PRODUCT / PROCESS CHANGE NOTIFICATION

PCN-000310 Force Majeure Event

Date: 4/20/2015

☒	Semtech Corporation, 200 Flynn Road, Camarillo CA 93012
☐	Semtech Canada Corporation, 4281 Harvester Road, Burlington, Ontario L7L 5M4 Canada
☐	Semtech Irvine, 5141 California Ave., Suite 100, Irvine CA 92617
☐	Semtech Neuchatel Sarl, Route des Gouttes d'Or 40, CH-2000 Neuchatel Switzerland
☐	Nanotech Semiconductor, Semtech Corporation, 2 West Point Court, Bristol, United Kingdom, BS32 4PY
☐	Semtech Corpus Christi SA de CV, Carretera Matamorros Edificio 7, Reynosa, Tamaulipas, Mexico 88780
☐	

Change Details

Part Number(s) Affected:	**Customer Part Number(s) Affected:** ☐ N/A
SC4213STRT, SC4213STRTU, SC2308BSTRTU, SC2308ASTRTU, SC1205HSTR, SMDA24C-7.TBT, SMDA15C-5.TBT, SMDA12C-5.TBT, SC1101CSTRT, SC2612ESTRT, SMDA05C-5.TBT, SMDA05C-7.TBT, SMDA12C-7.TBT, SC1205CSTRT, SMDA24C-5.TBT, SMDA15C-7.TBT, SC1538CS1518TRT, SC1103CSTRT, SMDA05-6.TBT, SC1545CS-1.8TRT	

Purpose, Description, and Effect of Change:

FORCE MAJEURE EVENT. One of our key suppliers notified Semtech that their primary lead frame supplier, Posehl Malaka Plating plant has suffered a catastrophic fire disabling its SOIC Stamped Lead Frame processing line. At the time of this notification, our supplier has informed Semtech that the recovery time will take 9 months.

To prevent a line down situation with our customers, Semtech and our supplier will transition from stamped lead frames back to etched lead frames from an already Semtech qualified supplier, DCI until such a time as Possehl is back to production status and requalifies their line with our supplier and Semtech Corporation.

The Stamped Lead frame affected at Possehl is LF PN: 437392; SOICMH-8L-095140-C194FH

The Etched Lead Frame from DCI that our supplier and Semtech will transition to is; LF PN: 442931, which is identical in design as the Possehl stamped LF.

PRODUCT / PROCESS CHANGE NOTIFICATION

PCN-000310 Force Majeure Event

Date: 4/20/2015

Change Classification	☒ Major ☐ Minor	Impact to Form, Fit, Function	☐ Yes ☒ No
Impact to Data Sheet	☐ Yes ☒ No	New Revision or Date	☒ N/A

Impact to Performance, Characteristics or Reliability:

- No impact to performance, characteristics, application, safety nor reliability

Implementation Date	4/24/2015	Work Week	1517
Last Time Ship (LTS) Of unchanged product	4/20/2015	Affecting Lot No. / Serial No. (SN)	N /A
Sample Availability	4/21/2015	Qualification Report Availability	4/20/2015

Supporting Documents for Change Validation/Attachments:

- **Comparison analysis between Stamped LF and Etched LF**
- **Assembly Qualification Report**

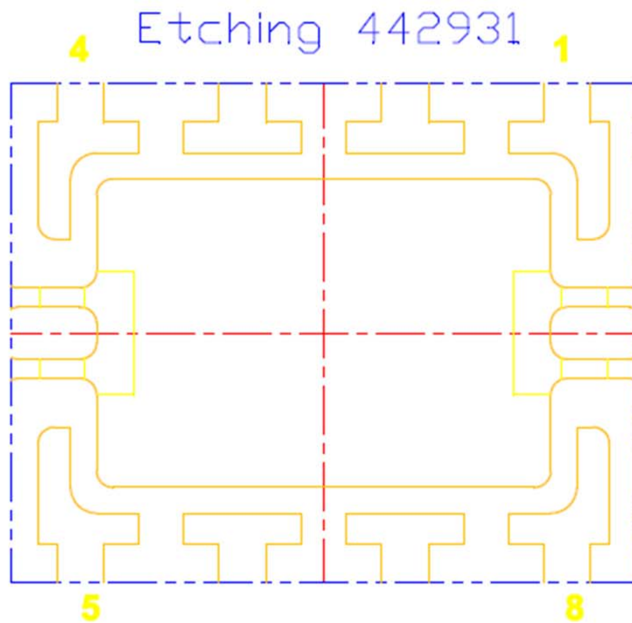
Issuing Authority		
Semtech Business Unit:	Protection and Power Management Product Groups	
Semtech Contact Info:	Pat Sanchez Semtech Corporation Sr. Manager, Corporate Quality 200 Flynn Road Camarillo, CA 93012 Psanchez@semtech.com Office: (805) 480-2074 Fax: (805) 498-3804	

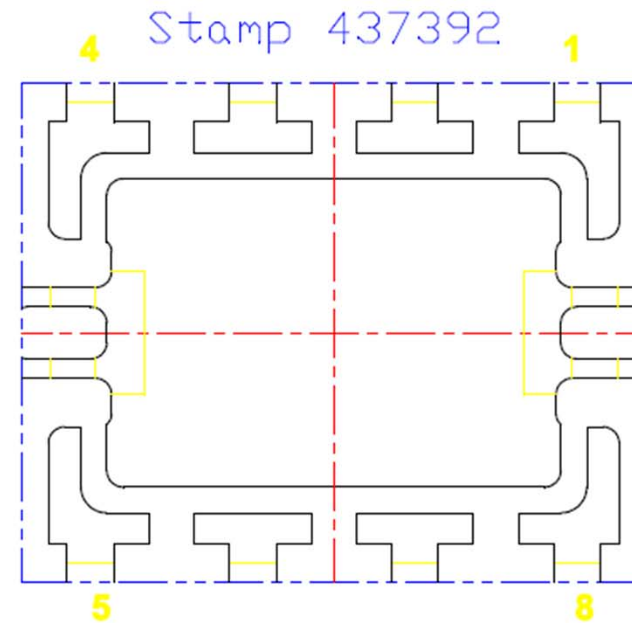
FOR FURTHER INFORMATION & WORLDWIDE SALES COVERAGE: http://www.semtech.com/contact/index.html#support

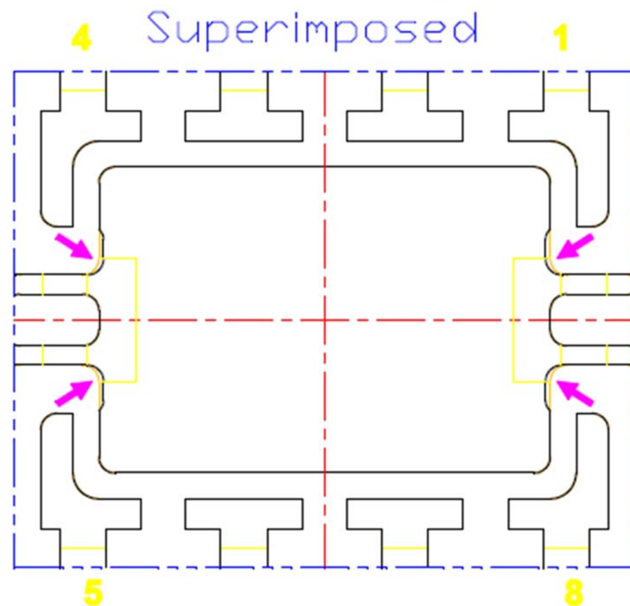
8L-SOIC
Stamp 437392 Vs Etch 442931

Carsem
A Member of the Hong Leong Group

Stamp 437392 Vs Etch 442931 (Dimension)





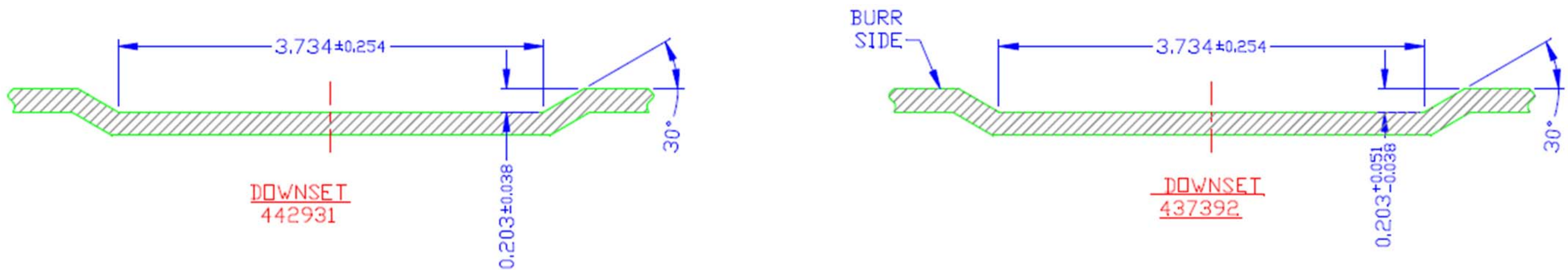


Remarks :

No difference in Dimensions.
Except for the Tiebar/Pad corners due to process difference.

Carsem
A Member of the Hong Leong Group

Stamp 437392 Vs Etch 442931 (Downset)

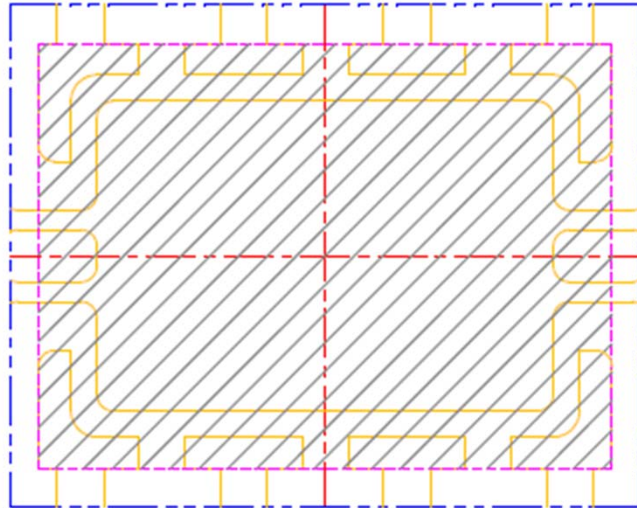


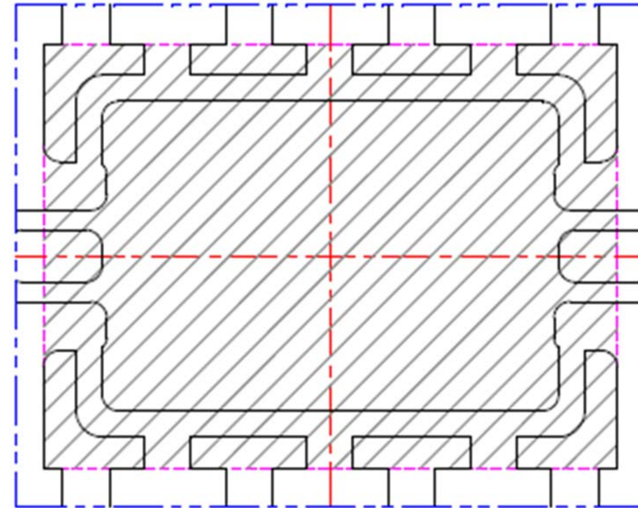
Remarks :

No difference in Downset design

Carsem
A Member of the Hong Leong Group

Stamp 437392 Vs Etch 442931 (Plating)





SPOT Ag
442931

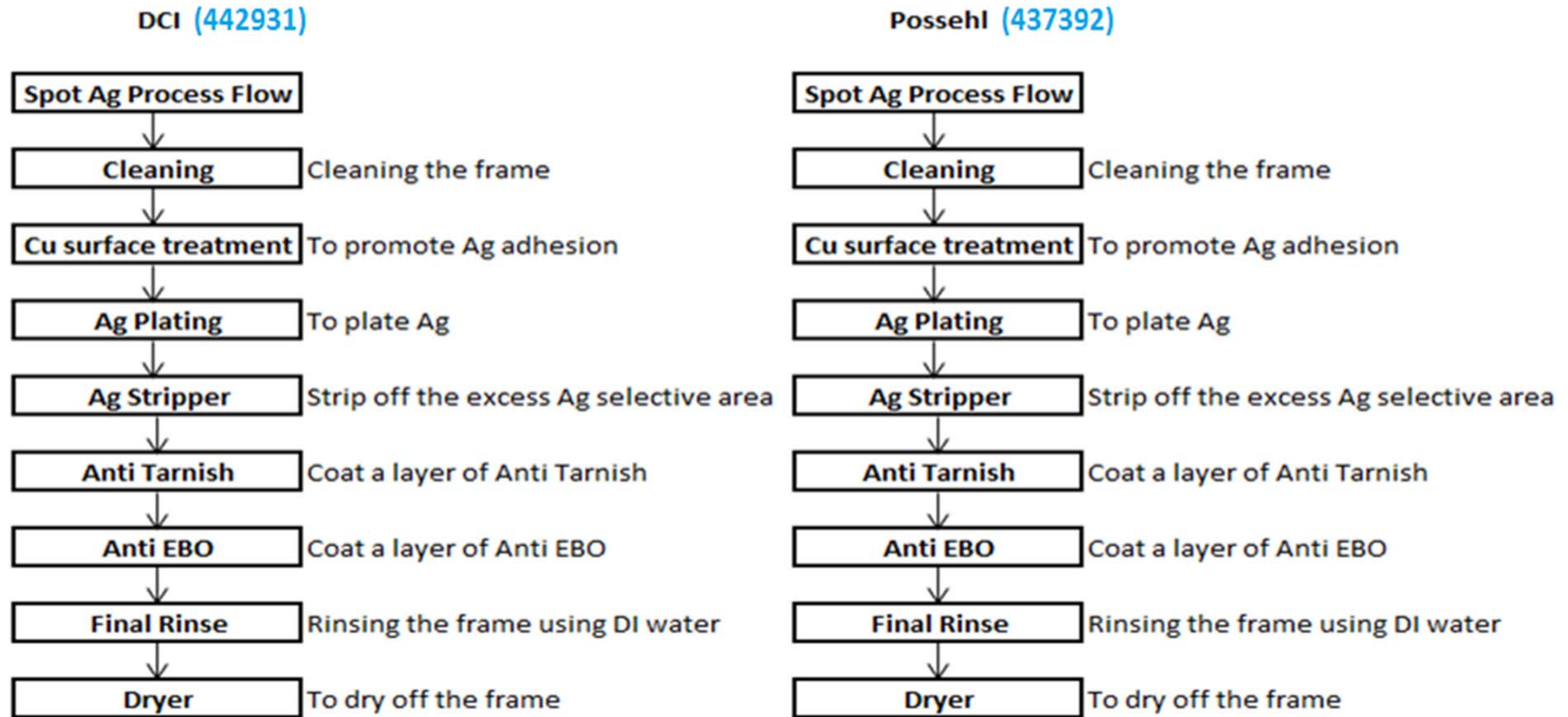
SPOT Ag
437392

Part No.	Ag Thickness	Vendor
442931 (Etch)	Min. 70u"	DCI
437392 (Stamp)	Min. 70u"	POSSEHL

Remarks :
No difference in Ag Plating area & Plating thickness.

Carsem
A Member of the Hong Leong Group

Stamp 437392 Vs Etch 442931 (Plating Flow)



Remarks :
Plating process flow of DCI & Possehl are comparable.

Carsem (M) Sdn.Bhd.

A Member of the Hong Leong Group Malaysia (185524-H)
JALAN LAPANGAN TERBANG P.O BOX 204, 30720 IPOH
PERAK DARUL RIDZUAN , MALAYSIA
(Company No . 124522-U)

Tel : 60-5-31323333 Fax : 60-5- 5265333 Telex : MA44050

ASSEMBLY QUALIFICATION REPORT

CUSTOMER	:	**AAA**
PACKAGE	:	**8SOICMH**
DEVICE	:	**BBB**
LOT#	:	**CCC**
COMPLETION DATE	:	**2014 JUL 07**
REFERENCE	:	**DDD**

BACKGROUND :-

CUSTOMER	:	**AAA**
PACKAGE TYPE	:	**8SOICMH**
DEVICE	:	**BBB**
LOT #	:	**CCC**
COMPLETION DATE	:	**2014 JUL 07**
PREPARED BY	:	**SH POON / CHARANJIT**
DEPARTMENT	:	**IC**
ENGINEERING	:	

KH HO **KARENJITT**

REVIEW & APPROVED BY :

FOL / EOL ENGINEERING MANAGER :

(WH YEOW)

QUALITY ASSURANCE MANAGER :

(SIVA K)

CONTENTS :-

	PAGE
1. Purpose of Qualification Assembly	*4*
2. Assembly Information	*4*
3. Executive Summary	*5*
4. Assembly Yield	*5*
5. Process Test Results	*6-10*
6. Others & Assembly Yield Results	*11*
7. Machine Parameters & Models for Front of Line	*12*
8. Machine Parameters & Models for End of Line	*13*
9. Additional Data Collection	*14-16*

1) *Purpose of Qualification Assembly*

Qualification build for ETCHED leadframe.
Package 8SOICMH

2) *Assembly Information **

		Vendor / Customer	*Part Description*
Wafer Size	:	**AAA**	**6"**
Die Size	:	**AAA**	**66 X 96 mils**
Mounting tape	:	**ADWILL**	**V8**
****Saw Blade*	:	**DISCO**	**HDDD**
Leadframe	:	**DCI**	**SOICMH-8L-095X140-C194-NA-AG.SPOT-NA-E-O**
Collet / Tool size	:	**MICRO MECHANICS**	**60 mils**
Epoxy	:	**ABLESTIK**	**EPXY-AG-8200-10cc**
Wire	:	**TANAKA**	**W1.3-48-AU-C-AL4-TNK**
Bonding Capillary	:	**GAISER**	**CAP-DY-RSB-1836HMX-3XL**
Molding Compound	:	**SUMITOMO**	**CPD-G700HA-16MMX10.3G-GM**
Lead finished	:	**PMI**	**100% TIN PLATE**

** This information shall apply to this qualification lot only.*
*** Where applicable*

3) EXECUTIVE SUMMARY

1.0 The following assembly data were collected :

Front of line (FOL)
Die shear strength
Wire pull strength
Ball shear strength
Ball diamater & ball thickness.

End of line (EOL)
Offset / Mismatch
Package Dimension
Plating Thickness
Visual Inspection

Samples were also observed / tested for

a. Wire sweep and void using X-ray

b. Solderbility

c. Crack and micro gap under 50X

d. C-SAM check after Post Mold Cure

Detailed results of the assembly data are contained in the report.

2.0 ***All the above results are positive, with no failures observed.***

3.0 ***Assembly Yield***

Lot No	***Yield***
CCC	***100.00%***

4.0 ***Non -standard Material Or Processes :*** N/A

5.0 ***Assembly Or Quality Concerns:*** N/A

CUSTOMER : **AAA**

PACKAGE : **8SOICMH**

LOT : **CCC**

4) Process Test Results

Sample	**Saw Kerf (mil)** **s/s = 5 units min.** **Data**
1	0.27
2	0.34
3	0.33
4	0.28
5	0.39
6	0.25
7	0.30
8	0.31
9	0.29
10	0.35
Maximum	**0.39**
Minimum	**0.25**
Spec Limit (L)	**N/A**
Spec Limit (U)	**1.42**
Mean	**0.31**
Std. Dev.	**0.04**

CUSTOMER : **AAA**

PACKAGE : **8SOICMH**

LOT : **CCC**

4) Process Test Results

Sample	Die Shear (kg/f) s/s = 10 units min.	
	Data	Mode
1	11.70	C
2	10.85	C
3	10.50	C
4	12.25	C
5	10.15	C
6	9.70	C
7	10.85	C
8	12.60	C
9	10.30	C
10	10.75	C
11	9.85	C
12	11.05	C
13	10.80	C
14	10.65	C
15	10.15	C
16	11.20	C
17	9.65	C
18	10.50	C
19	11.75	C
20	10.25	C
21	9.80	C
22	10.70	C
23	10.45	C
24	9.50	C
25	11.90	C
Maximum	**12.60**	
Minimum	**9.50**	
Spec Limit (L)	**5.06**	
Spec Limit (U)	**N/A**	
Mean	**10.71**	
Std. Dev.	**0.82**	
PpK	**2.30**	

Note

Die shear failure mode definition.

A : 50.0 - 100.0 % of silicon and epoxy remaining on DAP.
B : 10.0 - 49.0 % of silicon and epoxy remaining on DAP.
C : < 10.0 % of silicon and epoxy remaining on DAP.

CUSTOMER : **AAA**

PACKAGE : **8SOICMH**

LOT : **CCC**

4) Process Test Results

Sample	Wire Pull (g) s/s = 25 wires		Ball Shear (g) s/s = 25 wires	
	Data	Mode	Data	Mode
1	18.10	1	96.60	2
2	19.60	1	101.60	2
3	18.60	1	94.60	2
4	17.70	1	99.60	2
5	19.50	1	95.80	2
6	18.10	1	97.60	2
7	20.40	1	99.20	2
8	18.60	1	100.40	2
9	19.60	1	103.60	2
10	18.10	1	99.60	2
11	19.50	1	100.40	2
12	16.90	1	98.80	2
13	18.80	1	92.60	2
14	20.10	1	89.60	2
15	18.00	1	99.80	2
16	19.60	1	100.40	2
17	19.20	1	102.60	2
18	17.20	1	98.60	2
19	19.50	1	98.60	2
20	18.70	1	99.20	2
21	16.60	1	95.00	2
22	18.00	1	102.00	2
23	20.10	1	97.60	2
24	16.90	1	99.80	2
25	18.20	1	100.80	2
Maximum	**20.40**		**103.60**	
Minimum	**16.60**		**89.60**	
Spec Limit (L)	**5.00**		**60.00**	
Spec Limit (U)	**N/A**		**130.00**	
Mean	**18.62**		**98.58**	
Std. Dev.	**1.08**		**3.17**	
Ppk	**4.22**		**4.05**	

Note

Wire pull failure mode definition.
1 : Wire Break at neck point.
2 : Wire break at the point other than neck.
3 : Lifted bond.
4 : Lifted weld.

Ball shear failure mode definition.
1 : < 25.0 % of gold remaining on bond pad.
2 : > 25.0 % of gold remaining on bond pad.
3 : Lifted bond.
4 : Exposed underlying material.

CUSTOMER : **AAA**

PACKAGE : **8SOICMH**

LOT : **CCC**

4) ***Process Test Results***

Sample	Offset / Mismatch (mm) s/s = 1 shot / mold (4 units) Horizontal	Offset / Mismatch (mm) s/s = 1 shot / mold (4 units) Vertical	Physical Dimension s/s = 15 units min.			
			Lead Spread (mm)	Stand Off Height: Left (mm)	Stand Off Height: Right (mm)	Coplanarity (mm)
	Data	Data	Data	Data	Data	Data
1	0.033	0.028	6.015	0.158	0.153	0.008
2	0.030	0.026	6.005	0.150	0.165	0.011
3	0.028	0.030	6.008	0.163	0.164	0.003
4	0.028	0.024	6.015	0.163	0.165	0.009
5			6.024	0.167	0.158	0.008
6			6.024	0.169	0.168	0.011
7			6.002	0.168	0.151	0.009
8			6.029	0.170	0.160	0.009
9			6.020	0.159	0.151	0.013
10			6.050	0.158	0.155	0.013
11			6.028	0.165	0.150	0.002
12			6.021	0.155	0.149	0.009
13			6.043	0.168	0.174	0.004
14			6.046	0.169	0.160	0.012
15			6.002	0.158	0.151	0.004
16			5.992	0.167	0.152	0.004
17			6.015	0.169	0.162	0.008
18			6.020	0.160	0.163	0.009
19			6.020	0.167	0.164	0.015
20			6.034	0.158	0.149	0.006
21			6.096	0.160	0.168	0.007
22			6.072	0.157	0.160	0.003
23			6.090	0.154	0.165	0.009
24			6.010	0.160	0.163	0.016
25			6.044	0.154	0.172	0.006
Maximum	**0.0330**	**0.0300**	**6.059**	**0.170**	**0.174**	**0.016**
Minimum	**0.0280**	**0.0240**	**5.992**	**0.150**	**0.149**	**0.002**
Spec Limit (L)	**N/A**	**N/A**	**5.800**	**0.100**	**0.100**	**0.000**
Spec Limit (U)	**0.0508**	**0.0508**	**6.200**	**0.250**	**0.250**	**0.100**
Mean	**0.0298**	**0.0270**	**6.029**	**0.162**	**0.160**	**0.008**
Std. Dev.	**0.0024**	**0.0026**	**0.026**	**0.006**	**0.007**	**0.004**
PPK			**2.181**	**3.572**	**2.681**	**8.055**

REMARKS : Result is pass & all measurement is within spec.

CUSTOMER : AAA

PACKAGE : 8SOICMH

LOT : CCC

4) Process Test Results

Sample	Tin Thickness (uinch) s/s = 10 units min.	Tin Composition s/s = 10 units min.
	Data	**Data**
1	623.50	100.00
2	623.40	100.00
3	632.80	100.00
4	647.30	100.00
5	643.50	100.00
6	642.00	100.00
7	557.60	100.00
8	621.50	100.00
9	610.80	100.00
10	624.30	100.00
11	561.30	100.00
12	645.80	100.00
13	648.20	100.00
14	610.50	100.00
15	621.40	100.00
16	641.60	100.00
17	623.50	100.00
18	632.50	100.00
19	612.50	100.00
20	603.50	100.00
21	635.50	100.00
22	624.80	100.00
23	642.30	100.00
24	642.80	100.00
25	614.70	100.00
Maximum	**648.20**	**100.00**
Minimum	**557.60**	**100.00**
Spec Limit (L)	**400.00**	**97.00**
Spec Limit (U)	**1000.00**	**100.00**
Mean	**623.50**	**100.00**
Std. Dev.	**23.21**	**N/A**
PPK	**3.209**	**N/A**

REMARKS : Result is pass & all measurement is within spec.

CUSTOMER : AAA

PACKAGE : 8SOICMH

LOT : CCC

5) Other Tests

	Sample Size		Test Results
Micro Gap / Crack @ 50X scope			
- After Trim	1 frames / lot		0 / 256 - Pass
- Form/singulation	45 units / lot		0 / 45 - Pass
Intermetallic Check	3 units / lot		0 / 3 - Pass
(Spec : Min 60% IMC coverage)			(Above 60% coverage)
Solderability	4 units / condition	0hr - 245-260'C	0 / 10 - Pass
(0 hr and 8hr steam age, 245-260'C dip)		8hr - 245-260'C	0 / 10 - Pass
X-ray inspection			
*Wire sweep	1 mold shot / lot		0 / 512- Pass
(Spec : Max wire sweep <15%)			
*Internal void	1 mold shot / lot		0 / 512- Pass
Visual Inspection	1 mold shot / lot		0 / 512- Pass

6) Assembly yield results

Operation	Qty in	Qty out	Yield	Destructive Test # of units	Defect breakdown / remarks
2nd Optical	80	80	100.00%	N/A	N/A
3rd Optical	80	80	100.00%	N/A	N/A
4th Optical	80	80	100.00%	N/A	N/A
Assembly Yield	80	80	100.00%		

Note: All destructive test units will be excluded from the yield computation

7) ***Machine Parameters & Models For Front Of Line***

Process	***Equipment Model***	***Process Parameters***		
a) Wafer mount	Longhill	Top vacum :	4	kpa
	MODEL : LH-832	Bottom vacum :	6.5	kpa
	WMLH 008			
b) Wafer saw	DISCO 641	DI Resistivity	18.5	MW/cm
	DSDC056	Water Flow Rate @ - Cutting	1.6	l/min
		Cooling	1.6	l/min
		CO2 Bubbler Resistivity	0.92	MW/cm
		Cut speed	1.5	inch/s
c) 2nd Optical Inspection	NIKON SCOPE	Magnification	100X	
d) Die Attach	ASM838	Bond Time :	55	ms
	DAAM059	Bond Force :	80	g
		Dispense Time :	50	ms
		Dispense Pressure :	40	kPa
e) Epoxy Oven Cure	BLUE M OVEN	Cure Temperature :	175	^{o}C
	OVBM 013	Duration :	2	hr
		N2 Flowrate :	50	SCFH
f) Wire Bond	ASM EAGLE 60	1st Bond Power :	45	Dac
	WBAM 419	1st Bond Force :	65	g
		1st Bond Time :	30	ms
		2nd Bond Power :	75	Dac
		2nd Bond Force :	75	gm
		2nd Bond Time :	20	ms
		Bond temperature :	200	^{o}C
g) 3rd Optical Inspection (100%)	DIAS TODI 068	Magnification :	30x min	

8) Machine Parameters & Models For End Of Line

	Process			Parameter	Value	Unit
a)	Mold	Model:	ASM MOLD	Mold Temperature :	175	^{o}C
		Machine #:	AMAM 033	Transfer Pressure :	2000	psi
				Transfer Time :	9	sec
				Clamp Pressure :	150	ton
				Cure Time :	80	sec
b)	Laser marking	Model:	ASM			
		Machine #:	LMAM008			
c)	Post Mold Cure	Model:	TABAI	Oven Temperature :	175°C ± 5°C	
		Machine #:	OVYA005	Cure Duration :	6 hrs	
d)	Degate and dejunk	Model:	ASM			
		Machine #:	DJAM011			
e)	Tin Plating	Model:	CEM1500SS	Plating :	240	Amp
		Machine #:	SPCM008	Descaler :	1.4	S.G.
				Solution Temperature :	34	^{o}C
				DI Water Resistivity :	5.7	M ohm
f)	Mechanical sin	Model:	FOSYS			
		Machine #:	FSFO018			

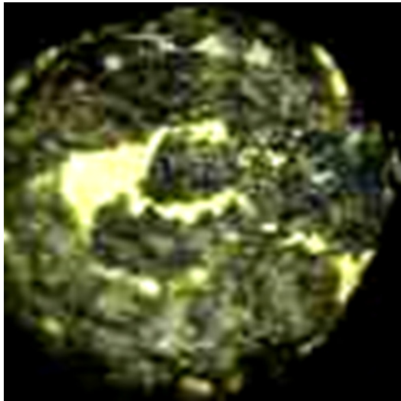
CUSTOMER : AAA

PACKAGE : 8SOICMH

LOT : CCC

9) Additional Data Collection

Intermatallic Test : Pass,all ball bond > 70% coverage.



CUSTOMER : AAA

PACKAGE : 8SOICMH

LOT : CCC

9) <u>Additional Data Collection</u>
<u>X-RAY Images</u>
Result - Pass

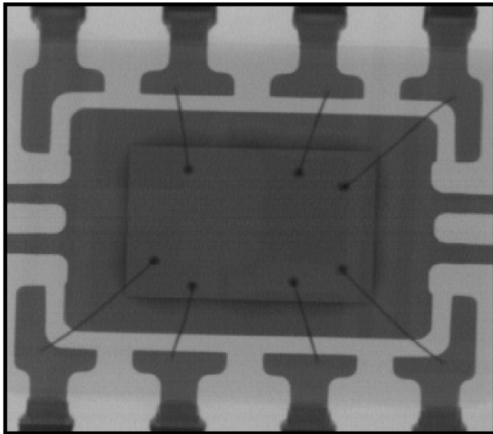


Fig a: Photo shows no wire sweep

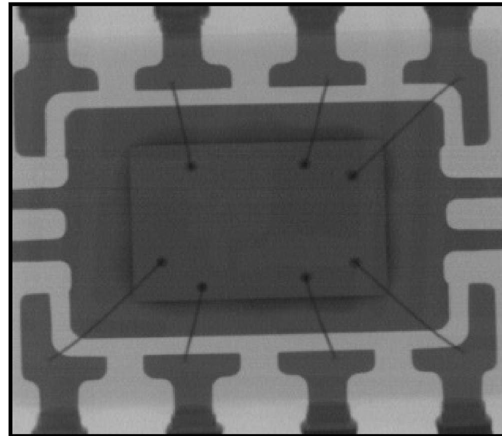


Fig b: Photo shows no wire sweep

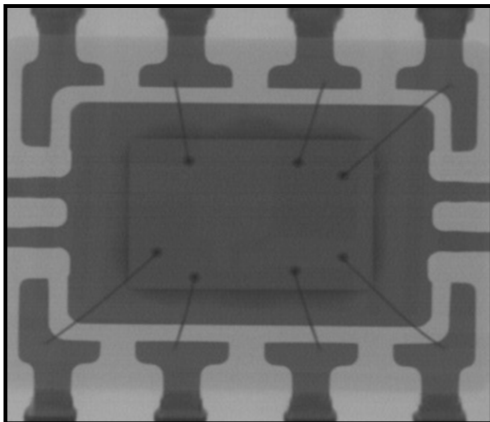


Fig c: Photo shows no internal void

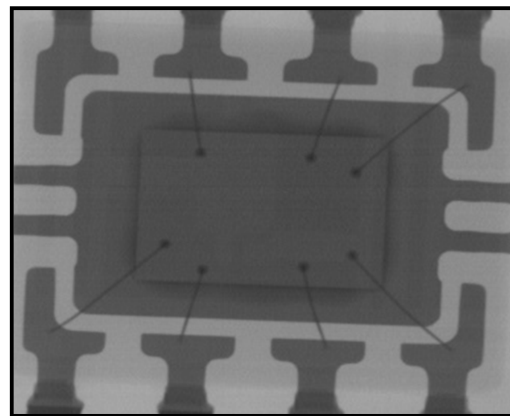


Fig d: Photo shows no internal void

REMARKS : No internal void observed & wire sweep is within spec (<20%).

CUSTOMER : **AAA**

PACKAGE : **8SOICMH**

LOT : **CCC**

9) Additional Data Collection

C-SAM Images

C-Sam After PMC Result .

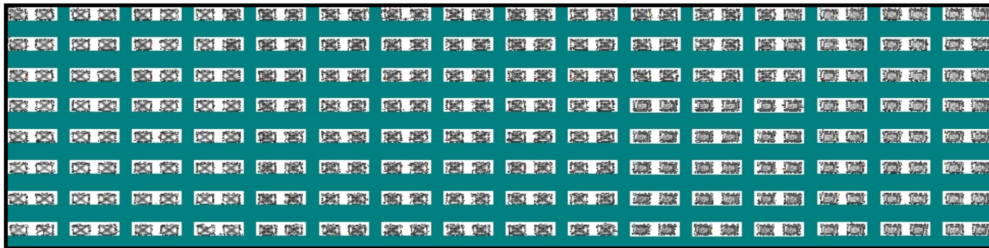


Fig a: C-SAM After PMC (Top View)

Fig b: C-SAM After PMC (Bottom View)

REMARKS : No delam observed. Result is pass.