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Cypress Semiconductor
Package Qualification Report

QTP# 034601 Rev. *B
October 2017

ALL Plastic Leaded Chip Carrier (PLCC)

Pb-Free, MSL3, 260C Reflow

Amkor Philippines Assembly

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

Qual Report		Description of Qualification Purpose		Date Comp
034601		ALL Plastic Leaded Chip Carrier (PLCC) package , Pb-Free, MSL3, 260C Reflow using G600 Mold Compound, 8361J epoxy and Matte Tin Plating with Annealing Process (150C, 1hr) assembled @ Amkor-Philippines		Mar 04
111501		Qualification of C194 Copper Base Leadframe for All PLCC Packages Built at Amkor Phils (P1)		May 11

MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION	
Package Designation:	J32
Package Outline, Type, or Name:	32 lead Plastic Leaded Chip Carrier (PLCC)
Mold Compound Name/Manufacturer:	G600
Mold Compound Flammability Rating:	V-O per UL 94
Oxygen Rating Index:	None
Lead Frame Material:	Copper
Lead Finish, Composition / Thickness:	Pure Sn
Die Backside Preparation Method/Metallization:	Grinding
Die Separation Method:	Wafer Saw
Die Attach Supplier:	Ablestik
Die Attach Material:	8361J
Wire Bond Method:	Thermosonic
Wire Material/Size:	Gold, 1.0mil
Thermal Resistance Theta JA °C/W:	65.10 °C/W
Package Cross Section Yes/No:	Yes
Assembly Process Flow:	49-14012
Name/Location of Assembly (prime) facility:	Amkor Philippines (PHIL-M)

ELECTRICAL TEST / FINISH DESCRIPTION	
Test Location:	Cypress Philippines (CML-R)
Fault Coverage:	100%

MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION	
Package Designation:	J52
Package Outline, Type, or Name:	52 lead Plastic Leaded Chip Carrier (PLCC)
Mold Compound Name/Manufacturer:	G600
Mold Compound Flammability Rating:	V-O per UL 94
Oxygen Rating Index:	None
Lead Frame Material:	Copper
Lead Finish, Composition / Thickness:	Pure Sn
Die Backside Preparation Method/Metallization:	Grinding
Die Separation Method:	Wafer Saw
Die Attach Supplier:	Ablestik
Die Attach Material:	8361J
Bond Diagram Designation	10-02868
Wire Bond Method:	Thermosonic
Wire Material/Size:	Gold, 1.3mil
Thermal Resistance Theta JA °C/W:	43.54 °C/W
Package Cross Section Yes/No:	Yes
Assembly Process Flow:	49-14012
Name/Location of Assembly (prime) facility:	Amkor Philippines (PHIL-M)

ELECTRICAL TEST / FINISH DESCRIPTION	
Test Location:	Cypress Philippines (CML-R)
Fault Coverage:	100%

MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION	
Package Designation:	JZ84
Package Outline, Type, or Name:	84 lead Plastic Leaded Chip Carrier (PLCC)
Mold Compound Name/Manufacturer:	G600
Mold Compound Flammability Rating:	V-O per UL 94
Oxygen Rating Index:	None
Lead Frame Material:	Copper / C194
Lead Finish, Composition / Thickness:	Pure Sn
Die Backside Preparation Method/Metallization:	Grinding
Die Separation Method:	Wafer Saw
Die Attach Supplier:	Ablestik
Die Attach Material:	8361J
Wire Bond Method:	Thermosonic
Wire Material/Size:	Gold, 1.3mil/ 1.0 mil
Thermal Resistance Theta JA °C/W:	30.56 °C/W
Package Cross Section Yes/No:	Yes
Assembly Process Flow:	49-14012
Name/Location of Assembly (prime) facility:	Amkor Philippines (PHIL-M)

ELECTRICAL TEST / FINISH DESCRIPTION	
Test Location:	Cypress Philippines (CML-R)
Fault Coverage:	100%

MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION	
Package Designation:	JZ44
Package Outline, Type, or Name:	44 lead Plastic Leaded Chip Carrier (PLCC)
Mold Compound Name/Manufacturer:	G600
Mold Compound Flammability Rating:	V-O per UL 94
Oxygen Rating Index:	None
Lead Frame Material:	Copper / C194
Lead Finish, Composition / Thickness:	Pure Sn
Die Backside Preparation Method/Metallization:	Grinding
Die Separation Method:	Wafer Saw
Die Attach Supplier:	Ablestik
Die Attach Material:	8361J
Bond Diagram Designation	10-06312
Wire Bond Method:	Thermosonic
Wire Material/Size:	1.0 mil
Thermal Resistance Theta JA °C/W:	30.56 °C/W
Package Cross Section Yes/No:	Yes
Assembly Process Flow:	49-14012
Name/Location of Assembly (prime) facility:	Amkor Philippines (PHIL-M)

ELECTRICAL TEST / FINISH DESCRIPTION	
Test Location:	Cypress Philippines (CML-R)
Fault Coverage:	100%

RELIABILITY TESTS PERFORMED PER SPECIFICATION REQUIREMENTS

Stress/Test	Test Condition (Temp/Bias)	Result P/F
Acoustic Microscopy Test (C-SAM)	J-STD-020	P
Adhesion of Lead Finish	MIL-STD-883, Method 2025 – Adhesion of Lead Finish	P
External Visual	MIL-PRF-38535, MILSTD-883, METHOD 2009	P
High Accelerated Saturation Test	130°C, 85%RH, 5.5V Precondition: JESD22 Moisture Sensitivity MSL 3 192 Hrs., 30°C/60%RH+3IR-Reflow, **260°C**+5, -0°C	P
High Temperature Operating Life Early Failure Rate	Dynamic Operating Condition, Vcc Max = 2.3V, 125C	P
High Temperature Operating Life Latent Failure Rate	Dynamic Operating Condition, Vcc Max= 2.45V, 135C	P
High Temperature Storage	150°C, no bias	P
Pressure Cooker Test	No bias, 121°C, 100%, Precondition: JESD22 Moisture Sensitivity MSL 3 192 Hrs., 30□C/60%RH+3IR-Reflow, **260°C**+5, -0°C	P
Solderability, Steam Aged	J-STD-002, JESD22-B102 95% solder coverage minimum	P
Temperature Cycle	MIL-STD-883C, Method 1010, Condition C, -65°C to 150°C Precondition: JESD22 Moisture Sensitivity MSL 3 192 Hrs., 30°C/60%RH+3IR-Reflow, **260°C**+5, -0°C	P
X-Ray	MIL-STD-883-2012	P
Physical Dimension	MIL-STD-1835, JESD22-B100	P
Internal Visual	MIL-STD-883-2014	P
Dye Penetrant Test	Test to determine the existence and extent of cracks, Criteria: No Package Crack	P
Constructional Analysis	Criteria: Meet external and internal characteristics of Cypress package	P

Reliability Test Data

QTP #: 034601

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: ACOUSTIC MICROSCOPY							
CY7C421 (7C421D)	2119532	*610349196*	PHIL-M	COMP	15	0	
CY7C136 (7C136G)	2124768	*610349419*	PHIL-M	COMP	15	0	
CY7C341B (7C341F)	2129128	*610352023*	PHIL-M	COMP	15	0	
STRESS: ADHESION OF LEAD FINISH							
CY7C421 (7C421D)	2119532	*610349196*	PHIL-M	COMP	5	0	
STRESS: EXTERNAL VISUAL							
CY7C421 (7C421D)	2119532	*610349196*	PHIL-M	COMP	15	0	
CY7C341B (7C341F)	2129128	*610352023*	PHIL-M	COMP	15	0	
STRESS: HI-ACCEL SATURATION TEST, 130C, 85%RH, (5.5V), PRE COND 192 HR 30C/60%RH, MSL3							
CY7C421 (7C421D)	2119532	*610349196*	PHIL-M	128	45	0	
CY7C136 (7C136G)	2124768	*610349419*	PHIL-M	128	50	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 150C, 5.75V, Vcc Max							
CY7C421 (7C421D)	2119532	*610349196*	PHIL-M	48	817	0	
CY7C136 (7C136G)	2124768	*610349419*	PHIL-M	48	799	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, 150C, 5.75V, Vcc Max							
CY7C421 (7C421D)	2119532	*610349196*	PHIL-M	80	355	0	
CY7C421 (7C421D)	2119532	*610349196*	PHIL-M	500	120	0	
CY7C136 (7C136G)	2124768	*610349419*	PHIL-M	80	120	0	
CY7C136 (7C136G)	2124768	*610349419*	PHIL-M	500	120	0	
STRESS: HIGH TEMP STORGAGE, PLASTIC, 150C							
CY7C421 (7C421D)	2119532	*610349196*	PHIL-M	500	45	0	
CY7C421 (7C421D)	2119532	*610349196*	PHIL-M	1000	45	0	
STRESS: PRESSURE COOKER TEST, 121C, 100%RH), PRE COND 192HRS 30C/60%RH, MSL3							
CY7C421 (7C421D)	2119532	*610349196*	PHIL-M	168	45	0	
CY7C341B (7C341F)	2129128	*610352023*	PHIL-M	168	50	0	
STRESS: SOLDERABILITY							
CY7C421 (7C421D)	2119532	*610349196*	PHIL-M	COMP	3	0	
CY7C341B (7C341F)	2129128	*610352023*	PHIL-M	COMP	3	0	

Reliability Test Data

QTP #: 034601

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: TC CONDITION C, -65C TO 150C, PRE COND. 192 HRS 30C/60% RH, MSL3							
CY7C421 (7C421D)	2119532	*610349196*	PHIL-M	300	45	0	
CY7C421 (7C421D)	2119532	*610349196*	PHIL-M	500	45	0	
CY7C421 (7C421D)	2119532	*610349196*	PHIL-M	1000	45	0	
CY7C136 (7C136G)	2124768	*610349419*	PHIL-M	300	50	0	
CY7C136 (7C136G)	2124768	*610349419*	PHIL-M	500	50	0	
CY7C136 (7C136G)	2124768	*610349419*	PHIL-M	1000	50	0	
CY7C341B (7C341F)	2129128	*610352023*	PHIL-M	300	50	0	
CY7C341B (7C341F)	2129128	*610352023*	PHIL-M	500	50	0	
CY7C341B (7C341F)	2129128	*610352023*	PHIL-M	1000	50	0	
STRESS: X-RAY							
CY7C421 (7C421D)	2119532	*610349196*	PHIL-M	COMP	15	0	
CY7C341B (7C341F)	2129128	*610352023*	PHIL-M	COMP	15	0	

Reliability Test Data

QTP #: 111501

Device	Fab Lot #	Assy Lot #	Ass Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: ACOUSTIC MICROSCOPY							
CY7C024 (7C024C)	2835941	*611116759*	PHIL-M	COMP	15	0	
CY7C024 (7C024C)	2835941	*611116762*	PHIL-M	COMP	15	0	
CY37064P44 (7C37625B)	8048005	*611116148*	PHIL-M	COMP	15	0	
STRESS: ADHESION OF LEAD FINISH							
CY7C024 (7C024C)	2835941	*611116759*	PHIL-M	COMP	5	0	
CY7C024 (7C024C)	2835941	*611116762*	PHIL-M	COMP	5	0	
CY37064P44 (7C37625B)	8048005	*611116148*	PHIL-M	COMP	5	0	
STRESS: CONSTRUCTIONAL ANALYSIS							
CY7C024 (7C024C)	2835941	*611116759*	PHIL-M	COMP	5	0	
CY7C024 (7C024C)	2835941	*611116762*	PHIL-M	COMP	5	0	
CY37064P44 (7C37625B)	8048005	*611116148*	PHIL-M	COMP	5	0	
STRESS: DYE PENETRANT TEST							
CY7C024 (7C024C)	2835941	*611116759*	PHIL-M	COMP	15	0	
CY7C024 (7C024C)	2835941	*611116762*	PHIL-M	COMP	15	0	
CY37064P44 (7C37625B)	8048005	*611116148*	PHIL-M	COMP	15	0	
STRESS: INTERNAL VISUAL							
CY7C024 (7C024C)	2835941	*611116759*	PHIL-M	COMP	5	0	
CY7C024 (7C024C)	2835941	*611116762*	PHIL-M	COMP	5	0	
CY37064P44 (7C37625B)	8048005	*611116148*	PHIL-M	COMP	5	0	
STRESS: PHYSICAL DIMENSION							
CY7C024 (7C024C)	2835941	*611116759*	PHIL-M	COMP	30	0	
CY7C024 (7C024C)	2835941	*611116762*	PHIL-M	COMP	30	0	
CY37064P44 (7C37625B)	8048005	*611116148*	PHIL-M	COMP	30	0	
STRESS: HI-ACCEL SATURATION TEST, 130C, 85%RH, PRE COND 192 HR 30C/60%RH, MSL3							
SAC DIE 1.03-2	N/A	*531L0088*	PHIL-M	1000	77	0	
STRESS: HIGH TEMP STORGAGE, PLASTIC, 150C							
SAC DIE 1.03-2	N/A	*531L0088*	PHIL-M	1000	77	0	

Reliability Test Data

QTP #: 111501

Device	Fab Lot #	Assy Lot #	Ass Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: TC CONDITION C, -65C TO 150C, PRE COND. 192 HRS 30C/60% RH, MSL3							
SAC DIE 1.03-2	N/A	*531L0088*	PHIL-M	500	77	0	
STRESS: SOLDERABILITY							
CY7C024 (7C024C)	2835941	*611116759*	PHIL-M	COMP	3	0	
CY7C024 (7C024C)	2835941	*611116762*	PHIL-M	COMP	3	0	
CY37064P44 (7C37625B)	8048005	*611116148*	PHIL-M	COMP	3	0	
STRESS: X-RAY							
CY7C024 (7C024C)	2835941	*611116759*	PHIL-M	COMP	15	0	
CY7C024 (7C024C)	2835941	*611116762*	PHIL-M	COMP	15	0	
CY37064P44 (7C37625B)	8048005	*611116148*	PHIL-M	COMP	15	0	

History Page

Document Title: QTP 034601: ALL PLASTIC LEADED CHIP CARRIER (PLCC), PB-FREE, MSL3, 260C REFLOW, AMKOR PHILIPPINES ASSEMBLY QUALIFICATION REPORT
Document Number: 001-69721

Rev.	ECN No.	Orig. of Change	Description of Change
**	3261166	NSR	Initial spec release. Changes from Rev. 1 - Changed Revision from Rev 1 to Rev 2 - Added QTP#111501 on the history page and QTP#111501 data on the reliability test data section. - Added JZ44 on the major package information used in this qualification. - Updated the reliability tests performed per specification requirements table.
*A	4020611	NSR	Removed VERSION 2.0 in the title page. Removed obsolete Bond Diagram Designation Spec 10-03722 & 10-05836. Removed reference Cypress specs in the reliability tests performed table.
*B	5939903	JYF	Removed obsolete Spec; Reformatted fonts; Changed reference for Reliability Director and Reliability Engineer.