Cypress Semiconductor
Product Qualification Report

QTP# 050502 VERSION 1.1
December 2005

CY284108-2	Clock Generator for Intel® Blackford and Bayshore Chipset
R52T-3 Technology, Fab4	

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CYPRESS TECHNICAL CONTACT FOR QUALIFICATION DATA:

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TECHNOLOGY QUALIFICATION HISTORY

Qual Report	Description of Qualification Purpose	Date Comp
024604	R52T-3 Technology Process Derivative Qual	May 03
025003	New Device A30M (CY28409) Base Die in R52T-3 Technology	June 03
050502	New Device (CY284108-2) Rev. A Base Option Device in R52T-3 Technology	Apr 05

PRODUCT DESCRIPTION (for qualification)		
Qualification Purpose: New Device (CY284108-2) Rev. A Base Option Device in R52T-3 Technology		
Marketing Part #:	CY284108-2	
Device Description:	Clock Generator for Intel® Blackford and Bayshore Chipset, 3.3V available 56-Lead SSOP	
Cypress Division:	Cypress Semiconductor Corporation –Consumer & Computation Division (CCD)	
Overall Die (or Mask) REV Level (pre-requisite for qualification):		Rev. A
What ID markings on Die:	CY7C8A038A	

TECHNOLOGY/FAB PROCESS DESCRIPTION - R52T-3			
Number of Metal Layers:	3	Metal Composition:	Metal 1: 500Å TiW / 6000Å Al / 500Å TiW Metal 2: 500Å TiW / 6000Å Al / 500Å TiW Metal 3: 300Å Ti / 8000Å Al / 300Å TiW
Passivation Type and Materials:		1000Å SiO2 / 9000Å Si3N4	
Free Phosphorus contents in top glass layer(%):		0%	
Number of Transistors in Device		44,000	
Number of Gates in Device		5,500	
Generic Process Technology/Design Rule (μ-drawn):		CMOS – Triple Metal, 0.25μm	
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/R52T-3	

PACKAGE AVAILABILITY

PACKAGE	ASSEMBLY SITE FACILITY
56-Lead SSOP	**Cypress Philippines (CML-R)**

MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION	
Package Designation:	SP56
Package Outline, Type, or Name:	56-Lead Shrink Small Outline Packages (SSOP)
Mold Compound Name/Manufacturer:	MP8000C
Mold Compound Flammability Rating:	V-O per UL94
Oxygen Rating Index:	N/A
Lead Frame Material:	Copper
Lead Finish, Composition / Thickness:	NiPdAu
Die Backside Preparation Method/Metallization:	Backgrinding
Die Separation Method:	100% Wafer Saw
Die Attach Supplier:	Dexter
Die Attach Material:	QMI 509
Die Attach Method:	Epoxy
Bond Diagram Designation:	10-06883
Wire Bond Method:	Thermosonic
Wire Material/Size:	Au, 1.0 mil
Thermal Resistance Theta JA °C/W:	76.07°C/W
Package Cross Section Yes/No:	N/A
Assembly Process Flow:	11-20048
Name/Location of Assembly (prime) facility:	Cypress Philippines (CML-R)

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

RELIABILITY TESTS PERFORMED PER SPECIFICATION REQUIREMENT

Stress/Test	Test Condition (Temp/Bias)	Result P/F
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
High Temperature Steady State Life	Static Operating Condition, Vcc Max = 3.3V, 125°C	P
High Accelerated Saturation Test (HAST)	130°C, 3.6V,85%RH Precondition: JESD22 Moisture Sensitivity MSL 3 192 Hrs, 30C/60%RH+3IR-Reflow, 220°C+0, -5°C Precondition: JESD22 Moisture Sensitivity MSL 1 168 Hrs, 85C/85%RH+3IR-Reflow, 220°C+0, -5°C	P
Temperature Cycle	MIL-STD-883C, Method 1010, Condition C, -65°C to 150°C Precondition: JESD22 Moisture Sensitivity MSL 3 192 Hrs, 30C/60%RH+3IR-Reflow, 220°C+0, -5°C Precondition: JESD22 Moisture Sensitivity MSL 1 168 Hrs, 85C/85%RH+3IR-Reflow, 220°C+0, -5°C	P
Pressure Cooker	121°C, 100%RH Precondition: JESD22 Moisture Sensitivity MSL 3 192 Hrs, 30C/60%RH+3IR-Reflow, 220°C+0, -5°C Precondition: JESD22 Moisture Sensitivity MSL 1 168 Hrs, 85C/85%RH+3IR-Reflow, 220°C+0, -5°C	P
High Temperature Storage	150°C ± 5°C no bias	P
Electrostatic Discharge Human Body Model (ESD-HBM)	2,200V JESD22, Method A114-B	P
Electrostatic Discharge Human Body Model (ESD-HBM)	2,200V MIL-STD-883, Method 3015.7	P
Electrostatic Discharge Charge Device Model (ESD-CDM)	500V Cypress Spec. 25-00020	P
Age Bond Strength	200C, 4HRS MIL-STD-883, Method 883-2011	P
Low Temperature Operating Life	-30C, 3.8V, 4.3V, 8MHZ	P
Acoustic Microscopy	Cypress Spec. 25-00104	P
Dynamic Latch-up	125C, 6V	P
Static Latch-up	125C, ± 300mA In accordance with JEDEC 17. Cypress Spec. 01-00081	P

RELIABILITY FAILURE RATE SUMMARY

Stress/Test	Device Tested/ Device Hours	# Fails	Activation Energy	Thermal AF[4]	Failure Rate
High Temperature Operating Life Early Failure Rate	4,743 Devices	0	N/A	N/A	0 PPM
High Temperature Operating Life[1,2] Long Term Failure Rate	749,328 DHRs	0	0 .7	55	22 FITs

[1] 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.

Reliability Test Data

QTP #: 024604

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: ACOUSTIC-, MSL3							
CY6981-BA (7C6981A)	4223346	*610243127/3004*	TAIWN-G	COMP	18	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (125C, 3.8V, Vcc Max)							
CY6981-BA (7C6981A)	4147861	*610221501/2/27521*	TAIWN-G	96	1342	0	
CY6981-BA (7C6981A)	4238026	*610250542*	TAIWN-G	96	1020	0	
CY6981-BA (7C6981A)	4223346	*610243127/3004/7*	TAIWN-G	96	1015	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE (125C, 3.8V, Vcc Max)							
CY6981-BA (7C6981A)	4147861	*610221501/2*	TAIWN-G	168	182	0	
CY6981-BA (7C6981A)	4147861	*610221501/2*	TAIWN-G	500	182	0	
CY6981-BA (7C6981A)	4147861	*610221501/2*	TAIWN-G	1000	182	0	
CY6981-BA (7C6981A)	4223346	*610243127/3004*	TAIWN-G	168	182	0	
CY6981-BA (7C6981A)	4223346	*610243127/3004*	TAIWN-G	500	182	0	
CY6981-BA (7C6981A)	4223346	*610243127/3004*	TAIWN-G	1000	180	0	
CY6981-BA (7C6981A)	4238026	*610250542*	TAIWN-G	168	368	0	
CY6981-BA (7C6981A)	4238026	*610250542*	TAIWN-G	500	368	0	
STRESS: ESD-CHARGE DEVICE MODEL (500V)							
CY6981-BA (7C6981A)	4147861	*610221501/2/2752*	TAIWN-G	COMP	9	0	
CY6981-BA (7C6981A)	4223346	*610243127/3004*	TAIWN-G	COMP	9	0	
ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015 (2,200V)							
CY6981-BA (7C6981A)	4147861	*610221501/2/2752*	TAIWN-G	COMP	9	0	
CY6981-BA (7C6981A)	4223346	*610243127/3004*	TAIWN-G	COMP	9	0	
STRESS: STATIC LATCH-UP TESTING (125C, 10V, +/-300mA)							
CY6981-BA (7C6981A)	4147861	*610221501/2/2752*	TAIWN-G	COMP	3	0	
CY6981-BA (7C6981A)	4238026	*610250542*	TAIWN-G	COMP	3	0	
STRESS: PRESSURE COOKER TEST, 121C, 100%RH), PRE CONDITION 192 HR 30C/60%RH, MSL3							
CY6981-BA (7C6981A)	4147861	*610221501/2/2752*	TAIWN-G	168	50	0	
CY6981-BA (7C6981A)	4223346	*610243127/3004*	TAIWN-G	168	48	0	
CY6981-BA (7C6981A)	4223346	*610243127/3004*	TAIWN-G	288	48	0	
CY6981-BA (7C6981A)	4238026	*610250542*	TAIWN-G	168	48	0	
CY6981-BA (7C6981A)	4238026	*610250542*	TAIWN-G	288	48	0	

Reliability Test Data

QTP #: 024604

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: HI-ACCEL SATURATION TEST (130C, 85%RH, 3.63V), PRE CONDITION 192 HRS 30C/60%RH, MSL3							
CY6981-BA (7C6981A)	4147861	*610221501/2/2752*	TAIWN-G	128	50	0	
CY6981-BA (7C6981A)	4223346	*610243127/3004*	TAIWN-G	128	47	0	
STRESS: TC COND. C -65C TO 150C, PRE CONDITION 192 HRS 30C/60%RH, MSL3							
CY6981-BA (7C6981A)	4147861	*610221501/2/2752*	TAIWN-G	300	50	0	
CY6981-BA (7C6981A)	4147861	*610221501/2/2752*	TAIWN-G	500	50	0	
CY6981-BA (7C6981A)	4147861	*610221501/2/2752*	TAIWN-G	1000	50	0	
CY6981-BA (7C6981A)	4223346	*610243127/3004*	TAIWN-G	300	48	0	
CY6981-BA (7C6981A)	4223346	*610243127/3004*	TAIWN-G	500	48	0	
CY6981-BA (7C6981A)	4223346	*610243127/3004*	TAIWN-G	1000	48	0	
CY6981-BA (7C6981A)	4238026	*610250542*	TAIWN-G	300	48	0	
CY6981-BA (7C6981A)	4238026	*610250542*	TAIWN-G	500	48	0	
CY6981-BA (7C6981A)	4238026	*610250542*	TAIWN-G	1000	48	0	

Reliability Test Data

QTP #: 025003

Device	Fab Lot #	Assy Lot #	Ass Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: ACOUSTIC-MSL1							
CY28409 (7C828409A)	4225874	610244243	CML-R	COMP	15	0	
CY28409 (7C828409A)	4247855	610302721	CML-R	COMP	15	0	
CY28409 (7C828409A)	4239218	610303255	CML-R	COMP	15	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 125C, 3.8V, Vcc Max							
CY28409 (7C828409A)	4225874	610244243	CML-R	96	1028	0	
CY28409 (7C828409A)	4249184	610308584	CML-R	96	338	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, 125C, 3.8V, Vcc Max							
CY28409 (7C828409A)	4249184	610308584	CML-R	168	120	0	
CY6981-BA (7C6981A)	4147861	610221501/2	TAIWN-G	168	183	0	
CY6981-BA (7C6981A)	4147861	610221501/2	TAIWN-G	500	182	0	
CY6981-BA (7C6981A)	4223346	610243127/3004	TAIWN-G	168	182	0	
CY6981-BA (7C6981A)	4223346	610243127/3004	TAIWN-G	500	182	0	
STRESS: HIGH TEMP STEADY STATE LIFE TEST, 125C, 3.3V, Vcc Max							
CY28409 (7C828409A)	4225874	610244243	CML-R	168	80	0	
CY28409 (7C828409A)	4225874	610244243	CML-R	336	80	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015, 2,200V							
CY28409 (7C828409A)	4225874	610244243	CML-R	COMP	9	0	
CY28409 (7C828409A)	4247855	610302721	CML-R	COMP	9	0	
STRESS: ESD-CHARGE DEVICE MODEL, 500V							
CY28409 (7C828409A)	4225874	610244243	CML-R	COMP	9	0	
CY28409 (7C828409A)	4247855	610302721	CML-R	COMP	9	0	
STRESS: DYNAMIC LATCH-UP TESTING, 125C, 6V							
CY28409 (7C828409A)	4225874	610244243	CML-R	COMP	3	0	
STRESS: STATIC LATCH-UP TESTING (125C, 10V, +/-300mA)							
CY28409 (7C828409A)	4225874	610244243	CML-R	COMP	3	0	
CY28409 (7C828409A)	4247855	610302721	CML-R	COMP	3	0	

Reliability Test Data

QTP #: 025003

Device	Fab Lot #	Assy Lot #	Ass Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: AGE BOND							
CY28409 (7C828409A)	4225874	610244243	CML-R	COMP	45	0	
CY28409 (7C828409A)	4247855	610302721	CML-R	COMP	45	0	
STRESS: HIGH TEMPERATURE STORAGE, 150C, No Bias							
CY28409 (7C828409A)	4225874	610244243	CML-R	500	50	0	
CY28409 (7C828409A)	4225874	610244243	CML-R	1000	50	0	
STRESS: LOW TEMP DYNAMIC OPERATING LIFE, -30C, 3.8V, Vcc							
CY62137V (7C62137A)	4852210	619903364	CML-R	500	45	0	
CY62137V (7C62137A)	4852210	619903364	CML-R	1000	45	0	
STRESS: LOW TEMP DYNAMIC OPERATING LIFE, -30C, 4.3V, Vcc							
CY62137V (7C62137A)	4912701	619914860	CML-R	500	46	0	
CY62137V (7C62137A)	4912701	619914860	CML-R	1000	45	0	
STRESS: HI-ACCEL SATURATION TEST (130C, 85%RH, 3.6V), PRE CONDITION 168 HR 85C/85%RH, MSL1							
CY28409 (7C828409A)	4225874	610244243	CML-R	128	50	0	
STRESS: PRESSURE COOKER TEST, 121C, 100%RH), PRE CONDITION 168 HR 85C/85%RH , MSL1							
CY28409 (7C828409A)	4225874	610244243	CML-R	168	50	0	
CY28409 (7C828409A)	4247855	610302721	CML-R	168	50	0	
CY28409 (7C828409A)	4247855	610302721	CML-R	288	50	0	
STRESS: TC COND. C -65C TO 150C, PRE CONDITION 168 HR 85C/85%RH, , MSL1							
CY28409 (7C828409A)	4225874	610244243	CML-R	300	50	0	
CY28409 (7C828409A)	4225874	610244243	CML-R	500	50	0	
CY28409 (7C828409A)	4225874	610244243	CML-R	1000	50	0	
CY28409 (7C828409A)	4247855	610302721	CML-R	300	50	0	
CY28409 (7C828409A)	4247855	610302721	CML-R	500	50	0	
CY28409 (7C828409A)	4247855	610302721	CML-R	1000	50	0	
CY28409 (7C828409A)	4239218	610303255	CML-R	300	48	0	
CY28409 (7C828409A)	4239218	610303255	CML-R	500	48	0	
CY28409 (7C828409A)	4239218	610303255	CML-R	1000	48	0	

Reliability Test Data

QTP #: 050502

Device	Fab Lot #	Assy Lot #	Ass Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: ESD-CHARGE DEVICE MODEL, 500V							
CY284108-2 (7C8410812A)	4447836	*610507602*	CML-R	COMP	9	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER JESD22, METHOD A114-B, 2,200V							
CY284108-2 (7C8410812A)	4447836	*610507602*	CML-R	COMP	9	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015, 2,200V							
CY284108-2 (7C8410812A)	4447836	*610507602*	CML-R	COMP	3	0	
STRESS: STATIC LATCH-UP TESTING (125C, 9.0V, +/-300mA)							
CY284108-2 (7C8410812A)	4447836	*610507602*	CML-R	COMP	3	0	