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Cypress Semiconductor Automotive Product Qualification Report

QTP# 030204
June 2013

256K STATIC RAM AUTOMOTIVE DEVICES RAM42HA TECHNOLOGY, FAB 4	
CY62256V	**256K (32K x 8) Static RAM (3V)**

CYPRESS TECHNICAL CONTACT FOR QUALIFICATION DATA:

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PRODUCT QUALIFICATION HISTORY

Qual Report	Description of Qualification Purpose	Date Comp
030206	7C622574DC 256K, 3V Automotive Qualification	Jun 03

PRODUCT DESCRIPTION (for qualification)		
Qualification Purpose: Qualify CY62256V device on RAM42HA Technology		
Marketing Part #:	CY62256V	
Device Description:	2.7V-3.6V, Automotive Industrial /Commercial available in Narrow Plastic Small Outline Ics package.	
Cypress Division:	Cypress Semiconductor Corporation –Memory Product Division (MPD)	
Overall Die (or Mask) REV Level (pre-requisite for qualification):		Rev. D
What ID markings on Die:	62256V 7C1257A	

TECHNOLOGY/FAB PROCESS DESCRIPTION – RAM42HA			
Number of Metal Layers:	1	Metal Composition:	Metal 1: TiW, AlCu, TiW/500A , 6000A, 300A
Passivation Type and Materials:	3KA Oxide + 6000A Nitride (both with PECVD)		
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 (-	CMOS, Single Metal / 0.42um		
Gate Oxide Material/Thickness (MOS):	SiO2 /70A		
Name/Location of Die Fab (prime) Facility:	Cypress Semiconductor -- Bloomington, MN		
Die Fab Line ID/Wafer Process ID:	Fab4/RAM42HA		

PACKAGE AVAILABILITY

PACKAGE	ASSEMBLY SITE FACILITY
28-lead SN,Z,ZR	**CHINA-JT**

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

MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION	
Package Designation:	SN2831
Package Outline, Type, or Name:	28-lead Narrow Plastic Small Outline IC (SNC)
Mold Compound Name/Manufacturer:	EME 660HR/Sumitomo
Mold Compound Flammability Rating:	V-O per UL94
Oxygen Rating Index:	>28%
Substrate Material:	NA
Lead Finish, Composition / Thickness:	85%Sn, 15%Pb
Die Backside Preparation Method/Metallization:	Backgrind
Die Separation Method:	100%
Die Attach Supplier:	Dexter
Die Attach Material:	QMI 509
Die Attach Method:	Epoxy
Wire Bond Method:	Thermosonic
Wire Material/Size:	Au, 0.80 mil
Thermal Resistance Theta JA °C/W:	76 C/W
Package Cross Section Yes/No:	N/A
Name/Location of Assembly (prime) facility:	CML-R

ELECTRICAL TEST / FINISH DESCRIPTION	
Test Location:	KYEC, TAIWAN
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 = 3.8V, 150C	P
High Temperature Operating Life Latent Failure Rate	Dynamic Operating Condition, Vcc Max = 3.8V, 150C	P
High Accelerated Saturation Test (HAST)	130C, 3.63V,85%RH Precondition:JESD22 Moisture Sensitivity MSL 3 192 Hrs, 30C/60%RH+3IR-Reflow, 220□C+5, 0C	P
Temperature Cycle	MIL-STD-883C, Method 1010, Condition C, -65C to 150C Precondition: JESD22 Moisture Sensitivity MSL3 192 Hrs, 30C/60%RH+3IR-Reflow, 220C+5, 0C	P
Pressure Cooker	121C, 100%RH Precondition:JESD22 Moisture Sensitivity MSL 3 192 Hrs, 30C/60%RH+3IR-Reflow, 220C+5, 0C	P
High Temperature Storage	165C, 150 C, No bias	P
Electrostatic Discharge Human Body Model (ESD-HBM)	500V/1000V/1500V/2000V MIL-STD-883, Method 3015.7	P
Electrostatic Discharge Charge Device Model (ESD-CDM)	AEC-Q100-011	P
Internal Visual	JESD22-B100	P
Bond Pull	Mil-Std 883, Method 2011	P
External Visual	JESD22-B100	P
Ball Shear	AEC-Q100-010	P
Solderability	JESD22-B102	P
Electrical Distributions	AEC-Q100-009	P
Physical Dimensions	JESD22B100 AND B108	P
Static Latch-up	125C, 10V, 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	2400	0	N/A	N/A	0 PPM
High Temperature Operating Life[1,2,] Long Term Failure Rate	95,172DHRs	0	0.7	170	** FIT

*** Sample size insufficient for accurate FIT Rate calculation.*

1 Assuming an ambient temperature of 55C and a junction temperature rise of 15C.
[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 #: 030204

Device	Fab Lot #	Assy Lot #	Ass Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 150C, 5.75V, Vcc Max							
CY62256V (7C622574D)	4232519	610249248	CML-R	24	800	0	
CY62256V (7C622574D)	4232382	610249397	CML-R	24	800	0	
CY62256V (7C622574D)	4237818	610250674	CML-R	24	800	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, 150C, 5.75V, Vcc Max							
CY62256V (7C622574D)	4232519	610249248	CML-R	408	77	0	
CY62256V (7C622574D)	4232382	610249397	CML-R	408	77	0	
CY62256V (7C622574D)	4237818	610250674	CML-R	420	77	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015, 500V							
CY62256V (7C622574D)	4232519	610249248	CML-R	COMP	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015, 1,000V							
CY62256V (7C622574D)	4232519	610249248	CML-R	COMP	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015, 1,500V							
CY62256V (7C622574D)	4232519	610249248	CML-R	COMP	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015, 2,000V							
CY62256V (7C622574D)	4232519	610249248	CML-R	COMP	5	0	
STRESS: ESD-CHARGE DEVICE MODEL, 250V							
CY62256V (7C622574D)	4232519	610249248	CML-R	COMP	3	0	
STRESS: ESD-CHARGE DEVICE MODEL, 500V							
CY62256V (7C622574D)	4232519	610249248	CML-R	COMP	5	0	
STRESS: STATIC LATCH-UP TESTING, 125C, 10V, ±300mA							
CY62256V (7C622574D)	4232519	610249248	CML-R	COMP	3	0	
STRESS: PHYSICAL DIMENSIONS							
CY62256V (7C622574D)	4232519	610249248	CML-R	COMP	5	0	
STRESS: BOND PULL							
CY62256V (7C622574D)	4232519	610249248	CML-R	COMP	5	0	
STRESS: BALL SHEAR							
CY62256V (7C622574D)	4232519	610249248	CML-R	COMP	5	0	

Reliability Test Data

QTP #: 030204

Device	Fab Lot #	Assy Lot #	Ass Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: ELECTRICAL DISTRIBUTIONS							
CY62256V (7C622574D)	4232519	610249248	CML-R	COMP	30	0	
CY62256V (7C622574D)	4232382	610249397	CML-R	COMP	30	0	
CY62256V (7C622574D)	4237818	610250674	CML-R	COMP	30	0	
STRESS: HIGH TEMPERATURE STORAGE, 165ºC							
CY62256V (7C622574D)	4709955	619702695	CML-R	336	48	0	
CY62256V (7C622574D)	4709955	619702695	CML-R	1000	48	0	
STRESS: HIGH TEMPERATURE STORAGE, 150ºC							
CY62256L (7C62256E)	4232523	610249634	CML-R	500	50	0	
CY62256L (7C62256E)	4232523	610249634	CML-R	1000	49	0	
CY62256L (7C62256E)	4227422	610236988	CML-R	500	45	0	
CY62256L (7C62256E)	4227422	610236988	CML-R	1000	45	0	
STRESS: SOLDERABILITY							
CY62256V (7C622574D)	4232519	610249248	CML-R	COMP	15	0	
CY62256V (7C622574D)	4232382	610249397	CML-R	COMP	15	0	
CY62256V (7C622574D)	4237818	610250674	CML-R	COMP	15	0	
STRESS: EXTERNAL VISUAL							
CY62256V (7C622574D)	4232519	610249248	CML-R	COMP	15	0	
CY62256V (7C622574D)	4232382	610249397	CML-R	COMP	15	0	
CY62256V (7C622574D)	4237818	610250674	CML-R	COMP	15	0	
STRESS: PRESSURE COOKER TEST, 121C, 100%RH, PRE COND 192 HR 30C/60%RH, MSL3							
CY62256V (7C622574D)	4232519	610249248	CML-R	96	77	0	
CY62256V (7C622574D)	4232382	610249397	CML-R	96	77	0	
CY62256V (7C622574D)	4237818	610250674	CML-R	96	77	0	
STRESS: HI-ACCEL SATURATION TEST, 130C, 85%RH, 3.63V, PRE COND 192 HR 30C/60%RH, MSL3							
CY62256V (7C622574D)	4232519	610249248	CML-R	96	77	0	
STRESS: TC COND. C -65C TO 150C, PRECONDITION 192 HRS 30C/60%RH, MSL3							
CY62256V (7C622574D)	4232519	610249248	CML-R	500	77	0	
CY62256V (7C622574D)	4232382	610249397	CML-R	500	77	0	
CY62256V (7C622574D)	4237818	610250674	CML-R	500	77	0	

Document History Page

Document Title: QTP #030204: 256K (3V) STATIC RAM AUTOMOTIVE DEVICES (CY62256A) RAM42HHA TECHNOLOGY, FAB 4
Document Number: 001-88023

Rev.	ECN No.	Orig. of Change	Description of Change
**	4033729	ILZ	Initial Spec Release Qualification report published on Cypress.com is not in spec format. Initiated spec for QTP 030204 and removed all Cypress reference spec and replaced with Industry standard. Updated package availability based on current qualified assembly

Distribution: WEB

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