Cypress Semiconductor
Technology Qualification Report

QTP# 032301 VERSION 1.0
May 2004

16 MEG A/D MUS SRAM S17 Technology, Promos Fab in Taiwan	
CYU001M16TFFA MoBL3™	16 Mb (1Mb x 16) Pseudo Static RAM Die
CYU001M16TFF1A MoBL3®	16 Mb (1M x 16) A/D MUX Pseudo Static RAM Die
CYU001M16TFF3A MoBL3®	16 Mb (1M x 16) A/D MUX Pseudo Static RAM Die

CYPRESS TECHNICAL CONTACT FOR QUALIFICATION DATA:

Rene Rodgers
Principal Reliability Engineer
(408 943-2732

TECHNOLOGY QUALIFICATION HISTORY

Qual Report	Description of Qualification Purpose	Date Comp
020606	New Technology S17 / New Device, 32Meg, MoBL3 SRAM CYU0326A5/7/9AZ and family	Feb 03
031605	Fast Process Change for S17 Promos for 16Meg and 32Meg IT SRAM	May 03
032301	Qualify 16 Meg A/D MUX product U0166TFF0/1/3AZ fabricated at Promos Fab using the S17 Technology	Apr 04

PRODUCT DESCRIPTION (for qualification)		
Qualification Purpose: Qualify 16M A/D MUX SRAM/MoBL3 device.		
Marketing Part #:	CY001M16TFFA/1A/3A	
Device Description:	1.7V – 1.9V, Industrial (Wafer Sales Only)	
Cypress Division:	Cypress Semiconductor Corporation –Memory Product Division (MPD)	
Overall Die (or Mask) REV Level (pre-requisite for qualification):		Rev. A
What ID markings on Die:	U0166TFF1A	

TECHNOLOGY/FAB PROCESS DESCRIPTION			
Number of Metal Layers:	2	Metal Composition:	Metal 1: Al Cu (WL) Metal 2: Al Cu
Passivation Type and Materials:	1650Å TEOS / 4500Å Nitride		
Free Phosphorus contents in top glass layer(%):	0%		
Number of Transistors in Device	35 million		
Number of Gates in Device	1.75 million		
Generic Process Technology/Design Rule (µ-drawn):	Promos S17/0.17 µm		
Gate Oxide Material/Thickness (MOS):	SiO_2, 62Å		
Name/Location of Die Fab (prime) Facility:	Promos (Taiwan)		
Die Fab Line ID/Wafer Process ID:	U016TFF		

RELIABILITY TESTS PERFORMED PER SPECIFICATION REQUIREMENT

Stress/Test	Test Condition (Temp/Bias)	Result P/F
High Temperature Operating Life Early Failure Rate	Dynamic Operating Condition, Vcc Max = 2.36V, 125°C Dynamic Operating Condition, Vcc Max = 2.9V, 125°C Dynamic Operating Condition, Vcc Max = 2.36V, 150°C Dynamic Operating Condition, Vcc Max = 2.1V, 125°C	P
High Temperature Operating Life Latent Failure Rate	Dynamic Operating Condition, Vcc Max = 2.36V, 150°C	P
High Accelerated Saturation Test (HAST)	130°C, 2.2V,85%RH Precondition: JESD22 Moisture Sensitivity MSL 3 192 Hrs, 30C/60%RH+3IR-Reflow, 235°C+5, 0°C	P
Temperature Cycle	MIL-STD-883C, Method 1010, Condition C, -65°C to 150°C Precondition: JESD22 Moisture Sensitivity MSL3 192 Hrs, 30C/60%RH+3IR-Reflow, 235°C+5, 0°C	P
Pressure Cooker	121°C, 100%RH Precondition: JESD22 Moisture Sensitivity MSL 3 192 Hrs, 30C/60%RH+3IR-Reflow, 235°C+5, 0°C	P
Electrostatic Discharge Human Body Model (ESD-HBM)	2,200V MIL-STD-883, Method 3015.7	P
Electrostatic Discharge Charge Device Model (ESD-CDM)	500V Cypress Spec. 25-00020	P
Acoustic Microscopy, MSL 3	Cypress Spec. 25-00104	P
Static Latch-up	125C, 6.5V, ± 300mA In accordance with JEDEC 17. Cypress Spec. 01-00081	P

RELIABILITY FAILURE RATE SUMMARY

Stress/Test	Device Tested/ Device Hours	# Fails	Activation Energy	Thermal AF[4]	Failure Rate
High Temperature Operating Life Early Failure Rate @125ºC	3760	0	N/A	N/A	0 PPM

[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 #: 020606

Device	Fab Lot #	Assy Lot #	Ass Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: ACOUSTIC-MSL3							
U0326A9AZ	9239738	P5U00001.3	TAIWN-G	COMP	15	0	
U0326A9AZ	9239738	610245963	TAIWN-G	COMP	15	0	
7C62167	P5Q00004	P5Q00004.3D	TAIWN-G	COMP	15	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 125C, 2.9V, Vcc Max							
U0326A9AZ	9239738	610247536	TAIWN-G	96	500	0	
U0326A9AZ	9239738	610245963	TAIWN-G	96	2495	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 150C, 2.36V, Vcc Max							
7C62167	P5Q00004	P5Q00004.3D	TAIWN-G	48	999	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, 150C, 2.36V, Vcc Max							
7C62167	P5Q00004	P5Q00004.3D	TAIWN-G	80	390	0	
7C62167	P5Q00004	P5Q00004.3D	TAIWN-G	500	390	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015, 2,200V							
U0326A9AZ	9239738	P5U00001.3	TAIWN-G	COMP	9	0	
U0326A9AZ	9239738	610247536	TAIWN-G	COMP	9	0	
STRESS: ESD-CHARGE DEVICE MODEL, 500V							
U0326A9AZ	9239738	P5U00001.3	TAIWN-G	COMP	9	0	
U0326A9AZ	9239738	610247536	TAIWN-G	COMP	9	0	
STRESS: STATIC LATCH-UP TESTING, 125C, 6.5V, ±300Ma							
U0326A9AZ	9239738	P5U00001.3	TAIWN-G	COMP	3	0	
U0326A9AZ	9239738	610247536	TAIWN-G	COMP	3	0	
STRESS: PRESSURE COOKER TEST, 121C, 100%RH, PRE COND 192 HR 30C/60%RH, MSL3							
U0326A9AZ	9239738	610245963	TAIWN-G	168	46	0	
7C62167	P5Q00004	P5Q00004.3D	TAIWN-G	168	47	0	
7C62167	P5Q00006	P5Q00006.4C	TAIWN-G	168	45	0	
STRESS: HI-ACCEL SATURATION TEST, 130C, 85%RH, 3.41V, PRE COND 192 HR 30C/60%RH, MSL3							
U0326A9AZ	9239738	610245963	TAIWN-G	128	42	0	

Reliability Test Data

QTP #: 020606

STRESS: TC COND. C -65C TO 150C, PRECONDITION 192 HRS 30C/60%RH, MSL3

Device	Fab Lot #	Assy Lot #	Ass Loc	Duration	Samp	Rej	Failure Mechanism
U0326A9AZ	9239738	*610245963*	*TAIWN-G*	300	47	0	
7C62167	P5Q00004	P5Q00004.3D	TAIWN-G	300	48	0	
7C62167	P5Q00004	P5Q00004.3D	TAIWN-G	500	47	0	
7C62167	P5Q00006	P5Q00006.4C	TAIWN-G	300	46	0	
7C62167	P5Q00006	P5Q00006.4C	TAIWN-G	500	46	0	
7C62167	P5Q00006	P5Q00006.4C	TAIWN-G	1000	46	0	

Reliability Test Data

QTP #: 031605

Device	Fab Lot #	Assy Lot #	Ass Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 125C, 2.36V, Vcc Max							
U0166B9A	P5Q00014	P5Q00014	TAIWN-G	96	1217	0	
U0166B9A	9313753	610313329	TAIWN-G	96	1009	0	
U0166B9A	9313753	610314482	TAIWN-G	96	8520		
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, 150C, 2.36V, Vcc Max							
U0166B9A	P5Q00014	P5Q00014	TAIWN-G	128	390	0	
U0166B9A	P5Q00014	P5Q00014	TAIWN-G	548	390	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015, 2,200V							
7C62167	P5Q00022	P5Q00022	TAIWN-G	COMP	9	0	
STRESS: ESD-CHARGE DEVICE MODEL, 500V							
7C62167	P5Q00022	P5Q00022	TAIWN-G	COMP	9	0	

Reliability Test Data

QTP #: 032301

Device	Fab Lot #	Assy Lot #	Ass Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: ESD-CHARGE DEVICE MODEL, 500V							
CYU001M16TFF7AU (U0166TFF7AZ)	9351091	*610400006*	TAIWAN-G	COMP	9	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER JESD22, METHOD A114-B, 2,200V							
CYU001M16TFF7AU (U0166TFF7AZ)	9351091	*610400006*	TAIWAN-G	COMP	9	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015, 2,200V							
CYU001M16TFF7AU (U0166TFF7AZ)	9351091	*610400006*	TAIWAN-G	COMP	3	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 125C, 2.1V, Vcc Max							
CYU001M16TFF7AU (U0166TFF7AZ)	9351091	*610400006*	TAIWAN-G	96	3760	0	
STRESS: STATIC LATCH-UP TESTING, 125C, 5V, +/-300mA							
CYU001M16TFF7AU (U0166TFF7AZ)	9351091	*610400006*	TAIWAN-G	COMP	3	0	