CYPRESS SEMICONDUCTOR

PRODUCT CHANGE NOTIFICATION

PCN:020015 **DATE:** May 14, 2002

Subject: Network Search Engine, Fab Location Change

To:

Description of change:
The part number listed below has been qualified to be transferred from IBM Fab in Essex Junction, Vermont to TSMC Fab in Hsin Chu, Taiwan using the same fab process and die revision. This change was initiated by the planned phase out of the previously qualified IBM Fab. No changes have been made that effect form, fit, or function and no changes will be made to the data sheet or part number. Device markings will be modified to include an "A" in the part number to denote devices manufactured under the TSMC process. Qualification report QTP# L000006 is attached.

Cypress part numbers affected:

IBM Part Number	New TSMC Part Number
CYNSE70064-50BGC	CYNSE70064A-50BGC
CYNSE70064-66BGC	CYNSE70064A-66BGC
CYNSE70064-83BGC	CYNSE70064A-83BGC

Customer part numbers affected:
Modified as indicated above

Benefit of change:
Better support and cycle time.

Qualification status:
Complete. Qualification report QTP# L000006 is attached.

Sample status:
Contact our local sales office.

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Sample status:
Contact our local sales office.

Approximate Implementation Date:
Production release of the new material will be phased in immediately.

Response Required:

Fax signed approval to Al Laxman at 408-943-2165 or reply by E-mail.
For any additional information regarding this change, contact your local sales representative.

Sincerely,

Mike Burke
Director of QA

Al Laxman
PCN Manager

3901 NORTH FIRST STREET SAN JOSE, CA 95134-1599 (408) 545-7120 FAX (408) 943-2165

Cypress Semiconductor
Product Qualification Report

QTP# L000006 VERSION 1.0
April, 2002

CYNSE70064A 2Meg, Network Search Engines
0.18um Technology, Fab TSMC

CYPRESS TECHNICAL CONTACT FOR QUALIFICATION DATA:

Ed Russell	Al Laxman
Reliability Director	Quality Engineering
(408) 432–7069	(408) 545–7120

PRODUCT QUALIFICATION HISTORY

Qual Report	Description of Qualification Purpose	Date Comp
L000005	New Technology 0.18um, TSMC Fab / New 4 Meg, NSE, Device CYNSE70128	Apr 02
L000006	2 Meg NSE, Device CYNSE70064A	Apr 02

PRODUCT DESCRIPTION (for qualification)			
Qualification Purpose: Qualify New 2Meg, NSE CYNSE70064A, 0.18um Technology at TSMC Fab.			
Marketing Part #:	CYNSE70064A-83BGC / CYNSE70064A-66BGC / CYNSE70064A-50BGC (Lara Network part # LN17020A-083 / LN17020A-066 / LNI7020A-050)		
Device Description:	2Meg, NSE device		
Cypress Division:	Cypress Semiconductor Corporation –Data Communication Division (DCD)		
Overall Die (or Mask) REV Level (pre-requisite for qualification):		Rev. B	
Die Size (stepping):	265 mils x 452 mils	What ID markings on Die:	LN7802MAR

TECHNOLOGY/FAB PROCESS DESCRIPTION			
Number of Metal Layers:	5	Metal Composition:	1-5: Al Cu
Passivation Type and Materials:	Oxide / Nitride		
Free Phosphorus contents in top glass layer(%):	0%		
Number of Transistors in Device	50 million		
Number of Gates in Device	20 million		
Generic Process Technology/Design Rule (μ-drawn):	CMOS, 5Metal layer, 0.18um		
Gate Oxide Material/Thickness (MOS):	SiO_2 32Å / 70Å		
Name/Location of Die Fab (prime) Facility:	TSMC Taiwan		
Die Fab Line ID/Wafer Process ID:	TSMC Fab 4 / CL018G		

PACKAGE AVAILABILITY

PACKAGE	ASSEMBLY SITE FACILITY
272-ball HSBGA	**ASE Taiwan**

Note: Package Qualification details upon request

MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION	
Package Designation:	BG272
Package Outline, Type, or Name:	272-ball Heat Sink Ball Grid Array (HSBGA)
Manufacturer / Mold Compound Name:	Toshiba KE-1100A
Mold Compound Flammability Rating:	V-0 per UL94
Oxygen Rating Index:	>28%
Substrate Material:	BT Resin
Lead Finish, Composition / Thickness:	Solder Ball, 63%Sn, 37%Pb
Die Backside Preparation Method/Metallization:	N/A
Die Separation Method:	Wafer Saw
Die Attach Supplier:	Ablestik
Die Attach Material:	8355F
Bond Diagram Designation:	K-B-ASE-0272B8A-01 Rev A
Wire Bond Method:	Thermosonic
Wire Material/Size:	Au / 1.0 mil
Thermal Resistance Theta JA °C/W:	14.6°C/W
Package Cross Section Yes/No:	N/A
Assembly Process Flow:	ASE SPEC# 64-04-000-0348
Name/Location of Assembly (prime) facility:	ASE Taiwan

ELECTRICAL TEST / FINISH DESCRIPTION	
Test Location:	ASE Taiwan
Fault Coverage:	100%

RELIABILITY TESTS PERFORMED PER SPECIFICATION REQUIREMENT

Stress/Test	Test Condition (Temp/Bias)	Result P/F
High Temperature Operating Life Latent Failure Rate	Dynamic Operating Condition, 125°C Vcc 1.8V=2.2V Vcc 3.3V=3.3V	P
Electrostatic Discharge Human Body Model (ESD-HBM)	2,000V MIL-STD-883, Method 3015.7	P
Electrostatic Discharge Charge Device Model (ESD-CDM)	500V	P
Static Latchup Sensitivity	25C to 100C, > ±200mA	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	N/A	N/A	N/A	N/A	N/A
High Temperature Operating Life[1,2] Long Term Failure Rate	360,000	0	0.7	N/A	46 FIT

[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.

Accelerated Lifetime Tests
High Temperature Operating Life (HTOL)

Test	LOT#	Temp. Cycle	Bias	Sample Size	Duration	Result Pass/Fail
HTOL	DB5399	125°C	Vcc 1.8 = 2.2V Vcc 3.3 = 3.3V	120	1000hrs	120/0
HTOL	DB5961	125°C	Vcc 1.8 = 2.2V Vcc 3.3 = 3.3V	120	1000hrs	120/0
HTOL	DB5962	125°C	Vcc 1.8 = 2.2V Vcc 3.3 = 3.3V	120	1000hrs	120/0

Human Body Model (HBM)

Test	Test Vehicle	Temp. Cycle	Bias	Sample Size	Duration	Result Pass/Fail
HBM	TV1	Ambient	2.0K Volts	4	COMP	4/0

Charge Device Model (CDM)

Test	Test Vehicle	Temp. Cycle	Bias	Sample Size	Duration	Result Pass/Fail
CDM	TV1	Ambient	>0. 5K Volts	6	COMP	6/0

Latch-up

Test	Test Vehicle	Temp. Cycle	Bias	Sample Size	Duration	Result Pass/Fail
Latch-up	TV1	25ºC to 100ºC	> ± 200mA	2	COMP	2/0