

# Cypress Semiconductor Automotive Package Qualification Report

QTP# 165105 VERSION \*\*  
May 2017

**28L-SSOP (209mils)**  
**Pure Sn leadfinish, Au Wire**  
**MSL3, 260C Reflow**  
**OSE-Taiwan (T)**

**FOR ANY QUESTIONS ON THIS REPORT, PLEASE CONTACT**  
**[reliability@cypress.com](mailto:reliability@cypress.com) or via a CYLINK CRM CASE**

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**PACKAGE QUALIFICATION HISTORY**

<b>QTP Number</b>	<b>Description of Qualification Purpose</b>	<b>Date</b>
165105	Qualification of Automotive 28L-SSOP (209mils) Package using Fab25 wafers at OSE-Taiwan (T) using 0.8mil Au wire with Sumitomo G631 mold compound, CRM-1076 die attach material, Copper leadframe and Pure Sn leadfinish at MSL3,260C Reflow Temperature.	May 2017

<b>MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION</b>	
Package Designation:	SP28
Package Outline, Type, or Name:	28-Lead SSOP 209mils
Mold Compound Name/Manufacturer:	G631 / Sumitomo
Mold Compound Flammability Rating:	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	002-16532
Wire Bond Method:	Thermosonic
Wire Material/Size:	Au / 0.8mil
Thermal Resistance Theta JA °C/W:	63
Package Cross Section Yes/No:	Yes
Assembly Process Flow:	49-35999M
Name/Location of Assembly (prime) facility:	OSE-Taiwan (T)
MSL LEVEL	3
REFLOW PROFILE	260C

<b>ELECTRICAL TEST / FINISH DESCRIPTION</b>	
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
Endurance/Data Retention	AEC-Q100-005, 150C, non-biased	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	P
Static Latch-up	AEC-Q100-004, 125C, 100mA	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 #: 165105**

<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: ACOUSTIC, MSL3</b>								
CY8C4146PVE (8A41007AB)	SP28	3643016	611641371	OSE-T	COMP	22	0	
CY8C4146PVE (8A41007AB)	SP28	3637043	611641369	OSE-T	COMP	22	0	
CY8C4146PVE (8A41007AB)	SP28	3646044	611642902	OSE-T	COMP	22	0	
<b>STRESS: BALL SHEAR</b>								
CY8C4146PVE (8A41007AB)	SP28	3643016	611641371	OSE-T	COMP	150	0	
CY8C4146PVE (8A41007AB)	SP28	3639020	611641370	OSE-T	COMP	150	0	
CY8C4146PVE (8A41007AB)	SP28	3637043	611641369	OSE-T	COMP	150	0	
CY8C4146PVE (8A41007AB)	SP28	3646044	611642902	OSE-T	COMP	150	0	
<b>STRESS: BOND PULL</b>								
CY8C4146PVE (8A41007AB)	SP28	3643016	611641371	OSE-T	COMP	150	0	
CY8C4146PVE (8A41007AB)	SP28	3639020	611641370	OSE-T	COMP	150	0	
CY8C4146PVE (8A41007AB)	SP28	3637043	611641369	OSE-T	COMP	150	0	
CY8C4146PVE (8A41007AB)	SP28	3646044	611642902	OSE-T	COMP	150	0	
<b>STRESS: CONSTRUCTIONAL ANALYSIS</b>								
CY8C4146PVE (8A41007AB)	SP28	3643016	611641371	OSE-T	COMP	5	0	
CY8C4146PVE (8A41007AB)	SP28	3639020	611641370	OSE-T	COMP	5	0	
CY8C4146PVE (8A41007AB)	SP28	3637043	611641369	OSE-T	COMP	5	0	
<b>STRESS: DIE SHEAR</b>								
CY8C4146PVE (8A41007AB)	SP28	3643016	611641371	OSE-T	COMP	15	0	
CY8C4146PVE (8A41007AB)	SP28	3639020	611641370	OSE-T	COMP	15	0	
CY8C4146PVE (8A41007AB)	SP28	3637043	611641369	OSE-T	COMP	15	0	
CY8C4146PVE (8A41007AB)	SP28	3646044	611642902	OSE-T	COMP	15	0	
<b>STRESS: DYE PENETRANT</b>								
CY8C4146PVE (8A41007AB)	SP28	3643016	611641371	OSE-T	COMP	15	0	
CY8C4146PVE (8A41007AB)	SP28	3639020	611641370	OSE-T	COMP	15	0	
CY8C4146PVE (8A41007AB)	SP28	3637043	611641369	OSE-T	COMP	15	0	



## Reliability Test Data

**QTP #: 165105**

Device	Package	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
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**STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 150C, 2.07V, Vcc Max**

CY8C4146PVE (8A41007AB)	SP28	3643016	611641371	OSE-T	48	856	0	
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**STRESS: ELECTRICAL DISTRIBUTION**

CY8C4146PVE (8A41007AB)	SP28	3643016	611641371	OSE-T	COMP	30	0	
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**STRESS: ENDURANCE / DATA RETENTION**

CY8C4146PVE (8A41007AB)	SP28	3643016	611641371	OSE-T	1000	78	0	
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**STRESS: ENDURANCE / HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, 150C, 2.07V, Vcc Max**

CY8C4146PVE (8A41007AB)	SP28	3643016	611641371	OSE-T	408	80	0	
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CY8C4146PVE (8A41007AB)	SP28	3639020	611641370	OSE-T	408	50	0	
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CY8C4146PVE (8A41007AB)	SP28	3637043	611641369	OSE-T	408	30	0	
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CY8C4146PVE (8A41007AB)	SP28	3646044	611642902	OSE-T	408	79	0	
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**STRESS: ESD-CHARGE DEVICE MODEL**

CY8C4146PVE (8A41007AB)	SP28	3643016	611641371	OSE-T	250	3	0	
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CY8C4146PVE (8A41007AB)	SP28	3643016	611641371	OSE-T	500	3	0	
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CY8C4146PVE (8A41007AB)	SP28	3643016	611641371	OSE-T	750	3	0	
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**STRESS: ESD-HUMAN BODY CIRCUIT PER JESD22-A114-B**

CY8C4146PVE (8A41007AB)	SP28	3643016	611641371	OSE-T	500	3	0	
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CY8C4146PVE (8A41007AB)	SP28	3643016	611641371	OSE-T	1000	3	0	
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CY8C4146PVE (8A41007AB)	SP28	3643016	611641371	OSE-T	2000	3	0	
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**STRESS: FINAL VISUAL INSPECTION**

CY8C4146PVE (8A41007AB)	SP28	3643016	611641371	OSE-T	COMP	3877	0	
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CY8C4146PVE (8A41007AB)	SP28	3639020	611641370	OSE-T	COMP	1598	0	
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CY8C4146PVE (8A41007AB)	SP28	3637043	611641369	OSE-T	COMP	780	0	
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CY8C4146PVE (8A41007AB)	SP28	3646044	611642902	OSE-T	COMP	3855	0	
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**STRESS: HI-ACCEL SATURATION TEST, 130C, 5.5V, 85%RH, PRE COND 192 HR 30C/60%RH, MSL3**

CY8C4146PVE (8A41007AB)	SP28	3643016	611641371	OSE-T	96	80	0	
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CY8C4146PVE (8A41007AB)	SP28	3637043	611641369	OSE-T	96	80	0	
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CY8C4146PVE (8A41007AB)	SP28	3646044	611642902	OSE-T	96	80	0	
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## Reliability Test Data

**QTP #: 165105**

<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: LEAD INTEGRITY</b>								
CY8C4146PVE (8A41007AB)	SP28	3643016	611641371	OSE-T	COMP	5	0	
<b>STRESS: PRESSURE COOKER TEST</b>								
CY8C4146PVE (8A41007AB)	SP28	3643016	611641371	OSE-T	96	80	0	
CY8C4146PVE (8A41007AB)	SP28	3643016	611641371	OSE-T	168	80	0	
CY8C4146PVE (8A41007AB)	SP28	3637043	611641369	OSE-T	96	80	0	
CY8C4146PVE (8A41007AB)	SP28	3637043	611641369	OSE-T	168	80	0	
CY8C4146PVE (8A41007AB)	SP28	3646044	611642902	OSE-T	96	80	0	
CY8C4146PVE (8A41007AB)	SP28	3646044	611642902	OSE-T	168	80	0	
<b>STRESS: PHYSICAL DIMENSION</b>								
CY8C4146PVE (8A41007AB)	SP28	3643016	611641371	OSE-T	COMP	30	0	
CY8C4146PVE (8A41007AB)	SP28	3639020	611641370	OSE-T	COMP	30	0	
CY8C4146PVE (8A41007AB)	SP28	3637043	611641369	OSE-T	COMP	30	0	
CY8C4146PVE (8A41007AB)	SP28	3646044	611642902	OSE-T	COMP	30	0	
<b>STRESS: POST TCT BOND PULL</b>								
CY8C4146PVE (8A41007AB)	SP28	3643016	611641371	OSE-T	500	5	0	
<b>STRESS: PRE/POST LFR CRITICAL PARAMETERS</b>								
CY8C4146PVE (8A41007AB)	SP28	3643016	611641371	OSE-T	COMP	30	0	
CY8C4146PVE (8A41007AB)	SP28	3639020	611641370	OSE-T	COMP	30	0	
CY8C4146PVE (8A41007AB)	SP28	3646044	611642902	OSE-T	COMP	30	0	
<b>STRESS: STATIC LATCH-UP (+/-100mA 125C)</b>								
CY8C4146PVE (8A41007AB)	SP28	3643016	611641371	OSE-T	COMP	6	0	
<b>STRESS: SOLDERABILITY</b>								
CY8C4146PVE (8A41007AB)	SP28	3643016	611641371	OSE-T	COMP	15	0	
CY8C4146PVE (8A41007AB)	SP28	3639020	611641370	OSE-T	COMP	15	0	
CY8C4146PVE (8A41007AB)	SP28	3637043	611641369	OSE-T	COMP	15	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: TC COND. C -65C TO 150C, PRECONDITION 192 HRS 30C/60%RH</b>								
CY8C4146PVE (8A41007AB)	SP28	3643016	611641371	OSE-T	500	85	0	
CY8C4146PVE (8A41007AB)	SP28	3643016	611641371	OSE-T	1000	80	0	
CY8C4146PVE (8A41007AB)	SP28	3637043	611641369	OSE-T	500	80	0	
CY8C4146PVE (8A41007AB)	SP28	3637043	611641369	OSE-T	1000	80	0	
CY8C4146PVE (8A41007AB)	SP28	3646044	611642902	OSE-T	500	80	0	
CY8C4146PVE (8A41007AB)	SP28	3646044	611642902	OSE-T	1000	80	0	
<b>STRESS: X-RAY</b>								
CY8C4146PVE (8A41007AB)	SP28	3643016	611641371	OSE-T	COMP	15	0	
CY8C4146PVE (8A41007AB)	SP28	3639020	611641370	OSE-T	COMP	15	0	
CY8C4146PVE (8A41007AB)	SP28	3637043	611641369	OSE-T	COMP	15	0	
CY8C4146PVE (8A41007AB)	SP28	3646044	611642902	OSE-T	COMP	15	0	





## Document History Page

Document Title: QTP# 165105: Automotive 28L-SSOP (209mils) Pure Sn leadfinish, Au Wire MSL3, 260C Reflow  
OSE-Taiwan (T)  
Document Number: 002-19901

Rev.	ECN No.	Orig. of Change	Description of Change
**	5763723	HSTO	Initial spec release