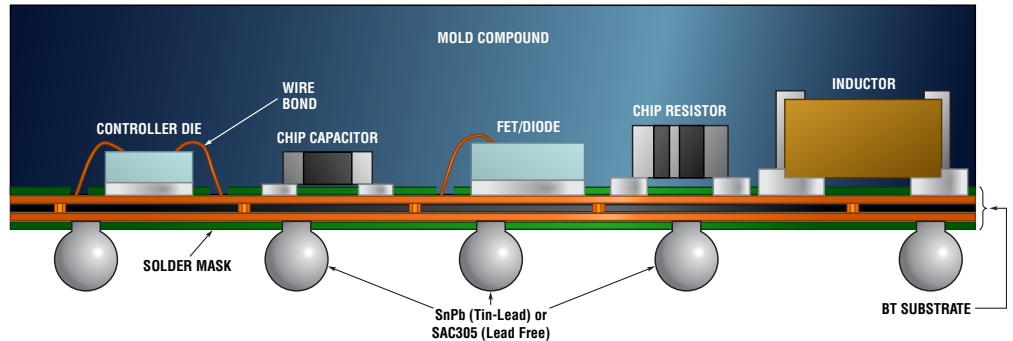


SnPb (Tin-Lead) BGA Packages μModule Power Products

SnPb BGA List:

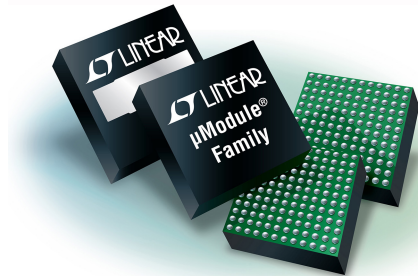
LTM®4601	LTM4649
LTM4601-1	LTM4675
LTM4601A	LTM4676
LTM4601AHV	LTM4676A
LTM4601A-1	LTM4677
LTM4604A	LTM8001
LTM4606	LTM8023
LTM4608A	LTM8025
LTM4609	LTM8026
LTM4613	LTM8027
LTM4616	LTM8028
LTM4620	LTM8029
LTM4620A	LTM8032
LTM4623	LTM8033
LTM4624	LTM8045
LTM4625	LTM8046
LTM4627	LTM8047
LTM4628	LTM8048
LTM4630	LTM8050
LTM4630-1	LTM8052
LTM4633	LTM8052A
LTM4634	LTM8054
LTM4637	LTM8055
LTM4639	LTM8056
LTM4641	LTM8057
LTM4644	LTM8058
LTM4648	

μModule® BGA Package Construction (Not to Scale)



Linear Technology introduces eutectic SnPb (tin-lead) ball BGA package options for 53 μModule power products. SnPb BGA μModule products can be distinguished by the package top mark (e0) complying with JEDEC standard J-STD-609. Download the [BGA manufacturing guidelines](#) for PCB assembly.

If you desire a product in a tin-lead BGA that is not listed on the left, [contact](#) your Linear Technology sales representative or call +1-408-432-1900. For technical support or other questions use our [online submission form](#).



Step-Down



Step-Up & Down



Digital Power
System Management



Multiple Output



Isolated



Step-Up & Down

Function	Input Voltage (V)		Output Voltage (V)		Output Current † (A)	Clock Sync Range (MHz)	Extended Temp Range (°C)	Parallelable Outputs (Total I _{OUT})	Inductor	BGA Package Dimensions (mm)	Part Number
	Min	Max	Min	Max							
Step-Up and Down	2.8	18	±2.5	±15	Up to 0.7	0.2 to 2.0	-55 to 125	–	Internal	6.25 × 11.25 × 4.92	LTM8045
	5	36	1.2	36	5.4	0.2 to 0.7	-55 to 125	×2 (10.8A)	Internal	11.25 × 15 × 3.42	LTM8054
	5	58	1.2	48	5.4	0.2 to 0.7	-55 to 125	×2 (10.8A)	Internal	15 × 15 × 4.92	LTM8056
	5	36	1.2	36	8.5	0.2 to 0.7	-55 to 125	×2 (17A)	Internal	15 × 15 × 4.92	LTM8055
	4.5	36	0.8	34	10	0.2 to 0.4	-55 to 125	×4 (16A)††	External	15 × 15 × 3.42	LTM4609

†Output current is different in step-down and step-up operating mode.

††Step-up mode



Isolated

Function	Isolation Rating	Output Channels	Input Voltage (V)		Output Voltage (V)		Output Ripple	Output Power (W)	Temp Range (°C)	UL Recognized	BGA Package Dimensions (mm)	Part Number
			Min	Max	Min	Max						
Isolated	725VDC	1	3.1	32	2.5	12	35mV _{P,P}	1.5	-55 to 125	-	9 x 11.25 x 4.92	LTM8047
		2	3.1	32	1.2	12	1mV _{P,P}	1.5 Combined	-55 to 125	-	9 x 11.25 x 4.92	LTM8048
	2kVAC (3kVDC)	1	3.1	31	2.5	12	10mV _{P,P}	1.5	-55 to 125	UL60950	9 x 11.25 x 4.92	LTM8057
		2	3.1	31	1.2	12	1mV _{P,P}	1.5 Combined	-55 to 125	UL60950	9 x 11.25 x 4.92	LTM8058
		1	3.1	31	1.8	12	50mV _{P,P}	2.5	-55 to 125	UL60950	9 x 15 x 4.92	LTM8046



Step-Down

Function	Input Voltage (V)		Output Voltage (V)		Output Capability per Channel	Temp Range (°C)	Parallelable Outputs (Total I _{OUT})	BGA Package Dimensions (mm)	Part Number
	Min	Max	Min	Max					
Single Output Step-Down	4.5	36	1.2	18	0.6A	-55 to 125	x1 (0.6A)	6.25 x 11.25 x 3.42	LTM8029
	3.6	36	0.8	10	2A	-55 to 125	x2 (4A)	9 x 11.25 x 3.42	LTM8023
	3.6	36	0.8	10	2A	-55 to 125	x2 (4A)	9 x 15 x 3.42	LTM8032
	3.6	58	0.8	24	2A	-55 to 125	x2 (4A)	9 x 15 x 4.92	LTM8050
	3.6	36	0.8	24	3A	-55 to 125	x2 (6A)	9 x 15 x 4.92	LTM8025
	3.6	36	0.8	24	3A	-55 to 125	x2 (6A)	11.25 x 15 x 4.92	LTM8033
	4*	20	0.6	5.5	3A	-40 to 125	x12 (36A)	6.23 x 6.25 x 2.42	LTM4623
	2.375	5.5	0.8	5	4A	-40 to 125	x2 (8A)	9 x 15 x 3.42	LTM4604A
	4*	14	0.6	5.5	4A	-40 to 125	x1 (4A)	6.25 x 6.25 x 5.01	LTM4624
	4.5	60	2.5	24	4A	-55 to 125	x2 (8A)	15 x 15 x 4.92	LTM8027
	6	36	0.8	1.8	5A	-55 to 125	x2 (10A)	15 x 15 x 4.92	LTM8028
	4	20	0.6	5.5	5A	-40 to 125	x12 (60A)	6.25 x 6.25 x 5.01	LTM4625
	6	36	1.2	24	5A	-55 to 125	x2 (10A)	11.25 x 15 x 2.82	LTM8026
	6	36	1.2	24	5A	-55 to 125	x1 (5A)	11.25 x 15 x 3.42	LTM8052
	6	36	1.2	24	5A	-55 to 125	x1 (5A)	11.25 x 15 x 3.42	LTM8052A
	4.5	28	0.6	5	6A	-55 to 125	x2 (12A)	15 x 15 x 3.42	LTM4606
	2.7	5.5	0.6	5	8A	-55 to 125	x4 (32A)	15 x 15 x 3.42	LTM4608A
	5	36	3.3	15	8A	-40 to 125	x2 (16A)	15 x 15 x 4.92	LTM4613
	2.375	5.5	0.6	5	10A	-40 to 125	x3 (30A)	9 x 15 x 4.92	LTM4648
	4.5	16	0.6	3.3	10A	-40 to 125	x3 (30A)	9 x 15 x 4.92	LTM4649
	4.5	38	0.6	6	10A	-55 to 125	x4 (40A)	15 x 15 x 5.02	LTM4641
	4.5	20	0.6	5	12A	-40 to 125	x4 (48A)	15 x 15 x 3.42	LTM4601†
	4.5	20	0.6	5	12A	-40 to 125	x4 (48A)	15 x 15 x 3.42	LTM4601-1†
	4.5	20	0.6	5	12A	-40 to 125	x4 (48A)	15 x 15 x 3.42	LTM4601A†‡
	4.5	20	0.6	5	12A	-40 to 125	x4 (48A)	15 x 15 x 3.42	LTM4601A-1†‡
	4.5	28	0.6	5	12A	-55 to 125	x4 (48A)	15 x 15 x 3.42	LTM4601AHV†‡
	4.5	20	0.6	5	15A	-55 to 125	x4 (60A)	15 x 15 x 4.92	LTM4627
	4.5	20	0.6	5.5	20A	-40 to 125	x4 (80A)	15 x 15 x 4.92	LTM4637
	2.375	7	0.6	5.5	20A	-40 to 125	x4 (80A)	15 x 15 x 4.92	LTM4639
Multiple Output Step-Down	6	36	0	24	Five: 1A	-55 to 125	x10 (10A)	15 x 15 x 3.42	LTM8001
	4*	14	0.6	5.5	Quad: 4A	-40 to 125	x4 (60A)	9 x 15 x 5.01	LTM4644
	4.75	28	0.8	5.5, 13.5	Triple: 5A, 5A, 4A	-40 to 125	x2 (10A)	15 x 15 x 5.01	LTM4634
	2.7	5.5	0.6	5	Dual: 8A	-55 to 125	x4 (32A)	15 x 15 x 3.42	LTM4616
	4.5	26.5	0.6	5.5	Dual: 8A	-40 to 125	x4 (32A)	15 x 15 x 4.92	LTM4628
	4.7*	16	0.8	1.8, 5.5	Dual: 10A	-55 to 125	x2 (20A)	15 x 15 x 5.01	LTM4633
	4.5	16	0.6	2.5	Dual: 13A	-40 to 125	x8 (100A)	15 x 15 x 5.01	LTM4620
	4.5	16	0.6	5.3	Dual: 13A	-40 to 125	x8 (100A)	15 x 15 x 5.01	LTM4620A
	4.5	15	0.6	1.8	Dual: 18A	-40 to 125	x4 (144A)	16 x 16 x 5.01	LTM4630
	4.5	15	0.6	1.8	Dual: 18A	-40 to 125	x8 (144A)	16 x 16 x 5.01	LTM4630-1

† LTM4601, LTM4601A, LTM4601HV and LTM4601AHV offer precision remote sense (see page 8). Devices ending with "-1" do not.

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

*Minimum Input Voltage can be reduced to 2.375V with external bias voltage

Digital Power
System
Management

Function	# of Outputs	Input Voltage (V)		Output Voltage (V)		Output Current per Channel (A)	Read Back Accuracy		Turn-On Time (ms)	BGA Package Dimensions (mm)	Part Number
		Min	Max	Min	Max		Voltage	Current			
Digital Power System Management	2	4.5	17	0.5	5.5	Dual: 9	0.5%	2.5%	70	16 x 11.9 x 3.51	LTM4675
		4.5	26.5	0.5	5.4	Dual: 13	1.0%	2.5%	170	16 x 16 x 5.01	LTM4676
		4.5	17	0.5	5.5	Dual: 13	0.5%	2.5%	70	16 x 16 x 5.01	LTM4676A
		4.5	16	0.5	1.8	Dual: 18	0.5%	2.5%	70	16 x 16 x 5.01	LTM4677