

# Cypress Semiconductor Qualification Report

QTP# 98319, VERSION 1.0  
October, 1998

ATM-SONET/SDH. Transceiver... CY7C955  
L28EPD. Technology... Fab. 2

CYPRESS TECHNICAL CONTACT FOR QUALIFICATION DATA:

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PRODUCT/TECHNOLOGY/FAB DESCRIPTION

PRODUCT DESCRIPTION (for qualification)			
Purpose: To qualify 7C955A in Fab2 with L28EPD Technology.			
Marketing Part #:	CY7C955		
Package:	128-pin PQFP		
Device Description:	ATM-SONET/SDH Transceiver		
Cypress Division:	Cypress Semiconductor Corporation...DCD. Division		
Overall Die (or Mask) REV Level (pre-requisite for qualification):	Rev. A		
Die Size (stepping):	306mils x 288 mils	What ID markings on Die:	7C955A

TECHNOLOGY/FAB PROCESS DESCRIPTION - L28EPD			
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 ( $\mu$ -drawn):	CMOS, Single Poly, Double Metal /0.65 $\mu$ m		
Gate Oxide Material/Thickness (MOS):	SiO <sub>2</sub> /.145..		
Name/Location of Die Fab (prime) Facility:	Cypress Semiconductor...Round Rock,. Texas		
Die Fab Line ID/Wafer Process ID:	Fab2/L28EPD		

PLASTIC PACKAGE/ASSEMBLY DESCRIPTION

Package Outline, Type, or Name:	128-pin PQFP		
Mold Compound Name/Manufacturer:	MP-8000		
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 84-1LMSR4
Wire Bond Method:	Thermosonic	Wire Material/Size:	Gold / 1.3 mil
JESD22-A112 Moisture Sensitivity Level	Level 5		
Assembly Line ID and Process ID:	Anam-Seoul, Korea (KOREA-L)		

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

RELIABILITY TESTS PERFORMED

Stress/Test	Test Condition (Temp/Bias)	Result P/F
Latchup Sensitivity – Static	In accordance with JEDEC 17. Cypress Spec. 01-00081	8.5V
Electrostatic Discharge Human Body Model (ESD-HBM)	MIL-STD-883, Method 3015.7	4,400V
Electrostatic Discharge Charge Device Model (ESD-CDM)	Cypress Spec. 25-00020	1,000V

RELIABILITY FAILURE RATE SUMMARY

Stress/Test	Device Tested/ Devive Hours	# Fails	Activation Energy	Thermal AF <sup>3</sup>	Failure Rate <sup>4</sup>
High Temperature Operating Life Early Failure Rate	503	0	N/A	N/A	0 PPM
High Temperature Operating Life <sup>1,2</sup> Long Term Failure Rate	74,000	0	0.7	170	73 FIT

<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 L28EPD Technology qualified in Fab2, QTP 98209

DEVICE RELATED RELIABILITY TEST DATA

QTP #: 98209<sup>1</sup>

DEVICE	ASSY-LOC	FABLOT#	ASSYLOT#	DURATION	S/S	REJ	FAIL MODE
<b>STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (150C, 5.75V)</b>							
CY82C693-NC	ASE-J	2821994	619807947	48	168	0	
CY82C693-NC	ASE-J	2820922	619807948	48	168	0	
CY82C693-NC	ASE-J	2822021	619808385	48	167	0	
<b>STRESS: ESD-CHARGE DEVICE MODEL (1000V)</b>							
CY82C693-NC	ASE-J	2820922	619807948	COMP	3	0	
<b>STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015 (2200V)</b>							
CY82C693-NC	ASE-J	2820922	619807948	COMP	3	0	
<b>STRESS: HI-ACCEL SATURATION TEST (140C, 5.5V), PRECOND. 192 HRS 30C/60%RH</b>							
CY82C693-NC	ASE-J	2821994	619807947	128	45	0	
CY82C693-NC	ASE-J	2820922	619807948	128	45	0	
<b>STRESS: HIGH TEMPERATURE STORAGE (165C, NO BIAS)</b>							
CY82C693-NC	ASE-J	2820922	619807948	336	48	0	
CY82C693-NC	ASE-J	2820922	619807948	1000	48	0	
<b>STRESS: HIGH TEMP STEADY STATE LIFE TEST (150C, 5.75V)</b>							
CY82C693-NC	ASE-J	2820922	619807948	80	73	0	
CY82C693-NC	ASE-J	2820922	619807948	168	72	0	
<b>STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE (150C, 5.75V)</b>							
CY82C693-NC	ASE-J	2821994	619807947	80	78	0	
CY82C693-NC	ASE-J	2821994	619807947	500	75	0	3 EOS
CY82C693-NC	ASE-J	2820922	619807948	80	78	0	
CY82C693-NC	ASE-J	2820922	619807948	500	73	0	5 EOS
<b>STRESS: EXTENDED DYNAMIC BURN-IN (150C, 5.75V)</b>							
CY82C693-NC	ASE-J	2820922	619807948	785	70	0	
<b>STRESS: COLD LIFE TEST (-45C, 6.5V)</b>							
CY74FCT543TSOC	CSPI-R	2816631	619805959/60/61	500	45	0	
<b>STRESS: PRESSURE COOKER TEST (121C, 100%RH)</b>							
CY82C693-NC	ASE-J	2820922	619807948	168	48	0	
<b>STRESS: TC COND. C, -65 TO 150C, PRECOND. 192 HRS 30C/60%RH (MSL 3)</b>							
CY82C693-NC	ASE-J	2821994	619807947	300	47	0	
CY82C693-NC	ASE-J	2820922	619807948	300	48	0	
CY82C693-NC	ASE-J	2820922	619807948	1000	48	0	

<sup>1</sup> QTP 98209, L28EPD Technology qualified in Fab 2.

