

Cypress Semiconductor Product Qualification Report

**QTP# 92463 VERSION 1.0
October, 2001**

High-Performance CPLD	
CY7C341	192-Macrocell MAX® EPLD

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CYPRESS TECHNICAL CONTACT FOR QUALIFICATION DATA:

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PRODUCT QUALIFICATION HISTORY

Qual Report	Description of Qualification Purpose	Date Comp
92463	Commercial device CY7C341 Qualification in P20 Technology, Fab 2	Jan 93

PRODUCT DESCRIPTION (for qualification)			
Qualification Purpose: Qualify Military device CY7C343 in P20 Technology, fab 2.			
Marketing Part #:	CY7C341		
Device Description:	5V, Commercial and Industrial and Military available in 84-pin WLCC, WPGA and PLCC package		
Cypress Division:	Cypress Semiconductor Corporation – Data Com Division (DCD)		
Overall Die (or Mask) REV:			Rev. A
Die Size:	355 mils x 384 mils	What ID markings on Die:	7C341-A

TECHNOLOGY/FAB PROCESS DESCRIPTION			
Number of Metal Layers:	2	Metal Composition:	Metal 1: Ti, 1%SiAl Metal 2: 1% SiAl
Passivation Type and Materials:	4,000Å 2% P LTO + 15,000Å Oxynitride		
Free Phosphorus contents in top glass layer(%):	0%		
Die Coating(s), if used:	N/A		
Generic Process Technology/Design Rule (μ -drawn):	CMOS, Double Poly, Double Metal, 0.85 μ m		
Gate Oxide Material/Thickness (MOS):	SiO ₂ / 195Å		
Name/Location of Die Fab (prime) Facility:	Cypress Semiconductor – Round Rock, TX		
Die Fab Line ID/Wafer Process ID:	Fab2/PLD20		

PACKAGE AVAILABILITY

PACKAGE	ASSEMBLY FACILITY SITE
44-pin WLCC / PLCC	Anam Korea, Alphatec, CSPI-R, Anam Manila

MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION	
Package Designation:	J84
Package Outline, Type, or Name:	84-pin Plastic Leaded Chip Carrier (PLCC)
Manufacture / Mold Compound Name:	NITTO MP8000CH
Mold Compound Flammability Rating:	V-O per UL 94
Oxygen Rating Index:	> 28%
Lead Frame Material:	Copper
Lead Finish, Composition / Thickness:	Solder Pleated 85%Sn, 15%Pb
Die Backside Preparation Method/Metallization:	N/A
Die Separation Method:	Wafer Saw
Die Attach Supplier:	Ablestik
Die Attach Material:	8361H
Die Attach Method	Epoxy
Bond Diagram Designation	10-01550
Wire Bond Method:	Thermosonic
Wire Material/Size:	Au, 1.0um
Thermal Resistance Theta JA °C/W:	30°C/W
Package Cross Section Yes/No:	N/A
Assembly Process Flow:	49-23087
Name/Location of Assembly (prime) facility:	Alphatec Bangkok

ELECTRICAL TEST / FINISH DESCRIPTION	
Test Location:	CSPI-R
Fault Coverage:	100%

RELIABILITY TESTS PERFORMED PER SPECIFICATION REQUIREMENTS

Stress/Test	Test Condition (Temp/Bias)	Result
High Temperature Operating Life Latent Failure Rate	Dynamic Operating Condition, Vcc = 125°C , 5.75V	P
High Temperature Steady State life	Static Operating Condition, Vcc Max= 125°C, 5.75V	P
Temperature Cycle	1) QTP #91321 -40°C to 125°C	P
Data Retention	165C, ± 5°C no bias	P
Pressure Coker	121C, 100%RH	P
High Accelerated Saturation Test (HAST)	140C, 5.5V, 85%RH	P

RELIABILITY FAILURE RATE SUMMARY

Stress/Test	Device Tested/ Device Hours	# Fails	Activation Energy	Acceleration Factor⁴	Failure Rate
High Temperature Operating Life Early Failure Rate	N/A	-	N/A	N/A	N/A PPM
High Temperature Operating Life Long Term Failure Rate ^{1,2}	132,000 HRs	0	0.7	170	126 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

QTP #: 92463

Device	Fab Lot #	Assy Lot #	Ass Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE (125C, 5.75V, Vcc Max)							
CY7C341-JCB (7C341A)	2218751	89913	ALPHA-X	168	132	0	
CY7C341-JCB (7C341A)	2218751	89913	ALPHA-X	500	132	0	
CY7C341-JCB (7C341A)	2218751	89913	ALPHA-X	1000	132	0	
STRESS: HI-ACCEL SATURATION TEST (140C, 85%RH, 5.5V),							
CY7C341-JCB (7C341A)	2215522	86270	ALPHA-X	128	45	0	
STRESS: DATA RETENTION, 165C							
CY7C341-JCB (7C341A)	2218751	89913	ALPHA-X	168	134	0	
CY7C341-JCB (7C341A)	2218751	89913	ALPHA-X	552	134	0	
STRESS: HIGH TEMP STEADY STATE LIFE TEST (125C, 5.75V, Vcc MAX)							
CY7C341-JCB (7C341A)	2218751	89913	ALPHA-X	168	132	0	
CY7C341-JCB (7C341A)	2218751	89913	ALPHA-X	336	132	0	
STRESS: PRESSURE COOKER TEST (121C, 100%RH)							
CY7C341-JCB (7C341A)	2218751	84000	ALPHA-X	168	45	0	
CY7C341-JCB (7C341A)	2218751	84000	ALPHA-X	288	45	0	
STRESS: TC COND. -40C TO 125C							
CY7C341-JCB (7C341A)	2215524	86270	ALPHA-X	300	45	0	
CY7C341-JCB (7C341A)	2215524	86270	ALPHA-X	1000	45	0	