

LM2901QPWRQ1

Quality, reliability & packaging data download

Status: ACTIVE

Report date: 03/20/2024



Assembly site: TI MALAYSIA A/T

RoHS	Yes
REACH	Yes
Device marking	2901Q1
Lead finish/Ball material	NIPDAU
MSL rating/Peak reflow	Level-1-260C-UNLIM
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	0.054819	97.586115	975861	0.082762	828
Not Categorized	Proprietary Materials	—	0.000006	0.010681	107	0.000009	0
Precious Metals	Palladium	7440-05-3	0.001348	2.399644	23996	0.002035	20
Precious Metals	Silver	7440-22-4	0.000002	0.003560	36	0.000003	0
Sub-total	—	—	0.056175	100	1000000	0.084810	848
Die Attach Adhesive							
Precious Metals	Silver	7440-22-4	0.234822	80.000136	800001	0.354520	3545
Thermoplastics	Epoxy	85954-11-6	0.058705	19.999864	199999	0.088629	886
Sub-total	—	—	0.293527	100	1000000	0.443149	4431
Lead Frame							
Copper and Its Alloys	Copper	7440-50-8	28.518	97.000000	970000	43.054741	430547
Copper and Its Alloys	Iron	7439-89-6	0.717654	2.441000	24410	1.083470	10835
Copper and Its Alloys	Phosphorus	7723-14-0	0.024255	0.082500	825	0.036619	366
Nickel and Its Alloys	Nickel	7440-02-0	0.09555	0.325000	3250	0.144256	1443
Precious Metals	Gold	7440-57-5	0.001176	0.004000	40	0.001775	18
Precious Metals	Palladium	7440-05-3	0.005145	0.017500	175	0.007768	78
Zinc and Its Alloys	Zinc	7440-66-6	0.03822	0.130000	1300	0.057702	577
Sub-total	—	—	29.400000	100	1000000	44.386331	443863
Lead Frame Plating							
Nickel and Its Alloys	Nickel	7440-02-0	0.097022	95.119608	951196	0.146478	1465
Precious Metals	Gold	7440-57-5	0.000796	0.780392	7804	0.001202	12
Precious Metals	Palladium	7440-05-3	0.004182	4.100000	41000	0.006314	63
Sub-total	—	—	0.102000	100	1000000	0.153993	1540
Mold Compound							
Other Inorganic Materials	Silica	7631-86-9	30.110598	85.000000	850000	45.459149	454591
Other Organic Materials	Carbon Black	1333-86-4	0.177121	0.500000	5000	0.267407	2674
Thermoplastics	Epoxy	85954-11-6	5.136514	14.500001	145000	7.754796	77548
Sub-total	—	—	35.424233	100	1000000	53.481351	534814
Semiconductor Device							
Ceramics / Glass	Doped Silicon	7440-21-3	0.960673	100.000000	1000000	1.450366	14504
Sub-total	—	—	0.960673	100	1000000	1.450366	14504
Total	—	—	66.236608	—	—	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
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 -	Per AEC Q100-011	See data sheet	—

					charged device model		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
BIPOLAR	Life test 125C, 1000 Hours or Equivalent JEDEC Condition	308	17907	Pass

Assembly process reliability data

Package Family	Reliability Test	Rolling Year (1Q2023 - 4Q2023) Sample Size	Cumulative Sample Size	Disposition
TSSOP	Biased HAST 130C/85%RH, 96 Hours or Equivalent JEDEC Condition	3003	41384	Pass
TSSOP	High temp storage bake 150C, 1000 Hours or Equivalent JEDEC Condition	1683	31583	Pass
TSSOP	Temperature cycle -65/150C, 500 Hours or Equivalent JEDEC Condition	7546	87212	Pass
TSSOP	Unbiased HAST 130C/85% RH, 96 Hours or Equivalent JEDEC Condition	5313	70606	Pass

Additional resources

[General quality guidelines](#)

[Certifications](#)

[Conflict minerals specialized disclosure report](#)

[Restricted chemical test report](#)

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