Cypress Semiconductor
Qualification Report

QTP# 96392 VERSION 1.0
May, 1998

Ethernet Fiber Optic Transceiver - Fab2

CY7B4663/CY7B4665

PRODUCT DESCRIPTION (for qualification)			
Information provided in this document is intended for generic qualification and technically describes the Cypress part supplied:			
Marketing Part #:	CYB4663		
Package:	28 Ld Plastic Lead Chip Carrier (PLCC)		
Device Description:	Ethernet Fiber Optic Transceiver		
Cypress Division:	Cypress Semiconductor Corporation - DCD Division		
Overall Die (or Mask) REV Level (pre-requisite for qualification):		Rev. A	
Die Size (stepping):	101 mils x 96 mils	What ID markings on Die:	7B9663A

TECHNOLOGY/FAB PROCESS DESCRIPTION			
Number of Metal Layers:	2	Metal Composition:	Metal 1: Ti/TiW/Al Metal 2: Ti/Al
Passivation Type and Materials:	3,000A TEOS + 15,000A Oxynitride		
Free Phosphorus contents in top glass layer(%):	3%		
Die Coating(s), if used:	N/A		
Generic Process Technology/Design Rule (µ-drawn):	BiCMOS, Single Poly, Double Metal /0.8 µm		
Gate Oxide Material/Thickness (MOS):	SiO_2 / 195A°		
Name/Location of Die Fab (prime) Facility:	Cypress Semiconductor - Round Rock, TX		
Die Fab Line ID/Wafer Process ID:	Fab2/SM13		

PLASTIC PACKAGE/ASSEMBLY DESCRIPTION			
Package Outline, Type, or Name:	28-pins Plastic Lead Chip Carrier (JC)		
Mold Compound Name/Manufacturer:	Sumitomo EME-6300		
Lead Frame material:	Copper		
Lead Finish, composition:	Solder Plated, 85%Sn, 15%Pb		
Die Attach Area Plating:	Silver Spot		
Die Attach Method:	Paste	Die Attach Material:	Ablestik 84-1LMISR4
Wire Bond Method:	Thermosonic	Wire Material/Size:	Gold / 1.3 mil
JESD22-A112 Moisture Sensitivity Level	Level 1		
Assembly Line ID and Process ID:	Omedata, Indonesia		

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 = 6.5V, 125°C	P
High Temperature Operating Life Latent Failure Rate	Dynamic Operating Condition, Vcc = 6.5V, 125°C	P
Read and Record Life Test	Dynamic Operating Condition, Vcc = 6.5V, 125°C	P
High Temperature Steady State Life	Static Operating Condition, Vcc = 5.5V, 150°C	P
High Accelerated Saturation Test (HAST)	140°C, 85%RH, 5.5V Precondition: JESD22 Moisture Sensitivity Level 1 (168 Hrs , 85°C /85%RH)	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)	MIL-STD-883, Method 3015.7	2,200V
Electrostatic Discharge Charge Device Model (ESD-CDM)	Cypress Spec. 25-00020	2,000V
Latchup Sensitivity	In accordance with JEDEC 17. Cypress Spec. 01-00081	P 10V

RELIABILITY FAILURE RATE SUMMARY

Stress/Test	Device Tested/ Devive Hours	# Fails	Activation Energy	Thermal AF[3]	Failure Rate
High Temperature Operating Life Early Failure Rate	1513 Devices	0	N/A	N/A	0 PPM
High Temperature Operating Life[1,2] Long Term Failure Rate	59,000 DHRs	0	0.7	55	281 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.

RELIABILITY TEST DATA

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DEVICE	ASSY-LOC	FABLOT#	ASSYLOT#	DURATION	S/S	REJ	FAIL MODE
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (125C, 6.5V)							
CY7B4663-JC	INDNS-O	2705693	519703469	48	477	0	
CY7B4663-JC	INDNS-O	2705693	519703469	48	480	0	
CY7B4663-JC	INDNS-O	2705693	519703469	48	556	0	
STRESS: ESD-CHARGE DEVICE MODEL (2,000V)							
CY7B4663-JC	INDNS-O	2705693	519703469	COMP	3	0	
7B9665AT-OJC	INDNS-O	2708091	519706801	COMP	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015 (2,200V)							
CY7B4663-JC	INDNS-O	2705693	519703469	COMP	3	0	
7B9665AT-OJC	INDNS-O	2708091	519706801	COMP	3	0	
STRESS: HI-ACCEL SATURATION TEST (140C, 5.5V), PRECOND. 168 HRS 85C/85%RH							
CY7B4663-JC	INDNS-O	2705693	519703469	128	50	0	
STRESS: HIGH TEMP STEADY STATE LIFE TEST (150C, 5.50V)							
CY7B4663-JC	INDNS-O	2705693	519703469	80	78	0	
CY7B4663-JC	INDNS-O	2705693	519703469	168	78	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE (125C, 6.5V)							
CY7B4663-JC	INDNS-O	2705693	519703469	80	118	0	
CY7B4663-JC	INDNS-O	2705693	519703469	500	118	0	
STRESS: READ & RECORD LIFE TEST (125C, 6.5V)							
CY7B4663-JC	INDNS-O	2705693	519703469	48	10	0	
CY7B4663-JC	INDNS-O	2705693	519703469	80	10	0	
CY7B4663-JC	INDNS-O	2705693	519703469	500	10	0	
STRESS: TC COND. C, -65 TO 150C, PRECOND. 168 HRS 85C/85%RH							
CY7B4663-JC	INDNS-O	2705693	519703469	300	49	0	