

Cypress Semiconductor Product Qualification Report

**QTP# 95075 VERSION 2.0
November 2005**

CY27H010	128 x 8 High Speed CMOS EPROM
P26 Technology, Fab2	

CYPRESS TECHNICAL CONTACT FOR QUALIFICATION DATA:

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TECHNOLOGY QUALIFICATION HISTORY

Qual Report	Description of Qualification Purpose	Date Comp
95075	Qualify New Device (CY27H010) in P26 Technology, Fab2	Aug 96

PRODUCT DESCRIPTION (for qualification)	
Qualification Purpose: New Device (CY27H010) in P26 Technology, Fab2	
Marketing Part #:	CY27H010
Device Description:	128 x 8 EPROM
Cypress Division:	Cypress Semiconductor Corporation – Consumer & Computation Division (CCD)
Overall Die (or Mask) REV Level (pre-requisite for qualification):	Rev. A
What ID markings on Die:	7C201A

TECHNOLOGY/FAB PROCESS DESCRIPTION - P26			
Number of Metal Layers:	2	Metal Composition:	Metal 1: 6000Å Al / 1200Å TiW Metal 2: 1500Å TiW / 9000Å Al / 320Å TiW
Passivation Type and Materials:	Oxynitride		
Free Phosphorus contents in top glass layer (%):	0%		
Generic Process Technology/Design Rule (μ-drawn):	CMOS. Double Metal/0.65μm		
Gate Oxide Material/Thickness (MOS):	SiO ₂ , 165Å		
Name/Location of Die Fab (prime) Facility:	Cypress Semiconductor – Round Rock, Tx (Fab2)		
Die Fab Line ID/Wafer Process ID:	Fab2/P26		

PACKAGE AVAILABILITY

PACKAGE	ASSEMBLY SITE FACILITY
32-Pin PDIP	Korea-H
32-Pin CDIP/WDIP	Alpha-X
32-Pin PLCC	Korea-A
32-Pin TSOP	Korea-A
32-Lead LCC	Alpha-X
32-Lead-QMB	Alpha-X

PACKAGE INFORMATION USED IN THIS QUALIFICATION	
Package Designation:	P32
Package Outline, Type, or Name:	32-Pin Plastic Dual In-Line Package (PDIP) (600mil)
Mold Compound Name/Manufacturer:	Sumitomo EME-6300H(r)
Die to Package Edge Clearance	191 mils per side
Lead Frame Material:	Copper
Lead Finish, Composition / Thickness:	Sn (85%), Pb (15%)
Die Attach Material:	Silver Epoxy
Die Attach Method:	Paste
Die Attach Area Plating:	Silver Spot
Die Attach Pad Dimension:	300mils x 300mils
Wire Bond Method:	Thermosonic
Wire Material/Size:	Gold 1.3 mil
Name/Location of Assembly (prime) facility:	Hyundai, Korea
Assembly Line ID and Process ID:	Korea-H/P326

PACKAGE INFORMATION USED IN THIS QUALIFICATION	
Package Designation:	W32
Package Outline, Type, or Name:	32-Pin Windowed Ceramic Dual In-Line Package (CDIP) (600mil)
Mold Compound Name/Manufacturer:	N/A
Die to Package Edge Clearance	178 mils per side
Lead Frame Material:	Alloy 42
Lead Finish, Composition / Thickness:	Solder Dipped, Sn (63%), Pb (37%)
Die Attach Material:	Silver Glass
Die Attach Method:	Paste
Die Attach Area Plating:	N/A
Die Attach Pad Dimension:	320mils x 330mils
Wire Bond Method:	Ultrasonic
Wire Material/Size:	Gold 1.25 mil
Name/Location of Assembly (prime) facility:	Bangkok, Thailand
Assembly Line ID and Process ID:	Alpha-X/W326

RELIABILITY TESTS PERFORMED PER SPECIFICATION REQUIREMENT

Stress/Test	Test Condition (Temp/Bias)	Result P/F
High Temperature Dynamic Operating Life (Early Failure Rate)	Dynamic Operating Condition, Vcc Max = 5.75V, 150°C	P
High Temperature Dynamic Operating Life (Latent Failure Rate)	Dynamic Operating Condition, Vcc Max = 5.75V, 150°C	P
High Temperature Steady State Life Test	Static Operating Condition, Vcc Max = 5.75V, 150°C	P
Military Test Group C	Group C, Sub group 1, Life Test = 5.75V, 150°C	P
High Accelerated Saturation Test (HAST)	140°C, 5.5V, 85%RH	P
Temperature Cycle	MIL-STD-883C, Method 1010, Condition C, -65°C to 150°C	P
Pressure Cooker	121°C, 100%RH	P
Electrostatic Discharge Human Body Model (ESD-HBM)	4,400V MIL-STD-883, Method 3015	P
Electrostatic Discharge Charge Device Model (ESD-CDM)	1,000V Cypress Spec. 25-00020	P
Data Retention	250°C, no bias	P
Data Retention	165°C, no bias	P
Current Density	Cypress Spec 22-00029	P
SEM X-Section	MIL-STD-883, Method 883-2018-2	P
Static Latch-up	125C, 8V, ± 200mA In accordance with JEDEC 17. Cypress Spec. 01-00081	P

RELIABILITY FAILURE RATE SUMMARY

Stress/Test	Device Tested/ Device Hours	# Fails	Activation Energy	Thermal AF⁴	Failure Rate
High Temperature Operating Life Early Failure Rate	1,002 Devices	0	N/A	N/A	0 PPM
High Temperature Operating Life ^{1,2} Long Term Failure Rate	174,000 DHRs	0	0.7	170	31 FITs

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 #: 95075

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (150C, 5.75V, Vcc Max)							
CY27H010-PC	2447661	349500299	KOREA-K	48	334	0	
CY27H010-WC	2437708	219414274	ALPHA-X	48	334	0	
CY27H010-WC	2437708	219414421	ALPHA-X	48	334	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE (150C, 5.75V, Vcc Max)							
CY27H010-PC	2447661	349500299	KOREA-K	80	116	0	
CY27H010-PC	2447661	349500299	KOREA-K	500	116	0	
CY27H010-WC	2437708	219414274	ALPHA-X	80	116	0	
CY27H010-WC	2437708	219414274	ALPHA-X	500	116	0	
CY27H010-WC	2437708	219414421	ALPHA-X	80	116	0	
CY27H010-WC	2437708	219414421	ALPHA-X	500	116	0	
STRESS: GROUP C, LIFE TEST (150C, 5.75V, Vcc Max)							
CY27H010-WMB	2447661	219502193	AKPHA-X	184	50	0	
STRESS: HIGH TEMP STEADY STATE LIFE TEST (150C, 5.75V, Vcc Max)							
CY27H010-PC	2447661	349500299	KOREA-K	80	76	0	
CY27H010-PC	2447661	349500299	KOREA-K	168	76	0	
CY27H010-WC	2437708	219414274	ALPHA-X	80	76	0	
CY27H010-WC	2437708	219414274	ALPHA-X	168	76	0	
CY27H010-WC	2437708	219414421	ALPHA-X	80	76	0	
CY27H010-WC	2437708	219414421	ALPHA-X	168	76	0	
STRESS: HIGH TEMP STEADY STATE LIFE TEST (125C, 5.75V, Vcc Max)							
CY7C342B-JC	2436622	ALTERA		168	77	0	
CY7C342B-JC	2436622	ALTERA		500	77	0	
CY7C342B-JC	2436646	ALTERA		168	77	0	
CY7C342B-JC	2436646	ALTERA		500	77	0	
STRESS: HI-ACCEL SATURATION TEST (140C, 85%RH, 5.5V)							
CY27H010-PC	2447661	349500299	KOREA-K	128	45	0	

Reliability Test Data

QTP #: 95075

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: ESD-CHARGE DEVICE MODEL (1,000V)							
CY27H010-PC				COMP	3	0	
ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015 (4,400V)							
CY27H010-PC				COMP	3	0	
STRESS: STATIC LATCH-UP TESTING (125C, 8V, +/-200mA)							
CY27H010				COMP	3	0	
STRESS: DATA RETENTION, 250C, no bias							
CY27H010-WC	2437708	219414274	ALPHA-X	168	76	0	
CY27H010-WC	2437708	219414421	ALPHA-X	96	76	0	
CY27H010-WC	2437708	219414421	ALPHA-X	168	76	0	
STRESS: DATA RETENTION, 165C, no bias							
CY27H010-PC	2447661	349500299	KOREA-K	168	76	0	
CY27H010-PC	2447661	349500299	KOREA-K	552	76	0	
CY7C342B-JC	2436622	ALTERA		168	77	0	
CY7C342B-JC	2436622	ALTERA		500	77	0	
CY7C342B-JC	2436646	ALTERA		168	77	0	
CY7C342B-JC	2436646	ALTERA		500	77	0	
CY7C342B-JC	2436646	ALTERA		232	132	0	
STRESS: TC COND. C -65C TO 150C							
CY27H010-PC	2447661	349500299	KOREA-K	300	45	0	
CY27H010-WC	2437708	219414274	ALPHA-X	100	45	0	
CY27H010-WC	2437708	219414274	ALPHA-X	1000	45	0	
CY27H010-WC	2437708	219414421	ALPHA-X	100	45	0	
CY27H010-WC	2437708	219414421	ALPHA-X	1000	45	0	
CY7C342B-JC	2436622	ALTERA		300	47	0	
CY7C342B-JC	2436622	ALTERA		300	77	0	
CY7C342B-JC	2436622	ALTERA		500	77	0	
CY7C342B-JC	2436622	ALTERA		300	77	0	
CY7C342B-JC	2436622	ALTERA		500	77	0	

Reliability Test Data

QTP #: 95075

<i>Device</i>	<i>Fab Lot #</i>	<i>Assy Lot #</i>	<i>Assy Loc</i>	<i>Duration</i>	<i>Samp</i>	<i>Rej</i>	<i>Failure Mechanism</i>
STRESS: PRESSURE COOKER TEST, (121C and 100%RH)							
CY27H010-PC	2447661	349500299	KOREA-K	168	45	0	
CY7C342B-JC	2436622	ALTERA		96	77	0	
CY7C342B-JC	2436622	ALTERA		168	77	0	
CY7C342B-JC	2436646	ALTERA		96	77	0	
CY7C342B-JC	2436646	ALTERA		168	77	0	