



Features

- ▶ 10 x 10 mm to 32 x 32 mm body size
- ▶ 44-240 lead counts
- ▶ Custom leadframe design available
- ▶ Die up and down configurations
- ▶ High conductivity copper leadframes
- ▶ JEDEC standard compliant package outlines
- ▶ Integrated thermal enhancement available with heat spreader
- ▶ Fine pitch wire bond capability
- ▶ Pb-free material sets

Applications

Amkor's MQFP line is adapted to meet the increasing challenges of advanced Digital Signal Processors (DSP), microcontrollers, ASIC, gate arrays (FPGA/PLD), and other technologies. These packages fill application needs in commercial, office, industrial and other product areas.

MQFP

Amkor's MQFP (Metric Quad Flat Pack) packages allow IC packaging engineers and systems designers the flexibility of growing or shrinking IC package size based upon application need. Amkor uses the most up-to-date materials and processes along with advanced equipment, to ensure successful, reliable performance of our IC devices. A complete line of MQFP packages are available to provide security, convenience and success.

Thermal Enhancement

Some designs and applications require an added margin of thermal performance (power). Amkor's easy and cost-effective solution is a heat spreader. This optional embedded thermal aid improves Theta JA by as much as 15% (without external heat sinks or fans) by supplementing the heat dissipation path from the IC chip to the PCB.

Thermal Performance

Multi-layer PCB, JEDEC Standard Test Boards

Package	Body Size (mm)	Pad Size (mm)	θ_{JA} at (°C/W) by Velocity (LFPM)		
			0	200	500
32 Ld	7 x 7	5 x 5	67.8	55.9	50.1
100 Ld	14 x 14	8 x 8	41.5	33.4	29.5
144 Ld	20 x 20	8.5 x 8.5	38.0	31.2	28.1
176 Ld	24 x 24	8 x 8	38.3	31.9	29.0

* Pre-JEDEC Standard Test Boards, Tested @ 1W

Electrical Performance

Simulated Results @ 100 MHz

Package	Body Size (mm)	Pad Size (mm)	Lead	Inductance (nH)	Capacitance (pF)	Resistance (mΩ)
32 Ld	7 x 7	5 x 5	Longest Shortest	0.904 0.799	0.211 0.202	9.2 7.8
48 Ld	7 x 7	5 x 5	Longest Shortest	1.110 0.962	0.225 0.200	13.8 12.0
100 Ld	14 x 14	8 x 8	Longest Shortest	2.300 1.520	0.419 0.322	26.3 17.8
144 Ld	20 x 20	8.5 x 8.5	Longest Shortest	6.430 4.230	1.100 1.070	62.9 52.6
176 Ld	24 x 24	8 x 8	Longest Shortest	9.510 5.200	1.270 1.340	89.0 64.0

MQFP

Reliability Qualification

Amkor devices are assembled in optimized package designs with proven reliable semiconductor materials.

- ▶ Moisture Sensitivity Characterization: JEDEC Level 3, 30°C/60% RH, 192 hours
- ▶ Temp Cycle: -65°C/+150°C, 1000 cycles
- ▶ Temp/Humidity: 85°C/85% RH, 1000 hours
- ▶ High Temp Storage: 150°C, 1000 hours

Process Highlights

- ▶ Die thickness: Target 18-20 mils (13 min to 25 max)
- ▶ Wirebond: 0.8 mil, 1.0 mil PCC Std
- ▶ Solder plating: Matte Sn
- ▶ Marking: Laser
- ▶ Lead inspection: Laser/optical
- ▶ Pack/ship options: Bar code, dry pack

Test Services

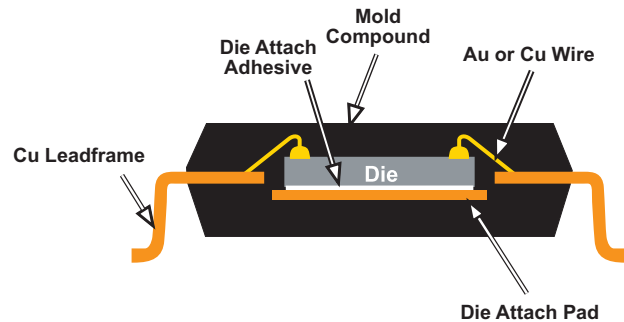
- ▶ Program generation/conversion
- ▶ Product engineering support
- ▶ Wafer sort
- ▶ Final test
- ▶ Tri-temp test capability

Shipping

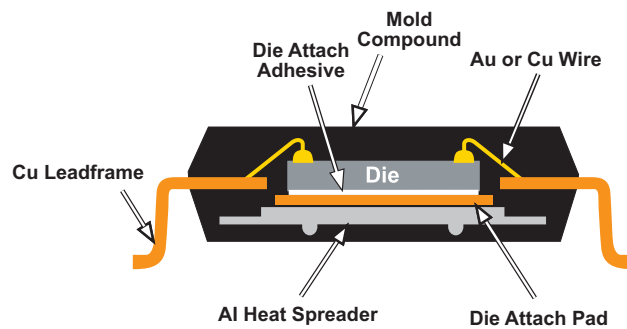
- ▶ JEDEC outline CS-004 low profile tray
 - ▷ Bakable (125°C and 150°C)
 - ▷ Non-bakable

Cross Section MQFP

Standard MQFP



MQFP with Drop-in Al Heat Spreader



MQFP

Configuration Options

MQFP Nominal Package Dimensions (mm)

Lead Count	Body Size	Body Thickness	Lead Form	Standoff	Tip-to-Tip	JEDEC	Tray Matrix	Units Per Tray
44/52/64	10 x 10	2.00	1.60	0.15	13.2	MO-022	6 x 16	96
44/52/64	10 x 10	2.00	1.95	0.15	13.9	MS-112	6 x 16	96
52/64/80/100	14 x 14	2.67	1.60	0.15	17.2	MS-022	6 x 14	84
52/64/80/100	14 x 14	2.67	1.95	0.15	17.9	MS-112	6 x 14	84
64/80/100/128	14 x 20	2.71	1.60	0.33	17.2 x 23.2	MS-022	6 x 11	66
64/80/100/128	14 x 20	2.71	1.95	0.23	17.9 x 23.9	MS-012	6 x 11	66
120/128/144/160/208/256	28 x 28	3.37	1.30	0.13	30.6	MS-029	3 x 8	24
120/128/144/160/208/256	28 x 28	3.37	1.30	0.33	30.6	MS-029	3 x 8	24
120/128/144/160/208/256	28 x 28	3.37	1.60	0.33	31.2	MS-022	3 x 8	24
240	32 x 32	3.40	1.30	0.38	34.6	MS-029	3 x 8	24
240	32 x 32	3.40	1.30	0.32	34.6	MS-029	3 x 8	24



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