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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.

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Cypress Semiconductor Automotive Product Qualification Report

QTP# 162403 VERSION *B
October 2022

Microcontroller, 90nm Technology Product Family, United Semiconductor Japan	
S6E2H Series	**32-bit ARM Cortex-M4F FM4 Microcontroller**
MB91520 Series	**32-bit FR81S Microcontroller**

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

Prepared By:
Hideho Taoka
Reliability Engineer

Reviewed By:
Kunihiro Miyazono
Reliability Manager

Approved By:
David Hoffman
Reliability Director

PRODUCT QUALIFICATION HISTORY

QTP Number	Description of Qualification Purpose	Date
162403	Qualification of 90nm Techology Product Family at United Semiconductor Japan	August, 2016

PRODUCT DESCRIPTION (for qualification)	
Qualification Purpose : Qualify 90nm technology product at United Semiconductor Japan	
Marketing Part #:	S6E2H
Device Description:	32-bit general purpose single-chip products with Flash

PACKAGE AVAILABILITY

PACKAGE	ASSEMBLY FACILITY SITE
LQFP120	Amkor Technology Japan (ATJ)

MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION	
Package Designation:	LQH080, LQI100, LQM120,
Package Outline, Type, or Name:	80-LQFP, 100-LQFP, 120-LQFP
Lead Finish : Thickness	Pure-Sn
Name/Location of Assembly facility:	Amkor Technology Japan (ATJ)
MSL Level	3
Reflow Profile	260’C

ELECTRICAL TEST / FINISH DESCRIPTION	
Test Location:	Amkor Technology Japan (ATJ)

RELIABILITY TESTS PERFORMED PER SPECIFICATION REQUIREMENTS

Stress/Test	Test Condition (Temp/Bias)	Result P/F
High Temperature Operating Life Latent Failure Rate	Dynamic Operating Condition, Max. rating Voltage, 125 degreeC, JESD22-A108	P
High Accelerated Stress Test (HAST)	130 degreeC, 85%RH, Max. Rating Voltage, Precondition: JESD22 Moisture Sensitivity Level3 JEDEC STD 22-A110	P
Unbiased High Accelerated Stress Test (UHAST)	130 degreeC, 85%RH, Precondition: JESD22 Moisture Sensitivity Level3 JEDEC STD 22-A118:	P
Temperature Cycle	JESD22-A104, Condition C, -60 to 150 degreeC	P
High Temperature Storage	JESD22-A103: 150 degreeC,	P
Electrostatic Discharge Human Body Model (ESD-HBM)	JEDEC EIA/JESD22-A114-B	P
Electrostatic Discharge Charge Device Model (ESD-CDM)	JESD22-C101	P
Static Latch up	125 degreeC, 140mA	P
Endurance + Data Retention Bake	JESD22-A117, Cycling temp : 105 degreeC Bake Temperature : 150 degreeC	P

RELIABILITY FAILURE RATE SUMMARY

Stress/Test	Device Tsted/ Device Hours	# Fails	Activation Energy	Thermal A.F (3)	Failure Rate
High Temperature Operating Life Early Failure Rate	4,800 Devices	0	N/A	N.A	0 PPM (1)
High Temperature Operating Life Latent Failure Rate	1,341,000DHRs	0	0.7	78	9FIT (2)

J 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.

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Reliability Test Data

QTP #: 162403

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS : High Temperature Operating Life							
MB91F526	-	1306M01	Amkor	1000	78	0	
MB91F526	-	1306M02	Amkor	1000	78	0	
MB91F526	-	1306M03	Amkor	1000	77	0	
MB91F526	-	1502N01	Amkor	1000	78	0	
STRESS : High Accelerated Stress Test							
MB91F526	-	1306M01	Amkor	96	78	0	
MB91F526	-	1306M02	Amkor	96	78	0	
MB91F526	-	1306M03	Amkor	96	78	0	
MB91F526	-	1502N01	Amkor	96	78	0	
STRESS : Unbiased Accelerated Stress Test							
MB91F526	-	1306M01	Amkor	96	77	0	
MB91F526	-	1306M02	Amkor	96	77	0	
MB91F526	-	1306M03	Amkor	96	77	0	
MB91F526		1502N01	Amkor	96	80	0	
STRESS ; Temperature Cycle							
MB91F526	-	1306M01	Amkor	1000	80	0	
MB91F526	-	1306M02	Amkor	1000	80	0	
MB91F526	-	1306M03	Amkor	1000	80	0	
MB91F526	-	1502N01	Amkor	500	80	0	
STRESS ; High Temperature Storage							
MB91F526	-	1306M01	Amkor	1000	80	0	
MB91F526	-	1306M02	Amkor	1000	80	0	
MB91F526	-	1306M03	Amkor	1000	80	0	
MB91F526	-	1502N01	Amkor	1000	45	0	
STRESS ; Endurance (100Kcycling) + Data Retention Test							
For S6E2H	-	-	Amkor	1344	77	0	
For S6E2H	-	-	Amkor	1344	77	0	
For S6E2H	-	-	Amkor	1344	77	0	

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
STRESS ; ESD (HBM)							
S6E2H	-	-	Amkor	COMP	9	0	
STRESS ; ESD-CDM							
S6E2H	-	-	Amkor	COMP	8	0	
STRESS ; Latch-up Test							
S6E2H	-	-	Amkor	COMP	3	0	

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Document History Page

Document Title: QTP#162403 : Microcontroller, 90nm Technology Product Family, Mie Fujitsu Semiconductor
Document Number: 002-16233

Rev.	ECN No.	Orig. of Change	Description of Change
**	5418652	KUMI	Initial spec. release.
*A	5482279	KUMI	Corrected OPN
*B	7797498	HSTO	Updated company logo Replaced “Mie Fujitsu” with “United Semiconductor Japan Deleted Cypress Division Replaced “Saturated” with “Stress” Replaced “J-Devices” with “Amkor Technology Japan (ATJ)” Deleted “Temperature Humidity Bias” in page#4 Replaced “J-Devices” with “Amkor” in Reliability Test Data Section