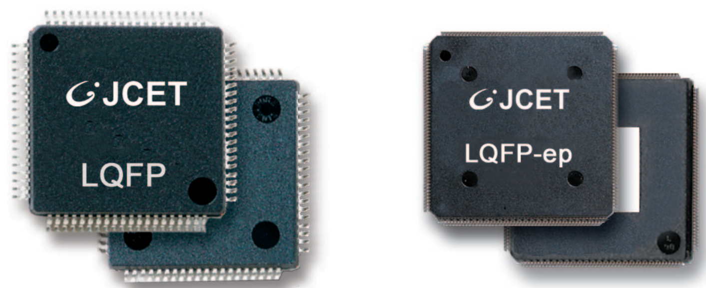
LQFP

Low Profile Quad Flat Pack

Highlights

- 7 x 7mm to 28 x 28mm body sizes
- 32 to 208 lead counts
- Lead pitch range from 0.80mm to 0.40mm



Features

- Body Sizes: 7 x 7mm to 28 x 28mm
- Package Height: 1.4mm
- Lead Counts: 32L to 208L
- Lead Pitch: 0.80mm to 0.40mm
- Available in gold or copper wirebond versions
- Wide range of open tool leadframe and die pad sizes available
- Moisture Sensitivity: JEDEC Level 3
- JEDEC standard compliant
- Lead-free, Green and Low Alpha materials sets available

Description

LQFP is a low profile (1.4mm) version of the QFP. The LQFP is a leadframe based, plastic encapsulated package with gull wing shaped leads on four sides. The LQFP offers pin counts up to 208, and is suitable for designs with high I/Os while meeting low profile requirements. They are used for mainstream cost sensitive applications.

We also offer LQFP in an Exposed Pad configuration (LQFP-ep). This is a thermally enhanced version of the LQFP package. Thermal enhancement is achieved by means of an exposed die pad, which can be soldered to a mother PC board for effective heat removal and grounding, if needed. This enhanced thermal package is made possible by a deep downset die pad leadframe design.

Applications

- 3D Graphics
- Multimedia
- PC Chipsets
- Video / Audio
- Telecom
- Disc Drives
- Communication Boards (Ethernet, ISDN)

Specifications

Die Thickness	280-340µm (11-17mils) range preferred
Wire	
Gold:	18-30µm (0.7-1.2mils) diameter
Copper:	18-30µm (0.7-1.2mils) diameter
Lead Finish	Matte Tin
Marking	Laser
Packing Options	Tape & reel, tube, JEDEC tray

Reliability

Moisture Sensitivity Level	JEDEC Level 3
Temperature Cycling	-65°C/150°C, 1000 cycles
High Temperature Storage	150°C, 500 hrs
Pressure Cooker Test	121°C, 100% RH, 2 atm, 168 hrs
Liquid Therapy Shock (opt)	-55°C/125°C, 1000 cycles

LQFP Thermal Performance θja (°C/W)

Package Size	Body Size (mm)	Pad Size (mm)	Die Size (mm)	Thermal Performance θja (C/W)
48L	7 x 7 x 1.4	5.3 x 5.3	3.8 x 3.8	50.0
100L	14 x 14 x 1.4	9.0 x 9.0	7.8 x 7.8	37.2
208L	28 x 28 x 1.4	9.0 x 9.0	7.8 x 7.8	32.1

Note: Simulation data for package mounted on 4 layer PCB (per JEDEC JESD51-7) under natural convection as defined in JESD51-2.

LQFP-ep Thermal Performance θja (°C/W)

Package Size	Body Size (mm)	Pad Size (mm)	Die Size (mm)	PCB Vias	Thermal Performance θja (C/W)
48L	7 x 7 x 1.0	5.5 x 5.5	5.3 x 5.3	25	26.9
64L	10 x 10 x 1.0	6.5 x 6.5	6.0 x 6.0	36	24.0
80L	12 x 12 x 1.0	7.2 x 7.2	6.0 x 6.0	36	23.0

Note: Simulation data for package mounted on 4 layer PCB (per JEDEC JESD51-7) under natural convection as defined in JESD51-2. Based on TQFP-ep simulations.

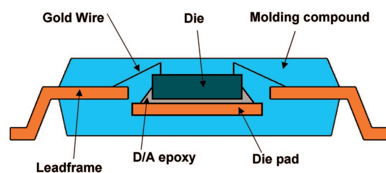
Electrical Performance

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. Data below is for a frequency of 100MHz and assumes 1.0 mil gold bonding wire.

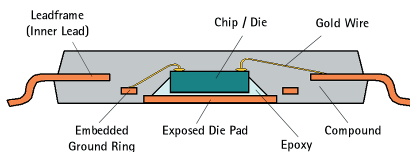
Conductor Component	Length (mm)	Resistance (mOhms)	Inductance (nH)	Mutal Inductance (nH)	Capacitance (pF)	Capacitance Mutual (pF)
Wire	2	120	1.65	0.45 - 0.85	0.10	0.01 - 0.02
Lead (7 x 7mm, 32L)	1.4 - 2.2	11.0 - 18.0	0.64 - 0.99	0.31 - 0.49	0.21 - 0.33	0.07 - 0.12
Total (7 x 7mm, 32L)		131 - 138	2.29 - 2.64	0.76 - 1.34	0.31 - 0.43	0.08 - 0.14
Wire	2	120	1.65	0.45 - 0.85	0.10	0.01 - 0.02
Lead (14 x 14mm, 128L)	3.0 - 4.5	24.0 - 36.0	1.96 - 2.92	1.08 - 1.61	0.45 - 0.67	0.20 - 0.30
Total (14 x 14mm, 128L)		144.0 - 156.0	3.61 - 4.57	1.53 - 2.46	0.55 - 0.77	0.21 - .032

Cross Sections

LQFP



LQFP-ep



Package Configurations

Package	Size (mm)	Lead Count
LQFP	7 x 7	32, 48, 64
	10 x 10	44, 64, 80
	14 x 14	64, 80, 100, 120
	20 x 20	144, 176
	24 x 24	176
	28 x 28	208
LQFP-ep	10 x 10	64
	14 x 14	64, 80, 100
	20 x 20	144, 176
	24 x 24	176

NOTE: Other LQFP-ep packages available with tooling up in an exposed pad leadframe design.

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