



PRODUCT / PROCESS CHANGE NOTIFICATION

PCN-000711

Date: 12-15-2021

P1/9

Semtech Corporation, 200 Flynn Road, Camarillo CA 93012

Change Details

Part Number(s) Affected:

- TS30012-M033QFNR;
- TS30012-M050QFNR;
- TS30013-M000QFNR;
- TS30013-M033QFNR;
- TS30013-M050QFNR;

Customer Part Number(s) Affected: N/A

Description, Purpose and Effect of Change:

Add Carsem Ipoh to support production Assembly & Final Test)

Change Classification	<input checked="" type="checkbox"/> Major <input type="checkbox"/> Minor	Impact to Form, Fit, Function	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Impact to Data Sheet	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	New Revision or Date	<input checked="" type="checkbox"/> N/A

Impact to Performance, Characteristics or Reliability:

No Impact to performance , Characteristics or Reliability

Implementation Date	12/15/2021	Work Week	WW51
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:

- TS3001X-M0XXQFNR SZ to Ipoh qual data Transfer (TEST QUAL DATA)
- TS3001X-M0XXQFNR SZ to Ipoh qual data Transfer (ASSEMBLY QUAL DATA)

Issuing Authority

Semtech Business Unit:	Power Management	
Semtech Contact Info:	<i>Carlos Sierra</i> Quality Assurance Semtech Corporation 200 Flynn Road Camarillo, CA, 93012 csierra@semtech.com	

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



Site Transfer
P/N TS3001X-M0XXQFNR

From: Carsem Suzhou
To: Carsem Ipoh






COMPARISON BETWEEN CARSEM SUZHOU & CARSEM IPOH

ITEM	CARSEM SUZHOU	CARSEM IPOH
ATE Tester	ETS364	ETS364
Handler	Manufatcurer : SRM Model : XD248 Type : Turret/Rotary # Sites : Quad	Manufatcurer : SRM Model : XD248 Type : Turret/Rotary # Sites : Quad
Load Board	TS3001X/3004X	TS3001X/3004X
Test Program	ef3001100_BC_10 ef3001115_BC_10 ef3001118_BC_10 ef3001125_BC_10 ef3001133_BC_10 ef3001150_BC_10 ef30011_BC_11	ef3001100_BC_10 ef3001115_BC_10 ef3001118_BC_10 ef3001125_BC_10 ef3001133_BC_10 ef3001150_BC_10 ef30011_BC_11



SZ vs IPOH Handler Comparison





	Carsem Ipoh	Carsem SZ		IPOH - S248	SZ - XD248
Model	S248	XD248	Handler Photo		
Manufacturer	SRM Integration (Malaysia) Sdn Bhd	SRM Integration (Malaysia) Sdn Bhd		GUI	
No of Site	Quad	Quad			
Top Marking & Orientation Vision	Yes	Yes			
Coplanarity & Pad Smear Vision	Yes	Yes			
Integrated Tape and Reel	Yes	Yes			
In Pocket Vision	Yes	Yes			
Socket Cleaning Frequency	1x/Shift	1x/Shift			
Impact to Part Lifetime	None	None			


Remarks: Both Carsem SZ and Carsem IPOH handlers are compatible with similar capabilities

TS3001X Series – 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.	 CORR_UNIT_LOOP33X.csp

Description	Acceptance Criteria	Remarks	Data
Bin-to-Bin Correlation: - Good and rejects bins are sorted according to the Bin assignment	100% Bin-to-Bin correlation for all good and reject units - Pass/fail correlation;	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 to be tested 100% at QA gate after these lots have been processed through final production test flow.	No QA Gate failures.	PASS Done. Attached is the data and summary. All 100% Inline QA sampling test is PASS	 QA Summary

TS3001X Series – 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 Site1 and Site 2 from same tester.	 TS3001X GRNR

Test#	Test Name	Unit	Sample	In Spec	Max Spec	Average Min	Average Max	Average Mean	StDev	Max-AveMin	Min-AveMax	Mean - Mean	Mean + Mean	Repeatability	Reproducibility	%R&R	%R&R	Remarks
10000101	lim_meas_val	AMPS	30	1.50	2.000	1.801	1.807	1.804	0.006	1	1	0.242	0.000	0.242	0.000	0.242	48.4%	Leakage Test. Baseline issue. Test is capable with cpk > 1.33
10000101	osc_meas_val	KHERTZ	30	960.00	1050.000	997.984	998.820	998.902	0.036	1	1	43.059	0.000	43.059	0.000	43.059	47.0%	High frequency. Baseline issue. Test is capable with cpk > 1.33
10100411	in_val	VOLTS	30	3.90	4.700	4.452	4.454	4.453	0.002	1	1	0.383	0.000	0.383	0.000	0.383	37.9%	Vout Measurement. Baseline issue. Test is capable with cpk > 1.33
100070101	ovuv_meas_val	%	30	88.00	102.000	100.972	100.964	100.976	0.012	1	1	1.175	0.000	1.175	0.000	1.175	29.4%	Several factors affecting %R&R > 10% that can be attributed to ATE
20100414	en_leak_ov_delta	uAIPS	30	-3.00	3.000	-1.068	-1.068	-1.068	0.019	1	1	1.885	0.000	1.885	0.000	1.885	37.9%	Capacity. none minor
10100410	en_leak_ov	uAIPS	30	-3.00	3.000	-1.608	-1.548	-1.577	0.062	1	1	1.948	0.000	1.948	0.000	1.948	26.5%	Differences on Waferboards, cables, sockets, interface boards, etc. These tests have historically high %R&R > 18% since day 1 in Carsem SZ. These tests do not impact FT yield since the tests are capable with cpk > 1.33. Test distribution between Carsem SZ and Carsem IPOH are comparable
20100413	en_leak_ov_delta	uAIPS	30	-0.10	0.100	-0.017	-0.011	-0.014	0.007	1	1	0.843	0.000	0.843	0.000	0.843	21.6%	
100140103	vout_meas	VOLTS	30	3.25	3.346	3.299	3.300	3.300	0.001	1	1	0.018	0.000	0.018	0.000	0.018	19.6%	
100010121	bg_tc_eff	mVOLTS	30	-10.00	10.000	0.334	0.788	0.521	0.374	1	1	3.757	0.000	3.757	0.000	3.757	18.6%	
20100416	PG_authorized_leak_delta	nAIPS	30	-30.00	30.000	0.575	2.822	1.899	2.247	1	1	10.293	3.196	10.293	3.196	10.778	18.0%	
10100412	en_resist	uAIPS	30	88.00	245.000	169.346	169.517	169.433	0.179	1	1	28.005	0.000	28.005	0.000	28.005	17.6%	
10100409	en_leak_ov	uAIPS	30	-1.00	0.000	-1.424	-1.427	-1.415	0.018	1	1	0.313	0.000	0.313	0.000	0.313	12.0%	
20100407	en_leak_ov_posit	uAIPS	30	-2.00	1.000	-1.414	-1.389	-1.422	0.024	1	1	0.318	0.000	0.318	0.000	0.318	10.5%	
10104040	pg_eff_&_js	nAIPS	30	-25.00	28.000	17.283	24.961	20.907	7.387	1	1	19.304	11.528	19.304	11.528	22.552	18.0%	

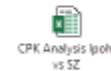
TS3001X – Carsem Ipoh Qual Data



CPK Carsem SZ VS Carsem Ipoh - Summary

High Capacity Analysis Data														30 Samples Production Data													
Test Number	Test Name	Mean	Std Dev	Min	Max	%	Spec Limit	Spec High	Std %	% Spec	Yield	Pre Def Item	Def	Test Number	Test Name	Mean	Std Dev	Min	Max	%	Spec Limit	Spec High	Std %	% Spec	Yield	Pre Def Item	Def
100010102	bg_tc_eff_val	7	0.607	0	7	88%	0	7	0	88%	100	0	0.619	10010102	bg_tc_eff_val	7	0.603	0	7	81.6%	0	7	0	81.6%	100	0	0.623
100030100	en_leak_ov_val	5	0	0	7	88%	0	7	0	88%	100	0	0.376	100030100	en_leak_ov_val	6	0	0	7	61.4%	0	7	0	61.4%	100	0	0.308
100140101	vout_meas_val	3	0	0	31	0	0	31	0	0	0	0	0.345	100140101	vout_meas_val	11	0	0	31	61.4%	0	31	0	61.4%	100	0	0.381
100010100	en_leak_ov	3	0	0	7	88%	0	7	0	88%	100	0	0.308	100010100	en_leak_ov	0	0	0	7	61.4%	0	7	0	61.4%	100	0	0.361
100010100	en_leak_ov	0	0	0	31	0	0	31	0	0	0	0	0.308	100010100	en_leak_ov	11	0	0	31	61.4%	0	31	0	61.4%	100	0	0.361

Critical Parameter looks good



Conclusion:
From the Cpk data all parameters are comparable for both Suzhou and Carsem

TS3001X Series – Qual Data



SPIKE CHECK

- Spike Check done ETS, while loop testing the device.
- No ripple found and no device damaged during the 1000X loop test.
- All the waveform captured within acceptable range
- Details are in the spike plot check attached.
- Spike check for both Carsem Suzhou and Carsem Ipoh are compatible



TS3001X Series – Qual Data – Other Summary



- No changes done to the Test Program and Limits:
 - FT Program:** *ef30011XX_BC_10 (ECO-053461) – TS30011-MOXXQFNR*
& *ef30011_BC_11 (ef30011_BC_11) – TS30012-MOXXQFNR & TS30013-MOXXQFNR*
 - QA Program:** *ef30011XX_BC_10 (ECO-053461) – TS30011-MOXXQFNR*
& *ef30011_BC_11 (ef30011_BC_11) – TS30012-MOXXQFNR & TS30013-MOXXQFNR*
- 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. 000711

Qualification of Carsem Ipoh for TS3001X-M0XXQFNR products

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Introduction



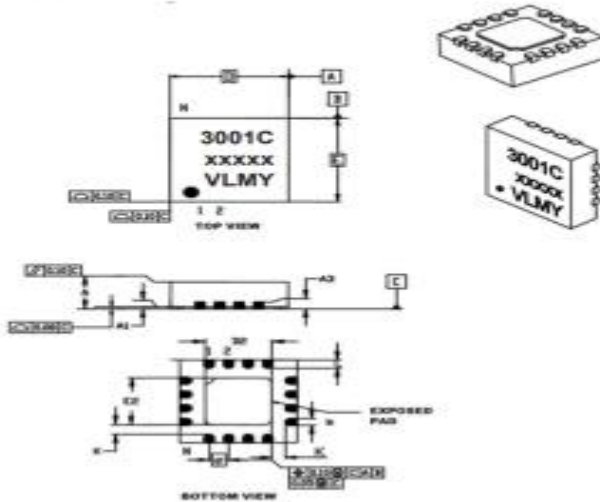
- TS3001X-M0XXQFNR Series have been qualified in Carsem Ipoh, Malaysia as a site for assembly. Current Assembly is performed in Carsem SuZhou, China.

- The change affect applicable to products:
TS3001X-M0XXQFNR

- Qualification Vehicles selected are ZSPM4561CI1R

- Schedule for Implementation
Passing REL qualification MSL 1 under Rel job# 7197.

SEMTECH Package Outline on TS3001X-M0XXQFNR
CarsemSZ (Old) and CarsemIPH (New)



Units	Dimensions Limits	Millimeters		
		Min	NCM	MAX
Number of Pins	N	16		
Pitch	e	0.50 BSC		
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3	0.20 REF		
Overall Length	D	3.00 BSC		
Exposed Pad Width	E2	1.55	1.70	1.80
Overall Width	E	3.00 BSC		
Exposed Pad Length	D2	1.55	1.70	1.80
Contact Width	b	0.20	0.25	0.30
Contact Length	L	0.20	0.30	0.40
Contact-to-Exposed Pad	K	0.20	-	-

No Change in Package Outline.

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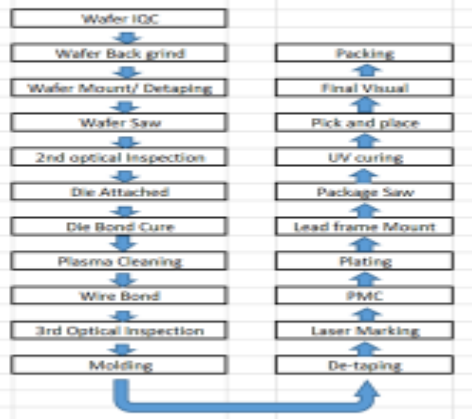
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Assembly Process Flow Comparison for
CarsemSZ (Old) vs. CarsemIPH (New)

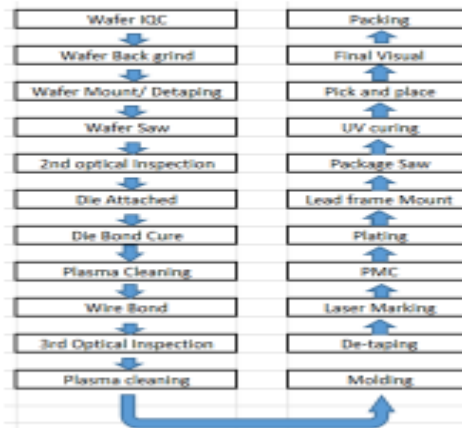


Assembly Process Flow:

CARSEMSZ (Old)



CARSEMIPH (New)



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

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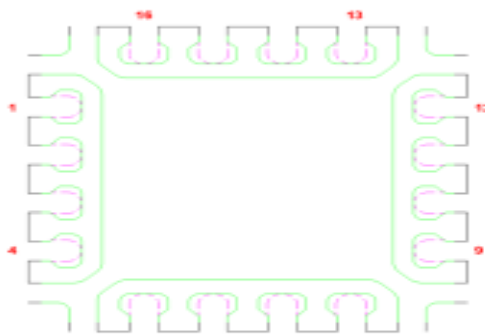
BOM Comparison CarsemSZ (Old) vs CarsemIPH (New)

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.

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

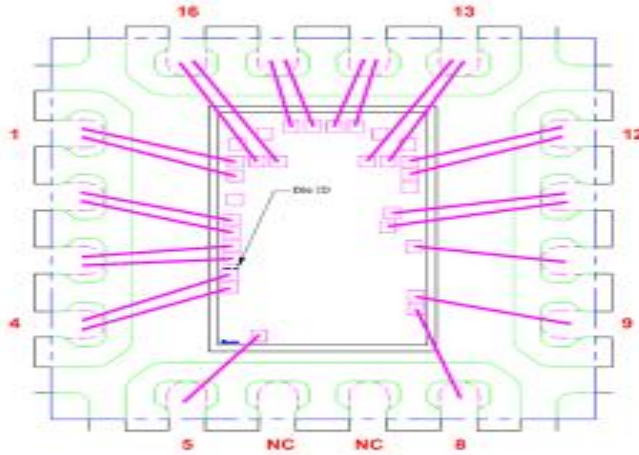
Lead frame Outline



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.

**Bonding Layout (CarsemSZ vs
CarsemIPH)**



No Change in Bonding Layout.