

# **Cypress Semiconductor Product Qualification Report**

**QTP# 99092 VERSION 2.0  
August, 2003**

## **Universal Serial Bus (USB) Microcontroller**

**CY7C63000A/CY7C63001A**

**CY7C63100A/CY7C63101A**

**CY7C63200A/CY7C63201A**

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

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**PRODUCT/TECHNOLOGY INFORMATION**

<b>PRODUCT DESCRIPTION (for qualification)</b>			
Purpose: Qualify CY7C63*A Rev. G, all layer mask changed on qualified device CY7C63* (7C6302A) fabricated in Fab2, P26 technology.			
Marketing Part #:	CY7C631001A		
Device Description:	Universal Serial Bus (USB) Microcontroller		
Cypress Division:	Cypress Semiconductor Corporation - CPD Division		
Overall Die (or Mask) REV Level (pre-requisite for qualification):			Rev. G
What ID markings on Die:	7C6302A		

<b>TECHNOLOGY/FAB PROCESS DESCRIPTION</b>			
Number of Metal Layers:	2	Metal Composition:	Metal 1: 6000Å Al, 1200 Å TiW Metal 2: 1500Å TiW, 9000Å Al, 320Å TiW
Passivation Type and Materials:	Oxynitride		
Free Phosphorus contents in top glass layer(%):	None		
Die Coating(s), if used:	N/A		
Number of Transistor in device:	50,000		
Number of Gate in device	10,000		
Generic Process Technology/Design Rule (μ-drawn):	CMOS, Double Poly, Double Metal / 0.65μm		
Gate Oxide Material/Thickness (MOS):	SiO <sub>2</sub> / 165 Å		
Name/Location of Die Fab (prime) Facility:	Cypress Semiconductor - Round Rock, TX (Fab2)		
Die Fab Line ID/Wafer Process ID:	Fab 2/ P26		

**PACKAGE/ASSEMBLY INFORMATION**

<b>PLASTIC PACKAGE/ASSEMBLY DESCRIPTION</b>			
Package Outline, Type, or Name:	24-pin SOIC		
Mold Compound Name/Manufacturer:	Sumitomo - EME 6300HR		
Lead Frame material:	Copper		
Lead Finish, composition:	Solder Plated, 85%Sn, 15%Pb		
Die Attach Area Plating:	Silver Spot		
Die Attach Method:	Epoxy	Die Attach Material:	Ablestik 84-1MISR4
Wire Bond Method:	Thermosonic	Wire Material/Size:	Gold / 1.3 mil
JESD22-A112 Moisture Sensitivity Level	Level 1		
Assembly Line ID and Process ID:	Cypress Philippines (CSPI-R) Cypress Bangkok, Thailand (ALPHA-X)		

<b>HERMETIC PACKAGE/ASSEMBLY DESCRIPTION</b>			
Package Outline, Type, or Name:	24-pin, 300-mil Window Cerdip		
Lead Frame material:	Alloy 42		
Lead Finish, composition:	Solder Dipped, 63%Sn, 37%Pb		
Die Attach Area Plating:	Silver Spot		
Die Attach Method:	Ag Glass	Die Attach Material:	QMI 2419MG
Wire Bond Method:	Ultrasonic	Wire Material/Size:	Al / 1.25 mil
Assembly Line ID and Process ID:	Cypress Bangkok, Thailand (ALPHA-X)		

**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 = 5.5V, 150°C	P
Electrostatic Discharge Human Body Model (ESD-HBM)	2,200V MIL-STD-883, Method 3015.7	P
Electrostatic Discharge Charge Device Model (ESD-CDM)	1,500V Cypress Spec. 25-00020	P
Latchup Sensitivity	12V In accordance with JEDEC 17. Cypress Spec. 01-00081	P

**RELIABILITY FAILURE RATE SUMMARY**

Stress/Test	Device Tested/ Device Hours	# Fails	Activation Energy	Acceleration Factor <sup>4</sup>	Failure Rate <sup>3</sup>
High Temperature Operating Life Early Failure Rate	2100 Devices	0	N/A	N/A	0 PPM
High Temperature Operating Life <sup>1,2</sup> Long Term Failure Rate	57,000 DHRs	0	0.7	170	95 FIT <sup>3</sup>

<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> Long Term Failure Rate is based on USB Microcontroller Rev. A qualification (QTP 96514). The high FIT rate is solely a function of the limit sample size. The P26 technology was qualified in Fab2 with a Fit Rate of 14 - 398,000 DHRs. with 0 reject (QTP # 96411, 96352, 95517 and 95075).

<sup>4</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.

**DEVICE RELATED RELIABILITY TEST DATA**

**QTP#: 96514<sup>1</sup>**

<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: DATA BAKE-HERMETIC (250C, NO BIAS)</b>							
CY7C63101-WC	ALPHA-X	2705785	219703142/3/4	96	76	0	
<b>STRESS: DATA BAKE-PLASTIC (165C, NO BIAS)</b>							
CY7C63101-SC	ALPHA-X	2705785	219703088/9/90	168	76	0	
CY7C63101-SC	ALPHA-X	2705785	219703088/9/90	552	76	0	
<b>STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (150C, 5.5V)</b>							
CY7C63101-SC	ALPHA-X	2705785	219703088/9/90	48	1027	0	
CY7C63101-SC	ALPHA-X	2706821	219704292/3/4	48	9526	0	
CY7C63101-SC	ALPHA-X	2715902	219706999	48	1023	1	SINGLE BIT
<b>STRESS: ESD-CHARGE DEVICE MODEL</b>							
CY7C63101-SC	ALPHA-X	2705785	219703095	COMP	3	0	
<b>STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015</b>							
7C63000AT-DC	USA-C	2705785		COMP	3	0	
<b>STRESS: HI-ACCEL SATURATION TEST (140C, 5.5V), PRECOND. 168 HRS 85C/85%RH</b>							
CY7C63101-SC	ALPHA-X	2705785	219703088/9/90	128	45	0	
<b>STRESS: HIGH TEMP STEADY STATE LIFE TEST (150C, 5.75V)</b>							
CY7C63101-SC	ALPHA-X	2705785	219703088/9/90	168	75	0	
<b>STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE (150C, 5.5V)</b>							
CY7C63101-SC	ALPHA-X	2706821	219704292/3/4	80	114	0	
CY7C63101-SC	ALPHA-X	2706821	219704292/3/4	500	114	0	
<b>STRESS: READ &amp; RECORD LIFE TEST (150C, 5.5V)</b>							
CY7C63101-SC	ALPHA-X	2705785	219703088/9/90	500	10	0	
<b>STRESS: TC COND. C, -65 TO 150C, HERMETIC DEVICES</b>							
CY7C63101-WC	ALPHA-X	2705785	219703142/3/4	100	45	0	
CY7C63101-WC	ALPHA-X	2705785	219703142/3/4	1000	45	0	
<b>STRESS: TC COND. C, -65 TO 150C, PRECOND. 168 HRS 85C/85%RH</b>							
CY7C63101-SC	ALPHA-X	2705785	219703088/9/90	300	45	0	
CY7C63101-SC	ALPHA-X	2705785	219703088/9/90	1000	45	0	

<sup>1</sup> CY7C63101 Rev. A qualified in Fab2, P26 technology

**RELIABILITY TEST DATA**

**QTP#: 99092**

<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: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (150C, 5.5V)</b>							
CY7C63101A-SC	CSPI-R	2906052	619907797	40	1050	0	
CY7C63101A-SC	CSPI-R	2906052	619907797	48	1050	0	
<b>STRESS: ESD-CHARGE DEVICE MODEL (1000V)</b>							
CY7C63101A-SC	CSPI-R	2906052	619907797	COMP	3	0	
<b>STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015 (2200V)</b>							
CY7C63101A-SC	CSPI-R	2906052	619907797	COMP	3	0	