Peregrine Semiconductor

Peregrine Semiconductor Corp.
9380 Carroll Park Drive, San Diego, CA. 92121

Product/Process Change (PCN) Notification

PCN Number: CO-02989 Date Issued: May 1, 2014 PCN Effective Date: August 1, 2014 Product(s) Affected: PE42540 Sample Availability: May 1, 2014 Change Control Board Approval #: CO-02989	Contact: Elizabeth La Greca Title: Director, Sales Operations Phone: 858-795-0106 Email: elagreca@psemi.com

Change Category:

☐ Wafer Fabrication Process	☐ Shipping/Labeling
☐ Design/Mask Change	☐ Equipment
☐ Singulation Process	☐ Material
☒ Assembly Process	☐ Product Specification
☒ Electrical Test – Location addition	☐ Product End of Life
☒ Manufacturing Site – Assembly site change	☒ Other - Ordering Code

Purpose of Change:

To convert PE42540 to a new manufacturing flow, including a new wafer bumping location and new package assembly site, while discontinuing manufacturing through the original bump supplier and assembly location. Final test will be added at the new assembly location.

Description of Change:

Summary of changes: Flip Chip International will be the new wafer bumping supplier and Amkor Technology Philippines will become the new site for PE42540 LGA assembly and test, replacing UAT Malaysia for bumping and Unisem Malaysia for assembly. In addition to the bump and assembly site change, the bump composition will change from copper pillar with solder cap, to tin-silver-copper solder bump.

Reliability, form, fit or function of the device is not affected by this change.

Beginning August 1, 2014, UAT/Unisem parts will no longer be manufactured. All parts shipped to the customer after this date will be manufactured through the FCI/Amkor manufacturing flow.

Ordering code changes:
Original ordering code PE42540LGBC-Z, EK42540-03
New ordering code PE42540LGBD-Z, EK42540-04

***Customer Acknowledgement is based upon JEDEC Standard, JESD46D.** **Form # DOC-00558 Rev2**
If there is a difference between JEDEC and specific customer requirements, customer requirements take precedence.

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Package BOM Comparison

Material	UAT /Unisem Flow	FCI / Amkor Flow
Bump Alloy	Copper Pillar with Tin-Silver Cap	Tin-Silver-Copper Solder Bump
Repassivation Material	BCB	PBO
Laminate	BT	BT
Termination Finish	Nickel-Gold	Nickel-Gold
Mold Compound	Nitto Denko-GE-100-LFCG	Hitachi-GE-100RFC32

Product reliability qualification passed. See customer qualification report (Appendix A).

Customer Acknowledgement of Receipt*:

☐ Change Denied *(Include explanation in comments section below)* ☐ Change Approved	**Name:**	
	Title:	
	Company:	
	Date:	
	Signature:	
Customer Comments:		

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Appendix A – Reliability Qualification Summary

PE42540

Reliability Summary Report

Part Number(s):	PE42540	Product Family:	SWITCH
Package Type:	32L 5x5 FCLGA	MSL Rating:	3
Reference QBS Doc(s):	N/A	Technology Platform:	ULTRACMOS® 4
Reliability Summary:	Based on the results of reliability testing, the PE42540 has met the reliability requirements for qualification.		

Table 1: Product Design Reliability Results

Test Performed	TEST METHOD/ Conditions	Duration	Req'd Sample Size[2] (#LOT x SS)	Actual Sample Size[3] (#LOT x SS)	Result (REJ/SS)	Report #
HTOL	Mil-Std-883 M1005.9/ JESD22-A108 VDD= 3.6V; T_J= 150°C	500 hrs.	1 x 77	3 x 80	Pass (0/239)[4]	DOC-50894

Table 2: Bump Reliability Results

Test Performed	TEST METHOD/ Conditions	Duration	Req'd Sample Size[2] (#LOT x SS)	Actual Sample Size[3] (#LOT x SS)	Result (REJ/SS)	Report #
HTS	Mil-Std-883 M1008.2/ JEDEC JESD22 A103 Ta= 175°C	500 hrs.	3 x 30 bumps	3 x 30 bumps	Pass (0/90)	DOC-03738
TC[1]	Mil-Std-883 M1010.8/ JESD22-A104 Ta= -65°C to +150°C	500 cyc.	3 x 30 bumps	3 x 30 bumps	Pass (0/90)	DOC-03738
Bump Dimensions	Mil-Std-883 M2016/ JESD22-B100	-	3 x 30 bumps	3 x 30 bumps	Pass (0/90)	DOC-03738
Bumped Die Reflow Evaluation 1	IPC/JEDEC J-STD-020D.1 6x Reflow 260°C Peak	-	3 x 30 bumps	3 x 30 bumps	Pass (0/90)	DOC-03738
Bumped Die Reflow Evaluation 2	IPC/JEDEC J-STD-020D.1 10x Reflow 260°C Peak	-	3 x 1 wafers	3 x 1 wafers	Pass (0/3)	DOC-03738

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PE42540

Reliability Summary Report

Table 3: Package Reliability Results

Test Performed	TEST METHOD/ Conditions	Duration	Req'd Sample Size[2] (#LOT x SS)	Actual Sample Size[3] (#LOT x SS)	Result (REJ/SS)	Report #
HTOL	Mil-Std-883 M1005.9/ JESD22-A108 VDD= 3.6V; T_J= 150ºC	500 hrs.	3 x 77	3 x 80	Pass (0/239)[4]	DOC-50894
HTS	Mil-Std-883 M1008.2/ JESD22-A103 T_A= 150ºC	1,000 hrs.	1 x 77	1 x 97 2 x 100	Pass (0/297)	DOC-50894
HAST[1]	JESD22-A110 T_A= 110ºC; RH= 85%; VDD= 3.3 V	264 hrs.	1 x 135	1 x 305	Pass (0/301)[5]	DOC-50894
TC[1]	Mil-Std-883 M1010.8/ JESD22-A104 T_A= -55ºC to +125ºC	1,000 cyc.	3 x 45	3 x 60	Pass (0/180)	DOC-50894
Physical Dimensions	Mil-Std-883 M2016/ JESD22-B100	-	3 x 10	3 x 10	Pass (0/30)	DOC-50894
Die Peel	Subcon Specs.	-	3 x 2	3 x 2	Pass (0/6)	DOC-50894
Solder-ability	Mil-Std-883 M2003.9/ JESD22-B102	-	3 x 1	3 x 1	Pass (0/3)	DOC-50894

Table 4: Wafer Process Reliability Results

Test Performed	TEST METHOD/ Conditions	Duration	Req'd Sample Size[2] (#LOT x SS)	Actual Sample Size[3] (#LOT x SS)	Result (REJ/SS)	Report #
HTOL	Mil-Std-883 M1005.9/ JESD22-A108 VDD= 4.0V; T_J= 150ºC	500 hrs.	3 x 77	3 x 77	Pass (0/231)	DOC-01389
HTS	Mil-Std-883 M1008.2/ JESD22-A103 T_A= 150ºC	1,000 hrs.	1 x 77	1 x 77	Pass (0/77)	DOC-01389
HAST[1]	JESD22-A110 T_A= 130ºC; RH= 85%; P_V= 2.27 atm; 2.75V	96 hrs.	3 x 45	3 x 45	Pass (0/135)	DOC-01389
TC[1]	Mil-Std-883 M1010.8/ JESD22-A104 T_A= -65ºC to +150ºC	500 cyc.	3 x 45	3 x 45	Pass (0/135)	DOC-01389

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Table 4: Wafer Process Reliability Results (continued)

Test Performed	TEST METHOD/ Conditions	Duration	Req'd Sample Size[2] (#LOT x SS)	Actual Sample Size[3] (#LOT x SS)	Result (REJ/SS)	Report #
Electro-migration	Internal Specification Doc #57-0001	>T50	3 x 16	3 x 16	Pass (0/48)	DOC-01388
Stress Migration	Internal Specification Doc #57-0001	-	3 x 4 wafers	3 x 4 wafers	Pass (0/12)	DOC-01388
Passivation Integrity	Mil-Std-883 M2021.3	-	1 x 1 wafer	1 x 1 wafer	Pass (0/1)	DOC-01388
Destructive Analysis	Mil Std 883 M5009	N/A	1 x 1 wafer	1 x 1 wafer	Pass (0/1)	DOC-01388
Hot Carrier	JESD28	>T50	1 x 1 wafer	1 x 1 wafer	Pass (0/1)	DOC-01388
TDDB	JESD35	>T50	3 x 2 wafer	3 x 2 wafer	Pass (0/6)	DOC-01388

[1] J-STD-020, Level-1 pre-conditioning applied: Moisture Soak at 85°C/85% RH for 168 hours. Reflow at 260±0.5°C.
[2] Required sample size is based on Peregrine Semiconductor's Internal Reliability qualification requirements.
[3] Actual sample size may be more than the required sample size to maximize the use of Reliability hardware.
[4] One device discounted due to ESD strike.
[5] 4 units discounted for non-package related failures.

Revision History			
#	Date	Author	Description of Changes
01	3/28/2014	A. Sayavong	Initial Release

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