

RELIABILITY REPORT





Reliability Data Report

Product Family R597

LTM9001 / LTM9002 / LTM9003 /
LTM9004 / LTM9006 / LTM9007 /
LTM9008 / LTM9009 / LTM9010 /
LTM9011 / LTM9012 / LTM9013

Reliability Data Report

Report Number: R597

Report generated on: Mon Mar 25 08:27:01 PDT 2013

| OPERATING LIFE TEST | | | | | |
|---------------------|-------------|------------------|------------------|------------------------------------|--------------------------------|
| PACKAGE TYPE | SAMPLE SIZE | OLDEST DATE CODE | NEWEST DATE CODE | K DEVICE HRS (+125°C) ¹ | No. of FAILURES ^{2,3} |
| LGA 11X11 | 154 | 0738 | 0738 | 154 | 0 |
| LGA 11X15 | 154 | 0722 | 0919 | 154 | 0 |
| Totals | 308 | - | - | 308 | 0 |

| TEMP CYCLE FROM -55 TO 125 DEG C | | | | | |
|----------------------------------|-------------|------------------|------------------|-----------------|-----------------|
| PACKAGE TYPE | SAMPLE SIZE | OLDEST DATE CODE | NEWEST DATE CODE | K DEVICE CYCLES | No. of FAILURES |
| LGA 11X11 | 469 | 0736 | 0901 | 572 | 0 |
| Totals | 469 | - | - | 572 | 0 |

| TEMP CYCLE FROM -40 TO 125 DEG C | | | | | |
|----------------------------------|-------------|------------------|------------------|-----------------|-----------------|
| PACKAGE TYPE | SAMPLE SIZE | OLDEST DATE CODE | NEWEST DATE CODE | K DEVICE CYCLES | No. of FAILURES |
| BGA 09X11 | 308 | 1016 | 1111 | 545 | 0 |
| BGA 11X15 | 77 | 1044 | 1044 | 76 | 0 |
| LGA 11X11 | 461 | 0848 | 1128 | 405 | 0 |
| LGA 11X15 | 1500 | 0841 | 1148 | 1498 | 0 |
| LGA 15X15 | 149 | 0852 | 1003 | 222 | 0 |
| Totals | 2,495 | - | - | 2,746 | 0 |

| TEMP CYCLE FROM -65 TO 150 DEG C | | | | | |
|----------------------------------|-------------|------------------|------------------|-----------------|-----------------|
| PACKAGE TYPE | SAMPLE SIZE | OLDEST DATE CODE | NEWEST DATE CODE | K DEVICE CYCLES | No. of FAILURES |
| LGA 11X11 | 303 | 0736 | 1022 | 411 | 0 |
| LGA 11X15 | 1476 | 0819 | 1104 | 1033 | 0 |
| LGA 15X15 | 303 | 0745 | 0749 | 129 | 0 |
| Totals | 2,082 | - | - | 1,573 | 0 |

| THERMAL SHOCK FROM -40 TO 125 DEG C | | | | | |
|-------------------------------------|-------------|------------------|------------------|-----------------|-----------------|
| PACKAGE TYPE | SAMPLE SIZE | OLDEST DATE CODE | NEWEST DATE CODE | K DEVICE CYCLES | No. of FAILURES |
| BGA 09X11 | 304 | 1016 | 1111 | 531 | 0 |
| BGA 11X15 | 77 | 1044 | 1044 | 77 | 0 |
| LGA 11X11 | 456 | 0824 | 1128 | 380 | 0 |
| LGA 11X15 | 1188 | 0841 | 1127 | 1241 | 0 |
| Totals | 2,025 | - | - | 2,229 | 0 |

(1) Assumes Activation Energy = 1.0 Electron Volts

(2) Failure Rate Equivalent to +55 °C, 60% Confidence Level =5.95 FITS

(3) Mean Time Between Failure in Years = 19179.5

Note 1: 1 FIT = 1 Failure in One Billion Hours.

Note 2: HAST, Temp Cycle & Thermal Shock are subjected to J-STD-020 MSL 3/4 Preconditioning

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| THERMAL SHOCK FROM -55 TO 125 DEG C | | | | | |
|-------------------------------------|-------------|------------------|------------------|-----------------|-----------------|
| PACKAGE TYPE | SAMPLE SIZE | OLDEST DATE CODE | NEWEST DATE CODE | K DEVICE CYCLES | No. of FAILURES |
| LGA 11X11 | 371 | 0736 | 0912 | 478 | 0 |
| Totals | 371 | - | - | 478 | 0 |

| THERMAL SHOCK FROM -65 TO 150 DEG C | | | | | |
|-------------------------------------|-------------|------------------|------------------|-----------------|-----------------|
| PACKAGE TYPE | SAMPLE SIZE | OLDEST DATE CODE | NEWEST DATE CODE | K DEVICE CYCLES | No. of FAILURES |
| LGA 11X11 | 254 | 0736 | 1022 | 408 | 0 |
| LGA 11X15 | 1300 | 0945 | 1104 | 870 | 0 |
| Totals | 1,554 | - | - | 1,278 | 0 |

| HIGH TEMPERATURE BAKE AT 150 DEG C | | | | | |
|------------------------------------|-------------|------------------|------------------|--------------|-----------------|
| PACKAGE TYPE | SAMPLE SIZE | OLDEST DATE CODE | NEWEST DATE CODE | K DEVICE HRS | No. of FAILURES |
| BGA 09X11 | 154 | 1048 | 1052 | 308 | 0 |
| LGA 11X11 | 303 | 0736 | 1022 | 328 | 0 |
| LGA 11X15 | 1204 | 0819 | 1127 | 1173 | 0 |
| Totals | 1,661 | - | - | 1,809 | 0 |

| BOARD MOUNTED TEMP CYCLE FROM 0 TO 100 DEG C | | | | | |
|--|-------------|------------------|------------------|----------------------------------|-----------------|
| PACKAGE TYPE | SAMPLE SIZE | OLDEST DATE CODE | NEWEST DATE CODE | K DEVICE CYCLES ^{4,5,6} | No. of FAILURES |
| Totals | 0 | - | - | 0 | 0 |

| MECHANICAL SHOCK (JESD22-B104 CONDITION B - PEAK = 1500G) | | | | | |
|---|-------------|------------------|------------------|--|-----------------|
| PACKAGE TYPE | SAMPLE SIZE | OLDEST DATE CODE | NEWEST DATE CODE | | No. of FAILURES |
| BGA 09X11 | 43 | 1016 | 1052 | | 0 |
| LGA 11X11 | 29 | 0736 | 0736 | | 0 |
| Totals | 72 | - | - | | 0 |

| VIBRATION VARIABLE FREQUENCY (JESD22-B103 CONDITION A - PEAK = 20G) | | | | | |
|---|-------------|------------------|------------------|--|-----------------|
| PACKAGE TYPE | SAMPLE SIZE | OLDEST DATE CODE | NEWEST DATE CODE | | No. of FAILURES |
| BGA 09X11 | 43 | 1016 | 1052 | | 0 |
| LGA 11X11 | 29 | 0736 | 0736 | | 0 |
| Totals | 72 | - | - | | 0 |

(4) Board Mount Temp Cycle Meets IPC-9701 / JESD22-A104.
 (5) Board Mount Temp Cycle Includes Full Electrical Characterization, XRAY & Cross-sections.
 (6) Each Board Mounted Vehicle is Cycled up to 2000 Times or More.