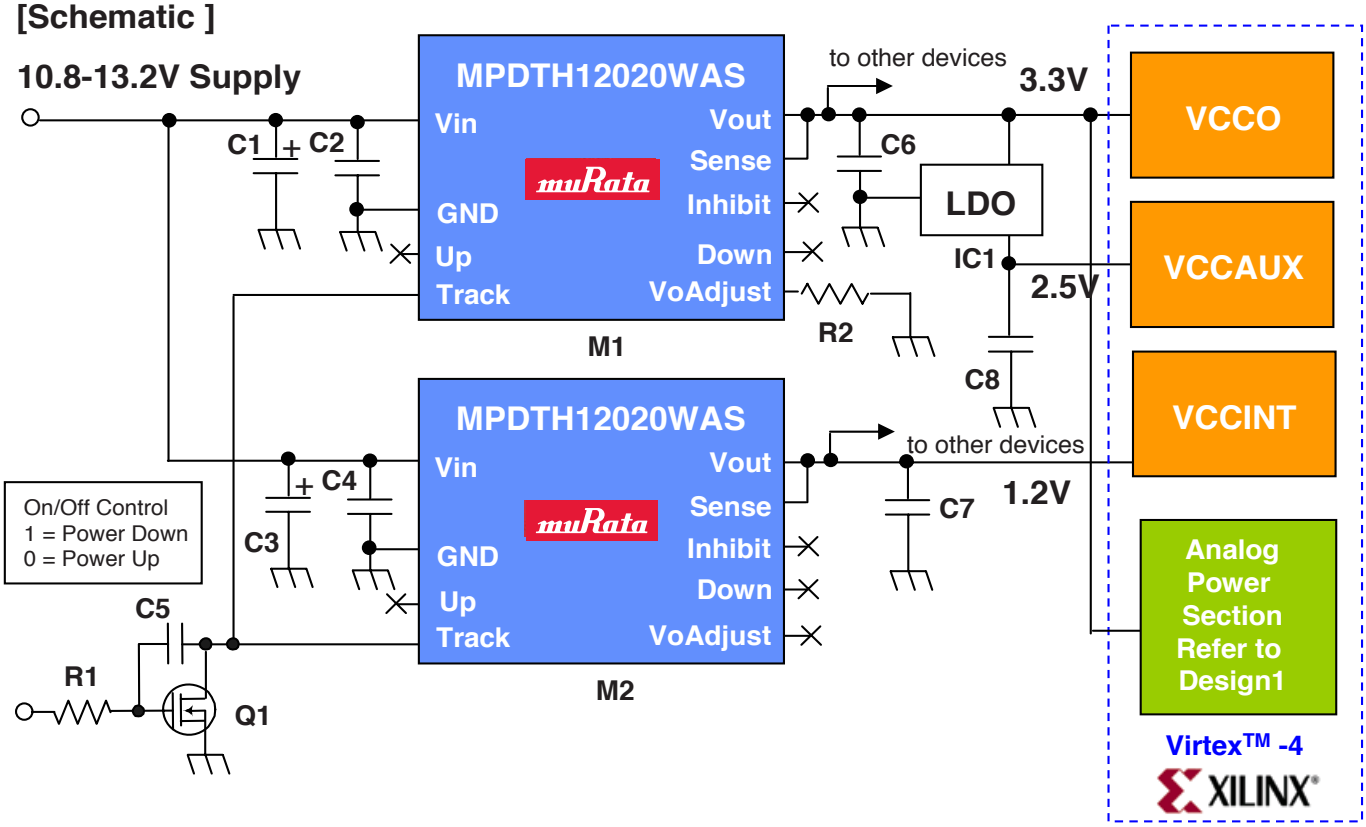
Virtex™-4 Design 4
12V Input, 18A Ind Standard Solution

MURATA PRODUCTS RoHS Compliant

[Features]

- Auto-Tracking Feature Makes Sequencing Design Easy
- POLA (Point-of-Load Alliance) Device; MPDTH12020WAS (M1,M2)

[Schematic]



[Bill of Materials]

Reference	Qty	Description	Manufacturer	Part Number
M1,M2	2	18A-out DC-DC converter, SMD	Murata	MPDTH12020WAS
C1,C3	2	Poly-Aluminum, 560μF, 25V	Std	Std
C2,C4	2	Ceramic, 10μF, 16V, X7R, 10%	Murata	GRM31CR71C106KAC7L
C5	1	Ceramic, 0.1μF, 50V, X7R, 10%	Murata	GRM188R71H104KA93L
C6,C7	2	Ceramic, 47μF, 6.3V, X7R, 10%	Murata	GRM32ER70J476KE20L
C8	1	Ceramic, 1μF, 16V, X7R, 10%	Murata	GRM188R71C105KA12L
IC1	1	2.5V LDO, 700mA-out	Std	Std
Q1	1	30V, 100mA	Std	Std
R1	1	22 kΩ, 1/16W, 5%	Std	Std
R2	1	2kΩ, 1/16W, 0.5%	Std	Std

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

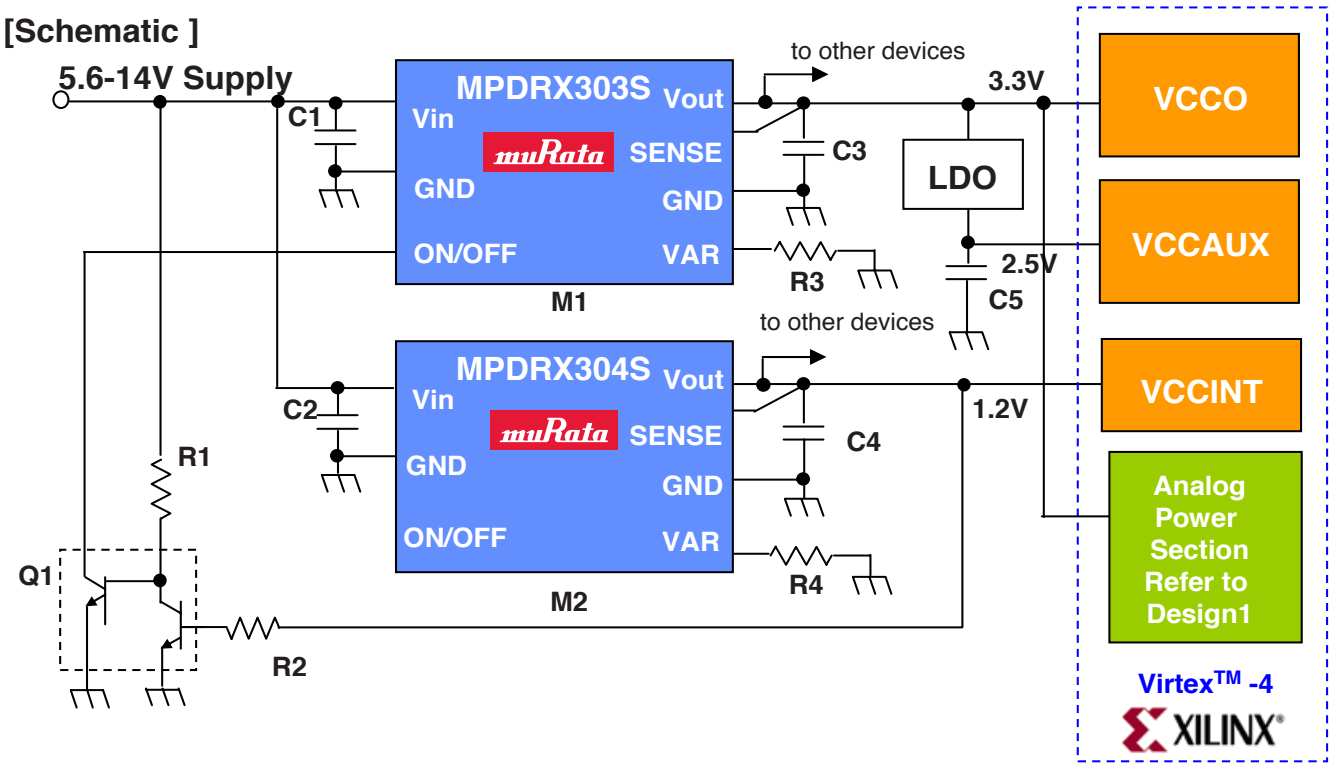
Virtex™-4 Design 5
5.6-14V Input, 26A High Speed Response, Great for IBA Solution

MURATA PRODUCTS RoHS Compliant

[Features]

- Ultra High speed Response, MPDRX303S,MPDRX304S.
- Adjustable Start-up Sequence via On/Off Control Pins.
- Wide input range 5.6-14V,great POL for IBA.

[Schematic]



[Bill of Materials]

Reference	Qty	Description	Manufacturer	Part Number
M1	1	26A-out DC-DC converter, SMD	Murata	MPDRX303S
M2	1	26A-out DC-DC converter, SMD	Murata	MPDRX304S
C1,C2	2	Ceramic, 47μF, 16V, B, 10%	Murata	GRM32EB31C476ME15L
C3,C4	4	Ceramic, 100μF, 6.3V, X6S, 20%x2	Murata	GRM32EC80J107ME20L
C5	1	Ceramic, 1μF, 16V, X7R, 10%	Murata	GRM188R71C105KA12L
Q1	1	Dual, 50V, 100mA	Std	Std
IC1	1	2.5V LDO,700mA	Std	Std
R1,R2	2	22 kΩ, 1/16W, 5%	Std	Std
R3	1	1.21kΩ, 1/16W, 0.5%	Std	Std
R4	1	16.45kΩ, 1/16W, 0.5%	Std	Std

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

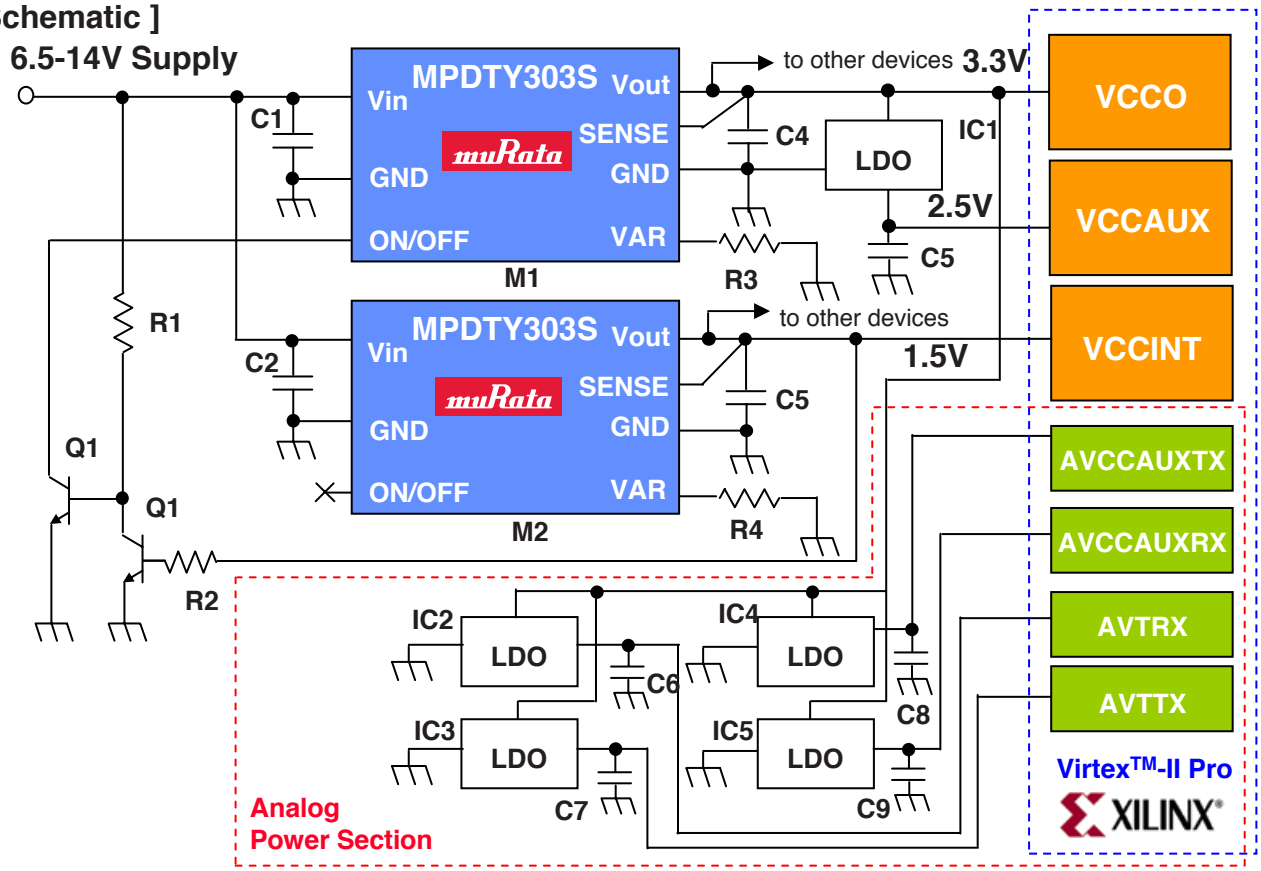
Virtex™-II Pro Design 1
6.5 - 14V Input, 8A Low Profile Solution

MURATA PRODUCTS
RoHS Compliant

[Features]

- Low Profile (H<4.2mm), High Efficiency MPDTY303S.
- Adjustable Start-up Sequence via On/Off Control Pins.

[Schematic]



[Bill of Materials]

Reference	Qty	Description	Manufacturer	Part Number
M1,M2	2	8A-out DC-DC converter, SMD	Murata	MPDTY303S
C1,C2	2	Ceramic,22μF, 16V, X7R, 10%	Murata	GRM32ER71C226KE18L
C3,C4	2	Ceramic, 47μF, 6.3V, X7R, 10%	Murata	GRM32ER70J476KE20L
C5-C9	5	Ceramic, 1μF, 16V, X7R, 10%	Murata	GRM188R71C105KA12L
IC1-IC5	5	2.5V LDO, 400mA-out	Std	Std
Q1	1	Dual, 50V, 100mA	Std	Std
R1,R2	2	47 kΩ, 1/16W, 5%	Std	Std
R3	1	4.01kΩ, 1/16W, 0.5%	Std	Std
R4	1	24.3kΩ, 1/16W, 0.5%	Std	Std

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

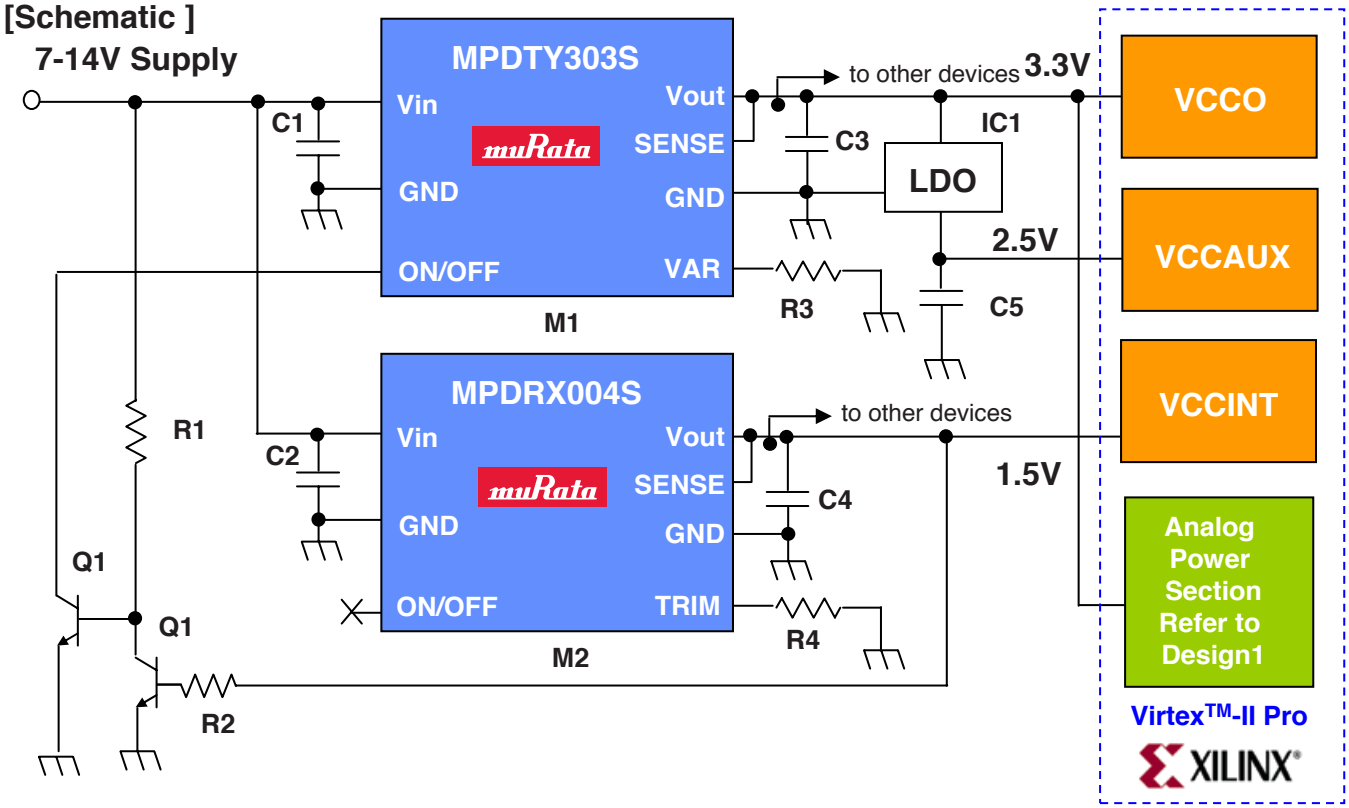
Virtex™-II Pro Design 2
7 - 14V Input, 12A High Speed Solution

MURATA PRODUCTS RoHS Compliant

[Features]

•Ultra High Speed Response, High Efficiency MPDRX004S.
•Adjustable Start-up Sequence via On/Off Control Pins.

[Schematic]



[Bill of Materials]

Reference	Qty	Description	Manufacturer	Part Number
M1	1	8A-out DC-DC converter, SMD	Murata	MPDTY303S
M2	1	12A-out DC-DC converter, SMD	Murata	MPDRX004S
C1,C2	2	Ceramic,22μF, 16V, X7R, 10%	Murata	GRM32ER71C226KE18L
C3,C4	2	Ceramic, 47μF, 6.3V, X7R, 10%	Murata	GRM32ER70J476KE20L
C5	1	Ceramic, 1μF, 16V, X7R, 10%	Murata	GRM188R71C105KA12L
IC1	1	2.5V LDO, 400mA-out	Std	Std
Q1	1	Dual, 50V, 100mA	Std	Std
R1,R2	2	47 kΩ, 1/16W, 5%	Std	Std
R3	1	4.01kΩ, 1/16W, 0.5%	Std	Std
R4	1	2.671kΩ, 1/16W, 0.5%	Std	Std

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

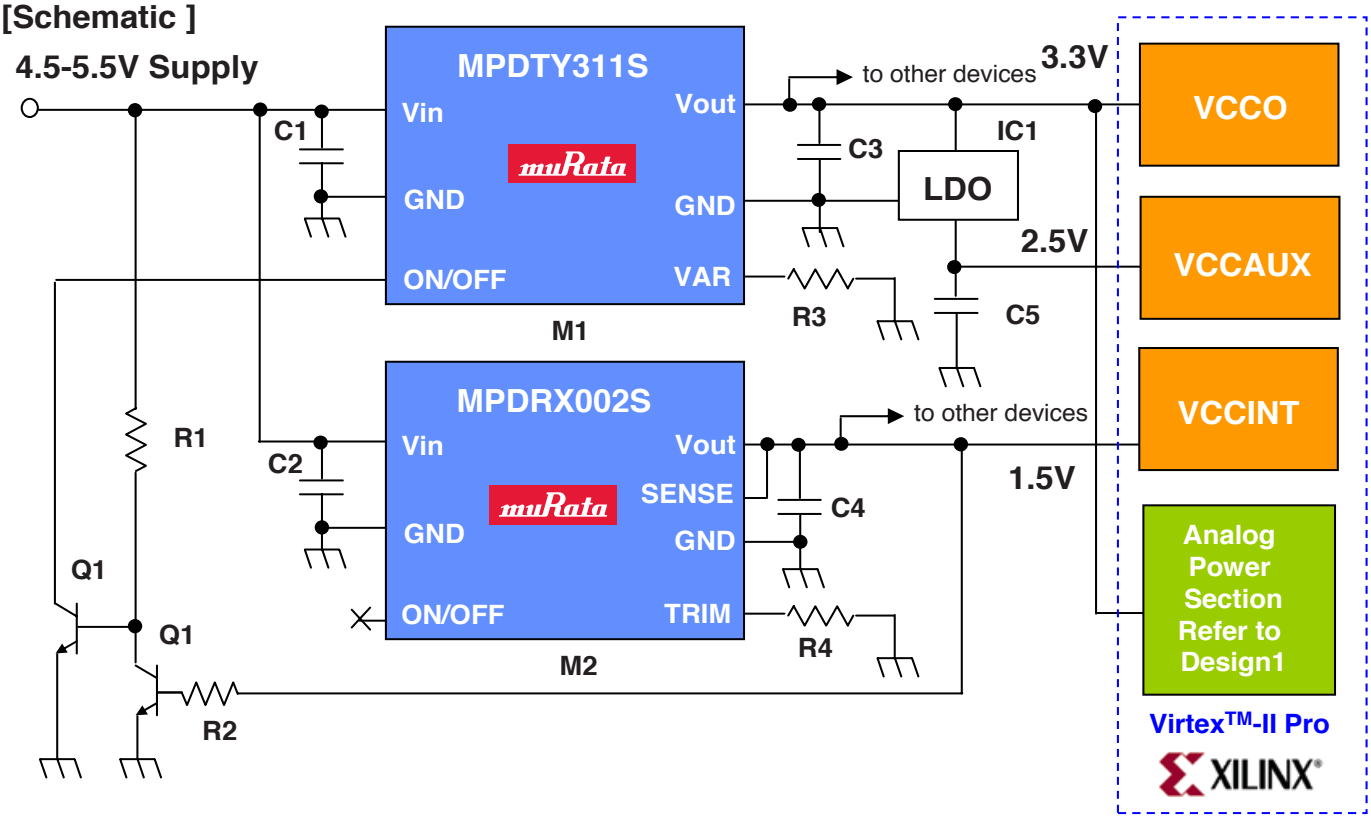
Virtex™-II Pro Design 3
5V Input, 16A High Speed Solution

MURATA PRODUCTS RoHS Compliant

[Features]

•Ultra High Speed Response, High Efficiency MPDRX002S.
•Adjustable Start-up Sequence via On/Off Control Pins.

[Schematic]



[Bill of Materials]

Reference	Qty	Description	Manufacturer	Part Number
M1	1	16A-out DC-DC converter, SMD	Murata	MPDTY311S
M2	1	16A-out DC-DC converter, SMD	Murata	MPDRX002S
C1-C4	4	Ceramic, 47μF, 6.3V, X7R, 10%	Murata	GRM32ER70J476KE20L
C5	1	Ceramic, 1μF, 16V, X7R, 10%	Murata	GRM188R71C105KA12L
IC1	1	2.5V LDO, 400mA-out	Std	Std
Q1	1	Dual, 50V, 100mA	Std	Std
R1,R2	2	47 kΩ, 1/16W, 5%	Std	Std
R3	1	560Ω, 1/16W, 0.5%	Std	Std
R4	1	2.67kΩ, 1/16W, 0.5%	Std	Std

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

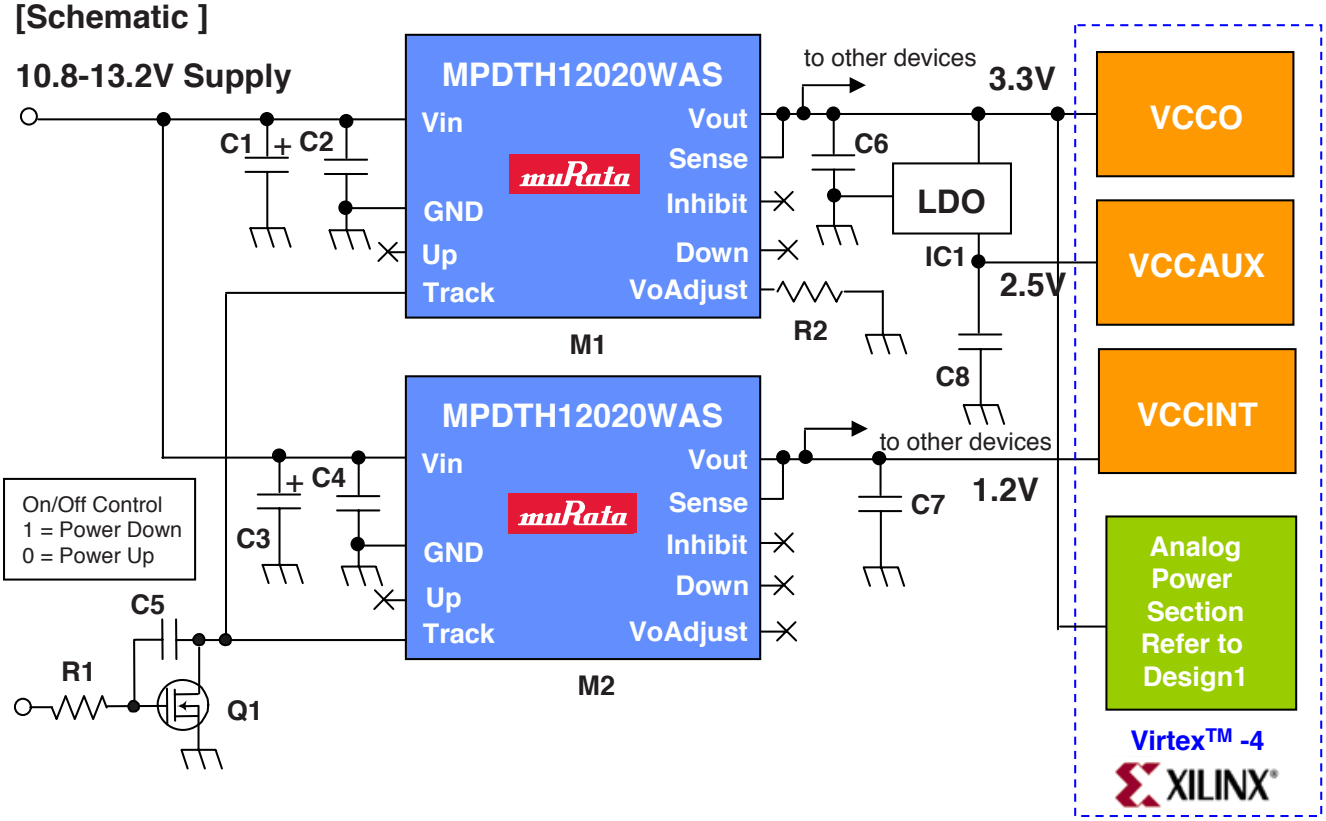
Virtex™-II Pro Design 4
12V Input, 18A Ind Standard Solution

MURATA PRODUCTS RoHS Compliant

[Features]

- Auto-Tracking Feature Makes Sequencing Design Easy
- POLA (Point-of-Load Alliance) Device; MPDTH12020WAS (M1,M2)

[Schematic]



[Bill of Materials]

Reference	Qty	Description	Manufacturer	Part Number
M1,M2	2	18A-out DC-DC converter, SMD	Murata	MPDTH12020WAS
C1,C3	2	Poly-Aluminum, 560μF, 25V	Std	Std
C2,C4	2	Ceramic, 10μF, 16V, X7R, 10%	Murata	GRM31CR71C106KAC7L
C5	1	Ceramic, 0.1μF, 50V, X7R, 10%	Murata	GRM188R71H104KA93L
C6,C7	2	Ceramic, 47μF, 6.3V, X7R, 10%	Murata	GRM32ER70J476KE20L
C8	1	Ceramic, 1μF, 16V, X7R, 10%	Murata	GRM188R71C105KA12L
IC1	1	2.5V LDO, 700mA-out	Std	Std
Q1	1	30V, 100mA	Std	Std
R1	1	22 kΩ, 1/16W, 5%	Std	Std
R2	1	2kΩ, 1/16W, 0.5%	Std	Std

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

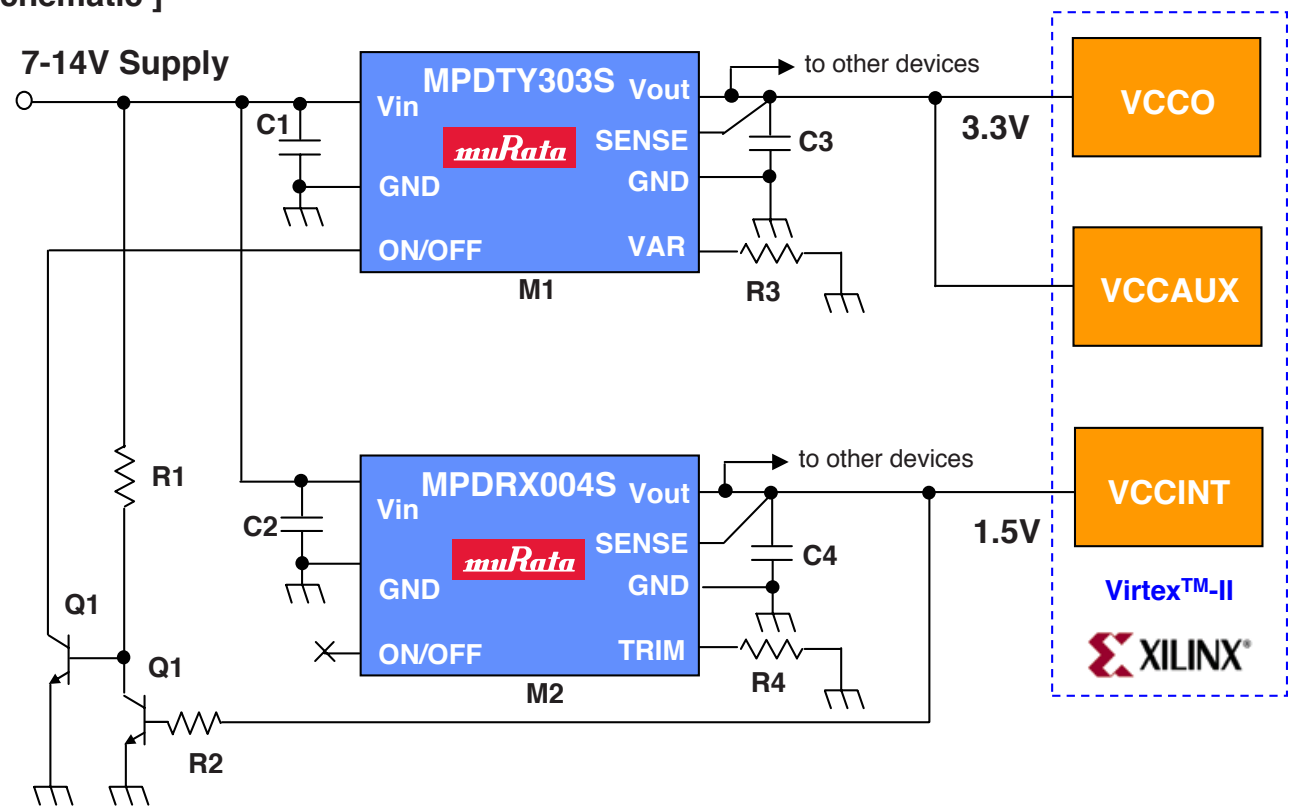
Virtex™-II Design 1
7-14V Input, 12A High Speed Solution

MURATA PRODUCTS
RoHS Compliant

[Features]

•Ultra High Speed Response, High Efficiency MPDRX004S.
•Adjustable Start-up Sequence via On/Off Control Pins.

[Schematic]



[Bill of Materials]

Reference	Qty	Description	Manufacturer	Part Number
M1	1	8A-out DC-DC converter, SMD	Murata	MPDTY303S
M2	1	12A-out DC-DC converter, SMD	Murata	MPDRX004S
C1-C2	2	Ceramic,22μF, 16V, X7R, 10%	Murata	GRM32ER71C226KE18L
C3-C4	2	Ceramic, 47μF, 6.3V, X7R, 10%	Murata	GRM32ER70J476KE20L
Q1	1	Dual, 50V, 100mA	Std	Std
R1,R2	2	47 kΩ, 1/16W, 5%	Std	Std
R3	1	4.01kΩ, 1/16W, 0.5%	Std	Std
R4	1	2.67kΩ, 1/16W, 0.5%	Std	Std

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

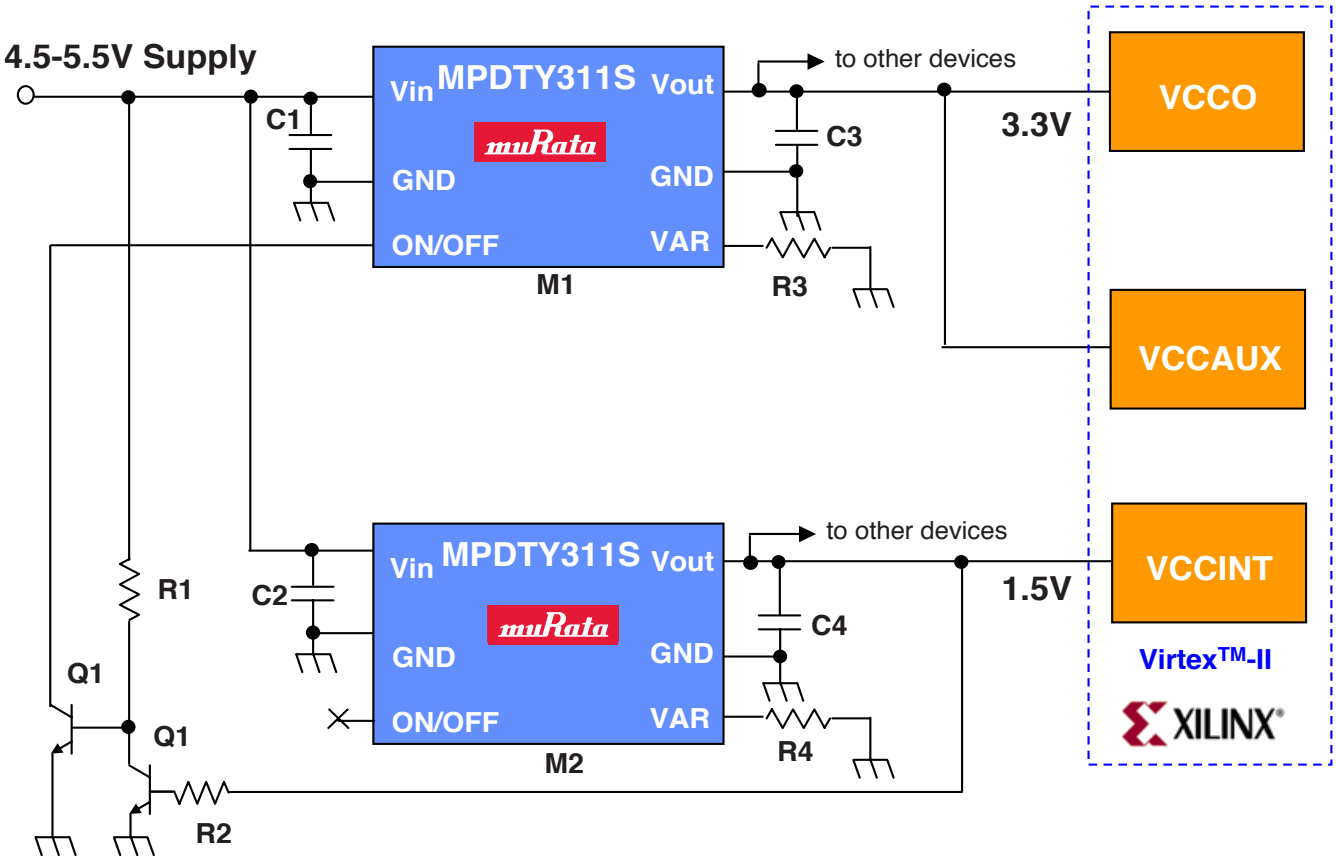
Virtex™-II Design 2
5V Input, 16A Low Profile Solution

MURATA PRODUCTS RoHS Compliant

[Features]

•Low Profile (H<4.2mm), High Efficiency MPDTY311S.
•Adjustable Start-up Sequence via On/Off Control Pins.

[Schematic]



[Bill of Materials]

Reference	Qty	Description	Manufacturer	Part Number
M1,M2	2	16A-out DC-DC converter, SMD	Murata	MPDTY311S
C1-C4	4	Ceramic, 47μF, 6.3V, X7R, 10%	Murata	GRM32ER70J476KE20L
Q1	1	Dual, 50V, 100mA	Std	Std
R1,R2	2	47 kΩ, 1/16W, 5%	Std	Std
R3	1	560Ω, 1/16W, 0.5%	Std	Std
R4	1	27.68kΩ, 1/16W, 0.5%	Std	Std

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

Appendix 1: Power/Current Requirement SIMULATION Examples

This SIMULATION data is intended to provide designers with a general understanding of the power requirements of Xilinx FPGA families in typical applications.

The number of the logic gates, the operating frequency, and so on, changes the value of the current consumption. Please refer to the Xilinx "Power Consumption Tools", available at www.xilinx.com/power, for closer approximations specific to individual applications.

MURATA PRODUCTS RoHS Compliant

Power/Current Requirement Calculation Examples for Spartan™ Devices

Series	Device	VCCINT (V)	VCCO (V)	ICCINT @100MHz (mA)	ICCO @100MHz (mA)
Spartan™-IIE	XC2S50E	1.8	3.3	201	71
	XC2S100E	1.8	3.3	260	79
	XC2S150E	1.8	3.3	362	104
	XC2S200E	1.8	3.3	442	114
	XC2S300E	1.8	3.3	529	129
	XC2S400E	1.8	3.3	786	161
	XC2S600E	1.8	3.3	1127	201

Routing=Medium; Toggle Rate=25%;
BRAM Port Width=8; Port A Read/Write Rate=25%; Port B Read/Write Rate=25%;
DLL Frequency Type=Low ;
I/O=LVTTL_2; Input/Output=50%; Avg Toggle Rate=25%; Output load=10pF

Series	Device	VCCINT (V)	VCCO (V)	VCCAUX (V)	ICCINT @100MHz (mA)	ICCO @100MHz (mA)
Spartan™-3	XC3S50	1.2	3.3	2.5	138	82
	XC3S200	1.2	3.3	2.5	354	115
	XC3S400	1.2	3.3	2.5	553	174
	XC3S1000	1.2	3.3	2.5	1009	193
	XC3S1500	1.2	3.3	2.5	1581	322
	XC3S2000	1.2	3.3	2.5	2280	374
	XC3S4000	1.2	3.3	2.5	3644	470
	XC3S5000	1.2	3.3	2.5	4237	518

Tj=100degC
Routing=Medium; Toggle Rate=25%;
BRAM Port Width=18; Port A Read/Write Rate=25%; Port B Read/Write Rate=25%;
Mutiplier Data Toggle Rate=Medium;
DCM Freq Mode=Low ;
I/O=LVCMOS33_12; Input/Output=50%; IOB Registers=DDR; Avg Toggle Rate=25%;
Average Output Enable Rate=50%; Output load=20pF;

Series	Device	VCCINT (V)	VCCO (V)	VCCAUX (V)	ICCINT @100MHz (mA)	ICCO @100MHz (mA)
Spartan™-3E	XC3S100E	1.2	3.3	2.5	162	74
	XC3S250E	1.2	3.3	2.5	418	114
	XC3S500E	1.2	3.3	2.5	743	166
	XC3S1200E	1.2	3.3	2.5	1208	201
	XC3S1600E	1.2	3.3	2.5	1792	248

Tj=100degC
Routing=Medium; Toggle Rate=25%;
BRAM Port Width=18; Port A Read/Write Rate=25%; Port B Read/Write Rate=25%;
Mutiplier Data Toggle Rate=Medium;
DCM Freq Mode=Low ;
I/O=LVCMOS33_12; Input/Output=50%; IOB Registers=DDR; Avg Toggle Rate=25%;
Average Output Enable Rate=50%; Output load=20pF;

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

Appendix 1: Power/Current Requirement SIMULATION Examples

This SIMULATION data is intended to provide designers with a general understanding of the power requirements of Xilinx FPGA families in typical applications.

The number of the logic gates, the operating frequency, and so on, changes the value of the current consumption. Please refer to the Xilinx "Power Consumption Tools", available at www.xilinx.com/power, for closer approximations specific to individual applications.

MURATA PRODUCTS RoHS Compliant

Power/Current Requirements Calculation Examples for Virtex™-II Devices

Series	Device	VCCINT (V)	VCCO (V)	VCCAUX (V)	ICCINT @100MHz (mA)	ICCO @100MHz (mA)	ICCAUX (mA)
Virtex™-II	XC2V40	1.5	3.3	3.3	166	60	100
	XC2V80	1.5	3.3	3.3	317	82	100
	XC2V250	1.5	3.3	3.3	919	136	100
	XC2V500	1.5	3.3	3.3	1511	180	100
	XC2V1000	1.5	3.3	3.3	2276	294	100
	XC2V1500	1.5	3.3	3.3	3244	359	100
	XC2V2000	1.5	3.3	3.3	4331	425	100
	XC2V3000	1.5	3.3	3.3	6271	490	100
	XC2V4000	1.5	3.3	3.3	9669	621	100
	XC2V6000	1.5	3.3	3.3	13065	752	100
	XC2V8000	1.5	3.3	3.3	18404	754	100

Tj=100degC
Routing=Medium; Toggle Rate=25%;
BRAM Port Width=18; Port A Read/Write Rate=25%; Port B Read/Write Rate=25%;
Mutiplier Data Toggle Rate=Medium;
DCM Freq Mode=Low ;
I/O=LVCMOS33_12; Input/Output=50%; IOB Registers=DDR; Avg Toggle Rate=25%;
Average Output Enable Rate=50%; Output load=20pF;

Series	Device	VCCINT (V)	VCCO (V)	VCCAUX (V)	ICCINT @100MHz (mA)	ICCO @100MHz (mA)	ICCAUX (mA)
Virtex™-II Pro	XC2VP2	1.5	3.3	2.5	855	135	167
	XC2VP4	1.5	3.3	2.5	1637	230	167
	XC2VP7	1.5	3.3	2.5	2395	261	167
	XC2VP20	1.5	3.3	2.5	4208	372	167
	XC2VP30	1.5	3.3	2.5	6185	425	167
	XC2VP40	1.5	3.3	2.5	8583	531	167
	XC2VP50	1.5	3.3	2.5	10499	562	167
	XC2VP70	1.5	3.3	2.5	14639	657	167
	XC2VP100	1.5	3.3	2.5	19468	768	167

Tj=100degC
Routing=Medium; Toggle Rate=25%;
BRAM Port Width=18; Port A Read/Write Rate=25%; Port B Read/Write Rate=25%;
Mutiplier Data Toggle Rate=Medium;
DCM Freq Mode=Low ;
I/O=LVCMOS33_12; Input/Output=50%; IOB Registers=DDR; Avg Toggle Rate=25%;
Average Output Enable Rate=50%; Output load=20pF;

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

Appendix 1: Power/Current Requirement SIMULATION Examples

This SIMULATION data is intended to provide designers with a general understanding of the power requirements of Xilinx FPGA families in typical applications.

The number of the logic gates, the operating frequency, and so on, changes the value of the current consumption. Please refer to the Xilinx "Power Consumption Tools", available at www.xilinx.com/power, for closer approximations specific to individual applications.

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Power/Current Requirements Calculation Examples for Virtex™-5 Devices

Series	Device	VCCINT (V)	VCCO (V)	VCCAUX (V)	@200MHz (mA)	@200MHz (mA)	@200MHz (mA)
Virtex™-5	XC5VLX30	1.0	1.8	2.5	1185	976	373
	XC5VLX50	1.0	1.8	2.5	1821	976	501
	XC5VLX85	1.0	1.8	2.5	3118	1951	811
	XC5VLX110	1.0	1.8	2.5	3995	1951	811

Tj=100degC
Toggle Rate=25%; Average Fanout=2;
I/O=SSTL Class II 1.8V; Input/Output=50%; IOB Registers=DDR; Avg Toggle Rate=25%;
Average Output Enable Rate=50%; Output load=20pF;
BRAM Port Width=18; Read/Write Rate=25%; Enable Rate=100%;
DCM Freq Mode=Low ;
Utilization Rate=100%;

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Cat. No. DC-01-B Aug. 08