

# QFNs-st

## Quad Flat No-Lead Package (Stand-off Terminal)

### Highlights

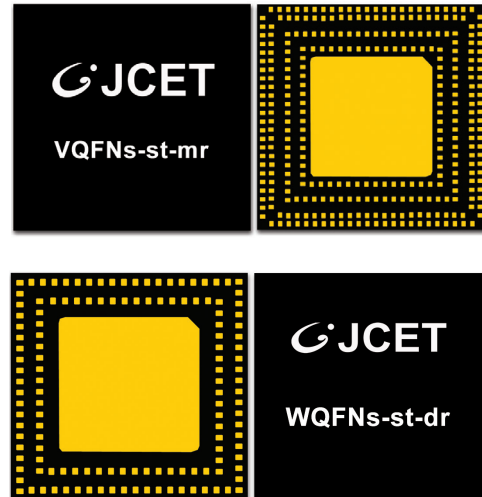
- Saw singulated, stand-off terminal version
- Square or rectangular body sizes
- Leads on 4 sides of the body (QFN)
- 25-50µm stand off
- Multi row lead design options
- Thin package thickness options: 0.80 & 1.0mm
- In-strip testing ready

### Features

- Body sizes: 6 x 6mm to 15 x 15mm
- Pin counts from 52L up to 700L
- Lead pitch: 0.40 and 0.50 with other options available
- High I/O configurations available (up to 700L, multi row)
- Custom I/O configuration options available
- Available in gold or copper wirebond versions
- Use of compression molding for long wire lengths
- 0.80mm and 1.0mm thickness options
- Leadframes are pre-plated (PPF)
- Green materials set
- Excellent thermal and electrical performance
- Full in-house package and leadframe design capability
- Full in-house assembly and test capability
- Full in-house electrical, thermal and mechanical simulation and measurement capability

### Applications

- Computing and Storage
- Telecommunications
- Radio Frequency (RF)
- Analog and Linear
- Logic
- ASICs and DSP



### Description

Our Quad Flat No-Lead Stand-off Terminal (QFNs-st) package features a significantly higher number of I/O terminal pads than traditional QFN packages. Whereas QFP and QFN packages require 0.4mm pitch to accommodate more I/O, QFNs-st can accommodate more I/O with a more relaxed terminal pitch by virtue of allowing multiple rows. QFNs-st has the flexibility to accommodate multiple rows of terminals with either fixed or variable pitch which, in turn, enables board routing for various applications, thereby extending the application and pin count range of this cost effective QFN type package.

The QFNs-st is a leadframe based, plastic encapsulated, chip scale packaging solution in molded array format (saw singulated). An exposed die pad coupled with extremely low RLC provides excellent electrical and thermal performance enhancements, and is especially suited for wireless, handheld portable, computing and storage applications. QFNs-st is available in various body sizes and thicknesses, has a green/lead-free bill of materials and can be mounted by conventional SMT equipment. Board level reliability and drop test have been proven for both mobile and computing applications.

### Test Services

- Product Engineering support
- Probe capability
- Program generation/conversion
- Drop Ship available



## Thermal Performance $\theta_{ja}$ ( $^{\circ}\text{C}/\text{W}$ )

Package Size	Body Size (mm)	Die Size (mm)	Air Flow (m/s)	T <sub>J</sub> ( $^{\circ}\text{C}$ )	T <sub>T</sub> ( $^{\circ}\text{C}$ )	$\theta_{JA}$ ( $^{\circ}\text{C}/\text{W}$ )	$\phi_{JT}$ ( $^{\circ}\text{C}/\text{W}$ )	$\phi_{JB}$ ( $^{\circ}\text{C}/\text{W}$ )
VQFNs-st-dr	7 x 7 x 0.8	3.8 x 3.9	NC	52.2	52.1	27.2	0.15	12.3
VQFNs-st-mr	11.5 x 11.5 x 0.8	5.9 x 5.7	NC	43.64	43.55	18.6	0.09	4.5

Note: Die Power (W) 1.0  
Ambient Temperature 25

## Electrical Performance

Electrical parasitic data is highly dependent on the package layout and wire properties. 3D electrical simulation can be used on the specific package design to provide the best prediction of electrical behavior. Electrical characterization available upon request.

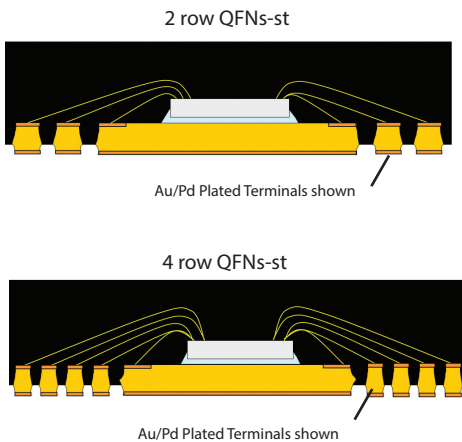
## Specifications

Die Thickness	125-350 $\mu\text{m}$
Wire	
Gold:	18-33 $\mu\text{m}$ (0.7-1.3mils) diameter
Copper:	18-33 $\mu\text{m}$ (0.7-1.2mils) diameter
Lead Finish	Matte Tin or preplated Ni/Pd/Au
Marking	Laser
Packing Options	Tape & reel, tube, JEDEC tray

## Reliability

Moisture Sensitivity Level	JEDEC MSL 3
Temperature Cycling	-65 $^{\circ}\text{C}/150^{\circ}\text{C}$ , 1000 cycles
High Temperature Storage	150 $^{\circ}\text{C}$ , 1000 hrs
Pressure Cooker Test	121 $^{\circ}\text{C}$ , 100% RH, 2 atm, 168 hrs
Temperature/Humidity Test	85 $^{\circ}\text{C}/85\%$ RH, 1000 hrs

## Cross Sections



## Package Configurations

Body Size (mm)	Rows	Lead Pitch=0.40mm		Lead Pitch=0.50mm		Lead Pitch=0.65mm	
		Leads	Max Pad Size*	Leads	Max Pad Size	Leads	Max Pad Size
6.0x6.0	2	92	3.7	76	3.9	52	3.2
	3	120	2.7	104	2.9	68	1.9
	4	136	1.7	120	1.9	NA	NA
	5	NA	NA	NA	NA	NA	NA
	6	NA	NA	NA	NA	NA	NA
7.0x7.0	2	116	4.9	92	4.6	60	3.9
	3	156	3.9	128	3.6	80	2.6
	4	184	2.9	152	2.6	88	1.3
	5	208	1.9	172	1.6	NA	NA
	6	220	0.9	180	0.6	NA	NA
8.0x8.0	2	132	5.7	108	5.9	76	5.2
	3	180	4.7	152	4.9	104	3.9
	4	216	3.7	184	3.9	120	2.6
	5	248	2.7	212	2.9	132	1.3
	6	268	1.7	228	1.9	NA	NA
9.0x9.0	2	156	6.9	124	6.9	84	5.8
	3	216	5.9	176	5.9	116	4.5
	4	264	4.9	216	4.9	136	3.2
	5	308	3.9	252	3.9	152	1.9
	6	340	2.9	276	2.9	NA	NA
10.0x10.0	2	172	7.7	140	7.9	100	7.1
	3	240	6.7	200	6.9	136	5.8
	4	296	5.7	248	5.9	164	4.5
	5	348	4.7	292	4.9	188	3.2
	6	388	3.7	324	3.9	200	1.9
11.0x11.0	2	196	8.9	156	8.9	116	8.4
	3	276	7.9	224	7.9	164	7.1
	4	344	6.9	280	6.9	200	5.8
	5	408	5.9	332	5.9	232	4.5
	6	460	4.9	372	4.9	252	3.2
11.5x11.5	2	204	9.3	164	9.4	116	8.4
	3	288	8.3	236	8.4	164	7.1
	4	360	7.3	296	7.4	200	5.8
	5	428	6.3	352	6.4	232	4.5
	6	484	5.3	396	5.4	252	3.2
12.0x12.0	2	212	9.7	172	9.9	124	9.1
	3	300	8.7	248	8.9	176	7.8
	4	376	7.7	312	7.9	216	6.5
	5	448	6.7	372	6.9	252	5.2
	6	508	5.7	420	5.9	276	3.9
13.0x13.0	2	236	10.9	188	10.9	140	10.4
	3	336	9.9	272	9.9	200	9.1
	4	424	8.9	344	8.9	248	7.8
	5	508	7.9	412	7.9	292	6.5
	6	580	6.9	468	6.9	324	5.2
14.0x14.0	2	252	11.7	204	11.9	148	11.0
	3	360	10.7	296	10.9	212	9.7
	4	456	9.7	376	9.9	264	8.4
	5	548	8.7	452	8.9	312	7.1
	6	628	7.7	516	7.9	348	5.8
15.0x15.0	2	276	12.9	220	12.9	164	12.3
	3	396	11.9	320	11.9	236	11.0
	4	504	10.9	408	10.9	296	9.7
	5	608	9.9	492	9.9	352	8.4
	6	700	8.9	564	8.9	396	7.1

\* Maximum paddle size calculated using minimum lead edge to paddle edge distance of 0.150mm. For recommended value of 0.200mm, decrease maximum paddle size value by 0.100mm. All paddle sizes in mm.