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Cypress Semiconductor
Package Qualification Report

QTP# 161604, 162603, 162906, 170103, 170106 VERSION **
December, 2017

64/80/100/120/144/176-LQFP Package,
Pb-free, Cu-wire, 260℃ Reflow, J-Devices

FOR ANY QUESTIONS ON THIS REPORT, PLEASE CONTACT
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PRODUCT QUALIFICATION HISTORY

QTP Number	Description of Qualification Purpose	Date
161604	144-LQFP Package Qualification with Cu-wire and EME-G660B at J-Devices Usuki	Nov., 2017
162603	208-LQFP Package Qualification with Cu-wire and EME-G660B at J-Devices Miyagi	Nov., 2017
162906	176-LQFP with expoase heat sink Package Qualification with Cu-wire and EME-G660B at J-Devices Miyagi	Nov., 2017
170103	176-LQFP with expoase heat sink Package Qualification with Cu-wire and EME-G660B at J-Devices Fukuoka	Nov., 2017
170106	208-LQFP Package Qualification with Cu-wire with Cu-wire and EME-G660B at J-Devices Fukuoka	Nov, 2017

PRODUCT DESCRIPTION (for qualification)	
Qualification Purpose: Qualify LQFP Lead-free package with Cu-wire and EME-G660B at J-Devices Miyagi/Fukuoka site.	
Marketing Part #:	S6J311EJAA
Device Description:	General purpose single-chip products with Flash
Cypress Division:	Cypress Semiconductor Corporation – Microcontroller and Connectivity Division

PACKAGE	ASSEMBLY FACILITY SITE
LQFP176 (with exposed heat sink)	J-Devices Miyagi and Fukuoka in Japan

MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION	
Package Designation:	LEP176
Package Outline, Type, or Name:	176-LQFP (with esposed heat sink)
Mold Compound Name/Manufacturer:	EME-G660B / Sumitomo
Mold Compound Flammability Rating:	V-0
Oxygen Rating Index: >28%	N/A
Lead Frame Designation:	Full Metal Pad
Substrate Material:	N/A
Lead Finish, Composition / Thickness:	Pure-Sn
Die Separation Method:	Sawing
Die Attach Material:	EN4600B / Hitachi
Wire Bond Method:	Ultrasonic & Force
Wire Material/Size	CuPdAu / 20um (0.8mil)
MSL Level	3
Reflow Profile	260℃

ELECTRICAL TEST / FINISH DESCRIPTION	
Test Location:	J-Devices Aizu site

PRODUCT DESCRIPTION (for qualification)	
Qualification Purpose:	Qualify LQFP Lead-free package with Cu-wire and EME-G660B at J-Devices Usuki site.
Marketing Part #:	MB91F524KHBPMC1-GS-F4E2, MB91F526KHEPMC1-GSE1
Device Description:	General purpose single-chip products with Flash
Cypress Division:	Cypress Semiconductor Corporation – Microcontroller and Connectivity Division

PACKAGE	ASSEMBLY FACILITY SITE
LQFP64 **LQFP80** **LQFP100** **LQFP120** **LQFP144**	J-Devices Usuki in Japan

MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION	
Package Designation:	LQN144
Package Outline, Type, or Name:	144-LQFP
Mold Compound Name/Manufacturer:	EME-G660B / Sumitomo
Mold Compound Flammability Rating:	V-0
Oxygen Rating Index: >28%	N/A
Lead Frame Designation:	Full Metal Pad
Substrate Material:	N/A
Lead Finish, Composition / Thickness:	Pure-Sn
Die Separation Method:	Sawing
Die Attach Material:	EN4600B / Hitachi
Wire Bond Method:	Ultrasonic & Force
Wire Material/Size	CuPdAu / 20um (0.8mil)
MSL Level	3
Reflow Profile	260℃

ELECTRICAL TEST / FINISH DESCRIPTION	
Test Location:	J-Devices Usuki site

PRODUCT DESCRIPTION (for qualification)	
Qualification Purpose: Qualify LQFP Lead-free package with Cu-wire and EME-G660B at J-Devices Miyagi/Fukuoka site.	
Marketing Part #:	MB91F592ASPMC-GSK5E1, MB91F594BSPMC-GSE1
Device Description:	General purpose single-chip products with Flash
Cypress Division:	Cypress Semiconductor Corporation – Microcontroller and Connectivity Division

PACKAGE	ASSEMBLY FACILITY SITE
LQFP144 **LQFP176** **LQFP208**	J-Devices Miyagi in Japan (MB91F594) J-Devices Fukuoka in Japan (MB91F592)

MAJOR PACKAGE INFORMATION USED IN THIS QUALIFICATION	
Package Designation:	LQR208
Package Outline, Type, or Name:	208-LQFP
Mold Compound Name/Manufacturer:	EME-G660B / Sumitomo
Mold Compound Flammability Rating:	V-0
Oxygen Rating Index: >28%	N/A
Lead Frame Designation:	Full Metal Pad
Substrate Material:	N/A
Lead Finish, Composition / Thickness:	Sn/Bi
Die Separation Method:	Sawing
Die Attach Material:	EN4600B / Hitachi
Wire Bond Method:	Ultrasonic & Force
Wire Material/Size	CuPdAu / 20um (0.8mil)
MSL Level	3
Reflow Profile	260℃

ELECTRICAL TEST / FINISH DESCRIPTION	
Test Location:	J-Devices Aizu in Japan (MB91F594) J-Devices Fukuoka site in Japan (MB91F592)

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 Temperature Operating Life Early Failure Rate	Dynamic Operating Condition, Vcc = Max. rating Voltage, 125 degree C, JESD22-A108	P
High Accelerated Saturation Test (HAST)	130 degreeC, 85%RH, Max. Rating Voltage, Precondition: JESD22 Moisture Sensitivity Level3 JEDEC STD 22-A110	P
Unbiased High Accelerated Saturation Test (UHST)	130 degreeC, 85%RH, Precondition: JESD22 Moisture Sensitivity Level3 JEDEC STD 22-A118:	P
Temperature Cycle	JESD22-A104, Condition C, -65 to 150 degreeC Precondition: JESD22 Moisture Sensitivity Level3 JEDEC STD 22-A118:	P
High Temperature Storage	JESD22-A103: 150 degreeC,	P
Acoustic microscopy	J-STD-020, AEC-Q006	P
Ball Shear	Post Temperature Cycle, HAST AEC-Q006	P
Bond Pull	Post Temperature Cycle, HAST AEC-Q006	P
Constructional Analysis	Criteria: Meet external and internal characteristics of Cypress package	P

Reliability Test Data

QTP #:161604, 162603, 162906, 170103, 170106

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism

STRESS : High Temperature Operating Life (Latent Failure Rate)

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
MB91F594	-	1429U00	Miyagi	1000	80	0	
S6J311EJAA	-	1433UL2	Miyagi	2000	80	0	
S6J311EJAA	-	1428Z01	Miyagi	2000	80	0	
S6J311EJAA	-	1431Z02	Miyagi	2000	79	0	
MB91F524	-	1502N01	Usuki	1000	78	0	
S6J311EJAA	4C39387	644ZZ010	Fukuoka	1000	77	0	
S6J311EJAA	4C39287	644ZZ011	Fukuoka	1000	77	0	
S6J311EJAA	4C39287	644ZZ012	Fukuoka	1000	77	0	

STRESS : High Temperature Operating Life (Early Failure Rate)

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
MB91F526	4K90173	1746-N01	Usuki	96	832	0	
MB91F526	4K91441	1746-N02	Usuki	96	856	0	
MB91F526	4K90173	1746-N03	Usuki	96	851	0	

STRESS : High Accelerated Saturation Test

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
MB91F594	-	1429U00	Miyagi	96	80	0	
S6J311EJAA	-	1433UL2	Miyagi	96	80	0	
S6J311EJAA	-	1428Z01	Miyagi	96	80	0	
S6J311EJAA	-	1431Z02	Miyagi	96	80	0	
MB91F524	-	1502N01	Usuki	96	78	0	
S6J311EJAA	4C39387	644ZZ010	Fukuoka	192	77	0	
S6J311EJAA	4C39287	644ZZ011	Fukuoka	192	77	0	
S6J311EJAA	4C39287	644ZZ012	Fukuoka	192	77	0	
MB91F526	-	1642-N01	Usuki	192	77	0	
MB91F526	-	1642-N02	Usuki	192	77	0	
MB91F526	-	1642-N03	Usuki	192	77	0	

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Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism

STRESS : Unbiased High Accelerated Saturation Test

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
MB91F594	-	1429U00	Miyagi	96	80	0	
S6J311EJAA	-	1433UL2	Miyagi	96	80	0	
S6J311EJAA	-	1428Z01	Miyagi	96	80	0	
S6J311EJAA	-	1431Z02	Miyagi	96	80	0	
MB91F524	-	1502N01	Usuki	96	80	0	
MB91F592	4K-84280	1646804	Fukuoka	96	77	0	
MB91F592	4K-84280	1646805	Fukuoka	96	77	0	
MB91F592	4K-84280	1646806	Fukuoka	96	77	0	
S6J311EJAA	4C39387	644ZZ010	Fukuoka	96	77	0	
S6J311EJAA	4C39287	644ZZ011	Fukuoka	96	77	0	
S6J311EJAA	4C39287	644ZZ012	Fukuoka	96	77	0	
MB91F526	-	1642-N01	Usuki	96	77	0	
MB91F526	-	1642-N02	Usuki	96	77	0	
MB91F526	-	1642-N03	Usuki	96	77	0	

STRESS : Temperature Cycle

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
MB91F594	-	1429U00	Miyagi	500	80	0	
S6J311EJAA	-	1433UL2	Miyagi	1000	80	0	
S6J311EJAA	-	1428Z01	Miyagi	1000	80	0	
S6J311EJAA	-	1431Z02	Miyagi	1000	80	0	
MB91F524	-	1502N01	Usuki	500	80	0	
MB91F592	4K-84280	1646804	Fukuoka	1000	77	0	
MB91F592	4K-84280	1646805	Fukuoka	1000	77	0	
MB91F592	4K-84280	1646806	Fukuoka	1000	77	0	
S6J311EJAA	4C39387	644ZZ010	Fukuoka	1000	77	0	
S6J311EJAA	4C39287	644ZZ011	Fukuoka	1000	77	0	
S6J311EJAA	4C39287	644ZZ012	Fukuoka	1000	77	0	
MB91F526	-	1642-N01	Usuki	1000	77	0	
MB91F526	-	1642-N02	Usuki	1000	77	0	
MB91F526	-	1642-N03	Usuki	1000	77	0	

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism

STRESS ; High Temperature Storage

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
MB91F594	-	1429U00	Miyagi	1000	45	0	
S6J311EJAA	-	1431Z02	Miyagi	1000	45	0	
MB91F524	-	1502N01	Usuki	1000	45	0	
MB91F592	4K-84280	1646805	Miyagi	2000	45	0	
S6J311EJAA	4C39387	644ZZ010	Fukuoka	2000	45	0	
S6J311EJAA	4C39287	644ZZ011	Fukuoka	2000	45	0	
S6J311EJAA	4C39287	644ZZ012	Fukuoka	2000	45	0	
MB91F526	-	1642-N01	Usuki	2000	45	0	
MB91F526	-	1642-N02	Usuki	2000	45	0	
MB91F526	-	1642-N03	Usuki	2000	45	0	

STRESS : Acoustic, MSL3

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
MB91F594	-	1429U00	Miyagi	COMP	22	0	
S6J311EJAA	-	1433UL2	Miyagi	COMP	22	0	
S6J311EJAA	-	1428Z01	Miyagi	COMP	22	0	
S6J311EJAA	-	1431Z02	Miyagi	COMP	22	0	
MB91F524	-	1502N01	Usuki	COMP	22	0	
MB91F592	4K-84280	1646804	Fukuoka	COMP	22	0	
MB91F592	4K-84280	1646805	Fukuoka	COMP	22	0	
MB91F592	4K-84280	1646806	Fukuoka	COMP	22	0	
S6J311EJAA	4C39387	644ZZ010	Fukuoka	COMP	22	0	
S6J311EJAA	4C39287	644ZZ011	Fukuoka	COMP	22	0	
S6J311EJAA	4C39287	644ZZ012	Fukuoka	COMP	22	0	
MB91F526	-	1642-N01	Usuki	COMP	22	0	
MB91F526	-	1642-N02	Usuki	COMP	22	0	
MB91F526	-	1642-N03	Usuki	COMP	22	0	

STRESS : Acoustic, Post -2x HAST

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
S6J311EJAA	4C39387	644ZZ010	Fukuoka	COMP	22	0	
S6J311EJAA	4C39287	644ZZ011	Fukuoka	COMP	22	0	
S6J311EJAA	4C39287	644ZZ012	Fukuoka	COMP	22	0	
MB91F526	-	1642-N01	Usuki	COMP	22	0	
MB91F526	-	1642-N02	Usuki	COMP	22	0	
MB91F526	-	1642-N03	Usuki	COMP	22	0	

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism

STRESS : Acoustic, Post -2x TC

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
S6J311EJAA	4C39387	644ZZ010	Fukuoka	COMP	22	0	
S6J311EJAA	4C39287	644ZZ011	Fukuoka	COMP	22	0	
S6J311EJAA	4C39287	644ZZ012	Fukuoka	COMP	22	0	
MB91F526	-	1642-N01	Usuki	COMP	22	0	
MB91F526	-	1642-N02	Usuki	COMP	22	0	
MB91F526	-	1642-N03	Usuki	COMP	22	0	

STRESS : Ball Shear

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
S6J311EJAA	4C39387	644ZZ010	Fukuoka	COMP	12	0	
S6J311EJAA	4C39287	644ZZ011	Fukuoka	COMP	12	0	
S6J311EJAA	4C39287	644ZZ012	Fukuoka	COMP	12	0	
MB91F526	-	1642-N01	Usuki	COMP	12	0	
MB91F526	-	1642-N02	Usuki	COMP	12	0	
MB91F526	-	1642-N03	Usuki	COMP	12	0	

STRESS : Bond Pull

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
S6J311EJAA	4C39387	644ZZ010	Fukuoka	COMP	12	0	
S6J311EJAA	4C39287	644ZZ011	Fukuoka	COMP	12	0	
S6J311EJAA	4C39287	644ZZ012	Fukuoka	COMP	12	0	
MB91F526	-	1642-N01	Usuki	COMP	12	0	
MB91F526	-	1642-N02	Usuki	COMP	12	0	
MB91F526	-	1642-N03	Usuki	COMP	12	0	

STRESS : Constructional Analysis

Device	Fab Lot #	Assy Lot #	Assy Loc	Duration	Samp	Rej	Failure Mechanism
S6J311EJAA	4C39387	644ZZ010	Fukuoka	COMP	1	0	
S6J311EJAA	4C39287	644ZZ011	Fukuoka	COMP	1	0	
S6J311EJAA	4C39287	644ZZ012	Fukuoka	COMP	1	0	
MB91F526	-	1642-N01	Usuki	COMP	1	0	
MB91F526	-	1642-N02	Usuki	COMP	1	0	
MB91F526	-	1642-N03	Usuki	COMP	1	0	

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Document History Page

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Rev.	ECN No.	Orig. of Change	Description of Change
**	5971175	KUMI	Initial spec. release.
*A	5988150	KUMI	Added wire and supplier information
*B	5995488	KUMI	Added MB91F526 Qual result, Change the location, Added wire diameter by ‘mil’.