Cypress Semiconductor
Technology Qualification Report

QTP# 98377 VERSION 2.0
August, 2003

Direct RAMbus ® Clock Generator
CY2211

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CYPRESS TECHNICAL CONTACT FOR QUALIFICATION DATA:

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PRODUCT DESCRIPTION (for qualification)	
Purpose: To qualify Direct Rambus Clock Generator, CY2211, R42D (Logic) technology with Hot Al. The R42D technology with Hot AL was qualified by QTP 98357, using the 4Meg SRAM with NoBl Architecture (385 mils x 375 mils die size)	
Marketing Part #:	CY2211
Package:	24-pin SOIC
Device Description:	Direct Rambus Clock Generator
Cypress Division:	Cypress Semiconductor, TTD Division
Overall Die (or Mask) REV Level (pre-requisite for qualification):	Rev. A
What ID markings on Die:	7C82111A

TECHNOLOGY/FAB PROCESS DESCRIPTION - R42LDHA			
Number of Metal Layers:	2	Metal Composition:	Metal 1: 500Å TiW/6000Å Al/.5%Cu/1200Å TiW Metal 2: 500Å TiW/8000Å Al/.5%Cu/300Å TiW
Passivation Type and Materials:	3000 ÅTEOS + 6000Å Si_3N_4		
Number of transistors in device	6000		
Number of Gates in device	1000		
Generic Process Technology/Design Rule (μ-drawn):	CMOS, Double Metal /0.35 μm		
Gate Oxide Material/Thickness (MOS):	SiO_2 / 70Å		
Name/Location of Die Fab (prime) Facility:	Cypress Semiconductor (CSPI-R)		
Die Fab Line ID/Wafer Process ID:	Fab4/R42LDHA		

PLASTIC PACKAGE/ASSEMBLY DESCRIPTION			
Package Outline Type, or Name:	16 pin soic		
Mold Compound Name / Manufacturer	Sumitomo 6300		
Mold Compound Tg. C	165		
Lead Frame material	Cu		
Lead Finish, composition:	Solder Plated, 85 - 95%Sn		
Die Attach Area Plating:	Ag		
Die Attach Method:	Epoxy	Die Attach Material	Ablestik 8361H
Wire Bond Method:	Thermosonic	Wire Material/Size	Gold / 1.0 mil
Assembly Line Process	11-2003	Pad Size;	96 x 140
Thermal Resistance JA	69		
JESD22-A112 Moisture Sensitivity Level:	Level 1		
Name/Location of Assembly (prime) facility:	Cypress Philippines (CSPI-R)		

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

RELIABILITY TESTS PERFORMED

Stress/Test	Test Condition (Temp/Bias)	Result P/F
High Temperature Operating Life Early Failure Rate (EFRA)	Dynamic Operating Condition, Vcc = 3.8 V, 150°C	P
High Temperature Operating Life Early Failure Rate (EFRB)	Dynamic Operating Condition, Vcc = 3.8 V, 125°C	P
Temperature Cycle	MIL-STD-883C, Method 1010, Condition C, -65°C to 150°C Precondition: JESD22 Moisture Sensitivity Level 1 (168 Hrs, 85C/85%RH)	P
Latchup Sensitivity	8V , ±200mA In accordance with JEDEC 17. Cypress Spec. 01-00081	P
Electrostatic Discharge Human Body Model (ESD-HBM)	2,000V MIL-STD-883, Method 3015.7	P
Electrostatic Discharge Charge Device Model (ESD-CDM)	1,000V Cypress Spec. 25-00020	P
Pressure Cooker Test	No bias, 121°C, 100%RH	P

RELIABILITY FAILURE RATE SUMMARY

Stress/Test	Device Tested/ Device Hours	# Fail	Activation	Thermal	Failure Rate[4]
High Temperature Operating Life Early Failure Rate[1]	1500	0	N/A	N/A	0 PPM
High Temperature Operating Life[1,2] Long Term Failure Rate	412,168 DHRs	1	0.7	170	29 FIT

[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.

[4] Long Term Failure Rate was based on R42D Technology with hot AL qualification, QTP 98357.

RELIABILITY TEST DATA

QTP#: 98357[31]

DEVICE	ASSY-LOC	FABLOT#	ASSYLOT#	DURATION	S/S	REJ	FAIL MODE
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (150C, 3.8V)							
CY7C1350-AC	CSPI-R	4812418	619805770	48	750	0	
CY7C1350-AC		4815594	619807192	48	288	0	
CY7C1350-AC		4815594	619807192	48	396	0	
CY7C1352-AC	CSPI-R	4824383	619809153	48	66	0	
STRESS: ESD-CHARGE DEVICE MODEL (500V)							
CY7C1352-AC	CSPI-R	4824383	619809153	COMP	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015 (4,400V)							
CY7C1352-AC	CSPI-R	4824383	619809153	COMP	3	0	
STRESS: HI-ACCEL SATURATION TEST (130C, 3.63V), PRECOND. 192 HRS 30C/60%RH							
CY7C1350-AC	CSPI-R	4816713	619808643	128	48	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE (150C, 3.8V)							
CY7C1350-AC	CSPI-R	4812418	619805770	80	392	1	1 UNKNOWN CAUSE
CY7C1350-AC	CSPI-R	4812418	619805770	500	390	0	
CY7C1350-AC	CSPI-R	4815594	619807192	80	396	0	
CY7C1350-AC	CSPI-R	4815594	619807192	548	396	0	
STRESS: PRESSURE COOKER TEST (121C, 100%RH)							
CY7C1352-AC	CSPI-R	4816713	619808642	168	45	0	
CY7C1352-AC	CSPI-R	4816713	619808642	288	45	0	
STRESS: TC COND. C, -65 TO 150C, PRECOND. 192 HRS 30C/60%RH (MSL 3)							
CY7C1350-AC	CSPI-R	4812418	619805769	300	45	0	
CY7C1350-AC	CSPI-R	4812418	619805770	300	45	0	
CY7C1350-AC	CSPI-R	4815594	619807192	300	45	0	

R42D technology with Hot AL was qualified by QTP 98357 using the 4Meg SRMA with NoBL Architecture.

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RELIABILITY TEST DATA

QTP#: 98377[1]

STRESS:	DEVICE	ASSY-LOC	FABLOT#	ASSYLOT#	DURATION	S/S	REJ	FAIL MODE
HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (150C, 5.75V)								
98377	CY2211SC	CSPI-R	4912646	619915605	48	200	0	
98377	CY2211SC	CSPI-R	4912646	619915605	48	300	0	
HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (125C, 5.75V)								
98377	CY2211SC	CSPI-R	4911500	619909813/4/5	48	250	0	
98377	CY2211SC	CSPI-R	4911500	619909813/4/5	48	300	0	
98377	CY2211SC	CSPI-R	4911500	619909813/4/5	48	117	0	
98377	CY2211SC	CSPI-R	4911500	619909813/4/5	48	300	0	
ESD-CHARGE DEVICE MODEL								
98377	CY2211SC	CSPI-R	4911500	619909813/4/5	COMP	3	0	
ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015								
98377	CY2211SC	CSPI-R	4911500	619909813/4/5	COMP	3	0	
PRESSURE COOKER TEST (121C, 100%RH)								
98377	CY2211SC	CSPI-R	4911500	619909813/4/5	168	48	0	
TC COND. C, -65 TO 150C, PRECOND. 168 HRS 85C/85%RH (MSL 1)								
99141	CY2211SC	PHIL-M	4915013	619912994	1000	50	0	
98377	CY2211SC	CSPI-R	4911500	619909813/4/5	300	48	0	
98377	CY2211SC	CSPI-R	4911500	619909813/4/5	1000	48	0	