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Cypress Semiconductor Product Qualification Report

QTP#92202&93462
February 1994

Programmable Skew Clock Buffer Family	
CY7B991	TTL Programmable Skew Clock Buffer
CY7B992	CMOS Programmable Skew Clock Buffer

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PRODUCT QUALIFICATION HISTORY

Qual Report		Description of Qualification Purpose		Date Comp
92202 & 93462		Programmable skew clock buffer (PSCB) product qualification		Feb 94

PRODUCT DESCRIPTION (for qualification)			
Qualification Purpose: Qualify CY7B991 and CY7B992 product.			
Marketing Part #:	CY7B991 and CY7B992		
Device Description:	Programmable skew clock buffer (PSCB) product qualification		
Cypress Division:	Cypress Semiconductor Corporation, DataCom Group		
Overall Die (or Mask) REV Level (pre-requisite for qualification):	Rev. A		
Die Size (stepping):	110 mils x 150 mils	What ID markings on Die:	7B991A/7B992A

TECHNOLOGY/FAB PROCESS DESCRIPTION E3			
Number of Metal Layers:	2	Metal Composition:	Metal 1: 500Å Ti, 1200Å TiW, 6,000Å Al, 500Å Ti Metal 2: 1,500Å Ti, 10,000Å Al
Passivation Type and Materials:	3,000Å TEOS + 15,000Å Oxynitride		
Free Phosphorus contents in top glass layer(%):	0% PSG		
Die Coating(s), if used:	None		
Generic Process Technology/Design Rule (□-drawn):	Single Poly, Double Metal / 0.8mm BiCMOS		
Gate Oxide Material/Thickness (MOS):	SiO ₂ - Control gate 195Å		
Name/Location of Die Fab (prime) Facility:	Cypress Semiconductor, San Jose, CA (Fab 1) Cypress Semiconductor, Round Rock, TX (Fab 2)		
Die Fab Line ID/Wafer Process ID:	Fab 1/STARM13 Fab 2/STARM13		

PLASTIC PACKAGE/ASSEMBLY DESCRIPTION	
Package Outline, Type, or Name:	32-pin Rectangular Plastic Leaded Chip Carrier (PLCC)
Die to Package edge clearance:	x=170 mils per side; y= 200 mils per side
Mold Compound Name/Manufacturer:	Sumitomo EME-6300H(R)
Lead Frame Material:	Copper
Lead Finish, Composition:	Solder Dipped, 63%Sn, 37%Pb
Die Attach Area Plating::	Silver
Die Attach Pad Dim:	PLCC: 200 mils x 200 mils
Die Attach Method:	Syringe dispense
Die Attach Material:	Silver Epoxy
Wire Bond Method:	Thermocompression
Wire Material/Size:	Gold / 1.3 mil
Name/Location of Assembly (prime) facility:	ANAM, Korea
Assembly Line ID and Process ID:	ANAM / J32RB

HERMETIC PACKAGE/ASSEMBLY DESCRIPTION	
Package Outline, Type, or Name:	32-pin Rectangular Leaded Chip Carrier (LCC)
Die to Package edge clearance:	x=166 mils per side; y= 195 mils per side
Mold Compound Name/Manufacturer:	N/A
Lead Frame Material:	N/A
Lead Finish, Composition:	Solder Dipped, 63%Sn, 37%Pb
Die Attach Area Plating::	None
Die Attach Pad Dim:	LCC: 250 mils x 250 mils
Die Attach Method:	Paste
Die Attach Material:	Silver Glass
Wire Bond Method:	Ultrasonic
Wire Material/Size:	Aluminum / 1.25 mil
Name/Location of Assembly (prime) facility:	Alphatec, Bangkok, Thailand
Assembly Line ID and Process ID:	Alpha-X/L32Rl

OTHER INFORMATION			
For approval by similarity, identify other devices using the same basic die with bonding or metal mask options or test selections and explain:			
None			
If Cypress is planning any changes in the near future, identify change (Qtr/Yr) in: 4Q93			
Die Design Rev./Shrink:	Rev. A	Die Process Change:	None
Fab/Assembly site change:		Cross Licensee/Licenser:	None
Other Devices to be qualified in this technology:	None		
Other Packages to be qualified for this device:	LCC		
ESD Voltage Rating (per MIL-STD-883C, Method 3015):	> 2,200V		
Flammability Classification (UL-94V):	None		
Alternate Fab/Assembly Locations:	Fab1: San Jose, CA Fab2: Round Rock, TX		
Please attach the following Qualification / Reliability data for the die revision and Package type, for the fab and assembly sites identified above (mark [X] if included):			
1	X	HAST (5.5V, 140°C, 85%RH, 15psig)	8 X Operating Life at (temp): 125°C
2	X	Temperature Cycles (-40°C to 125°C)	9 X Steady State Life (HTSSL, 5.25V, 150°C)
3	X	Temperature Cycles (-65°C to 150°C)	10 Temperature Humidity Bias (5.5V, 85°C, 85%RH)
4		Data Retention Bake, Plastic (185°C)	11 X Latchup Testing
5		Data Retention Bake, Hermetic (250°C)	12 X Other: Internal Water Vapor
6	X	Autoclave (PCT, 121°C, 100%RH)	13 Other:
7	X	ESD Tests (MIL-STD 883, method 3015)	14 Other:

PRODUCT INFORMATION FOR QUALIFICATION BY SIMILARITY

Product Family: BiCMOS Clock (CY7C991/992)
Mfg Division: Cypress Semiconductor

Supplier's Part Number	Rated Speed	Pkg Size/ Type	Die Revision	Die Size mil x mil (stepping)	Design Rule (μ)	Fabrication		Passivation Type	Mold Compound	Assembly Line Location	ESD Volt Rating	Availability (mm/yy)
						Process ID	Line ID					
CY7B991/ CY7B922 CY7B991/ CY7B922	**JC/JI 0.5 ns to 0.7 ns	32-pin PLCC 32-pin LCC	A	110 x 150	0.8μ	SM13B	1,2	Plasma Ox + Oxynitride	Sumitomo	Anam-Korea Alphatec-Thailand	> 2,200V HBM	Now

DEVICE RELIABILITY SUMMARY

Device Type(s):	CY7B991/CY7B992	Wafer Fab:	Fab 1 - San Jose, CA
Pkg Description:	32-pins PLCC 32-pins LCC	Assembly:	Anam - Korea Alphatec - Thailand

High Temperature Dynamic Operating Life (HTOL, 5.5V, 125°C) - Early Failure Rate						
Device	Lot#	24 Hours	48 Hours	96 Hours		Cumulative
CY7B991-JC	1222664			0/535		0/1760
CY7B991-JC	1246520	0/900		0/900		
CY7B992-LC	1228851		0/325			

High Temperature Dynamic Operating Life (HTCL, 5.5V, 125°C) - Latent Failure Rate						
Device	Lot#	96 Hours	168 Hours	1000 Hours	2000 Hours	Cumulative
CY7B991-JC	1222664		0/250	0/250	0/250	0/572 ¹
CY7B992-LC	1228851	0/322		0/210		

Group C, Subgroup 1, Life Test (HTOL, 5.5V, 150°C)						
Device	Lot#	184 Hours				Cumulative
CY7B991-LMB	1228852	0/50				0/98
CY7B992-LMB	1228851	0/48				

High Temperature Steady State Life Test (HTSSL, 5.75V, 125°C)						
Device	Lot#	168 Hours	336 Hours			Cumulative
CY7B991-JC	1222664	0/75	0/75			0/146 ²
CY7B992-LC	1228851	0/71	0/71			

Temperature Cycle (Condition B, -40°C to 125°C)						
Device	Lot#	300 Cycles	1000 Cycles			Cumulative
CY7B991-JC	1222664	0/46	0/46			0/46

Temperature Cycle (Condition C, -65°C to 150°C)						
Device	Lot#	100 Cycles	1000 Cycles			Cumulative
CY7B992-LC	1228851	0/44	0/44			0/44 ¹

Autoclave (PCT, No bias, 121°C, 100% RH, 15 psig)						
Device	Lot#	168 Hours				Cumulative
CY7B991-JC	1222664	0/46				0/46

High Accelerated Saturation Test (HAST, 5.5V, 140°C, 85% RH, 15 psig)						
Device	Lot#	100 Hours				Cumulative
CY7B991-JC	1222664	0/46				0/46

¹ 3 EOS from lot # 1228851.

² 1 ESD from lot # 1222664. 5 EOS from lot # 1228851.

³ 1 EOS

Device Reliability Summary

PROGRAMMABLE CLOCK SKEW BUFFER (FAB 1) CY7B992		
Electrostatic Discharge: Human Body Model Circuit per Mil Std 883, Method 3015		
> +2200V	Unit 1	> -2200V
> +2200V	Unit 2	> -2200V
> +2200V	Unit 3	> -2200V
(Highest passing voltage, +10% Guard-banded)		

Latchup (FAB1)
Testing to Cypress Internal Latch-up Procedure
3 Tests: 0/3
Current Injection = 200mA Trigger
Hot Socket = V _{CC} 0 - 7V
V _{CC} Oscillation : V _{CC} = 3.5 - 7.5V at 1MHz
Temp = 150°C

Other miscellaneous tests
Input/Output capacitance : Passed
Read & Record : Passed
Current Density : Passed

DEVICE RELIABILITY SUMMARY

Device Type(s):	CY7B991/CY7B992	Wafer Fab:	Fab 2 - Round Rock, TX
Pkg Description:	32-pins PLCC 32-pins LCC	Assembly:	Anam - Korea Alphatec - Thailand

High Temperature Dynamic Operating Life (HTOL, 5.5V, 125°C) - Early Failure Rate						
Device	Lot #	48 Hours				Cumulative
CY7B991-JC	49304967	0/322				0/1429
CY7B991-JC	49304968	0/426				
CY7B991-JC	49306462	0/143				
CY7B992-LC	219306627	0/539				

High Temperature Dynamic Operating Life (HTCL, 5.5V, 125°C) - Latent Failure Rate						
Device	Lot#	80 Hours	500 Hours			Cumulative
CY7B991-JC	49304968	0/139	0/139			0/255
CY7B992-LMB	219306627	0/116	0/116			

Group C, Subgroup 1, Life Test (HTOL, 5.5V, 150°C)						
Device	Lot#	184 Hours				Cumulative
CY7B991-LMB	219305442	0/77				0/154
CY7B992-LMB	219306627	0/77				

High Temperature Steady State Life Test (HTSSL, 5.75V, 125°C)						
Device	Lot#	80 Hours	168 Hours			Cumulative
CY7B991-JC	49304968	0/96	0/96			0/172
CY7B992-LMB	219306627	0/76				

Device Reliability Summary

PROGRAMMABLE CLOCK SKEW BUFFER (FAB 2)		
CY7B992		
Electrostatic Discharge:		
Human Body Model Circuit per Mil Std 883, Method 3015		
> +2200V	Unit 1	> -2200V
> +2200V	Unit 2	> -2200V
> +2200V	Unit 3	> -2200V
(Highest passing voltage, +10% Guard-banded)		

Latchup (FAB2)
Testing to Cypress Internal Latch-up Procedure
3 Tests: 0/3
Current Injection = 200mA Trigger
Hot Socket = V _{CC} 0 - 7V
V _{CC} Oscillation : V _{CC} = 3.5 - 7.5V at 1MHz
Temp = 150°C

Other qualifications that affect this product family or process	
Qual Nbr	Qualification Description
92441	64K BiCMOS SRAM/SM23B TECHNOLOGY QUALIFIED IN FAB 2

CYPRESS QUALIFICATION REPORT

Device ID:	CY7B161/162/164/166 CY7B185	Prod. Family:	64K BiCMOS SRAM	Mask ID:	6A166
Status:	FULL QUAL.	Results:	PASS	FIT Rate (FITs):	7
Complete Date:	November, 1993				
Process ID:	SM23B	Technology:	BiCMOS	Process Loc:	Round Rock, TX
Package:	24-pins, 300-mil SOJ	Mold Compound:	Sumitomo EME-6300H(R)	Lead Frame:	Copper
Die Attach Mat:	Silver Epoxy	Package Loc:	Omedata, Indonesia	Test Loc:	San Jose, CA

Cypress Test No.	Stress/Test	Reference Method	Actual Conditions			Status *	Qualification Data Reference	Test Result	
			Temp/Bias	Hrs/Cyc	SS/Fail			Pass	Fail
22	Early Failure Rate	29-00020	150°C/5.75V	12 Hrs.	0/1123	C	QTP# 92441	P	
				48 Hrs.	0/2814	C	QTP# 92441	P	
22A	Latent Failure Rate	29-00020	150°C/5.75V	80 Hrs.	0/2813	C	QTP# 92441	P	
				500 Hrs.	1/2452 ¹	C	QTP# 92441	P	
37A	High Temp. Steady State	29-00020	150°C/5.75V	80 Hrs.	0/151	C	QTP# 92441	P	
				168 Hrs.	0/227	C	QTP# 92441	P	
12	Temperature Cycle	JEDEC22, COND. B	40°C to 125°C	300 Cyc.	0/135	C	QTP# 92441	P	
				500 Cyc.	0/135	C	QTP# 92441	P	
24	Pressure Pot	29-00047	121°C, 100%RH, 30PSIA	168 Hrs.	0/90	C	QTP# 92441	P	
23a	HAST	29-00063	5.5V, 140°C 85%RH	128 Hrs.	0/90	C	QTP# 92441	P	
22B	Long Life Verification	29-00020	150°C, 5.75V	1000 Hrs.	0/332	C	QTP# 92441	P	
				2000 Hrs.	0/332	C	QTP# 92441	P	

* I - Interim, C - Complete

¹ Particle related reject.

Document History Page

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Rev.	ECN No.	Orig. of Change	Description of Change
**	4255842	ZIJ	Initial spec release.

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