

LM4128BQ1MF4.1/NOPB

Quality, reliability & packaging data download

Status: ACTIVE

Report date: 03/20/2024



Assembly site: Texas Instruments Electronics

RoHS	Yes
REACH	Yes
Device marking	R6FB
Lead finish/Ball material	SN
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	0.026481	100.000000	1000000	0.166783	1668
Sub-total	—	—	0.026481	100	1000000	0.166783	1668
<b>Die Attach Adhesive</b>							
Precious Metals	Silver	7440-22-4	0.186886	75.000100	750001	1.177050	11771
Thermoplastics	Epoxy	85954-11-6	0.062295	24.999900	249999	0.392348	3923
Sub-total	—	—	0.249181	100	1000000	1.569398	15694
<b>Lead Frame</b>							
Copper and Its Alloys	Copper	7440-50-8	5.436408	96.509995	965100	34.239724	342397
Copper and Its Alloys	Iron	7439-89-6	0.134065	2.379993	23800	0.844372	8444
Copper and Its Alloys	Phosphorus	7723-14-0	0.00169	0.030002	300	0.010644	106
Precious Metals	Silver	7440-22-4	0.054077	0.960004	9600	0.340589	3406
Zinc and Its Alloys	Zinc	7440-66-6	0.00676	0.120007	1200	0.042576	426
Sub-total	—	—	5.633000	100	1000000	35.477904	354779
<b>Lead Frame Plating</b>							
Other Nonferrous Metals and Alloys	Tin	7440-31-5	0.7	100.000000	1000000	4.408758	44088
Sub-total	—	—	0.7	100	1000000	4.408758	44088
<b>Mold Compound</b>							
Other Inorganic Materials	Silica	7631-86-9	7.474305	88.700005	887000	47.074858	470749
Other Nonferrous Metals and Alloys	Metal Hydroxide	Trade Secret	0.252795	3.000000	30000	1.592160	15922
Other Organic Materials	Carbon Black	1333-86-4	0.025279	0.299994	3000	0.159213	1592
Thermoplastics	Epoxy	85954-11-6	0.67412	8.000001	80000	4.245760	42458
Sub-total	—	—	8.426499	100	1000000	53.071991	530720
<b>Semiconductor Device</b>							
Ceramics / Glass	Doped Silicon	7440-21-3	0.842327	100.000000	1000000	5.305165	53052
Sub-total	—	—	0.842327	100	1000000	5.305165	53052
Total	—	—	15.877488	—	—	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
5.14×10^8	1.9	55	60	0.7	125	1000	5998	0	—

## 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

No results found

## Additional resources

[General quality guidelines](#)

[Certifications](#)

[Conflict minerals specialized disclosure report](#)

[Restricted chemical test report](#)

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