PRODUCT / PROCESS CHANGE NOTIFICATION
PCN-000703
Date: 01-03-2022

Semtech Corporation, 200 Flynn Road, Camarillo CA 93012

Change Details

Part Number(s) Affected:	Customer Part Number(s) Affected: ☒ N/A
TS13102-QFNR	

Description, Purpose and Effect of Change:

Assembly transfer - For Device TS13102-QFNR
Assembly Transfer from Carsem Suzhou to Carsem Malaysia
Qualification and Reliability report attached

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 or Reliability

Implementation Date	**01/03/2022**	**Work Week**	**WW01**
Last Time Ship (LTS) Of unchanged product	**N/A**	**Affecting Lot No. / Serial No. (SN)**	**N/A**
Sample Availability	**-**	**Qualification Report Availability**	**Yes**

Supporting Documents for Change Validation/Attachments:

- **TS13102-QFNR – Qual Data (attached to letter)**
- **TS13102-QFNR – Assembly Qual Data (attached to letter)**

Issuing Authority

Semtech Business Unit:	Power Management	
Semtech Contact Info:	***Carlos Sierra*** *Quality Assurance* *Semtech Corporation* 200 Flynn Road Camarillo, CA, 93012 *csierra@semtech.com*	Digital signature Carlos Sierra

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TS13102-QFNR Carsem Ipoh Qualification Report

TS13102-QFNR– Qual Data

Description	Acceptance Criteria	Remarks	Data
Test Repeatability: - 3~5 Devices loop run 30 times;	Pass or Fail 100% match	**PASS** Done. 10 Units 33X – PASS Consistently. Data as in attached file.	TS13102-QFNR_218842.1_10PCS_33X.zip

Description	Acceptance Criteria	Remarks	Data
Bin-to-Bin Correlation: - For each production test insertion, a minimum sample of 300 units must be used. - Minimum 15 reject units.	100% Bin-to-Bin correlation for all good and reject units - Pass/fail correlation; - Bin Swap/flip - Yield difference (Bin Paretos) - Wafer map;	**PASS** Done. Attached is the data and summary. All samplings are matching for Bin to Bin Summary vs Physical	Bin to Bin Correlation

Description	Acceptance Criteria	Remarks	Data
QA gate validation: -Good units from 3 different wafer lots shall be tested 100% at QA gate after these lots have been processed through final production test flow.	No QA Gate failures.	**PASS** Done. For 1 Qualification lot.Attached is the data and summary. All 100% Inline QA sampling test is PASS	QA

TS13102-QFNR– Qual Data

Description	Acceptance Criteria	Remarks	Data
Tester-to-tester variation: GR&R - Perform tester to tester variation analysis for selected parameters; - Tester 1, Tester 2; - DIB1, DIB2; - Test site 1 to test site n;	Tester-to-Tester variation (GR&R) for selected parameters: - GRR<=10% Acceptable; - GRR<=33% Waiver required; - GRR >33% reject;	**PASS** Done. All within spec. Using Site 1 and Site2 from same tester.	GR&R

TS13102-QFNR– Qual Data

CPK Carsem Ipoh VS Carsem Suzhou

			SUZHOU				IPOH			
T#	name	units	execs	mean	stddev	cpk	execs	mean	stddev	cpk
400001	SW1_STRESS	VOLTS	1609	84.7645665	0.123346898	0.836777272	1488	84.72608855	0.087972175	1.037871527
400002	SW2_STRESS	VOLTS	1586	64.95802579	0.134005072	0.104409506	1487	64.91951998	0.078221605	0.342957336
600006	IVGG_PST_5p25V	uAMPS	934	1.770594703	0.3133069	0.819850765	1412	1.802055829	0.288573791	0.926459548
1400002	TCLK_MIN_ON	uSECONDS	906	0.849971988	0.022668118	0.294510849	1392	0.84218627	0.0249545	0.371526016
1400005	TBIT_MIN	uSECONDS	906	6.799775908	0.18134494	0.368035813	1392	6.757490159	0.199656002	0.458314289
1500001	VGG	VOLTS	906	5.423539198	0.012533503	0.709730128	1392	5.41967291	0.012412581	0.81441295

Conclusion:

- From the Cpk data comparison most of test parameter are Good.
- Critical parameters looks good.
- 6 Test parameters with CPK lower than 1.33
- However these test are comparable between Carsem Ipoh and Carsem Suzhou. Ipoh results are better.

Overall result is acceptable.

Microsoft Excel Worksheet

TS13102-QFNR– Qual Data

SPIKE CHECK

- ❑ Spike Check done ETS, while loop testing the device.
- ❑ No ripple found and no device damaged during the loop test.
- ❑ All the waveform captured within acceptable range
- ❑ Details are in the spike plot check attached.

TS13102-QFNR– Qual Data- Other Summary

- ❑ No changes do to the Test Program, Limits:
  FT Program: *EF1310204 (FTP-TS13102-QFNR-ETS-Rev04 (ECO-049930))*
  QA Program: *EF1310204 (QTP-TS13102-QFNR-ETS-Rev04 (ECO-049930))*
- ❑ Both Carsem Suzhou and Ipoh uses the same Tester Platform (ETS)
- ❑ Both Carsem Suzhou and Ipoh uses the same QC flow diagram *100% FT and Sample QA*.
- ❑ No Changes required in Control Plan and FMEA.

PCN No. 000703
Qualification of Carsem Ipoh for TS13102-QFNR products

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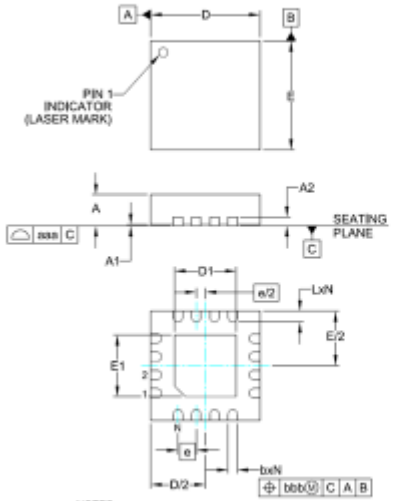
Introduction

- TS13102-QFNR is been qualified in carsem Ipoh, Malaysia as a site for assembly. Current Assembly is performed in Carsem SuZhou, China.
- The change affect applicable to products:
  TS13102-QFNR
- Qualification Vehicles selected are ZSPM4561CI1R
- Schedule for Implementation
  Passing REL qualification MSL 1 under Rel job# 7197.

SEMTECH Package Outline on TS13102-QFNR CarsemSZ (Old) and CarsemIPH (New)



DIMENSIONS			
DIM	MILLIMETERS		
	MIN	NOM	MAX
A	0.80	0.90	1.00
A1	0.00	0.02	0.05
A2	-	(0.20)	-
b	0.18	0.25	0.30
D	2.90	3.00	3.10
D1	1.55	1.70	1.80
E	2.90	3.00	3.10
E1	1.55	1.70	1.80
e	0.50 BSC		
L	0.20	0.30	0.40
N	16		
aaa	0.08		
bbb	0.10		

No Change in Package Outline.

NOTES:
1. CONTROLLING DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).
2. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

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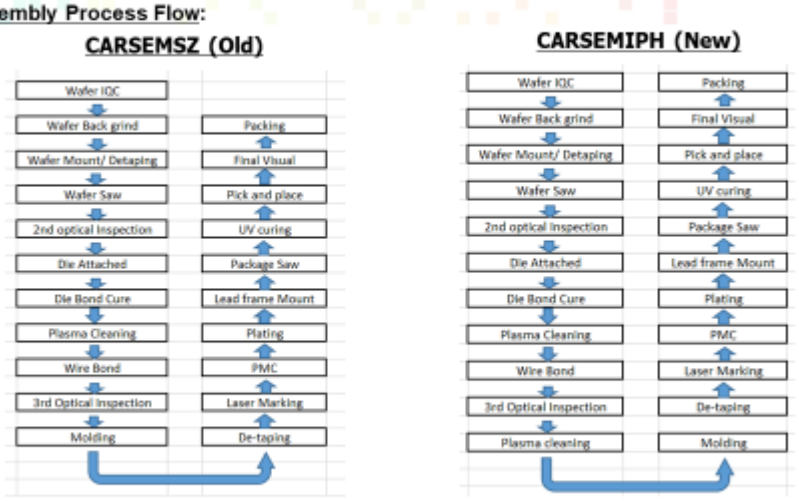
Assembly Process Flow Comparison for CarsemSZ (Old) vs. CarsemIPH (New)

Assembly Process Flow:



- No major Change in manufacturing Flow for both Assembly site CarsemSZ versus CarsemIPH except additional process step for plasma cleaning before mold for Carsem Ipoh.

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BOM Comparison CarsemSZ (Old) vs CarsemIPH (New)

CarsemSZ (Old)				CarsemIPH (New)			
Epoxy	Leadframe	Wire Type	Mold compound	Epoxy	Leadframe	Wire Type	Mold compound
Henkel QMI-519 Conductive epoxy	DCI AgCu LDF	1.2 mils PdCu wire	Sumitomo G770HCD	Henkel QMI-519 Conductive epoxy	DCI AgCu LDF	1.2 mils PdCu wire	Sumitomo G770HCD

- BOM for both supplier CarsemSZ and CarsemIPH are no difference.

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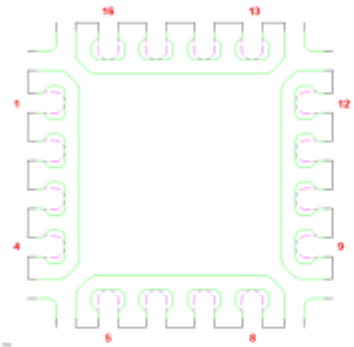
Lead frame outline Comparison CARSEMSZ (OLD) Vs CARSEMIPH(NEW)

Lead frame Outline



Die Pad :2.1 x 2.1mm
Exposed Pad : 1.7 x 1.7mm

No Difference on lead frame outline for CARSEMSZ and CARSEMIPH as both are using the same lead frame.

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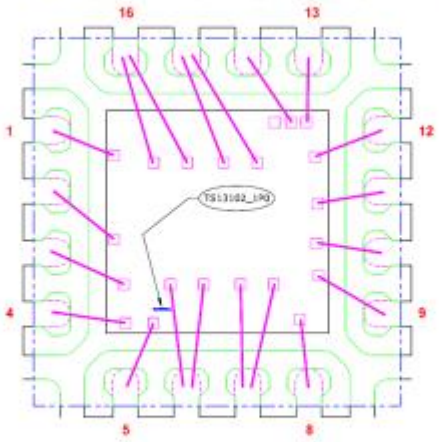
Bonding Layout (CarsemSZ vs CarsemIPH)

SEMTECH



No Change in Bonding Layout.

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Part Numbers Affected: TS13102-QFNR