TPS92602QPWPRQ1

Quality, reliability & packaging data download

Status: NOT RECOMMENDED FOR NEW DESIGNS

Report date: 03/25/2025

Assembly site: **TI TAIWAN A/T**

RoHS	Yes
REACH	Yes
Device marking	TPS92602
Lead finish/Ball material	NIPDAU
MSL rating/Peak reflow	Level-3-260C-168 HR
Rating	Automotive

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265

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	0.357972	100.000000	1000000	0.219852	2199
Sub-total	—	—	0.357972	100	1000000	0.219852	2199
Die Attach Adhesive							
Precious Metals	Silver	7440-22-4	1.523593	85.000017	850000	0.935731	9357
Thermoplastics	Epoxy	85954-11-6	0.268869	14.999983	150000	0.165129	1651
Sub-total	—	—	1.792462	100	1000000	1.100860	11009
Lead Frame							
Copper and Its Alloys	Copper	7440-50-8	68.5173	97.050000	970500	42.080653	420807
Copper and Its Alloys	Iron	7439-89-6	1.8356	2.600000	26000	1.127354	11274
Copper and Its Alloys	Phosphorus	7723-14-0	0.1059	0.150000	1500	0.065040	650
Zinc and Its Alloys	Zinc	7440-66-6	0.1412	0.200000	2000	0.086720	867
Sub-total	—	—	70.6000	100	1000000	43.359766	433598
Lead Frame Plating							
Nickel and Its Alloys	Nickel	7440-02-0	0.233995	95.119919	951199	0.143711	1437
Precious Metals	Gold	7440-57-5	0.001919	0.780081	7801	0.001179	12
Precious Metals	Palladium	7440-05-3	0.010086	4.100000	41000	0.006194	62
Sub-total	—	—	0.246000	100	1000000	0.151084	1511
Mold Compound							
Not Categorized	Phenolic Resin	9003-35-4	3.724956	4.499999	45000	2.287723	22877
Other Inorganic Materials	Silica	7631-86-9	74.499129	90.000000	900000	45.754459	457545
Other Organic Materials	Carbon Black	1333-86-4	0.413884	0.500000	5000	0.254191	2542
Thermoplastics	Epoxy	85954-11-6	4.138841	5.000001	50000	2.541915	25419
Sub-total	—	—	82.776810	100	1000000	50.838288	508383
Semiconductor Device							
Ceramics / Glass	Doped Silicon	7440-21-3	7.050512	100.000000	1000000	4.330149	43301
Sub-total	—	—	7.050512	100	1000000	4.330149	43301
Total	—	—	162.823756	—	—	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**
2.02×10^9	0.5	55	60	0.7	125	1000	51994	1	—

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	—
TDDB	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	—
SM	D5	—	—	—	Stress Migration	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 (1Q2024 - 4Q2024) Sample Size	Cumulative Sample Size	Disposition
Power BICMOS	Life test 125C, 1000 Hours or Equivalent JEDEC Condition	23890	414228	Pass

Assembly process reliability data

Package Family	Reliability Test	Rolling Year (1Q2024 - 4Q2024) Sample Size	Cumulative Sample Size	Disposition
HTSSOP	Biased HAST 130C/85%RH, 96 Hours or Equivalent JEDEC Condition	3066	44372	Pass
HTSSOP	High temp storage bake 150C, 1000 Hours or Equivalent JEDEC Condition	5003	33375	Pass
HTSSOP	Temperature cycle -65/150C, 500 Hours or Equivalent JEDEC Condition	6393	95495	Pass
HTSSOP	Unbiased HAST 130C/85% RH, 96 Hours or Equivalent JEDEC Condition	3871	70060	Pass

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Additional resources

General quality guidelines

Certifications

Conflict minerals specialized disclosure report

Restricted chemical test report

For additional component information, please visit Material content search

For additional information, please contact TI customer support center

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