

Please note that Cypress is an Infineon Technologies Company.

The document following this cover page is marked as “Cypress” document as this is the company that originally developed the product. Please note that Infineon will continue to offer the product to new and existing customers as part of the Infineon product portfolio.

Continuity of document content

The fact that Infineon offers the following product as part of the Infineon product portfolio does not lead to any changes to this document. Future revisions will occur when appropriate, and any changes will be set out on the document history page.

Continuity of ordering part numbers

Infineon continues to support existing part numbers. Please continue to use the ordering part numbers listed in the datasheet for ordering.

Cypress Semiconductor Automotive Product Qualification Report

**QTP# 084601 VERSION *C
May 2015**

Automotive Fast Async Device	
R7FD-3R Technology, Fab 4	
CY7C1011CV33	2-Mbit (128K x 16) Static RAM

FOR ANY QUESTIONS ON THIS REPORT, PLEASE CONTACT
reliability@cypress.com or via a CYLINK CRM CASE

Prepared By:
Honesto Sintos
Reliability Engineer

Reviewed By:
Rene Rodgers
Reliability Manager

Approved By:
Don Darling
Reliability Director

PRODUCT QUALIFICATION HISTORY

QTP Number	Description of Qualification Purpose	Date
034402	CY7C1020CV33, 512Kb and family on R7FD-3R Technology from Fab4, AEC-Q100 Automotive Application	Jul 04
075101	Automotive Device Qualification for the 7A13412FC, 2Meg R7FD-3R Fast Async w/ NSM Fix	Jan 08
084601	Automotive Device Qualification for 7A13412FC, 2Meg R7FD-3R Fast Async for E-Grade	Feb 09

PRODUCT DESCRIPTION (for qualification)	
Qualification Purpose:	To qualify the 7A13412FC, 2Meg R7FD-3R Fast Asynch for E-grade
Marketing Part #:	CY7C1011CV33
Device Description:	3.3V, R7FD-3R, 128K X 16
Cypress Division:	Cypress Semiconductor Corporation – Memory Product Division (MPD)

TECHNOLOGY/FAB PROCESS DESCRIPTION			
Number of Metal Layers:	2	Metal Composition:	Metal 1: 150A TiW, 4200A Al /300A TiW Metal 2: 300A Ti, 8000A Al /300A TiW
Passivation Type and Materials:		1000A TEOS / 9,000A PECVD Nitrite	
Generic Process Technology/Design Rule (μ-drawn):		0.15μm	
Gate Oxide Material/Thickness (MOS):		SiO ₂ , 32A	
Name/Location of Die Fab (prime) Facility:		Cypress Semiconductor-Bloomington, MN	
Die Fab Line ID/Wafer Process ID:		Fab4, R7FD-3R	

PACKAGE AVAILABILITY

PACKAGE	ASSEMBLY FACILITY SITE
44-Lead TSOP II	JT-China

Note: Package Qualification details available upon request.

MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION	
Package Designation:	ZW44
Package Outline, Type, or Name:	44-Lead Thin Small Outline Package (TSOP II)
Mold Compound Name/Manufacturer:	Hitachi CEL9200CYR
Mold Compound Flammability Rating:	UL 94 V0
Mold Compound Alpha Emission Rate :	0.001counts/cm2-h Max
Oxygen Rating Index:	N/A
Lead Frame Material:	Copper
Lead Finish, Composition / Thickness:	NiPdAu
Die Backside Preparation Method/Metallization:	Backgrind
Die Separation Method:	Wafer Saw
Die Attach Supplier:	Dexter
Die Attach Material:	QMI509
Die Attach Method:	Epoxy Dispense
Bond Diagram Designation	001-23879
Wire Bond Method:	Thermosonic
Wire Material/Size:	Au. 1.0mil
Thermal Resistance Theta JA °C/W:	42.96
Package Cross Section Yes/No:	N/A
Assembly Process Flow:	001-64160
Name/Location of Assembly facility:	JT-China
MSL Level	3
Reflow Profile	260C

ELECTRICAL TEST / FINISH DESCRIPTION	
Test Location:	JT-China

Note: Please contact a Cypress Representative for other packages availability

RELIABILITY TESTS PERFORMED PER SPECIFICATION REQUIREMENTS

Stress/Test	Test Condition (Temp/Bias)	Result P/F
Wire Bond Shear	AEC-Q100-001	P
Wire Bond Pull	Mil-Std 883, Method 2011	P
External Visual	MIL-STD-883-2014	P
Electrostatic Discharge Charge Device Model (ESD-CDM)	250V/500V/750V (Corner Pins) AEC-Q100-011	P
Electrical Distributions	AEC-Q100-009	P
Electrostatic Discharge Human Body Model (ESD-HBM)	500V/1000V/1500V/2,000V AEC-Q100-002	P
High Accelerated Saturation Test (HAST)	JESD22-A110, 130°C, 3.65V, 85%RH Precondition: JESD22-A113 Moisture Sensitivity MSL 3 192 Hrs, 30°C/60%RH+3IR-Reflow, 235°C+0, -5°C	P
High Temperature Operating Life Early Failure Rate	AEC-Q100-008 and JESD22-A108, 150°C Dynamic Operating Condition, Vcc = 2.3V, 150°C	P
High Temperature Operating Life Latent Failure Rate	JESD22-A108, 150°C Dynamic Operating Condition, Vcc Max = 2.3V, 150°C	P
High Temperature Storage	JESD22-A103, 150°C	P
Static Latch-up	AEC-Q100-004, 125°C, 5.4V, ± 100mA JESD78B	P
Physical Dimensions	JESD22B100 and B108	P
Pressure Cooker	JESD22-A102, 121°C, 100%RH, 15PSIG Precondition: JESD22-A113 Moisture Sensitivity MSL 3 192 Hrs, 30°C/60%RH+3IR-Reflow, 235°C+0, -5°C	P
Accelerated Soft Error Test	JESD89 -1, JESD89-3	P
Solderability	JESD22-B102	P
Temperature Cycle	JESD22-A104, -65°C to 150°C Precondition: JESD22-A113 Moisture Sensitivity MSL 3 192 Hrs, 30°C/60%RH+3IR-Reflow, 235°C+0, -5°C	P

RELIABILITY FAILURE RATE SUMMARY

Stress/Test	Device Tested/ Device Hours	# Fail	Activation n	Thermal	Failure Rate
High Temperature Operating Life Early Failure Rate	10,494 Devices	0	N/A	N/A	0 PPM
High Temperature Operating Life ^{1,2} Long Term Failure Rate	97,920 DHRs	0	0.7	170	55 FIT ²

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 = 8.62x10⁻⁵ eV/Kelvin.

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

Based on Automotive qual samples size not Commercial qual sample size.



Reliability Test Data

QTP #: 034402

Device	Fab Lot #	Assy Lot #	Ass Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 150C, 2.3V, Vcc Max							
CY7C1020CV33 (7C1320G)	4320164	610345596	CML-R	24	839	0	
CY7C1020CV33 (7C1320G)	4210573	610347340	CML-R	24	839	0	
CY7C1020CV33 (7C1320G)	4329858	610344870	CML-R	24	832	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE, 150C, 2.3V, Vcc Max							
CY7C1020CV33 (7C1320G)	4320164	610345596	CML-R	48	80	0	
CY7C1020CV33 (7C1320G)	4320164	610345596	CML-R	80	80	0	
CY7C1020CV33 (7C1320G)	4320164	610345596	CML-R	408	80	0	
CY7C1020CV33 (7C1320G)	4210573	610347340	CML-R	48	80	0	
CY7C1020CV33 (7C1320G)	4210573	610347340	CML-R	80	80	0	
CY7C1020CV33 (7C1320G)	4210573	610347340	CML-R	408	80	0	
CY7C1020CV33 (7C1320G)	4329858	610344870	CML-R	48	80	0	
CY7C1020CV33 (7C1320G)	4329858	610344870	CML-R	80	80	0	
CY7C1020CV33 (7C1320G)	4329858	610344870	CML-R	408	80	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER JESD22, METHOD A114-B, 500V							
CY7C1020CV33 (7C1320G)	4320164	610345596	CML-R	COMP	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER JESD22, METHOD A114-B, 1,000V							
CY7C1020CV33 (7C1320G)	4320164	610345596	CML-R	COMP	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER JESD22, METHOD A114-B, 1,500V							
CY7C1020CV33 (7C1320G)	4320164	610345596	CML-R	COMP	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER JESD22, METHOD A114-B, 2,000V							
CY7C1020CV33 (7C1320G)	4320164	610345596	CML-R	COMP	3	0	
STRESS: ESD-CHARGE DEVICE MODEL, 250V							
CY7C1020CV33 (7C1320G)	4320164	610345596	CML-R	COMP	3	0	
STRESS: ESD-CHARGE DEVICE MODEL, 500V							
CY7C1020CV33 (7C1320G)	4320164	610345596	CML-R	COMP	3	0	
STRESS: ESD-CHARGE DEVICE MODEL, 750V (Corner Pins)							
CY7C1020CV33 (7C1320G)	4320164	610345596	CML-R	COMP	6	0	



Reliability Test Data

QTP #: 034402

Device	Fab Lot #	Assy Lot #	Ass Loc	Duration	Samp	Rej	Failure Mechanism
--------	-----------	------------	---------	----------	------	-----	-------------------

STRESS: BOND PULL

CY7C1020CV33 (7C1320G)	4320164	610345596	CML-R	COMP	5	0	
------------------------	---------	-----------	-------	------	---	---	--

STRESS: STATIC LATCH-UP TESTING, 125C, 5.45 V, ±100mA

CY7C1020CV33 (7C1320G)	4320164	610345596	CML-R	COMP	6	0	
------------------------	---------	-----------	-------	------	---	---	--

STRESS: ELECTRICAL DISTRIBUTIONS

CY7C1020CV33 (7C1320G)	4320164	610345596	CML-R	COMP	30	0	
------------------------	---------	-----------	-------	------	----	---	--

CY7C1020CV33 (7C1320G)	4210573	610347340	CML-R	COM	30	0	
------------------------	---------	-----------	-------	-----	----	---	--

CY7C1020CV33 (7C1320G)	4329858	610344870	CML-R	COMP	30	0	
------------------------	---------	-----------	-------	------	----	---	--

STRESS: HIGH TEMPERATURE STORAGE, 150°C

CY7C1020CV33 (7C1320G)	4320164	610345596	CML-R	500	80	0	
------------------------	---------	-----------	-------	-----	----	---	--

CY7C1020CV33 (7C1320G)	4320164	610345596	CML-R	1000	80	0	
------------------------	---------	-----------	-------	------	----	---	--

STRESS: PHYSICAL DIMENSIONS

CY7C1020CV33 (7C1320G)	4320164	610345596	CML-R	COMP	30	0	
------------------------	---------	-----------	-------	------	----	---	--

STRESS: SOLDERABILITY

CY7C1020CV33 (7C1320G)	4320164	610345596	CML-R	COMP	15	0	
------------------------	---------	-----------	-------	------	----	---	--

CY7C1020CV33 (7C1320G)	4210573	610347340	CML-R	COMP	15	0	
------------------------	---------	-----------	-------	------	----	---	--

CY7C1020CV33 (7C1320G)	4329858	610344870	CML-R	COMP	15	0	
------------------------	---------	-----------	-------	------	----	---	--

STRESS: BALL SHEAR

CY7C1020CV33 (7C1320G)	4320164	610345596	CML-R	COMP	5	0	
------------------------	---------	-----------	-------	------	---	---	--

STRESS: EXTERNAL VISUAL

CY7C1020CV33 (7C1320G)	4320164	610345596	CML-R	COMP	1351	0	
------------------------	---------	-----------	-------	------	------	---	--

CY7C1020CV33 (7C1320G)	4210573	610347340	CML-R	COMP	1199	0	
------------------------	---------	-----------	-------	------	------	---	--

CY7C1020CV33 (7C1320G)	4329858	610344870	CML-R	COMP	1197	0	
------------------------	---------	-----------	-------	------	------	---	--

STRESS: HI-ACCEL SATURATION TEST, 130C, 85%RH, 3.65V, PRE COND 192 HR 30C/60%RH, MSL3

CY7C1020CV33 (7C1320G)	4320164	610345596	CML-R	96	77	0	
------------------------	---------	-----------	-------	----	----	---	--

CY7C1020CV33 (7C1320G)	4320164	610345596	CML-R	128	77	0	
------------------------	---------	-----------	-------	-----	----	---	--

CY7C1020CV33 (7C1320G)	4210573	610347340	CML-R	96	75	0	
------------------------	---------	-----------	-------	----	----	---	--

CY7C1020CV33 (7C1320G)	4210573	610347340	CML-R	128	75	0	
------------------------	---------	-----------	-------	-----	----	---	--

CY7C1020CV33 (7C1320G)	4329858	610344870	CML-R	96	80	0	
------------------------	---------	-----------	-------	----	----	---	--

CY7C1020CV33 (7C1320G)	4329858	610344870	CML-R	128	80	0	
------------------------	---------	-----------	-------	-----	----	---	--

Company Confidential

A printed copy of this document is considered uncontrolled. Refer to online copy for latest revision.



Reliability Test Data

QTP #: 034402

Device	Fab Lot #	Assy Lot #	Ass Loc	Duration	Samp	Rej	Failure Mechanism
--------	-----------	------------	---------	----------	------	-----	-------------------

STRESS: PRESSURE COOKER TEST, 121C, 100%RH, PRE COND 192 HR 30C/60%RH, MSL3

CY7C1020CV33 (7C1320G)	4320164	610345596	CML-R	96	80	0	
CY7C1020CV33 (7C1320G)	4320164	610345596	CML-R	168	77	0	
CY7C1020CV33 (7C1320G)	4210573	610347340	CML-R	96	80	0	
CY7C1020CV33 (7C1320G)	4210573	610347340	CML-R	168	80	0	
CY7C1020CV33 (7C1320G)	4329858	610344870	CML-R	96	80	0	
CY7C1020CV33 (7C1320G)	4329858	610344870	CML-R	168	80	0	

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

CY7C1020CV33 (7C1320G)	4320164	610345596	CML-R	300	80	0	
CY7C1020CV33 (7C1320G)	4320164	610345596	CML-R	500	80	0	
CY7C1020CV33 (7C1320G)	4320164	610345596	CML-R	1000	80	0	
CY7C1020CV33 (7C1320G)	4210573	610347340	CML-R	300	80	0	
CY7C1020CV33 (7C1320G)	4210573	610347340	CML-R	500	80	0	
CY7C1020CV33 (7C1320G)	4210573	610347340	CML-R	1000	80	0	
CY7C1020CV33 (7C1320G)	4329858	610344870	CML-R	300	78	0	
CY7C1020CV33 (7C1320G)	4329858	610344870	CML-R	500	78	0	
CY7C1020CV33 (7C1320G)	4329858	610344870	CML-R	1000	78	0	



Reliability Test Data

QTP #: 075101

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE, 150C, 2.30V, Vcc Max							
CY7C1011CV33 (7A13412F)	4711544	610762256	CML-R	48	3500	0	
CY7C1011CV33 (7A13412F)	4709996	610752257	CML-R	48	3497	0	
CY7C1011CV33 (7A13412F)	4710395	610762258	CML-R	48	3497	0	
STRESS: ESD-CHARGE DEVICE MODEL, 250V							
CY7C1011CV33 (7A13412F)	4711544	610762256	CML-R	COMP	3	0	
STRESS: ESD-CHARGE DEVICE MODEL, 500V							
CY7C1011CV33 (7A13412F)	4711544	610762256	CML-R	COMP	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER JESD22-A114, 500V							
CY7C1011CV33 (7A13412F)	4711544	610762256	CML-R	COMP	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER JESD22-A114, 1000V							
CY7C1011CV33 (7A13412F)	4711544	610762256	CML-R	COMP	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER JESD22-A114, 1500V							
CY7C1011CV33 (7A13412F)	4711544	610762256	CML-R	COMP	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER JESD22-A114, 2000V							
CY7C1011CV33 (7A13412F)	4711544	610762256	CML-R	COMP	3	0	
STRESS: STATIC LATCH-UP TESTING, 125C, 5.4V, +/-100mA							
CY7C1011CV33 (7A13412F)	4711544	610762256	CML-R	COMP	6	0	
STRESS: ELECTRICAL DISTRIBUTION							
CY7C1011CV33 (7A13412F)	4706875	610722768	CML-R	COMP	30	0	
CY7C1011CV33 (7A13412F)	4647740	610702615	CML-R	COMP	30	0	
CY7C1011CV33 (7A13412F)	4648473	610702464	CML-R	COMP	30	0	



Reliability Test Data

QTP #: 084601

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: BALL SHEAR							
CY7C1041CV33 (7C1341F)	4338799	610401498	CML-R	COMP	30	0	
STRESS: BOND PULL							
CY7C1041CV33 (7C1341F)	4338799	610401498	CML-R	COMP	30	0	
STRESS: ELECTRICAL DISTRIBUTION							
CY7C1041CV33 (7C1341F)	4347658	610407671	CML-R	COMP	30	0	
CY7C1011CV33 (7A13412F)	4706875	610722768	CML-R	COMP	30	0	
CY7C1011CV33 (7A13412F)	4647740	610702615	CML-R	COMP	30	0	
CY7C1011CV33 (7A13412F)	4648473	610702464	CML-R	COMP	30	0	
STRESS: EXTERNAL VISUAL							
CY7C1041CV33 (7C1341F)	4347658	610407671	CML-R	COMP	179	0	
CY7C1041CV33 (7C1341F)	4346466	610401794	CML-R	COMP	105	0	
CY7C1041CV33 (7C1341F)	4338799	610401498	CML-R	COMP	165	0	
STRESS: PRESSURE COOKER TEST, 121C, 100%RH, PRE COND 192 HR 30C/60%RH, MSL3							
CY7C1041CV33 (7C1341F)	4347658	610407671	CML-R	96	50	0	
STRESS: PHYSICAL DIMENSIONS							
CY7C1041CV33 (7C1341F)	4347658	610407671	CML-R	COMP	10	0	
CY7C1041CV33 (7C1341F)	4346466	610401794	CML-R	COMP	10	0	
CY7C1041CV33 (7C1341F)	4338799	610401498	CML-R	COMP	10	0	
STRESS: STATIC LATCH-UP TESTING, 125C, 5.4V, ±100mA							
CY7C1041CV33 (7C1341F)	4347658	610407671	CML-R	COMP	3	0	
STRESS: SOLDERABILITY							
CY7C1041CV33 (7C1341F)	4347658	610407671	CML-R	COMP	15	0	
CY7C1041CV33 (7C1341F)	4346466	610401794	CML-R	COMP	15	0	
CY7C1041CV33 (7C1341F)	4338799	610401498	CML-R	COMP	15	0	
STRESS: TC CONDITION C, 150C TO -65C, PRE COND 192 HR 30C/60%RH, MSL3							
CY7C1041CV33 (7C1341F)	4347658	610407671	CML-R	500	50	0	
CY7C1041CV33 (7C1341F)	4346466	610401794	CML-R	500	50	0	
CY7C1041CV33 (7C1341F)	4338799	610401498	CML-R	500	50	0	

Document History Page

Document Title: 084601: AUTOMOTIVE FAST ASYNC DEVICE (CY7C1011CV33) R7FD-3R TECHNOLOGY, FAB4
Document Number: 001-69309

Rev.	ECN No.	Orig. of Change	Description of Change
**	3242172	HGA	Initial Spec Release
*A	4001808	HSTO	-Replaced Memory Image Division (MID) with Memory Product Division (MPD) in Product Description. -Replaced CML-R with JT-China in Assembly Facility Site, Major Package Information Table and Test Location. -Deleted Cypress obsolete referenced spec 11-20047 in Major Package and replaced it with 001-64160 -Deleted Cypress referenced specs 12-00292/12-00103, 01-00081, 25-00055 and retained/replaced with industry standards in Reliability Test Performed per Specification Requirements Table.
*B	4379048	HSTO	Align qualification report based on the new template in the front page
*C	4775580	HSTO	Update reference for Reliability Director

Distribution: WEB

Posting: None