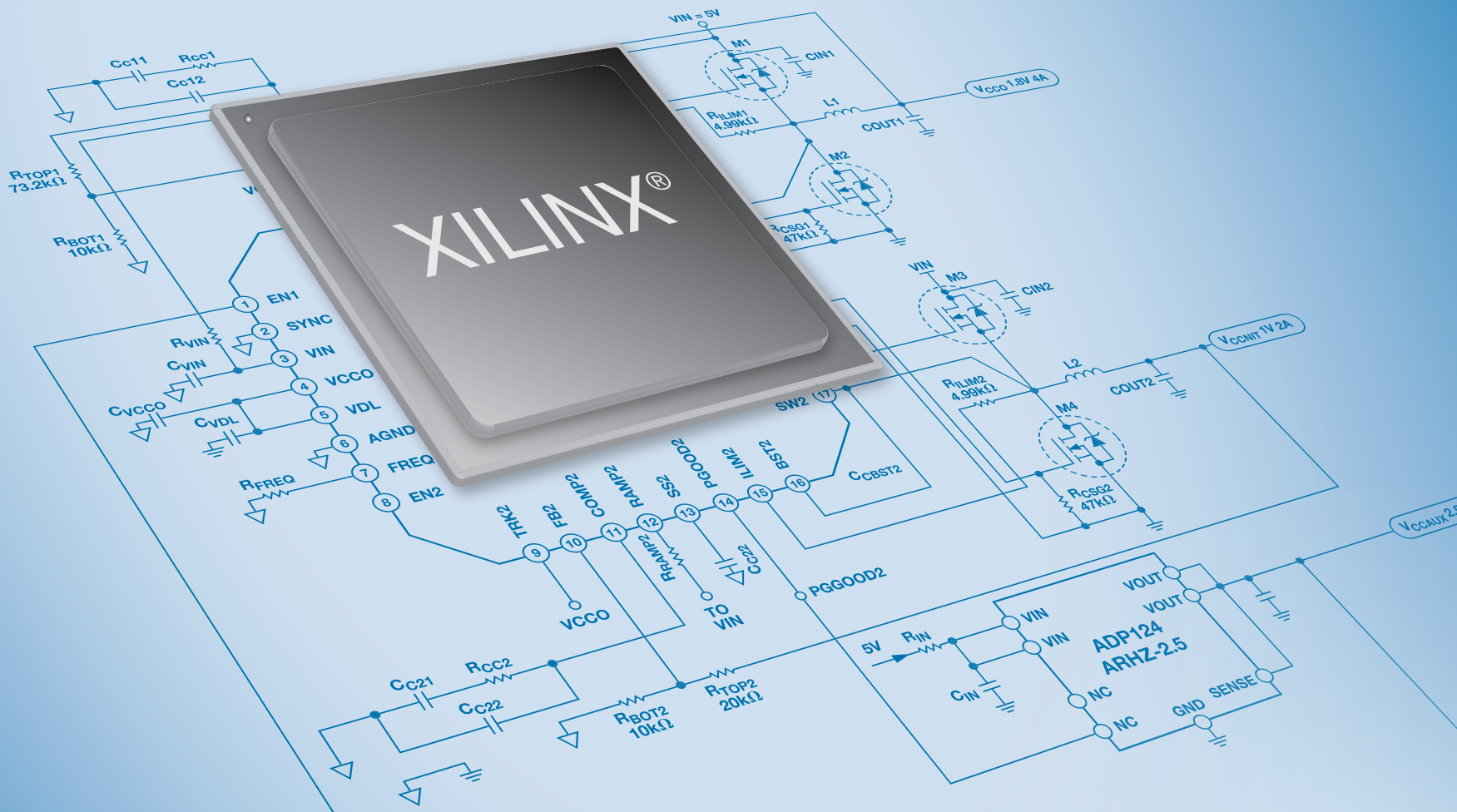
Analog Devices' Efficient, Compact Power Solutions for Xilinx High Performance FPGAs



XILINX®

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ANALOG DEVICES

Power Management Solutions for Xilinx Programmable Logic Devices

Selecting the optimum regulator to power your FPGA depends on the input voltage, maximum load current, and efficiency requirements. Low dropout (LDO) regulators are excellent at low current levels where their low efficiency wastes little power. LDOs also offer low noise and fast transient response compared to switching regulators. They have a small footprint and are relatively inexpensive. At medium current levels buck (step-down) regulators are used. For the highest load currents controller regulators are required that use external power MOSFETs.

How to Use the Selection Tables

Determine the peak current requirement for each rail of your Xilinx® FPGA by referring to the relevant data sheet and using Xilinx Web tools, such as XPower Analyzer. Then, use the appropriate table in this guide to select power solutions that offer the required V_{OUT} and I_{OUT} for that rail. If a low noise supply rail is required, then an LDO may be the best solution.

ADI provides two types of selection tables in this guide; tables for selecting the FPGA core power regulator (for example, the 0.9 V supply for the Virtex®-7 core shown on Page 3), and tables for selecting the power regulator for I/O or AUX supplies that are provided near the end of this guide.

From the left header column of the core power tables, select the input supply voltage available and then move to the box on the right under the header that specifies the required core load current. In each box there are two or more regulator suggestions. Select the best product using your exact load current and input voltage available. Refer to the data sheet on the chosen LDO, buck controller product for detailed specifications and application circuits.

The ADIsimPower™ design tool offers a complete set of features to create a complete BOM for all of these solutions. The power regulator tables for I/O or AUX supplies are used in a similar way to the core power tables. The ADIsimPower design tool is also used to create a complete BOM for I/O or AUX supplies. Visit *www.analog.com/ADIsimPower.*

Contents

Virtex-7, Kintex-7, Artix-7, Virtex-6, and Spartan-6 (-1L only)

0.9 V Core or 1.0 V Core Supply

Input Supply	Part Number	Type	Part Number	Type	Part Number	Type	Part Number	Type	Part Number	Type	Part Number	Type
	≤200 mA		≤600 mA		≤1.0 A		≤2.0 A		≤4.0 A		≤25 A	
1.2 V to 2.7 V	ADP123	LDO	ADP125	LDO	ADP1706*	LDO	ADP1740*	LDO	ADP2118*	Buck	ADP1821/ADP1822	Controllers
	ADP1710	LDO	ADP172*	LDO	ADP1707*	LDO	ADP1741*	LDO	ADP1821/ADP1822	Controllers	ADP1828	Controller
	ADP1711	LDO	ADP1715/ADP1716	LDO	ADP1708*	LDO	ADP1754*	LDO	ADP1828	Controller	ADP1829*	Dual controller
			ADP2108*	Buck	ADP1752*	LDO	ADP1755*	LDO	ADP1829*	Dual controller		
			ADP2109*	Buck	ADP1753*	LDO	ADP2119*	Buck				
			ADP2140*	Buck, LDO	ADP1754*	LDO						
					ADP1755*	LDO						
					ADP2120*	Buck						
2.7 V to 5 V	ADP123	LDO	ADP125	LDO	ADP1706*	LDO	ADP1740*	LDO	ADP2114*	Dual buck	ADP2116*	Dual buck
	ADP1710	LDO	ADP1715/ADP1716	LDO	ADP1707*	LDO	ADP1741*	LDO	ADP2116*	Dual buck	ADP1821/ADP1822	Controllers
	ADP1711	LDO	ADP2108*	Buck	ADP1708*	LDO	ADP1754*	LDO	ADP2118*	Buck	ADP1828	Controller
	ADP2108*	Buck	ADP2109*	Buck	ADP1752*	LDO	ADP1755*	LDO	ADP1821/ADP1822	Controllers	ADP1829*	Dual controller
			ADP2140*	Buck, LDO	ADP1753*	LDO	ADP2114*	Dual buck	ADP1828	Controller	ADP1850*	Dual controller
					ADP1754*	LDO	ADP2119*	Buck	ADP1829*	Dual controller	ADP1870/ADP1871	Controllers
					ADP1755*	LDO	ADP1864	Controller	ADP1850*	Dual controller	ADP1872/ADP1873	Controllers
					ADP2120*	Buck			ADP1864	Controller	ADP1882/ADP1883	Controllers
					ADP1864	Controller			ADP1870/ADP1871	Controllers		
									ADP1872/ADP1873	Controllers		
									ADP1882/ADP1883	Controllers		
≤12 V to 24 V	ADP2300	Buck	ADP2300	Buck	ADP2300	Buck	ADP2302	Buck	ADP2303	Buck	ADP1821/ADP1822	Controllers
	ADP2301	Buck	ADP2301	Buck	ADP2301	Buck	ADP2323	Dual buck	ADP2323	Dual buck	ADP1828	Controller
					ADP1864	Controller	ADP1864	Controller	ADP1821/ADP1822	Controllers	ADP1829*	Dual controller
									ADP1828	Controller	ADP1850*	Dual controller
									ADP1829*	Dual controller	ADP1870/ADP1871	Controllers
									ADP1850*	Dual controller	ADP1872/ADP1873	Controllers
									ADP1864	Controller	ADP1882/ADP1883	Controllers
									ADP1870/ADP1871	Controllers		
									ADP1872/ADP1873	Controllers		
									ADP1882/ADP1883	Controllers		

*Devices are available in tiny packages, either WLCSP or LCSP (QFN).

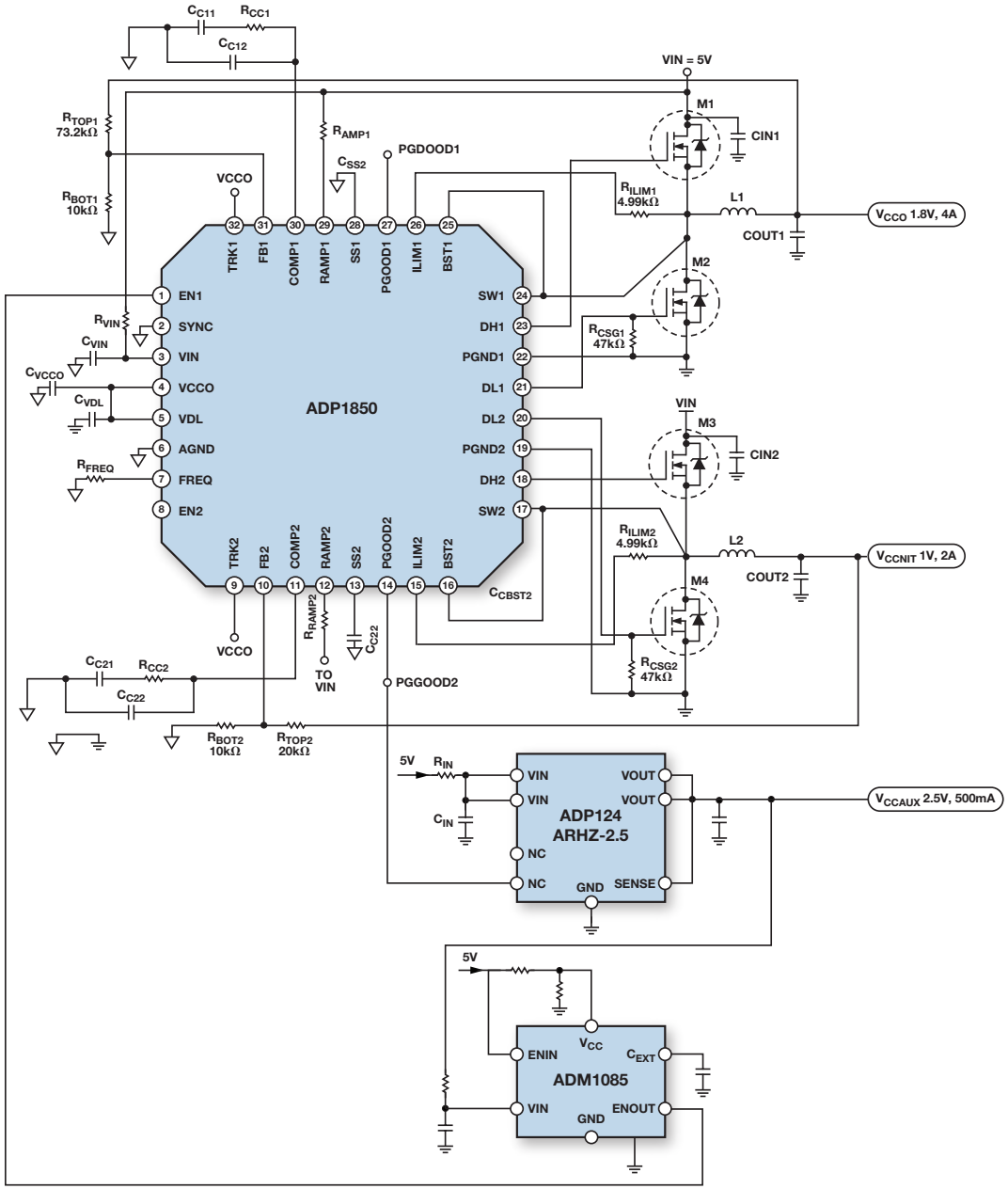
Virtex-5 and Virtex-5Q

1.0 V Core Supply

Input Supply	Part Number	Type	Part Number	Type	Part Number	Type	Part Number	Type	Part Number	Type	Part Number	Type
	≤200 mA		≤600 mA		≤1.0 A		≤2.0 A		≤4.0 A		≤25 A	
1.2 V to 2.7 V	ADP123	LDO	ADP125	LDO	ADP1706*	LDO	ADP1740*	LDO	ADP2118*	Buck	ADP1821/ADP1822	Controller
	ADP1710	LDO	ADP172*	LDO	ADP1707*	LDO	ADP1741*	LDO	ADP1821/ADP1822	Controller	ADP1828	Controller
	ADP1711	LDO	ADP1715/ADP1716	LDO	ADP1708*	LDO	ADP1754*	LDO	ADP1828	Controller	ADP1829*	Dual controller
			ADP2108*	Buck	ADP1752*	LDO	ADP1755*	LDO	ADP1829*	Dual controller		
			ADP2109*	Buck	ADP1753*	LDO	ADP2119*	Buck				
			ADP2140*	Buck, LDO	ADP1754*	LDO						
					ADP1755*	LDO						
					ADP2120*	Buck						
2.7 V to 5 V	ADP123	LDO	ADP125	LDO	ADP1706*	LDO	ADP1740*	LDO	ADP2114*	Dual buck	ADP2116*	Dual buck
	ADP1710	LDO	ADP1715/ADP1716	LDO	ADP1707*	LDO	ADP1741*	LDO	ADP2116*	Dual buck	ADP1821/ADP1822	Controller
	ADP1711	LDO	ADP2108*	Buck	ADP1708*	LDO	ADP1754*	LDO	ADP2118*	Buck	ADP1828	Controller
	ADP2108*	Buck	ADP2109*	Buck	ADP1752*	LDO	ADP1755*	LDO	ADP1821/ADP1822	Controller	ADP1829*	Dual controller
			ADP2140*	Buck, LDO	ADP1753*	LDO	ADP2114*	Dual buck	ADP1828	Controller	ADP1850*	Dual controller
					ADP1754*	LDO	ADP2119*	Buck	ADP1829*	Dual controller	ADP1870/ADP1871	Controller
					ADP1755*	LDO	ADP1864	Controller	ADP1850*	Dual controller	ADP1872/ADP1873	Controller
					ADP2120*	Buck			ADP1864	Controller	ADP1882/ADP1883	Controller
					ADP1864	Controller			ADP1870/ADP1871	Controller		
									ADP1872/ADP1873	Controller		
									ADP1882/ADP1883	Controller		
≤12 V to 24 V	ADP2300	Buck	ADP2300	Buck	ADP2300	Buck	ADP2302	Buck	ADP2303	Buck	ADP1821/ADP1822	Controller
	ADP2301	Buck	ADP2301	Buck	ADP2301	Buck	ADP2323	Dual buck	ADP2323	Dual buck	ADP1828	Controller
					ADP1864	Controller	ADP1864	Controller	ADP1821/ADP1822	Controller	ADP1829*	Dual controller
									ADP1828	Controller	ADP1850*	Dual controller
									ADP1829*	Dual controller	ADP1870/ADP1871	Controller
									ADP1850*	Dual controller	ADP1872/ADP1873	Controller
									ADP1864	Controller	ADP1882/ADP1883	Controller
									ADP1870/ADP1871	Controller		
									ADP1872/ADP1873	Controller		
									ADP1882/ADP1883	Controller		

*Devices are available in tiny packages, either WLCSP or LCSP (QFN).

Typical Power Supply Circuit for Virtex-5



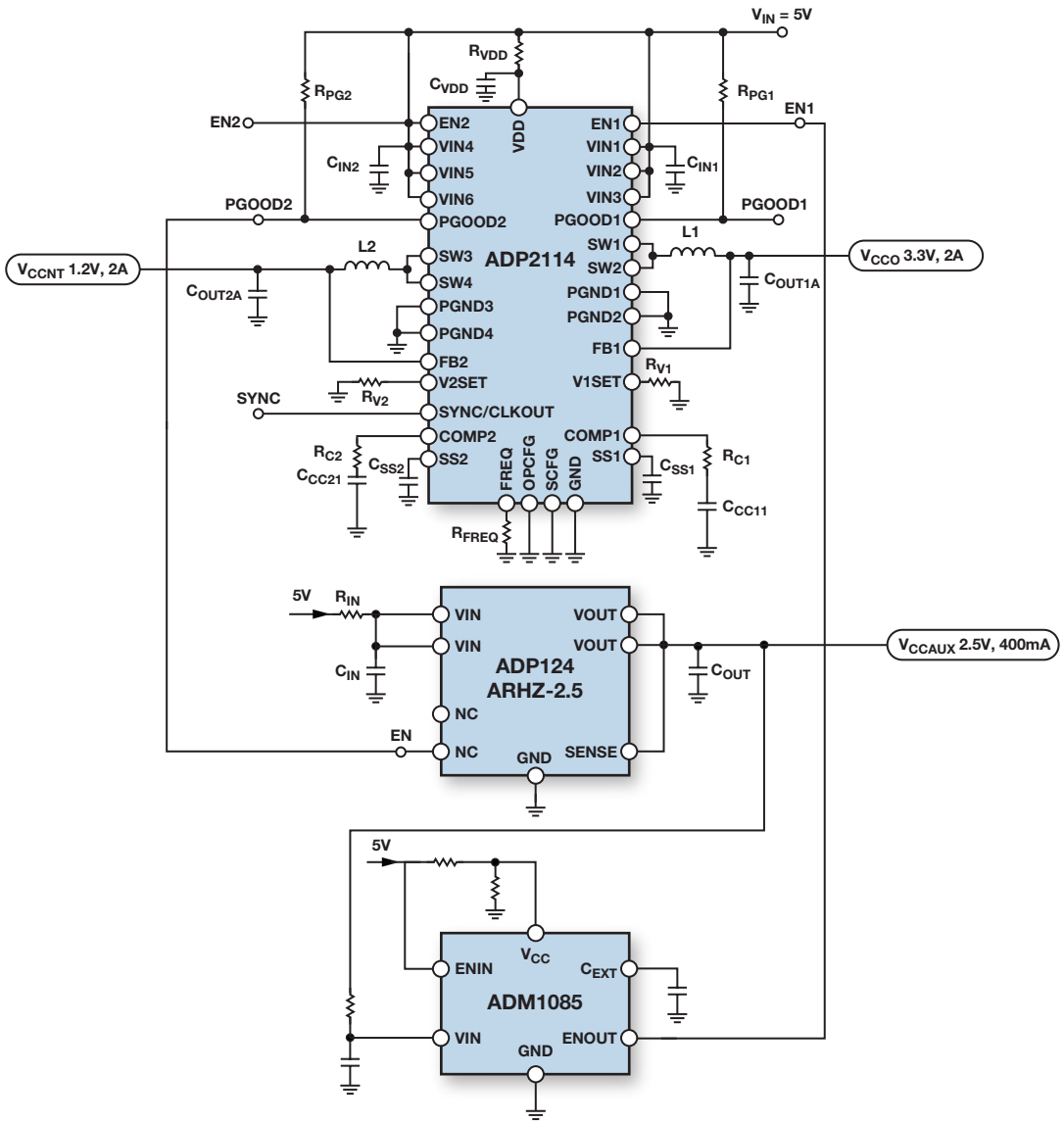
Spartan-6 (-2, -3, and -4 speed grades), Virtex-4, and Spartan-3 Family

1.2 V Core Supply

Input Supply	Part Number	Type	Part Number	Type	Part Number	Type	Part Number	Type	Part Number	Type	Part Number	Type
	≤200 mA		≤600 mA		≤1.0 A		≤2.0 A		≤4.0 A		≤25 A	
1.5 V to 2.7 V	ADP121*	LDO	ADP125	LDO	ADP1706*	LDO	ADP1740*	LDO	ADP2118*	Buck	ADP1821/ADP1822	Controller
	ADP123	LDO	ADP170/ADP171	LDO	ADP1707*	LDO	ADP1741*	LDO	ADP1821/ADP1822	Controller	ADP1828	Controller
	ADP150*	LDO	ADP172*	LDO	ADP1708*	LDO	ADP1754*	LDO	ADP1828	Controller	ADP1829*	Dual controller
	ADP1710	LDO	ADP1715/ADP1716	LDO	ADP1752*	LDO	ADP1755*	LDO	ADP1829*	Dual controller		
	ADP1711	LDO	ADP2108*	Buck	ADP1753*	LDO	ADP2119*	Buck				
			ADP2109*	Buck	ADP1754*	LDO						
			ADP2140*	Buck, LDO	ADP1755*	LDO						
			ADP5020*	Dual buck, LDO	ADP2120*	Buck						
			ADP5022*	Dual buck, LDO								
2.7 V to 5 V	ADP121*	LDO	ADP125	LDO	ADP1706*	LDO	ADP1740*	LDO	ADP2114*	Dual buck	ADP2116*	Dual buck
	ADP123	LDO	ADP1715/ADP1716	LDO	ADP1707*	LDO	ADP1741*	LDO	ADP2116*	Dual buck	ADP1821/ADP1822	Controller
	ADP150*	LDO	ADP2108*	Buck	ADP1708*	LDO	ADP1754*	LDO	ADP2118*	Buck	ADP1828	Controller
	ADP1710	LDO	ADP2109*	Buck	ADP1752*	LDO	ADP1755*	LDO	ADP1821/ADP1822	Controller	ADP1829*	Dual controller
	ADP1711	LDO	ADP2140*	Buck, LDO	ADP1753*	LDO	ADP2114*	Dual buck	ADP1828	Controller	ADP1850*	Dual controller
	ADP2108*	Buck	ADP5020*	Dual buck, LDO	ADP1754*	LDO	ADP2119*	Buck	ADP1829*	Dual controller	ADP1870/ADP1871	Controller
			ADP5022*	Dual buck, LDO	ADP1755*	LDO	ADP1864	Controller	ADP1850*	Dual controller	ADP1872/ADP1873	Controller
					ADP2120*	Buck			ADP1864	Controller	ADP1882/ADP1883	Controller
					ADP1864	Controller			ADP1870/ADP1871	Controller		
									ADP1872/ADP1873	Controller		
									ADP1882/ADP1883	Controller		
≤12 V to 24 V	ADP2300	Buck	ADP2300	Buck	ADP2300	Buck	ADP2302	Buck	ADP2303	Buck	ADP1821/ADP1822	Controller
	ADP2301	Buck	ADP2301	Buck	ADP2301	Buck	ADP2323	Dual buck	ADP2323	Dual buck	ADP1828	Controller
					ADP1864	Controller	ADP1864	Controller	ADP1821/ADP1822	Controller	ADP1829*	Dual controller
									ADP1828	Controller	ADP1850*	Dual controller
									ADP1829*	Dual controller	ADP1870/ADP1871	Controller
									ADP1850*	Dual controller	ADP1872/ADP1873	Controller
									ADP1864	Controller	ADP1882/ADP1883	Controller
									ADP1870/ADP1871	Controller		
									ADP1872/ADP1873	Controller		
									ADP1882/ADP1883	Controller		

*Devices are available in tiny packages, either WLCSP or LFCSP (QFN).

Typical Power Supply Circuit for Spartan-3



Virtex-II® Pro and Virtex-II

1.5 V Core Supply

Input Supply	Part Number	Type	Part Number	Type	Part Number	Type	Part Number	Type	Part Number	Type	Part Number	Type
	≤200 mA		≤600 mA		≤1.0 A		≤2.0 A		≤4.0 A		≤25 A	
1.8 V to 2.7 V	ADP121*	LDO	ADP125	LDO	ADP1706*	LDO	ADP1740*	LDO	ADP2118*	Buck	ADP1821/ADP1822	Controller
	ADP123	LDO	ADP170/ADP171	LDO	ADP1707*	LDO	ADP1741*	LDO	ADP1821/ADP1822	Controller	ADP1828	Controller
	ADP150*	LDO	ADP172*	LDO	ADP1708*	LDO	ADP1754*	LDO	ADP1828	Controller	ADP1829*	Dual controller
	ADP1710	LDO	ADP1715/ADP1716	LDO	ADP1752*	LDO	ADP1755*	LDO	ADP1829*	Dual controller		
	ADP1711	LDO	ADP2108*	Buck	ADP1753*	LDO	ADP2119*	Buck				
			ADP2109*	Buck	ADP1754*	LDO						
			ADP2140*	Buck, LDO	ADP1755*	LDO						
			ADP5020*	Dual buck, LDO	ADP2120*	Buck						
			ADP5022*	Dual buck, LDO								
2.7 V to 5 V	ADP121*	LDO	ADP125	LDO	ADP1706*	LDO	ADP1740*	LDO	ADP2114*	Dual buck	ADP2116*	Dual buck
	ADP123	LDO	ADP1715/ADP1716	LDO	ADP1707*	LDO	ADP1741*	LDO	ADP2116*	Dual buck	ADP1821/ADP1822	Controller
	ADP150*	LDO	ADP3334	LDO	ADP1708*	LDO	ADP1754*	LDO	ADP2118*	Buck	ADP1828	Controller
	ADP1710	LDO	ADP3336	LDO	ADP1752*	LDO	ADP1755*	LDO	ADP1821/ADP1822	Controller	ADP1829*	Dual controller
	ADP1711	LDO	ADP2108*	Buck	ADP1753*	LDO	ADP2114*	Dual buck	ADP1828	Controller	ADP1850*	Dual controller
	ADP1720	LDO	ADP2109*	Buck	ADP1754*	LDO	ADP2119*	Buck	ADP1829*	Dual controller	ADP1870/ADP1871	Controller
	ADP3331	LDO	ADP2140*	Buck, LDO	ADP1755*	LDO	ADP1864	Controller	ADP1850*	Dual controller	ADP1872/ADP1873	Controller
	ADP3333	LDO	ADP5020*	Dual buck, LDO	ADP2120*	Buck			ADP1864	Controller	ADP1882/ADP1883	Controller
	ADP2108*	Buck	ADP5022*	Dual buck, LDO	ADP1864	Controller			ADP1870/ADP1871	Controller		
									ADP1872/ADP1873	Controller		
									ADP1882/ADP1883	Controller		
≤12 V to 24 V	ADP1720	LDO	ADP3334*	LDO	ADP2300	Buck	ADP2302	Buck	ADP2303	Buck	ADP1821/ADP1822	Controller
	ADP3331	LDO	ADP3336	LDO	ADP2301	Buck	ADP2323	Dual buck	ADP2323	Dual buck	ADP1828	Controller
	ADP3333	LDO	ADP2300	Buck	ADP1864	Controller	ADP1864	Controller	ADP1821/ADP1822	Controller	ADP1829*	Dual controller
	ADP2300	Buck	ADP2301	Buck					ADP1828	Controller	ADP1850*	Dual controller
	ADP2301	Buck							ADP1829*	Dual controller	ADP1870/ADP1871	Controller
									ADP1850*	Dual controller	ADP1872/ADP1873	Controller
									ADP1864	Controller	ADP1882ADP18/83	Controller
									ADP1870/ADP1871	Controller		
									ADP1872/ADP1873	Controller		
									ADP1882ADP18/83	Controller		

*Devices are available in tiny packages, either WLCSP or LCSP (QFN).

Virtex-E, Spartan-IIE, and CoolRunner®-II

1.8 V Core Supply

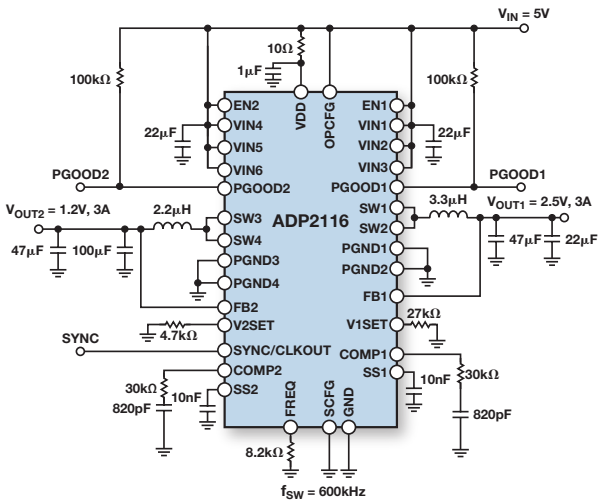
Input Supply	Part Number	Type	Part Number	Type	Part Number	Type	Part Number	Type	Part Number	Type	Part Number	Type
	≤200 mA		≤600 mA		≤1.0 A		≤2.0 A		≤4.0 A		≤25 A	
2.3 V to 2.7 V	ADP121*	LDO	ADP125	LDO	ADP1706*	LDO	ADP1740*	LDO	ADP2118*	Buck	ADP1821/ADP1822	Controller
	ADP130	LDO	ADP170/ADP171	LDO	ADP1707*	LDO	ADP1741*	LDO	ADP1821/ADP1822	Controller	ADP1828	Controller
	ADP150*	LDO	ADP172*	LDO	ADP1708*	LDO	ADP1754*	LDO	ADP1828	Controller	ADP1829*	Dual controller
	ADP1710	LDO	ADP1715/ADP1716	LDO	ADP1752*	LDO	ADP1755*	LDO	ADP1829*	Dual controller		
	ADP1711	LDO	ADP2108*	Buck	ADP1753*	LDO	ADP2119*	Buck				
			ADP2109*	Buck	ADP1754*	LDO						
			ADP2140*	Buck, LDO	ADP1755*	LDO						
			ADP5020*	Dual buck, LDO	ADP2120*	Buck						
			ADP5022*	Dual buck, LDO								
2.7 V to 5 V	ADP121*	LDO	ADP125	LDO	ADP1706*	LDO	ADP1740*	LDO	ADP2114*	Dual buck	ADP2116*	Dual buck
	ADP123	LDO	ADP1715/ADP1716	LDO	ADP1707*	LDO	ADP1741*	LDO	ADP2116*	Dual buck	ADP1821/ADP1822	Controller
	ADP150*	LDO	ADP3334	LDO	ADP1708*	LDO	ADP1754*	LDO	ADP2118*	Buck	ADP1828	Controller
	ADP1710	LDO	ADP3336	LDO	ADP1752*	LDO	ADP1755*	LDO	ADP1821/ADP1822	Controller	ADP1829*	Dual controller
	ADP1711	LDO	ADP2108*	Buck	ADP1753*	LDO	ADP2114*	Dual buck	ADP1828	Controller	ADP1850*	Dual controller
	ADP1720	LDO	ADP2109*	Buck	ADP1754*	LDO	ADP2119*	Buck	ADP1829*	Dual controller	ADP1870/ADP1871	Controller
	ADP3331	LDO	ADP2140*	Buck, LDO	ADP1755*	LDO	ADP1864	Controller	ADP1850*	Dual controller	ADP1872/ADP1873	Controller
	ADP3333	LDO	ADP5020*	Dual buck, LDO	ADP2120*	Buck			ADP1864	Controller	ADP1882/ADP1883	Controller
	ADP2108*	Buck	ADP5022*	Dual buck, LDO	ADP1864	Controller			ADP1870/ADP1871	Controller		
									ADP1872/ADP1873	Controller		
									ADP1882/ADP1883	Controller		
≤2 V to 24 V	ADP1720	LDO	ADP3335*	LDO	ADP2300	Buck	ADP2302	Buck	ADP2303	Buck	ADP1821/ADP1822	Controller
	ADP3331	LDO	ADP3336	LDO	ADP2301	Buck	ADP2323	Dual buck	ADP2323	Dual buck	ADP1828	Controller
	ADP3333	LDO	ADP2300	Buck	ADP1864	Controller	ADP1864	Controller	ADP1821/ADP1822	Controller	ADP1829*	Dual controller
	ADP2300	Buck	ADP2301	Buck					ADP1828	Controller	ADP1850*	Dual controller
	ADP2301	Buck							ADP1829*	Dual controller	ADP1870/ADP1871	Controller
									ADP1850*	Dual controller	ADP1872/ADP1873	Controller
									ADP1864	Controller	ADP1882/ADP1883	Controller
									ADP1870/ADP1871	Controller		
									ADP1872/ADP1873	Controller		
									ADP1882/ADP1883	Controller		

*Devices are available in tiny packages, either WLCSP or LFCSP (QFN).

2.5 V Core Supply

Input Supply	Part Number	Type	Part Number	Type	Part Number	Type	Part Number	Type	Part Number	Type	Part Number	Type
	≤200 mA		≤600 mA		≤1.0 A		≤2.0 A		≤4.0 A		≤25 A	
3 V to 5 V	ADP121*	LDO	ADP124	LDO	ADP1706*	LDO	ADP1740*	LDO	ADP2114*	Dual buck	ADP2116*	Dual buck
	ADP122	LDO	ADP125	LDO	ADP1707*	LDO	ADP1741*	LDO	ADP2116*	Dual buck	ADP1821/ADP1822	Controller
	ADP123	LDO	ADP1715/ADP1716	LDO	ADP1708*	LDO	ADP1754*	LDO	ADP2118*	Buck	ADP1828	Controller
	ADP150*	LDO	ADP3334	LDO	ADP1752*	LDO	ADP1755*	LDO	ADP1821/ADP1822	Controller	ADP1829*	Dual controller
	ADP1720	LDO	ADP3336	LDO	ADP1753*	LDO	ADP2114*	Dual buck	ADP1828	Controller	ADP1850*	Dual controller
	ADP3331	LDO	ADP2108*	Buck	ADP1754*	LDO	ADP2119*	Buck	ADP1829*	Dual controller	ADP1870/ADP1871	Controller
	ADP3333	LDO	ADP2140*	Buck, LDO	ADP1755*	LDO	ADP1864	Controller	ADP1850*	Dual controller	ADP1872/ADP1873	Controller
	ADP2108*	Buck	ADP5020*	Dual buck, LDO	ADP2120*	Buck			ADP1864	Controller	ADP1882ADP18/83	Controller
			ADP5022*	Dual buck, LDO	ADP1864	Controller			ADP1870/ADP1871	Controller		
									ADP1872/ADP1873	Controller		
									ADP1882/ADP1883	Controller		
≤12 V to 24 V	ADP1720	LDO	ADP3335*	LDO	ADP2300	Buck	ADP2302	Buck	ADP2303	Buck	ADP1821/ADP1822	Controller
	ADP3330	LDO	ADP3336	LDO	ADP2301	Buck	ADP2323	Dual buck	ADP2323	Dual buck	ADP1828	Controller
	ADP3331	LDO	ADP2300	Buck	ADP1864	Controller	ADP1864	Controller	ADP1821/ADP1822	Controller	ADP1829*	Dual controller
	ADP3333	LDO	ADP2301	Buck					ADP1828	Controller	ADP1850*	Dual controller
	ADP2300	Buck							ADP1829*	Dual controller	ADP1870/ADP1871	Controller
	ADP2301	Buck							ADP1850*	Dual controller	ADP1872/ADP1873	Controller
									ADP1864	Controller	ADP1882/ADP1883	Controller
									ADP1870/ADP1871	Controller		
									ADP1872/ADP1873	Controller		
									ADP1882/ADP1883	Controller		

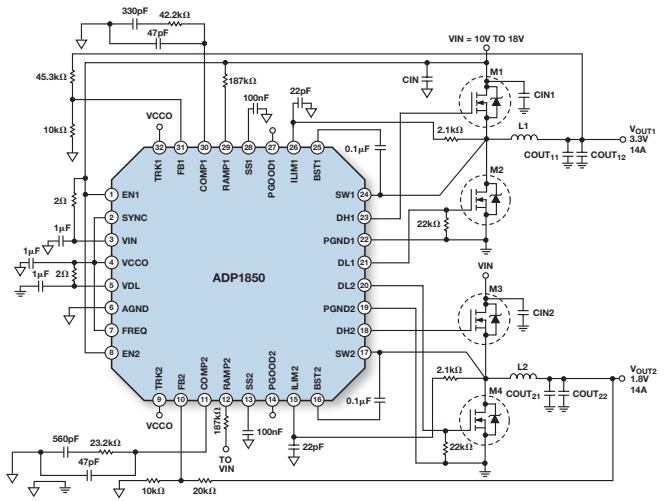
*Devices are available in tiny packages, either WLCSP or LCSP (QFN).



3.3 V Core Supply

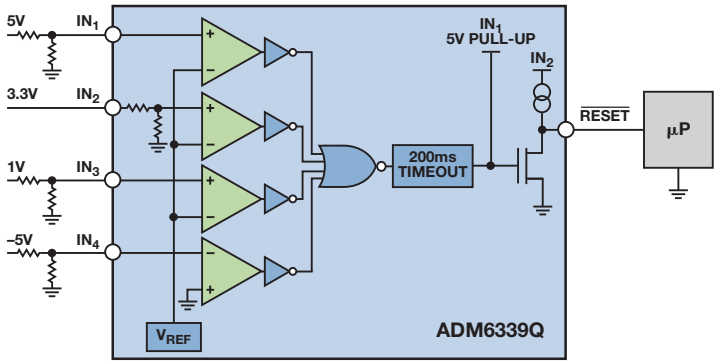
Input Supply	Part Number	Type	Part Number	Type	Part Number	Type	Part Number	Type	Part Number	Type	Part Number	Type
	≤200 mA		≤600 mA		≤1.0 A		≤2.0 A		≤4.0 A		≤25 A	
5 V	ADP121*	LDO	ADP124	LDO	ADP1706*	LDO	ADP1740*	LDO	ADP2114*	Dual buck	ADP2116*	Dual buck
	ADP122	LDO	ADP125	LDO	ADP1707*	LDO	ADP1741*	LDO	ADP2116*	Dual buck	ADP1821/ADP1822	Controller
	ADP123	LDO	ADP1715/ADP1716	LDO	ADP1708*	LDO	ADP1754*	LDO	ADP2118*	Buck	ADP1828	Controller
	ADP150*	LDO	ADP3334	LDO	ADP1752*	LDO	ADP1755*	LDO	ADP1821/ADP1822	Controller	ADP1829*	Dual controller
	ADP1720	LDO	ADP3336	LDO	ADP1753*	LDO	ADP2114*	Dual buck	ADP1828	Controller	ADP1850*	Dual controller
	ADP3331	LDO	ADP2108*	Buck	ADP1754*	LDO	ADP2119*	Buck	ADP1829*	Dual controller	ADP1870/ADP1871	Controller
	ADP3333	LDO	ADP2140*	Buck, LDO	ADP1755*	LDO	ADP1864	Controller	ADP1850*	Dual controller	ADP1872/ADP1873	Controller
	ADP2108*	Buck	ADP5020*	Dual buck, LDO	ADP2120*	Buck			ADP1864	Controller	ADP1882/ADP1883	Controller
			ADP5022*	Dual buck, LDO	ADP1864	Controller			ADP1870/ADP1871	Controller		
									ADP1872/ADP1873	Controller		
									ADP1882/ADP1883	Controller		
≤12 V to 24 V	ADP1720	LDO	ADP3335*	LDO	ADP2300	Buck	ADP2302	Buck	ADP2303	Buck	ADP1821/ADP1822	Controller
	ADP3330	LDO	ADP3336	LDO	ADP2301	Buck	ADP2323	Dual buck	ADP2323	Dual buck	ADP1828	Controller
	ADP3331	LDO	ADP2300	Buck	ADP1864	Controller	ADP1864	Controller	ADP1821/ADP1822	Controller	ADP1829*	Dual controller
	ADP3333	LDO	ADP2301	Buck					ADP1828	Controller	ADP1850*	Dual controller
	ADP2300	Buck							ADP1829*	Dual controller	ADP1870/ADP1871	Controller
	ADP2301	Buck							ADP1850*	Dual controller	ADP1872/ADP1873	Controller
									ADP1864	Controller	ADP1882/ADP1883	Controller
									ADP1870/ADP1871	Controller		
									ADP1872/ADP1873	Controller		
									ADP1882/ADP1883	Controller		

*Devices are available in tiny packages, either WLCSP or LFCSP (QFN).



Multivoltage Supervisors

Analog Devices offers a portfolio of multivoltage monitors suited to monitoring two, three, or four supplies. There are several device families offering combinations of positive and negative pretrimmed thresholds and user adjustable inputs, with some including a watchdog timer function. With up to twice the threshold accuracy over temperature of competitive parts, these new ADI products offer the ability to monitor emerging low voltage core requirements and, therefore, maximize system protection.



ADM6339 Quad Voltage Monitor Features

- Monitors positive and negative supplies
- Factory set threshold options:
  –5 V, +1.8 V, +2.5 V, +3.0 V, +3.3 V, +5 V
- Adjustable input threshold options:
  –0.5 V, +0.62 V, +1.23 V

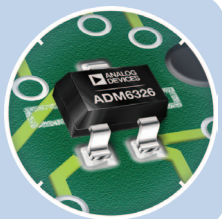
Multivoltage Supervisors

Part Number	Number of Monitored Voltages	Reset Threshold (V)	Adjustable Accuracy (Over Temperature)	Min Reset Timeout (ms)	Reset Output Stage		Manual Reset Capability	Typ Watchdog Timeout (ms)	UV and OV Monitor	Package	Price ($U.S.)[1]
					Active Low	Active High					
ADM13305	2	0.6 (adj), 1.68, 2.25, 2.93, 4.55	±0.8%	140	Push-pull	Push-pull	Yes	1600	—	8-lead SOIC_N	0.95
ADM13307	3	0.6 (adj), 1.25 (adj), 1.68, 2.25, 2.93, 4.55	±0.8%	140	Push-pull	Push-pull	Yes	—	—	8-lead SOIC_N	0.98
ADM6710	3 or 4	0.62 (adj), 1.58, 1.67, 2.19, 2.32, 2.63, 2.78, 2.93, 3.08, 4.38, 4.63	±1.5%	140	Open-drain	—	—	—	—	6-lead SOT-23	1.60
ADM1184	4	0.6 (adj)	±0.8%	100	Open-drain	—	—	—	—	10-lead MSOP	2.39
ADM6339	4	–0.50 (adj), +0.62 (adj), +1.23 (adj), –4.38, –4.63, +1.58, +2.19, +2.63, +2.78, +2.93, +3.08, +4.38, +4.63	±0.8%	140	Open-drain	—	—	—	—	6-lead SOT-23	1.79
ADM2914	4	0.5 (adj)	±1.5%	Adj	Open-drain	—	—	—	Yes	16-lead QSOP	3.99
ADM12914	4	0.5 (adj)	±0.8%	Adj	Open-drain	—	—	—	Yes	16-lead QSOP	4.99
ADM6305	2	0.4 (adj), 1.23 (adj)	±1.5%	1, 20, 140, 1120	Open-drain	—	—	—	—	5-lead SOT-23	1.15
ADM6306	2	0.4 (adj), 1.23 (adj), 2.5, 2.63, 2.7, 2.8, 2.93, 3.0, 3.08, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 4.0, 4.1, 4.2, 4.3, 4.39, 4.5, 4.63, 4.7, 4.8, 4.9, 5.0	±1.5%	1, 20, 140, 1120	Open-drain	—	Yes	—	—	5-lead SOT-23	1.15

[1] 1000 to 4999

ADI Introduces a New Family of Ultralow Power Supervisory Circuits

The ADM6326, ADM6328, ADM6346, and ADM6348 are ultralow power microprocessor supervisory circuits suited to monitoring the power supplies in portable microprocessor-based applications. This new family of ultralow power supervisory circuits extends the battery life of portable devices by consuming only 500 nA (typ) supply current while maximizing product reliability through robust supply monitoring.



Power Supplies for 1.2 V or 1.5 V I/O

Input Voltage	Part Number	Type	Part Number	Type	Part Number	Type	Part Number	Type	Part Number	Type
	≤600 mA		≤1.0 A		≤2.0 A		≤4.0 A		≤25 A	
1.8 V	ADP170/ADP171	LDO	ADP1752*	LDO	ADP1740*	LDO	ADP1821/ADP1822	Controller	ADP1821/ADP1822	Controller
	ADP172*	LDO	ADP1753*	LDO	ADP1741*	LDO	ADP1828	Controller	ADP1828	Controller
			ADP1754*	LDO	ADP1754*	LDO	ADP1829*	Dual controller	ADP1829*	Dual controller
			ADP1755*	LDO	ADP1755*	LDO				
2.5 V	ADP125	LDO	ADP1752*	LDO	ADP1740*	LDO	ADP2118*	Buck	ADP1821/ADP1822	Controller
	ADP172*	LDO	ADP1753*	LDO	ADP1741*	LDO	ADP1821/ADP1822	Controller	ADP1828	Controller
	ADP2108*	Buck	ADP1754*	LDO	ADP2118*	Buck	ADP1828	Controller	ADP1829*	Dual controller
	ADP2109*	Buck	ADP1755*	LDO	ADP2119*	Buck	ADP1829*	Dual controller		
	ADP2140*	Buck, LDO	ADP2120*	Buck						
3.3 V	ADP125	LDO	ADP1752*	LDO	ADP1740*	LDO	ADP2118*	Buck	ADP1821/ADP1822	Controller
	ADP172*	LDO	ADP1753*	LDO	ADP1741*	LDO	ADP1821/ADP1822	Controller	ADP1828	Controller
	ADP1715/ADP1716	LDO	ADP1754*	LDO	ADP2114*	Dual buck	ADP1828	Controller	ADP1829*	Dual controller
	ADP2108*	Buck	ADP1755*	LDO	ADP2119*	Buck	ADP1829*	Dual controller	ADP1850*	Dual controller
	ADP2109*	Buck	ADP2120*	Buck			ADP1850*	Dual controller	ADP1870/ADP1871	Controller
	ADP2140*	Buck, LDO					ADP1870/ADP1871	Controller	ADP1872/ADP1873	Controller
	ADP5020*	Dual buck, LDO					ADP1872/ADP1873	Controller	ADP1882/ADP1883	Controller
	ADP5022*	Dual buck, LDO					ADP1882/ADP1883	Controller		
5 V	ADP125	LDO	ADP2120*	Buck	ADP2114*	Dual buck	ADP2118*	Buck	ADP1821/ADP1822	Controller
	ADP1715/ADP1716	LDO	ADP2300	Buck	ADP2118*	Buck	ADP2303	Buck	ADP1828	Controller
	ADP2108*	Buck	ADP2301	Buck	ADP2119*	Buck	ADP1821/ADP1822	Controller	ADP1829*	Dual controller
	ADP2109*	Buck	ADP1864	Controller	ADP2302	Buck	ADP1828	Controller	ADP1850*	Dual controller
	ADP2140*	Buck, LDO			ADP2323	Dual buck	ADP1829*	Dual controller	ADP1870/ADP1871	Controller
	ADP5020*	Dual buck, LDO			ADP1864	Controller	ADP1850*	Dual controller	ADP1872/ADP1873	Controller
	ADP5022*	Dual buck, LDO					ADP1864	Controller	ADP1882/ADP1883	Controller
							ADP1870/ADP1871	Controller		
							ADP1872/ADP1873	Controller		
							ADP1882/ADP1883	Controller		

*Devices are available in tiny packages, either WLCSP or LFCSP (QFN).

Power Supplies for 1.8 V I/O

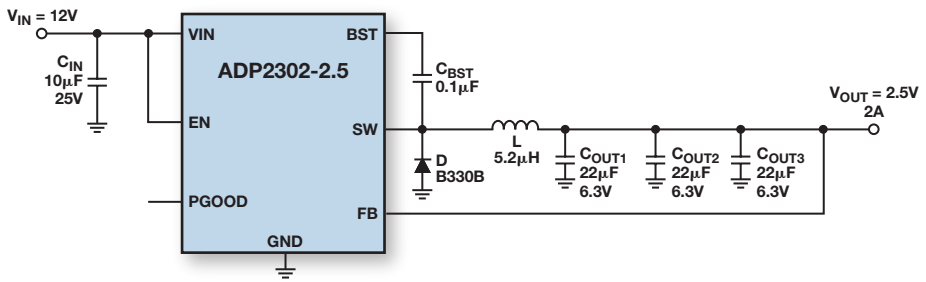
Input Voltage	Part Number	Type	Part Number	Type	Part Number	Type	Part Number	Type	Part Number	Type
	≤600 mA		≤1.0 A		≤2.0 A		≤4.0 A		≤25 A	
2.5 V	ADP124	LDO	ADP1752*	LDO	ADP1740*	LDO	ADP2118*	Buck	ADP1821/ADP1822	Controller
	ADP172*	LDO	ADP1753*	LDO	ADP1741*	LDO	ADP1821/ADP1822	Controller	ADP1828	Controller
			ADP1754*	LDO	ADP2118*	Buck	ADP1828	Controller	ADP1829*	Dual controller
			ADP1755*	LDO	ADP2119*	Buck	ADP1829*	Dual controller		
			ADP2120*	Buck						
3.3 V	ADP124	LDO	ADP1752*	LDO	ADP1740*	LDO	ADP2118*	Buck	ADP1821/ADP1822	Controller
	ADP172*	LDO	ADP1753*	LDO	ADP1741*	LDO	ADP1821/ADP1822	Controller	ADP1828	Controller
	ADP1715/ADP1716	LDO	ADP1754*	LDO	ADP2114*	Dual buck	ADP1828	Controller	ADP1829*	Dual controller
	ADP2108*	Buck	ADP1755*	LDO	ADP2119*	Buck	ADP1829*	Dual controller	ADP1850*	Dual controller
	ADP2109*	Buck	ADP2120*	Buck			ADP1850*	Dual controller	ADP1870/ADP1871	Controller
	ADP2140*	Buck, LDO					ADP1870/ADP1871	Controller	ADP1872/ADP1873	Controller
	ADP5020*	Dual buck, LDO					ADP1872/ADP1873	Controller	ADP1882/ADP1883	Controller
	ADP5022*	Dual buck, LDO					ADP1882/ADP1883	Controller		
5 V	ADP124	LDO	ADP2120*	Buck	ADP2114*	Dual buck	ADP2118*	Buck	ADP1821/ADP1822	Controller
	ADP1715/ADP1716	LDO	ADP2300	Buck	ADP2119*	Buck	ADP2303	Buck	ADP1828	Controller
	ADP2108*	Buck	ADP2301	Buck	ADP2302	Buck	ADP1821/ADP1822	Controller	ADP1829*	Dual controller
	ADP2109*	Buck	ADP1864	Controller	ADP2323	Dual buck	ADP1828	Controller	ADP1850*	Dual controller
	ADP2140*	Buck, LDO			ADP1864	Controller	ADP1829*	Dual controller	ADP1870/ADP1871	Controller
	ADP5020*	Dual buck, LDO					ADP1850*	Dual controller	ADP1872/ADP1873	Controller
	ADP5022*	Dual buck, LDO					ADP1864	Controller	ADP1882/ADP1883	Controller
							ADP1870/ADP1871	Controller		
							ADP1872/ADP1873	Controller		
							ADP1882/ADP1883	Controller		

*Devices are available in tiny packages, either WLCSP or LFCSP (QFN).

Power Supplies for 2.5 V I/O

Input Voltage		Part Number	Type	Part Number	Type	Part Number	Type	Part Number	Type	Part Number	Type
		≤600 mA		≤1.0 A		≤2.0 A		≤4.0 A		≤25 A	
	3.3 V	ADP124	LDO	ADP1752*	LDO	ADP1740*	LDO	ADP2118*	Buck	ADP1821/ADP1822	Controller
		ADP172*	LDO	ADP1753*	LDO	ADP1741*	LDO	ADP1821/ADP1822	Controller	ADP1828	Controller
		ADP2108*	Buck	ADP1754*	LDO	ADP2114*	Dual buck	ADP1828	Controller	ADP1829*	Dual controller
		ADP2140*	Buck, LDO	ADP1755*	LDO	ADP2118*	Buck	ADP1829*	Dual controller	ADP1850*	Dual controller
		ADP5020*	Dual buck, LDO	ADP2120*	Buck	ADP2119*	Buck	ADP1850*	Dual controller	ADP1870/ADP1871	Controller
		ADP5022*	Dual buck, LDO					ADP1870/ADP1871	Controller	ADP1872/ADP1873	Controller
								ADP1872/ADP1873	Controller	ADP1882/ADP1883	Controller
								ADP1882/ADP1883	Controller		
	5 V	ADP124	LDO	ADP2120*	Buck	ADP2114*	Dual buck	ADP2118*	Buck	ADP1821/ADP1822	Controller
		ADP1715/ADP1716	LDO	ADP1864	Controller	ADP2119*	Buck	ADP1821/ADP1822	Controller	ADP1828	Controller
		ADP2108*	Buck			ADP1864	Controller	ADP1828	Controller	ADP1829*	Dual controller
		ADP2140*	Buck, LDO					ADP1829*	Dual controller	ADP1850*	Dual controller
		ADP5020*	Dual buck, LDO					ADP1850*	Dual controller	ADP1870/ADP1871	Controller
		ADP5022*	Dual buck, LDO					ADP1864	Controller	ADP1872/ADP1873	Controller
								ADP1870/ADP1871	Controller	ADP1882/ADP1883	Controller
								ADP1872/ADP1873	Controller		
								ADP1882/ADP1883	Controller		
	12 V	ADP3335*	LDO	ADP2300	Buck	ADP2302	Buck	ADP2303	Buck	ADP1821/ADP1822	Controller
		ADP3336	LDO	ADP2301	Buck	ADP2323	Dual buck	ADP2323	Dual buck	ADP1828	Controller
		ADP2300	Buck	ADP1864	Controller	ADP1864	Controller	ADP1821/ADP1822	Controller	ADP1829*	Dual controller
		ADP2301	Buck					ADP1828	Controller	ADP1850*	Dual controller
								ADP1829*	Dual controller	ADP1870/ADP1871	Controller
								ADP1850*	Dual controller	ADP1872/ADP1873	Controller
								ADP1864	Controller	ADP1882/ADP1883	Controller
								ADP1870/ADP1871	Controller		
								ADP1872/ADP1873	Controller		
								ADP1882/ADP1883	Controller		

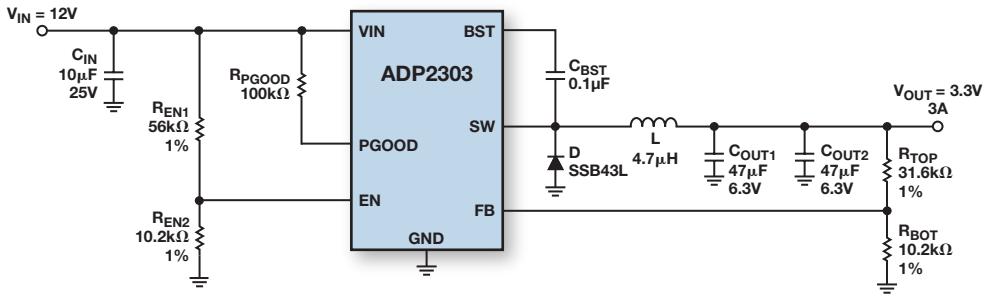
*Devices are available in tiny packages, either WLCSP or LFCSP (QFN).



Power Supplies for 3.3 V I/O

Input Voltage	Part Number	Type	Part Number	Type	Part Number	Type	Part Number	Type	Part Number	Type
	≤600 mA		≤1.0 A		≤2.0 A		≤4.0 A		≤25 A	
5 V	ADP124	LDO	ADP1706*	LDO	ADP2114*	Dual buck	ADP2118*	Buck	ADP1821/ADP1822	Controller
	ADP1715/ADP1716	LDO	ADP1707*	LDO	ADP2119*	Buck	ADP1821/ADP1822	Controller	ADP1828	Controller
	ADP2108*	Buck	ADP1708*	LDO	ADP1864	Controller	ADP1828	Controller	ADP1829*	Dual controller
	ADP2140*	Buck, LDO	ADP2120*	Buck			ADP1829*	Dual controller	ADP1850*	Dual controller
	ADP5020*	Dual buck, LDO	ADP1864	Controller			ADP1850*	Dual controller	ADP1870/ADP1871	Controller
	ADP5022*	Dual buck, LDO					ADP1864	Controller	ADP1872/ADP1873	Controller
							ADP1870/ADP1871	Controller	ADP1882/ADP1883	Controller
							ADP1872/ADP1873	Controller		
							ADP1882/ADP1883	Controller		
12 V	ADP3335*	LDO	ADP2300	Buck	ADP2302	Buck	ADP2303	Buck	ADP1821/ADP1822	Controller
	ADP3336	LDO	ADP2301	Buck	ADP2323	Dual buck	ADP2323	Dual buck	ADP1828	Controller
	ADP2300	Buck	ADP1864	Controller	ADP1864	Controller	ADP1821/ADP1822	Controller	ADP1829*	Dual controller
	ADP2301	Buck					ADP1828	Controller	ADP1850*	Dual controller
							ADP1829*	Dual controller	ADP1870/ADP1871	Controller
							ADP1850*	Dual controller	ADP1872/ADP1873	Controller
							ADP1864	Controller	ADP1882/ADP1883	Controller
							ADP1870/ADP1871	Controller		
							ADP1872/ADP1873	Controller		
							ADP1882/ADP1883	Controller		

*Devices are available in tiny packages, either WLCSP or LFCSP (QFN).



Online Tools/Resources

In addition to providing world-class products and technical support, ADI takes great pride in offering design engineers the very best in online design tools. These tools have been specifically designed to provide power designers and nonpower designers alike the tools needed to design, optimize, and implement the very best power circuits available.

Tools like the recently released ADIsimPower tool provide users with an easy four-step process using an intuitive graphical user interface via your Web browser. This particular tool allows the designer to preselect their key goals, whether they be cost, size, or performance, and optimizes the solution to meet those goals. Additional tools are available online (as Excel-based downloadable versions) that make product selection and design a snap. ADI puts the power back in your hands.

Other Available Online Tools

- ADIsimPower: dc-to-dc power management tool
- Supervisory parametric search tool

Downloadable Excel-Based Tools

- ADI linear regulator design tool and parametric search
- ADP161x boost regulator design tool
- ADP161x coupled-SEPIC design tool
- ADP161x SEPIC-Cuk design tool
- ADP1621 boost regulator design tool
- ADP1621 coupled-SEPIC design tool
- ADP1864 buck controller design tool
- ADP1870/ADP1871/ADP1872/ADP1873 buck designer tool
- ADP1877 buck designer tool
- ADP21xx buck regulator design tool
- ADP2114/ADP2116 Dual buck regulator design tool
- ADP230x buck regulator design tool
- ADP2503/ADP2504 buck-boost regulator design tool
- ADP3050 buck regulator design tool
- ADI supervisor parametric search and cross reference

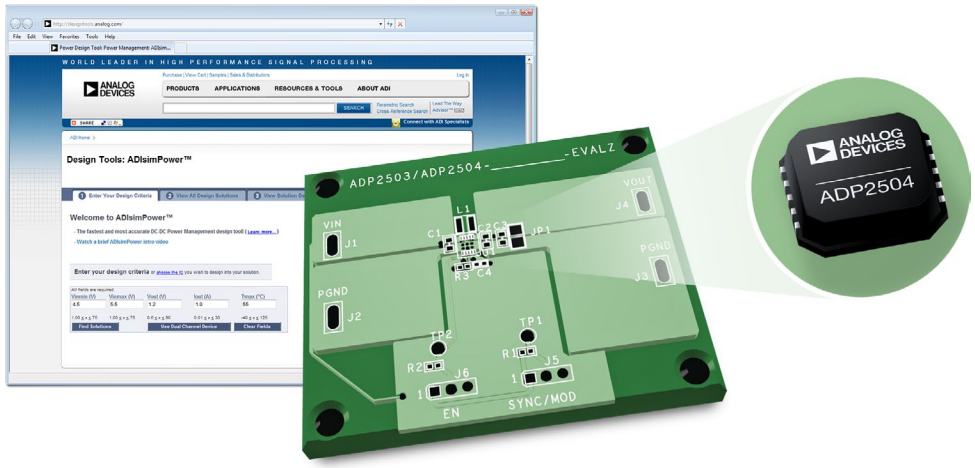
Power Management RedyKit

Analog Devices' power RedyKit™ simplifies product evaluation by providing two assembled and tested evaluation boards, plus a full set of product options, for example, multiple voltage options for an IC regulator.

In the example of a low dropout (LDO) regulator, a traditional evaluation board offers the user a single voltage output, say 3.3 V, that is trimmed to high accuracy by the manufacturer or set by two precision resistors in the case of an adjustable version. If the user wants a 2.5 V output from the evaluation board, a different IC may have to be ordered from the manufacturer, which incurs one or more days delay before evaluation—very inconvenient.

To make the process simpler for the customer, Analog Devices has chosen to offer a complete product evaluation kit, the RedyKit, which includes two evaluation boards, plus all the standard options in a product family. The kit allows the user to evaluate all the options with one easy to order kit. All the IC options come sorted and stored in the kit with the Analog Devices part number clearly printed on each antistatic zip-top bag. To order these kits, contact your local sales office. Data sheets and schematics can be found on the respective product Web pages. The URL will be included in the kit.

For additional information, go to the Analog Devices website at *www.analog.com/power.*



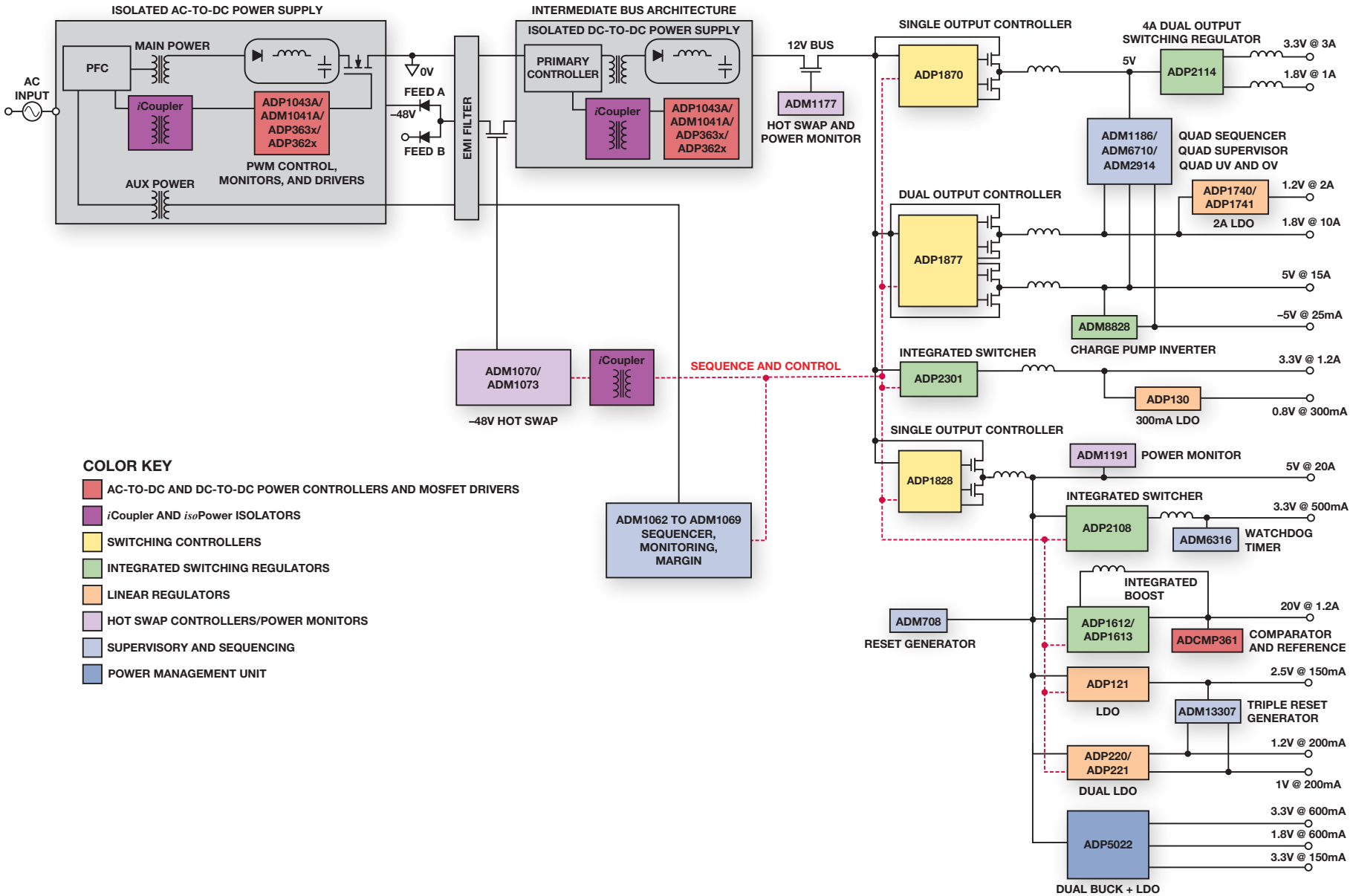
Features

- Two fully assembled and tested evaluation boards per kit
- Full set of IC voltage options in each kit
- 3 samples of each IC voltage option packed in separate antistatic bags
- Kit allows the user to quickly evaluate all IC voltage options
- Only need to order one kit per product family

RedyKit Availability and Voltage Options

Part Number	Board Voltage Options
ADP121UJZ-REDYKIT	2.8 V, 3.3 V, all voltages in kit
ADP122UJZ-REDYKIT	2.5 V, 3.3 V, all voltages in kit
ADP124CPZ-REDYKIT	1.8 V, 3.3 V, all voltages in kit
ADP124RHZ-REDYKIT	2.8 V, 3.3 V, all voltages in kit
ADP130UJZ-REDYKIT	1.2 V, 1.8 V, all voltages in kit
ADP150UJZ-REDYKIT	1.8 V, 3.3 V, all voltages in kit
ADP160UJZ-REDYKIT	1.8 V, 3.3 V, all voltages in kit
ADP162UJZ-REDYKIT	3.3 V, 4.2 V, all voltages in kit
ADP2108UJZ-REDYKIT	1.2 V, 3.3 V, all voltages in kit
ADP2503CPZ-REDYKIT	3.3 V, 5.0 V, all voltages in kit
ADP2504CPZ-REDYKIT	2.8 V, 5.0 V, all voltages in kit

Power Chain


ISOLATED AC-TO-DC POWER SUPPLY
AC INPUT
PFC
MAIN POWER
iCoupler
ADP1043A/ ADM1041A/ ADP363x/ ADP362x
PWM CONTROL, MONITORS, AND DRIVERS
AUX POWER
0V
FEED A
–48V
FEED B
EMI FILTER
INTERMEDIATE BUS ARCHITECTURE
ISOLATED DC-TO-DC POWER SUPPLY
PRIMARY CONTROLLER
iCoupler
ADP1043A/ ADM1041A/ ADP363x/ ADP362x
12V BUS
ADM1177
HOT SWAP AND POWER MONITOR
SINGLE OUTPUT CONTROLLER
ADP1870
4A DUAL OUTPUT SWITCHING REGULATOR
5V
ADP2114
3.3V @ 3A
1.8V @ 1A
ADM1186/ ADM6710/ ADM2914
QUAD SEQUENCER QUAD SUPERVISOR QUAD UV AND OV
DUAL OUTPUT CONTROLLER
ADP1877
ADP1740/ ADP1741
2A LDO
1.2V @ 2A
1.8V @ 10A
5V @ 15A
–5V @ 25mA
ADM8828
CHARGE PUMP INVERTER
ADM1070/ ADM1073
–48V HOT SWAP
iCoupler
SEQUENCE AND CONTROL
INTEGRATED SWITCHER
ADP2301
3.3V @ 1.2A
ADP130
300mA LDO
0.8V @ 300mA
SINGLE OUTPUT CONTROLLER
ADP1828
ADM1191
POWER MONITOR
5V @ 20A
INTEGRATED SWITCHER
ADP2108
3.3V @ 500mA
ADM6316
WATCHDOG TIMER
ADM1062 TO ADM1069 SEQUENCER, MONITORING, MARGIN
INTEGRATED BOOST
ADP1612/ ADP1613
20V @ 1.2A
ADM708
RESET GENERATOR
ADCMP361
COMPARATOR AND REFERENCE
ADP121
LDO
2.5V @ 150mA
ADM13307
TRIPLE RESET GENERATOR
ADP220/ ADP221
DUAL LDO
1.2V @ 200mA
1V @ 200mA
ADP5022
DUAL BUCK + LDO
3.3V @ 600mA
1.8V @ 600mA
3.3V @ 150mA
COLOR KEY
AC-TO-DC AND DC-TO-DC POWER CONTROLLERS AND MOSFET DRIVERS
iCoupler AND isoPower ISOLATORS
SWITCHING CONTROLLERS
INTEGRATED SWITCHING REGULATORS
LINEAR REGULATORS
HOT SWAP CONTROLLERS/POWER MONITORS
SUPERVISORY AND SEQUENCING
POWER MANAGEMENT UNIT

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