



## LQFP PowerQuad® 2 Packages:

LQFP PowerQuad® 2 (PQ2) is the same Amkor patented, advanced IC packaging technology used in plastic QFPs but applied to Low Profile 1.4 mm QFPs (LQFP). This breakthrough in IC packaging provides extraordinary gains in power dissipation and speed through the use of innovative integrated, embedded copper heatsink. The IC is attached directly to the large, highly-efficient copper heatsink which readily dissipates generated heat. To enhance the thermal conduction from the IC to the mounting surface, the LQFP PQ2 package leads are mechanically connected, yet electrically isolated, to the heatsink by a proprietary process. Thermal resistance improvements greater than 55% are realized with this technology and without the use of any external cooling aids! The large heatsink also provides a “floating” ground plane to the signal leads of the package thereby reducing self-inductance by 50% over conventional plastic LQFPs. In addition, the patented LQFP PQ2 heatsink has integrated mechanical “locking” features to ensure total package integrity and eliminates moisture penetration. The end result is a high-power, high-speed IC package with the properties to enable new, smaller, denser, portable electronic products and emerging end applications to move from concept to production.

## Applications:

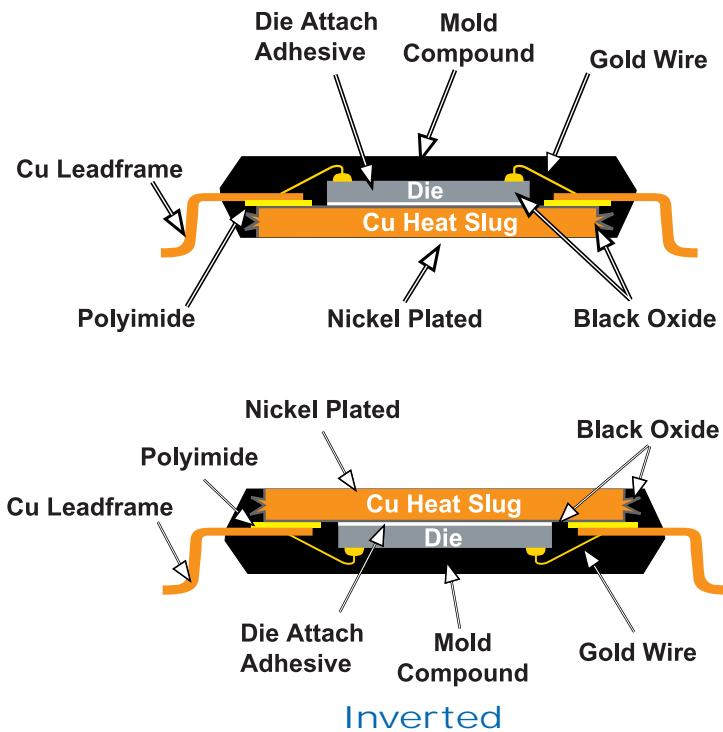
Major semiconductor manufacturers and packaging engineers have chosen LQFP PQ2 as the IC package of choice for power microprocessors, controllers, DSPs, high speed logic/FPGAs, PLDs, ASICs and other advanced technologies. System designers and OEM product developers find the LQFP PQ2 solves power, thermal and speed concerns while supporting system constraints (standard package outlines, cost, SMT capability, product availability, technical support) in uses such as: laptops, notebooks, telecom, cordless/wireless, high-end audio/video, CPU/GUI board systems and many other small form-factor applications.

## LQFP PowerQuad® 2

Features:	<p>High-performance operation and attributes of the LQFP PowerQuad® 2 include the following:</p> <ul style="list-style-type: none"> <li>• High conductive, solid exposed heatsink</li> <li>• 1.4 mm body for lightweight, portable applications</li> <li>• Direct die attach to heatsink</li> <li>• 50% reduction in package self-inductance</li> <li>• 50% improvement in <math>\theta_{JA}</math> over standard LQFP</li> <li>• 32 to 144 lead counts</li> <li>• 7 x 7 - 20 x 20 mm body sizes (JEDEC standard packages MS-026)</li> <li>• Heatsink-up and down configurations available</li> </ul>																																										
Thermal Resistance:	<p><b>Single-Layer PCB</b></p> <table border="1"> <thead> <tr> <th rowspan="2">Pkg</th> <th rowspan="2">Body Size (mm)</th> <th rowspan="2">Pad Size (mm)</th> <th colspan="3">Theta JA (°C/W) by Velocity (LFPM)</th> </tr> <tr> <th>0</th> <th>200</th> <th>500</th> </tr> </thead> <tbody> <tr> <td>100 ld</td> <td>14 x 14</td> <td>8.4</td> <td>34.1</td> <td>26.8</td> <td>22.7</td> </tr> <tr> <td>208 ld</td> <td>28 x 28</td> <td>14.0</td> <td>20.4</td> <td>15.6</td> <td>13.3</td> </tr> </tbody> </table> <p><b>Multi-Layer PCB</b></p> <table border="1"> <thead> <tr> <th rowspan="2">Pkg</th> <th rowspan="2">Body Size (mm)</th> <th rowspan="2">Pad Size (mm)</th> <th colspan="3">Theta JA (°C/W) by Velocity (LFPM)</th> </tr> <tr> <th>0</th> <th>200</th> <th>500</th> </tr> </thead> <tbody> <tr> <td>100 ld</td> <td>14 x 14</td> <td>8.4</td> <td>18.1</td> <td>15.5</td> <td>14.1</td> </tr> <tr> <td>208 ld</td> <td>28 x 28</td> <td>14.0</td> <td>12.8</td> <td>10.4</td> <td>9.3</td> </tr> </tbody> </table> <p>Pre-JEDEC Standard Test Boards</p>	Pkg	Body Size (mm)	Pad Size (mm)	Theta JA (°C/W) by Velocity (LFPM)			0	200	500	100 ld	14 x 14	8.4	34.1	26.8	22.7	208 ld	28 x 28	14.0	20.4	15.6	13.3	Pkg	Body Size (mm)	Pad Size (mm)	Theta JA (°C/W) by Velocity (LFPM)			0	200	500	100 ld	14 x 14	8.4	18.1	15.5	14.1	208 ld	28 x 28	14.0	12.8	10.4	9.3
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Reliability:	<p>Advanced design, manufacturing processes and materials assure long-term reliable performance.</p> <ul style="list-style-type: none"> <li>• Temp cycle -65/+150 °C, 1000 cycles</li> <li>• Thermal shock (liq) -65/+150 °C, 1000 cycles</li> <li>• Autoclave 121 °C, 2 atm, 168 hours</li> <li>• Temp/Humidity 85 °C/85%RH, 1000 hours</li> <li>• High temp storage 150 °C, 1000 hours</li> </ul>																																										

## LQFP PowerQuad® 2

### Cross-sections LQFP PowerQuad® 2



### Process Highlights

Die thickness (max)	15.0 mils
Strip solder plating	85/15 Sn/Pb
Marking	Pad
Lead inspection	Laser/Optical
Pack/ship options	Bar Code/Dry Pack/TNR

### Test Services

- Program generation/conversion
- Product engineering
- Wafer sort
- 256 Pin x 20 MHz test system available
- -55 °C to +165 °C test available
- Burn-in

### Shipping

Low profile tray (JEDEC Outline CS-007)

### Configuration Options:

#### LOW PROFILE POWERQUAD® 2 PACKAGE FAMILY (mm)

Lead Count	Body Size (mm)	Body Thickness (mm)	Lead Pitch (mm)	Form Length (mm)	Tip To Tip (mm)	Foot Length (mm)	Board Standoff (mm)	JEDEC Package	Tray Matrix	Units Per Tray
32	7 x 7	1.4	0.80	1.0	9.0	0.60	0.10	MS-026	10 x 25	250
64	14 x 14	1.4	0.80	1.0	16.0	0.60	0.10	MS-026	6 x 15	90
80	14 x 14	1.4	0.65	1.0	16.0	0.60	0.10	MS-026	6 x 15	90
100	14 x 14	1.4	0.50	1.0	16.0	0.60	0.10	MS-026	6 x 15	90
128	14 x 14	1.4	0.40	1.0	16.0	0.60	0.10	MS-026	6 x 15	90
128	20 x 20	1.4	0.50	1.0	22.0	0.60	0.10	MS-026	5 x 12	60
144	20 x 20	1.4	0.50	1.0	22.0	0.60	0.10	MS-026	5 x 12	60

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