Thermal Measurement Report

DATE: 5/8/96
revised 11/18/96

Package Description:

Package: 240 32 x 32 mm QFP
Die Down
Flag: 10.6 mm Square
Leadframe: SIDN 1234625
Die Attach: JMI 2500AN
Mold Compound: Sumitomo 7304LC
Assembled: ANAM
Die: PST6 - 10.16 mm Square

Junction to Ambient Thermal Resistance or Theta JA ($R_{\theta JA}$) was measured per SEMI Test Method G38-87 at 1.5 watts in a horizontal configuration. The test board conforms to EIA/JESD 51-3; it is a single layer 115x102 mm board designed to test 0.5 mm pitch QFP packages from 208 to 304 leads. The trace width is 0.24 mm, trace thickness is 0.076 mm. Sample size was 5.

Convection	Theta JA Average °C/watt	Standard Deviation °C/watt	Theta JA Ave + 3 Std. Dev. °C/watt
Natural	31.0	0.08	31.3
100 ft/min	27.7	0.18	28.3
200	26.1	0.1	26.4
400	23.7	0.34	24.7
800	19.9	0.11	20.2

"Thermal resistance" from junction to a thermocouple on top center of case, previously titled Theta J-Ref ($R_{\theta JR}$), was been renamed by the industry standard committee JEDEC JC15.1 as Ψ_{JT} and defined in EIA/JESD51-2. It is a useful value to use to estimate junction temperature in steady state customer environments.

Convection	Ψ_{JT} Average °C/watt	Standard Deviation °C/watt
Natural	1.9	0.09
100 ft/min	2.3	0.06
200	2.5	0.04
400	3.1	0.08
800	3.9	0.1

Junction to case thermal resistance, Theta JC ($R_{\theta JC}$), was measured using the cold plate technique with the cold plate temperature used as the "case" temperature. The reference specifications are MIL-STD 883D, Method 1012.1 and SEMI G30-88. Sample size was 5.

Theta JC Average °C/watt	Standard Deviation °C/watt	Theta JC Ave + 3 Std. Dev. °C/watt
8.9	0.07	9.1

Junction to board thermal resistance Theta JB ($R_{\theta JB}$) was measured using a cold plate technique with the cold plate in thermal contact with the bottom of the printed circuit board. The board temperature was measured with a thermocouple soldered to a center lead along one side of the package where the lead was soldered to the board. The measurement was taken using the 4 conductor layer printed circuit board described below. Sample size is 5.

Theta JB Average °C/watt	Standard Deviation °C/watt	Theta JB Ave + 3 Std. Dev. °C/watt
18.8	0.19	19.4

Junction to Ambient Thermal Resistance (Theta JA) was also measured on a four layer test board. The test board was a 115x102 mm board designed to test 0.5 mm pitch QFP packages from 208 to 304 leads with two solid internal plane of 1 oz nominal thickness (0.033 mm thick). The trace pattern on the component side had a trace width of 0.231 mm, trace thickness of 0.0715 mm. Sample size was 5.

Do Not Use this data without special footnote indicating that the results were measured on a board with two solid internal planes.

Convection	Theta JA Average °C/watt	Standard Deviation °C/watt	Theta JA Ave + 3 Std. Dev. °C/watt
Natural	26.1	0.11	26.4
100 ft/min	23.8	0.13	24.2
200	22.8	0.13	23.2
400	21.3	0.19	21.9
800	18.6	0.16	19.1

SEMI specifications are available from Semiconductor Equipment and Materials International at (415) 964-5111.

MIL-SPEC and EIA/JESD (JEDEC) specifications are available from Global Engineering Documents at 800-854-7179 or 303-397-7956.

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