Cypress Semiconductor
Product Qualification Report

QTP# 091302 VERSION*D
February 2025

MoBL Asynchronous SRAM Product Family RAM42HNHA Technology, Fab5 GSMC	
CY62256*	**256K (32K x 8) Static RAM**

FOR ANY QUESTIONS ON THIS REPORT, PLEASE CONTACT
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PRODUCT QUALIFICATION HISTORY

QTP Number	Description of Qualification Purpose	Date
091302	RAM42 Technology and 7C62256 256K Micro Power Asynchronous SRAM Product Transfer from CMI to GSMC Qualification	Oct 09

QUALIFICATION DESCRIPTION	
Qualification Purpose: Qualification of GSMC R42 technology and CY62256* 256K Micro Power Asynchronous SRAM product family.	
Marketing Part #:	CY622565LL-55SNXI, CY622565LL-55ZXI, CY622565LL-55SNXIT, CY622565LL-55ZXIT, CY622565LL-70PXC, CY622565LL-70SNXC, CY622565LL-70SNXCT, CY622565LL-ZRXIT
Device Description:	4.5V-5.5V, Industrial /Commercial available in Narrow Plastic Small Outline IC package.
Cypress Division:	Cypress Semiconductor Corporation – Memory Product Division

TECHNOLOGY/FAB PROCESS DESCRIPTION – RAM42			
Number of Metal Layers:	1	Metal Composition:	Metal 1: 500TiN/8000Al/250TiN
Passivation Type and Materials:		7000 TEOS + 6000Si3N4	
Free Phosphorus contents in top glass layer(%):		0%	
Number of Transistors in Device		1.72 million	
Number of Gates in Device		1.72 million	
Generic Process Technology/Design Rule (µ-drawn):		CMOS, Single Metal / 0.42µM	
Gate Oxide Material/Thickness (MOS):		SiO2 /110A	
Name/Location of Die Fab (prime) Facility:		Grace Semiconductor, Shanghai, China	
Die Fab Line ID/Wafer Process ID:		Fab4/RAM42	

PACKAGE AVAILABILITY

PACKAGE	ASSEMBLY SITE FACILITY
28-lead SY, ZT, ZY, PZ	**JT-China (SY, ZT, ZY) and MMT-X (PZ)**

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

MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION	
Package Designation:	SY283 / ZT28R / PZ286 / ZY28R
Package Outline, Type, or Name:	28-lead, JT-China (SYI, ZTI, ZYI), MMT-X(PZI)
Body Dimensions:	8x13.4 mm (ZYI & ZTI), SYI-300mils, PZI-600mils
Mold Compound Name/Manufacturer:	SYI-KEG600DA, ZTI-CEL9200HFU, ZYI-CEL9200HFU,PZI-G600V
Die Attach Material:	SYI-QMI509, ZTI-4900G, ZYI-4900G, PZI-84-1LMSIR4
Wire (Al/Au) Diam:	1.0 Au (PZI), 0.9 Au (SYI, ZTI, ZYI)
Lead Frame Plating:	NiPdAu
Die Backside Preparation Method/Metallization:	Back grind
Die Separation Method:	100% Saw Through
Die Attach Supplier:	Dexter (SY,ZT), Ablebond (PZ)
Die Attach Material:	QMI509
Die Attach Method:	Silver Epoxy
Wire Bond Method:	Thermosonic
Wire Material/Size:	1.0 Au (PZI), 0.9 Au (SYI, ZTI, ZYI)
Thermal Resistance Theta JA °C/W:	76.56C/W
Name/Location of Assembly (prime) facility:	JT-China (SY, ZT, ZY), MMT-X (PZ)

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

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 = 5.75V, 125°C JESD22-A108	P
High Temperature Operating Life Latent Failure Rate	Dynamic Operating Condition, Vcc Max = 5.75V, 150°C JESD22-A108	P
High Accelerated Saturation Test (HAST)	JESD22-A110:130°C, 85%RH, 5.75V Precondition: JESD22 Moisture Sensitivity Level (192 Hrs., 30 °C, 60% RH, 260°C Reflow)	P
Temperature Cycle	MIL-STD-883, Method 1010, Condition C, -65 °C to 150 °C Precondition: JESD22 Moisture Sensitivity Level (192 Hrs., 30 °C, 60% RH, 260°C Reflow)	P
Pressure Cooker	JESD22-A102: 121°C, 100%RH, 15 PSIG Precondition: JESD22 Moisture Sensitivity Level (192 Hrs., 30 °C, 60% RH, 260°C Reflow)	P
High Temperature Storage	JESD22-A103: 150 C, no bias	P
Electrostatic Discharge Human Body Model (ESD-HBM)	2,200V/3,300V JEDEC EIA/JESD22-A114	P
Electrostatic Discharge Charge Device Model (ESD-CDM)	500V/1,000V/1,250V JESD22-A101	P
Static Latch-up	125C, 8.25V ± 200mA/9.1V ± 240mA JESD78	P
Age Bond Strength	Mil-Std-883, Method 2011	P
Acoustic Microscopy	J-STD-020 Precondition: JESD22 Moisture Sensitivity Level (192 Hrs., 30 °C, 60% RH, 260°C Reflow)	P
Soft Error (Alpha Particle)	JESD89	P
Low Temperature Operating Life	Dynamic Operating Condition, Vcc Max= -30°C, 5.75V JESD22-A108	P
Long Life Verification	Dynamic Operating Condition, Vcc Max= 5.75V, 150°C JESD22-A108	P
High Temp Steady State Life Test	Static Operating Condition, Vcc max = 5.5V, 150°C JESD22-A108	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	3,020	0	N/A	N/A	0 PPM
High Temperature Operating Life[1,2,] Long Term Failure Rate	118,000 DHRs	0	0.7	170	** 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.

** Sample size insufficient for accurate FIT Rate calculation.

Reliability Test Data

QTP #: 091302

Device	Fab Lot #	Assy Lot #	Ass Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 125ºC, 5.75V, Vcc Max							
CY62256 (7C12565EK)	4924213	610925073	CML-R	96	3020	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, 150ºC, 5.75V, Vcc Max							
CY62256 (7C12565EK)	4924213	610925073	CML-R	500	118	0	
STRESS: Pre-/ Post HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE CHAR							
CY62256 (7C12565EK)	4924213	610925073	CML-R	COMP	10	0	
STRESS: ESD-HUMAN BODY MODEL, 2,200V							
CY62256 (7C12565EK)	4924213	610925073	CML-R	COMP	8	0	
STRESS: ESD-HUMAN BODY MODEL, 3,300V							
CY62256 (7C12565EK)	4924213	610925073	CML-R	COMP	3	0	
STRESS: ESD-CHARGE DEVICE MODEL, 500V, ST283 Package							
CY62256 (7C12565EK)	4924213	610925073	CML-R	COMP	9	0	
STRESS: ESD-CHARGE DEVICE MODEL, 1,000V, ST283 Package							
CY62256 (7C12565EK)	4924213	610925073	CML-R	COMP	3	0	
STRESS: ESD-CHARGE DEVICE MODEL, 1,250V, ST283 Package							
CY62256 (7C12565EK)	4924213	610925073	CML-R	COMP	3	0	
STRESS: ESD-CHARGE DEVICE MODEL, 500V, ZT28 Package							
CY62256 (7C12565EK)	4924213	610925953	CML-R	COMP	9	0	
STRESS: ESD-CHARGE DEVICE MODEL, 1,000V, ZT28 Package							
CY62256 (7C12565EK)	4924213	610925953	CML-R	COMP	3	0	
STRESS: ESD-CHARGE DEVICE MODEL, 1,250V, ZT28 Package							
CY62256 (7C12565EK)	4924213	610925953	CML-R	COMP	3	0	
STRESS: ESD-CHARGE DEVICE MODEL, 500V, PZ286 Package							
CY62256 (7C12565EK)	4924213	610929158	MMT-X	COMP	9	0	
STRESS: ESD-CHARGE DEVICE MODEL, 1,000V, PZ286 Package							
CY62256 (7C12565EK)	4924213	610929158	MMT-X	COMP	3	0	
STRESS: ESD-CHARGE DEVICE MODEL, 1,250V, PZ286 Package							
CY62256 (7C12565EK)	4924213	610929158	MMT-X	COMP	3	0	

Reliability Test Data

QTP #: 091302

Device	Fab Lot #	Assy Lot #	Ass Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: STATIC LATCH-UP, +/-200mA, 8.25V							
CY62256 (7C12565EK)	4924213	610925073	CML-R	COMP	6	0	
STRESS: STATIC LATCH-UP, +/-240mA, 9.10V							
CY62256 (7C12565EK)	4924213	610925073	CML-R	COMP	3	0	
STRESS : SER – ALPHA PARTICLE, Vcc Nom							
CY62256 (7C12565EK)	4924213	610925073	CML-R	COMP	3	0	
STRESS: AGE BOND STRENGTH							
CY62256 (7C12565EK)	4924213	610925073	CML-R	COMP	5	0	
STRESS: HIGH TEMPERATURE STORAGE, 150ºC							
CY62256 (7C12565EK)	4924213	610925073	CML-R	1000	77	0	
STRESS: HIGH TEMP STEADY STATE LIFE TEST, 150ºC, 5.75V, Vcc Max							
CY62256 (7C12565EK)	4924213	610925073	CML-R	168	76	0	
STRESS: LOW TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, -30C, 5.75V Vcc Max							
CY62256 (7C12565EK)	4924213	610925073	CML-R	500	77	0	
STRESS: LONG LIFE VERIFICATION, 150C, 5.75V Vcc Max							
CY62256 (7C12565EK)	4924213	610925073	CML-R	1000	118	0	
STRESS: HI-ACCEL SATURATION TEST, 130ºC, 85%RH, 3.63V, PRE COND 192 HR 30C/60%RH, MSL3							
CY62256 (7C12565EK)	4924213	610925073	CML-R	128	77	0	
STRESS: PRESSURE COOKER TEST, 121ºC, 100%RH, PRE COND 192 HR 30C/60%RH, MSL3							
CY62256 (7C12565EK)	4924213	610925073	CML-R	96	77	0	
STRESS: TC COND. C -65C TO 150ºC, PRECONDITION 192 HRS 30C/60%RH, MSL3							
CY62256 (7C12565EK)	4924213	610925073	CML-R	500	77	0	

Document History Page

Document Title: 091302: MOBL ASYNCHRONOUS SRAM PRODUCT FAMILY (CY62256) RAM42HNHA TECHNOLOGY, FAB5 GSMC
Document Number: 001-60308

Rev.	ECN No.	Orig. of Change	Description of Change
**	2895897	HGA	Initial Spec Release, ref. HGA memo# 972 –QTP report Added LLV data, ref. TUZ memo#219
*A	3962437	JYF	Removed Version 1.1 in QTP#091302 title page; Updated division of device from MID to Memory Product Division in Product Description Table; Replaced CML-R with JT-China in Assembly Facility Site and Major Package Information Table; Deleted obsolete referenced spec 11-20052 im Major Package Information Table and replaced with 001-64160 and 001−04160; Updated Reliability Test Performed Table: -Deleted Pre/Post LFR AC/DC Char and SEM X-Section, internal requirement only; -Deleted “3IR” in reflow step of HAST, PCT and TCT -Deleted Cypress’ referenced specs 25-00020, 001-00081, 25-00104 & 001-47027 and retained/replaced with industry standards
*B	4344495	JYF	Sunset review: Updated QTP title page; Updated Reliability Tests Performed table for template alignment: -Deleted stress duration of EFR, LFR and HTSSL -Updated industry standard of EFR, TCT and HBM
*C	5239056	JYF MQJ	Sunset review: Updated Reliability reference in QTP title page; Deleted obsolete 001−04160. Removed Distribution: WEB and Posting: None in the document history page.
*D	8110124	JYF AVE	Sunset review: Removed obsolete spec 001-64160 Updated logo and removed distribution and posting information in the history page