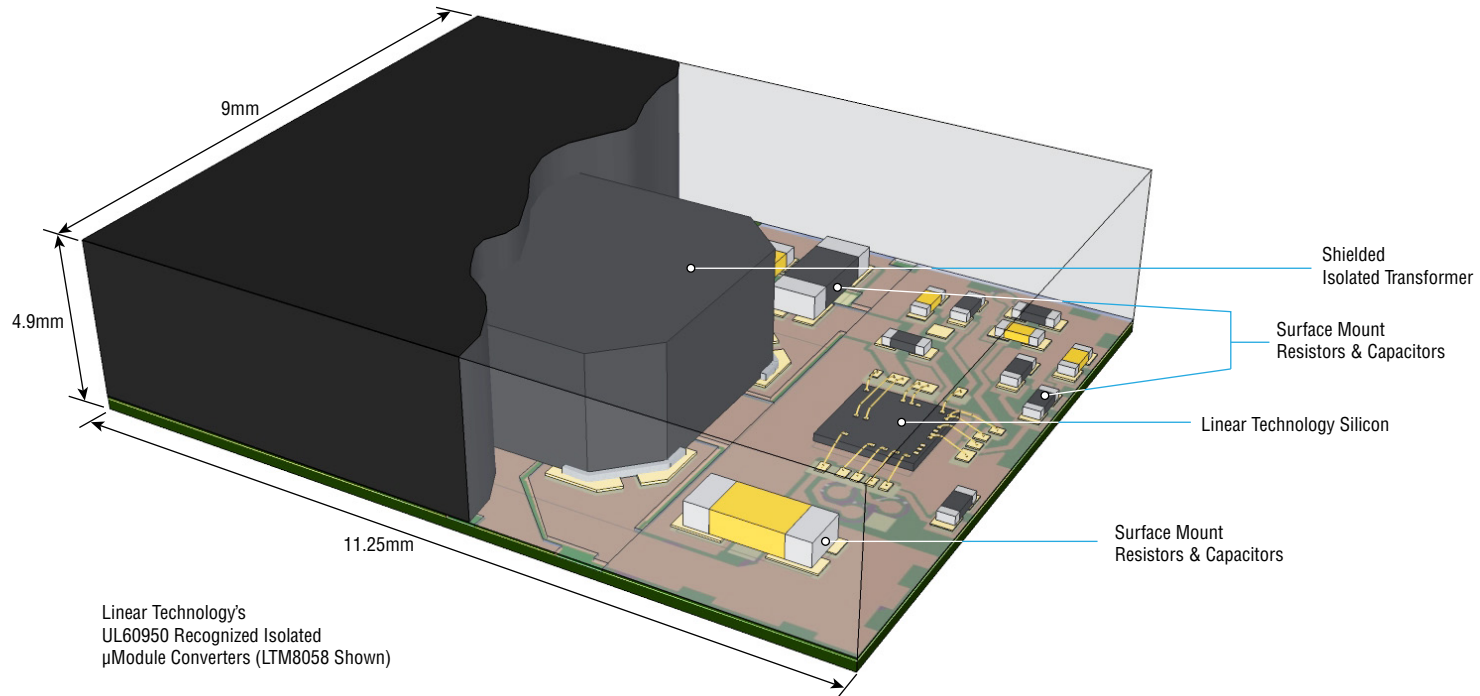


# μModule Power Products

Simplify Power



μModule® Power Products Simplify Implementation, Verification and Manufacturing of Power Circuits by Integrating Power Functions in a Compact Package.



Digital Power System Management (Page 21)



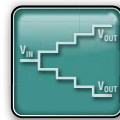
Inverting (Page 7)



LED Driver (Page 10)



Step-Down (Pages 8 & 9)



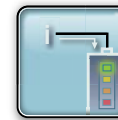
Step-Up & Down (Page 11)



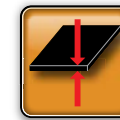
EN55022 Class B Certified (Page 11)



Isolated (Page 11)



Battery Charger (Page 11)



Ultrathin (Page 25)

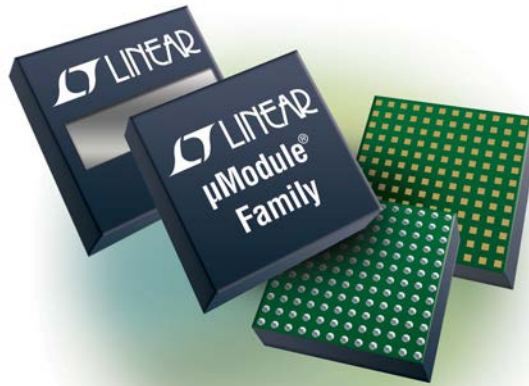


Tune-a-μModule Regulator (Page 22)



NOW PART OF





15 Product Families

100 μModule Power Products

30 Package Options

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# Latest $\mu$ Module Families

## Digital Power System Management

READ status from and WRITE settings to these  $\mu$ Module regulators via a serial bus. (Page 21)

## High Power, Precision Current Sharing

Parallel several  $\mu$ Module regulators to deliver high power to a load with uniform distribution of load current. (Pages 18 & 19)

## 1.82mm Ultrathin Packages

Place this family of  $\mu$ Module regulators on the backside of the PCB or next to an FPGA or ASIC sharing the same heat sink or cold plate. (Page 25)

## Ultralow Noise

This family of  $\mu$ Module regulators have onboard filters and are EN55022 class B certified. (Page 11)

## Tune-a- $\mu$ Module Regulator

Gain access to internal compensation of a  $\mu$ Module regulator and tune loop response to obtain best output voltage accuracy, fast transient response and minimum output capacitance for powering FPGAs, ASICs and microprocessors. (Page 22)

## Buck-Boost

New product additions to this  $\mu$ Module regulator family have integrated magnetics and operate from higher input voltage. (Page 11)

## Multiple Output

5, 4, 3, or 2 output  $\mu$ Module regulators allow current sharing of outputs to increase load current and ON/OFF or sequencing of each output. (Page 10)

## Isolated

With integrated transformer this  $\mu$ Module regulator family provides electrical isolation between input and output. (Page 11)

## µModule Packages



Package Height	Package Type	Part Number Example	Feature
5.01mm	BGA	LTM4630, LTM4630A, LTM4630-1	Dual 18A
		LTM4676, LTM4676A	Dual 13A, Power System Management
4.41mm	LGA	LTM4630, LTM4630A, LTM4630-1	Dual 18A
		LTM4676, LTM4676A	Dual 13A, Power System Management



4.92mm	BGA	LTM4627	20A
		LTM8055, LTM8056	Step-Up & Down
3.42mm	BGA	LTM4601	12A
		LTM8001	Five Outputs
4.32mm	LGA	LTM4627	20A
		LTM8027	4A, 60V Input
2.82mm	LGA	LTM4601	12A
		LTM4607	Step-Up & Down



5.01mm	LGA	LTM4620, LTM4620A	Dual 13A
3.42mm	BGA	LTM4620, LTM4620A	Dual 13A



5.01mm	BGA	LTM4633	Triple 10A
		LTM4634	Triple 5A x 2, 4A, High Voltage



4.92mm	BGA	LTM4637	20A
4.32mm	LGA	LTM4637	20A



Package Height	Package Type	Part Number Example	Feature
4.92mm	BGA	LTM8033	3A, Ultralow Noise
3.42mm	BGA	LTM8054	Step-Up & Down
4.32mm	LGA	LTM8033	3A, Ultralow Noise
2.82mm	LGA	LTM8052	Constant Voltage, Constant Current



5.01mm	BGA	LTM4644	Quad 4A
4.92mm	BGA	LTM4649	10A
		LTM8025	3A, 36V <sub>IN</sub>
4.32mm	LGA	LTM4618	Dual 8A
		LTM8025	3A, 36V <sub>IN</sub>
3.42mm	BGA	LTM4608	Low V <sub>IN</sub> , 8A
		LTM8032	2A, Ultralow Noise
2.82mm	LGA	LTM8023	2A, 36V <sub>IN</sub>
		LTM4608	Dual 8A



4.92mm	BGA	LTM8057	Isolated
		LTM8058	Isolated
3.42mm	BGA	LTM8023	2A, 36V <sub>IN</sub>
2.82mm	LGA	LTM8023	2A, 36V <sub>IN</sub>








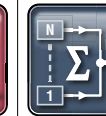








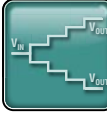

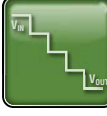

4.92mm	BGA	LTM8045	Inverting or SEPIC
3.42mm	BGA	LTM8029	Single 600mA, 36V <sub>IN</sub>
2.82mm	LGA	LTM8021	Single 500mA, 36V <sub>IN</sub>



5.01mm	BGA	LTM4625	5A
1.82mm	LGA	LTM4622	Dual 2.5A, Ultrathin
		LTM4623	3A, Ultrathin



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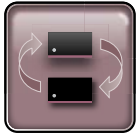
## Selector Guide

		Feature												
		 Low Output Voltage Ripple	 Inverting	 EN55022 Class B	 Current Limit	 Synchronizable	 Parallelable	 Multiple Output	 Wide Temperature	 Precision Remote Sense	 Output Sequencing	 Voltage Margining	 Package	 Pin Compatible
<b>Function</b>	 Isolated Page 11	Page 25	Page 7	-	-	-	-	Page 11	Page 12	-	-	-	Page 24	-
	 Step-Up & Down Page 11	Page 25	Page 7	-	-	Page 11	Page 11	-	Page 12	-	-	-	Page 24	Page 6
	 Battery Charger Page 11	-	-	-	Page 11	-	Page 11	-	-	-	-	-	-	-
	 Step-Down Pages 8 & 9	Page 11	Page 7	Page 11	Pages 8 & 9	Pages 8 & 9	Pages 8 & 9	Page 11	Page 12	Page 13	Pages 20 & 21	Pages 20 & 21	Page 24	Page 6
	 LED Driver Page 10	-	-	-	-	Page 10	-	-	-	-	-	-	-	-

### Find it Fast

Example: Multiple Output,  
Step-Down  $\mu$ Module  
Regulators = Page 11

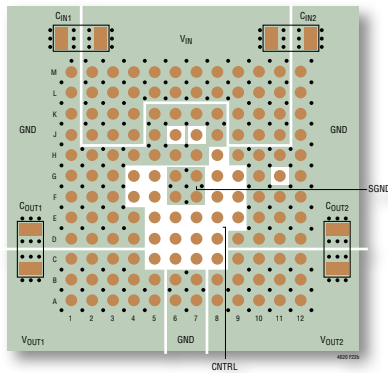
														
									Page 11					



Pin Compatible

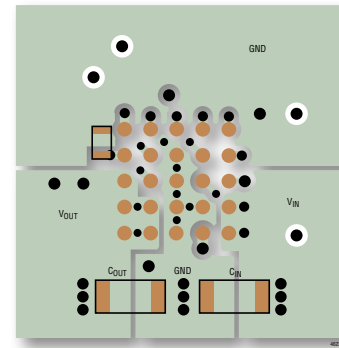
Function	Device 1	Device 2	Device 3	Details
Step-Down	LTM8022 (36V <sub>IN</sub> , 1A)	LTM8023 (36V <sub>IN</sub> , 2A)		See Page 8
	LTM4602 (20V <sub>IN</sub> , 6A)	LTM4600 (20V <sub>IN</sub> , 10A)		See Pages 8 & 9
	LTM4603 (20V <sub>IN</sub> , 6A)	LTM4601 (20V <sub>IN</sub> , 12A)		See Pages 8 & 9
	LTM4627 (20V <sub>IN</sub> , 15A)	LTM4637 (20V <sub>IN</sub> , 20A)		See Page 9
	LTM4623 (20V <sub>IN</sub> , 3A)	LTM4625 (20V <sub>IN</sub> , 5A)		See Page 8 <span style="float: right;">new</span>
	LTM8026 (36V <sub>IN</sub> , 5A, CVCC)	LTM8052 (36V <sub>IN</sub> , 5A, 2-Quadrant, CVCC)		See Page 8
Dual Step-Down	LTM4628 (5.5V <sub>OUT</sub> , 2x8A)	LTM4620, LTM4620A (2x13A)	LTM4630, LTM4630A, LTM4630-1 (2x18A)	See Pages 8 & 9
Low EMI Step-Down	LTM8031 (36V <sub>IN</sub> , 1A)	LTM8032 (36V <sub>IN</sub> , 2A)		See Page 11
	LTM4606 (28V <sub>IN</sub> , 6A)	LTM4612 (36V <sub>IN</sub> , 5A)		See Page 11
Step-Up & Down	LTM4605 (16V <sub>OUT</sub> , 5A)	LTM4607 (24V <sub>OUT</sub> , 5A)	LTM4609 (34V <sub>OUT</sub> , 4A)	See Page 11
	LTM8055 (36V <sub>IN</sub> , 36V <sub>OUT</sub> , 8.5A)	LTM8056 (58V <sub>IN</sub> , 48V <sub>OUT</sub> , 5.4A)		See Page 11 <span style="float: right;">new</span>

### Same PCB Layout for Multiple μModule Regulators (Examples)



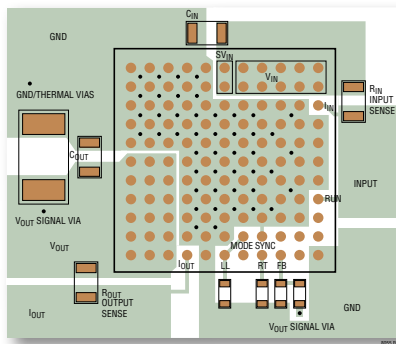
#### High Power Step-Down

- LTM4628 (Dual 8A)
- LTM4620 (Dual 13A, V<sub>OUT</sub> < 2.5V)
- LTM4620A (Dual 13A, V<sub>OUT</sub> < 5.5V)
- LTM4630 (Dual 18A, V<sub>OUT</sub> < 1.8V)
- LTM4630A (Dual 18A, V<sub>OUT</sub> < 5.3V)
- LTM4630-1 (Dual 18A, V<sub>OUT</sub> < 1.8V, External Compensation)



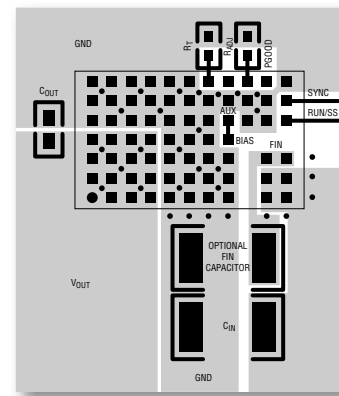
#### Tiny 6.25 x 6.25mm Package Step-Down

- LTM4623 (20V<sub>IN</sub>, 3A, Ultrathin)
- LTM4625 (20V<sub>IN</sub>, 5A)



#### Step-Up & Down

- LTM8055 (36V<sub>IN</sub>, 36V<sub>OUT</sub>, 8.5A, Step-Up & Down)
- LTM8056 (58V<sub>IN</sub>, 48V<sub>OUT</sub>, 5.4A Step-Up & Down)



#### Low EMI Step-Down

- LTM8031 (36V<sub>IN</sub>, 1A)
- LTM8032 (36V<sub>IN</sub>, 2A)



Inverting

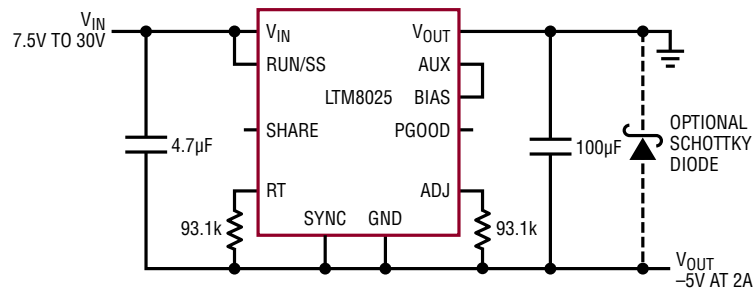
Isolated and SEPIC Inverting										
Topology	Input Voltage (V)		Output Voltage (V)		Total Output Capability	Clock Sync Range (MHz)	UL60950 Recognized	Package Dimensions (mm)	Package	Part Number
	Min	Max	Min	Max						
SEPIC or Inverting	2.8	18	-2.5	-15	Up to 0.7A	0.2 to 2.0	No	6.25 × 11.25 × 4.92	BGA	LTM8045
725V DC Isolated Flyback	3.1	32	-2.5	-12	1.5W	-	No	9 × 11.25 × 4.92	BGA	LTM8047
2kV Isolated Flyback	3.1	31	-2.5	-12	1.5W	-	Yes	9 × 11.25 × 4.92	BGA	LTM8057
	3.1	31	-1.8	-12	2.5W	-	Yes	9 × 15 × 4.92	BGA	LTM8046
Step-Down Based Inverting										
Step-Down	4	36	-1.25	-5	Up to 200mA	-	-	6.25 × 6.25 × 2.32	LGA	LTM8020
	3	36	-0.8	-5	Up to 500mA	-	-	11.25 × 6.25 × 2.82	LGA	LTM8021
	4.5	36	-1.2	-18	Up to 600mA	-	-	11.25 × 6.25 × 3.42	BGA	LTM8029
	3.6	36	-0.8	-10	Up to 1A	0.25 to 2	-	11.25 × 9 × 2.82	LGA	LTM8022
	3.6	36	-0.8	-10	Up to 2A	0.25 to 2	-	11.25 × 9 × 2.82 11.25 × 9 × 3.42	LGA BGA	LTM8023
	3.6	36	-0.8	-24	Up to 3A	0.25 to 2	-	9 × 15 × 4.32 9 × 11.25 × 4.92	LGA BGA	LTM8025
	4.5	60	-2.5	-24	up to 4A	0.1 to 0.5	-	15 × 15 × 4.32 15 × 15 × 4.92	LGA BGA	LTM8027
	6	36	-1.2	-24	Up to 5A	0.1 to 1	-	11.25 × 15 × 2.82	LGA	LTM8026

new

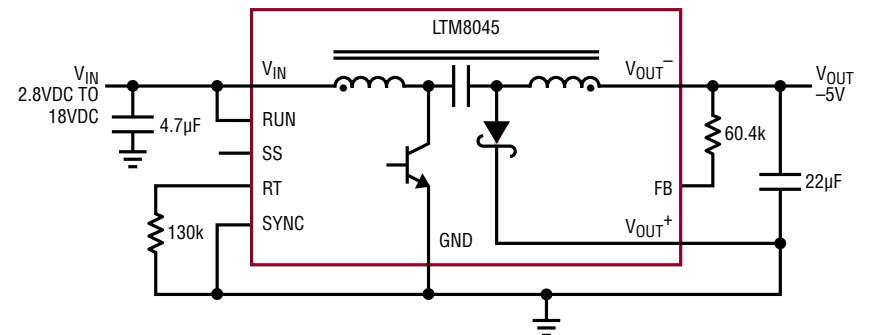
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Note: The parts above represent the simplest  $\mu$ Module power product solutions for inverting regulators. While all  $\mu$ Module step-down regulators can be reconfigured as inverters on the PCB, they are subject to three extra design steps described in Design Note DN1021.

Invert with a Buck Converter



Invert with an Isolated Converter



↓SORT



Step-Down

Output Channels	Input Voltage (V)		Output Voltage (V)		Output Current (A)	Sync Range (MHz)	Paralleleable Outputs (Total I <sub>OUT</sub> )	Adjustable Current Limit	Package Dimensions (mm)	Package	Part Number
	Min	Max	Min	Max							
1	4	36	1.2	5	0.2	-	-	-	6.25 × 6.25 × 2.32	LGA	LTM8020
1	3	36	0.8	5	0.5	-	-	-	6.25 × 11.25 × 2.82	LGA	LTM8021
1	4.5	36	1.2	18	0.6	-	-	-	6.25 × 11.25 × 3.42	BGA	LTM8029
1	3.6	36	0.8	10	1	0.25 to 2.0	×2 (1A)	-	9 × 11.25 × 2.82	LGA	LTM8022
1	3.6	36	0.8	10	1	0.25 to 2.0	×2 (1A)	-	9 × 15 × 2.82	LGA	LTM8031
5	6	36	0	24	Five 1	0.2 to 1.0	×10 (10A)	√	15 × 15 × 3.42	BGA	LTM8001
1	3.6	36	0.8	10	2	0.25 to 2.0	×2 (4A)	-	9 × 11.25 × 2.82 9 × 11.25 × 3.42	LGA BGA	LTM8023
1	3.6	36	0.8	10	2	0.25 to 2.0	×2 (4A)	-	9 × 15 × 2.82 9 × 15 × 3.42	LGA BGA	LTM8032
1	3.6	58	0.8	24	2	0.25 to 2.0	×2 (4A)	-	9 × 15 × 4.92	BGA	LTM8050
2	3.6*	20	0.6	5.5	Dual 2.5	0.56 to 4	×8 (20A)	-	6.25 × 6.25 × 1.82	LGA	LTM4622
1	3.6	36	0.8	24	3	0.25 to 2.0	×2 (6A)	-	9 × 15 × 4.32 9 × 15 × 4.92	LGA BGA	LTM8025
1	3.6	36	0.8	24	3	0.25 to 2.0	×2 (6A)	-	11.25 × 15 × 4.32 11.25 × 15 × 4.92	LGA BGA	LTM8033
1	4*	20	0.6	5.5	3	0.56 to 4	×12 (36A)	-	6.25 × 6.25 × 1.82	LGA	LTM4623
1	2.375	5.5	0.8	5	4	-	×2 (8A)	-	9 × 15 × 2.32 9 × 15 × 3.42	LGA BGA	LTM4604A
2	2.375	5.5	0.8	5	Dual 4	-	×2 (8A)	-	15 × 15 × 2.82	LGA	LTM4614
3	2.375	5.5	0.8	5	4, 4, 1.5	-	×2 (8A)	-	15 × 15 × 2.82	LGA	LTM4615
1	4*	14	0.6	5.5	4	-	-	-	6.25 × 6.25 × 5.01	BGA	LTM4624
2	4.5	26.5	0.8	5	Dual 4	0.25 to 0.78	×2 (8A)	-	15 × 15 × 2.82	LGA	LTM4619
1	4.5	60	2.5	24	4	0.1 to 0.5	-	-	15 × 15 × 4.32 15 × 15 × 4.92	LGA BGA	LTM8027
4	4*	14	0.6	5.5	Quad 4	0.7 to 1.3	×4 (16A)	-	9 × 15 × 5.01	BGA	LTM4644
1	6	36	0.8	1.8	5	0.2 to 1.0	×2 (10A)	√	15 × 15 × 4.92	BGA	LTM8028
1	6	36	1.2	24	5	0.1 to 1.0	×2 (10A)	√	11.25 × 15 × 2.82	LGA	LTM8026
1	5	36	3.3	15	5	0.2 to 1.3	×2 (10A)	-	15 × 15 × 2.82	LGA	LTM4612
1	4*	20	0.6	5.5	5	0.56 to 4	×12 (60A)	-	6.25 × 6.25 × 5.01	BGA	LTM4625
1	6	36	1.2	24	±5	0.1 to 1.0	-	√	11.25 × 15 × 2.82	LGA	LTM8052
1	6	36	1.2	24	±5	0.1 to 1.0	-	√	11.25 × 15 × 2.82	LGA	LTM8052A
3	4.75	28	0.8	5.5, 13.5	5, 5, 4	0.25 to 0.75	×2 (10A)	-	15 × 15 × 5.01	BGA	LTM4634
1	4.5	20	0.6	5	6	-	-	-	15 × 15 × 2.82	LGA	LTM4602
1	4.5	20	0.6	5	6	0.7 to 1.3	×4 (24A)	-	15 × 15 × 2.82	LGA	LTM4603
1	4.5	26.5	0.8	5	6	0.4 to 0.78	×2 (12A)	-	9 × 15 × 4.32	LGA	LTM4618
1	4.5	28	0.6	5	6	-	-	-	15 × 15 × 2.82	LGA	LTM4602HV
1	4.5	28	0.6	5	6	0.7 to 1.3	×4 (24A)	-	15 × 15 × 2.82	LGA	LTM4603HV
1	4.5	28	0.6	5	6	0.63 to 1.0	×2 (12A)	-	15 × 15 × 2.82 15 × 15 × 3.42	LGA BGA	LTM4606
1	2.7	5.5	0.6	5	8	0.75 to 2.25	×4 (32A)	-	9 × 15 × 2.82	LGA	LTM4608A
2	2.7	5.5	0.6	5	Dual 8	0.75 to 2.25	×4 (32A)	-	15 × 15 × 2.82 15 × 15 × 3.42	LGA BGA	LTM4616
2	4.5	26.5	0.6	5.5	Dual 8	0.4 to 0.78	×4 (32A)	-	15 × 15 × 4.32 15 × 15 × 4.92	LGA BGA	LTM4628
1	5	36	3.3	15	8	0.2 to 1.3	×2 (16A)	-	15 × 15 × 4.32	LGA	LTM4613
2	4.5	17	0.5	5.5	Dual 9	0.25 to 1	×8 (72A)	√	16 × 11.9 × 3.51	BGA	LTM4675

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↓SORT



Step-Down  
(Continued)

Output Channels	Input Voltage (V)		Output Voltage (V)		Output Current (A)	Sync Range (MHz)	Parallelable Outputs (Total I <sub>OUT</sub> )	Adjustable Current Limit	Package Dimensions (mm)	Package	Part Number
	Min	Max	Min	Max							
1	4.5	16	0.6	3.3	10	0.3 to 0.8	×3 (30A)	–	9 × 15 × 4.92	BGA	LTM4649
1	4.5	20	0.6	5	10	–	–	–	15 × 15 × 2.82	LGA	LTM4600
1	4.5	28	0.6	5	10	–	–	–	15 × 15 × 2.82	LGA	LTM4600HV
1	4.5	36	0.8	34	10	0.2 to 0.4	×4 (40A)	–	15 × 15 × 2.82 15 × 15 × 3.42	LGA BGA	LTM4609
1	4.5	36	0.8	24	10	0.2 to 0.4	×4 (40A)	–	15 × 15 × 2.82	LGA	LTM4607
1	4	38	0.6	6	10	0.175 to 0.66	×4 (40A)	–	15 × 15 × 5.01	BGA	LTM4641
3	4.7*	16	0.8	1.8, 5.5	Triple 10	0.6 to 0.75	×2 (20A)	–	15 × 15 × 5.01	BGA	LTM4633
1	4.5	20	0.8	16	12	0.2 to 0.4	×4 (48A)	–	15 × 15 × 2.82	LGA	LTM4605
1	4.5	20	0.6	5	12	0.6 to 1.1	×4 (48A)	–	15 × 15 × 2.82 15 × 15 × 3.42	LGA BGA	LTM4601†
1	4.5	20	0.6	5	12	0.6 to 1.1	×4 (48A)	–	15 × 15 × 2.82 15 × 15 × 3.42	LGA BGA	LTM4601-1†
1	4.5	20	0.6	5	12	0.6 to 1.1	×4 (48A)	–	15 × 15 × 2.82 15 × 15 × 3.42	LGA BGA	LTM4601A†‡
1	4.5	20	0.6	5	12	0.6 to 1.1	×4 (48A)	–	15 × 15 × 2.82 15 × 15 × 3.42	LGA BGA	LTM4601A-1†‡
1	4.5	28	0.6	5	12	0.6 to 1.1	×4 (48A)	–	15 × 15 × 2.82 15 × 15 × 3.42	LGA BGA	LTM4601AHV†‡
1	4.5	28	0.6	5	12	0.6 to 1.1	×4 (48A)	–	15 × 15 × 2.82 15 × 15 × 3.42	LGA BGA	LTM4601HV†
2	4.5	16	0.6	2.5	Dual 13	0.4 to 0.78	×8 (100A)	–	15 × 15 × 4.41 15 × 15 × 5.01	LGA BGA	LTM4620
2	4.5	16	0.6	5.3	Dual 13	0.4 to 0.78	×8 (100A)	–	15 × 15 × 4.41 15 × 15 × 5.01	LGA BGA	LTM4620A
2	4.5	26.5	0.5	5.4	Dual 13	0.25 to 1.0	×8 (100A)	√	16 × 16 × 5.01	BGA	LTM4676
2	4.5	17	0.5	5.5	Dual 13	0.25 to 1.0	×8 (100A)	√	16 × 16 × 5.01	BGA	LTM4676A
1	1.5	5.5	0.8	5	15	0.36 to 0.71	×4 (60A)	–	15 × 15 × 4.32	LGA	LTM4611
1	4.5	20	0.6	5	15	0.4 to 0.8	×4 (60A)	–	15 × 15 × 4.32 15 × 15 × 4.92	LGA BGA	LTM4627
2	4.5	15	0.6	1.8	Dual 18	0.4 to 0.78	×8 (144A)	–	16 × 16 × 4.41 16 × 16 × 5.01	LGA BGA	LTM4630
2	4.5	15	0.6	1.8	Dual 18	0.4 to 0.78	×8 (144A)	–	16 × 16 × 5.01	BGA	LTM4630-1
2	4.5	15	0.6	5.3	Dual 18	0.4 to 0.78	×8 (144A)	–	16 × 16 × 4.41	LGA	LTM4630A
2	4.5	16	0.5	1.8	Dual 18	0.25 to 1	×8 (144A)	√	16 × 16 × 5.01	BGA	LTM4677
1	4.5	20	0.6	5.5	20	0.25 to 0.8	×4 (80A)	–	15 × 15 × 4.32 15 × 15 × 4.92	LGA BGA	LTM4637
1	2.375	7	0.6	5.5	20	0.25 to 0.8	×4 (80A)	–	15 × 15 × 4.92	BGA	LTM4639

\*Can be reduced with external bias supply

† LTM4601, LTM4601A, LTM4601HV and LTM4601AHV offer precision remote sense. Devices ending with –1 do not.

‡ LTM4601A, LTM4601A-1 and LTM4601AHV have redundant pads for enhanced solder joint strength to the PCB.

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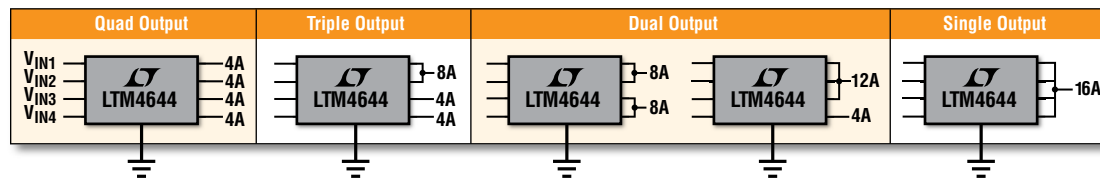


Multiple Output

Function	Output Channels	Input Voltage (V)		Output Voltage (V)		Output Capability (per Channel)	Sync Range (MHz)	Parallelable Outputs (Total I <sub>OUT</sub> )	Package Dimensions (mm)	Package	Part Number	
		Min	Max	Min	Max							
Step-Down	2	3.6*	20	0.5	5.5	Dual 2.5A	0.56 to 4	x8 (20A)	6.25 × 6.25 × 1.82	LGA	LTM4622	new
	2	2.375	5.5	0.8	5	Dual 4A	–	x2 (8A)	15 × 15 × 2.82	LGA	LTM4614	
	2	4.5	26.5	0.8	5	Dual 4A	0.25 to 0.78	x2 (8A)	15 × 15 × 2.82	LGA	LTM4619	
	2	2.7	5.5	0.6	5	Dual 8A	0.75 to 2.25	x4 (32A)	15 × 15 × 2.82 15 × 15 × 3.42	LGA BGA	LTM4616	
	2	4.5	26.5	0.6	5.5	Dual 8A	0.4 to 0.78	x4 (32A)	15 × 15 × 4.32 15 × 15 × 4.92	LGA BGA	LTM4628	
	2	4.5	17	0.5	5	Dual 9A	0.25 to 1.0	x8 (72A)	16 × 11.9 × 3.51	BGA	LTM4675	new
	2	4.5	16	0.6	2.5	Dual 13A	0.4 to 0.78	x8 (100A)	15 × 15 × 4.41 15 × 15 × 5.01	LGA BGA	LTM4620	
	2	4.5	16	0.6	5.3	Dual 13A	0.4 to 0.78	x8 (100A)	15 × 15 × 4.41 15 × 15 × 5.01	LGA BGA	LTM4620A	
	2	4.5	26.5	0.5	5.4	Dual 13A	0.25 to 1.0	x8 (100A)	16 × 16 × 5.01	BGA	LTM4676	new
	2	4.5	17	0.5	5.5	Dual 13A	0.25 to 1.0	x8 (100A)	16 × 16 × 5.01	BGA	LTM4676A	new
	2	4.5	15	0.6	1.8	Dual 18A	0.4 to 0.78	x8 (144A)	16 × 16 × 4.41 16 × 16 × 5.01	LGA BGA	LTM4630	
	2	4.5	15	0.6	1.8	Dual 18A	0.4 to 0.78	x8 (144A)	16 × 16 × 5.01	BGA	LTM4630-1	new
	2	4.5	15	0.6	5.3	Dual 18A	0.4 to 0.78	x8 (144A)	16 × 16 × 4.41	LGA	LTM4630A	new
	2	4.5	16	0.5	1.8	Dual 18A	0.25 to 1.0	x8 (100A)	16 × 16 × 5.01	BGA	LTM4677	new
Isolated Flyback	2	3.1	32	1.2	12	1.5W Combined	–	–	9 × 11.25 × 4.92	BGA	LTM8048	
	2	3.1	31	1.2	12	1.5W Combined	–	–	9 × 11.25 × 4.92	BGA	LTM8058	
Step-Down	3	2.375	5.5	0.8	5	Triple 4A, 4A, 1.5A	–	x2 (8A)	15 × 15 × 2.82	LGA	LTM4615	new
	3	4.75	28	0.8	5.5, 13.5	Triple 5A, 5A, 4A	0.25 to 0.75	x2 (10A)	15 × 15 × 5.01	BGA	LTM4634	new
	3	4.7*	16	0.8	1.8, 5.5	Triple 10A	0.6 to 0.75	x2 (20A)	15 × 15 × 5.01	BGA	LTM4633	new
	4	4*	14	0.6	5.5	Quad 4A	0.7 to 1.3	x4 (16A)	9 × 15 × 5.01	BGA	LTM4644	new
	5	6	36	0	24	Five 1A	0.2 to 1.0	x10 (10A)	15 × 15 × 3.42	BGA	LTM8001	

\*Can be reduced with external bias supply.

LTM4644's Outputs Are Configurable from Four 4A Outputs to a Single 16A



LED Driver

Input Voltage (V)		Output Voltage (V)		LED Drive Current (A)	Dimming	Clock Sync Range (MHz)	Open LED Protection	LGA Package Dimensions (mm)	Part Number
Min	Max	Min	Max						
3	30	2	32	1	Analog and PWM	0.3 to 2.5	Yes	9 × 15 × 2.82	LTM8042
3	30	2	32	0.35	Analog and PWM	0.3 to 2.5	Yes	9 × 15 × 2.82	LTM8042-1
4	36	2.5	13	1	Analog and PWM	–	Yes	9 × 15 × 4.32	LTM8040



EN55022 Class B

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Function	Input Voltage (V)		Output Voltage (V)		Output Current (A)	EN55022B Certified	Sync Range (MHz)	Package Dimensions (mm)	Package	Part Number
	Min	Max	Min	Max						
Step-Down	4	36	1.2	5	0.2	Certificates and PCB Gerber Files Available at <a href="http://www.linear.com/ClassB">www.linear.com/ClassB</a>	-	6.25 × 6.25 × 2.32	LGA	LTM8020
	3	36	0.8	5	0.5		-	6.25 × 11.25 × 2.82	LGA	LTM8021
	3.6	36	0.8	10	1		0.25 to 2.0	9 × 15 × 2.82	LGA	LTM8031
	3.6	36	0.8	10	2		0.25 to 2.0	9 × 15 × 2.82 9 × 15 × 3.42	LGA BGA	LTM8032
	3.6	36	0.8	24	3		0.25 to 2.0	11.25 × 15 × 4.32 11.25 × 15 × 4.92	LGA BGA	LTM8033
	4*	20	0.6	5.5	3		0.56 to 4	6.25 × 6.25 × 1.82	LGA	LTM4623
	4*	14	0.6	5.5	4		-	6.25 × 6.25 × 5.01	BGA	LTM4624
	5	36	3.3	15	5		0.18 to 1.3	15 × 15 × 2.82	LGA	LTM4612
	4.5	28	0.6	5	6		0.7 to 1.1	15 × 15 × 2.82 15 × 15 × 3.42	LGA BGA	LTM4606
	5	36	3.3	15	8		0.18 to 1.3	15 × 15 × 4.32	LGA	LTM4613

\*Can be reduced with external bias supply.



Isolated

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Isolation Voltage	Output Channels	Input Voltage (V)		Output Voltage (V)		Output Ripple	Output Power	UL Recognized	BGA Package Dimensions (mm)	Part Number
		Min	Max	Min	Max					
725VDC	1	3.1	32	2.5	12	35mV <sub>P-P</sub>	1.5W	-	9 × 11.25 × 4.92	LTM8047
	2	3.1	32	1.2	12	1mV <sub>P-P</sub>	1.5W Combined	-	9 × 11.25 × 4.92	LTM8048
2kVDC (3kVDC)	1	3.1	31	2.5	12	10mV <sub>P-P</sub>	1.5W	UL60950	9 × 11.25 × 4.92	LTM8057
	2	3.1	31	1.2	12	1mV <sub>P-P</sub>	1.5W Combined	UL60950	9 × 11.25 × 4.92	LTM8058
	1	3.1	31	1.8	12	50mV <sub>P-P</sub>	2.5W	UL60950	9 × 15 × 4.92	LTM8046



Battery Charger

Input Voltage (V)		Output Voltage (V)		Maximum Charge Current (A)	Supported Battery Chemistries	Adjustable Current Limit	MPPT*	Auto Recharge	Parallelable Output	Clock Sync Range (MHz)	LGA Package Dimensions (mm)	Part Number
Min	Max	Min	Max									
4.95	32	4.1	8.4	2	Li-Ion, Li-Polymer	√	-	√	-	-	9 × 15 × 4.32	LTM8061
4.95	32	3.3	14.4	2	Li-Ion, Li-Polymer, SLA, LiFePO4	-	√	√	×3 (6A)	-	9 × 15 × 4.32	LTM8062
4.95	32	3.3	18.8	2	Li-Ion, Li-Polymer, SLA, LiFePO4	-	√	√	×3 (6A)	-	9 × 15 × 4.32	LTM8062A

\*Maximum peak power tracking for use in solar powered applications.

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Step-Up & Down

Input Voltage (V)		Output Voltage (V)		Output Current (A)	Clock Sync Range (MHz)	Extended Temp Range	Parallelable Output (Total I <sub>OUT</sub> )	Inductor	Package Dimensions (mm)	Package	Part Number
Min	Max	Min	Max								
2.8	18	±2.5	±15	Up to 0.7†	0.2 to 2.0	-55°C to 125°C	-	Internal	6.25 × 11.25 × 4.92	BGA	LTM8045
5	36	1.2	36	5.4†	0.2 to 0.7	-55 to 125°C	×2 (10.8)	Internal	11.25 × 15 × 3.42	BGA	LTM8054
5	58	1.2	48	5.4†	0.2 to 0.7	-55 to 125°C	×2 (10.8A)	Internal	15 × 15 × 4.92	BGA	LTM8056
5	36	1.2	36	8.5†	0.2 to 0.7	-55 to 125°C	×2 (17A)	Internal	15 × 15 × 4.92	BGA	LTM8055
4.5	36	0.8	24	10†	0.2 to 0.4	-	×4 (20A)††	External	15 × 15 × 2.82	LGA	LTM4607
5	36	0.8	34	10†	0.2 to 0.4	-55°C to 125°C	×4 (16A)††	External	15 × 15 × 2.82 15 × 15 × 3.42	LGA BGA	LTM4609
4.5	20	0.8	16	12†	0.2 to 0.4	-	×4 (20A)††	External	15 × 15 × 2.82	LGA	LTM4605

†Output current varies depending on operation mode.

††Step-up mode

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Wide Temperature

Function	Output Channels	Input Voltage (V)		Output Voltage (V)		Output Capability (per Channel)	Sync Range (MHz)	EN55022B Certified	Package Dimensions (mm)	Package	Part Number
		Min	Max	Min	Max						
725V Isolated Flyback	1	3.1	32	2.5	12	1.5W	-	-	9 × 11.25 × 4.92	BGA	LTM8047MP
	2	3.1	32	1.2	12	1.5W Combined	-	-	9 × 11.25 × 4.92	BGA	LTM8048MP
2kVAC (3kVDC) Isolated Flyback	1	3.1	31	2.5	12	1.5W	-	-	9 × 11.25 × 4.92	BGA	LTM8057MP
	2	3.1	31	1.2	12	1.5W Combined	-	-	9 × 11.25 × 4.92	BGA	LTM8058MP
	1	3.1	31	1.8	12	2.5W	-	-	9 × 15 × 4.92	BGA	LTM8046MP
Step-Up & Down	1	2.8	18	±2.5	±15	Up to 0.7A	0.2 to 2.0	-	6.25 × 11.25 × 4.92	BGA	LTM8045MP
	1	5	36	1.2	36	5.4A	0.2 to 0.7	-	11.25 × 15 × 3.42	BGA	LTM8054MP
	1	5	58	1.2	48	5.4A	0.2 to 0.7	-	15 × 15 × 4.92	BGA	LTM8056MP
	1	5	36	1.2	36	8.5A	0.2 to 0.7	-	15 × 15 × 4.92	BGA	LTM8055MP
	1	4.5	36	0.8	34	4A†	0.2 to 0.4	-	15 × 15 × 2.82 15 × 15 × 3.42	LGA BGA	LTM4609MP
Step-Down	1	4	36	1.2	5	0.2A	-	√	6.25 × 6.25 × 2.32	LGA	LTM8020MP
		4.5	36	1.2	18	0.6A	-	-	6.25 × 11.25 × 3.42	BGA	LTM8029MP
		3.6	36	0.8	10	1A	0.25 to 2.0	-	9 × 11.25 × 2.82	LGA	LTM8022MP
		3.6	36	0.8	10	1A	0.25 to 2.0	√	9 × 15 × 2.82	LGA	LTM8031MP
		3.6	36	0.8	10	2A	0.25 to 2.0	-	9 × 11.25 × 2.82 9 × 11.25 × 3.42	LGA BGA	LTM8023MP
		3.6	36	0.8	10	2A	0.25 to 2.0	√	9 × 15 × 2.82 9 × 15 × 3.42	LGA BGA	LTM8032MP
		3.6	58	0.8	24	2A	0.25 to 2.0	-	9 × 15 × 4.92	BGA	LTM8050MP
		3.6	36	0.8	24	3A	0.25 to 2.0	-	9 × 15 × 4.32 9 × 15 × 4.92	LGA BGA	LTM8025MP
		3.6	36	0.8	24	3A	0.25 to 2.0	√	11.25 × 15 × 4.32 11.25 × 15 × 4.92	LGA BGA	LTM8033MP
		4.5	60	2.5	24	4A	0.12 to 0.5	-	15 × 15 × 4.32 11.25 × 15 × 4.92	LGA BGA	LTM8027MP
		6	36	1.2	24	5A	0.1 to 1.0	-	11.25 × 15 × 2.82	LGA	LTM8026MP
		6	36	0.8	1.8	5A	0.2 to 1.0	-	15 × 15 × 4.92	BGA	LTM8028MP
		5	36	3.3	15	5A	0.2 to 1.3	√	15 × 15 × 2.82	LGA	LTM4612MP
		6	36	1.2	24	±5A	0.1 to 1.0	-	11.25 × 15 × 2.82	LGA	LTM8052MP
		6	36	1.2	24	±5A	0.1 to 1.0	-	11.25 × 15 × 2.82	LGA	LTM8052AMP
		4.5	28	0.6	5	6A	0.63 to 1.0	√	15 × 15 × 2.82 15 × 15 × 3.42	LGA BGA	LTM4606MP
		2.7	5.5	0.6	5	8A	0.75 to 2.25	-	9 × 15 × 2.82	LGA	LTM4608AMP
		5	36	3.3	15	8A	0.2 to 1.3	√	15 × 15 × 4.32	LGA	LTM4613MP
		4.5	28	0.6	5	10A	-	-	15 × 15 × 2.82	LGA	LTM4600HVMP
		4	38	0.6	6	10A	0.175 to 0.66	-	15 × 15 × 5.01	BGA	LTM4641MP
		4.5	28	0.6	5	12A	0.6 to 1.1	-	15 × 15 × 2.82 15 × 15 × 3.42	LGA BGA	LTM4601AHVMP
		4.5	20	0.6	5	15A	0.4 to 0.8	-	15 × 15 × 4.32 15 × 15 × 4.92	LGA BGA	LTM4627MP
		2	2.7	5.5	0.6	5	8A	0.75 to 2.25	-	15 × 15 × 2.82 15 × 15 × 3.42	LGA BGA
3	4.7*	16	0.8	1.8, 5.5	10A	0.6 to 0.75	-	15 × 15 × 5.01	BGA	LTM4633MP	
6	6	36	0	24	1A	0.2 to 1.0	-	15 × 15 × 3.42	BGA	LTM8001MP	

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\*Can be reduced with external bias supply.

†In step-up mode. Output current in step-down mode is approximately 2x greater for the LTM4609.

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Precision Remote Sense

Function	Output Channels	Input Voltage (V)		Output Voltage (V)		Output Current per Channel (A)	V <sub>OUT</sub> Accuracy	Sync Range (MHz)	Package Dimensions (mm)	Package	Part Number
		Min	Max	Min	Max <sup>1</sup>						
Step-Down	1	4.5	20	0.6	3.3	6	±1.5%	0.7 to 1.3	15 × 15 × 2.82	LGA	LTM4603
	1	4.5	28	0.6	3.3	6	±1.5%	0.7 to 1.3	15 × 15 × 2.82	LGA	LTM4603HV
	2	4.5	26.5	0.6	3.3	8	±1.5%	0.4 to 0.78	15 × 15 × 4.32 15 × 15 × 4.92	LGA BGA	LTM4628
	2	4.5	17	0.5	5.5	9	±0.5%	0.25 to 1.0	16 × 11.9 × 3.51	BGA	LTM4675
	1	4.5	16	0.6	3.3	10	±1.5%	0.3 to 0.8	9 × 15 × 4.92	BGA	LTM4649
	1	4.5	38	0.6	6	10	±1.5%	–	15 × 15 × 5.01	BGA	LTM4641
	1	4.5	20	0.6	3.3	12	±1.5%	0.6 to 1.1	15 × 15 × 2.82 15 × 15 × 3.42	LGA BGA	LTM4601
	1	4.5	20	0.6	3.3	12	±1.5%	0.6 to 1.1	15 × 15 × 2.82 15 × 15 × 3.42	LGA BGA	LTM4601A‡
	1	4.5	28	0.6	3.3	12	±1.5%	0.6 to 1.1	15 × 15 × 2.82 15 × 15 × 3.42	LGA BGA	LTM4601AHV‡
	1	4.5	28	0.6	3.3	12	±1.5%	0.6 to 1.1	15 × 15 × 2.82 15 × 15 × 3.42	LGA BGA	LTM4601HV
	2	4.5	16	0.6	2.5	Dual 13	±1.5%	0.4 to 0.78	15 × 15 × 4.41 15 × 15 × 5.01	LGA BGA	LTM4620
	2	4.5	16	0.6	3.3	Dual 13	±1.5%	0.4 to 0.78	15 × 15 × 4.41 15 × 15 × 5.01	LGA BGA	LTM4620A
	2	4.5	26.5	0.5	5.4	Dual 13	±1.0%	0.25 to 1.0	16 × 16 × 5.01	BGA	LTM4676
	2	4.5	16	0.5	5.5	Dual 13	±0.5%	0.25 to 1.0	16 × 16 × 5.01	BGA	LTM4676A
	1	1.5	5.5	0.8	3.7	15	±2.0%	0.36 to 0.71	15 × 15 × 4.32	LGA	LTM4611
	1	4.5	20	0.6	3.3	15	±1.5%	0.4 to 0.8	15 × 15 × 4.32 15 × 15 × 4.92	LGA BGA	LTM4627
	2	4.5	15	0.6	1.8	Dual 18	±1.5%	0.4 to 0.78	16 × 16 × 4.41 16 × 16 × 5.01	LGA BGA	LTM4630
	2	4.5	15	0.6	5.3	Dual 18	±1.5%	0.4 to 0.78	16 × 16 × 4.41	LGA	LTM4630A
	2	4.5	15	0.6	1.8	Dual 18	±0.8%	0.4 to 0.78	16 × 16 × 5.01	BGA	LTM4630-1A
	2	4.5	15	0.6	1.8	Dual 18	±1.5%	0.4 to 0.78	16 × 16 × 4.41	LGA	LTM4630-1B
2	4.5	16	0.5	1.8	Dual 18	±0.5%	0.25 to 1	16 × 16 × 5.01	BGA	LTM4677	
1	4.5	20	0.6	3.3	20	±1.5%	0.25 to 0.8	15 × 15 × 4.32 15 × 15 × 4.92	LGA BGA	LTM4637	
1	4.5	2.375	7	0.6	5.5	20	±1.5%	0.25 to 0.8	15 × 15 × 4.92	BGA	LTM4639

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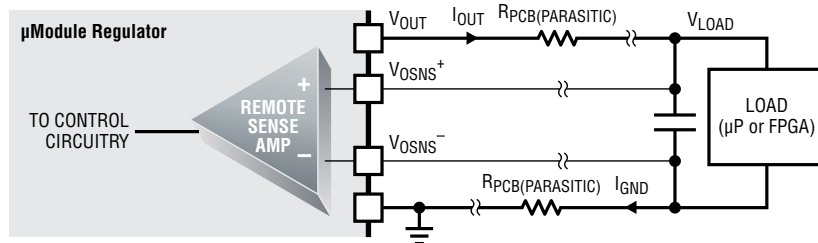
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<sup>1</sup> When internal remote sense amplifier is in use. See the Step-Down table on page 8 for maximum output voltage when the remote sense amplifier is not in use.

‡ LTM4601A and LTM4601AHV have redundant pads for enhanced solder joint strength to the PCB.

## PCB Voltage Drop Compensation for Voltage Regulation at the Load

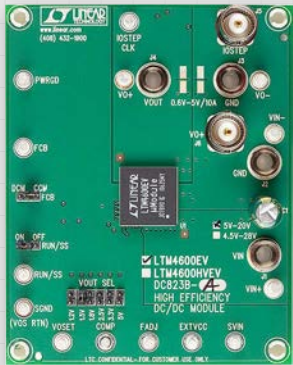
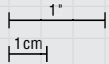
If PCB design limitations require the DC/DC converter to be placed away from a high current load, the  $\mu$ Module regulators listed above offer an onboard differential sense amplifier to correct for PCB IR drop voltage losses between  $V_{OUT}$  and  $V_{LOAD}$  as well as the ground return path. As a result, these devices guarantee voltage accuracy of  $\pm 2.0\%$  or better at the point of load, over line, load and temperature.



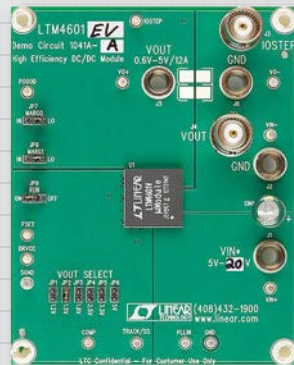
## Demonstration Circuits

All powermanagement  $\mu$ Module regulators are available with demonstration circuits and user manuals. Demonstration circuits can be ordered through the Linear Technology website or by contacting your Linear Technology sales representative. Design files are available at [www.linear.com/demo](http://www.linear.com/demo).

### Sorted by $\mu$ Module Part Numbers



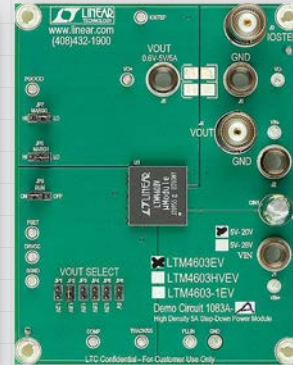
LTM4600 (DC823B-A)  
LTM4600HV (DC823B-B)



LTM4601 (DC1041A-A)  
LTM4601A (DC1414A)  
LTM4601AHV (DC1414B-B)  
LTM4601HV (DC1041A-B)



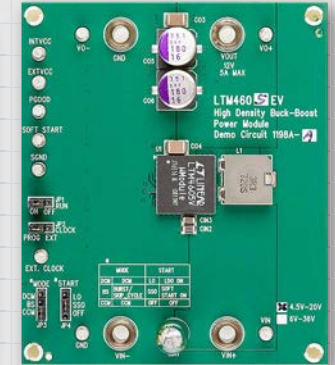
LTM4602 (DC1084A-A)  
LTM4602HV (DC1084A-B)



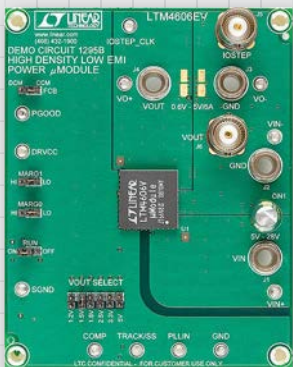
LTM4603 (DC1083A-A)  
LTM4603HV (DC1083A-B)



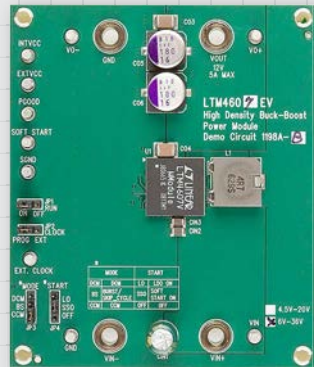
LTM4604A (DC1392A)



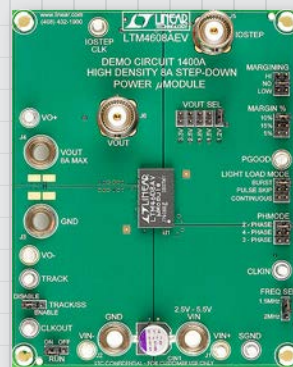
LTM4605 (DC1198A-A)



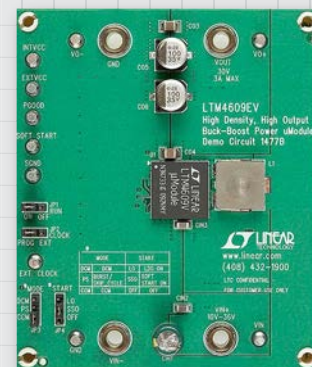
LTM4606 (DC1295B)



LTM4607 (DC1198A-B)



LTM4608A (DC1400A)

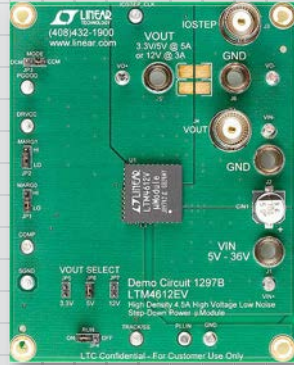


LTM4609 (DC1477B)

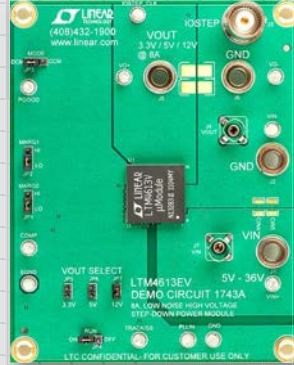
1"  
1cm



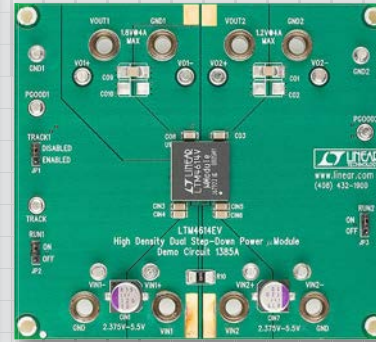
LTM4611 (DC1588A)



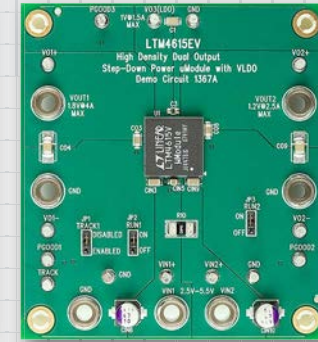
LTM4612 (DC1297B)



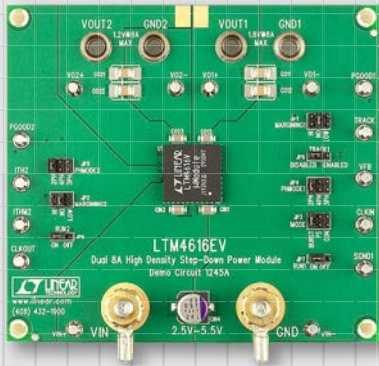
LTM4613 (DC1743A)



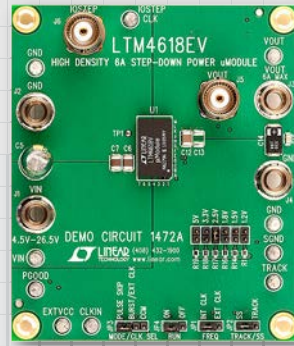
LTM4614 (DC1385A)



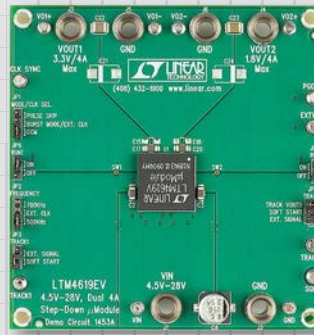
LTM4615 (DC1367A)



LTM4616 (DC1245A)



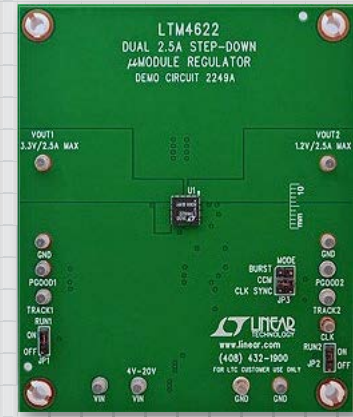
LTM4618 (DC1472A)



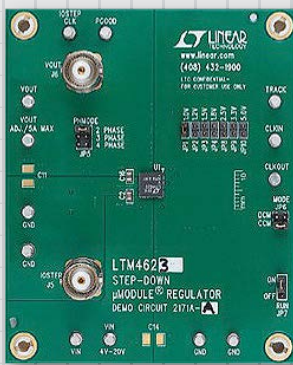
LTM4619 (DC1453A)



LTM4620 (DC1498A)  
LTM4620A (DC1759A)



LTM4622 (DC2249A)



LTM4623 (DC2171A-A)



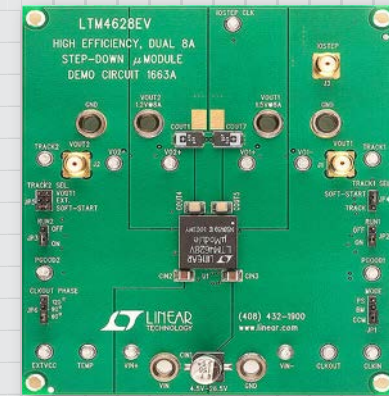
LTM4624 (DC1889A)



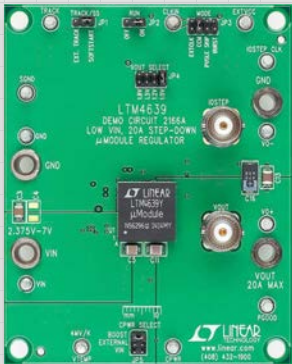
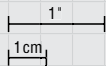
LTM4625 (DC2171A-B)



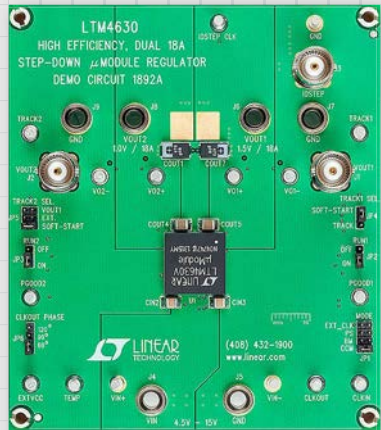
LTM4627 (DC1669A)



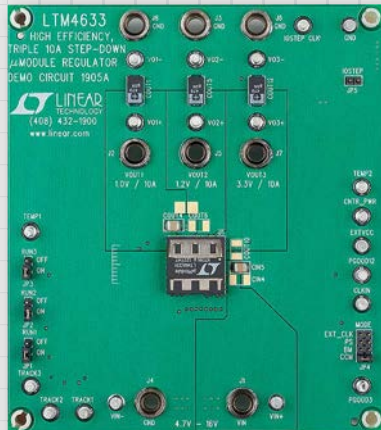
LTM4628 (DC1663A)



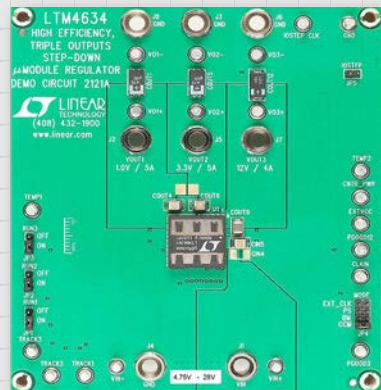
LTM4639 (DC2166A)



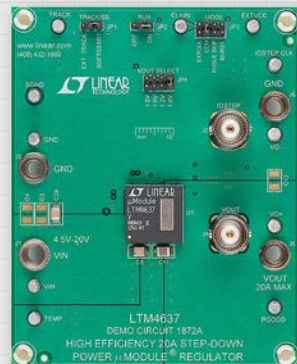
LTM4630 (DC1892A)



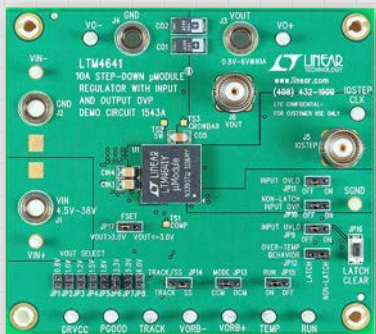
LTM4633 (DC1905A)



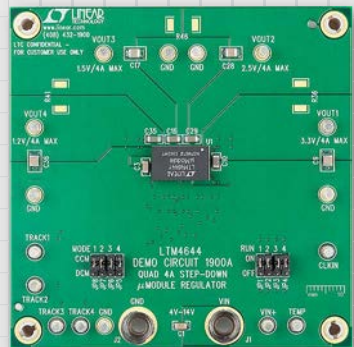
LTM4634 (DC2121A)



LTM4637 (DC1872A)



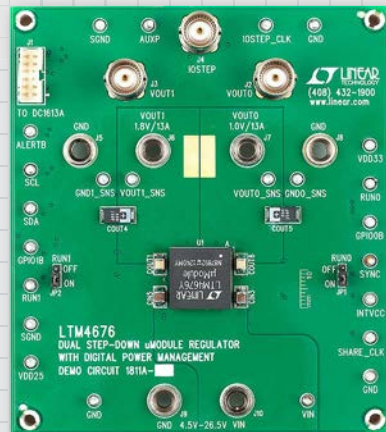
LTM4641 (DC1543A)



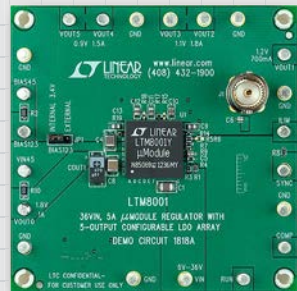
LTM4644 (DC1900A)



LTM4649 (DC1856A-B)



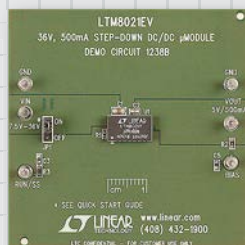
LTM4676 (DC1811A)



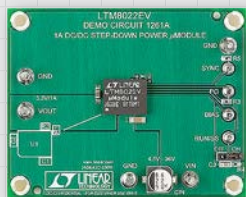
LTM8001 (DC1818A)



LTM8020 (DC1194A)



LTM8021 (DC1238B)



LTM8022 (DC1261A)



LTM8023 (DC1195A)



LTM8025 (DC1379B)



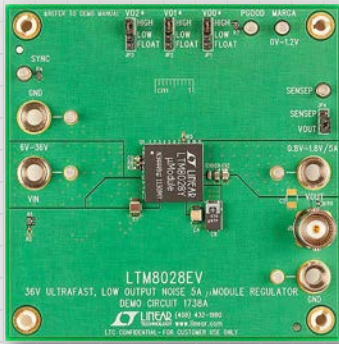
LTM8026 (DC1696A)



1"  
1cm



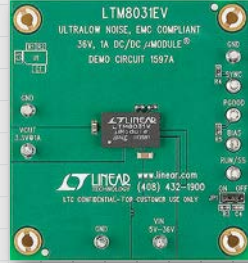
LTM8027 (DC1307B)



LTM8028 (DC1738A)



LTM8029 (DC1724A)



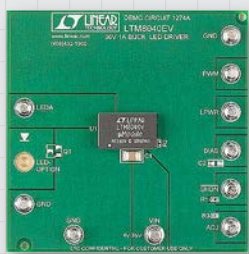
LTM8031 (DC1597A)



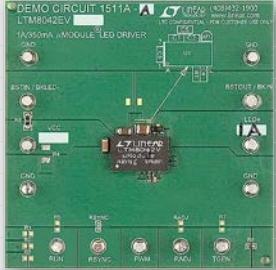
LTM8032 (DC1386B)



LTM8033 (DC1623A)



LTM8040 (DC1274A)



LTM8042 (DC1511A-A)  
LTM8042-1 (DC1511A-B)



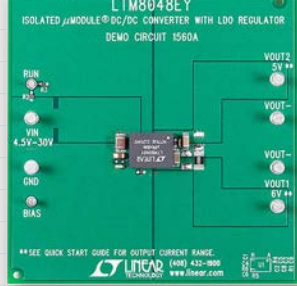
LTM8045 (DC1533A)



LTM8046 (DC1559A)



LTM8047 (DC1693A)



LTM8048 (DC1560A)



LTM8050 (DC1723A)



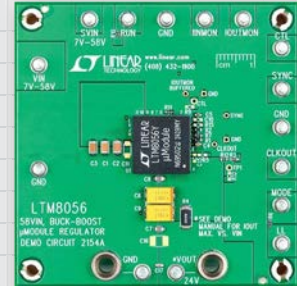
LTM8052 (DC1866A)



LTM8052A (DC1939A)



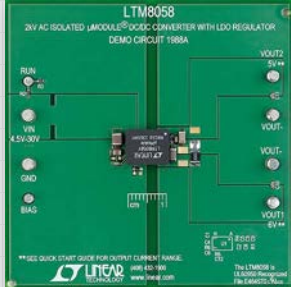
LTM8055 (DC2017A)



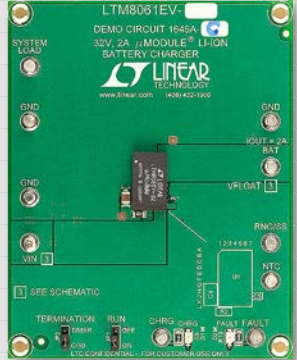
LTM8056 (DC2154A)



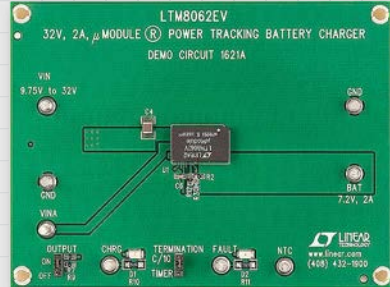
LTM8057 (DC1987A)



LTM8058 (DC1988A)

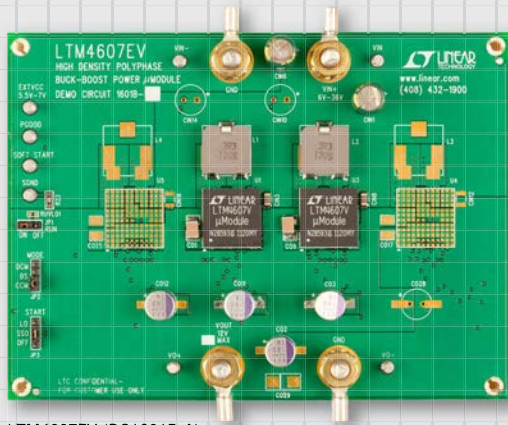


LTM8061 (DC1645A-A)

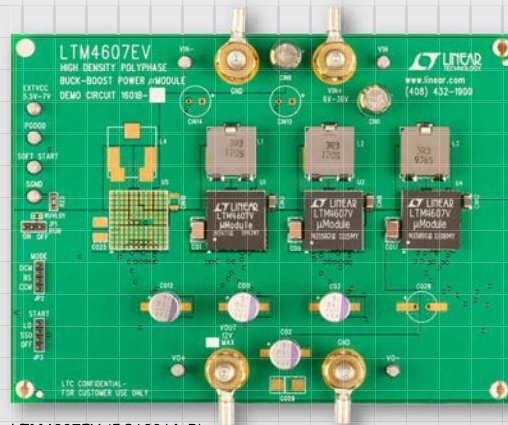


LTM8062 (DC1621A)

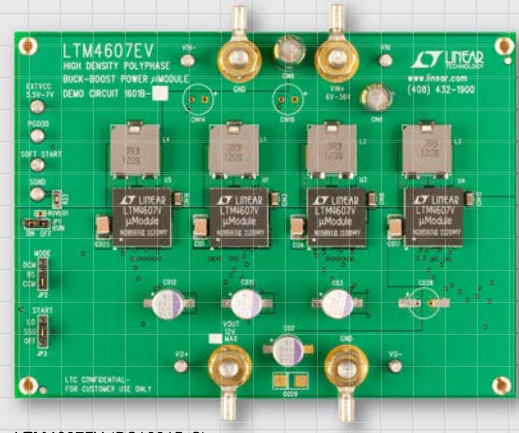
1"  
1cm



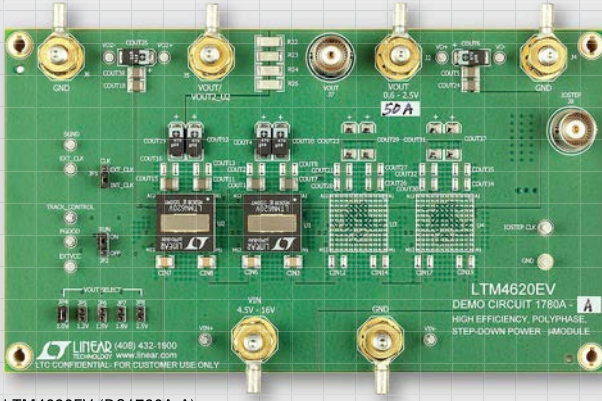
LTM4607EV (DC1601B-A)



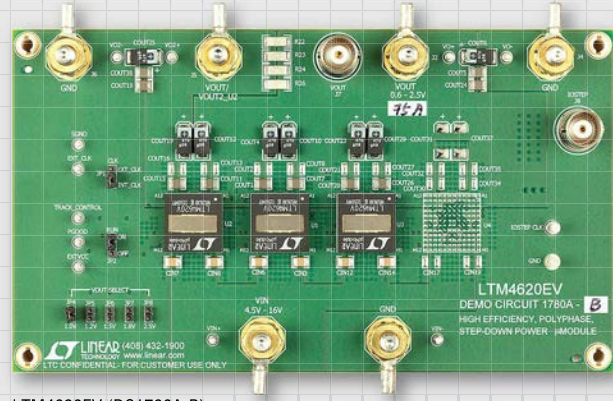
LTM4607EV (DC1601A-B)



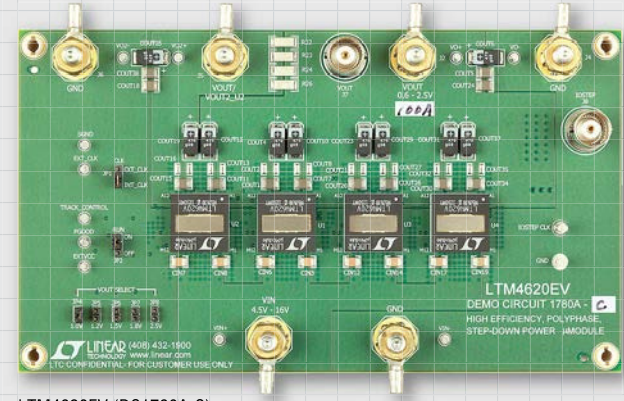
LTM4607EV (DC1601B-C)



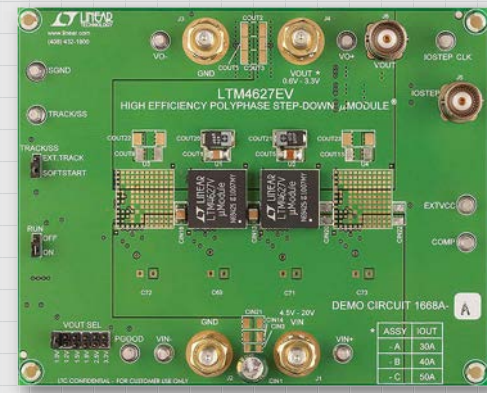
LTM4620EV (DC1780A-A)



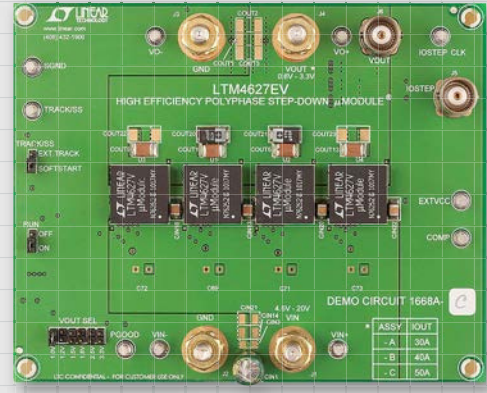
LTM4620EV (DC1780A-B)



LTM4620EV (DC1780A-C)

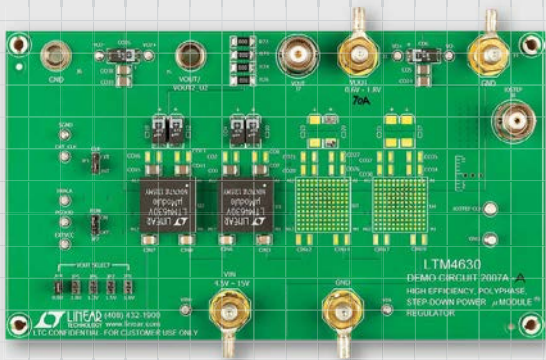


LTM4627EV (DC1668B-A)

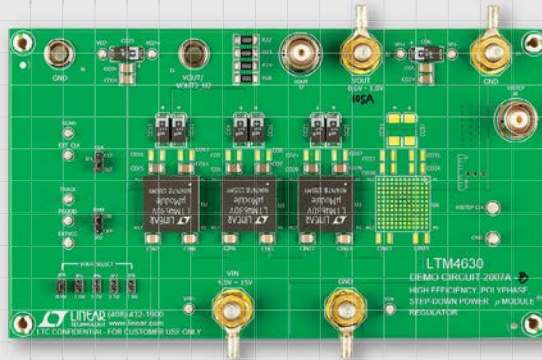


LTM4627EV (DC1668B-C)

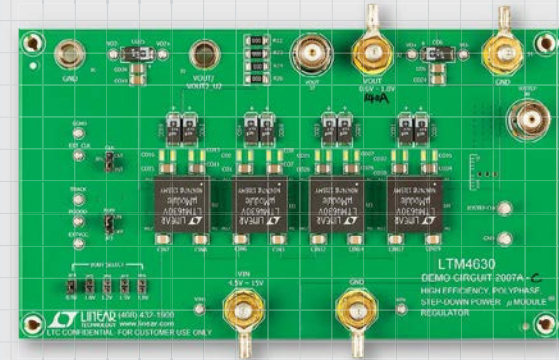
1"  
1cm



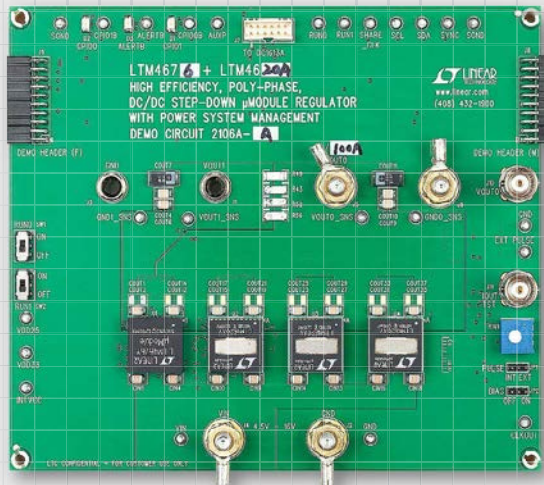
LTM4630 (DC2007A-A)



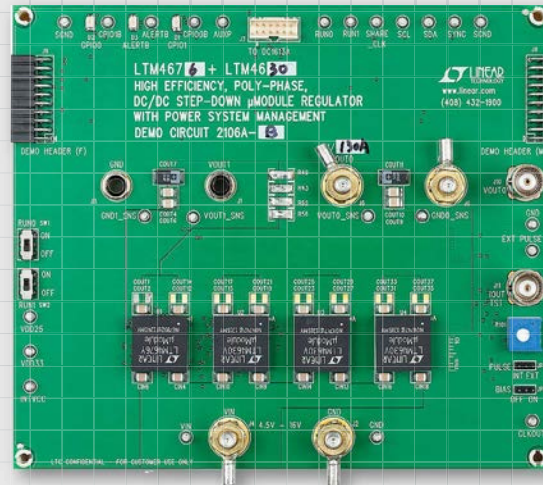
LTM4630 (DC2007A-B)



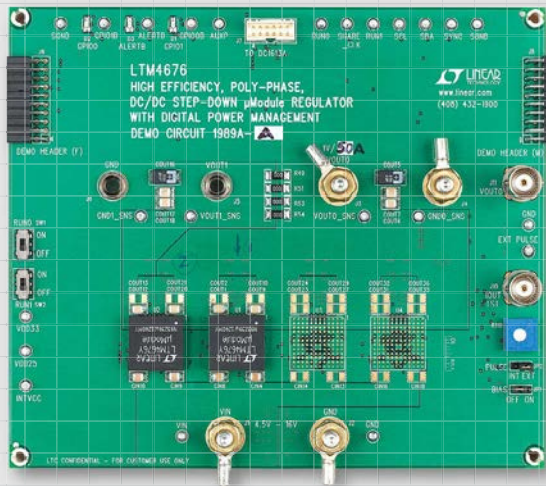
LTM4630 (DC2007A-C)



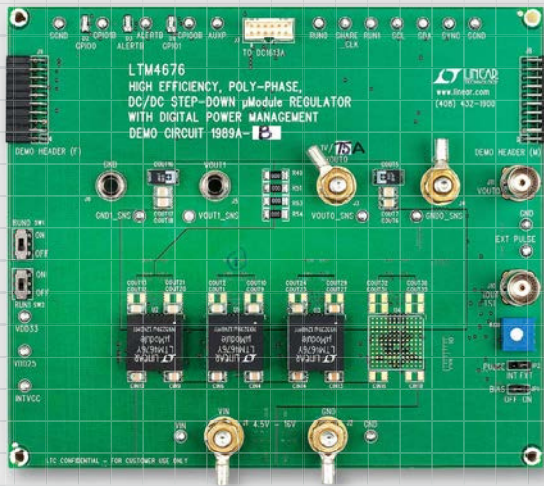
LTM4676/LTM4620A (DC2106A-A)



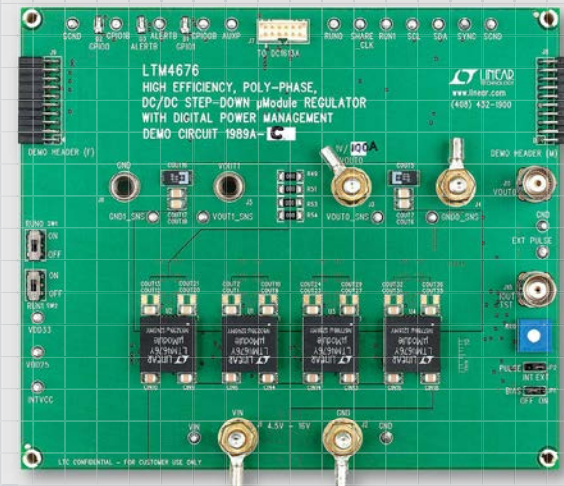
LTM4676/LTM4630A (DC2106A-B)



LTM4676 (DC1989A-A)



LTM4676 (DC1989A-B)



LTM4676 (DC1989A-C)

↓SORT



Output Sequencing



Voltage Margining

Function	Input Voltage (V)		Output Voltage (V)		Output Current per Channel (A)	V <sub>OUT</sub> Margin Up/Down	Output Sequencing	Package Dimensions (mm)	Package	Part Number	
	Min	Max	Min	Max							
Step-Down	4*	20	0.6	5.5	3	-	√	6.25 × 6.25 × 1.82	LGA	LTM4623	new
	2.375	5.5	0.8	5	4	-	√	9 × 15 × 2.32 9 × 15 × 3.42	LGA BGA	LTM4604A	
	4*	14	0.6	5.5	4	-	√	6.25 × 6.25 × 5.01	BGA	LTM4624	
	5	36	3.3	15	5	Adjustable	√	15 × 15 × 2.82	LGA	LTM4612	
	6	36	0.8	1.8	5	Adjustable	-	15 × 15 × 4.32 15 × 15 × 4.92	LGA BGA	LTM8028	
	4*	20	0.6	5.5	5	-	√	6.25 × 6.25 × 5.01	BGA	LTM4625	new
	4.5	20	0.6	5	6	Adjustable	√	15 × 15 × 2.82	LGA	LTM4603	
	4.5	26.5	0.8	5	6	-	√	9 × 15 × 4.32	LGA	LTM4618	
	4.5	28	0.6	5	6	Adjustable	√	15 × 15 × 2.82	LGA	LTM4603HV	
	4.5	28	0.6	5	6	Adjustable	√	15 × 15 × 2.82 15 × 15 × 3.42	LGA BGA	LTM4606	
	2.7	5.5	0.6	5	8	5%, 10%, 15%	√	9 × 15 × 2.82	LGA	LTM4608A	
	5	36	3.3	15	8	Adjustable	√	15 × 15 × 4.32	LGA	LTM4613	
	4.5	16	0.6	3.3	10	-	√	9 × 15 × 4.92	BGA	LTM4649	
	4	38	0.6	6	10	-	√	15 × 15 × 5.01	BGA	LTM4641	
	4.5	28	0.6	5	12	Adjustable	√	15 × 15 × 2.82 15 × 15 × 3.42	LGA BGA	LTM4601†	
	4.5	20	0.6	5	12	Adjustable	√	15 × 15 × 2.82 15 × 15 × 3.42	LGA BGA	LTM4601-1†	
	4.5	20	0.6	5	12	Adjustable	√	15 × 15 × 2.82 15 × 15 × 3.42	LGA BGA	LTM4601A†‡	
	4.5	20	0.6	5	12	Adjustable	√	15 × 15 × 2.82 15 × 15 × 3.42	LGA BGA	LTM4601A-1†‡	
	4.5	20	0.6	5	12	Adjustable	√	15 × 15 × 2.82 15 × 15 × 3.42	LGA BGA	LTM4601AHV†‡	
	4.5	28	0.6	5	12	Adjustable	√	15 × 15 × 2.82 15 × 15 × 3.42	LGA BGA	LTM4601HV†	
1.5	5.5	0.8	5	15	-	√	15 × 15 × 4.32	LGA	LTM4611		
4.5	20	0.6	5	15	-	√	15 × 15 × 4.32 15 × 15 × 4.92	LGA BGA	LTM4627		
4.5	20	0.6	5.5	20	-	√	15 × 15 × 4.32 15 × 15 × 4.92	LGA BGA	LTM4637		
2.375	7	0.6	5.5	20	-	√	15 × 15 × 4.92	BGA	LTM4639	new	
Multiple Output Step-Down	3.6	20	0.6	5.5	Dual 2	-	√	6.25 × 6.25 × 1.82	LGA	LTM4622	new
	2.375	5.5	0.8	5	Dual 4	-	√	15 × 15 × 2.82	LGA	LTM4614	
	2.375	5.5	0.8	5	Triple 4, 4, 1.5	-	√	15 × 15 × 2.82	LGA	LTM4615	
	4.5	26.5	0.8	5	Dual 4	-	√	15 × 15 × 2.82	LGA	LTM4619	
	4*	14	0.6	5.5	Quad 4	-	√	9 × 15 × 5.01	BGA	LTM4644	new
	2.7	5.5	0.6	5	Dual 8	5%, 10%, 15%	√	15 × 15 × 2.82 15 × 15 × 3.42	LGA BGA	LTM4616	
	4.5	26.5	0.6	5.5	Dual 8	-	√	15 × 15 × 4.32 15 × 15 × 4.92	LGA BGA	LTM4628	
	4.5	17	0.5	5.5	Dual 9	Adjustable	√	16 × 11.9 × 3.51	BGA	LTM4675	new
	4.7*	16	0.8	1.8, 5.5	Triple 10	-	√	15 × 15 × 5.01	BGA	LTM4633	new

\*Can be reduced with external bias supply.

† LTM4601, LTM4601A, LTM4601HV and LTM4601AHV offer precision remote sense (see page 13). Devices ending with -1 do not.

‡ LTM4601A, LTM4601A-1 and LTM4601AHV have redundant pads for enhanced solder joint strength to the PCB.



Output Sequencing Continued



Voltage Margining Continued

↓SORT

Function	Input Voltage (V)		Output Voltage (V)		Output Current per Channel (A)	V <sub>OUT</sub> Margin Up/Down	Output Sequencing	Package Dimensions (mm)	Package	Part Number
	Min	Max	Min	Max						
Multiple Output Step-Down	4.5	16	0.6	2.5	Dual 13	-	√	15 × 15 × 4.41 15 × 15 × 5.01	LGA BGA	LTM4620
	4.5	16	0.6	5.3	Dual 13	-	√	15 × 15 × 4.41 15 × 15 × 5.01	LGA BGA	LTM4620A
	4.5	26.5	0.5	5.4	Dual 13	Adjustable	√	16 × 16 × 5.01	BGA	LTM4676
	4.5	17	0.5	5.5	Dual 13	Adjustable	√	16 × 16 × 5.01	BGA	LTM4676A
	4.5	15	0.6	1.8	Dual 18	-	√	16 × 16 × 4.41 16 × 16 × 5.01	LGA BGA	LTM4630
	4.5	15	0.6	5.3	Dual 18	-	√	16 × 16 × 4.41	LGA	LTM4630A
	4.5	15	0.6	1.8	Dual 18	-	√	16 × 16 × 5.01	BGA	LTM4630-1
	4.5	16	0.5	1.8	Dual 18	Adjustable	√	16 × 16 × 5.01	BGA	LTM4677

new  
new  
new  
new  
new

↓SORT



Low V<sub>IN</sub>

Function	Output Channels	Input Voltage (V)		Output Voltage (V)		Output Current per Channel (A)	Clock Sync Range (MHz)	Package Dimensions (mm)	Package	Part Number
		Min	Max	Min	Max <sup>1</sup>					
Step-Down	1	1.5	5.5	0.8	5	15	0.36 to 0.71	15 × 15 × 4.32	LGA	LTM4611
		2.375*	20	0.5	5.5	3	0.56 to 4	6.25 × 6.25 × 1.82	LGA	LTM4623*
		2.375	5.5	0.8	5	4	-	9 × 15 × 2.32 9 × 15 × 3.42	LGA BGA	LTM4604A
		2.375*	14	0.6	5.5	4	-	6.25 × 6.25 × 5.01	BGA	LTM4624*
		2.375*	20	0.6	5.5	5	0.56 to 4	6.25 × 6.25 × 5.01	BGA	LTM4625*
		2.7	5.5	0.6	5	8	0.75 to 2.25	9 × 15 × 2.82	LGA	LTM4608A
		2.375*	7	0.6	5.5	20	0.25 to 0.8	15 × 15 × 4.92	BGA	LTM4639
		3	36	0.8	5	0.5	-	6.25 × 11.25 × 2.82	LGA	LTM8021
	2	2.375	5.5	0.8	5	Dual 4, 4	-	15 × 15 × 2.82	LGA	LTM4614
		2.7	5.5	0.6	5	Dual 8, 8	0.75 to 2.25	15 × 15 × 2.82 15 × 15 × 3.42	LGA BGA	LTM4616
	3	2.375	5.5	0.8	5	Triple 4, 4, 1.5	-	15 × 15 × 2.82	LGA	LTM4615
4	2.375*	14	0.6	5.5	Quad 4	0.7 to 1.3	9 × 15 × 5.01	BGA	LTM4644*	
Step-Up & Down	1	2.8	18	±2.5	±15	Up to 0.7	-	6.25 × 11.25 × 4.92	BGA	LTM8045
LED Driver	1	3	30	2	32	1	0.3 to 2.5	9 × 15 × 2.82	LGA	LTM8042
		3	30	2	32	0.35	0.3 to 2.5	9 × 15 × 2.82	LGA	LTM8042-1

\* Requires external bias

new  
new  
new  
new  
new  
new  
new

↓SORT



Digital Power System Management

Function	Output Channels	Input Voltage (V)		Output Voltage (V)		Output Current per Channel (A)	Read Back Accuracy		Turn-On Time (ms)	Package Dimensions (mm)	Package	Part Number
		Min	Max	Min	Max <sup>1</sup>		Voltage	Current				
Step-Down	2	4.5	17	0.5	5.5	Dual 9	0.5%	2.5%	70	16 × 11.9 × 3.51	BGA	LTM4675
	2	4.5	26.5	0.5	5.4	Dual 13	1.0%	2.5%	170	16 × 16 × 5.01	BGA	LTM4676
	2	4.5	17	0.5	5.5	Dual 13	0.5%	2.5%	70	16 × 16 × 5.01	BGA	LTM4676A
	2	4.5	16	0.5	1.8	Dual 18	0.5%	2.5%	70	16 × 16 × 5.01	BGA	LTM4677

new  
new  
new



Tune-a-µModule

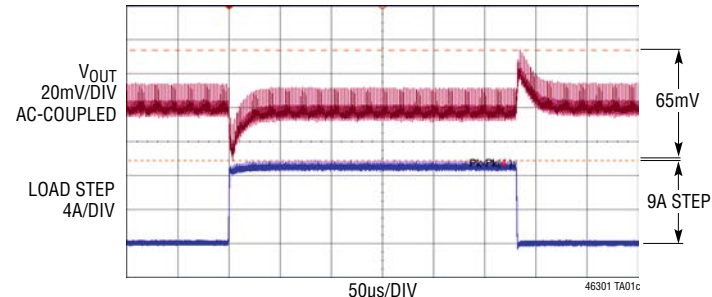
Function	Output Channels	Input Voltage (V)		Output Voltage (V)		Output Current per Channel (A)	V <sub>OUT1</sub> Accuracy (DC)	V <sub>OUT1</sub> Accuracy (AC)	Clock Sync Range (MHz)	Package Dimensions (mm)	Package	Part Number
		Min	Max	Min	Max							
Step-Down	2	4.5	15	0.6	1.8	18	±0.8%	±3%	0.4 to 0.78	16 x 16 x 5.01	BGA	LTM4630-1A
	2	4.5	15	0.6	1.8	18	±1.5%	±3%	0.4 to 0.78	16 x 16 x 5.01	BGA	LTM4630-1B

new  
new

### Tune-a-µModule Regulator

Access and alter loop response of a µModule regulator by adjusting compensation to achieve precision V<sub>OUT</sub> at DC and transient based on the behavior of load as well as output capacitor type and quantity.

### LTM4630-1, 1.0V at 36A ±3% Transient Response



\*SEE DEMO CIRCUIT DC2081A-B

25% Load Step Transient Response with ±3% Output Regulation Window  
12V<sub>IN</sub>, 1.2V<sub>OUT</sub>, 36A with 5 x 220µF Ceramic Cap

↓ SORT

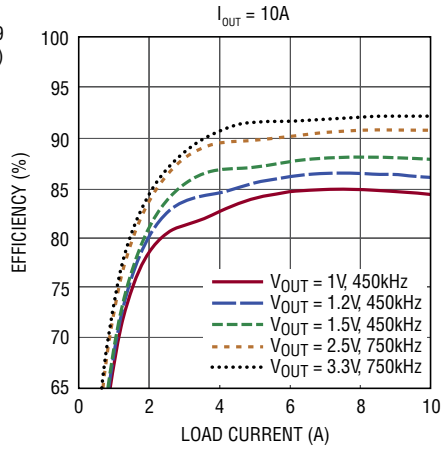


Best 12V to 1V Step-Down

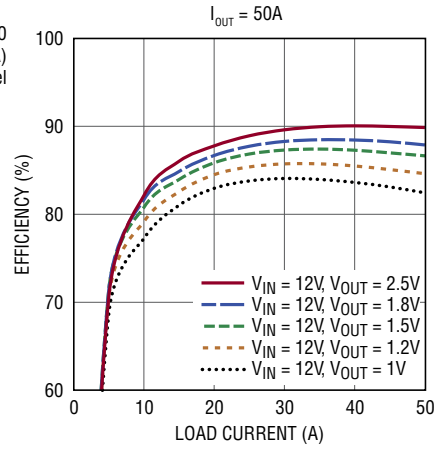
Function	Output Channels	Input Voltage (V)		Output Voltage (V)		Total Output Current (A)	Peak Efficiency 12V to 1V (Load)	Package Dimensions (mm)	Package	Part Number
		Min	Max	Min	Max					
Step-Down	1	4.5	16	0.6	3.3	10	85% (6A) 85% (10A)	9 x 15 x 4.92	BGA	LTM4649
	1	4.5	20	0.5	5	15	85% (8A) 81% (15A)	15 x 15 x 4.32 15 x 15 x 4.92	LGA BGA	LTM4627
	1	4.5	20	0.6	5.5	20	87% (8A) 84% (20A)	15 x 15 x 4.32 15 x 15 x 4.92	LGA BGA	LTM4637
	2	4.5	16	0.6	2.5	50	87% (30A) 84% (50A)	15 x 15 x 4.41 15 x 15 x 5.01	LGA BGA	LTM4620
	2	4.5	15	0.6	1.8	70	86% (30A) 84% (70A)	15 x 15 x 4.41 15 x 15 x 5.01	LGA BGA	LTM4630
	2	4.5	15	0.6	1.8	105	86% (40A) 84% (105A)	15 x 15 x 4.41 15 x 15 x 5.01	LGA BGA	LTM4630
	2	4.5	15	0.5	1.8	144	86% (60A) 83% (140A)	15 x 15 x 4.41 15 x 15 x 5.01	LGA BGA	LTM4630
Step-Down with Power System Management	2	4.5	17	0.5	5.5	18	82% (12A) 81% (18A)	16 x 11.9 x 3.51	BGA	LTM4675
	2	4.5	17	0.5	5.5	26	84% (12A) 80% (26A)	15 x 15 x 5.01	BGA	LTM4676A
	2	4.5	17	0.5	5.5	50	84% (25A) 80% (50A)	15 x 15 x 5.01	BGA	LTM4676A
	2	4.5	17	0.5	5.5	75	84% (35A) 80% (75A)	15 x 15 x 5.01	BGA	LTM4676A
	2	4.5	17	0.5	5.5	100	84% (50A) 80% (100A)	15 vx 15 x 5.01	BGA	LTM4676A

# High Efficiency, 12V<sub>IN</sub>, 10A < I<sub>OUT</sub> < 140A

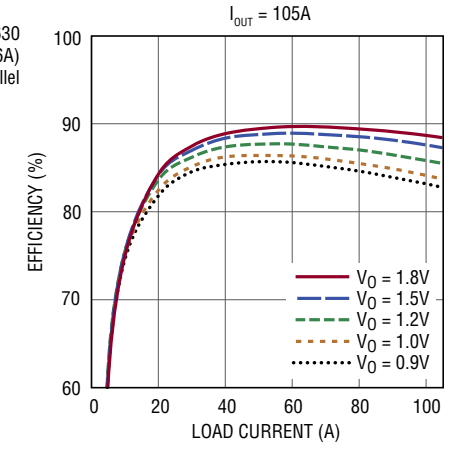
LTM4649  
(Single 10A)



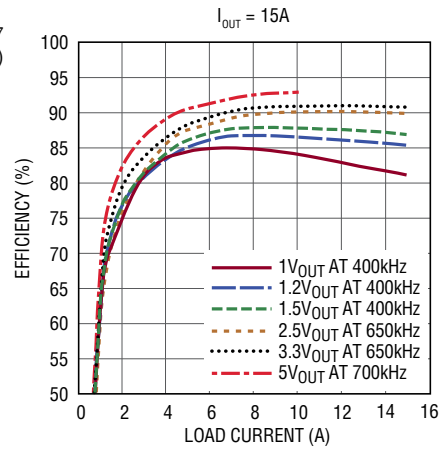
LTM4620  
(Dual 13A, Single 26A)  
2 Parallel



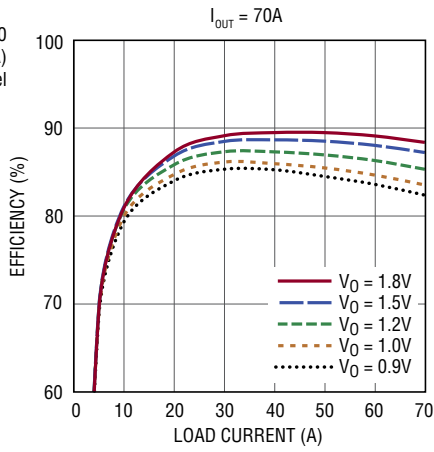
LTM4630  
(Dual 18A, Single 36A)  
3 Parallel



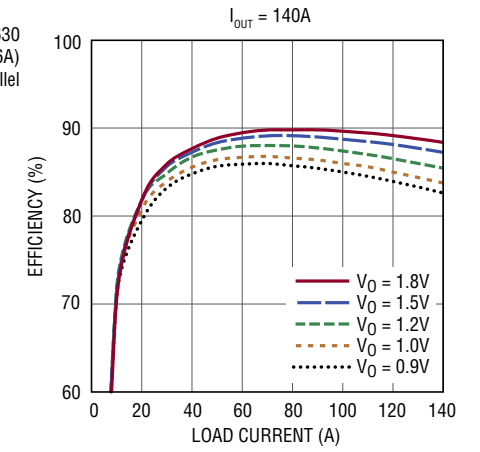
LTM4627  
(Single 15A)



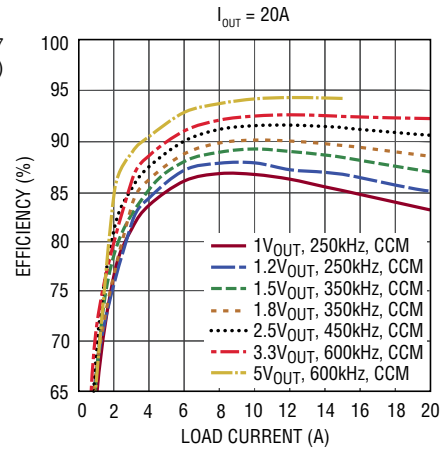
LTM4630  
(Dual 18A, Single 36A)  
2 Parallel



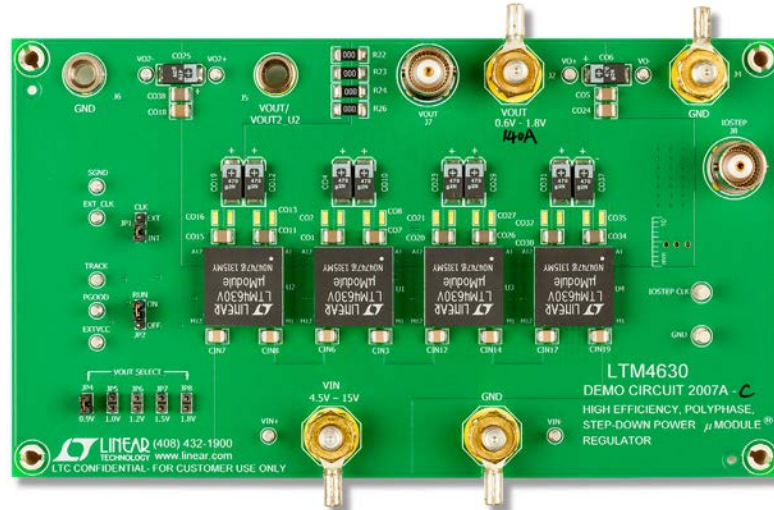
LTM4630  
(Dual 18A, Single 36A)  
4 Parallel



LTM4637  
(Single 20A)



LTM4630 4 Parallel  
144A Demo Board





SnPb BGA

↓SORT

Function	Input Voltage (V)		Output Voltage (V)		Output Capacity per Channel	Isolation Rating	Extended Temp Range	Parallelable Outputs (Total I <sub>OUT</sub> )	BGA Package Dimensions (mm)	Part Number
	Min	Max	Min	Max						
Step-Up & Down	2.8	18	±2.5	±15	Up to 0.7A	non-Isolated	-55°C to 125°C	-	6.25 × 11.25 × 4.92	LTM8045
	5	36	0.8	34	4A**	non-Isolated	-55°C to 125°C	x4 (16A)	15 × 15 × 3.42	LTM4609
	5	58	1.2	48	5.4A	non-isolated	-55 to 125	x2 (10.8A)	15 × 15 × 4.92	LTM8056
	5	36	1.2	36	8.5A	non-isolated	-55 to 125	x2 (17A)	15 × 15 × 4.92	LTM8055
Isolated	3.1	32	2.5	12	1.5W	725VDC	-55°C to 125°C	-	9 × 11.25 × 4.92	LTM8047
	3.1	32	1.2	12	1.5W Combined	725VDC	-55°C to 125°C	-	9 × 11.25 × 4.92	LTM8048
	3.1	31	2.5	12	1.5W	2kVAC (3kVDC)	-55°C to 125°C	-	9 × 11.25 × 4.92	LTM8057
	3.1	31	1.2	12	1.5W Combined	2kVAC (3kVDC)	-55°C to 125°C	-	9 × 11.25 × 4.92	LTM8058
	3.1	31	1.8	12	2.5W	2kVAC (3kVDC)	-55°C to 125°C	-	9 × 15 × 4.92	LTM8046
Single Output Step-Down	3.6	36	0.8	10	2A	non-isolated	-55°C to 125°C	x2 (4A)	9 × 11.25 × 3.42	LTM8023
	3.6	36	0.8	10	2A	non-isolated	-55°C to 125°C	x2 (4A)	9 × 15 × 3.42	LTM8032
	3.6	36	0.8	24	3A	non-isolated	-55°C to 125°C	x2 (6A)	9 × 15 × 4.92	LTM8025
	3.6	36	0.8	24	3A	non-isolated	-55°C to 125°C	x2 (6A)	11.25 × 15 × 4.92	LTM8033
	2.375	5.5	0.8	5	4A	non-isolated	-	x2 (8A)	9 × 15 × 3.42	LTM4604A
	4*	14	0.6	5.5	4A	non-isolated	-	-	6.25 × 6.25 × 5.01	LTM4624
	4.5	60	2.5	24	4A	non-isolated	-55 to 125	x2 (8A)	15 × 15 × 4.92	LTM8027
	6	36	0.8	1.8	5A	non-isolated	-55°C to 125°C	x2 (10A)	15 × 15 × 4.92	LTM8028
	4*	20	0.6	5.5	5A	non-isolated	-	x12 (60A)	6.25 × 6.25 × 5.01	LTM4625
	4.5	28	0.6	5	6A	non-isolated	-55°C to 125°C	x2 (12A)	15 × 15 × 3.42	LTM4606
	4.5	16	0.6	3.3	10A	non-isolated	-	x3 (30A)	9 × 15 × 4.92	LTM4649
	4	38	0.6	6	10A	non-isolated	-55°C to 125°C	x4 (40A)	15 × 15 × 5.02	LTM4641
	4.5	20	0.6	5	12A	non-isolated	-	x4 (48A)	15 × 15 × 3.42	LTM4601†
	4.5	20	0.6	5	12A	non-isolated	-	x4 (48A)	15 × 15 × 3.42	LTM4601-1†
	4.5	20	0.6	5	12A	non-isolated	-	x4 (48A)	15 × 15 × 3.42	LTM4601A†‡
	4.5	20	0.6	5	12A	non-isolated	-	x4 (48A)	15 × 15 × 3.42	LTM4601A-1†‡
	4.5	28	0.6	5	12A	non-isolated	-55°C to 125°C	x4 (48A)	15 × 15 × 3.42	LTM4601AHV†‡
	4.5	20	0.6	5	15A	non-isolated	-55°C to 125°C	x4 (60A)	15 × 15 × 4.92	LTM4627
	4.5	20	0.6	5.5	20A	non-isolated	-	x4 (80A)	15 × 15 × 4.92	LTM4637
	2.375	7	0.6	5.5	20A	non-isolated	-	x4 (80A)	15 × 15 × 4.92	LTM4639
Multiple Output Step-Down	6	36	0	24	Five 1A	non-isolated	-55°C to 125°C	x10 (10A)	15 × 15 × 3.42	LTM8001
	4*	14	0.6	5.5	Quad 4A	non-isolated	-	x4 (16A)	9 × 15 × 5.01	LTM4644
	4.75	28	0.8	5.5,13.5	Triple 5A, 5A, 4A	non-isolated	-	x2 (10A)	15 × 15 × 5.01	LTM4634
	2.7	5.5	0.6	5	Dual 8A	non-isolated	-55°C to 125°C	x4 (32A)	15 × 15 × 3.42	LTM4616
	4.5	26.5	0.6	5.5	Dual 8A	non-isolated	-	x4 (32A)	15 × 15 × 4.92	LTM4628
	4.5	17	0.5	5.5	Dual 9A	non-isolated	-	x8 (72A)	16 × 11.9 × 3.51	LTM4675
	4.7*	16	0.8	1.8,5.5	Dual 10A	non-isolated	-55°C to 125°C	x2 (20A)	15 × 15 × 5.01	LTM4633
	4.5	16	0.6	2.5	Dual 13A	non-isolated	-	x8 (100A)	15 × 15 × 5.01	LTM4620
	4.5	16	0.6	5.3	Dual 13A	non-isolated	-	x8 (100A)	15 × 15 × 5.01	LTM4620A
	4.5	26.5	0.5	5.4	Dual 13A	non-isolated	-	x8 (100A)	16 × 16 × 5.01	LTM4676
	4.5	17	0.5	5.5	Dual 13A	non-isolated	-	x8 (100A)	16 × 16 × 5.01	LTM4676A
	4.5	15	0.6	1.8	Dual 18A	non-isolated	-	x8 (144A)	16 × 16 × 5.01	LTM4630
	4.5	15	0.6	1.8	Dual 18A	non-isolated	-	x8 (144A)	16 × 16 × 5.01	LTM4630-1

\*Can be reduced with external bias supply.

\*\*In step-up mode. Output current in step-down mode is approximately 2x greater for the LTM4609.

† LTM4601, LTM4601A, LTM4601HV and LTM4601AHV offer precision remote sense (see page 13). Devices ending with -1 do not.

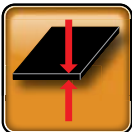
‡ LTM4601A, LTM4601A-1 and LTM4601AHV have redundant pads for enhanced solder joint strength to the PCB.



## Low Noise

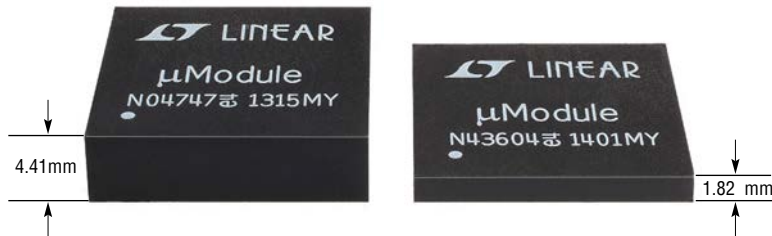
Low Output Voltage Ripple

Topology	Input Voltage (V)		Output Voltage (V)		Total Output Capability	Clock Sync Range (MHz)	LDO Outputs	Parallelable Outputs (Total I <sub>OUT</sub> )	V <sub>OUT</sub> Noise (mV)	BGA Package Dimensions (mm)	Part Number
	Min	Max	Min	Max							
Sync Buck Plus 5 LDO Post Regulators	6	36	0	24	5A	0.2 to 1.0	1.1A × 5	×10 (10A)	3.5	15 × 15 × 3.42	LTM8001
Sync Buck Plus LDO Post Regulator	6	36	0.8	1.8	5A	0.2 to 1.0	5A × 1	–	0.75	15 × 15 × 4.92	LTM8028
725VDC Isolated Flyback Plus LDO Post Regulator	3.1	32	1.2	12	1.5W	–	1	–	1.0	9 × 11.25 × 4.92	LTM8048
2kVAC (3kVDC) Isolated Flyback Plus LDO Post Regulator	3.1	31	1.2	12	1.5W	–	1	–	1.0	9 × 11.25 × 4.92	LTM8058 <span style="color: blue;">new</span>
SEPIC or Inverting	2.8	18	±2.5	±15	Up to 0.7	0.2 to 2.0	None	–	1.0	6.25 × 11.25 × 4.92	LTM8045

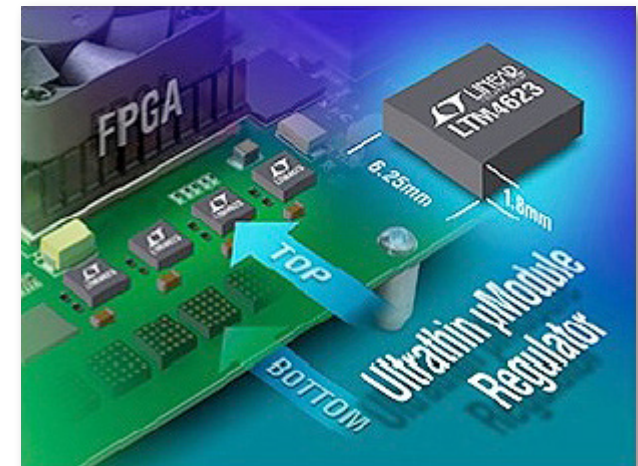
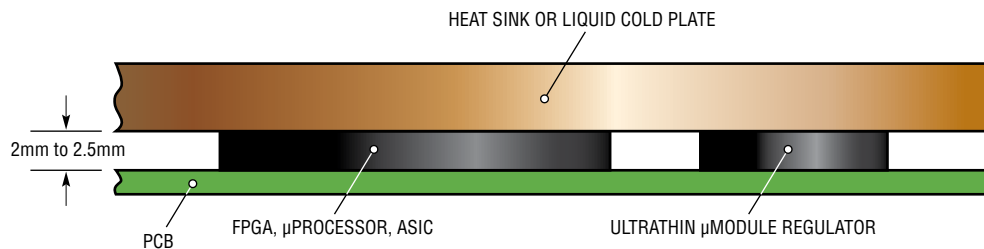


Ultrathin

Function	Output Channels	Input Voltage (V)		Output Voltage (V)		Output Current (A)	Clock Sync Range (MHz)	Parallelable Outputs (Total I <sub>OUT</sub> )	Package Dimensions (mm)	Package	Part Number
		Min	Max	Min	Max						
Step Down	2	3.6*	20	0.6	5.5	Dual: 2.5	0.56 to 4	× 8 (20A)	6.25 × 6.25 × 1.82	LGA	LTM4622 <span style="color: blue;">new</span>
	1	4*	20	0.6	5.5	3	0.56 to 4	× 12 (36A)	6.25 × 6.25 × 1.82	LGA	LTM4623 <span style="color: blue;">new</span>



Ultrathin μModule Regulators Fit Under the FPGA Heat Sink





Reliability

	LTM80xx		LTM46xx	
	Device Hours or Cycles	Failures	Device Hours or Cycles	Failures
High Temperature Bake (150°C)	16,317k	0	39,866k	0
Operating Life Test (125°C Equivalent)	2,491k	0	4,152k	0
Temperature Cycle <sup>1</sup> (-65°C to 150°C)	13,397k	0	21,478	0
Thermal Shock Cycle <sup>1</sup> (-65°C to 150°C)	12,552k	0	15,442k	0
Board Mount Temperature Cycle (-40°C to 125°C)	1,045k	0	2,118k	0

<sup>1</sup> After J-STD-020 Level 3 preconditioning

To download the full reliability reports, visit [www.linear.com/umodule](http://www.linear.com/umodule)



Environmental Compliance

µModule power products in BGA packages with SAC305 solder balls and LGA packages are halogen-free and RoHS compliant. Select products are also available in BGA packages with SnPb solder balls. Contact your Linear Technology authorized sales representative for details. The materials declaration file for all released products is available at: [www.linear.com/umodule](http://www.linear.com/umodule)



Scan to access these documents or visit [www.linear.com/umodule](http://www.linear.com/umodule)



Design Support

## Design and Application Support

### Thermal Performance

- AN110 LTM4601 DC/DC µModule Regulator Thermal Performance
- AN119B Powering Complex FPGA-Based Systems—Thermal Performance

### Electrical Performance

- AN119A Powering Complex FPGA-Based Systems—Electrical Performance
- DN385 10A High Performance Point-of-Load DC/DC µModule Regulator
- DN411 Simple and Compact 4-Output Point-of-Load DC/DC µModule System
- DN430 8A Low Voltage, Low Profile DC/DC µModule Regulator
- DN438 µModule Buck-Boost Regulators
- DN530 Increasing Output Voltage and Current Range

### PCB Layout and Assembly

- AN117 DC/DC µModule Regulator Printed Circuit Board Design Guidelines

### CAD Symbols and Footprints

The downloadable zip files below contain the schematic symbol and PCB footprint compatible with Mentor Graphics PADS v9.5 or later, and Cadence ORCAD v16.5 or later.

- LTM46xx Series
- LTM80xx Series

### Demonstration Circuits

Demonstration circuits (pages 10-13) along with associated bill of materials (BoM) and Gerber files are available for all products. Current sharing boards are available for select regulators.

### Package Mark Codes

The part number, lot number, date code and final assembly location are marked on the top of the package to facilitate product traceability.

The letter “V” following the part number indicates an LGA package. The letter “Y” indicates a BGA package. The lot number consists of a single letter followed by three to five numbers. The date code consists of four numbers in a YYWW format and is commonly followed by a two letter code indicating the country of final assembly: MY for Malaysia and KR for South Korea. The “e4” or “e1” mark indicates a RoHS compliant package.

For example, the LTM8020 in an LGA package shown is from lot# J447 and was assembled work week 18 of 2009 in Malaysia. The LTM4676 in a BGA package is from lot# N67786 and was assembled work week 16 of 2012 in Malaysia.

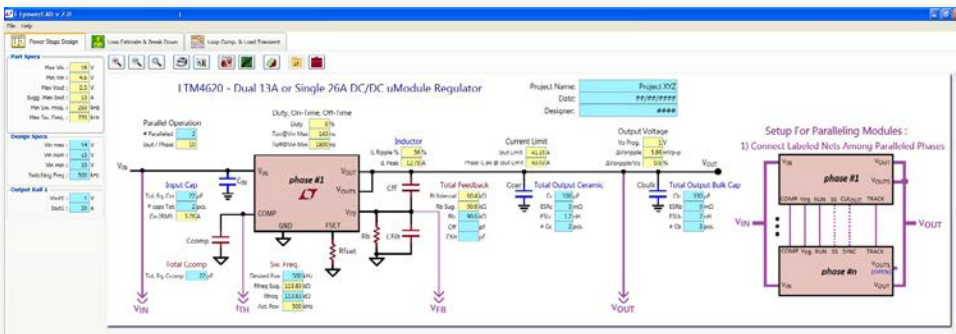




Design Support

## LTpowerCAD II Power Supply Design Tool at [www.linear.com/LTpowerCAD](http://www.linear.com/LTpowerCAD)

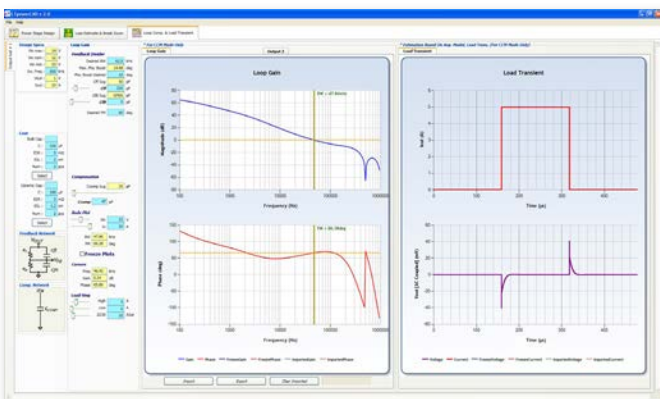
LTpowerCAD™ is a free and easy-to-use power supply design tool with a user-friendly graphical user interface (GUI) and powerful design features. It helps power supply designers to select a solution for given supply specifications, choose power stage components, estimate regulator efficiency and power loss, and optimize supply loop stability and load transient performance. It is a fast offline tool that runs on Windows PCs, and now includes a sync-release feature to ensure your program and component library are up-to-date. Once a circuit design is completed, it is easily exported to the [LTspice®](#) simulation platform.



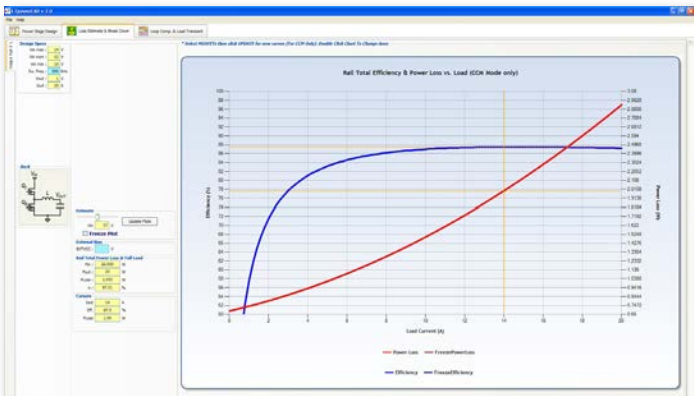
Power Stage Design

Part #	Part Name	Type	Package	Max. Inp. Vol.	Max. Outp. Curr.
17	LTM4620	uModule	Back	14.5	26
17	LTM4620	uModule	Back	14.5	13
17	LTM4620	uModule	Back	14.5	13
17	LTM4620	uModule	Back	14.5	13
17	LTM4620	uModule	Back	14.5	13
17	LTM4620	uModule	Back	14.5	13
17	LTM4620	uModule	Back	14.5	13
17	LTM4620	uModule	Back	14.5	13
17	LTM4620	uModule	Back	14.5	13
17	LTM4620	uModule	Back	14.5	13

Part Search and Selection



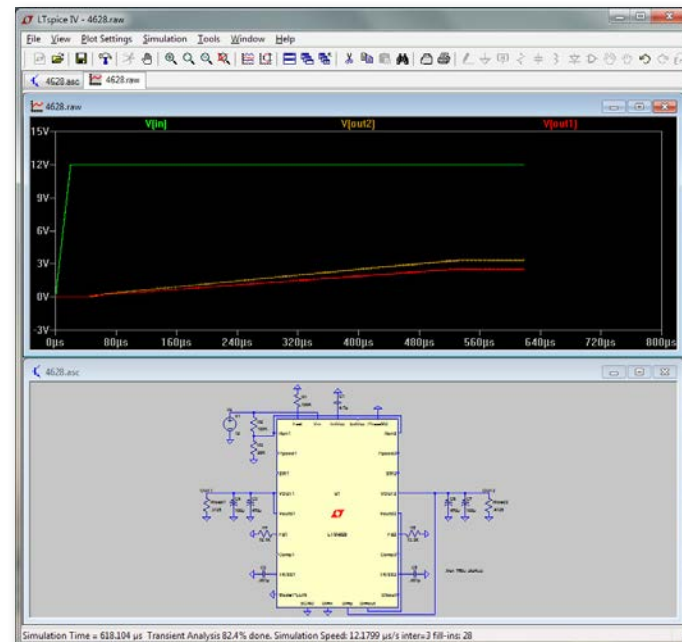
Loop Gain and Load Transient Response Analysis



Efficiency and Power Loss Analysis

## LTspice Circuit Simulation Tool

LTspice is a free, simple and powerful circuit simulation tool with a library containing all Linear Technology products, as well as commonly used discrete passive and transistor components.



## µModule Power Solutions for FPGAs

### Altera Arria 10 GX FPGA Development Kit

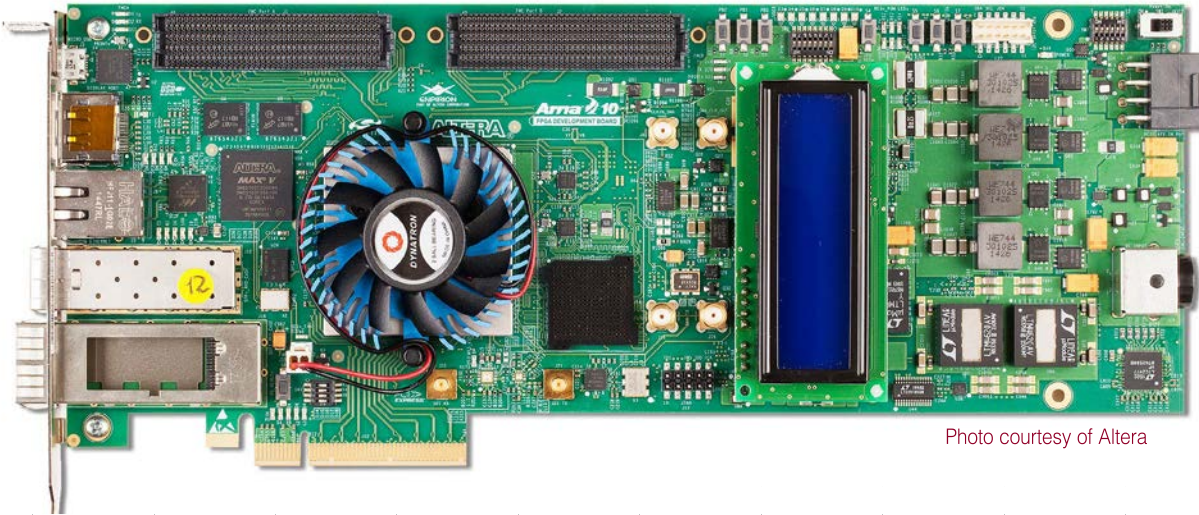


Photo courtesy of Altera

Input	Outputs	Part Number
12V	3.3V/30A	LTM4620A x 2pcs
	1.1V/17A	LTM4637

### Xilinx Virtex -7 10G/40G/100G Optical Interface FPGA Platform

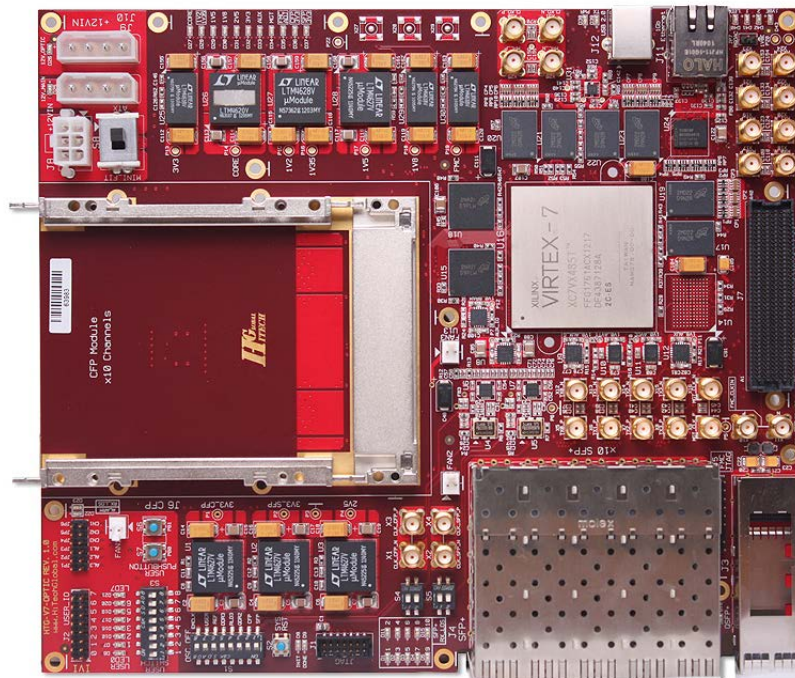


Photo courtesy of HiTech Global

Input	Outputs	Part Number
12V	1.0V/26A	LTM4620
	1.2V/8A, 1.35V/8A	LTM4628
	1.5V/15A	LTM4627
	1.8V/6A	LTM4618
	2.5V/15A	LTM4627
	3.3V/6A	LTM4618
	3.3V/15A	LTM4627
	3.3V/15A	LTM4627
1.5V/8A or 1.8V/8A	LTM4618	

## µModule Power Solutions for FPGAs

### Xilinx Zynq Networking Platform



Photo courtesy of HiTech Global

Input	Outputs	Part Number
12V	1.0V/16A	<a href="#">LTM4644</a>
	1.2V/4A, 1.8V/4A, 2.0V/4A, 2.5V/4A	<a href="#">LTM4644</a>
	1.3V/4A, 3.3V/4A	<a href="#">LTM4644</a>
	1.5V/16A	<a href="#">LTM4644</a>

### Xilinx Kintex -7 PCI Express Development Board

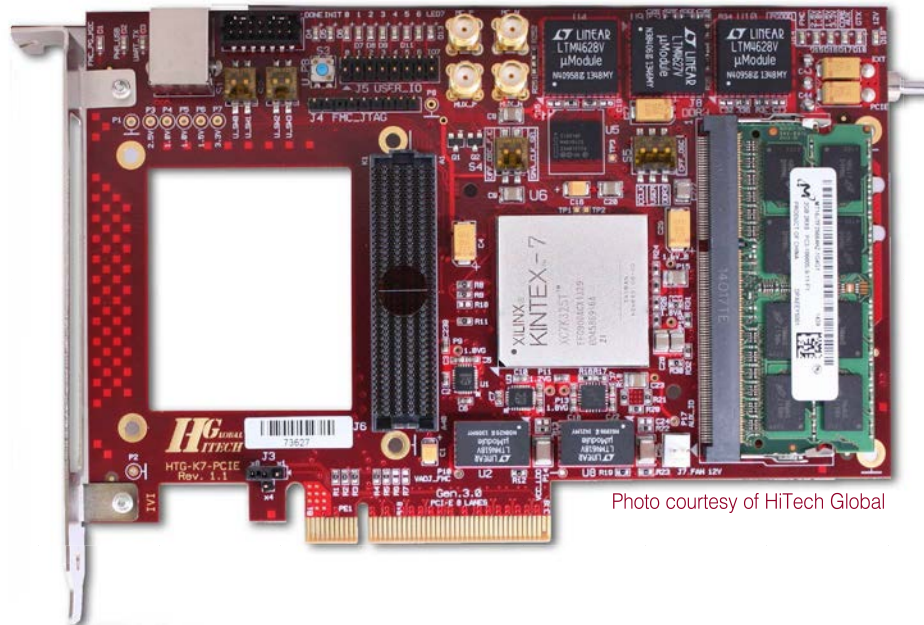


Photo courtesy of HiTech Global

Input	Outputs	Part Number
12V	1.0V/15A	<a href="#">LTM4627</a>
	1.5V/8A, 3.3V/8A	<a href="#">LTM4628</a>
	1.5V/6A	<a href="#">LTM4618</a>
	1.8V/8A, 2.5V/8A	<a href="#">LTM4628</a>
	2.5V/6A	<a href="#">LTM4618</a>

µModule Power Solutions for FPGAs

Altera Stratix V Dual 40G Half-Size PCI Express Networking Card



Photo courtesy of HiTech Global

Input	Outputs	Part Number
12V	0.85V/26A	LTM4620
	1.5V/13A, 1.8V/13A	LTM4620
	2.5V/8A, 3.3V/8A	LTM4628

Altera Stratix V GX/GS Half-Length PCIe Board with Dual QSFP+/SFP+, DDR3 and QDRII+



Photo courtesy of BittWare

Input	Outputs	Part Number
12V	3.3V/8A, 2.5V/8A	LTM4628
	1.5V/8A, 1.8V/8A	LTM4628
	0.85V/32A	LTM4628 x 2pcs

## µModule Power Solutions for FPGAs

### Xilinx Virtex-7 High End Networking Card



Photo courtesy of HiTech Global

Input	Outputs	Part Number
12V	1.0V/50A	<a href="#">LTM4620 x 2pcs</a>
	1.5V/15A	<a href="#">LTM4627</a>
	1.8V/6A	<a href="#">LTM4618</a>
	2.5V/15A	<a href="#">LTM4627</a>
	3.3V/15A	<a href="#">LTM4627</a>

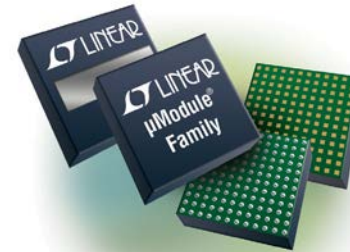
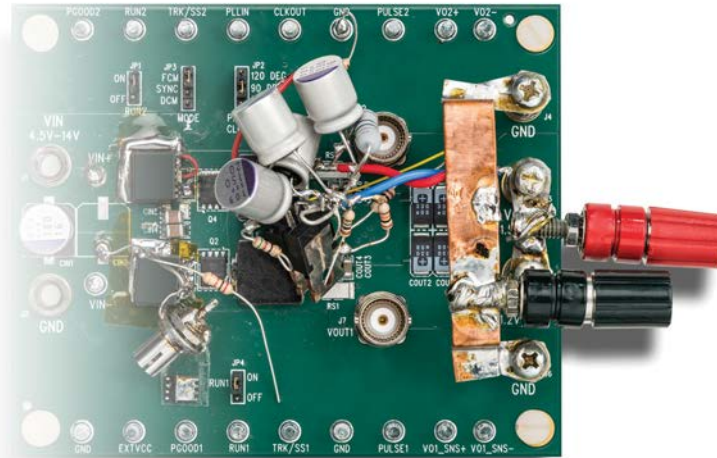
### Dual Altera Stratix V GX/GS PCIe Board with Quad QSFP+, DDR3, QDRII+ and RLDRAM3



Photo courtesy of BittWare

Input	Outputs	Part Number
12V	0.9V/52A	<a href="#">LTM4620 x 2pcs</a>
	0.9V/52A	<a href="#">LTM4620 x 2pcs</a>

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