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Cypress Semiconductor Package Qualification Report

**QTP 094002 VERSION *C
May 2014**

**165-Ball Fine Pitch Ball Grid Array (FBGA)
(13X15X1.4mm)
SnAgCu, MSL3, 260C Reflow
CML-RA**

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

Qual Report	Description of Qualification Purpose	Date Comp
062504	<165-Ball FBGA (13 x 15 x 1.4mm), (1.0mil wire), SUBB165W, SnPbAg, MSL3, 220C Reflow assembled at CML-RA	Jun 06
094002	Qualify 165 Ball FBGA (13 x 15 x 1.4mm), Sn Ag Cu (SAC405) , CK7000 Mold Compound, QMI 506 Die Attach Epoxy, MSL3, 260C Reflow assembled at CML-RA	Nov 09
111604	Qualify 165 Ball FBGA (13 x 15 x 1.4mm), Sn Ag Cu (SAC405) , CK7000 Mold Compound, QMI 506 Die Attach Epoxy, MSL3, 260C Reflow assembled at CML-RA for RAM9 Devices	Apr 11

MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION	
Package Designation:	BW 165 (13X15X1.4mm)
Package Outline, Type, or Name:	165-Ball Fine Pitch Ball Grid Array (FBGA)
Mold Compound Name/Manufacturer:	CK-7000 / Plascon
Mold Compound Flammability Rating:	V-O per UL94
Mold Compound Alpha Emission Rate :	0.0002 cnts/cm2/hr
Oxygen Rating Index:	45%
Substrate Material:	BT- Resin / UNIMICRON
Lead Finish, Composition / Thickness:	SAC405
Die Backside Preparation Method/Metallization:	Backgrinding
Die Separation Method:	100% Saw
Die Attach Supplier:	Hysol
Die Attach Material:	QMI-506
Die Attach Method:	Epoxy
Bond Diagram Designation:	001-52292
Wire Bond Method:	Thermosonic
Wire Material/Size:	Au / 1.0 mil
Thermal Resistance Theta JA °C/W:	16.1 °C/W
Package Cross Section Yes/No:	N/A
Assembly Process Flow:	001-09031
Name/Location of Assembly (prime) facility:	CML-RA
MSL Level	3
Reflow Profile	260C

ELECTRICAL TEST / FINISH DESCRIPTION	
Test Location:	CML-RA

RELIABILITY TESTS PERFORMED PER SPECIFICATION REQUIREMENTS

Stress/Test	Test Condition (Temp/Bias)	Result P/F
Acoustic Microscopy	J-STD-020 Precondition: JESD22 Moisture Sensitivity Level (192 Hrs., 30 C, 60% RH, 260C Reflow)	P
Ball Shear	JESD22-B116A, Cpk : 1.33, Ppk : 1.66	P
Bond Pull	MIL-STD-883 – Method 2011, Cpk : 1.33, Ppk : 1.66	P
Constructional Analysis	Criteria: Meet external and internal characteristic of package	P
Die Shear	MIL-STD-883, Method 2019 Per die size: □ <3000 sq. mils = 1.2 kgf □ 30001-5000 sq. mils = 1.2 kgf □ >5001 sq. mils = 1.2 kgf	P
Dye Penetration	Test to determine the existence and extent of cracks, Criteria: No Package Crack	P
Electrostatic Discharge Charge Device Model (ESD-CDM)	500V JESD22-C101	P
Electrostatic Discharge Human Body Model (ESD-HBM)	2,200V JESD22, Method A114-E	P
Final Visual	JESD22-B101B	P
High Temp Storage	150C, no bias	P
High Temperature Operating Life Early Failure Rate	Dynamic Operating Condition, Vcc Max = 2.07V, 125C JESD22-A108	P
High Temperature Operating Life Latent Failure Rate	Dynamic Operating Condition, Vcc Max = 2.07V, 125C JESD22-A108	P
Internal Visual	MIL-STD-883-2014	P
High Accelerated Saturation Test (HAST)	130□C, 85%RH, 2.07 V Precondition: JESD22 Moisture Sensitivity MSL3 192 Hrs., 30□C/60%RH+3IR-Reflow, 220C +0, -5C 130□C, 85%RH, 2.05V Precondition: JESD22 Moisture Sensitivity MSL3 192 Hrs., 30□C/60%RH+3IR-Reflow, 260C +0, -5C	P
Physical Dimension	MIL-STD-1835, JESD22-B100	P
Pressure Cooker	121°C, 100%RH Precondition: JESD22 Moisture Sensitivity MSL3 192 Hrs., 30□C/60%RH+3IR-Reflow, 220C +0, -5C	P

	192 Hrs., 30°C/60%RH+3IR-Reflow, 260C +0, -5C	
Solderability	J-STD-002, JESD22-B102 95% solder coverage minimum	P
Temperature Cycle	JEDEC22, Condition C, -65C to 150C Precondition: JESD22 Moisture Sensitivity MSL3 192 Hrs., 30C/60%RH+3IR-Reflow, 220C +0, -5C 192 Hrs., 30C/60%RH+3IR-Reflow, 260C +0, -5C	P
Thermal Shock	MIL-STD-883C, Method 1010, Condition B, -55C to 125C	P
X-ray	MIL-STD-883 2012	P

Reliability Test Data

QTP #: 062504

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: ACOUSTIC, MSL3							
CY7C1313AV18 (7R1313B)	4540176	610559351	CML-RA	COMP	15	0	
CY7C1313AV18 (7R1313B)	4539953	610559350	CML-RA	COMP	15	0	
CY7C1313AV18 (7R1313B)	4539953	610559349	CML-RA	COMP	15	0	
STRESS: BOND PULL							
CY7C1313AV18 (7R1313B)	4540176	610559351	CML-RA	COMP	10	0	
STRESS: BALL SHEAR							
CY7C1313AV18 (7R1313B)	4540176	610559351	CML-RA	COMP	30	0	
STRESS: DIE SHEAR							
CY7C1313AV18 (7R1313B)	4540176	610559351	CML-RA	COMP	15	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 125C, 2.07V, Vcc Max							
CY7C1313AV18 (7R1313B)	4540176	610559351	CML-RA	48	1486	0	
CY7C1313AV18 (7R1313B)	4539953	610559350	CML-RA	48	744	0	
CY7C1313AV18 (7R1313B)	4539953	610559349	CML-RA	48	495	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, 125C, 2.07V, Vcc Max							
CY7C1313AV18 (7R1313B)	4540176	610559351	CML-RA	80	126	0	
CY7C1313AV18 (7R1313B)	4540176	610559351	CML-RA	500	121	0	
CY7C1313AV18 (7R1313B)	4539953	610559350	CML-RA	80	126	0	
CY7C1313AV18 (7R1313B)	4539953	610559350	CML-RA	500	125	0	
STRESS: ESD-CHARGE DEVICE MODEL, 500V							
CY7C1313AV18 (7R1313B)	4536793	610546315	CML-RA	COMP	9		0
STRESS: ESD-HUMAN BODY CIRCUIT PER JESD22, METHOD A114-B, 2,200V							
CY7C1313AV18 (7R1313B)	4536793	610546315	CML-RA	COMP	9		0
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015, 2,200V							
CY7C1313AV18 (7R1313B)	4536793	610546315	CML-RA	COMP	3		0
STRESS: EXTERNAL VISUAL							
CY7C1313AV18 (7R1313B)	4540176	610559351	CML-RA	COMP	15	0	
STRESS: INTERNAL VISUAL							
CY7C1313AV18 (7R1313B)	4540176	610559351	CML-RA	COMP	5		0



Reliability Test Data

QTP #: 062504

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
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STRESS: PHYSICAL DIMENSIONS

CY7C1313AV18 (7R1313B)	4540176	610559351	CML-RA	COMP	5	0	
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STRESS: HI-ACCEL SATURATION TEST (130C, 85%RH, 2.07V), PRE COND 192 HR 30C/60%RH, MSL3

CY7C1313AV18 (7R1313B)	4540176	610559351	CML-RA	128	47	0	
CY7C1313AV18 (7R1313B)	4535671	610546317	CML-RA	128	50	0	

STRESS: HIGH TEMPERATURE STORAGE, PLASTIC, 150C

CY7C1313AV18 (7R1313B)	4540176	610559351	CML-RA	500	45	0	
CY7C1313AV18 (7R1313B)	4540176	610559351	CML-RA	1000	45	0	

STRESS: PRESSURE COOKER TEST (121C, 100%RH, 15 Psig), PRE COND 192 HR 30C/60%RH, MSL3

CY7C1313AV18 (7R1313B)	4540176	610559351	CML-RA	168	43	0	
CY7C1313AV18 (7R1313B)	4539953	610559350	CML-RA	168	44	0	

STRESS: TC COND. C -65C TO 150C, PRE COND 192 HRS 30C/60%RH, MSL3

CY7C1313AV18 (7R1313B)	4540176	610559351	CML-RA	300	70	0	
CY7C1313AV18 (7R1313B)	4540176	610559351	CML-RA	500	70	0	
CY7C1313AV18 (7R1313B)	4539953	610559350	CML-RA	300	44	0	
CY7C1313AV18 (7R1313B)	4539953	610559349	CML-RA	300	45	0	

STRESS: THERMAL SHOCK

CY7C1313AV18 (7R1313B)	4540176	610559351	CML-RA	100	45	0	
CY7C1313AV18 (7R1313B)	4540176	610559351	CML-RA	200	45	0	

STRESS: X-RAY

CY7C1313AV18 (7R1313B)	4540176	610559351	CML-RA	COMP	15	0	
CY7C1313AV18 (7R1313B)	4539953	610559350	CML-RA	COMP	15	0	



Reliability Test Data

QTP #: 094002

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
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STRESS: ACOUSTIC, MSL3

CY7C1512KO (7C1512KO)	8847013	610914578	CML-RA	COMP	15	0	
CY7C1512KO (7C1512KO)	8847013	610914579	CML-RA	COMP	14	0	
CY7C1512KO (7C1512KO)	8847013	610914580	CML-RA	COMP	14	0	

STRESS: BALL SHEAR

CY7C1412AV18 (7C1412B)	4727226	610746258	CML-RA	COMP	30	0	
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STRESS: DYE PENETRANT TEST

CY7C1412AV18 (7C1412B)	4727226	610746258	CML-RA	COMP	15	0	
CY7C1512KO (7C1512KO)	8847013	610914579	CML-RA	COMP	15	0	
CY7C1512KO (7C1512KO)	8847013	610914580	CML-RA	COMP	15	0	

STRESS: HI-ACCEL SATURATION TEST (130C, 85%RH, 2.050V), PRE COND 192 HR 30C/60%RH, MSL3

CY7C1512KO (7C1512KO)	8847013	610914578	CML-RA	264	76	0	
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STRESS: PRESSURE COOKER TEST (121C, 100%RH, 15 Psig), PRE COND 192 HR 30C/60%RH, MSL3

CY7C1512KO (7C1512KO)	8847013	610914578	CML-RA	168	76	0	
CY7C1512KO (7C1512KO)	8847013	610914578	CML-RA	288	71	0	

STRESS: SOLDERABILITY

CY7C1512KO (7C1512KO)	8847013	610914578	CML-RA	COMP	5	0	
CY7C1512KO (7C1512KO)	8847013	610914579	CML-RA	COMP	5	0	
CY7C1512KO (7C1512KO)	8847013	610914580	CML-RA	COMP	5	0	

STRESS: SOLDER BALL SHEAR

CY7C1512KO (7C1512KO)	8847013	610914578	CML-RA	COMP	30	0	
CY7C1512KO (7C1512KO)	8847013	610914579	CML-RA	COMP	30	0	
CY7C1512KO (7C1512KO)	8847013	610914580	CML-RA	COMP	30	0	

STRESS: TC COND. C -65C TO 150C, PRE COND 192 HRS 30C/60%RH, MSL3

CY7C1512KO (7C1512KO)	8847013	610914578	CML-RA	500	76	0	
CY7C1512KO (7C1512KO)	8847013	610914578	CML-RA	1000	76	0	
CY7C1512KO (7C1512KO)	8847013	610914579	CML-RA	500	72	0	
CY7C1512KO (7C1512KO)	8847013	610914579	CML-RA	1000	72	0	
CY7C1512KO (7C1512KO)	8847013	610914580	CML-RA	500	72	0	
CY7C1512KO (7C1512KO)	8847013	610914580	CML-RA	1000	72	0	

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Document History Page

Document Title: QTP#094002:165-BALL FINE PITCH BALL GRID ARRAY (FBGA) (13X15X1.4MM), SNAGCU, MSL3, 260C REFLOW CML-RA
Document Number: 001-69283

Rev.	ECN No.	Orig. of Change	Description of Change
**	3240821	NSR	Initial spec release. Changes from 094002 Rev1.0: <ul style="list-style-type: none"> - Changed the reference/mother QTP from 074102 to 062504 - Update test conditions with defined criteria in Reliability test performed per specific requirement table to update. - Changed HAST voltage of QTP 094002 from 1.8V to 2.05V - Added new QTP 111604 as qualification by extension for RAM9 devices.
*A	3993284	HSTO	-Deleted Cypress referenced specs 25-00104, 12-00292, 25-20035, 25-20027, 25-00020, 25-00018, 25-00031 and retained/replaced with industry standards in Reliability Test Performed per Specification Requirements Table. -Added the PCT 288 readpoint in Reliability Test Data page for QTP#094002
*B	4376528	HSTO	Align qualification report based on the new template in the front page
*C	4768500	HSTO	Update reference for Reliability Director

Distribution: WEB

Posting: None