

SN74AHC125QPWRQ1

## Quality, reliability & packaging data download

Status: ACTIVE

Report date: 08/23/2022



Assembly site: **TI MALAYSIA A/T**

RoHS	Yes
REACH	Yes
Device marking	AHC125Q
Lead finish/Ball material	NIPDAU
MSL rating/Peak reflow	Level-3-260C-168 HR
Rating	Automotive

## Material content

Component	Substance	CAS Number	Amount (mg)	Homogeneous Material Level		Component Level	
				Percentage %	ppm	Percentage %	ppm
<b>Bond Wire</b>							
Other Nonferrous Metals and Alloys	Yttrium	7440-65-5	0.000001	0.000739	7	0.000002	0
Precious Metals	Gold	7440-57-5	0.135319	99.998522	999985	0.236602	2366
Precious Metals	Silver	7440-22-4	0.000001	0.000739	7	0.000002	0
Sub-total	—	—	0.135321	100	1000000	0.236606	2366
<b>Die Attach Adhesive</b>							
Precious Metals	Silver	7440-22-4	0.189853	80.000084	800001	0.331954	3320
Thermoplastics	Epoxy	85954-11-6	0.047463	19.999916	199999	0.082988	830
Sub-total	—	—	0.237316	100	1000000	0.414941	4149
<b>Lead Frame</b>							
Copper and Its Alloys	Copper	7440-50-8	21.33279	97.410000	974100	37.299885	372999
Copper and Its Alloys	Iron	7439-89-6	0.5256	2.400000	24000	0.918999	9190
Copper and Its Alloys	Phosphorus	7723-14-0	0.00657	0.030000	300	0.011487	115
Other Nonferrous Metals and Alloys	Lead	7439-92-1	0.00657	0.030000	300	0.011487	115
Other Nonferrous Metals and Alloys	Tin	7440-31-5	0.00657	0.030000	300	0.011487	115
Zinc and Its Alloys	Zinc	7440-66-6	0.0219	0.100000	1000	0.038292	383
Sub-total	—	—	21.90000	100	1000000	38.291638	382916
<b>Lead Frame Plating</b>							
Nickel and Its Alloys	Nickel	7440-02-0	0.370968	95.120000	951200	0.648629	6486
Precious Metals	Gold	7440-57-5	0.003042	0.780000	7800	0.005319	53
Precious Metals	Palladium	7440-05-3	0.01599	4.100000	41000	0.027958	280
Sub-total	—	—	0.390000	100	1000000	0.681906	6819
<b>Mold Compound</b>							
Other Inorganic Materials	Fused Silica	60676-86-0	29.027843	86.000000	860000	50.754505	507545
Other Plastics and Rubber	Carbon Black	1333-86-4	0.10126	0.300000	3000	0.177051	1771
Thermoplastics	Epoxy	85954-11-6	4.624203	13.700000	137000	8.085311	80853
Sub-total	—	—	33.753306	100	1000000	59.016867	590169
<b>Semiconductor Device</b>							
Ceramics / Glass	Doped Silicon	7440-21-3	0.7767	100.000000	1000000	1.358042	13580
Sub-total	—	—	0.7767	100	1000000	1.358042	13580
Total	—	—	57.192643	—	—	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
9.3×10 <sup>8</sup>	1.1	55	60	0.7	125	1000	10859	0	—

## Qualification summary

Type	AEC Q100 test #	Test spec	Min lot qty	SS / lot	Test name	Condition	Result
<b>Test group A - accelerated environment stress test</b>							
THB/HAST	A2	JESD22-A101/JESD22-A110	3	77	Temperature humidity-bias or biased HAST	THB 85C/85%RH for 1000 hours or HAST 110C/85%RH for 264 hours or equivalent	Pass
AC/UHAST	A3	JESD22-A102/JESD22-A118	3	77	Autoclave or unbiased HAST	AC 121C for 96 hours or UHAST 110C/85%RH for 264 hours or equivalent	Pass
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
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
WBP	C2	MIL-STD883 method 2011	1	30	Wire bond pull	Cpk > 1.67	Pass
SD	C3	JEDEC J-STD-002D	1	15	Solderability	>95% lead coverage	Pass
PD	C4	JESD22-B100 and B108	3	10	Physical dimensions	Cpk > 1.67	Pass
<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
NBTI	D4	—	—	—	Negative 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	6	Latch-up	Per AEC Q100-004	Pass
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 (2Q21 - 1Q22) Sample Size	Cumulative Sample Size	Disposition
CMOS	High Temperature Operating Life, 125C, 1000 Hours (or Equivalent)	388	52086	Pass

### Assembly process reliability data

Package Family	Reliability Test	Rolling Year (2Q21 - 1Q22) Sample Size	Cumulative Sample Size	Disposition
TSSOP	Autoclave, 121C, 96 Hours	1155	53383	Pass
TSSOP	Biased HAST, 110C/85%RH, 264 Hours	374	1220	Pass
TSSOP	Biased HAST, 130C/85%RH, 96 Hours	1267	34128	Pass
TSSOP	High Temperature Storage Life, 150C, 1000 Hours	1420	10513	Pass
TSSOP	High Temperature Storage Life, 170C, 420 Hours	154	16911	Pass
TSSOP	Temperature Cycle, -40/125C, 850 Cycles	0	82	Pass
TSSOP	Temperature Cycle, -55/125C, 700 Cycles	0	1403	Pass
TSSOP	Temperature Cycle, -65/150C, 500 Cycles	4255	75024	Pass
TSSOP	Temperature-Humidity Bias Test (85C/85%RH), 1000 Hours	0	1416	Pass
TSSOP	Unbiased HAST, 130C/85%RH, 96 Hours	716	8984	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.