**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
# Customer Specific Qualification Report
**QTP# 112001**
**November 2011**

| **Zero Delay Buffer**<br>5 LAYER MASK CHANGE ( POLY, CONTACT, MET1, VIA, MET2)<br>**L28 Technology, TSMC-2A** | |
|---|---|
| **CY2304ES***<br>**CY2304S*** | Low-Cost 3.3V Zero Delay Buffer |
| **CY2305ES*,CY2305EZ*,**<br>**CY2305S*, CY2305Z*** | |
| **CY2308ES*,CY2308EZ*,**<br>**CY2308S*, CY2308Z*** | |
| **CY2309ES*,CY2309EZ*,**<br>**CY2309S*, CY2309Z*** | |
| **CY2300ES*,CY2300S***<br>**CY2303ES*,CY2303S*** | Phase-Aligned Clock Multiplier |

**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 |
| 112001 | | 5 Layer Mask Change – Poly, Contact, Met1, Via, Met2) to CY230x, L28 Process at TSMC | Nov 2011 |

| PRODUCT DESCRIPTION (for qualification) | |
|---|---|
| Purpose: 5 Layer Mask Change (Poly, Contact, Met1, Via, Met2) to CY230x parts, L28 Process at TSMC | |
| Marketing Part #: | CY2305ESX*-1H, CY2308ESX*-1, CY2308ESX*-2*, CY2309ESX*-1H*, CY2309EZX*-1H*, CY2300SX* |
| Device Description: | 3.3V Zero Delay Buffer available in 8/16-Lead SOIC and 16-Lead TSSOP |
| Cypress Division: | Cypress Semiconductor Corporation –Memory Products Division (MPD) |

| 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<br>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 (µ-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 |
| 16 Lead TSSOP | PHIL-M, CML-RA, TAIWAN-T |

**Note:** Package Qualification details upon request

| MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION | |
|---|---|
| **Package Designation:** | SZ0815 / SZ1615 |
| **Package Outline, Type, or Name:** | 8-Lead / 16-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<br>Early Failure Rate | Dynamic Operating Condition, Vcc = 3.8V, 150°C | P |
| High Temperature Operating Life<br>Latent Failure Rate | Dynamic Operating Condition, Vcc = 3.8V, 150°C | P |
| Temperature Cycle | $-65^0$C to $150^0$C,<br>MIL-STD-883C, Method 1010, (99285),<br>JESD22-A-104, , (081704)<br>Precondition: JESD22 Moisture Sensitivity Level 1<br>(168 hrs, 85C/85%RH) | P |
| High Accelerated Saturation Test<br>(HAST) | 130C, 3.63V, 85%RH<br>Precondition: JESD22 Moisture Sensitivity Level 1<br>(168 Hrs, 85C/85%RH) | P |
| High Temperature Steady Life Test | Cypress Spec. 29-00020 (VCC=150°C/3.63V) | P |
| Electrostatic Discharge<br>Human Body Model (ESD-HBM) | 2,200V<br>MIL-STD-883, Method 3015.7 (99285),<br>JESD22-A114E , (081704) | P |
| Electrostatic Discharge<br>Charge Device Model (ESD-CDM) | 500V<br>Cypress Spec. 25-00020 | P |
| Electrostatic Discharge<br>Machine Model (ESD-MM) | 200V<br>Cypress Spec. 001-10140 | P |
| Low Temperature Operating Life | Cypress Spec. 25-00089 (-30C) | P |
| Pressure Cooker | Cypress Spec. 25-00047 (121°C/100%RH) | P |
| Data Retention | Cypress Spec. 25-00060 (150°C) | P |
| Latch-up Sensitivity | 125°C,± 200mA, ± 140mA<br>In accordance with JEDEC 17 (99285),<br>JESD-78A (081704), Cypress Spec. 01-00081, | 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 | 1,530 | 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 = $8.62 \times 10^{-5}$ 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 | | | |

# Reliability Test Data

## QTP #: 112001

| Device | Fab Lot # | Assy Lot # | Assy Loc | Duration | Samp | Rej | Failure Mechanism |
|---|---|---|---|---|---|---|---|
| ***STRESS: ESD-CHARGE DEVICE MODEL, (500V)*** | | | | | | | |
| CY2308ESXC (7C80725DE) | 4106949 | 611124234 | CML-RA | COMP | 9 | 0 | |
| CY2309ESXC (7C80727DE) | 4106949 | 611116031 | CML-RA | COMP | 9 | 0 | |
| CY2300SXC (7C80731EE) | 4106949 | 611126172 | M-PHIL | COMP | 9 | 0 | |
| CY2308ESXC (7C80720EE) | 4106949 | 611116032 | CML-RA | COMP | 9 | 0 | |
| ***STRESS: ESD-HUMAN BODY CIRCUIT PER JESD22, METHOD A114-E, (2,200V)*** | | | | | | | |
| CY2308ESXC (7C80725DE) | 4106949 | 611124234 | CML-RA | COMP | 8 | 0 | |
| CY2309ESXC (7C80727DE) | 4106949 | 611116031 | CML-RA | COMP | 8 | 0 | |
| CY2300SXC (7C80731EE) | 4106949 | 611126172 | M-PHIL | COMP | 8 | 0 | |
| CY2308ESXC (7C80720EE) | 4106949 | 611116032 | CML-RA | COMP | 8 | 0 | |
| ***STRESS: ESD-MACHINE MODEL, (200V)*** | | | | | | | |
| CY2305ESXC (7C80723EE) | 4106949 | 611109698 | CML-RA | COMP | 5 | 0 | |
| CY2309ESXC (7C80727DE) | 4106949 | 611116031 | CML-RA | COMP | 5 | 0 | |
| CY2309EZXC (7C80727DE) | 4106949 | 611124233 | CML-RA | COMP | 5 | 0 | |
| ***STRESS: STATIC LATCH-UP TESTING PER JEDEC17 (125C, ±140mA)*** | | | | | | | |
| CY2308ESXC (7C80725DE) | 4106949 | 611124234 | CML-RA | COMP | 6 | 0 | |
| CY2300SXC (7C80731EE) | 4106949 | 611126172 | M-PHIL | COMP | 6 | 0 | |
| ***STRESS: ETEST DATA*** | | | | | | | |
| CY2308ESXC (7C80725DE) | 4106949 | 611124234 | CML-RA | COMP | COMPARABLE | | |
| CY2300SXC (7C80731EE) | 4106949 | 611126172 | M-PHIL | COMP | COMPARABLE | | |
| ***STRESS: SORT YIELD*** | | | | | | | |
| CY2308ESXC (7C80725DE) | 4106949 | 611124234 | CML-RA | COMP | COMPARABLE | | |
| CY2300SXC (7C80731EE) | 4106949 | 611126172 | M-PHIL | COMP | COMPARABLE | | |

# Document History Page

Document Title: QTP 112001: ZERO DELAY BUFFER 5 LAYER MASK CHANGE ( POLY, CONTACT, MET1, VIA, MET2) TO CY230X, L28 PROCESS AT TSMC
Document Number: 001-74006

| Rev. | ECN No. | Orig. of Change | Description of Change |
|---|---|---|---|
| ** | 3436045 | NSR | Initial spec release. This qualification report is for customer IBM and Cisco PCN release only. It is not intended for External WEB (Cypress.COM) release. |

Distribution: WEB

Posting: None