

Cypress Semiconductor Automotive Package Qualification Report

**QTP# 164506 VERSION **
February 2017**

**128L-TQFP (14x20x1.4mm)
Pure Sn leadfinish, Au Wire
MSL3, 260C Reflow
ASEK-Taiwan (G)**

**FOR ANY QUESTIONS ON THIS REPORT, PLEASE CONTACT
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PACKAGE QUALIFICATION HISTORY

QTP Number	Description of Qualification Purpose	Date
163803	Qualification of Automotive 100L-TQFP (14x14x1.4mm) Package for TSG6_XL device using Fab25 wafers at ASEK-Taiwan (G) using 0.8mil Au wire with EME-G631 mold compound, CRM-1076 die attach material, Copper with Ag plating leadframe material and Pure Sn leadfinish at MSL3, 260C Reflow Temperature.	Feb 2017
164506	Qualification of Automotive 128L-TQFP Package at ASEK-Taiwan (G) using 0.8mil Au wire with G631 mold compound, CRM-1076 die attach material, Copper with Ag plating leadframe material and Pure Sn leadfinish at MSL3, 260C Reflow Temperature	Feb 2017

MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION	
Package Designation:	AZ0AB
Package Outline, Type, or Name:	100-Lead TQFP 14x14x1.4mm
Mold Compound Name/Manufacturer:	EME-G631 / Sumitomo
Mold Compound Flammability Rating:	UL-94 V-0
Mold Compound Alpha Emission Rate:	N/A (Not low alpha mold compound)
Oxygen Rating Index: >28%	54%
Lead Frame Designation:	Full Metal Pad
Lead Frame Material:	Copper
Substrate Material:	N/A
Lead Finish, Composition / Thickness:	Pure Sn
Die Backside Preparation Method/Metallization:	Backgrind
Die Separation Method:	Wafer Saw
Die Attach Supplier:	Sumitomo
Die Attach Material:	CRM-1076
Bond Diagram Designation	002-15599
Wire Bond Method:	Thermosonic
Wire Material/Size:	Au / 0.8mil
Thermal Resistance Theta JA °C/W:	38
Package Cross Section Yes/No:	Yes
Assembly Process Flow:	49-41999M
Name/Location of Assembly (prime) facility:	ASEK-Taiwan (G)
MSL LEVEL	3
REFLOW PROFILE	260C

ELECTRICAL TEST / FINISH DESCRIPTION	
Test Location:	CML (R)

Note: Please contact a Cypress Representative for other package availability.

MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION	
Package Designation:	AZ128
Package Outline, Type, or Name:	128-Lead TQFP 14x20x1.4mm
Mold Compound Name/Manufacturer:	EME-G631 / Sumitomo
Mold Compound Flammability Rating:	UL-94 V-0
Mold Compound Alpha Emission Rate:	N/A (Not low alpha mold compound)
Oxygen Rating Index: >28%	54%
Lead Frame Designation:	Full Metal Pad
Lead Frame Material:	Copper
Substrate Material:	N/A
Lead Finish, Composition / Thickness:	Pure Sn
Die Backside Preparation Method/Metallization:	Backgrind
Die Separation Method:	Wafer Saw
Die Attach Supplier:	Sumitomo
Die Attach Material:	CRM-1076
Bond Diagram Designation	001-97920
Wire Bond Method:	Thermosonic
Wire Material/Size:	Au / 0.8mil
Thermal Resistance Theta JA °C/W:	38
Package Cross Section Yes/No:	Yes
Assembly Process Flow:	49-41999M
Name/Location of Assembly (prime) facility:	ASEK-Taiwan (G)
MSL LEVEL	3
REFLOW PROFILE	260C

ELECTRICAL TEST / FINISH DESCRIPTION	
Test Location:	CML (R)

Note: Please contact a Cypress Representative for other package availability.

RELIABILITY TESTS PERFORMED PER SPECIFICATION REQUIREMENTS

Stress/Test	Test Condition (Temp/Bias)	Result P/F
High Temperature Operating Life Early Failure Rate	AEC-Q100-008 and JESD22-A108, 150°C Dynamic Operating Condition, Vcc Max = 2.07V	P
Endurance /High Temperature Operating Life Latent Failure Rate	JESD22-A108, 150°C Dynamic Operating Condition, Vcc Max = 2.07V	P
High Accelerated Saturation Test (HAST)	JESD22-A110, 130C, 5.5V, 85%RH Precondition: JESD22-A113 Moisture Sensitivity MSL 3 192 Hrs, 30C/60%RH+3IR-Reflow, 260°C+0, -5°C	P
Temperature Cycle	JESD22-A104, -65°C to 150°C Precondition: JESD22-A113 Moisture Sensitivity MSL 3 192 Hrs, 30C/60%RH+3IR-Reflow, 260°C+0, -5°C	P
Pressure Cooker	JESD22-A102, 121C, 100%RH, 15 Psig Precondition: JESD22-A113 Moisture Sensitivity MSL 3 192 Hrs, 30C/60%RH+3IR-Reflow, 260°C+0, -5°C	P
Acoustic	J-STD-020 Precondition: JESD22-A113 Moisture Sensitivity MSL 3 192 Hrs, 30C/60%RH+3IR-Reflow, 260C+0, -5C	P
High Temp Storage	JESD22-A103: 150 C, no bias	P
Wire Bond Pull	Mil-Std 883, Method 2011	P
Post Temperature Cycle Wire Bond Pull	Mil-Std 883, Method 2011	P
Dye Penetrant Test	Criteria: No Package Crack	P
Electrostatic Discharge Charge Device Model (ESD-CDM)	AEC-Q100-011 250V/500V/ 750V (corner pins)	P
Electrostatic Discharge Human Body Model (ESD-HBM)	AEC-Q100-002 500V/1000V/2000V/4000V/6000V	P
Electrical Distribution	AEC-Q100-009	P
Wire Ball Shear	AEC-Q100-001	P
Final Visual	JESD22-B101B	P
Physical Dimensions	JESD22B100 and B108	P
Constructional Analysis	Criteria: Meet external and internal characteristics of Cypress package	P
Solderability	JESD22-B102	P



Reliability Test Data

QTP #: 163803

<i>Device</i>	<i>Package</i>	<i>Fab Lot #</i>	<i>Assy Lot #</i>	<i>Assy Loc</i>	<i>Duration</i>	<i>Samp</i>	<i>Rej</i>	<i>Failure Mechanism</i>
STRESS: ACOUSTIC, MSL3								
CYAT81688 (8A206802BB)	AZ0A	3629023	611627389	ASEK-G	COMP	22	0	
CYAT81688 (8A206802BB)	AZ0A	3632047	611630353	ASEK-G	COMP	22	0	
CYAT81688 (8A206802BB)	AZ0A	3634008	611631857	ASEK-G	COMP	22	0	
STRESS: BALL SHEAR								
CYAT81688 (8A206802BB)	AZ0A	3629023	611627389	ASEK-G	COMP	5	0	
CYAT81688 (8A206802BB)	AZ0A	3632047	611634182	ASEK-G	COMP	5	0	
CYAT81688 (8A206802BB)	AZ0A	3632047	611630353	ASEK-G	COMP	5	0	
CYAT81688 (8A206802BB)	AZ0A	3634008	611631857	ASEK-G	COMP	5	0	
STRESS: BOND PULL								
CYAT81688 (8A206802BB)	AZ0A	3629023	611627389	ASEK-G	COMP	5	0	
CYAT81688 (8A206802BB)	AZ0A	3632047	611634182	ASEK-G	COMP	5	0	
CYAT81688 (8A206802BB)	AZ0A	3632047	611630353	ASEK-G	COMP	5	0	
CYAT81688 (8A206802BB)	AZ0A	3634008	611631857	ASEK-G	COMP	5	0	
STRESS: CONSTRUCTIONAL ANALYSIS								
CYAT81688 (8A206802BB)	AZ0A	3629023	611627389	ASEK-G	COMP	5	0	
CYAT81688 (8A206802BB)	AZ0A	3632047	611630353	ASEK-G	COMP	5	0	
CYAT81688 (8A206802BB)	AZ0A	3634008	611631857	ASEK-G	COMP	5	0	
STRESS: DIE SHEAR								
CYAT81688 (8A206802BB)	AZ0A	3629023	611627389	ASEK-G	COMP	15	0	
CYAT81688 (8A206802BB)	AZ0A	3632047	611634182	ASEK-G	COMP	15	0	
CYAT81688 (8A206802BB)	AZ0A	3632047	611630353	ASEK-G	COMP	15	0	
CYAT81688 (8A206802BB)	AZ0A	3634008	611631857	ASEK-G	COMP	15	0	
STRESS: DYE PENETRANT								
CYAT81688 (8A206802BB)	AZ0A	3629023	611627389	ASEK-G	COMP	15	0	
CYAT81688 (8A206802BB)	AZ0A	3632047	611630353	ASEK-G	COMP	15	0	
CYAT81688 (8A206802BB)	AZ0A	3634008	611631857	ASEK-G	COMP	15	0	



Reliability Test Data

QTP #: 163803

Device Package Fab Lot # Assy Lot # Assy Loc Duration Samp Rej Failure Mechanism

STRESS: ELECTRICAL DISTRIBUTION

CYAT81688 (8A206802BB)	AZ0A	3629023	611627389	ASEK-G	COMP	80	0
CYAT81688 (8A206802BB)	AZ0A	3632047	611630353	ASEK-G	COMP	80	0
CYAT81688 (8A206802BB)	AZ0A	3634008	611631857	ASEK-G	COMP	80	0

STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 150C, 2.07V, Vcc Max

CYAT81688 (8A206802BB)	AZ0A	3629023	611627389	ASEK-G	48	3333	0
CYAT81688 (8A206802BB)	AZ0A	3632047	611630353	ASEK-G	48	3379	0
CYAT81688 (8A206802BB)	AZ0A	3634008	611631857	ASEK-G	48	3395	0

STRESS: ENDURANCE / HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, 150C, 2.07V, Vcc Max

CYAT81688 (8A206802BB)	AZ0A	3629023	611627389	ASEK-G	408	80	0
CYAT81688 (8A206802BB)	AZ0A	3632047	611630353	ASEK-G	408	80	0
CYAT81688 (8A206802BB)	AZ0A	3634008	611631857	ASEK-G	408	80	0

STRESS: ESD-CHARGE DEVICE MODEL

CYAT81688 (8A206802BB)	AZ0A	3629023	611627389	ASEK-G	250	3	0
CYAT81688 (8A206802BB)	AZ0A	3629023	611627389	ASEK-G	500	3	0
CYAT81688 (8A206802BB)	AZ0A	3629023	611627389	ASEK-G	750	3	0

STRESS: ESD-HUMAN BODY CIRCUIT PER JESD22-A114-B

CYAT81688 (8A206802BB)	AZ0A	3629023	611627389	ASEK-G	500	3	0
CYAT81688 (8A206802BB)	AZ0A	3629023	611627389	ASEK-G	1000	3	0
CYAT81688 (8A206802BB)	AZ0A	3629023	611627389	ASEK-G	2000	3	0
CYAT81688 (8A206802BB)	AZ0A	3629023	611627389	ASEK-G	4000	3	0
CYAT81688 (8A206802BB)	AZ0A	3629023	611627389	ASEK-G	6000	3	0

STRESS: FINAL VISUAL INSPECTION

CYAT81688 (8A206802BB)	AZ0A	3629023	611627389	ASEK-G	COMP	4349	0
CYAT81688 (8A206802BB)	AZ0A	3632047	611634182	ASEK-G	COMP	3405	0
CYAT81688 (8A206802BB)	AZ0A	3632047	611630353	ASEK-G	COMP	7046	0
CYAT81688 (8A206802BB)	AZ0A	3634008	611631857	ASEK-G	COMP	6516	0



Reliability Test Data

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<i>Device</i>	<i>Package</i>	<i>Fab Lot #</i>	<i>Assy Lot #</i>	<i>Assy Loc</i>	<i>Duration</i>	<i>Samp</i>	<i>Rej</i>	<i>Failure Mechanism</i>
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STRESS: HI-ACCEL SATURATION TEST, 130C, 5.5V, 85%RH, PRE COND 192 HR 30C/60%RH, MSL3

CYAT81688 (8A206802BB)	AZ0A	3629023	611627389	ASEK-G	96	77	0	
CYAT81688 (8A206802BB)	AZ0A	3632047	611630353	ASEK-G	96	79	0	
CYAT81688 (8A206802BB)	AZ0A	3634008	611631857	ASEK-G	96	80	0	

STRESS: HIGH TEMPERATURE STORAGE

CYAT81688 (8A206802BB)	AZ0A	3629023	611627389	ASEK-G	1000	45	0	
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STRESS: LEAD INTEGRITY

CYAT81688 (8A206802BB)	AZ0A	3632047	611630353	ASEK-G	COMP	5	0	
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STRESS: PRESSURE COOKER TEST

CYAT81688 (8A206802BB)	AZ0A	3629023	611627389	ASEK-G	96	80	0	
CYAT81688 (8A206802BB)	AZ0A	3629023	611627389	ASEK-G	168	80	0	
CYAT81688 (8A206802BB)	AZ0A	3632047	611630353	ASEK-G	96	80	0	
CYAT81688 (8A206802BB)	AZ0A	3632047	611630353	ASEK-G	168	80	0	
CYAT81688 (8A206802BB)	AZ0A	3634008	611631857	ASEK-G	96	80	0	
CYAT81688 (8A206802BB)	AZ0A	3634008	611631857	ASEK-G	168	80	0	

STRESS: PHYSICAL DIMENSION

CYAT81688 (8A206802BB)	AZ0A	3629023	611627389	ASEK-G	COMP	10	0	
CYAT81688 (8A206802BB)	AZ0A	3632047	611634182	ASEK-G	COMP	10	0	
CYAT81688 (8A206802BB)	AZ0A	3632047	611630353	ASEK-G	COMP	10	0	
CYAT81688 (8A206802BB)	AZ0A	3634008	611631857	ASEK-G	COMP	10	0	

STRESS: POST TCT BOND PULL

CYAT81688 (8A206802BB)	AZ0A	3629023	611627389	ASEK-G	500	5	0	
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STRESS: PRE/POST LFR CRITICAL PARAMETERS

CYAT81688 (8A206802BB)	AZ0A	3629023	611627389	ASEK-G	COMP	82	0	
CYAT81688 (8A206802BB)	AZ0A	3632047	611630353	ASEK-G	COMP	82	0	
CYAT81688 (8A206802BB)	AZ0A	3634008	611631857	ASEK-G	COMP	82	0	



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<i>Device</i>	<i>Package</i>	<i>Fab Lot #</i>	<i>Assy Lot #</i>	<i>Assy Loc</i>	<i>Duration</i>	<i>Samp</i>	<i>Rej</i>	<i>Failure Mechanism</i>
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STRESS: SOLDERABILITY

CYAT81688 (8A206802BB)	AZ0A	3629023	611627389	ASEK-G	COMP	15	0	
CYAT81688 (8A206802BB)	AZ0A	3632047	611630353	ASEK-G	COMP	15	0	
CYAT81688 (8A206802BB)	AZ0A	3634008	611631857	ASEK-G	COMP	15	0	

STRESS: TC COND. C -65C TO 150C, PRECONDITION 192 HRS 30C/60%RH

CYAT81688 (8A206802BB)	AZ0A	3629023	611627389	ASEK-G	500	85	0	
CYAT81688 (8A206802BB)	AZ0A	3629023	611627389	ASEK-G	1000	80	0	
CYAT81688 (8A206802BB)	AZ0A	3632047	611630353	ASEK-G	500	95	0	
CYAT81688 (8A206802BB)	AZ0A	3632047	611630353	ASEK-G	1000	95	0	
CYAT81688 (8A206802BB)	AZ0A	3634008	611631857	ASEK-G	500	83	0	
CYAT81688 (8A206802BB)	AZ0A	3634008	611631857	ASEK-G	1000	83	0	

STRESS: X-RAY

CYAT81688 (8A206802BB)	AZ0A	3629023	611627389	ASEK-G	COMP	15	0	
CYAT81688 (8A206802BB)	AZ0A	3632047	611634182	ASEK-G	COMP	15	0	
CYAT81688 (8A206802BB)	AZ0A	3632047	611630353	ASEK-G	COMP	15	0	
CYAT81688 (8A206802BB)	AZ0A	3634008	611631857	ASEK-G	COMP	15	0	



Reliability Test Data

QTP #: 164506

<i>Device</i>	<i>Package</i>	<i>Fab Lot #</i>	<i>Assy Lot #</i>	<i>Assy Loc</i>	<i>Duration</i>	<i>Samp</i>	<i>Rej</i>	<i>Failure Mechanism</i>
STRESS: ACOUSTIC, MSL3								
CYAT81688 (8A206803BB)	AZ128	3629023	611631856	ASEK-G	COMP	22	0	
STRESS: BALL SHEAR								
CYAT81688 (8A206803BB)	AZ128	3629023	611631856	ASEK-G	COMP	5	0	
STRESS: BOND PULL								
CYAT81688 (8A206803BB)	AZ128	3629023	611631856	ASEK-G	COMP	5	0	
STRESS: CONSTRUCTIONAL ANALYSIS								
CYAT81688 (8A206803BB)	AZ128	3629023	611631856	ASEK-G	COMP	5	0	
STRESS: DIE SHEAR								
CYAT81688 (8A206803BB)	AZ128	3629023	611631856	ASEK-G	COMP	15	0	
STRESS: DYE PENETRANT								
CYAT81688 (8A206803BB)	AZ128	3629023	611631856	ASEK-G	COMP	15	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 150C, 2.07V, Vcc Max								
CYAT81688 (8A206803BB)	AZ128	3629023	611631856	ASEK-G	48	843	0	
STRESS: ESD-CHARGE DEVICE MODEL								
CYAT81688 (8A206803BB)	AZ128	3629023	611631856	ASEK-G	250	3	0	
CYAT81688 (8A206803BB)	AZ128	3629023	611631856	ASEK-G	500	3	0	
CYAT81688 (8A206803BB)	AZ128	3629023	611631856	ASEK-G	750	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER JESD22-A114-B								
CYAT81688 (8A206803BB)	AZ128	3629023	611631856	ASEK-G	500	3	0	
CYAT81688 (8A206803BB)	AZ128	3629023	611631856	ASEK-G	1000	3	0	
CYAT81688 (8A206803BB)	AZ128	3629023	611631856	ASEK-G	2000	3	0	
CYAT81688 (8A206803BB)	AZ128	3629023	611631856	ASEK-G	4000	3	0	
STRESS: FINAL VISUAL INSPECTION								
CYAT81688 (8A206803BB)	AZ128	3629023	611631856	ASEK-G	COMP	5298	0	
STRESS: HI-ACCEL SATURATION TEST, 130C, 5.5V, 85%RH, PRE COND 192 HR 30C/60%RH, MSL3								
CYAT81688 (8A206803BB)	AZ128	3629023	611631856	ASEK-G	96	78	0	
STRESS: HIGH TEMPERATURE STORAGE								
CYAT81688 (8A206803BB)	AZ128	3629023	611631856	ASEK-G	1000	50	0	

Reliability Test Data

QTP #: 164506

<i>Device</i>	<i>Package</i>	<i>Fab Lot #</i>	<i>Assy Lot #</i>	<i>Assy Loc</i>	<i>Duration</i>	<i>Samp</i>	<i>Rej</i>	<i>Failure Mechanism</i>
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, 150C, 2.07V, Vcc Max								
CYAT81688 (8A206803BB)	AZ128	3629023	611631856	ASEK-G	408	80	0	
STRESS: PRESSURE COOKER TEST								
CYAT81688 (8A206803BB)	AZ128	3629023	611631856	ASEK-G	96	80	0	
CYAT81688 (8A206803BB)	AZ128	3629023	611631856	ASEK-G	168	80	0	
STRESS: PHYSICAL DIMENSION								
CYAT81688 (8A206803BB)	AZ128	3629023	611631856	ASEK-G	COMP	10	0	
STRESS: POST TCT BOND PULL								
CYAT81688 (8A206803BB)	AZ128	3629023	611631856	ASEK-G	COMP	5	0	
STRESS: PRE/POST LFR CRITICAL PARAMETERS								
CYAT81688 (8A206803BB)	AZ128	3629023	611631856	ASEK-G	COMP	82	0	
STRESS: STATIC LATCH-UP (+/-100mA 125C)								
CYAT81688 (8A206803BB)	AZ128	3629023	611631856	ASEK-G	COMP	6	0	
STRESS: SOLDERABILITY								
CYAT81688 (8A206803BB)	AZ128	3629023	611631856	ASEK-G	COMP	15	0	
STRESS: TC COND. C -65C TO 150C, PRECONDITION 192 HRS 30C/60%RH								
CYAT81688 (8A206803BB)	AZ128	3629023	611631856	ASEK-G	500	85	0	
CYAT81688 (8A206803BB)	AZ128	3629023	611631856	ASEK-G	1000	80	0	
STRESS: X-RAY								
CYAT81688 (8A206803BB)	AZ128	3629023	611631856	ASEK-G	COMP	15	0	



Document History Page

Document Title: QTP#164506: AUTOMOTIVE 128L-TQFP (14x20x1.4mm) PURE SN LEADFINISH, AU WIRE
MSL3, 260C REFLOW ASEK-TAIWAN (G)
Document Number: 002-18731

Rev.	ECN No.	Orig. of Change	Description of Change
**	5630929	HSTO	Initial spec release