

Cypress Semiconductor Qualification Report

QTP# 97506, VERSION 1.0
May, 1998

1 Meg SRAM, R42 Technology, Fab 4 Qualification
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CY62126/7V

64K x 16 Static RAM, 2.7V - 3.6V Operation
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CYPRESS TECHNICAL CONTACT FOR QUALIFICATION DATA:

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PRODUCT/TECHNOLOGY/FAB DESCRIPTION

PRODUCT DESCRIPTION (for qualification)	
Qualification Purpose:	Qualify 1 Meg SRAM, CY62126/7V (Rev. A) in Fab 4 with R42 technology
Marketing Part #:	CY62126/7V
Package:	44-pin TSOP Type II
Device Description:	1 Meg SRAM, R42 Technology
Cypress Division:	Cypress Semiconductor Corporation - MPD Division
Overall Die (or Mask) REV Level (pre-requisite for qualification):	Rev. A
What ID markings on Die:	7C62126/7V

TECHNOLOGY/FAB PROCESS DESCRIPTION - R42			
Number of Metal Layers:	2	Metal Composition:	Metal 1: TiW, AlCu, TiW/500Å, 6000Å, 300Å
Passivation Type and Materials:	3K Å Oxide + 6,000 Å Nitride (both with PECVD)		
Free Phosphorus contents in top glass layer(%):	N/A		
Die Coating(s), if used:	n/a		
Generic Process Technology/Design Rule (μ-drawn):	CMOS , 0.35μm		
Gate Oxide Material/Thickness (MOS):	SiO ₂ / 70 Å		
Name/Location of Die Fab (prime) Facility:	Cypress Semiconductor - Bloomington, MN		
Die Fab Line ID/Wafer Process ID:	Fab4/R42		

PLASTIC PACKAGE/ASSEMBLY DESCRIPTION

Package Outline, Type, or Name:	44-pin, TSOP Type II		
Mold Compound Name/Manufacturer:	Sumitomo 7320CR		
Lead Frame material:	Copper		
Lead Finish, composition:	Solder Plated, 90%Sn, 10%Pb		
Die Attach Area Plating:	Ring Plating		
Die Attach Method:	Epoxy	Die Attach Material:	Ablebond 84-1LMI
Wire Bond Method:	Thermosonic	Wire Material/Size:	Gold / 1.0 mil
JESD22-A112 Moisture Sensitivity Level	Level 3		
Assembly Line ID and Process ID:	Hyundai, Korea		

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 Latent Failure Rate	Dynamic Operating Condition, Vcc = 3.8V, 150°C	P
Read and Record Life Test	Dynamic Operating Condition, Vcc = 3.8V, 150°C	P
High Accelerated Saturation Test (HAST)	140°C, 85%RH, 3.63V Precondition: JESD22 Moisture Sensitivity Level 3 192 Hrs. 30°C/60%RH	P
Temperature Cycle	MIL-STD-883C, Method 1010, Condition C, -65°C to 150°C Precondition: JESD22 Moisture Sensitivity Level 3 192 Hrs. 30°C/60%RH	P
Age Bond Pull	MIL-STD-883, Method 2011	P
Electrostatic Discharge Human Body Model (ESD-HBM)	MIL-STD-883, Method 3015.7	3,000V
Electrostatic Discharge Charge Device Model (ESD-CDM)	Cypress Spec. 25-00020	750V
Latchup Sensitivity - Static	In accordance with JEDEC 17. Cypress Spec. 01-00081	10V
Latchup Sensitivity - Dynamic		9.5V
Cold Life Test ^{Note B}	-30C, 4.3V	P

Note B 256K SRAM, R42 technology, QTP 97496

RELIABILITY FAILURE RATE SUMMARY

Stress/Test	Device Tested/ Devive Hours	# Fails	Activation Energy	Thermal AF	Failure Rate
High Temperature Operating Life ¹ Early Failure Rate	N/A	N/A	N/A	N/A	N/A
High Temperature Operating Life ^{2,3} Long Term Failure Rate	60,000 DHRs (1 Meg SRAM, R42 Process, QTP 97506)	0	0.7	170	90FIT
	1,059,000DHRs(1Meg SRAM, R42D Process, QTP 97211)	2	0.7	170	17 FIT

¹ Early Failure Rate was not performed. Production burn-in at 48 Hrs/4.3V/150°C is performed for the product.

² Assuming an ambient temperature of 55°C and a junction temperature rise of 15°C.

³ Chi-squared 60% estimations used to calculate the failure rate.

$$AF = \exp \left[\frac{E_A}{k} \left[\frac{1}{T_2} - \frac{1}{T_1} \right] \right]$$

where:

E_A = The Activation Energy of the defect mechanism.

k = Boltzmann's constant = 8.62x10⁻⁵ eV/Kelvin.

T₁ is the junction temperature of the device under stress and T₂ is the junction temperature of the device at use conditions.

RELIABILITY TEST DATA

QTP #: 97506

DEVICE	ASSY-LOC	FABLOT#	ASSYLOT#	DURATION	S/S	REJ	FAIL MODE
STRESS: ESD-CHARGE DEVICE MODEL, 750V							
CY62127V-ZSI	KOREA-H	4801567	619802140L1	COMP	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015, 3000V							
CY62127V-ZSI	KOREA-H	4801567	619802140L1	COMP	3	0	
STRESS: HI-ACCEL SATURATION TEST (140C, 85%RH, 3.63V), PRECOND. 192 HRS 30C/60%RH							
CY62127V-ZSI	KOREA-H	4801567	619802140L1	128	45	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE (150C, 3.8V)							
CY62127V-ZSI	KOREA-H	4801567	619802140L1	80	120	0	
CY62127V-ZSI	KOREA-H	4801567	619802140L1	500	120	0	
STRESS: TC COND. C, -65 TO 150C, PRECOND. 192 HRS 30C/60%RH							
CY62127V-ZSI	KOREA-H	4801567	619802140L1	300	48	0	
CY62127V-ZSI	KOREA-H	4801567	619802140L1	1000	38	0	
CY62127V-ZSIB	KOREA-H	4801567	619802141	300	48	0	
CY62127V-ZSIB	KOREA-H	4801567	619802141	1000	48	0	
STRESS: READ & RECORD LIFE TEST (150C, 3.8V)							
CY62127V-ZSI	KOREA-H	4801567	619802140L1	48	12	0	
CY62127V-ZSI	KOREA-H	4801567	619802140L1	80	12	0	
CY62127V-ZSI	KOREA-H	4801567	619802140L1	500	12	0	

DEVICE RELATED RELIABILITY TEST DATA

QTP #: 97211¹

DEVICE	ASSY-LOC	FABLOT#	ASSYLOT#	DURATION	S/S	REJ	FAIL MODE
STRESS: ESD-CHARGE DEVICE MODEL, 1000V							
CY7C1021V33-VC	TAIWN-G	4719474	619704310	COMP	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015, 2200V							
CY7C1021V33-VC	TAIWN-G	4719474	619704310	COMP	3	0	
STRESS: HI-ACCEL SATURATION TEST (140C, 85%RH, 3.63V), PRECOND. 192 HRS 30C/60%RH							
CY7C1021V33-VC	TAIWN-G	4719474	619704310	128	64	0	
CY7C1021V33-VC	TAIWN-G	4719474	619704310	256	64	0	
CY7C1021V33-VC	TAIWN-G	4721588	619705012	128	96	0	
STRESS: HIGH TEMPERATURE STORAGE (165C, NO BIAS)							
CY7C1021V33-VC	TAIWN-G	4719474	619704310	336	48	0	
CY7C1021V33-VC	TAIWN-G	4719474	619704310	1000	48	0	
STRESS: HIGH TEMP STEADY STATE LIFE TEST (150C, 3.63V)							
CY7C1021V33-VC	TAIWN-G	4719474	619704310	80	160	0	
CY7C1021V33-VC	TAIWN-G	4719474	619704310	168	160	0	
CY7C1021V33-VC	TAIWN-G	4721588	619705012	80	160	0	
CY7C1021V33-VC	TAIWN-G	4721588	619705012	168	160	0	
CY7C1021V33-VC	TAIWN-G	4722642	619705819	80	156	0	
CY7C1021V33-VC	TAIWN-G	4722642	619705819	168	156	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE (150C, 3.80V)							
CY7C1021V33-VC	TAIWN-G	4719474	619704310	80	538	0	
CY7C1021V33-VC	TAIWN-G	4719474	619704310	500	538	1	1 SINGLE BIT
CY7C1021V33-VC	TAIWN-G	4721588	619705012	80	528	0	
CY7C1021V33-VC	TAIWN-G	4721588	619705012	500	528	1	1 SINGLE BIT
CY7C1021V33-VC	TAIWN-G	4722642	619705819	80	525	0	
CY7C1021V33-VC	TAIWN-G	4722642	619705819	500	525	0	
STRESS: LONG LIFE VERIFICATION (150C, 3.80V)							
CY7C1021V33-VC	TAIWN-G	4719474	619704310	1000	527	0	
STRESS: READ & RECORD LIFE TEST (150C, 3.80)							
CY7C1021V33-VC	TAIWN-G	4719474	619704310	80	10	0	
CY7C1021V33-VC	TAIWN-G	4719474	619704310	500	10	0	
STRESS: TC COND. C, -65 TO 150C, PRECOND. 192 HRS 30C/60%RH							
CY7C1021V33-VC	TAIWN-G	4719474	619704310	300	90	0	
CY7C1021V33-VC	TAIWN-G	4719474	619704310	1000	90	0	
CY7C1021V33-VC	TAIWN-G	4721588	619705012	300	96	0	
CY7C1021V33-VC	TAIWN-G	4721588	619705012	1000	96	0	
CY7C1021V33-VC	TAIWN-G	4722642	619705819	300	90	0	

¹ QTP 97211, 1 Meg SRAM, R42D technology, F4 qualification