Cypress Semiconductor
Qualification Report

QTP# 97352 VERSION 1.1
May, 2003

Universal Serial Bus (USB) Microcontroller

CY7C63000/CY7C63001

CY7C63100/CY7C63101

CY7C63200/CY7C63201

CYPRESS TECHNICAL CONTACT FOR QUALIFICATION DATA:

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PRODUCT/TECHNOLOGY INFORMATION

PRODUCT DESCRIPTION (for qualification)			
Purpose: Qualify CY7C63101, rev. E (mask changed on qualified device CY7C63101 rev. A in Fab2, P26 technology)			
Marketing Part #:	CY7C63101		
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. E/F	
What ID markings on Die:	7C63000A		

TECHNOLOGY/FAB PROCESS DESCRIPTION			
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_2 / 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

PLASTIC PACKAGE/ASSEMBLY DESCRIPTION			
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 Bangkok, Thailand (ALPHA-X)		

HERMETIC PACKAGE/ASSEMBLY DESCRIPTION			
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
Electrostatic Discharge Human Body Model (ESD-HBM)	4,440V 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 (See note)

Note: The CY7C63101 Rev. A passed Latchup Sensitivity test at 12V. The Rev E failed 200mA injection current on pin 5. The CY7C63101 Rev. E can be shipped with only a pin five 50 mA Latchup waiver. Corrective action has been assigned, the device will be fixed with Rev. G material.

RELIABILITY FAILURE RATE SUMMARY

Stress/Test	Device Tested/ Device Hours	# Fails	Activation Energy	Acceleration Factor[4]	Failure Rate[3]
High Temperature Operating Life Early Failure Rate	3002 Devices	1	N/A	N/A	333 PPM
High Temperature Operating Life[1,2] Long Term Failure Rate	57,000 DHRs	0	0.7	170	95 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] The high FIT rate is solely a function of the limit sample size (QTP 96514). 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).
[4] 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.

DEVICE RELATED RELIABILITY TEST DATA

QTP#: 96514[1]

DEVICE	ASSY-LOC	FABLOT#	ASSYLOT#	DURATION	S/S	REJ	FAIL MODE
STRESS: DATA BAKE-HERMETIC (250C, NO BIAS)							
CY7C63101-WC	ALPHA-X	2705785	219703142/3/4	96	76	0	
STRESS: DATA BAKE-PLASTIC (165C, NO BIAS)							
CY7C63101-SC	ALPHA-X	2705785	219703088/9/90	168	76	0	
CY7C63101-SC	ALPHA-X	2705785	219703088/9/90	552	76	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (150C, 5.5V)							
CY7C63101-SC	ALPHA-X	2705785	219703088/9/90	48	1027	0	2 EOS
CY7C63101-SC	ALPHA-X	2706821	219704292/3/4	48	9526	0	
CY7C63101-SC	ALPHA-X	2715902	219706999	48	1023	1	1 SINGLE BIT
STRESS: ESD-CHARGE DEVICE MODEL							
CY7C63101-SC	ALPHA-X	2705785	219703095	COMP	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015							
7C63000AT-DC	USA-C	2705785		COMP	3	0	
STRESS: HI-ACCEL SATURATION TEST (140C, 5.5V), PRECOND. 168 HRS 85C/85%RH							
CY7C63101-SC	ALPHA-X	2705785	219703088/9/90	128	45	0	
STRESS: HIGH TEMP STEADY STATE LIFE TEST (150C, 5.75V)							
CY7C63101-SC	ALPHA-X	2705785	219703088/9/90	168	75	0	1 EOS
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE (150C, 5.5V)							
CY7C63101-SC	ALPHA-X	2706821	219704292/3/4	80	114	0	2 EOS
CY7C63101-SC	ALPHA-X	2706821	219704292/3/4	500	114	0	
STRESS: READ & RECORD LIFE TEST (150C, 5.5V)							
CY7C63101-SC	ALPHA-X	2705785	219703088/9/90	500	10	0	
STRESS: TC COND. C, -65 TO 150C, HERMETIC DEVICES							
CY7C63101-WC	ALPHA-X	2705785	219703142/3/4	100	45	0	
CY7C63101-WC	ALPHA-X	2705785	219703142/3/4	1000	45	0	
STRESS: TC COND. C, -65 TO 150C, PRECOND. 168 HRS 85C/85%RH							
CY7C63101-SC	ALPHA-X	2705785	219703088/9/90	300	45	0	
CY7C63101-SC	ALPHA-X	2705785	219703088/9/90	1000	45	0	

[1] CY7C63101 Rev. A qualified in Fab2, P26 technology