SN74HC573AQPWRG4Q1

Quality, reliability & packaging data download

Status: ACTIVE

Report date: 01/08/2024

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

RoHS	Yes
REACH	Yes
Device marking	HC573AQ
Lead finish/Ball material	NIPDAU
MSL rating/Peak reflow	Level-1-260C-UNLIM
Rating	Automotive

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Material content

				Homogeneous Material Level		Component Level	
Component	**Substance**	**CAS Number**	**Amount (mg)**	**Percentage %**	**ppm**	**Percentage %**	**ppm**
Bond Wire							
Other Nonferrous Metals and Alloys	Yttrium	7440-65-5	0.000001	0.000691	7	0.000001	0
Precious Metals	Gold	7440-57-5	0.144742	99.997927	999979	0.191807	1918
Precious Metals	Silver	7440-22-4	0.000002	0.001382	14	0.000003	0
Sub-total	—	—	0.144745	100	1000000	0.191811	1918
Die Attach Adhesive							
Precious Metals	Silver	7440-22-4	0.518427	70.000000	700000	0.687001	6870
Thermoplastics	Epoxy	85954-11-6	0.222183	30.000000	300000	0.294429	2944
Sub-total	—	—	0.740610	100	1000000	0.981431	9814
Lead Frame							
Copper and Its Alloys	Copper	7440-50-8	27.85926	97.410000	974100	36.918121	369181
Copper and Its Alloys	Iron	7439-89-6	0.6864	2.400000	24000	0.909593	9096
Copper and Its Alloys	Phosphorus	7723-14-0	0.00858	0.030000	300	0.011370	114
Other Nonferrous Metals and Alloys	Lead	7439-92-1	0.00858	0.030000	300	0.011370	114
Other Nonferrous Metals and Alloys	Tin	7440-31-5	0.00858	0.030000	300	0.011370	114
Zinc and Its Alloys	Zinc	7440-66-6	0.0286	0.100000	1000	0.037900	379
Sub-total	—	—	28.60000	100	1000000	37.899724	378997
Lead Frame Plating							
Nickel and Its Alloys	Nickel	7440-02-0	0.437552	95.120000	951200	0.579829	5798
Precious Metals	Gold	7440-57-5	0.003588	0.780000	7800	0.004755	48
Precious Metals	Palladium	7440-05-3	0.01886	4.100000	41000	0.024993	250
Sub-total	—	—	0.460000	100	1000000	0.609576	6096
Mold Compound							
Other Inorganic Materials	Fused Silica	60676-86-0	36.291884	85.500000	855000	48.092741	480927
Other Nonferrous Metals and Alloys	Metal Hydroxide	Trade Secret	1.273399	2.999999	30000	1.687464	16875
Other Organic Materials	Carbon Black	1333-86-4	0.12734	0.300000	3000	0.168747	1687
Other Organic Materials	Chlorine	7782-50-5	0.008489	0.019999	200	0.011249	112
Other Organic Materials	Organic Phosphorus	1330-78-5	0.042447	0.100001	1000	0.056249	562
Thermoplastics	Epoxy	85954-11-6	4.703089	11.080001	110800	6.232370	62324
Sub-total	—	—	42.446648	100	1000000	56.248820	562488
Semiconductor Device							
Ceramics / Glass	Doped Silicon	7440-21-3	3.070288	100.000000	1000000	4.068639	40686
Sub-total	—	—	3.070288	100	1000000	4.068639	40686
Total	—	—	75.462291	—	—	100	1000000

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Component	**Substance**	**CAS Number**	**Amount (mg)**	**Percentage %**	**ppm**	**Percentage %**	**ppm**
Bond Wire							
Copper and Its Alloys	Copper	7440-50-8	0.062902	97.536090	975361	0.061656	617
Not Categorized	Proprietary Materials	—	0.000007	0.010854	109	0.000007	0
Precious Metals	Gold	7440-57-5	0.000033	0.051170	512	0.000032	0
Precious Metals	Palladium	7440-05-3	0.001547	2.398784	23988	0.001516	15
Precious Metals	Silver	7440-22-4	0.000002	0.003101	31	0.000002	0
Sub-total	—	—	0.064491	100	1000000	0.063213	632
Die Attach Adhesive							
Precious Metals	Silver	7440-22-4	0.053668	80.000000	800000	0.052605	526
Thermoplastics	Epoxy	85954-11-6	0.013417	20.000000	200000	0.013151	132
Sub-total	—	—	0.067085	100	1000000	0.065756	658
Lead Frame							
Copper and Its Alloys	Copper	7440-50-8	52.637349	97.585000	975850	51.594449	515944
Copper and Its Alloys	Iron	7439-89-6	1.24062	2.300000	23000	1.216040	12160
Copper and Its Alloys	Phosphorus	7723-14-0	0.008091	0.015000	150	0.007931	79
Zinc and Its Alloys	Zinc	7440-66-6	0.05394	0.100000	1000	0.052871	529
Sub-total	—	—	53.940000	100	1000000	52.871291	528713
Lead Frame Plating							
Nickel and Its Alloys	Nickel	7440-02-0	0.057072	95.120000	951200	0.055941	559
Precious Metals	Gold	7440-57-5	0.000468	0.780000	7800	0.000459	5
Precious Metals	Palladium	7440-05-3	0.00246	4.100000	41000	0.002411	24

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Sub-total	—	—	0.060000	100	1000000	0.058811	588
Mold Compound							
Other Inorganic Materials	Fused Silica	60676-86-0	40.996376	85.999999	860000	40.184118	401841
Other Organic Materials	Carbon Black	1333-86-4	0.143011	0.300001	3000	0.140178	1402
Thermoplastics	Epoxy	85954-11-6	6.530818	13.700000	137000	6.401423	64014
Sub-total	—	—	47.670205	100	1000000	46.725719	467257
Semiconductor Device							
Ceramics / Glass	Doped Silicon	7440-21-3	0.21956	100.000000	1000000	0.215210	2152
Sub-total	—	—	0.21956	100	1000000	0.215210	2152
Total	—	—	102.021341	—	—	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**
8.71×10^9	0.1	55	60	0.7	125	1000	101758	0	—

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	—

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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	—
TDDB	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	—
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 - charged device model	Per AEC Q100-011	See data sheet	—
LU	E4	AEC Q100-004	1	6	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
Power BICMOS	Life test 125C, 1000 Hours or Equivalent JEDEC Condition	31354	386023	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	40999	Pass
TSSOP	High temp storage bake 150C, 1000 Hours or Equivalent JEDEC Condition	1683	31373	Pass
TSSOP	Temperature cycle -65/150C, 500 Hours or Equivalent JEDEC Condition	7546	86057	Pass
TSSOP	Unbiased HAST 130C/85% RH, 96 Hours or Equivalent JEDEC Condition	5313	69451	Pass

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Certifications

Conflict minerals specialized disclosure report

Restricted chemical test report

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