Cypress Semiconductor
Customer Specific Qualification Report

QTP# 110605 Revision *B
March 2025

Zero Delay Buffer L28 Technology, TSMC-2A	
CY2305ES **CY2305S**	**Low-Cost 3.3V Zero Delay Buffer**

CYPRESS TECHNICAL CONTACT FOR QUALIFICATION DATA:

Zhaomin Ji
Principal Reliability Engineer
(408) 432-7021

Mira Ben-Tzur
Quality Engineering Director
(408) 943-2675

QUALIFICATION HISTORY

Qual Report		Description of Qualification Purpose	Date Comp
99285		To qualify L28-TSMC Technology in TMSC-2A	May 2003
081704		CY230X L28 Process Transfer from CTI Fab2 to TSMC-2A	Aug 2008
110605		5 Layer Mask Change (Poly, Contact, Met1, Via, Met2) to CY2305-1X parts, L28 Process at TSMC	May 2011

PRODUCT DESCRIPTION (for qualification)	
Purpose: 5 Layer Mask Change (Poly, Contact, Met1, Via, Met2) to CY2305-1X parts, L28 Process at TSMC	
Marketing Part #:	CY2305ESX*-1H, CY2305ESX*-1, CY2305SX*-1H, CY2305SX*-1, CY2305S*-1H, CY2305S*-1
Device Description:	3.3V Zero Delay Buffer available in 8/16-Lead SOIC
Cypress Division:	Cypress Semiconductor Corporation –Data Communication Division (DCD)

TECHNOLOGY/FAB PROCESS DESCRIPTION – R9T-3R			
Number of Metal Layers:	2	Metal Composition :	Metal 1: 400Å Ti / 1,000Å TiN/ 4,700Å AlSiCu / 375Å TiN Metal 2: 1,500 Å Ti / 8,000Å AlSiCu / 375Å TiN
Passivation Type and Materials:		3,000Å SiN / 3,150Å SOG, 1,200Å SiN	
Generic Process Technology/Design Rule (□-drawn):		CMOS, Single Poly, Double Metal/0.65um	
Gate Oxide Material/Thickness (MOS):		SiO2 / 125 Å	
Name/Location of Die Fab (prime) Facility:		TSMC-2A, Taiwan	
Die Fab Line ID/Wafer Process ID:		TSMC-2A/L28 TSMC	

PACKAGE AVAILABILITY

PACKAGE	*ASSEMBLY SITE FACILITY*
8-Lead SOIC	PHIL-M, CML-RA
16 Lead SOIC	PHIL-M, CML-RA, TAIWAN-T

Note: Package Qualification details upon request

MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION	
Package Designation:	SZ0815
Package Outline, Type, or Name:	8-Lead Small Outline IC (SOIC)
Mold Compound Name/Manufacturer:	MP8500
Mold Compound Flammability Rating:	V-O per UL94
Mold Compound Alpha Emission Rate	N/A
Oxygen Rating Index:	None
Lead Frame Material:	Copper
Lead Finish, Composition / Thickness:	NiPdAu
Die Backside Preparation Method/Metallization:	Backgrind
Die Separation Method:	Wafer Saw
Die Attach Supplier:	Ablestik
Die Attach Material:	QMI509
Die Attach Method:	Epoxy
Bond Diagram Designation:	10-05162
Wire Bond Method:	Thermosonic
Wire Material/Size:	Au / 0.9mil
Thermal Resistance Theta JA °C/W:	149°C/W
Package Cross Section Yes/No:	No
Assembly Process Flow:	001-49354
Name/Location of Assembly (prime) facility:	CML Autoline (RA)

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

Note: Please contact a Cypress Representative for other packages availability

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 = 3.8V, 150°C	P
High Temperature Operating Life Latent Failure Rate	Dynamic Operating Condition, Vcc = 3.8V, 150°C	P
Temperature Cycle	-65^{0}C to 150^{0}C, MIL-STD-883C, Method 1010, (99285), JESD22-A-104, , (081704) Precondition: JESD22 Moisture Sensitivity Level 1 (168 hrs, 85C/85%RH)	P
High Accelerated Saturation Test (HAST)	130C, 3.63V, 85%RH Precondition: JESD22 Moisture Sensitivity Level 1 (168 Hrs, 85C/85%RH)	P
High Temperature Steady Life Test	Cypress Spec. 29-00020 (VCC=150°C/3.63V)	P
Electrostatic Discharge Human Body Model (ESD-HBM)	2,200V MIL-STD-883, Method 3015.7 (99285), JESD22-A114E , (081704)	P
Electrostatic Discharge Charge Device Model (ESD-CDM)	500V Cypress Spec. 25-00020	P
Electrostatic Discharge Machine Model (ESD-MM)	200V Cypress Spec. 001-10140	P
Low Temperature Operating Life	JESD22-A108 (-30C)	P
Pressure Cooker	Cypress Spec. 25-00047 (121°C/100%RH)	P
Data Retention	JESD22-A103 (150°C)	P
Latch-up Sensitivity	± 200mA In accordance with JEDEC 17 (99285), JESD-78A (081704), Cypress Spec. 01-00081, 125°C,± 200mA	P

RELIABILITY FAILURE RATE SUMMARY

Stress/Test	Device Tested/ Device Hours	# Fails	Activation Energy	Acceleration Factor[3]	Failure Rate
High Temperature Operating Life Early Failure Rate	1530	0	N/A	N/A	0 PPM
High Temperature Operating Life[1, 2] Long Term Failure Rate	181,660HRs	0	0.7	170	30FIT

[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.

* Fit rate data based from the Technology Qual

Reliability Test Data

QTP #:99285

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: DATA RETENTION, PLASTIC, 150C							
CY2280-OC	2937109	619927291/2/3	CSPI-R	500	85	0	
CY2280-OC	2937109	619927291	CSPI-R	500	85	0	
CY2280-OC	2937109	619927291	CSPI-R	1000	85	0	
CY2280-OC	2937190	619928659	CSPI-R	500	50	0	
CY2280-OC	2937190	619928659	CSPI-R	1000	50	0	
CY2280-OC	2942829	619933793	CSPI-R	500	50	0	
CY2280-OC	2942829	619933793	CSPI-R	1000	50	0	
STRESS: ESD-CHARGE DEVICE MODEL, (1000V)							
CY2280-OC	2937109	619927291/2/3	CSPI-R	COMP	3	0	
CY2280-OC	2937190	619928659/60/61	CSPI-R	COMP	3	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER PER MIL STD 883, METHOD 3015 (2,200V)							
CY2280-OC	2937109	619927291/2/3	CSPI-R	COMP	3	0	
CY2280-OC	2937190	619928659/60/61	CSPI-R	COMP	3	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (150C, 3.8V, Vcc Max)							
CY2280-OC	2937109	619927291/2/3	CSPI-R	48	335	0	
CY2280-OC	2937190	619928659/60/61	CSPI-R	48	234	0	
CY2280-OC	2937190	619928659/60/61	CSPI-R	48	101	0	
CY2280-OC	2942829	619933793/4/5	CSPI-R	48	349	0	
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE (150C, 3.8V, Vcc Max)							
CY2280-OC	2937109	619927291/2/3	CSPI-R	80	120	0	
CY2280-OC	2937109	619927291/2/3	CSPI-R	500	120	0	
CY2280-OC	2937190	619928659/60/61	CSPI-R	80	120	0	
CY2280-OC	2937190	619928659/60/61	CSPI-R	500	120	0	
CY2280-OC	2942829	619933793/4/5	CSPI-R	80	125	0	
CY2280-OC	2942829	619933793/4/5	CSPI-R	500	123	0	
STRESS: HI-ACCEL SATURATION TEST (140C/85%RH/3.63V), PRECOND. 168 HRS 85C/85%RH							
CY2280-OC	2937109	619927291/2/3	CSPI-R	128	50	0	

Reliability Test Data

QTP #:99285

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: HIGH TEMP STEADY STATE LIFE TEST (150C, 3.63V)							
CY2280-OC	2937109	619927291/2/3	CSPI-R	80	77	0	
CY2280-OC	2937109	619927291/2/3	CSPI-R	168	77	0	
STRESS: LOW TEMPERATURE OPERATING LIFE (-30C/8MHZ)							
CY2280-OC	2937190	619928659/60/61	CSPI-R	500	50	0	
STRESS: PRESSURE COOKER TEST, MSL 1 (121C, 100%RH)							
CY2280-OC	2937109	619927291/2/3	CSPI-R	168	53	0	
STRESS: TC COND. C, -65 TO 150C, PRECOND. 168 HRS 85C/85%RH (MSL 1))							
CY2280-OC	2937109	619927291/2/3	CSPI-R	300	50	0	

Reliability Test Data

QTP #: 081704

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (150C, 3.8V, Vcc Max)							
CY2309ESXI (7C80727B)	8823000	610828970	M-PHIL	48	504	0	
CY2309ESXI (7C80727B)	8823000	610831567	M-PHIL	48	663	0	
CY2309ESXC (7C80727B)	8823000	610831048	RA-CML	48	504	0	
STRESS: ESD-CHARGE DEVICE MODEL, (500V)							
CY2309ESXI (7C80727B)	8823000	610828970	M-PHIL	COMP	9	0	
CY2300ESXC (7C80731B)	8823000	610828961	M-PHIL	COMP	9	0	
CY2305ESXI (7C80723B)	8823000	610828969	M-PHIL	COMP	9	0	
CY2309EZXI (7C80727B)	8823000	610831054	M-PHIL	COMP	9	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER JESD22, METHOD A114-E, (2,200V							
CY2308ESXI (7C80725B)	8823000	610828966	M-PHIL	COMP	8	0	
CY2309ESXI (7C80727B)	8823000	610828970	M-PHIL	COMP	8	0	
CY2300ESXC (7C80731B)	8823000	610828961	M-PHIL	COMP	8	0	
CY2309ESX1 (7C80721B)	8823000	610831772	M-PHIL	COMP	8	0	
STRESS: ESD-MACHINE MODEL, 110V							
CY2309SXI (7C80727B)	4825485	610831567	RA-CML	COMP	3	0	
STRESS: ESD-MACHINE MODEL, 160V							
CY2309SXI (7C80727B)	4825485	610831567	RA-CML	COMP	3	0	
STRESS: ESD-MACHINE MODEL, 200V							
CY2309SXI (7C80727B)	4825485	610831567	RA-CML	COMP	3	0	
STRESS: ESD-MACHINE MODEL, 250V							
CY2309SXI (7C80727B)	4825485	610831567	RA-CML	COMP	3	0	
STRESS: ESD-MACHINE MODEL, 300V							
CY2309SXI (7C80727B)	4825485	610831567	RA-CML	COMP	3	0	
STRESS: STATIC LATCH-UP TESTING PER JEDEC17 (125C, ±200mA, 5.4V)							
CY2308ESXI (7C80725B)	8823000	610828966	M-PHIL	COMP	6	0	
CY2309ESXI (7C80727B)	8823000	610828970	M-PHIL	COMP	6	0	
CY2309ESX1 (7C80721B)	8823000	610831772	M-PHIL	COMP	6	0	
CY2309ESX1 (7C80721B)	8823000	610831772	M-PHIL	COMP	6	0	

Reliability Test Data

QTP #: 081704

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: STATIC LATCH-UP TESTING PER JESD78 (125C, ±200mA, 5.4V)							
CY2308ESXI (7C80725B)	8823000	610828966	M-PHIL	COMP	6	0	
CY2309ESXI (7C80727B)	8823000	610828970	M-PHIL	COMP	6	0	
CY2300ESXC (7C80731B)	8823000	610828961	M-PHIL	COMP	6	0	
STRESS: ETEST DATA							
CY2308ESXI (7C80725B)	8823000			COMPARABLE			
STRESS: SORT YIELD							
CY2308ESXI (7C80725B)	8823000			COMPARABLE			

Reliability Test Data

QTP #: 110605

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (150C, 3.8V, Vcc Max)							
CY2305ESXC (7C80723EE)	4106949	611109698	CML-RA	48	1530	0	
STRESS: ESD-CHARGE DEVICE MODEL, (500V)							
CY2305ESXC (7C80723EE)	4106949	611109698	CML-RA	COMP	9	0	
STRESS: ESD-HUMAN BODY CIRCUIT PER JESD22, METHOD A114-E, (2,200V)							
CY2305ESXC (7C80723EE)	4106949	611109698	CML-RA	COMP	8	0	
CY2305ESXC (7C80723EE)	4106949	611109697	CML-RA	COMP	8	0	
STRESS: STATIC LATCH-UP TESTING PER JEDEC17 (125C, ±140mA)							
CY2305ESXC (7C80723EE)	4106949	611109698	CML-RA	COMP	6	0	
CY2305ESXC (7C80723EE)	4106949	611109697	CML-RA	COMP	6	0	
STRESS: ETEST DATA							
CY2305ESXC (7C80723EE)	4106949	611109698	CML-RA	COMPARABLE			
STRESS: SORT YIELD							
CY2305ESXC (7C80723EE)	4106949	611109698	CML-RA	COMPARABLE			

Document History Page

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Rev.	ECN No.	Orig. of Change	Description of Change
**	3255471	NSR	Initial spec release. This qualification report is for customer IBM and Cisco PCN release only. It is not intended for WEB release.
*A	4795787	ILZ	Sunset Review. No change For submission to Frozen State after Sunset
*B	8115768	HSTO CHONGK AHHUAN	Removed obsolete specs# 25-00060 and 25-00089 Aligned header and footer with template 002-33284. Removed Distribution and Posting in history page.