

# Cypress Semiconductor Automotive Package Qualification Report

**QTP# 163310 VERSION \*\*  
January 2017**

**20/28-lead SSOP (209mil)  
NiPdAu leadfinish, Au Wire  
MSL3, 260C Reflow  
Amkor-Philippines (M)**

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

<b>QTP Number</b>	<b>Description of Qualification Purpose</b>	<b>Date</b>
163310	Qualification of 20/28-Lead SSOP (209mils) Automotive Package in Amkor-Philippines (M) using 1.0mil Au wire with G700LS mold compound, Ablestik 8290 die attach material, Copper leadframe, NiPdAu (RuPPF) leadfinish at MSL3, 260C Reflow Temperature.	Jan 2017

**MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION**

Package Designation:	SP20 / SP28
Package Outline, Type, or Name:	20/28L – SSOP (209mils)
Mold Compound Name/Manufacturer:	G700LS / 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
Lead Finish, Composition / Thickness:	Roughened NiPdAu
Die Backside Preparation Method/Metallization:	Backgrind
Die Separation Method:	Saw
Die Attach Supplier:	Ablestik
Die Attach Material:	8290
Bond Diagram Designation	001-17469 / 001-13284
Wire Bond Method:	Thermosonic
Wire Material/Size:	Au / 1 mil
Thermal Resistance Theta JA °C/W:	186.4 C/W
Package Cross Section Yes/No:	Yes
Assembly Process Flow:	001-78330
Name/Location of Assembly (prime) facility:	Amkor-Philippines (M)
MSL LEVEL	3
REFLOW PROFILE	260C

**ELECTRICAL TEST / FINISH DESCRIPTION**

Test Location:	CML (R)
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**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, 125°C Dynamic Operating Condition, Vcc Max = 5.5V	P
High Temperature Operating Life Latent Failure Rate	JESD22-A108, 125°C Dynamic Operating Condition, Vcc Max = 5.5V	P
High Accelerated Saturation Test (HAST)	JESD22-A110, 130C, 5.25V, 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
Constructional Analysis	Criteria: Meet external and internal characteristics of Cypress package	P
Solderability	JESD22-B102	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



## Reliability Test Data

**QTP #: 163310**

<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 Failure Mechanism</i>
<b>STRESS: ACOUSTIC, MSL3</b>							
CY8C21534 (8A21534AC) SP28		4507653	611612741	AMKOR-M	COMP	22	0
CY8C29466 (8A29466AC) SP28		4506339	611612743	AMKOR-M	COMP	22	0
CY8C21334 (8A21334AC) SP20		4507653	611612738	AMKOR-M	COMP	22	0
<b>STRESS: BALL SHEAR</b>							
CY8C21534 (8A21534AC) SP28		4507653	611612741	AMKOR-M	COMP	30	0
CY8C29466 (8A29466AC) SP28		4506339	611612743	AMKOR-M	COMP	30	0
CY8C21334 (8A21334AC) SP20		4507653	611612738	AMKOR-M	COMP	30	0
<b>STRESS: BOND PULL</b>							
CY8C21534 (8A21534AC) SP28		4507653	611612741	AMKOR-M	COMP	30	0
CY8C29466 (8A29466AC) SP28		4506339	611612743	AMKOR-M	COMP	30	0
CY8C21334 (8A21334AC) SP20		4507653	611612738	AMKOR-M	COMP	30	0
<b>STRESS: CONSTRUCTIONAL ANALYSIS</b>							
CY8C21534 (8A21534AC) SP28		4507653	611612741	AMKOR-M	COMP	5	0
CY8C29466 (8A29466AC) SP28		4506339	611612743	AMKOR-M	COMP	5	0
CY8C21334 (8A21334AC) SP20		4507653	611612738	AMKOR-M	COMP	5	0
<b>STRESS: DYE PENETRANT</b>							
CY8C21534 (8A21534AC) SP28		4507653	611612741	AMKOR-M	COMP	15	0
CY8C29466 (8A29466AC) SP28		4506339	611612743	AMKOR-M	COMP	15	0
CY8C21334 (8A21334AC) SP20		4507653	611612738	AMKOR-M	COMP	15	0
<b>STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 150C, 5.5V, Vcc Max</b>							
CY8C21534 (8A21534AC) SP28		4507653	611612741	AMKOR-M	96	80	0
CY8C29466 (8A29466AC) SP28		4506339	611612743	AMKOR-M	96	80	0
CY8C21334 (8A21334AC) SP20		4507653	611612738	AMKOR-M	96	80	0
<b>STRESS: FINAL VISUAL</b>							
CY8C21534 (8A21534AC) SP28		4507653	611612741	AMKOR-M	COMP	541	0
CY8C29466 (8A29466AC) SP28		4506339	611612743	AMKOR-M	COMP	715	0
CY8C21334 (8A21334AC) SP20		4507653	611612738	AMKOR-M	COMP	548	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>
<b>STRESS: HI-ACCEL SATURATION TEST, 130C, 5.5V, 85%RH, PRE COND 192 HR 30C/60%RH, MSL3</b>								
CY8C21534 (8A21534AC) SP28		4507653	611612741	AMKOR-M	96	80	0	
CY8C21534 (8A21534AC) SP28		4507653	611612741	AMKOR-M	192	77	0	
CY8C29466 (8A29466AC) SP28		4506339	611612743	AMKOR-M	96	80	0	
CY8C29466 (8A29466AC) SP28		4506339	611612743	AMKOR-M	192	80	0	
CY8C21334 (8A21334AC) SP20		4507653	611612738	AMKOR-M	96	80	0	
CY8C21334 (8A21334AC) SP20		4507653	611612738	AMKOR-M	192	80	0	
<b>STRESS: HIGH TEMPERATURE STORAGE</b>								
CY8C21534 (8A21534AC) SP28		4507653	611612741	AMKOR-M	1000	45	0	
CY8C29466 (8A29466AC) SP28		4506339	611612743	AMKOR-M	1000	45	0	
CY8C21334 (8A21334AC) SP20		4507653	611612738	AMKOR-M	1000	45	0	
<b>STRESS: LEAD INTEGRITY</b>								
CY8C21534 (8A21534AC) SP28		4507653	611612741	AMKOR-M	COMP	5	0	
<b>STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, 125C, 5.5V, Vcc Max</b>								
CY8C21534 (8A21534AC) SP28		4507653	611612741	AMKOR-M	1000	80	0	
CY8C29466 (8A29466AC) SP28		4506339	611612743	AMKOR-M	1000	80	0	
CY8C21334 (8A21334AC) SP20		4507653	611612738	AMKOR-M	1000	80	0	
<b>STRESS: PRESSURE COOKER TEST</b>								
CY8C21534 (8A21534AC) SP28		4507653	611612741	AMKOR-M	96	80	0	
CY8C21534 (8A21534AC) SP28		4507653	611612741	AMKOR-M	168	80	0	
CY8C29466 (8A29466AC) SP28		4506339	611612743	AMKOR-M	96	80	0	
CY8C29466 (8A29466AC) SP28		4506339	611612743	AMKOR-M	168	79	0	
CY8C21334 (8A21334AC) SP20		4507653	611612738	AMKOR-M	96	80	0	
CY8C21334 (8A21334AC) SP20		4507653	611612738	AMKOR-M	168	79	0	
<b>STRESS: PHYSICAL DIMENSION</b>								
CY8C21534 (8A21534AC) SP28		4507653	611612741	AMKOR-M	COMP	10	0	
CY8C29466 (8A29466AC) SP28		4506339	611612743	AMKOR-M	COMP	10	0	
CY8C21334 (8A21334AC) SP20		4507653	611612738	AMKOR-M	COMP	10	0	



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<b>STRESS: POST TCT BOND PULL</b>							
CY8C21534 (8A21534AC) SP28		4507653	611612741	AMKOR-M	500	5	0
CY8C29466 (8A29466AC) SP28		4506339	611612743	AMKOR-M	500	5	0
CY8C21334 (8A21334AC) SP20		4507653	611612738	AMKOR-M	500	5	0
<b>STRESS: SOLDERABILITY</b>							
CY8C21534 (8A21534AC) SP28		4507653	611612741	AMKOR-M	COMP	15	0
CY8C29466 (8A29466AC) SP28		4506339	611612743	AMKOR-M	COMP	15	0
CY8C21334 (8A21334AC) SP20		4507653	611612738	AMKOR-M	COMP	15	0
<b>STRESS: TC COND. C -65C TO 150C, PRECONDITION 192 HRS 30C/60%RH</b>							
CY8C21534 (8A21534AC) SP28		4507653	611612741	AMKOR-M	500	85	0
CY8C21534 (8A21534AC) SP28		4507653	611612741	AMKOR-M	1000	80	0
CY8C29466 (8A29466AC) SP28		4506339	611612743	AMKOR-M	500	85	0
CY8C29466 (8A29466AC) SP28		4506339	611612743	AMKOR-M	1000	80	0
CY8C21334 (8A21334AC) SP20		4507653	611612738	AMKOR-M	500	84	0
CY8C21334 (8A21334AC) SP20		4507653	611612738	AMKOR-M	1000	79	0
<b>STRESS: X-RAY</b>							
CY8C21534 (8A21534AC) SP28		4507653	611612741	AMKOR-M	COMP	15	0
CY8C29466 (8A29466AC) SP28		4506339	611612743	AMKOR-M	COMP	15	0
CY8C21334 (8A21334AC) SP20		4507653	611612738	AMKOR-M	COMP	15	0



## Document History Page

Document Title:QTP#163310: 20/28-lead SSOP (209mil) NiPdAu leadfinish, Au Wire MSL3, 260C Reflow Amkor-Philippines (M)

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Rev.	ECN No.	Orig. of Change	Description of Change
**	5581957	HSTO	Initial spec release