

TPS560200QDGKRQ1

Quality, reliability & packaging data download

Status: ACTIVE

Report date: 07/22/2024



Assembly site: **Ext-Mfg**

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

Material content

Component	Substance	CAS Number	Homogeneous Material Level			Component Level	
			Amount (mg)	Percentage %	ppm	Percentage %	ppm
Bond Wire							
Not Categorized	Proprietary Materials	—	0.000005	0.007459	75	0.000018	0
Precious Metals	Gold	7440-57-5	0.067032	99.992541	999925	0.235883	2359
Sub-total	—	—	0.067037	100	1000000	0.235900	2359
Die Attach Adhesive							
Precious Metals	Silver	7440-22-4	0.15335	82.000086	820001	0.539632	5396
Thermoplastics	Epoxy	85954-11-6	0.033662	17.999914	179999	0.118455	1185
Sub-total	—	—	0.187012	100	1000000	0.658087	6581
Lead Frame							
Copper and Its Alloys	Copper	7440-50-8	13.036772	99.700000	997000	45.875839	458758
Magnesium and Its Alloys	Magnesium	7439-95-4	0.006538	0.050000	500	0.023007	230
Other Inorganic Materials	Silicon	7440-21-3	0.03269	0.250000	2500	0.115035	1150
Sub-total	—	—	13.076000	100	1000000	46.013880	460139
Lead Frame Plating							
Nickel and Its Alloys	Nickel	7440-02-0	0.3892	97.300000	973000	1.369578	13696
Precious Metals	Gold	7440-57-5	0.0012	0.300000	3000	0.004223	42
Precious Metals	Palladium	7440-05-3	0.0084	2.100000	21000	0.029559	296
Precious Metals	Silver	7440-22-4	0.0012	0.300000	3000	0.004223	42
Sub-total	—	—	0.4000	100	1000000	1.407583	14076
Mold Compound							
Other Inorganic Materials	Fused Silica	60676-86-0	13.104811	92.500002	925000	46.115265	461153
Other Organic Materials	Carbon Black	1333-86-4	0.070837	0.500001	5000	0.249272	2493
Thermoplastics	Epoxy	85954-11-6	0.991715	6.999997	70000	3.489802	34898
Sub-total	—	—	14.167363	100	1000000	49.854340	498543
Semiconductor Device							
Ceramics / Glass	Doped Silicon	7440-21-3	0.5201	100.000000	1000000	1.830209	18302
Sub-total	—	—	0.5201	100	1000000	1.830209	18302
Total	—	—	28.417512	—	—	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
9.999999999 × 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 (3Q2023 - 2Q2024) Sample Size	Cumulative Sample Size	Disposition
Power BICMOS	Life test 125C, 1000 Hours or Equivalent JEDEC Condition	31999	399655	Pass

Assembly process reliability data

Package Family	Reliability Test	Rolling Year (3Q2023 - 2Q2024) Sample Size	Cumulative Sample Size	Disposition
VSSOP	Biased HAST 130C/85%RH, 96 Hours or Equivalent JEDEC Condition	847	30771	Pass
VSSOP	High temp storage bake 150C, 1000 Hours or Equivalent JEDEC Condition	610	17981	Pass
VSSOP	Temperature cycle -65/150C, 500 Hours or Equivalent JEDEC Condition	3927	52619	Pass
VSSOP	Unbiased HAST 130C/85% RH, 96 Hours or Equivalent JEDEC Condition	2464	43676	Pass

Additional resources

[General quality guidelines](#)

[Certifications](#)

[Conflict minerals specialized disclosure report](#)

[Restricted chemical test report](#)

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