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Cypress Semiconductor Automotive Package Qualification Report

**QTP# 154004 VERSION **
February, 2016**

48 FBGA Package (6mm x 10mm x 1.2mm)

SnAgCu, Au Wire

MSL3, 260C Reflow

ASE, Taiwan

FOR ANY QUESTIONS ON THIS REPORT, PLEASE CONTACT
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PRODUCT QUALIFICATION HISTORY

QTP Number	Description of Qualification Purpose	Date
154004	New Automotive (-40C to +125C) Package Qualification of the ASE 48 FBGA with KE G2270 Low Alpha Mold Compound, 2025D Die Attach, 1.0 mil Au Bond Wire, SnAgAu Lead Finish, 260C Reflow, MSL3	Feb 2016

MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION	
Package Designation:	BK48C
Package Outline, Type, or Name:	48 FBGA
Mold Compound Name/Manufacturer:	KE G2270 (low alpha) / KYOCERA
Mold Compound Flammability Rating:	V-0
Mold Compound Alpha Emission Rate:	0.001C/CM2-H
Oxygen Rating Index: >28%	52%
Substrate Material:	BT Resin / UMTC
Lead Finish, Composition / Thickness:	SnAgCu 0.3
Die Backside Preparation Method/Metallization:	Backgrind
Die Separation Method:	100% Saw
Die Attach Supplier:	Henkel
Die Attach Material:	2025D
Bond Diagram Designation	001-97797
Wire Bond Method:	Thermosonic
Wire Material/Size:	1.0 mil Au
Thermal Resistance Theta JA °C/W:	46.09 °C/W
Package Cross Section Yes/No:	No
Assembly Process Flow:	49-41040
Name/Location of Assembly (prime) facility:	ASE-G
MSL LEVEL	3
REFLOW PROFILE	260C

ELECTRICAL TEST / FINISH DESCRIPTION	
Test Location:	Sort Test: CMI, USA / Class Test and Finish: CML, Philippines

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
Electrostatic Discharge Human Body Model (ESD-HBM)	AEC-Q100-002, 500V, 1,000V, 2,000V	P
Electrostatic Discharge Charge Device Model (ESD-CDM)	AEC-Q100-011, 250V, 500V, 750V (corner pins)	P
Latchup Sensitivity	AEC-Q100-004, +/- 140mA at 125C, 5.4V	P
NVM Endurance /Data Retention (Plastic)	AEC-Q100-005, Endurance at 25C with Retention at 25C and Endurance at 125C with Retention at 150 C, non-biased	P
NVM Endurance / High Temperature Operating Life	AEC-Q100-005 and JESD22-A108, Endurance at 125C with Life Test at 150 C, Dynamic Operating Condition, Vcc = 3.60V	P
High Temperature Operating Life Early Failure Rate	AEC-Q100-008 and JESD22-A108, 150 C Dynamic Operating Condition, Vcc = 3.60V	P
High Temperature Operating Life Latent Failure Rate	JESD22-A108, 150 C Dynamic Operating Condition, Vcc = 3.60V	P
High Accelerated Saturation Test (HAST)	JESD22-A110,130 C, 85%RH, nnV Precondition: JESD22-A113 Moisture Sensitivity Level (192 Hrs., 30 C°, 60% RH)	P
Temperature Cycle	JESD22- A104, -65 C to 150 C Precondition: JESD22-A113 Moisture Sensitivity Level (192 Hrs., 30 C°, 60% RH)	P
Post Temperature Cycle Wire Bond Pull	Mil-Std 883, Method 2011	P
Pressure Cooker Test	JESD22-A102, 121 C, 100%RH, 15 PSIG Precondition: JESD22-A113 Moisture Sensitivity Level (192 Hrs., 30 C°, 60% RH)	P
Wire Bond Shear	AEC Q100-001	P
Wire Bond Pull	Mil-Std 883, Method 2011	P
Solderability	JESD22-B102	P
Physical Dimensions	JESD22B100 and B108	P
Solder Ball Shear	AEC Q100-010	P
Electrical Distributions	AEC Q100-009	P

Reliability Test Data

QTP #: 154103

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: Electrostatic Discharge- Human Body Model (ESD-HBM): 500V							
CY14B104NA-BA45XE	4520595	*611530604*	*ASE-G*	500V	3	0	
STRESS: Electrostatic Discharge- Human Body Model (ESD-HBM): 1,000V							
CY14B104NA-BA45XE	4520595	*611530604*	*ASE-G*	1000V	3	0	
STRESS: Electrostatic Discharge- Human Body Model (ESD-HBM): 2,000V							
CY14B104NA-BA45XE	4520595	*611530604*	*ASE-G*	2000V	3	0	
STRESS: Electrostatic Discharge- Charge Device Model (ESD-CDM): 48 BGA- 250V							
CY14B104NA-BA45XE	4520595	*611530604*	*ASE-G*	250V	3	0	
STRESS: Electrostatic Discharge- Charge Device Model (ESD-CDM): 48 BGA- 500V							
CY14B104NA-BA45XE	4520595	*611530604*	*ASE-G*	500V	3	0	
STRESS: Electrostatic Discharge- Charge Device Model (ESD-CDM): 48 BGA- 750V (corner pins)							
CY14B104NA-BA45XE	4520595	*611530604*	*ASE-G*	750V	3	0	
STRESS: Static Latch up, ±140mA 125C, and Overvoltage Test at 5.4V							
CY14B104NA-BA45XE	4520595	*611530604*	*ASE-G*	COMP	6	0	
STRESS: 125C Endurance Test (1.4 Million Cycles) + 150C, 1000 hour Data Retention							
CY14B104NA-BA45XE	4520595	*611530604*	*ASE-G*	1000	80	0	
CY14B104NA-BA45XE	4504243	*611530606*	*ASE-G*	1000	80	0	
CY14B104NA-BA45XE	*4519953*	*611530603*	*ASE-G*	1000	80	0	
STRESS: 25C Endurance Test (1.4 Million Cycles) + 25C, 1000 hour Data Retention							
CY14B104NA-BA45XE	4520595	*611530604*	*ASE-G*	1000	80	0	
CY14B104NA-BA45XE	4504243	*611530606*	*ASE-G*	1000	80	0	
CY14B104NA-BA45XE	*4519953*	*611530603*	*ASE-G*	1000	80	0	
STRESS: 125C Endurance Test (1.4 Million Cycles) + High Temperature Operating Life, 150C, 3.6V, 408 Hrs							
CY14B104NA-BA45XE	4520595	*611530604*	*ASE-G*	408	79	0	
CY14B104NA-BA45XE	4504243	*611530606*	*ASE-G*	408	80	0	
CY14B104NA-BA45XE	*4519953*	*611530603*	*ASE-G*	408	80	0	
STRESS: High Temperature Operating Life- Early Failure Rate, 150C, 3.6V, 48 Hrs							
CY14B104NA-BA45XE	4520595	*611530604*	*ASE-G*	48	3446	0	
CY14B104NA-BA45XE	4504243	*611530606*	*ASE-G*	48	3446	0	
CY14B104NA-BA45XE	*4519953*	*611530603*	*ASE-G*	48	3448	0	
STRESS: High Temperature Operating Life- Latent Failure Rate, 150C, 3.6V, 408 Hrs							
CY14B104NA-BA45XE	4520595	*611530604*	*ASE-G*	408	80	0	
CY14B104NA-BA45XE	4504243	*611530606*	*ASE-G*	408	80	0	
CY14B104NA-BA45XE	*4519953*	*611530603*	*ASE-G*	408	80	0	

Reliability Test Data

QTP #: 154103

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: Highly Accelerated Saturation Test (HAST), 130C, 85%RH, 3.6V (MSL 3 Preconditioning)							
CY14B104NA-BA45XE	4520595	*611530604*	*ASE-G*	96	80	0	
CY14B104NA-BA45XE	4504243	*611530606*	*ASE-G*	96	80	0	
CY14B104NA-BA45XE	*4519953*	*611530603*	*ASE-G*	96	80	0	
STRESS: Temperature Cycling Test (TCT), Condition C, -65 C to 150 C (MSL 3 Preconditioning)							
CY14B104NA-BA45XE	4520595	*611530604*	*ASE-G*	500	80	0	
CY14B104NA-BA45XE	4520595	*611530604*	*ASE-G*	1000	80	0	
CY14B104NA-BA45XE	4504243	*611530606*	*ASE-G*	96	80	0	
CY14B104NA-BA45XE	4504243	*611530606*	*ASE-G*	1000	80	0	
CY14B104NA-BA45XE	*4519953*	*611530603*	*ASE-G*	96	80	0	
CY14B104NA-BA45XE	*4519953*	*611530603*	*ASE-G*	1000	80	0	
STRESS: Post Temperature Cycling Test (TCT) Bond Pull							
CY14B104NA-BA45XE	4520595	*611530604*	*ASE-G*	500	5	0	
STRESS: Pressure Cooker Test (PCT), 121 C, 100%RH, 15 PSIG (MSL 3 Preconditioning)							
CY14B104NA-BA45XE	4520595	*611530604*	*ASE-G*	96	80	0	
CY14B104NA-BA45XE	4520595	*611530604*	*ASE-G*	168	80	0	
CY14B104NA-BA45XE	4504243	*611530606*	*ASE-G*	96	80	0	
CY14B104NA-BA45XE	4504243	*611530606*	*ASE-G*	168	80	0	
CY14B104NA-BA45XE	*4519953*	*611530603*	*ASE-G*	96	80	0	
CY14B104NA-BA45XE	*4519953*	*611530603*	*ASE-G*	168	80	0	
STRESS: Wire Bond Shear							
CY14B104NA-BA45XE	4520595	*611530604*	*ASE-G*	COMP	150	0	
CY14B104NA-BA45XE	4504243	*611530606*	*ASE-G*	COMP	150	0	
CY14B104NA-BA45XE	*4519953*	*611530603*	*ASE-G*	COMP	150	0	
STRESS: Wire Bond Pull							
CY14B104NA-BA45XE	4520595	*611530604*	*ASE-G*	COMP	150	0	
CY14B104NA-BA45XE	4504243	*611530606*	*ASE-G*	COMP	150	0	
CY14B104NA-BA45XE	*4519953*	*611530603*	*ASE-G*	COMP	150	0	
STRESS: Solderability							
CY14B104NA-BA45XE	4520595	*611530604*	*ASE-G*	COMP	15	0	
CY14B104NA-BA45XE	4504243	*611530606*	*ASE-G*	COMP	15	0	
CY14B104NA-BA45XE	*4519953*	*611530603*	*ASE-G*	COMP	15	0	
STRESS: Physical Dimensions							
CY14B104NA-BA45XE	4520595	*611530604*	*ASE-G*	COMP	30	0	
CY14B104NA-BA45XE	4504243	*611530606*	*ASE-G*	COMP	30	0	
CY14B104NA-BA45XE	*4519953*	*611530603*	*ASE-G*	COMP	30	0	
STRESS: BGA Solder Ball Shear							
CY14B104NA-BA45XE	4520595	*611530604*	*ASE-G*	COMP	15	0	
CY14B104NA-BA45XE	4504243	*611530606*	*ASE-G*	COMP	15	0	
CY14B104NA-BA45XE	*4519953*	*611530603*	*ASE-G*	COMP	15	0	

Reliability Test Data

QTP #: 154103

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: Electrical Distributions							
CY14B104NA-BA45XE	4520595	*611530604*	*ASE-G*	COMP	30	0	
CY14B104NA-BA45XE	4504243	*611530606*	*ASE-G*	COMP	30	0	
CY14B104NA-BA45XE	*4519953*	*611530603*	*ASE-G*	COMP	30	0	

Document History Page

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Document Number: 002-11403

Rev.	ECN No.	Orig. of Change	Description of Change
**	5153831	BECK	Initial Release