

LM5157QRTERQ1

Quality, reliability & packaging data download

Status: ACTIVE

Report date: 03/20/2024



Assembly site: TI Semiconductor

RoHS	Yes
REACH	Yes
Device marking	L5157Q
Lead finish/Ball material	NIPDAU
MSL rating/Peak reflow	Level-2-260C-1 YEAR
Rating	Automotive

Material content

				Homogeneous Material Level		Component Level	
Component	Substance	CAS Number	Amount (mg)	Percentage %	ppm	Percentage %	ppm
Bond Wire							
Copper and Its Alloys	Copper	7440-50-8	0.323021	99.997523	999975	1.624849	16248
Copper and Its Alloys	Iron	7439-89-6	0.000001	0.000310	3	0.000005	0
Nickel and Its Alloys	Nickel	7440-02-0	0.000001	0.000310	3	0.000005	0
Other Nonferrous Metals and Alloys	Manganese	7439-96-5	0.000001	0.000310	3	0.000005	0
Precious Metals	Silver	7440-22-4	0.000005	0.001548	15	0.000025	0
Sub-total	—	—	0.323029	100	1000000	1.624889	16249
Die Attach Adhesive							
Precious Metals	Silver	7440-22-4	0.410589	80.000039	800000	2.065331	20653
Thermoplastics	Epoxy	85954-11-6	0.102647	19.999961	200000	0.516331	5163
Sub-total	—	—	0.513236	100	1000000	2.581662	25817
Lead Frame							
Copper and Its Alloys	Copper	7440-50-8	8.78265	97.585000	975850	44.178187	441782
Copper and Its Alloys	Iron	7439-89-6	0.207	2.300000	23000	1.041244	10412
Copper and Its Alloys	Phosphorus	7723-14-0	0.00135	0.015000	150	0.006791	68
Zinc and Its Alloys	Zinc	7440-66-6	0.009	0.100000	1000	0.045271	453
Sub-total	—	—	9.00000	100	1000000	45.271493	452715
Lead Frame Plating							
Nickel and Its Alloys	Nickel	7440-02-0	0.228288	95.120000	951200	1.148327	11483
Precious Metals	Gold	7440-57-5	0.001872	0.780000	7800	0.009416	94
Precious Metals	Palladium	7440-05-3	0.00984	4.100000	41000	0.049497	495
Sub-total	—	—	0.240000	100	1000000	1.207240	12072
Mold Compound							
Other Inorganic Materials	Fused Silica	60676-86-0	7.628046	87.999991	880000	38.370337	383703
Other Organic Materials	Carbon Black	1333-86-4	0.026005	0.300003	3000	0.130809	1308
Other Organic Materials	Chlorine	7782-50-5	0.000087	0.001004	10	0.000438	4
Thermoplastics	Epoxy	85954-11-6	1.014097	11.699002	116990	5.101076	51011
Sub-total	—	—	8.668235	100	1000000	43.602660	436027
Semiconductor Device							
Ceramics / Glass	Doped Silicon	7440-21-3	1.13556	100.000000	1000000	5.712055	57121
Sub-total	—	—	1.13556	100	1000000	5.712055	57121
Total	—	—	19.880060	—	—	100	1000000

MTBF/FIT estimates

MTBF / FIT		MTBF / FIT supporting data							
MTBF	FIT	Usage temp (°C)	Conf level (%)	Activation energy (eV)	Test temp (°C)	Test duration (hours)	Sample size	Fails	Additional comments
8.71×10^9	0.1	55	60	0.7	125	1000	101758	0	—

Qualification summary

Type	AEC Q100 test #	Test spec	Min lot qty	SS / lot	Test name	Condition	Result	Notes
Test group A - accelerated environment stress test								
THB/HAST	A2	JESD22-A101/JESD22-A110	3	77	Biased HAST	130C/85%RH 96 hours	Pass	Or equivalent Q100 condition
AC/UHAST	A3	JESD22-A102/JESD22-A118	3	77	Unbiased HAST	130C/85%RH for 96 hours	Pass	Or equivalent Q100 condition
TC	A4	JESD22-A104	3	77	Temperature cycle	Per grade requirements. See data sheet.	Pass	—
TC-WBP	A4	MIL-STD883 method 2011	1	30	Post temp cycle bond pull	Per requirements	Pass	As applicable per die configuration
HTSL	A6	JESD22-A103	1	45	High temp storage bake	Per grade requirements. See data sheet.	Pass	—
Test group B - accelerated lifetime simulation test								
HTOL	B1	JESD22-A108	3	77	High temperature operating life	Per grade requirements. See data sheet.	Pass	—
ELFR	B2	AEC Q100-008	3	800	Early life failure rate	Per grade requirements. See data sheet.	Pass	—
Test group C - package assembly integrity tests								
WBS	C1	AEC Q100-001	1	30	Wire bond shear	Cpk > 1.67	Pass	As applicable per die configuration
WBP	C2	MIL-STD883 method 2011	1	30	Wire bond pull	Cpk > 1.67	Pass	As applicable per die configuration
SD	C3	JEDEC J-STD-002	1	15	Solderability	>95% lead coverage	Pass	—
PD	C4	JESD22-B100 and B108	3	10	Physical dimensions	Cpk > 1.67	Pass	—
SBS	C5	AEC Q100-010	3	5 balls from 10 devices	Solder Ball Shear	Cpk > 1.67	Pass	As applicable per die configuration
Test group D - die fabrication reliability tests								
EM	D1	—	—	—	Electromigration	Per technology requirements	Pass	—
TDDDB	D2	—	—	—	Time dependent dielectric breakdown	Per technology requirements	Pass	—
HCI	D3	—	—	—	Hot carrier injection	Per technology requirements	Pass	—
BTI	D4	—	—	—	Bias temperature instability	Per technology requirements	Pass	—
Test group E - electrical verification								
HBM	E2	AEC Q100-002	1	3	Electrostatic discharge - human body model	Per AEC Q100-002	See data sheet	—

CDM	E3	AEC Q100-011	1	3	Electrostatic discharge - charged device model	Per AEC Q100-011	See data sheet	—
LU	E4	AEC Q100-004	1	3	Latch-up	Per AEC Q100-004	Pass	As applicable per Q100-004
ED	E5	AEC Q100-009	3	30	Electrical distributions	Per AEC Q100-009	Pass	—

Ongoing reliability monitoring

FAB process reliability data

Fab Process	Reliability Test	Rolling Year (1Q2023 - 4Q2023) Sample Size	Cumulative Sample Size	Disposition
Power BICMOS	Life test 125C, 1000 Hours or Equivalent JEDEC Condition	31433	391952	Pass

Assembly process reliability data

Package Family	Reliability Test	Rolling Year (1Q2023 - 4Q2023) Sample Size	Cumulative Sample Size	Disposition
QFN	Biased HAST 130C/85%RH, 96 Hours or Equivalent JEDEC Condition	12287	144376	Pass
QFN	High temp storage bake 150C, 1000 Hours or Equivalent JEDEC Condition	12517	134270	Pass
QFN	Temperature cycle -65/150C, 500 Hours or Equivalent JEDEC Condition	38704	342445	Pass
QFN	Unbiased HAST 130C/85% RH, 96 Hours or Equivalent JEDEC Condition	22803	257870	Pass

Additional resources

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[Certifications](#)

[Conflict minerals specialized disclosure report](#)

[Restricted chemical test report](#)

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