Product Change Notification / MFOL-26VGNH622

Date:

23-Aug-2022

Product Category:

Switching Regulators

PCN Type:

Manufacturing Change

Notification Subject:

CCB 4613 Final Notice: Qualification of Microchip Technology Tempe – Fab 2 (TMGR) as a new fabrication site for Die#2, Die#3 and EME-G700LA as a new mold compound material for selected MIC2851xx device families available in 32L VQFN (6x6x0.9mm) package at ASE assembly site.

Affected CPNs:

MFOL-26VGNH622_Affected_CPN_08232022.pdf
MFOL-26VGNH622_Affected_CPN_08232022.csv

Notification Text:

PCN Status: Final Notification

PCN Type: Manufacturing Change

Microchip Parts Affected: Please open one of the files found in the Affected CPNs section.
Note: For your convenience Microchip includes identical files in two formats (.pdf and .xls)

Description of Change: Qualification of Microchip Technology Tempe – Fab 2 (TMGR) as a new fabrication site for Die#2, Die#3 and EME-G700LA as a new mold compound material for selected MIC2851xx device families available in 32L VQFN (6x6x0.9mm) package at ASE assembly site.

Pre and Post Change Summary:

Fab location change for Die # 2 and Die # 3 only applies for CPNs below:

MIC28514T-E/PHA, MIC28514T-E/PHAVAO, MIC28515T-E/PHA, and MIC28515T-E/PHAVAO

A separate PCN (ALAN-22WDFU453) was issued for other products.

		Pre Change	Post Change
Fabrication Location	Die # 1	Microchip Technology Colorado (MCSO)	Microchip Technology Colorado (MCSO)
	Die # 2	MaxPower Semiconductor (MAPW)	Microchip Technology Tempe - Fab 2 (TMGR)
	Die # 3	MaxPower Semiconductor (MAPW)	Microchip Technology Tempe - Fab 2 (TMGR)
Wafer Size	Die # 1	6 inches	6 inches
	Die # 2 and Die # 3	8 inches	8 inches

Mold compound change only applies for CPNs below:

MIC28514T-E/PHA, MIC28515T-E/PHA, MIC28516T-E/PHA, and MIC28517T-E/PHA

	Pre Change	Post Change
Assembly Site	ASE Inc. (ASE)	ASE Inc. (ASE)
Wire Material	CuPdAu	CuPdAu
Die Attach Material	CDF625P8C8 (Controller die) – DAF 84-1 LMISR4 (FET die) - Paste	CDF625P8C8 (Controller die) – DAF 84-1 LMISR4 (FET die) - Paste
Molding Compound Material	EME-G631H	EME-G700LA
Lead-Frame Material	C194	C194

Impacts to Data Sheet: None

Change Impact: None

Reason for Change: To improve manufacturability by qualifying Microchip Technology Tempe – Fab 2 (TMGR) as a new fabrication site for Die#2, Die#3 and EME-G700LA as a new mold compound material.

Change Implementation Status: In Progress

Estimated First Ship Date: September 30, 2022 (date code: 2240)

Note: Please be advised that after the estimated first ship date customers may receive pre and post change parts.

Time Table Summary:

	August 2022					September 2022			
Workweek	32	33	34	35	36	37	38	39	40
Qual Report Availability				x					
Final PCN Issue Date				x					
Estimated Implementation Date									x

Method to Identify Change: Traceability code

Qualification Report: Please open the attachments included with this PCN labeled as PCN_#_Qual_Report.

Revision History: August 23, 2022: Issued final notification.

The change described in this PCN does not alter Microchip's current regulatory compliance regarding the material content of the applicable products.

Attachments:

PCN_MFOL-26VGNH622_Qual Report.pdf

Please contact your local Microchip sales office with questions or concerns regarding this notification.

Terms and Conditions:

If you wish to receive Microchip PCNs via email please register for our PCN email service at our PCN home page select register then fill in the required fields. You will find instructions about registering for Microchips PCN email service in the PCN FAQ section.

If you wish to change your PCN profile, including opt out, please go to the PCN home page select login and sign into your myMicrochip account. Select a profile option from the left navigation bar and make the applicable selections.

MFOL-26VGNH622 - CCB 4613 Final Notice: Qualification of Microchip Technology Tempe – Fab 2 (TMGR) as a new fabrication site for Die#2, Die#3 and EME-G700LA as a new mold compound material for selected MIC2851xx device families available in 32L VQFN (6x6x0.9mm) package at ASE assembly site.

Affected Catalog Part Numbers (CPN)

MIC28514T-E/PHA
MIC28514T-E/PHAVAO
MIC28515T-E/PHA
MIC28515T-E/PHAVAO
MIC28516T-E/PHA
MIC28517T-E/PHA

QUALIFICATION REPORT SUMMARY

PCN#: MFOL-26VGNH622

Date:
July 25, 2022

Qualification of Microchip Technology Tempe – Fab 2 (TMGR) as a new fabrication site for Die#2, Die#3 and EME-G700LA as a new mold compound material for selected MIC2851xx device families available in 32L VQFN (6x6x0.9mm) package at ASE assembly site.

Purpose: Qualification of Microchip Technology Tempe – Fab 2 (TMGR) as a new fabrication site for Die#2, Die#3 and EME-G700LA as a new mold compound material for selected MIC2851xx device families available in 32L VQFN (6x6x0.9mm) package at ASE assembly site.

I. Summary:

The purpose of this report is to qualify the MIC28514/28515 in 32 leads VQFN 6x6mm at ASEK, using MIC2128 (29628) controller + MCHP Q1008 FETs, following the requirements from CCB#4613 for Automotive MCM Q104 and Automotive Cu wires Q006, and the guidelines established in Microchip specification QCI-39000, Worldwide Quality Conformance Requirements.

II. Conclusion:

Based on the qualification test results, the MCM product family MIC28514/28515 with MCHP Q1008 FETs complies with the requirements from the reliability guidelines implemented in the qualification plan. Therefore, this product and package can be released to production as per guidelines established in Microchip specification QCI-39000, “Worldwide Quality Conformance Requirements.

III. Device Description:

Device	MIC28514/5 (MIC2128 + MCHP Q1008 FETs)
Product	75V, High Performance Switching Buck Regulator
Document Control Number	ML072022002C
Document Revision	B
CCB No.	4613

IV. Qualification Material:

Test Lot	Lot 1	Lot 2	Lot 3
WAFER LOT	MCSO520363705.000/9Y2975 Die 2&3: TMPE221308136.211	MCSO520363705.000/9Y2975 Die 2&3: TMPE221308136.211	MCSO520363705.000/9Y2975 Die 2&3: TMPE221308136.211
ASSEMBLY LOT	ASE-223100114.000	ASE-223200013.000	ASE-223300001.000
PACKAGE	VQFN66-32L, 0.9mm	VQFN66-32L, 0.9mm	VQFN66-32L, 0.9mm
QUAL TESTS	HTOL, ELFR, ESD HBM, CDM, LU, Precondition, HTSL, LTSL, HAST, UHAST, TC, PTC	Precondition, HTSL, HAST, UHAST, TC	Precondition, HTSL, HAST, UHAST, TC

Test Lot	Lot 4	Lot 5
WAFER LOT	MCSO521397533.100/0Y2897 Die 2&3: TMPE221308136.300	MCSO521397533.100/0Y2897 Die 2&3: TMPE221308136.410
ASSEMBLY LOT	ASE-223800204.000	ASE-223800205.000
PACKAGE	VQFN66-32L, 0.9mm	VQFN66-32L, 0.9mm
QUAL TESTS	HTOL	HTOL

V. Bill of Materials:

Misc.	**Assembly site**	ASEK
	BD Number	BD-000686-01_MIC28514T-E/PHAVAO BD-000685-01 MIC28515-E/PHAVAO
	MP Code (MPC)	3500NYPHAVA1_MIC28514T-E/PHAVAO 3500PYPHAVA1_MIC28514T-E/PHAVAO
	Part Number (CPN)	MIC28514T-E/PHAVAO MIC28515T-E/PHAVAO
Lead-Frame	**Paddle size**	4.9022x2.4130 mm, 2.1844x2.7432 mm, 2.4384x2.7432 mm 0.7874x2.1082 mm
	Material	C194
	Process	Etched
	Part Number	A25542-0
	Lead Plating	Matte Tin
	Remark	Wettable Flank (Stepped)
Bond Wire	**Material**	CuPdAu
Die Attach	**Part Number**	CDF625P8C8 (Controller die) – DAF 84-1 LMISR4 (FET die) - Paste
	Conductive	Yes
MC	**Part Number**	EME-G700LA
PKG	**PKG Type**	VQFN
	Pin Count	32LD
	PKG width/size	6x6mm
	PKG Code	PHA

VI. Qualification Test

Results: Package Pre-conditioning

Test Method/Condition	JEDEC J-STD-020D and JESD22-A113F, MSL Level 1 soak and 260^{O}C peak Reflow Temperature
Lot #	Results (Fail/Pass)
Lot 1	0/303
Lot 2	0/260
Lot 3	0/260

Pre and post testing was conducted at +25◦C and +125◦C.

HAST (Highly Accelerated Temperature and Humidity Stress Test)

Test Method/Condition	JESD22-A110, Vin = +30V, Ta = +130^{O}C/85%RH	
Lot #	96HR Results (Fail/Pass)	192HR Results (Fail/Pass)
Lot 1	1/109*	0/78
Lot 2	1/109**	0/78
Lot 3	0/109	0/78

Pre and Post testing was conducted at +25◦C and +125◦C

* FA2022-00623: Invalid HAST failure due to bad socket contact of HAST board causing EOS damage to unit #96.

** FA2022-00679: Invalid HAST failure due to bad socket contact of HAST board causing EOS damage to unit #26.

Unbiased HAST

Test Method/Condition	JESD22-A118, Ta = +130^{O}C/85%RH
Lot #	96HR Results (Fail/Pass)
Lot 1	0/35
Lot 2	0/35
Lot 3	0/35

Pre and Post testing was conducted at +25◦C.

Temperature Cycling

Test Method/Condition	JESD22-A104, Ta = -40°C/+125 °C	
Lot #	1000 Cycle Results (Fail/Pass)	2000 Cycle Results (Fail/Pass)
Lot 1	0/109	0/77
Lot 2	0/109	0/77
Lot 3	0/109	0/77

Pre and Post testing was conducted at +25◦C, and +125◦C

Power Temperature Cycling

Test Method/Condition	JESD22-A105, Ta = -40°C/+125 °C, 1000 cycles and 2000 cycles, Vin = +24V, EXTVDD = +12V	
Lot #	1000 Cyc Results (Fail/Pass)	2000 Cyc Results (Fail/Pass)
Lot 4	0/48	4/48*

Pre and Post testing was conducted at +25◦C, and +125◦C

* FA2022-01990: Invalid PTC failures due to bad socket contacts of PTC board causing EOS damage to units #4, 6, 19, 29.

High Temperature Storage Life

Test Method/Condition	JESD22-A103, Ta = +150 °C,	
Lot #	1000 HRS Results (Fail/Pass)	2000 HRS Results (Fail/Pass)
Lot 1	0/50	0/48
Lot 2	0/50	0/48
Lot 3	0/48	0/46

Pre and Post testing was conducted at +25◦C and +125◦C.

Low Temperature Storage Life

Test Method/Condition	JESD22-A119, Ta = -40°C, 1000HRS
Lot #	Results (Fail/Pass)
Lot 1	0/30

Pre and Post testing was conducted at +25◦C, -40◦C and +125◦C

ESD HBM, CDM, & Latch-Up

Test	Reference Method	Sample Size/Lot	Result
ESD – HBM	JS-001-2012	18/Lot 1	Pass +/- 500V
ESD – CDM	JS-002-2014	18/Lot 1	Pass +/- 1500V
Latch-up	JESD78	6/Lot 1 at +25◦C 6/Lot 1 at +125◦C	Pass +/-105mA I/O trigger, Pass 1.5X Vsupply Overvoltage test Pass +/-105mA I/O trigger, Pass 1.5X Vsupply Overvoltage test

Pre and Post testing was conducted at +25◦C and +125◦C

Early Life Failure Rate (ELFR):

Test Method	MIL-STD 883 Method 1005
Test Condition	Vin = +75V, EXTVDD = +12V, Ta = +125^{O}C/48 hours
Sample Size	231 units minimum per lot for 1 lot
Lot #	Results (Fail/Pass)
Lot 1	0/240

Pre and Post testing was conducted at +25◦C and +125◦C

High Temperature Operating Life (HTOL)

Test Method	MIL-STD 883 Method 1005
Test Condition	Vin = +75V, EXTVDD = +12V, Ta = +125^{O}C/1008 hours
Sample Size	30 units minimum per lot for 3 lots
Lot #	Results (Fail/Pass)
Lot 1	1/35*
Lot 2	0/35
Lot 3	1/35**

Pre and Post testing was conducted at +25◦C, -40◦C, and +125◦C

* FA2022-01029: Invalid HTOL failure due to bad socket contact causing Vin resistor shorted and burned on the socket and EOS damage to unit #13.

** FA2022-01682: Invalid HTOL failure due to bad socket contact causing Vin resistor shorted and burned on the socket and EOS damage to unit #34.

Start Up and Temperature Steps

Test Condition	Vin = +12V, -40 ^{o}C to +130 ^{o}C with 10 ^{o}C step
Lot #	Results (Fail/Pass)
Lot 1	0/5

Destructive Physical Analysis

Test Condition	Ta = -40^{o}C/+125 ^{o}C, 1000 cycles and 2000 cycles
Lot #	Results (Fail/Pass)
Lot 1,2,3	0/5

SOLDERABILITY, JESD22-B102 or JEDEC J-STD-002D >95% lead coverage

LOT 1:

Test Items	Sample Size /Unit	Comment
Solderability (TSOL002_01 / PLATING)	22 units	PASS

Wire Bond Pull (Mil Std 883-TM2011)

LOT 1: Pass

Wire Pull Strength, g

Test Items	Sample Size /Unit	Comment
Wire Pull (On Finger) (WP_02 / WP_2ND_CU)	24 Wires	PASS
Wire Pull (WP_02 / WP_CU)	35 Wires	PASS

Wire Ball Shear (AEC Q100-001/AEC Q003)

LOT 1: Pass

Ball Shear Strength, g

Test Items	Sample Size / Unit	Comment
Ball Shear (BS_01 / BS_ CU)	35 balls	PASS

Physical Dimension

Test Method/Condition	JESD22-B100 and B108, Min SS = 10 units/lot
Lot#	Results (Fail/Pass)
Lot 1	Pass
Lot 2	Pass
Lot 3	Pass

X-Ray wire sweep

LOT 1: Pass

Test Items	Sample Size /Unit	Comment
X-ray Inspection (TMD_002_03 / X_RAY)	780 100% Insp	PASS
X-ray Wire Sweep (TWSP001_01 / WIRE_SWEEP)	20 Wires	PASS

LOT 2: Pass

Test Items	Sample Size /Unit	Comment
X-ray Inspection (TMD_002_03 / X_RAY)	795 100% Insp	PASS
X-ray Wire Sweep (TWSP001_01 / WIRE_SWEEP)	20 Wires	PASS

LOT 3: Pass

Test Items	Sample Size /Unit	Comment
X-ray Inspection (TMD_002_03 / X_RAY)	780 100% Insp	PASS
X-ray Wire Sweep (TWSP001_01 / WIRE_SWEEP)	20 Wires	PASS