

TPS54618CQRTERQ1

Quality, reliability & packaging data download

Status: ACTIVE

Report date: 06/21/2024



Assembly site: TI Semiconductor

RoHS	Yes
REACH	Yes
Device marking	618CQ
Lead finish/Ball material	NIPDAU
MSL rating/Peak reflow	Level-3-260C-168 HR
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	0.373638	99.997324	999973	1.809627	18096
Copper and Its Alloys	Iron	7439-89-6	0.000002	0.000535	5	0.000010	0
Nickel and Its Alloys	Nickel	7440-02-0	0.000001	0.000268	3	0.000005	0
Other Inorganic Materials	Sulfur	7704-34-9	0.000001	0.000268	3	0.000005	0
Other Nonferrous Metals and Alloys	Manganese	7439-96-5	0.000001	0.000268	3	0.000005	0
Precious Metals	Silver	7440-22-4	0.000005	0.001338	13	0.000024	0
Sub-total	—	—	0.373648	100	1000000	1.809676	18097
Bond Wire 2							
Copper and Its Alloys	Copper	7440-50-8	0.046344	100.000000	1000000	0.224456	2245
Sub-total	—	—	0.046344	100	1000000	0.224456	2245
Die Attach Adhesive							
Precious Metals	Silver	7440-22-4	0.414736	80.000000	800000	2.008676	20087
Thermoplastics	Epoxy	85954-11-6	0.103684	20.000000	200000	0.502169	5022
Sub-total	—	—	0.518420	100	1000000	2.510845	25108
Lead Frame							
Copper and Its Alloys	Copper	7440-50-8	9.225392	97.520000	975200	44.681007	446810
Copper and Its Alloys	Iron	7439-89-6	0.21758	2.300000	23000	1.053797	10538
Copper and Its Alloys	Phosphorus	7723-14-0	0.002838	0.030000	300	0.013745	137
Zinc and Its Alloys	Zinc	7440-66-6	0.01419	0.150000	1500	0.068726	687
Sub-total	—	—	9.460000	100	1000000	45.817275	458173
Lead Frame Plating							
Nickel and Its Alloys	Nickel	7440-02-0	0.4756	95.120000	951200	2.303456	23035
Precious Metals	Gold	7440-57-5	0.0039	0.780000	7800	0.018889	189
Precious Metals	Palladium	7440-05-3	0.0205	4.100000	41000	0.099287	993
Sub-total	—	—	0.5000	100	1000000	2.421632	24216
Mold Compound							
Other Inorganic Materials	Fused Silica	60676-86-0	7.569577	88.000000	880000	36.661458	366615
Other Organic Materials	Carbon Black	1333-86-4	0.025805	0.299996	3000	0.124980	1250
Other Organic Materials	Chlorine	7782-50-5	0.000086	0.001000	10	0.000417	4
Thermoplastics	Epoxy	85954-11-6	1.006324	11.699004	116990	4.873893	48739
Sub-total	—	—	8.601792	100	1000000	41.660747	416607
Semiconductor Device							
Ceramics / Glass	Doped Silicon	7440-21-3	1.14703	100.000000	1000000	5.555369	55554
Sub-total	—	—	1.14703	100	1000000	5.555369	55554
Total	—	—	20.647234	—	—	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
9.99999999×10^9	0.1	55	60	0.7	125	1000	183306	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 (2Q2023 - 1Q2024) Sample Size	Cumulative Sample Size	Disposition
Power BICMOS	Life test 125C, 1000 Hours or Equivalent JEDEC Condition	33173	396801	Pass

Assembly process reliability data

Package Family	Reliability Test	Rolling Year (2Q2023 - 1Q2024) Sample Size	Cumulative Sample Size	Disposition
QFN	Biased HAST 130C/85%RH, 96 Hours or Equivalent JEDEC Condition	12530	145993	Pass
QFN	High temp storage bake 150C, 1000 Hours or Equivalent JEDEC Condition	15261	136459	Pass
QFN	Temperature cycle -65/150C, 500 Hours or Equivalent JEDEC Condition	42510	348451	Pass
QFN	Unbiased HAST 130C/85% RH, 96 Hours or Equivalent JEDEC Condition	24797	261412	Pass

Additional resources

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[Certifications](#)

[Conflict minerals specialized disclosure report](#)

[Restricted chemical test report](#)

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