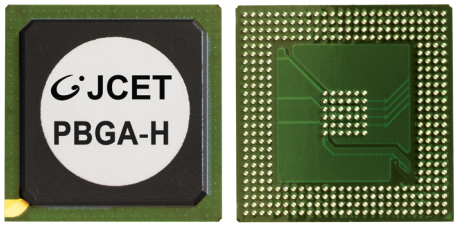
PBGA-H

Plastic Ball Grid Array - Heat Spreader

Highlights

- Cost effective drop-in thermal solution
- Wide range of body sizes tooled to date
- Tail-less substrate options available for improved electrical performance and routing density
- Available in eutectic, Pb-free and green bill of materials



Features

- Full in-house package and substrate design capability
- Full in-house electrical, thermal and mechanical simulation and measurement capability
- Multiple metal layer options for signal, power and ground planes for improved electrical performance
- High density routing and tailless substrate technology
- Formed 1 piece, drop-in heat spreader
- Wide range of custom and open tool designs available
- Flexible body sizes ranging from 15mm x 15mm to 40mm x 40mm
- 0.65, 0.80, 1.00, 1.27mm and 1.5mm ball pitch with greater than 1000 I/O available
- Perimeter or full ball array
- Pb free and green material sets available
- Multiple chip design and optional passive / discrete components available (SiP)
- JEDEC standard compliant

Applications

- ASIC
- DSPs and Memory
- Gate Arrays
- Microprocessors/Controllers/Graphics
- PC Chipsets and Peripherals
- Graphics Processors
- Set Top Boxes
- Game Consoles
- Gigabit Ethernet

Description

BGA technology was first introduced as a solution for the increasingly high lead counts required for advanced semiconductors used in applications such as portable computers and wireless telecommunications. As the number of leads surrounding the ICs increased, high lead count packages experienced significant electrical shorting problems. BGA technology solved this problem by effectively creating leads on the bottom surface of the package in the form of small bumps or solder balls. BGA packages can be used for high performance applications with high I/O connections and high thermal and electrical requirements. The characteristics of BGA packages make them suitable for a wide variety of devices used in computing platforms, networking, hand-held consumer products, wireless communications devices, video cameras, home electronic devices and game consoles.

We offer a Plastic Ball Grid Array - Heat Spreader (PBGA-H) version, which is a cost-effective, thermally enhanced version of the PBGA package that features a formed, one piece heat spreader integrated into the mold cap and exposed at the PBGA package surface. This enables further board or system level thermal enhancement by the package end-user.

The PBGA-H leverages our extensive portfolio of tooled PBGA body sizes and ball counts. PBGA-H packages utilize the most advanced design, characterization, and assembly processes and materials available, resulting in the industry's highest quality, reliability, and performance.

Green and lead-free material sets are available for all PBGA package types.

Specifications

Die Thickness	150-381µm (6-15mils)
Gold Wire	15-30µm (0.6/0.7/0.8/0.9/1.0/1.1/1.2mils) diameter
Pd/Cu Wire	15-30µm (0.6/0.7/0.8/1.0mils) diameter
Bond Pad Pitch	45µm inline or 25/50µm staggered capable
Mold Cap Thickness	0.7-1.17mm
Marking	Laser
Packing Options	JEDEC tray/tape & reel

Reliability

Moisture Sensitivity Level	JEDEC Level 3
Temperature Cycling	–65°C to 150°C, 1000 cycles (typical)
High Temperature Storage	150°C, 1000 hrs (typical)
Pressure Cooker Test	121°C, 100% RH/2 atm, 168 hrs
Liquid Thermal Shock	(Condition B) -55°C/125°C, 1000 cycles

Thermal Performance θja (°C/W)

Thermal performance is highly dependent on package size, die size, substrate layers and thickness, and land configuration. Simulation for specific applications should be performed to obtain maximum accuracy.

Package	Ball Count	Die Size (mm)	Thermal Performance θja (C/W)
27 x 27 (4L)	256	7.8 x 7.8	18.0
27 x 27 (4L)	272	7.8 x 7.8	17.3
35 x 35 (4L)	388	10.2 x 10.2	13.7

Note: Simulation data for package mounted on 4 layer PCB (per JEDEC JESD51-9) under natural convection as defined in JESD51-2.

Electrical Performance

Electrical parasitic data is highly dependent on the package layout. 3D electrical simulation can be used on the specific package design to provide the best prediction of electrical behavior. First order approximations can be calculated using parasitics per unit length for the constituents of the signal path. Data below is for a frequency of 100MHz and assumes 1.0 mil gold bonding wire.

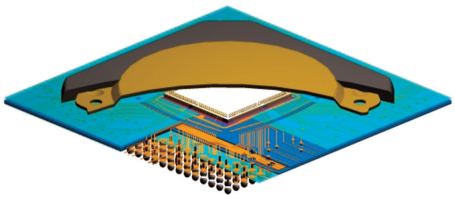
Conductor Component	Length (mm)	Resistance (mOhms)	Inductance (nH)	Inductance Mutual (nH)	Capacitance (pF)	Capacitance Mutual (pF)
Wire	2	120	1.65	0.45 - 0.85	0.10	0.01 - 0.02
Net (2L)	2 - 7	34 - 119	1.3 - 4.55	0.26 - 2.28	0.25 - 0.95	0.06 - 0.42
Total (2L)		154 - 239	2.95 - 6.2	0.71 - 3.13	0.35 - 1.05	0.07 - 0.44
Wire	2	120	1.65	0.45 - 0.85	0.10	0.01 - 0.02
Net (4L)	2 - 7	34 - 119	0.90 - 3.15	0.18 - 1.58	0.35 - 1.10	0.06 - 0.42
Total (4L)		154 - 239	2.55 - 4.80	0.63 - 2.43	0.45 - 1.20	0.07 - 0.44

Note: Results are simulated values per JEDEC EIA/JEP123 standards.

Cross Section

Body Size (mm)	Ball Count
17 x 17	192, 196, 208, 217, 252, 256
17.2 x 17.2	512
19 x 19	272, 289, 292, 296, 297, 300, 301, 305, 324, 376
21 x 21	400, 456, 484
23 x 23	169, 192, 208, 217, 233, 241, 288, 301, 304, 305, 318, 320, 324, 338, 340, 348, 352, 360, 376, 385, 388, 420, 456, 480, 484, 492
27 x 27	225, 256, 272, 277, 292, 300, 312, 316, 320, 324, 336, 352, 384, 388, 400, 416, 456, 472, 480, 484, 496, 508, 512, 544, 580, 585, 636, 650, 676
31 x 31	304, 320, 353, 385, 421, 433, 434, 448, 458, 460, 480, 540, 556, 560, 564, 604, 608, 609, 640, 644, 652, 676, 688, 692, 701, 721, 772, 896
35 x 35	304, 312, 313, 340, 352, 385, 388, 400, 420, 426, 432, 448, 452, 454, 456, 458, 474, 480, 484, 492, 496, 512, 516, 532, 542, 544, 548, 556, 564, 573, 580, 611, 624, 640, 648, 661, 665, 676, 680, 688, 700, 716, 729, 736, 740, 748, 756, 792, 816, 824, 840, 867, 868, 1012, 1156
37.5 x 37.5	435, 480, 552, 600, 601, 625, 627, 685, 701, 785, 788, 804, 840, 841
40 x 40	503, 557, 569, 596, 600, 745, 776, 928, 961, 1253

Package Configurations



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