Cypress Semiconductor Automotive Package Qualification Report

**QTP# 152603 VERSION **
April 2016**

128-Lead TQFP (14x20x1.4mm)

Pure Sn Leadfinish, Au Wire

MSL3, 260°C Reflow

ASEK-Taiwan (G)

**FOR ANY QUESTIONS ON THIS REPORT PLEASE CONTACT reliability@cypress.com :
OR VIA LINK A CYLINK CRM CASE**

Prepared By:
Honesto Sintos (HSTO)
Reliability Engineer

Reviewed By:
Rene Rodgers (RT)
Reliability Engineer MTS

Approved By:
Don Darling (DCDA)
Reliability Director

PACKAGE QUALIFICATION HISTORY

QTP Number	Description of Qualification Purpose	Date
152603	Qualification of Automotive 128-Lead TQFP (14x20x1.4mm) Package in ASEK-Taiwan (G) using 0.8mil Au wire with G631 mold compound, CRM-1076 die attach material, Copper with Ag plating leadframe and Pure Sn leadfinish at MSL3, 260C Reflow Temperature.	Mar.2016

MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION	
Package Designation:	AZ128
Package Outline, Type, or Name:	128L TQFP 14x20x1.4mm
Mold Compound Name/Manufacturer:	EME-G631 / Sumitomo
Mold Compound Flammability Rating:	Class V-0
Mold Compound Alpha Emission Rate:	N/A, not low alpha
Oxygen Rating Index:	54%
Lead Frame Designation:	FMP
Lead Frame Material:	Copper with Ag plating
Lead Finish, Composition / Thickness:	Pure Sn
Die Backside Preparation Method/Metallization:	Wafer backgrind
Die Separation Method:	Wafer Saw
Die Attach Supplier:	Sumitomo
Die Attach Material:	CRM-1076
Die Attach Method:	Epoxy
Bond Diagram Designation:	001-97920
Wire Bond Method:	Thermosonic
Wire Material/Size:	Au / 0.8mil
Thermal Resistance Theta JA °C/W:	33C/W
Package Cross Section Yes/No:	No
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-RA

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

RELIABILITY TESTS PERFORMED PER SPECIFICATION REQUIREMENT

Stress/Test	Test Condition (Temp/Bias)	Result P/F
Acoustic Microscopy	J-STD-020 Precondition: JESD22-A113 Moisture Sensitivity MSL 3 (192 Hrs., 30°C, 60% RH, 260°C Reflow)	P
Constructional Analysis	Criteria: Meet external and internal characteristics of Cypress package	P
Dye Penetrant Test	Criteria: No Package Crack	P
Electrostatic Discharge Human Body Model (ESD-HBM)	AEC-Q100-002 500V/1000V/1500V/2000V/4000V	P
Electrostatic Discharge Charge Device Model (ESD-CDM)	AEC-Q100-011 250V/500V/ 750V (corner pins)	P
Final Visual	JESD22-B101B	P
High Accelerated Saturation Test (HAST)	JESD22-A110, 130C, 5.5V, 85%RH Precondition: JESD22-A113 Moisture Sensitivity MSL 3 (192 Hrs., 30°C, 60% RH, 260°C Reflow)	P
High Temperature Operating Life Early Failure Rate	AEC-Q100-008 and JESD22-A108, 150°C Dynamic Operating Condition, Vcc Max = 2.07V	P
High Temperature Operating Life Latent Failure Rate	JESD22-A108, 150°C Dynamic Operating Condition, Vcc Max =2.07V	P
Physical Dimensions	JESD22B100 and B108	P
Pressure Cooker	JESD22-A102, 121C, 100%RH, 15 Psig Precondition: JESD22-A113 Moisture Sensitivity MSL 3 (192 Hrs., 30°C, 60% RH, 260°C Reflow)	P
Post Temperature Cycle Wire Bond Pull	Mil-Std 883, Method 2011	P
Solderability	JESD22-B102	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
Wire Ball Shear	AEC-Q100-001	P
Wire Bond Pull	Mil-Std 883, Method 2011	P

Reliability Test Data

QTP #: 152603

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: ACOUSTICS							
CYAT81688 (8A206803AH)	5532014	611534015	ASEK-G	COMP	22	0	
CYAT81688 (8A206803AH)	5532014	611534014	ASEK-G	COMP	21	0	
CYAT81688 (8A206803AH)	5527014	611536506	ASEK-G	COMP	22	0	
STRESS: BALL SHEAR							
CYAT81688 (8A206803AH)	5532014	611534015	ASEK-G	COMP	150	0	
CYAT81688 (8A206803AH)	5532014	611534014	ASEK-G	COMP	150	0	
CYAT81688 (8A206803AH)	5527014	611536506	ASEK-G	COMP	150	0	
STRESS: BOND PULL							
CYAT81688 (8A206803AH)	5532014	611534015	ASEK-G	COMP	150	0	
CYAT81688 (8A206803AH)	5532014	611534014	ASEK-G	COMP	150	0	
CYAT81688 (8A206803AH)	5527014	611536506	ASEK-G	COMP	150	0	
STRESS: CONSTRUCTIONAL ANALYSIS							
CYAT81688 (8A206803AH)	5532014	611534014	ASEK-G	COMP	5	0	
STRESS: DYE PENETRANT							
CYAT81688 (8A206803AH)	5532014	611534015	ASEK-G	COMP	15	0	
CYAT81688 (8A206803AH)	5532014	611534014	ASEK-G	COMP	15	0	
CYAT81688 (8A206803AH)	5527014	611536506	ASEK-G	COMP	15	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 150C, 2.07V, Vcc Max							
CYAT81688 (8A206803AH)	5527015	611534013	ASEK-G	48	3233	0	
CYAT81688 (8A206803AH)	5532014	611534015	ASEK-G	48	207	0	
CYAT81688 (8A206803AH)	5532014	611534014	ASEK-G	48	3424	0	
CYAT81688 (8A206803AH)	5527014	611536506	ASEK-G	48	3438	0	
STRESS: ESD-CHARGE DEVICE MODEL							
CYAT81688 (8A206803AH)	5532014	611534014	ASEK-G	250	3	0	
CYAT81688 (8A206803AH)	5532014	611534014	ASEK-G	500	3	0	
CYAT81688 (8A206803AH)	5532014	611534014	ASEK-G	750	3	0	

Reliability Test Data

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Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: ESD-HUMAN BODY CIRCUIT PER JESD22-A114-B							
CYAT81688 (8A206803AH)	5532014	611534014	ASEK-G	500	3	0	
CYAT81688 (8A206803AH)	5532014	611534014	ASEK-G	1000	3	0	
CYAT81688 (8A206803AH)	5532014	611534014	ASEK-G	2000	3	0	
CYAT81688 (8A206803AH)	5532014	611534014	ASEK-G	4000	3	0	
STRESS: FINAL VISUAL							
CYAT81688 (8A206803AH)	5532014	611534015	ASEK-G	COMP	1637	0	
CYAT81688 (8A206803AH)	5532014	611534014	ASEK-G	COMP	7761	0	
CYAT81688 (8A206803AH)	5527014	611536506	ASEK-G	COMP	7193	0	
STRESS: HI-ACCEL SATURATION TEST, 130C, 85%RH, 5.5V, PRE COND 192 HR 30C/60%RH, MSL3							
CYAT81688 (8A206803AH)	5532014	611534015	ASEK-G	96	80	0	
CYAT81688 (8A206803AH)	5532014	611534014	ASEK-G	96	80	0	
CYAT81688 (8A206803AH)	5527014	611536506	ASEK-G	96	79	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, 150C, 2.07V, Vcc Max							
CYAT81688 (8A206803AH)	5532014	611534015	ASEK-G	408	82	0	
CYAT81688 (8A206803AH)	5532014	611534014	ASEK-G	408	82	0	
CYAT81688 (8A206803AH)	5527014	611536506	ASEK-G	408	82	0	
STRESS: PRESSURE COOKER TEST, 121C, 100%RH, 15 Psig, PRE COND 192 HR 30C/60%RH, MSL3							
CYAT81688 (8A206803AH)	5532014	611534015	ASEK-G	96	80	0	
CYAT81688 (8A206803AH)	5532014	611534015	ASEK-G	168	80	0	
CYAT81688 (8A206803AH)	5532014	611534014	ASEK-G	96	80	0	
CYAT81688 (8A206803AH)	5532014	611534014	ASEK-G	168	79	0	
CYAT81688 (8A206803AH)	5527014	611536506	ASEK-G	96	80	0	
CYAT81688 (8A206803AH)	5527014	611536506	ASEK-G	168	80	0	

Reliability Test Data

QTP #: 152603

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: PHYSICAL DIMENSION							
CYAT81688 (8A206803AH)	5532014	611534015	ASEK-G	COMP	10	0	
CYAT81688 (8A206803AH)	5532014	611534014	ASEK-G	COMP	10	0	
CYAT81688 (8A206803AH)	5527014	611536506	ASEK-G	COMP	10	0	
STRESS: POST TEMPERATURE CYCLE WIRE BOND PULL							
CYAT81688 (8A206803AH)	5532014	611534015	ASEK-G	500	5	0	
STRESS: PRE /POST LFR CRITICAL PARAMETER							
CYAT81688 (8A206803AH)	5532014	611534015	ASEK-G	COMP	80+2	0	
CYAT81688 (8A206803AH)	5532014	611534014	ASEK-G	COMP	80+2	0	
CYAT81688 (8A206803AH)	5527014	611536506	ASEK-G	COMP	80+2	0	
STRESS: SOLDERABILITY							
CYAT81688 (8A206803AH)	5532014	611534015	ASEK-G	COMP	15	0	
CYAT81688 (8A206803AH)	5532014	611534014	ASEK-G	COMP	15	0	
CYAT81688 (8A206803AH)	5527014	611536506	ASEK-G	COMP	15	0	
STRESS: TC COND. C -65C TO 150C, PRE COND 192 HRS 30C/60%RH, MSL3							
CYAT81688 (8A206803AH)	5532014	611534015	ASEK-G	500	84	0	
CYAT81688 (8A206803AH)	5532014	611534015	ASEK-G	1000	79	0	
CYAT81688 (8A206803AH)	5532014	611534014	ASEK-G	500	82	0	
CYAT81688 (8A206803AH)	5532014	611534014	ASEK-G	1000	81	0	
CYAT81688 (8A206803AH)	5527014	611536506	ASEK-G	500	85	0	
CYAT81688 (8A206803AH)	5527014	611536506	ASEK-G	1000	85	0	

Document History Page

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Rev.	ECN No.	Orig. of Change	Description of Change
**	5199937	HSTO	Initial spec release