

ESD204DQAR

## Quality, reliability & packaging data download

Status: ACTIVE

Report date: 05/10/2024



Assembly site: **TI Semiconductor**

RoHS	Yes
REACH	Yes
Device marking	CE5, CEY, CEG
Lead finish/Ball material	NIPDAU
MSL rating/Peak reflow	Level-1-260C-UNLIM
Rating	—

### Material content

No results found

Assembly site: **Ext-Mfg**

<b>RoHS</b>	Yes
<b>REACH</b>	Yes
<b>Device marking</b>	CE5, CEY, CEG
<b>Lead finish/Ball material</b>	NIPDAU
<b>MSL rating/Peak reflow</b>	Level-1-260C-UNLIM
<b>Rating</b>	—

## Material content

Component	Substance	CAS Number	Amount (mg)	Homogeneous Material Level		Component Level	
				Percentage %	ppm	Percentage %	ppm
<b>Bond Wire</b>							
Precious Metals	Gold	7440-57-5	0.020852	100.000000	1000000	0.506559	5066
Sub-total	—	—	0.020852	100	1000000	0.506559	5066
<b>Die Attach Adhesive</b>							
Other Inorganic Materials	Aluminum Oxide	1344-28-1	0.008596	48.450006	484500	0.208823	2088
Thermoplastics	Epoxy	85954-11-6	0.009146	51.549994	515500	0.222184	2222
Sub-total	—	—	0.017742	100	1000000	0.431008	4310
<b>Lead Frame</b>							
Copper and Its Alloys	Copper	7440-50-8	2.143713	97.441500	974415	52.077361	520774
Copper and Its Alloys	Iron	7439-89-6	0.0517	2.350000	23500	1.255951	12560
Copper and Its Alloys	Phosphorus	7723-14-0	0.001815	0.082500	825	0.044092	441
Other Nonferrous Metals and Alloys	Lead	7439-92-1	0.000022	0.001000	10	0.000534	5
Zinc and Its Alloys	Zinc	7440-66-6	0.00275	0.125000	1250	0.066806	668
Sub-total	—	—	2.200000	100	1000000	53.444745	534447
<b>Lead Frame Plating</b>							
Nickel and Its Alloys	Nickel	7440-02-0	0.019024	95.120000	951200	0.462151	4622
Precious Metals	Gold	7440-57-5	0.000156	0.780000	7800	0.003790	38
Precious Metals	Palladium	7440-05-3	0.00082	4.100000	41000	0.019920	199
Sub-total	—	—	0.020000	100	1000000	0.485861	4859
<b>Mold Compound</b>							
Other Inorganic Materials	Fused Silica	60676-86-0	1.530061	85.000036	850000	37.169872	371699

Other Inorganic Materials	Silica	7631-86-9	0.009	0.499980	5000	0.218638	2186
Other Organic Materials	Carbon Black	1333-86-4	0.0018	0.099996	1000	0.043728	437
Thermoplastics	Epoxy	85954-11-6	0.25921	14.399988	144000	6.297006	62970
Sub-total	—	—	1.800071	100	1000000	43.729243	437292
<b>Semiconductor Device</b>							
Ceramics / Glass	Doped Silicon	7440-21-3	0.057736	100.000000	1000000	1.402584	14026
Sub-total	—	—	0.057736	100	1000000	1.402584	14026
Total	—	—	4.116401	—	—	100	1000000

## Assembly site: Ext-Mfg

<b>RoHS</b>	Yes
<b>REACH</b>	Yes
<b>Device marking</b>	CE5, CEY, CEG
<b>Lead finish/Ball material</b>	NIPDAU
<b>MSL rating/Peak reflow</b>	Level-1-260C-UNLIM
<b>Rating</b>	—

## 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	0.02024	99.995060	999951	0.545453	5455
Precious Metals	Palladium	7440-05-3	0.000001	0.004940	49	0.000027	0
Sub-total	—	—	0.020241	100	1000000	0.545480	5455
<b>Die Attach Adhesive</b>							
Other Inorganic Materials	Aluminum Nitride	24304-00-5	0.000146	1.001234	10012	0.003935	39
Other Nonferrous Metals and Alloys	Titanium Dioxide	13463-67-7	0.000437	2.996845	29968	0.011777	118
Other Organic Materials	Hydroxypropyl Methacrylate	27813-02-1	0.00627	42.998217	429982	0.168972	1690
Other Organic Materials	Tripropylene Glycol Diacrylate	42978-66-5	0.000437	2.996845	29968	0.011777	118
Other Plastics and Rubber	Anhydride	85-44-9	0.002042	14.003566	140036	0.055030	550
Thermoplastics	Epoxy	85954-11-6	0.00525	36.003292	360033	0.141484	1415
Sub-total	—	—	0.014582	100	1000000	0.392974	3930

Lead Frame							
Copper and Its Alloys	Copper	7440-50-8	1.703039	94.613278	946133	45.895678	458957
Other Nonferrous Metals and Alloys	Proprietary Metals (including Ag and Cu)	7440-22-4, 7440-50-8	0.096961	5.386722	53867	2.613029	26130
Sub-total	—	—	1.800000	100	1000000	48.508708	485087
Lead Frame Plating							
Nickel and Its Alloys	Nickel	7440-02-0	0.025682	95.118519	951185	0.692111	6921
Precious Metals	Gold	7440-57-5	0.000211	0.781481	7815	0.005686	57
Precious Metals	Palladium	7440-05-3	0.001107	4.100000	41000	0.029833	298
Sub-total	—	—	0.027000	100	1000000	0.727631	7276
Mold Compound							
Other Inorganic Materials	Aluminum Nitride	24304-00-5	0.007164	0.399974	4000	0.193065	1931
Other Inorganic Materials	Fused Silica	60676-86-0	1.5726	87.800058	878001	42.380441	423804
Other Nonferrous Metals and Alloys	Metal Oxide	Trade Secret	0.001791	0.099994	1000	0.048266	483
Other Organic Materials	Carbon Black	1333-86-4	0.003582	0.199987	2000	0.096532	965
Other Organic Materials	Organic Phosphorus	1330-78-5	0.010747	0.600017	6000	0.289624	2896
Other Plastics and Rubber	Silicone	218163-11-2	0.007164	0.399974	4000	0.193065	1931
Thermoplastics	Epoxy	85954-11-6	0.188067	10.499996	105000	5.068271	50683
Sub-total	—	—	1.791115	100	1000000	48.269263	482693
Semiconductor Device							
Ceramics / Glass	Doped Silicon	7440-21-3	0.057736	100.000000	1000000	1.555944	15559
Sub-total	—	—	0.057736	100	1000000	1.555944	15559
Total	—	—	3.710674	—	—	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
9.24 × 10 <sup>8</sup>	1.1	55	60	0.7	125	1000	10793	0	—

## Qualification summary

Stress	Reference	Min lot qty	SS / lot	Condition	Duration	Result	Notes
HTOL	JESD22-A108	3	77	Life test, 125C	1000 hours	Pass	Or equivalent JEDEC condition
HTSL	JESD22-A103	3	25	High temp storage bake, 150C	1000 hours	Pass	Or equivalent JEDEC condition
AC/UHAST	JESD22-A102/JESD22-A118	3	25	Unbiased HAST 130C / 85% RH	96 hours	Pass	Or equivalent JEDEC condition
THB/HAST	JESD22-A101/JESD22-A110	3	25	HAST 130C/85%RH	96 hours	Pass	Or equivalent JEDEC condition
TC	JESD22-A104	3	25	Temperature cycle -65/150C	500 cycles	Pass	Or equivalent JEDEC condition
SD	J-STD-002	3	22	Per specification	>95% lead coverage	Pass	—

HBM	JS-001	1	3	ESD - HBM	Classification	<a href="#">See data sheet</a>	—
CDM	JS-002	1	3	ESD - CDM	Classification	<a href="#">See data sheet</a>	—
LU	JESD78	1	3	Latch-up	Per JESD78	Pass	As applicable per JESD78
MSL	J-STD-020	—	—	Per J-STD-020	Classification	<a href="#">See data sheet</a>	—

## Ongoing reliability monitoring

### FAB process reliability data

Fab Process	Reliability Test	Rolling Year (2Q2023 - 1Q2024) Sample Size	Cumulative Sample Size	Disposition
VDIODE	High temperature reverse bias 125C, 1000 Hours or Equivalent JEDEC Condition	385	1540	Pass
VDIODE	Life test 125C, 1000 Hours or Equivalent JEDEC Condition	385	6713	Pass

### Assembly process reliability data

Package Family	Reliability Test	Rolling Year (2Q2023 - 1Q2024) Sample Size	Cumulative Sample Size	Disposition
SON	Biased HAST 130C/85%RH, 96 Hours or Equivalent JEDEC Condition	4167	72232	Pass
SON	High temp storage bake 150C, 1000 Hours or Equivalent JEDEC Condition	4317	53577	Pass
SON	Temperature cycle -65/150C, 500 Hours or Equivalent JEDEC Condition	11097	127135	Pass
SON	Unbiased HAST 130C/85% RH, 96 Hours or Equivalent JEDEC Condition	8168	106050	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](#)

For additional information, please contact [TI customer support center](#)

## Important Notice and Disclaimer

TI PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATASHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES “AS IS” AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with TI products. You are solely responsible for (1) selecting the appropriate TI products for your application, (2) designing, validating and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, or other requirements.

These resources are subject to change without notice. TI grants you permission to use these resources only for development of an application that uses the TI products described in the resource. Other reproduction and display of these resources is prohibited. No license is granted to any other TI intellectual property right or to any third party intellectual property right. TI disclaims responsibility for, and you will fully indemnify TI and its representatives against, any claims, damages, costs, losses, and liabilities arising out of your use of these resources.

TI's products are provided subject to [TI's Terms of Sale](#) or other applicable terms available either on ti.com or provided in conjunction with such TI products. TI's provision of these resources does not expand or otherwise alter TI's applicable warranties or warranty disclaimers for TI products.

TI objects to and rejects any additional or different terms you may have proposed.