

# **Cypress Semiconductor Product Qualification Report**

**QTP# 98333 VERSION 2.0  
August, 2003**

**100-MHz Spread Spectrum Clock Synthesizer/Driver  
USB, Hublink and SDRAM Support  
CY2287PVC**

## **CYPRESS TECHNICAL CONTACT FOR QUALIFICATION DATA:**

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<b>PRODUCT DESCRIPTION (for qualification)</b>	
Qualification Purpose: To qualify Fab2 to fabricate 7C81200A Clock Motherboard family, commercial products in L28 Technology.	
Marketing Part #:	CY2287PVC
Package:	56 pins SSOP
Device Description:	100-MHz Spread SpectrumClock Synthesizer/Driver with USB, Hublink and SDRAM Support
Cypress Division:	Cypress Semiconductor Corporation - CPD Division
Overall Die (or Mask) REV Level (pre-requisite for qualification):	Rev. A
What ID markings on Die:	7C81200A

<b>TECHNOLOGY/FAB PROCESS DESCRIPTION - L28</b>			
Number of Metal Layers:	2	Metal Composition:	Metal 1: 500A Ti/1,200A TiW/6,000A Al/1,200A TiW Metal 2: 1,500A TiW//10,000A Al/150A Ti
Passivation Type and Materials:	3,000A TEOS + 15,000A Si <sub>2</sub> N <sub>4</sub>		
Free Phosphorus contents in top glass layer(%):	N/A		
Die Coating(s), if used:	N/A		
Generic Process Technology/Design Rule (μ-drawn):	CMOS, Single Poly, Double Metal /0.65 μm		
Gate Oxide Material/Thickness (MOS):	SiO <sub>2</sub> / 145 A		
Name/Location of Die Fab (prime) Facility:	Cypress Semiconductor - Round Rock, TX		
Die Fab Line ID/Wafer Process ID:	Fab2/L28		

PLASTIC PACKAGE/ASSEMBLY DESCRIPTION			
Package Outline, Type, or Name:	56 Pins SSOP		
Mold Compound Name/Manufacturer:	Hitachi CEL-9200		
Lead Frame material:	Copper		
Lead Finish, composition:	Solder Plated, 85%Sn, 15%Pb		
Die Attach Area Plating:	Solder Plate		
Die Attach Method:	Epoxy	Die Attach Material:	Ablestik 8361H
Wire Bond Method:	Thermosonic	Wire Material/Size:	Gold / 1.0 mil
JESD22-A112 Moisture Sensitivity Level	Level 1		
Assembly Line ID and Process ID:	Cypress Philippines (SSOP)		

**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	Dynamic Operating Condition, Vcc = 3.8V, 150°C	P
High Temperature Operating Life Latent Failure Rate	Dynamic Operating Condition, Vcc = 3.8V, 150°C	P
Temperature Cycle	MIL-STD-883C, Method 1010, Condition C, -65°C to 150°C Precondition: JESD22 Moisture Sensitivity Level 1 168 Hrs, 85°C/85%RH	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
Latchup Sensitivity	10V In accordance with JEDEC 17. Cypress Spec. 01-00081	P

### RELIABILITY FAILURE RATE SUMMARY

Stress/Test	Device Tested/ Device Hours	# Fails	Activation Energy	Thermal <sup>3</sup> A.F	Failure Rate <sup>4</sup>
High Temperature Operating Life Early Failure Rate	850 Devices	0	N/A	N/A	0 PPM
High Temperature Operating Life <sup>1,2</sup> Long Term Failure Rate	173,900 DHRs	0	0.7	170	31 FITs

<sup>1</sup> Assuming an ambient temperature of 55°C and a junction temperature rise of 15°C.

<sup>2</sup> Chi-squared 60% estimations used to calculate the failure rate.

<sup>3</sup> 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 =  $8.62 \times 10^{-5}$  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.

<sup>4</sup> Failure Rate is based on Fab 2, L28 Technology qualification, QTP 97403.

**DEVICE RELATED RELIABILITY TEST DATA**

**QTP 97403<sup>1</sup>**

DEVICE	ASSY-LOC	FABLOT#	ASSYLOT#	DURATION	S/S	REJ	FAIL MODE
<b>STRESS: DATA BAKE-PLASTIC (165C, NO BIAS)</b>							
CY2273APVC	CSPI-R	2732995	619708289/319	168	78	0	
CY2273APVC	CSPI-R	2732995	619708289/319	552	78	0	
CY2273APVC	CSPI-R	2735423	619709731	168	78	0	
CY2273APVC	CSPI-R	2735423	619709731	552	78	0	
CY2273APVC	CSPI-R	2734307	619709732	168	78	0	
CY2273APVC	CSPI-R	2734307	619709732	552	78	0	
<b>STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (150C, 3.65V)</b>							
CY2273APVC	CSPI-R	2732995	619708289/319	48	180	0	
CY2273APVC	CSPI-R	2735423	619709731	48	340	0	
CY2273APVC	CSPI-R	2734307	619709732	48	330	0	
<b>STRESS: ESD-CHARGE DEVICE MODEL, 2000V</b>							
CY2273APVC	CSPI-R	2732995	619708289/319	COMP	3	0	
<b>STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015, 4000V</b>							
CY2273APVC	CSPI-R	2732995	619708289/319	COMP	3	0	
<b>STRESS: HI-ACCEL SATURATION TEST (140C, 3.63V), PRECOND. 168 HRS 85C/85%RH</b>							
CY2273APVC	CSPI-R	2732995	619708289/319	128	44	0	
CY2273APVC	CSPI-R	2732995	619708289/319	256	44	0	
CY2273APVC	CSPI-R	2734307	619709732	128	45	0	
<b>STRESS: HIGH TEMPERATURE STORAGE (165C, NO BIAS)</b>							
CY2273APVC	CSPI-R	2732995	619708289/319	336	45	0	
CY2273APVC	CSPI-R	2732995	619708289/319	500	45	0	
CY2273APVC	CSPI-R	2732995	619708289/319	1000	45	0	
<b>STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE (150C, 3.65V)</b>							
CY2273APVC	CSPI-R	2732995	619708289/319	80	116	0	
CY2273APVC	CSPI-R	2732995	619708289/319	500	116	0	
CY2273APVC	CSPI-R	2735423	619709731	80	120	0	
CY2273APVC	CSPI-R	2735423	619709731	500	116	0	
CY2273APVC	CSPI-R	2734307	619709732	80	116	0	
CY2273APVC	CSPI-R	2734307	619709732	500	115	0	1 EOS
<b>STRESS: COLD LIFE TEST (-30C, 6.5V)</b>							
CY2273APVC	CSPI-R	2732995	619708289/319	500	45	0	
CY2273APVC	CSPI-R	2732995	619708289/319	1000	44	0	1 EOS
<b>STRESS: READ &amp; RECORD LIFE TEST (150C, 3.65V)</b>							
CY2273APVC	CSPI-R	2734307	619709732	48	10	0	
CY2273APVC	CSPI-R	2734307	619709732	80	10	0	
CY2273APVC	CSPI-R	2734307	619709732	500	10	0	

<sup>1</sup> L28 Technology qualified in Fab 2.

**RELIABILITY TEST DATA**

**QTP 97403**

<b>DEVICE</b>	<b>ASSY-LOC</b>	<b>FABLOT#</b>	<b>ASSYLOT#</b>	<b>DURATION</b>	<b>S/S</b>	<b>REJ</b>	<b>FAIL MODE</b>
<b>STRESS: TC COND. C, -65 TO 150C, PRECOND. 168 HRS 85C/85%RH</b>							
CY2273APVC	CSPI-R	2732995	619708289/319	300	45	0	
CY2273APVC	CSPI-R	2732995	619708289/319	1000	45	0	
CY2273APVC	CSPI-R	2735423	619709731	300	48	0	
CY2273APVC	CSPI-R	2735423	619709731	1000	48	0	
CY2273APVC	CSPI-R	2734307	619709732	300	47	0	
CY2273APVC	CSPI-R	2734307	619709732	1000	47	0	

**RELIABILITY TEST DATA**

**QTP 98333**

DEVICE	ASSY-LOC	FABLOT#	ASSYLOT#	DURATION	S/S	REJ	FAIL MODE
<b>STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (150C, 3.8V)</b>							
CY2287PVC	CSPI-R	2836088	619814987/8/9	48	300	0	
CY2287PVC	CSPI-R	2836088	619814987/8/9	48	300	0	
CY2287PVC	CSPI-R	2836088	619814987/8/9	48	300	0	
CY2287PVC	CSPI-R	2836088	619814987/8/9	48	120	0	
<b>STRESS: ESD-CHARGE DEVICE MODEL (1000V)</b>							
CY2287PVC	CSPI-R	2836088	619814987/8/9	COMP	3	0	
<b>STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015 (2000V)</b>							
CY2287PVC	CSPI-R	2836088	619814987/8/9	COMP	3	0	
<b>STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE (150C, 3.8V)</b>							
CY2287PVC	CSPI-R	2836088	619814987/8/9	80	120	0	
<b>STRESS: PRESSURE COOKER TEST (121C, 100%RH)</b>							
CY2287PVC	CSPI-R	2836088	619814987/8/9	168	48	0	
<b>STRESS: TC COND. C, -65 TO 150C, PRECOND. 168 HRS 85C/85%RH (MSL 1)</b>							
CY2287PVC	CSPI-R	2836088	619814987/8/9	300	48	0	