# THIS SPEC IS OBSOLETE

Spec No: 001-88642

Spec Title: QTP#97476: 256K STATIC RAM "CY7C194/CY7195/ CY7C199" R28 PROCESS,FAB 2 QUALIFICATION

Replaced by: None

# Cypress Semiconductor
# Product Qualification Report

**QTP# 97476 rev*A**
**August 2016**

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| 256K Static RAM, R28 Process, Fab 2 Qualification | |
|---|---|
| CY7C194/CY7195/CY7C199 | 32k X 8 Static RAM |

**CYPRESS TECHNICAL CONTACT FOR QUALIFICATION DATA:**

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## PRODUCT QUALIFICATION HISTORY

| Qual Report | | Description of Qualification Purpose | | Date Comp |
|---|---|---|---|---|
| 97476 | | Qualify Fab 2 for 256K SRAM, R28 process ( Rev0. And Rev.R) | | Nov. 1997 |

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| PRODUCT DESCRIPTION (for qualification) | | |
|---|---|---|
| Qualification Purpose: Qualify Fab 2 for 256K SRAM, R28 process (Rev O. and Rev. R) | | |
| Marketing Part #: | CY7C199 | |
| Package: | 28 pins, 300 mil SOJ | |
| Device Description | 32K x 8 Static RAM | |
| Cypress Division: | Cypress Semiconductor Corporation – MPD Division | |
| Overall Die (or Mask) RE Level (pre-requisite for qualification | | Rev. O and Rev. R |
| What ID markings on Die | 7C199C | |

| TECHNOLOGY/FAB PROCESS DESCRIPTION –R28 | | | |
|---|---|---|---|
| Number of Metal Layers | 2 | Metal Composition: | Metal 1: Ti/TiW/Al-Si/TiW, 500Å/1.2KÅ/6KÅ/1.2K Å<br>Metal 2: TiW/Al-Si/TiW, 1.2KÅ/10KÅ/150Å |
| Passivation Type and Materials: | | | 7000A TEOS + 6000A Si2N4 |
| Free Phosphorus contents in top glass layer (%): | | | N/A |
| Die Coating(s), if used: | | | None |
| Number of Transistor in device | | | |
| Number of Gate in device | | | |
| Generic Process Technology /Design Rule ( -drawn): | | | CMOS, Double Poly, Double Metal /0.65 m You a |
| Gate Oxide Material/Thickness (MOS):in | | | SiO2 / 165 Å |
| Name/Location of Die Fab (prime) Facility: | | | Cypress Semiconductor – Round Rock, TX |
| Die Fab Line ID/Wafer Process ID: | | | Fab2/R28 |

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| PLASTIC PACKAGE / ASSEMBLY DESCRIPTION | |
|---|---|
| **Package Outline, Type, or Name:** | 28-pin, 300 mil SOJ |
| **Mold Compound Name/Manufacturer:** | Sumitomo EME-6300H or Nito MP-8000 |
| **Lead Frame Material:** | Copper Alloy 194 |
| **Lead Finish, Composition / Thickness:** | Solder Plated, 90±5%Sn, 10±%Pb |
| **Die Attach Area Plating:** | Silver Spot |
| **Die Attach Material:** | Ablestik 8361 |
| **Die Attach Method:** | Paste |
| **Wire Bond Method:** | Thermosonic |
| **Wire Material/Size:** | Gold / 1.0 mil |
| **Assembly Line ID and Process ID:** | Cypress Philippines (CSPI-R)<br>Omedata, Indonesia (INDNS-O) |

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**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 = 5.75V, 150C | P |
| High Temperature Operating Life Latent Failure Rate | Dynamic Operating Condition, Vcc = 5.75V, 150C | P |
| Read and Record Life Test | Dynamic Operating Condition, Vcc = 5.75V, 150C | P |
| Long Life Verification | Dynamic Operating Condition, Vcc = 5.75V, 150C | P |
| Cold Life Test | Dynamic Operating Condition, Vcc = 6.5V, -30C | P |
| High Temperature Steady State Life | Static Operating Condition, Vcc = 5.5V, 150C | P |
| High Accelerated Saturation Test (HAST) | 140C, 85%RH, 5.5V Precondition: JESD22 Moisture Sensitivity Level 1 (168 Hrs, 85/85% RH) | P |
| Temperature Cycle | MIL-STD-883C, Method 1010, Condition C, -65□C to 150□C Precondition: JESD22 Moisture Sensitivity Level 1 (168 Hrs, 85/85% RH) | P |
| High Temperature Storage | 165C, no bias | P |
| Age bond pull | MIL STD 883, Method 2011 | P |
| Current Density | meets the Technology Device | P |
| Electrostatic Discharge Human Body Model (ESD-HBM) | MIL-STD-883, Method 3015.7 | P |
| Electrostatic Discharge Charge Device Model (ESD-CDM) | JESD22-C101 | P |
| Latchup Sensitivity<br>Static Latchup Sensitivity | In accordance with JEDEC 17. | P |

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## RELIABILITY FAILURE RATE SUMMARY

| Stress/Test | Device Tested/ Device Hours | # Fails | Activation Energy | Thermal[3] A.F | Failure Rate |
|---|---|---|---|---|---|
| High Temperature Operating Life Early Failure Rate3 | 1,610 Devices | 0 | N/A | N/A | 0 PPM |
| High Temperature Operating Life1,2 Long Term Failure Rate | 633,360 DHRs | 0 | 0 .7 | 170 | 9 FIT |

[3] 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 = $8.62 \times 10^{-5}$ 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.

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# Reliability Test Data

## QTP #: 97476

| Device | Fab Lot # | Assy Lot # | Assy Loc | Duration | Samp | Rej | Failure Mechanism |
|---|---|---|---|---|---|---|---|
| ***STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-EARLY FAILURE RATE (150C, 5.75V)*** | | | | | | | |
| CY7C199-VC | 2734322 | 519711442D | INDNS-O | 48 | 540 | 0 | |
| CY7C199-VC | 2733142 | 619707330/7/8 | CSPI-R | 48 | 535 | 0 | |
| CY7C199-VC | 2733162 | 619707989 | CSPI-R | 48 | 535 | 0 | |
| ***STRESS: ESD-CHARGE DEVICE MODEL*** | | | | | | | |
| CY7C199-VC | 2734322 | 519711442D | INDNS-O | COMP | 3 | 0 | |
| CY7C199-VC | 2733142 | 619707330/7/8 | CSPI-R | COMP | 3 | 0 | |
| ***STRESS: ESD-HUMAN BODY CIRCUIT PER MIL STD 883, METHOD 3015*** | | | | | | | |
| CY7C199-VC | 2734322 | 519711442D | INDNS-O | COMP | 3 | 0 | |
| CY7C199-VC | 2736541 | 619708989 | CSPI-R | COMP | 3 | 0 | |
| ***STRESS: HI-ACCEL SATURATION TEST (140C, 5.5V), PRECOND. 168 HRS 85C/85%RH*** | | | | | | | |
| CY7C199-VC | 2733142 | 619707330/7/8 | CSPI-R | 128 | 48 | 0 | |
| CY7C199-VC | 2733142 | 619707330/7/8 | CSPI-R | 256 | 48 | 0 | |
| CY7C199-VC | 2733162 | 619707989 | CSPI-R | 128 | 45 | 0 | |
| CY7C199-VC | 2733162 | 619707989 | CSPI-R | 128 | 50 | 0 | |
| CY7C199-VC | 2735410 | 619708288 | CSPI-R | 128 | 45 | 0 | |
| CY7C199-VC | 2735410 | 619708288 | CSPI-R | 128 | 48 | 0 | |
| CY7C199-VC | 2736541 | 619708989 | CSPI-R | 128 | 47 | 0 | |
| ***STRESS: HIGH TEMPERATURE STORAGE (165C, NO BIAS)*** | | | | | | | |
| CY7C199-VC | 2733142 | 619707330/7/8 | CSPI-R | 336 | 48 | 0 | |
| CY7C199-VC | 2733142 | 619707330/7/8 | CSPI-R | 500 | 48 | 0 | |
| CY7C199-VC | 2733142 | 619707330/7/8 | CSPI-R | 1000 | 48 | 0 | |
| ***STRESS: HIGH TEMP STEADY STATE LIFE TEST (150C, 5.50V)*** | | | | | | | |
| CY7C199-VC | 2733142 | 619707330/7/8 | CSPI-R | 80 | 81 | 0 | |
| CY7C199-VC | 2733142 | 619707330/7/8 | CSPI-R | 168 | 81 | 0 | |
| CY7C199-VC | 2736541 | 619708989 | CSPI-R | 80 | 80 | 0 | |
| CY7C199-VC | 2736541 | 619708989 | CSPI-R | 168 | 80 | 0 | |

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# Reliability Test Data

## QTP #: 97476

| Device | Fab Lot # | Assy Lot # | Assy Loc | Duration | Samp | Rej | Failure Mechanism |
|---|---|---|---|---|---|---|---|
| ***STRESS: HIGH TEMP DYNAMIC OPERATING LIFE-LATENT FAILURE RATE (150C, 5.75V)*** | | | | | | | |
| CY7C199-VC | 2734322 | 519711442D | INDNS-O | 80 | 540 | 0 | |
| CY7C199-VC | 2733142 | 619707330/7/8 | CSPI-R | 80 | 535 | 0 | |
| CY7C199-VC | 2733142 | 619707330/7/8 | CSPI-R | 500 | 533 | 0 | |
| CY7C199-VC | 2733162 | 619707989 | CSPI-R | 80 | 527 | 0 | |
| CY7C199-VC | 2733162 | 619707989 | CSPI-R | 500 | 527 | 0 | |
| ***STRESS: LONG LIFE VERIFICATION (150C, 5.75V)*** | | | | | | | |
| CY7C199-VC | 2733142 | 619707330/7/8 | CSPI-R | 1000 | 120 | 0 | |
| ***STRESS: COLD LIFE TEST (-30C, 6.5V)*** | | | | | | | |
| CY7C199-VC | 2733142 | 619707330/7/8 | CSPI-R | 500 | 45 | 0 | |
| ***STRESS: READ & RECORD LIFE TEST (150C, 5.75V)*** | | | | | | | |
| CY7C199-VC | 2733142 | 619707330/7/8 | CSPI-R | 48 | 10 | 0 | |
| CY7C199-VC | 2733142 | 619707330/7/8 | CSPI-R | 80 | 10 | 0 | |
| CY7C199-VC | 2733142 | 619707330/7/8 | CSPI-R | 500 | 10 | 0 | |
| ***STRESS: TC COND. C, -65 TO 150C, PRECOND. 168 HRS 85C/85%RH*** | | | | | | | |
| CY7C199-VC | 2733142 | 619707330/7/8 | CSPI-R | 300 | 48 | 0 | |
| CY7C199-VC | 2733142 | 619707330/7/8 | CSPI-R | 1000 | 48 | 0 | |
| CY7C199-VC | 2733162 | 619707989 | CSPI-R | 300 | 50 | 0 | |
| CY7C199-VC | 2733162 | 619707989 | CSPI-R | 1000 | 50 | 0 | |

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# Document History Page

Document Title: QTP#97476: 256K Static RAM "CY7C194/CY7195/CY7C199" R28 Process,Fab 2 Qualification
Document Number: 001-88642

| Rev. | ECN No. | Orig. of Change | Description of Change |
|---|---|---|---|
| ** | 4083753 | HSTO | Initial Spec Release<br>Qualification report published on Cypress.com and was transferred to qualification report spec template. |
| *A | 5384830 | HSTO | Obsolete specs |

Distribution: WEB

Posting: None

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