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Continuity of document content
The fact that Infineon offers the following product as part of the Infineon product portfolio does not lead to any changes to this document. Future revisions will occur when appropriate, and any changes will be set out on the document history page.

Continuity of ordering part numbers
Infineon continues to support existing part numbers. Please continue to use the ordering part numbers listed in the datasheet for ordering.

Cypress Semiconductor
Technology Transfer Qualification Report

QTP# 002202 VERSION*B
October 2014

Robo Clock II™ High-Speed Multi-Phase PLL Clock **B53D-3 Technology, Fab 4**	
CY7B993V	12 – 100 MHZ
CY7B994V	24 – 200 MHZ

Robo Clock II™ is a Trademark of Cypress Semiconductor

FOR ANY QUESTIONS ON THIS REPORT, PLEAE CONTACT
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PRODUCT QUALIFICATION HISTORY

QTP Number	Description of Qualification Purpose	Date
99256	New Technology B53D-3, Fab1 / CY7B993V / CY7B994V (for reference only)	Aug 00
002202	Technology transfer from Fab1 to Fab4 using CY7B993V / CY7B994V	Mar 01

PRODUCT DESCRIPTION (for qualification)		
Qualification Purpose: Qualify Technology B53D in Fab 4 using CY7B993V/CY7B994V.		
Marketing Part #:	CY7B993V/CY7B994V	
Device Description:	3.3V, Commercial and Industrial, available in 100-pin TQFP and 100-ball BGA Package.	
Cypress Division:	Cypress Semiconductor Corporation – Memory Product Division (MPD)	
Overall Die (or Mask) REV:		Rev. A
What ID markings on Die:	7B993A	

TECHNOLOGY/FAB PROCESS DESCRIPTION			
Number of Metal Layers:	2	Metal Composition:	Metal 1: 500A TiW+6,000A Al/0.5%Cu/300A TiW Metal 2: 300A TiW+8,000A Al/0.5%Cu/300A TiW
Passivation Type and Materials:	1,000A TEOS + 9,000A SiN		
Free Phosphorus contents in top glass layer(%):	0%		
Die Coating(s), if used:	N/A		
Number of Transistors:	15,000		
Number of Gates:	3,750		
Generic Process Technology/Design Rule (μ-drawn):	CMOS, Double Metal/0.25 μm		
Gate Oxide Material/Thickness (MOS):	SiO_2 55Å		
Name/Location of Die Fab (prime) Facility:	Cypress Semiconductor – Bloomington, MN		
Die Fab Line ID/Wafer Process ID:	Fab4/B53D-3		

PACKAGE AVAILABILITY

PACKAGE	ASSEMBLY FACILITY SITE
100-ball FBGA	**TAIWN-G**
100-pin TQFP	**TAIWN-G**

Note: **Package Qualification details upon request.**

MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION	
Package Designation:	A100
Package Outline, Type, or Name:	100-pin Thin Quad Flat Pack (TQFP)
Mold Compound Name/Manufacturer:	Hitachi CEL9200
Mold Compound Flammability Rating:	V-O per UL 94
Oxygen Rating Index:	**>**28%
Lead Frame Material:	Copper
Lead Finish, Composition / Thickness:	Solder Plated, 85%Sn, 15%Pb
Die Backside Preparation Method/Metallization:	N/A
Die Separation Method:	Wafer Saw
Die Attach Supplier:	Ablebond
Die Attach Material:	Ablebond 8361H
Die Attach Method:	Epoxy
Wire Bond Method:	Thermosonic
Wire Material/Size:	Au,1.0um
Thermal Resistance Theta JA °C/W:	46.7°C/W
Package Cross Section Yes/No:	N/A
Name/Location of Assembly (prime) facility:	ASE Taiwan (TAIWN-G)

ELECTRICAL TEST / FINISH DESCRIPTION	
Test Location:	ASE Taiwan (TAIWN-G)
Fault Coverage:	100%

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	Dynamic Operating Condition, Vcc = 4.0V, 125°C, JESD22-A108	P
High Temperature Operating Life Latent Failure Rate	Dynamic Operating Condition, Vcc = 4.0V, 125°C JESD22-A108	P
High Temp Steady State Life Test	Static Operating Condition, Vcc = 3.63V, 125°C JESD22-A108	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, 235°C+5, -0°C	P
Pressure Cooker	JESD22-A102: 121°C, 100%RH 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, 235°C+5, -0°C	P
High Accelerated Saturation Test (HAST)	JEDEC STD 22-A110: 130°C, 85%RH, 3.63V 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, 235°C+5, -0°C	P
Electrostatic Discharge Human Body Model (ESD-HBM)	2,200V MIL-STD-883, Method 3015	P
Electrostatic Discharge Charge Device Model (ESD-CDM)	JESD22-C101	P
Age Bond Strength	MIL-STD-883C, Method 2011	P
High Temperature Storage	JESD22-A103: 150°C, no bias	P
Bond Pull Test	MIL-STD-883 – Method 2011	P
Low Temperature Operating Life	-30°C, 4.3V, JESD22-A108	P
Current Density	Meets the Technology Device Level Reliability Specifications	P
Acoustic Microscopy, MSL 3	J-STD-020	P
Dynamic Latchup Sensitivity	In accordance with JEDEC 17	P
Static Latchup Sensitivity	125°C, 10V, ± 300mA In accordance with JEDEC 17	P

RELIABILITY FAILURE RATE SUMMARY

Stress/Test	Device Tested/ Device Hours	# Fails	Activation Energy	Acceleration Factor[3]	Failure Rate[4]
High Temperature Operating Life Early Failure Rate	1,454	0	N/A	N/A	0 PPM
High Temperature Operating Life Long Term Failure Rate[1,,2]	1,086,660 HRs	0	0.7	55	15 FIT

3 Assuming an ambient temperature of 55°C and a junction temperature rise of 15°C.
[2] Chi-squared 60% estimations used to calculate the failure rate.
[3] Thermal Acceleration Factor is calculated from the Arrhenius equation

$$AF = \exp\left[\frac{E_A}{k}\left[\frac{1}{T_2} - \frac{1}{T_1}\right]\right]$$

where:

E_A =The Activation Energy of the defect mechanism.
K = Boltzmann's constant = 8.62×10^{-5} eV/Kelvin.
T_1 is the junction temperature of the device under stress and T_2 is the junction temperature of the device at use conditions.

[4] **Failure Rate and FIT Rate base on QTP #002202**

Reliability Test Data

QTP #: 002202

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: ACOUSTIC, MSL3							
CY7B993V-AC	4021265	*610036043*	TAIWN-G	COMP	15	0	
CY7B994V-AC	4030964	*610042957*	TAIWN-G	COMP	15	0	
CY7B994V-AC	4030964	*610045835*	TAIWN-G	COMP	15	0	
STRESS: HIGH TEMP DYNAMIC OPERTING LIFE – EARLY FAILURE RAT, (125C, 4.0V, >VCC MAX							
CY7B994V-AC	4030964	*610042957*	TAIWN-G	96	679	0	
CY7B994V-AC	4030964	*610045835*	TAIWN-G	96	775	0	
STRESS: HIGH TEMP DYNAMIC OPERTING LIFE-LATENT FAILURE RATE, 125C, 4.0, >Vcc Max							
CY7B994V-AC	4030964	*610042957*	TAIWN-G	168	330	0	
CY7B994V-AC	4030964	*610042957*	TAIWN-G	1000	328	0	
CY7B994V-AC	4030965	*610045835*	TAIWN-G	168	330	0	
CY7B994V-AC	4030965	*610045835*	TAIWN-G	1000	239	0	
CY7B994V-AC	4030965	*610045835*	TAIWN-G	2000	239	0	
STRESS: HIGH TEMP STEADY STATE LIFE TEST, 125C, 3.63V,>Vcc Max							
CY7B993V-AC	4021265	*610036043*	TAIWN-G	168	78	0	
CY7B993V-AC	4021265	*610036043*	TAIWN-G	336	78	0	
STRESS: HIGH TEMP STORGAE, PLASTIC, 150C							
CY7B993V-AC	4021265	*610036043*	TAIWN-G	500	48	0	
CY7B993V-AC	4021265	*610036043*	TAIWN-G	1000	48	0	
STRESS: LOW TEMPERATURE OPERATING LIKE, -30C,4.3V							
CY7B993V-AC	4021265	*610036043*	TAIWN-G	500	47	0	
STRESS: DYNAMIC LATCH-UP TESTING 6.79V							
CY7B993V-AC	4021265	*610036043*	TAIWN-G	COMP	3	0	

Reliability Test Data

QTP #: 002202

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: ESD-CHARGE DEVICE MODEL, 500V							
CY7B993V-AC	4021265	*610036043*	TAIWN-G	COMP	9	0	
CY7B994V-AC	4030964	*610042957*	TAIWN-G	COMP	9	0	
CY7B994V-AC	4030964	*610045835*	TAIWN-G	COMP	9	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015, 2,200V							
CY7B993V-AC	4021265	*610036043*	TAIWN-G	COMP	9	0	
CY7B994V-AC	4030964	*610042957*	TAIWN-G	COMP	9	0	
CY7B994V-AC	4030964	*610045835*	TAIWN-G	COMP	9	0	
STRESS: STATIC LATCH-UP TESTING 125C, 10V, +/-300mA							
CY7B993V-AC	4021265	*610036043*	TAIWN-G	COMP	3	0	
CY7B994V-AC	4030965	*610045835*	TAIWN-G	COMP	3	0	
CY7B994V-AC	4030964	*610052500*	TAIWN-G	COMP	3	0	
STRESS: BOND PULL							
CY7B993V-AC	4021265	*610036043*	TAIWN-G	COMP	30	0	
STRESS: AGE BOND STRENGTH							
CY7B994V-AC	4030964	*610052500*	TAIWN-G	COMP	15	0	
CY7B994V-AC	4030965	*610052501*	TAIWN-G	COMP	15	0	
STRESS: HI-ACCEL SATURATION TEST, 130C, 85%RH, 3.63V, PRE COND 192 HR 30C/60%RH, MSL3							
CY7B993V-AC	4021265	*610036043*	TAIWN-G	128	46	0	
STRESS: PRESSURE COOKER TEST, 121C, 100%RH, PRE COND 192HRS 30C/60%RH, MSL3							
CY7B993V-AC	4021265	*610036043*	TAIWN-G	168	48	0	
CY7B994V-AC	4030964	*610042957*	TAIWN-G	168	48	0	
CY7B994V-AC	4030964	*610045835*	TAIWN-G	168	46	0	

Reliability Test Data

QTP #: 002202

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							
CY7B993V-AC	4021265	*610036043*	TAIWN-G	300	48	0	
CY7B993V-AC	4021265	*610036043*	TAIWN-G	500	48	0	
CY7B993V-AC	4021265	*610036043*	TAIWN-G	1000	48	0	
CY7B994V-AC	4030964	*610042957*	TAIWN-G	300	48	0	
CY7B994V-AC	4030964	*610042957*	TAIWN-G	500	48	0	
CY7B994V-AC	4030964	*610042957*	TAIWN-G	1000	48	0	
CY7B994V-AC	4030964	*610045835*	TAIWN-G	300	48	0	
CY7B994V-AC	4030964	*610045835*	TAIWN-G	500	48	0	
CY7B994V-AC	4030964	*610045835*	TAIWN-G	1000	48	0	

Document History Page

Document Title: QTP 002202: ROBO CLOCK II™ HIGH-SPEED MULTI-PHASE PLL CLOCK, B53D-3 TECHNOLOGY, FAB 4
Document Number: 001-84207

Rev.	ECN No.	Orig. of Change	Description of Change
**	3791446	NSR	Initial Spec Release.
*A	4170151	HSTO	Sunset Review Removed the reference Cypress specs in the reliability tests performed table and replace with the reference industry standards
*B	4550009	HSTO	Align qualification report based on the new template in the front page Add “TM” in the document title to align device description in front page

Distribution: WEB

Posting: None