May 23, 2014
PPCN #140007

PROCESS/ PRODUCT CHANGE NOTIFICATION

This is to inform you that Micrel Inc has qualified Chipbond Technology Corp. in Hsinchu, Taiwan as an alternative production site for wafer backside grinding and backside Tri-metal deposition processes. This manufacturing subcontractor is in addition to the current QBBS (Quality Barkgrinding & Backmetal Service) and SCL (Scientific Coating Labs) in USA as qualified locations for back grinding and Tri-metal processes. This change adds more capacity and provides for the flexibility of back grinding and Tr-metal processing locations. This will enable Micrel to continue to make on-time deliveries to our growing end customers.
If you have any questions concerning this change, please contact:

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PHONE: +1-408-435-2422

TYPE OF CHANGE

Tri-metal (BSM, Back Side Metal) is a technique to improve the heat dissipation of the high power IC. BSM Tri-metal is a layer of three metals evaporating on the backside of the wafer as a connection of the metal and the basic material (heat sink / lead frame) so as to have the better heat dissipation and the electrical conduction. We are adding Chipbond as a back grinding and Tri-metal source in addition to the current QBBS and SCL. There is no change in the back grinding thickness and Tri-metal materials and thicknesses. There are no other changes on the Fab, assembly, and test. The package type, form, fit and function of the products will not be affected. Products will be shipped with the same packing and shipment format.

EFFECTIVITY

Starting August 1st, 2014, Micrel will begin to deliver the listed devices from Chipbond. After August 1st, 2014, the products shipped to customers could be either assembled from QBBS, SCL or Chipbond. In order to make on-time deliveries to our growing end customers, we will reserve the flexibility to deliver certain part numbers at earlier date if un-expected material or capacity shortage occurs at QBBS and SCL in the future.

PRODUCT ID (DESCRIPTION)

See the product list in the attached Excel file “PPCN 140007 part list Add Chipbond additional wafer back grinding and Tri-metal” for Micrel’s products that would have back grinding and Tri-metal deposition at QBBS, SCL or Chipbond site.

NOTE: PER JESD46, LACK OF ACKNOWLEDGEMENT OF THE PPCN WITHIN 30 DAYS OF THE NOTIFICATION DATE CONSTITUTES CUSTOMER’S ACCEPTANCE OF THE CHANGE.

DESCRIPTION OF CHANGE

Micrel has qualified Chipbond, Taiwan for back grinding and Tri-metal of the listed Micrel products. This will provide additional capacity for back grinding and Tri-metal of these products.

EFFECT OF CHANGE

Back grinding thickness and Tri-metal materials and thicknesses remain the same; there is no change in form, fit or function of the product. There are no other changes on the Fab, assembly, and test. Products will be shipped with the same packing and shipment format.

QUALIFICATION

Chipbond is a Micrel's qualified subcontractor. Chipbond has pass Micrel's production audit every time. We attach a representative reliability report for qualifying products back grounded and Tri-metal deposited at Chipbond, Taiwan.

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RELIABILITY REPORT

DATE : 3/31/2014

QUALITY ENG :	PURPOSE:
Dinh Pham	Chipbond Technology Corporation back side Metal Qual (Taiwan)

PART NUMBER	PACKAGE TYPE	ASSEMBLY LOCATION	FAB LOCATION	PROCESS NAME
MIC29302	TO263	GTBF CHINA SWPb2Sn2.5Ag Die Attach M/C G600FB	SAN JOSE, California	BCDM

DIE QUALIFICATION RESULTS :

TEST DESCRIPTION	METHOD/CONDITIONS	LOT ID.	DATE CODE	168 HR Rej/ss	1000 HR Rej/ss	COMMENTS
HTOL **High Temperature Operating Life Test**	JESD22, Method A108	CA05304MEA	1350	0/77	0/77	
	TA= + 125°C	CA05304MEB	1350	0/77	0/77	
	VCC = +26V	CA05304MEC	1351	0/77	0/77	

TEST DESCRIPTION	METHOD/CONDITIONS	LOT ID.	DATE CODE	Rej/ss	L1 PRE-CONDITIONING FLOW
Level 3 ***Pre-conditioning Flow***	***JESD22-A113***	CA05304MEA CA05304MEB CA05304MEC	1350 1350 1351	0/273 0/170 0/170	STEP1-> ELECTRICAL TEST STEP2-> EXTERNAL VISUAL STEP3-> SOAK 168H +85c/85%rh STEP4-> 3X IR REFLOW +260c STEP5-> FLUX IMMERSION STEP6-> RINSE STEP7-> EXTERNAL VISUAL STEP8-> ELECTRICAL TEST

PACKAGE QUALIFICATION RESULTS :

TEST DESCRIPTION	METHOD/CONDITIONS	LOT ID.	DATE CODE	96 HR Rej/ss	COMMENTS
HAST ***With Level 3 Pre-conditioning***	JESD22-A110	CA05304MEA	1350	0/45	
	Ta= +131°C/85%RH	CA05304MEB	1350	0/45	
		CA05304MEC	1351	0/45	

TEST DESCRIPTION	METHOD/CONDITIONS	LOT ID.	DATE CODE	1000 CYC rej/ss	COMMENTS

NOTE: PER JESD46, LACK OF ACKNOWLEDGEMENT OF THE PPCN WITHIN 30 DAYS OF THE NOTIFICATION DATE CONSTITUTES CUSTOMER'S ACCEPTANCE OF THE CHANGE.

<table>
<tr><td>TEMP CYCLE

W Pre-conditioning</td><td>JESD22-A104

Ta = -65°C/+150°C</td><td>CA05304MEA

CA05304MEB

CA05304MEC</td><td>1350

1350

1351</td><td>0/45

0/45

0/45</td><td></td></tr>
<tr><th>TEST DESCRIPTION</th><th>METHOD/CONDITIONS</th><th>LOT ID.</th><th>DATE CODE</th><th>1000 HR
Rej/ss</th><th>COMMENTS</th></tr>
<tr><td>HTSL High Temperature Storage Life

W Pre-conditioning</td><td>JESD22-A103

Ta = +150°C</td><td>CA05304MEA</td><td>1350</td><td>0/76</td><td></td></tr>
<tr><td>FLAMMABILITY</td><td>UL-94V-0

Certified</td><td colspan="4">All mold compounds used by Micrel meet this standard. See the UL website on-line list of material flammability certifications. Micrel requires a Certificate of Compliance from the assembly house and we verify the certifications on the web.</td></tr>
<tr><td colspan="6">New tri-metal process at Chipbond Passed Reliability testing.

BSM(Back Side Metal) sealing & packing technique to improve the heat dissipation of the high power IC. BSM is a layer of metal evaporating on the backside of the wafer as a connection of the metal and the basic material (heat sink / lead frame) so as to have the better heat dissipation and the electrical conduction.</td></tr>
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