

RELIABILITY REPORT





NOW PART OF



Reliability Data Report Product Family R504

LTM4600 / LTM4601 / LTM4602 / LTM4603 /
LTM4604 / LTM4605 / LTM4606 / LTM4607 /
LTM4608 / LTM4609 / LTM4611 / LTM4612 /
LTM4613 / LTM4614 / LTM4615 / LTM4616 /
LTM4617 / LTM4618 / LTM4619 / LTM4620 /
LTM4622 / LTM4623 / LTM4624 / LTM4625 /
LTM4627 / LTM4628 / LTM4630 / LTM4631 /
LTM4632 / LTM4633 / LTM4634 / LTM4637 /
LTM4639 / LTM4641 / LTM4642 / LTM4643 /
LTM4644 / LTM4645 / LTM4646 / LTM4647 /
LTM4648 / LTM4649 / LTM4650 / LTM4651 /
LTM4653 / LTM4661 / LTM4662 / LTM4675 /
LTM4676 / LTM4677

Reliability Data Report

Report Number: R504

Report generated on: Fri May 03 15:26:59 PDT 2019

OPERATING LIFE TEST					
PACKAGE TYPE	SAMPLE SIZE	OLDEST DATE CODE	NEWEST DATE CODE	K DEVICE HRS (+125°C) ¹	No. of FAILURES ^{2,3}
BGA 06X06	154	1301	1338	154	0
BGA 15X09	460	1228	1438	460	0
BGA 15X15	834	1141	1428	795	0
BGA 16X16	306	1324	1533	306	0
LGA 06X06	154	1430	1449	154	0
LGA 15X09	788	0634	0843	788	0
LGA 15X15	2153	0452	1223	2002	0
LGA 16X16	153	1233	1247	115	0
Totals	5,002	-	-	4,774	0

HIGHLY ACCELERATED STRESS TEST AT +130 DEG C / 85% RH					
PACKAGE TYPE	SAMPLE SIZE	OLDEST DATE CODE	NEWEST DATE CODE	K DEVICE HRS (+85°C) ⁴	No. of FAILURES
BGA 06X06	1152	1337	1714	3488	0
BGA 09X11	613	1414	1748	1996	0
BGA 15X09	2479	1306	1836	8030	0
BGA 11X15	595	1621	1724	1795	0
BGA 15X15	1502	1049	1825	3761	0
BGA 16X16	3037	1334	1809	8292	0
LGA 06X06	689	1338	1524	2497	0
LGA 15X09	306	1502	1632	883	0
LGA 15X15	4952	0645	1807	13659	0
LGA 16X16	665	1248	1749	1800	0
Totals	15,990	-	-	46,201	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
BGA 06X06	2383	1245	1742	1348	0
BGA 09X11	662	1414	1708	668	0
BGA 15X09	4197	1150	1811	2980	0
BGA 11X15	534	1304	1745	760	0
BGA 15X15	5017	1148	1825	3187	0
BGA 16X16	4124	1216	1809	3278	0
LGA 06X06	1036	1138	1710	896	0
LGA 15X09	2472	0634	1712	1782	0
LGA 11X15	76	1304	1304	76	0
LGA 15X15	16907	0643	1807	14576	0
LGA 16X16	1617	1147	1652	1404	0
Totals	39,025	-	-	30,955	0

(1) Assumes Activation Energy = 1.0 Electron Volts
(2) Failure Rate Equivalent to +55 °C, 60% Confidence Level = 0.38 FITS
(3) Mean Time Between Failure in Years = 297282.19
(4) Assumes 20X Acceleration from 85 °C to +130 °C

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

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

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TEMP CYCLE FROM -40 TO 125 DEG C					
PACKAGE TYPE	SAMPLE SIZE	OLDEST DATE CODE	NEWEST DATE CODE	K DEVICE CYCLES	No. of FAILURES
LGA 15X09	76	0710	0710	76	0
LGA 15X15	230	0632	0642	230	0
Totals	306	-	-	306	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
BGA 06X06	3841	1439	1625	517	0
BGA 09X11	152	1546	1622	84	0
BGA 15X09	3918	1213	1836	739	0
BGA 15X15	9634	1141	1708	2585	0
BGA 16X16	1993	1412	1809	286	0
LGA 06X06	716	1452	1624	71	0
LGA 15X09	10002	0634	1632	3624	0
LGA 15X15	69382	0513	1714	22784	0
LGA 16X16	1247	1449	1749	262	0
Totals	100,885	-	-	30,952	0

THERMAL SHOCK FROM -55 TO 125 DEG C					
PACKAGE TYPE	SAMPLE SIZE	OLDEST DATE CODE	NEWEST DATE CODE	K DEVICE CYCLES	No. of FAILURES
BGA 06X06	1260	1245	1742	1298	0
BGA 09X11	609	1414	1625	681	0
BGA 15X09	2330	1150	1811	2570	0
BGA 11X15	489	1304	1713	677	0
BGA 15X15	2933	1049	1825	2904	0
BGA 16X16	3165	1242	1809	2898	0
LGA 06X06	837	1138	1524	837	0
LGA 15X09	1394	0634	1612	1726	0
LGA 11X15	77	1304	1304	77	0
LGA 15X15	11126	0708	1833	14073	0
LGA 16X16	1385	1147	1551	1269	0
Totals	25,605	-	-	29,010	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
BGA 06X06	90	1527	1636	90	0
BGA 15X09	384	1213	1836	384	0
BGA 15X15	1867	1141	1708	1359	0
BGA 16X16	328	1412	1511	32	0
LGA 06X06	47	1550	1550	4	0
LGA 15X09	4993	0634	1632	2769	0
LGA 15X15	31405	0332	1709	13814	0
LGA 16X16	72	1525	1525	72	0
Totals	39,186	-	-	18,524	0

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POWER CYCLE FROM 50 TO 100 DEG C					
PACKAGE TYPE	SAMPLE SIZE	OLDEST DATE CODE	NEWEST DATE CODE	K DEVICE CYCLES	No. of FAILURES
BGA 06X06	24	1306	1416	1	0
BGA 15X09	132	1116	1604	6	0
LGA 15X09	117	0712	0730	5850	0
LGA 15X15	811	0513	1715	16047	0
Totals	1,084	-	-	21,904	0

HIGH TEMPERATURE BAKE AT 125 DEG C					
PACKAGE TYPE	SAMPLE SIZE	OLDEST DATE CODE	NEWEST DATE CODE	K DEVICE HRS	No. of FAILURES
BGA 06X06	3376	1412	1615	3376	0
BGA 15X09	3477	1447	1631	3402	0
BGA 15X15	2697	1405	1650	2623	0
BGA 16X16	793	1515	1642	793	0
LGA 06X06	50	1452	1452	50	0
LGA 15X09	1686	1229	1643	1542	0
LGA 15X15	9410	1231	1702	9151	0
LGA 16X16	213	1552	1645	213	0
Totals	21,702	-	-	21,150	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 06X06	495	1245	1624	495	0
BGA 09X11	358	1414	1546	319	0
BGA 15X09	1056	1213	1644	984	0
BGA 11X15	77	1324	1324	77	0
BGA 15X15	2099	1141	1542	2053	0
BGA 16X16	983	1334	1616	946	0
LGA 06X06	743	1338	1552	748	0
LGA 15X09	5117	0634	1632	5489	0
LGA 11X15	50	1304	1304	50	0
LGA 15X15	30275	0441	1643	32877	0
LGA 16X16	813	1248	1517	809	0
Totals	42,066	-	-	44,847	0

HIGH TEMPERATURE BAKE AT 175 DEG C					
PACKAGE TYPE	SAMPLE SIZE	OLDEST DATE CODE	NEWEST DATE CODE	K DEVICE HRS	No. of FAILURES
LGA 15X15	578	0648	1434	353	0
Totals	578	-	-	353	0

BOARD MOUNTED TEMP CYCLE FROM 0 TO 100 DEG C					
PACKAGE TYPE	SAMPLE SIZE	OLDEST DATE CODE	NEWEST DATE CODE	K DEVICE CYCLES ^{5,6,7}	No. of FAILURES
BGA 15X15	230	1227	1227	458	0
LGA 15X15	124	0632	1040	594	0
Totals	354	-	-	1,052	0

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

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BOARD MOUNTED TEMP CYCLE FROM -40 TO 125 DEG C					
PACKAGE TYPE	SAMPLE SIZE	OLDEST DATE CODE	NEWEST DATE CODE	K DEVICE CYCLES ^{5,6,7}	No. of FAILURES
BGA 15X15	77	1029	1029	154	0
LGA 15X09	783	0634	0729	950	0
LGA 15X15	634	0513	0941	1014	0
Totals	1,494	-	-	2,118	0

BOARD MOUNTED TEMP CYCLE FROM -55 TO 125 DEG C					
PACKAGE TYPE	SAMPLE SIZE	OLDEST DATE CODE	NEWEST DATE CODE	K DEVICE CYCLES ^{5,6,7}	No. of FAILURES
LGA 15X15	185	0624	1041	256	0
Totals	185	-	-	256	0

MECHANICAL SHOCK (JESD22-B104 CONDITION B - PEAK = 1500G)					
PACKAGE TYPE	SAMPLE SIZE	OLDEST DATE CODE	NEWEST DATE CODE		No. of FAILURES
LGA 15X09	25	0634	0634		0
LGA 15X15	140	0708	1039		0
Totals	165	-	-		0

VIBRATION VARIABLE FREQUENCY (JESD22-B103 CONDITION A - PEAK = 20G)					
PACKAGE TYPE	SAMPLE SIZE	OLDEST DATE CODE	NEWEST DATE CODE		No. of FAILURES
LGA 15X09	40	0634	0713		0
LGA 15X15	188	0708	1348		0
Totals	228	-	-		0

VIBRATION VARIABLE FREQUENCY (JESD22-B103 CONDITION A - PEAK = 20G)					
PACKAGE TYPE	SAMPLE SIZE	OLDEST DATE CODE	NEWEST DATE CODE		No. of FAILURES
LGA 15X09	40	0634	0713		0
LGA 15X15	188	0708	1348		0
Totals	228	-	-		0