LQFP

Amkor offers a broad line of LQFP (Low-profile Quad Flat Package) IC packages designed to provide the same great benefits as TQFP packaging with a 1.4 mm body thickness. These packages allow IC packaging engineers, component specifiers and systems designers to solve issues such as increasing board density, die shrink programs and thin end-product profile.

FEATURES

- 7 x 7 mm to 28 x 28 mm body size with 1.4 mm body thickness
- 32-256 lead counts
- Pre-plated frame options
- Inverted pad configuration
- Cu, Ag and Au wire available
- Large selection of die pad sizes and custom leadframe design available
- Optimal for stacked die
- Pb-free RoHs compliant materials

APPLICATIONS

Amkor's LQFPs are an ideal package for most IC semiconductor technologies such as ASIC, PMU controllers, microprocessors, gate arrays (FPGA/PLD) and PC chip sets.

LQFP packages are particularly well suited for electronic systems requiring broad performance characteristics. Such applications include laptop PCs, video/audio, telecom, RF, data acquisition, set-top box, communication boards and automotive.

Thermal Performance

Single-Layer PCB

Package	Body Size (mm)	Pad Size (mm)	θJA 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

JEDEC standard test boards

Multi-Layer PCB

Package	Body Size (mm)	Pad Size (mm)	θJA at (°C/W) by Velocity (LFPM)		
			0	200	500
32 Ld	7 x7	5 x 5	47.9	42.1	39.4
100 Ld	14 x 14	8 x 8	31.7	26.8	24.7
144 Ld	20 x 20	8.5 x 8.5	31.7	26.9	24.9
176 Ld	24 x 24	8 x 8	31.9	27.3	25.4
208 Ld*	28 x 28	16 x 16	18.1	15.3	14.4

JEDEC standard test boards
*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
208 Ld	28 x 28	11 x 11	Longest Shortest	9.670 6.190	1.380 1.210	86.2 64.8

Amkor Technology®

LQFP

Reliability Qualification

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

Commercial Reliability Levels

- Moisture sensitivity characterization: JEDEC level 3, 30°C/60% RH, 192 hours
- Temp cycle "C": -65°C/+150°C, 500 cycles
- uHAST: 130°C/85% RH, 96 hours
- High temp storage: 150°C, 1000 hours
- AEC-Q100 qualified

Process Highlights

- Die thickness: 14.5 ± .5 mil
- Strip solder plating: Matte Sn, pre-plated Ni/Pd frames, roughened Cu leadframe option
- Marking: Laser
- Lead inspection: Laser/optical
- Pack/Ship options: Barcode, dry pack
- Wafer backgrinding available

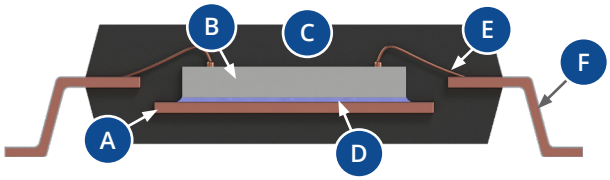
Test Services

- Program generation/conversion
- Product engineering support
- Wafer sort
- -55°C to +165° test available

Shipping

- JEDEC outline CO-124 low-profile tray
- Tape and reel

Cross Section LQFP



- A Die attach pad
- B Die
- C Mold compound
- D Die attach adhesive
- E Wire
- F Cu leadframe

Configuration Options

LQFP Nominal Package Dimensions (mm)

Lead Count	Body Size	Body Thickness	Lead Form	Standoff	Foot Length	Tip-to-Tip	JEDEC	Tray Matrix	Units Per Tray
32/48/64	7 x 7	1.40	1.00	0.10	0.60	9.0	MS-026	10 x 25	250
44/52/64/80	10 x 10	1.40	1.00	0.10	0.60	12.0	MS-026	8 x 20	160
80	12 x 12	1.40	1.00	0.10	0.60	14.0	MS-026	7 x 17	119
64/80/100/120/128	14 x 14	1.40	1.00	0.10	0.60	16.0	MS-026	6 x 15	90
128/144/176	20 x 20	1.40	1.00	0.10	0.60	22.0	MS-026	5 x 12	60
160/176/216	24 x 24	1.40	1.00	0.10	0.60	26.0	MS-026	4 x 10	40
280/256	28 x 28	1.40	1.00	0.10	0.60	30.0	MS-026	4 x 9	36

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