Cypress Semiconductor
Product Qualification Report

QTP# 024307 VERSION 1.0
December, 2003

FastEdge ™ Series **B55SGT Technology, Fab 4**	
CY2DP314	**1 of 2:4 Differential Fanout Buffer**
CY2DP3110	**1 of 2:10 Differential Fanout Buffer**
CY2DP3120	**1:20 Differential Clock Buffer/Driver**
CY2PP318	**1 of 2:8 Differential Fanout Buffer**
CY2PP3115	**1:15 Differential Fanout Buffer**
CY2PP3210	**Dual 1:5 Differential Fanout Buffer**
CY2PP3220	**Dual 1:10 Differential Fanout Buffer**
CY2PP326	**2 x 2 Clock and Data Switch Buffer**

CYPRESS TECHNICAL CONTACT FOR QUALIFICATION DATA:

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PACKAGE QUALIFICATION HISTORY

QUAL REPORT	DESCRIPTION OF QUALIFICATION PURPOSE	DATE COMP.
024307	7B8P3110AC HF Buffer Family, 55SGT18A @CMI	Nov 03

PRODUCT DESCRIPTION (for qualification)	
Qualification Purpose: Qualify 7B8P3110AC HF Buffer Family,B55SGT18A @Fab4	
Marketing Part #:	CY2DP3110
Device Description:	FastEdge™ Series 1 of 2:10 Differential Fanout Buffer
Cypress Division:	Timing Technology Division
Overall Die (or Mask) REV Level (prerequisite for qualification):	REV. A
What ID markings on Die:	7B83110A

Note: Other Mkt'g Numbers: CY2[DP]P[318, 326, 3115, 3120, 3210, 3220], i.e. CY2PP318

TECHNOLOGY/FAB PROCESS DESCRIPTION – B55STG		
Number of Metal Layers: 3	Metal Composition	M1: 500Å TiW / 6000Å Al / 500Å TiW M2: 500Å TiW / 8000Å Al / 500Å TiW M3: 500Å TiW / 40,000Å Al / 300Å TiW
Passivation Type and Materials:	4000Å TEOS / 9000Å Si3N4	
Free Phosphorus contents in top glass layer (%):	0%	
Number of Transistors in Device	Maximum Available in Base: 100,000 Transistors Average Design: 60,000 transistors	
Number of Gates in Device:	Maximum Available: 25,000 / Average design: 15,000	
Generic Process Technology/Design Rule (μ-drawn)	CMOS (0.21 – 0.35 μm), SiGe Bipolar	
Gate Oxide Material/Thickness (MOS):	SiO2, 45Å	
Bipolar Isolation	STI	
Base/Emitter	SiGe / N+ Poly	
Name/Location of Die Fab (prime) Facility:	Cypress Semiconductor – Bloomington, MN (CMI)	
Die Fab Line ID/ Wafer Process ID:	Fab 4/ B55SGT	

PACKAGE AVAILABILITY

PACKAGE	ASSEMBLY SITE FACILITY
32-pin TQFP	Anam - Korea (Q)

Note: Package Qualification details are available upon request.

MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION	
Package Designation:	A32
Package Outline, Type, or Name:	32-lead Thin Quad Flat Package (TQFP)
Mold Compound Name/Manufacturer:	7320CR Sumitomo
Mold Compound Flammability Rating:	V-O per UL94
Oxygen Rating Index:	>28%
Lead Frame Material:	Copper
Lead Finish, Composition / Thickness:	SnPb (85/15) 300-800 micro-inches
Die Backside Preparation Method/Metallization:	Backgrind 11mils
Die Separation Method:	Wafer Saw
Die Attach Supplier:	Ablestik
Die Attach Material:	84-1LMISR4
Die Attach Method:	Silver Epoxy
Bond Diagram Designation	10-04978
Wire Bond Method:	Thermosonic
Wire Material/Size:	Au 1.0 mil
Thermal Resistance Theta JA °C/W:	88.0 Theta JA °C/W
Package Cross Section Yes/No:	N/A
Assembly Process Flow:	49-10011
Name/Location of Assembly (prime) facility:	Anam- KOREA

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

Note: Please contact a Cypress Representative for availability of other packages.

RELIABILITY TESTS PERFORMED PER SPECIFICATION REQUIREMENTS

Stress/Test	Test Condition (Temp/Bias)	Result P/F
Electrostatic Discharge Human Body Model (ESD-HBM)	2,200 V MIL-STD-883, Method 3015.7	P
Electrostatic Discharge Charge Device Model (ESD-CDM)	500V Cypress Spec. 25-00020	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, 220 °C+5, -0 °C	P
High Temperature Operating Life Early Failure Rate	Dynamic Operating Condition, Vcc Max = 3.8V, 125 °C	P
High Temperature Operating Life Latent Failure Rate	Dynamic Operating Condition, Vcc Max = 3.8V, 125°C	P
Pressure Cooker	121 °C, 100 %RH Precondition: JESD22 Moisture Sensitivity MSL 3 192 Hrs, 30C/60 %RH+3IR-Reflow, 220 °C+5, -0 °C	P
Aged Bond Strength	200 °C, 4 Hrs MIL-STD-833, Method 883-2011	P
Static Latchup	121 °C, 10.0 V ± 300 mA In accordance with JEDEC 17. Cypress Spec. 01-00081	P
Acoustic Microscopy, MSL-3	Cypress Spec. 25-00104	P
High Temperature Storage	150 °C ± 5 °C, No Bias	P

RELIABILTY FAILURE RATE SUMMARY

Stress/Test	Device Tested/ Device Hours	# Fails	Activation Energy	Thermal AF[4]	Failure Rate
High Temperature Operating Life Early Failure Rate[1]	1002	0	N/A	N/A	0 PPM
High Temperature Operating Life[1,2] Long Term Failure Rate	656,204	0	0.70	55	25 FITs

[1] The product does not require a production burn-in.
[2] An ambient temperature of 55 ºC and a junction temperature rise of 15 ºC are assumed.
[3] Chi-squared 60% estimations are used to calculate the failure rate.
[4] 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 = Boltzman's Constant = 8.62×10^{-5} eV/Kelvin
T_1 = The junction temperature of the device under stress and T_2 = the junction temperature of the device at use conditions.

Reliability Test Data

QTP #: 024307

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: ACOUSTIC – MICROSCOPE MSL3							
CY2DP3110AI (7B83110A)	4250487	610308689/90/1	KOREA-Q	COMP	15	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 125C, 3.8V, Vcc Max							
CY2DP3110AI (7B83110A)	4250487	610308689/90/1	KOREA-Q	96	1002	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, 125C, 3.8V, Vcc Max							
CY2DP3110AI (7B83110A)	4250487	610308689/90/1	KOREA-Q	168	180	0	
CY2DP3110AI (7B83110A)	4250487	610308689/90/1	KOREA-Q	500	180	0	
CY2DP3140I (7B8314A)	4306669	610317907	PHIL-M	168	184	0	
CY2DP3140I (7B8314A)	4306669	610317907	PHIL-M	500	184	0	
CY2DP3140I (7B8314A)	4306669	610317907	PHIL-M	675	184	0	
STRESS: AGE BOND STRENGTH							
CY2DP3110AI (7B83110A)	4250487	610308689/90/1	KOREA-Q	COMP	5	0	
CY2DP3140I (7B8314A)	4306669	610317907	PHIL-M	COMP	4	0	
CY2PP326A1 (7B8326A)	4306670	610324358	KOREA-Q	COMP	30	0	
STRESS: STATIC LATCH-UP TESTING, 125C, 10.0V, +/300mA							
CY2DP3110AI (7B83110A)	4250487	610308689/90/1	KOREA-Q	COMP	3	0	
CY2PP326A1 (7B8326A)	4306670	610324358	KOREA-Q	COMP	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015, 2,200V							
CY2DP3110AI (7B83110A)	4250487	610308689/90/1	KOREA-Q	COMP	9	0	
CY2DP3140I (7B8314A)	4306669	610317907	PHIL-M	COMP	9	0	
CY2PP326A1 (7B8326A)	4306670	610324358	KOREA-Q	COMP	9	0	
STRESS: ESD-CHARGE DEVICE MODEL, 500V							
CY2DP3110AI (7B83110A)	4250487	610308689/90/1	KOREA-Q	COMP	9	0	
CY2DP3140I (7B8314A)	4306669	610317907	PHIL-M	COMP	9	0	
CY2PP326A1 (7B8326A)	4306670	610324358	KOREA-Q	COMP	9	0	
STRESS: HIGH TEMPERATURE STORAGE, PLASTIC, 150C, No Bias							
CY2DP3110AI (7B83110A)	4250487	610308689/90/1	KOREA-Q	500	50	0	
CY2DP3110AI (7B83110A)	4250487	610308689/90/1	KOREA-Q	1000	50	0	

Reliability Test Data

QTP #: 024307

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: PRESSURE COOKER TEST, 121C, 100%RH, PRE COND 192 HR 30C/60%RH, MSL3							
CY2DP3110AI (7B83110A)	4250487	610308689/90/1	KOREA-Q	168	50	0	
CY2DP3110AI (7B83110A)	4250487	610308689/90/1	KOREA-Q	288	50	0	
STRESS: TC COND. C -65C TO 150C, PRECONDITION 192 HRS 30C/60%RH, MSL3							
CY2DP3110AI (7B83110A)	4250487	610308689/90/1	KOREA-Q	300	50	0	
CY2DP3110AI (7B83110A)	4250487	610308689/90/1	KOREA-Q	500	49	0	
CY2DP3110AI (7B83110A)	4250487	610308689/90/1	KOREA-Q	1000	49	0	

Reliability Test Data

QTP #: 015104

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, 125C, 3.8V, Vcc Max							
(7B95322AC-LATC)	4225782	610248639/40/4	SEOL-L	168	177	0	
(7B95322AC-LATC)	4225782	610248639/40/4	SEOL-L	500	176	0	
(7B95322AC-LATC)	4225782	610248639/40/4	SEOL-L	1000	173	0	
(7B95322AC-LATC)	4221876	340200102/3/4	SEOL-L	168	180	0	
(7B95322AC-LATC)	4221876	340200102/3/4	SEOL-L	500	179	0	
(7B95322AC-LATC)	4221876	340200102/3/4	SEOL-L	1000	177	0	
(7B95322AC-LATC)	4222115	610243315/6/32	SEOL-L	168	179	0	
(7B95322AC-LATC)	4222115	610243315/6/32	SEOL-L	500	178	0	