

INA180A2QDBVRQ1

Quality, reliability & packaging data download

Status: ACTIVE

Report date: 03/20/2024



Assembly site: TI PHILIPPINES A/T

RoHS	Yes
REACH	Yes
Device marking	1MN3
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
<b>Bond Wire</b>							
Precious Metals	Gold	7440-57-5	0.04958	99.997983	999980	0.329015	3290
Precious Metals	Silver	7440-22-4	0.000001	0.002017	20	0.000007	0
Sub-total	—	—	0.049581	100	1000000	0.329022	3290
<b>Die Attach Adhesive</b>							
Precious Metals	Silver	7440-22-4	0.079326	75.000000	750000	0.526411	5264
Thermoplastics	Epoxy	85954-11-6	0.026442	25.000000	250000	0.175470	1755
Sub-total	—	—	0.105768	100	1000000	0.701881	7019
<b>Lead Frame</b>							
Copper and Its Alloys	Copper	7440-50-8	4.984488	97.050000	970500	33.077266	330773
Copper and Its Alloys	Iron	7439-89-6	0.133536	2.600000	26000	0.886150	8862
Copper and Its Alloys	Phosphorus	7723-14-0	0.007704	0.150000	1500	0.051124	511
Zinc and Its Alloys	Zinc	7440-66-6	0.010272	0.200000	2000	0.068165	682
Sub-total	—	—	5.136000	100	1000000	34.082706	340827
<b>Lead Frame Plating</b>							
Nickel and Its Alloys	Nickel	7440-02-0	0.066584	95.120000	951200	0.441854	4419
Precious Metals	Gold	7440-57-5	0.000546	0.780000	7800	0.003623	36
Precious Metals	Palladium	7440-05-3	0.00287	4.100000	41000	0.019045	190
Sub-total	—	—	0.070000	100	1000000	0.464523	4645
<b>Mold Compound</b>							
Other Inorganic Materials	Fused Silica	60676-86-0	8.322905	87.999987	880000	55.231138	552311
Other Organic Materials	Carbon Black	1333-86-4	0.028374	0.300005	3000	0.188291	1883
Other Organic Materials	Chlorine	7782-50-5	0.000095	0.001004	10	0.000630	6
Thermoplastics	Epoxy	85954-11-6	1.106474	11.699004	116990	7.342607	73426
Sub-total	—	—	9.457848	100	1000000	62.762666	627627
<b>Semiconductor Device</b>							
Ceramics / Glass	Doped Silicon	7440-21-3	0.250029	100.000000	1000000	1.659203	16592
Sub-total	—	—	0.250029	100	1000000	1.659203	16592
Total	—	—	15.069226	—	—	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

6.16×10 <sup>9</sup>	0.2	55	60	0.7	125	1000	71906	0	—
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## 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
High-Precision CMOS	Life test 125C, 1000 Hours or Equivalent JEDEC Condition	2310	57337	Pass

### Assembly process reliability data

Package Family	Reliability Test	Rolling Year (1Q2023 - 4Q2023) Sample Size	Cumulative Sample Size	Disposition
SOP/SOT	Biased HAST 130C/85%RH, 96 Hours or Equivalent JEDEC Condition	11601	98492	Pass
SOP/SOT	High temp storage bake 150C, 1000 Hours or Equivalent JEDEC Condition	15564	76204	Pass
SOP/SOT	Temperature cycle -65/150C, 500 Hours or Equivalent JEDEC Condition	25896	179071	Pass
SOP/SOT	Unbiased HAST 130C/85% RH, 96 Hours or Equivalent JEDEC Condition	18039	150208	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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