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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

<b>MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION</b>	
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

<b>ELECTRICAL TEST / FINISH DESCRIPTION</b>	
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
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**STRESS: Electrostatic Discharge- Human Body Model (ESD-HBM): 500V**

CY14B104NA-BA45XE	4520595	611530604	ASE-G	500V	3	0	
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**STRESS: Electrostatic Discharge- Human Body Model (ESD-HBM): 1,000V**

CY14B104NA-BA45XE	4520595	611530604	ASE-G	1000V	3	0	
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**STRESS: Electrostatic Discharge- Human Body Model (ESD-HBM): 2,000V**

CY14B104NA-BA45XE	4520595	611530604	ASE-G	2000V	3	0	
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**STRESS: Electrostatic Discharge- Charge Device Model (ESD-CDM): 48 BGA- 250V**

CY14B104NA-BA45XE	4520595	611530604	ASE-G	250V	3	0	
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**STRESS: Electrostatic Discharge- Charge Device Model (ESD-CDM): 48 BGA- 500V**

CY14B104NA-BA45XE	4520595	611530604	ASE-G	500V	3	0	
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**STRESS: Electrostatic Discharge- Charge Device Model (ESD-CDM): 48 BGA- 750V (corner pins)**

CY14B104NA-BA45XE	4520595	611530604	ASE-G	750V	3	0	
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**STRESS: Static Latch up,  $\pm 140\text{mA}$  125C, and Overvoltage Test at 5.4V**

CY14B104NA-BA45XE	4520595	611530604	ASE-G	COMP	6	0	
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**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
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**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	
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**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	

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## Reliability Test Data

**QTP #: 154103**

<b>Device</b>	<b>Fab Lot #</b>	<b>Assy Lot #</b>	<b>Assy Loc</b>	<b>Duration</b>	<b>Samp</b>	<b>Rej</b>	<b>Failure Mechanism</b>
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**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