

LP2951-50QDRGRQ1

Quality, reliability & packaging data download

Status: ACTIVE

Report date: 03/20/2024



Assembly site: TI MALAYSIA A/T

RoHS	Yes
REACH	Yes
Device marking	ZUFQ
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
<b>Bond Wire</b>							
Other Nonferrous Metals and Alloys	Indium	7440-74-6	0.000001	0.001885	19	0.000006	0
Precious Metals	Gold	7440-57-5	0.053057	99.996231	999962	0.300186	3002
Precious Metals	Silver	7440-22-4	0.000001	0.001885	19	0.000006	0
Sub-total	—	—	0.053059	100	1000000	0.300197	3002
<b>Die Attach Adhesive</b>							
Precious Metals	Silver	7440-22-4	0.187842	79.999830	799998	1.062772	10628
Thermoplastics	Epoxy	85954-11-6	0.046961	20.000170	200002	0.265696	2657
Sub-total	—	—	0.234803	100	1000000	1.328468	13285
<b>Lead Frame</b>							
Copper and Its Alloys	Copper	7440-50-8	7.518188	99.249993	992500	42.536393	425364
Other Nonferrous Metals and Alloys	Chromium	7440-47-3	0.019695	0.260000	2600	0.111430	1114
Other Nonferrous Metals and Alloys	Tin	7440-31-5	0.018938	0.250007	2500	0.107147	1071
Zinc and Its Alloys	Zinc	7440-66-6	0.01818	0.240000	2400	0.102859	1029
Sub-total	—	—	7.575001	100	1000000	42.857830	428578
<b>Lead Frame Plating</b>							
Nickel and Its Alloys	Nickel	7440-02-0	0.129363	95.119853	951199	0.731910	7319
Precious Metals	Gold	7440-57-5	0.001061	0.780147	7801	0.006003	60
Precious Metals	Palladium	7440-05-3	0.005576	4.100000	41000	0.031548	315
Sub-total	—	—	0.136000	100	1000000	0.769461	7695
<b>Mold Compound</b>							
Other Inorganic Materials	Fused Silica	60676-86-0	8.284015	90.499997	905000	46.869288	468693
Other Organic Materials	Carbon Black	1333-86-4	0.045768	0.500000	5000	0.258946	2589
Thermoplastics	Epoxy	85954-11-6	0.823825	9.000003	90000	4.661036	46610
Sub-total	—	—	9.153608	100	1000000	51.789270	517893
<b>Semiconductor Device</b>							
Ceramics / Glass	Doped Silicon	7440-21-3	0.522248	100.000000	1000000	2.954774	29548
Sub-total	—	—	0.522248	100	1000000	2.954774	29548
Total	—	—	17.674719	—	—	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
1.6×10^9	0.6	55	60	0.7	125	1000	41301	1	—

## Qualification summary

Type	AEC Q100 test #	Test spec	Min lot qty	SS / lot	Test name	Condition	Result	Notes
<b>Test group A - accelerated environment stress test</b>								
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	—
<b>Test group B - accelerated lifetime simulation test</b>								
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	—
<b>Test group C - package assembly integrity tests</b>								
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
<b>Test group D - die fabrication reliability tests</b>								
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	—
<b>Test group E - electrical verification</b>								
HBM	E2	AEC Q100-002	1	3	Electrostatic discharge - human body model	Per AEC Q100-002	<a href="#">See data sheet</a>	—
CDM	E3	AEC Q100-011	1	3	Electrostatic discharge - charged device model	Per AEC Q100-011	<a href="#">See data sheet</a>	—
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
BIPOLAR	Life test 125C, 1000 Hours or Equivalent JEDEC Condition	308	17907	Pass

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
SON	Biased HAST 130C/85%RH, 96 Hours or Equivalent JEDEC Condition	4868	71693	Pass
SON	High temp storage bake 150C, 1000 Hours or Equivalent JEDEC Condition	3880	53269	Pass
SON	Temperature cycle -65/150C, 500 Hours or Equivalent JEDEC Condition	11103	124842	Pass
SON	Unbiased HAST 130C/85% RH, 96 Hours or Equivalent JEDEC Condition	7792	105357	Pass

## Additional resources

[General quality guidelines](#)

[Certifications](#)

[Conflict minerals specialized disclosure report](#)

[Restricted chemical test report](#)

For additional component information, please visit [Material content search](#)

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