



**PRODUCT / PROCESS CHANGE NOTIFICATION**  
**PCN-000712**  
**Date: 12-29-2021**

P1/9

Semtech Corporation, 200 Flynn Road, Camarillo CA 93012

**Change Details**

<b>Part Number(s) Affected:</b>  -TS30041-M000QFNR; -TS30041-M015QFNR; -TS30041-M018QFNR; -TS30041-M025QFNR; -TS30041-M033QFNR; -TS30041-M050QFNR; -TS30042-M000QFNR; -TS30042-M015QFNR; -TS30042-M018QFNR; -TS30042-M025QFNR; -TS30042-M033QFNR; -TS30042-M050QFNR;	<b>Customer Part Number(s) Affected:</b> <input checked="" type="checkbox"/> N/A
---	--

**Description, Purpose and Effect of Change:**  
 Add Carsem Ipoh to support production Assembly & Final Test)

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


**Impact to Performance, Characteristics or Reliability:**  
 No Impact to performance , Characteristics or Reliability

<b>Implementation Date</b>	<b>12/29/2021</b>	<b>Work Week</b>	<b>WW53</b>
<b>Last Time Ship (LTS)</b> <small>Of unchanged product</small>	<b>N/A</b>	<b>Affecting Lot No. / Serial No. (SN)</b>	<b>N/A</b>
<b>Sample Availability</b>	-	<b>Qualification Report Availability</b>	<b>Yes</b>

**Supporting Documents for Change Validation/Attachments:**

- TS3004X-M0XXQFNR SZ to Ipoh Test qual data Transfer
- TS3004X-M0XXQFNR SZ to Ipoh Assembly qual data Transfer

**Issuing Authority**

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



**PRODUCT / PROCESS CHANGE NOTIFICATION**  
**PCN-000712**  
**Date: 12-29-2021**

P2/9

[csierra@semtech.com](mailto:csierra@semtech.com)

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



**Site Transfer**

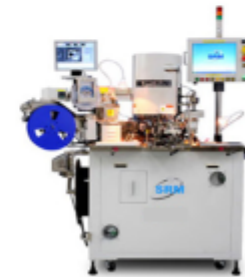
**P/N TS30041-M0XXQFNR & TS30042-M0XXQFNR**

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	ef3004x_BC01 (TP-001224)	ef3004x_BC01 (TP-001224)




**SZ vs IPOH Handler Comparison**


	Carsem Ipoh	Carsem SZ
Model	S248	XD248
Manufacturer	SRM Integration (Malaysia) Sdn Bhd	SRM Integration (Malaysia) Sdn Bhd
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


	IPOH - S248	SZ - XD248
Handler Photo		
GUI		

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


## TS3004X Series – Qual Data

Description	Acceptance Criteria	Remarks	Data
<b>Test Repeatability:</b> - 3-5 Devices loop run 30 times.	Pass or Fail 100% match	<b>PASS</b> Done. 10 Units 33X – PASS Consistently. Data as in attached file.	 TS30042_02_GNRL_COMP_LIOPR331.zip

Description	Acceptance Criteria	Remarks	Data
<b>Bin-to-Bin Correlation:</b> - 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	<b>PASS</b> Done. Attached is the data and summary. All samplings are matching for Bin to Bin Summary vs Physical	 TS30042-M0000CF NR_303077.1

Description	Acceptance Criteria	Remarks	Data
<b>QA gate validation:</b> - Good units to be tested 100% at QA gate after these lots have been processed through final production test flow.	No QA Gate failures.	<b>PASS</b> Done. Attached is the data and summary. All 100% Inline QA sampling test is PASS	 TS30042_M0000QNR_303077.1-QA.zip

## TS3004X Series – Qual Data

Description	Acceptance Criteria	Remarks	Data
<b>Tester-to-tester variation: GR&amp;R</b> - 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;	<b>PASS</b> Done. All within spec. Using Site1 to Site 4 from same tester.	 TS30042 GRNR

Test#	Test Name	Unit	Samplings	Min. Speed	Max. Speed	Average Min	Average Max	Average Mean	Pre-Cal	Min. Av. Av. Min	Max. Av. Av. Min	Max. Av. Av. Max	Max. Av. Av. Mean	Repeatability	Process Capability	RGR	% GR&R	Remarks
TW0000 1	vsoc_trim_code	code	30	0.000	31.000	18.933	18.933	18.933	0.000	4	0	80.967	0.000	98.987	0.000	98.987	11.1%	Forming Test
TW0000 3	vsocn_code	code	30	0.000	1.000	4.261	5.433	4.717	1.931	3	1	19.311	0.000	19.311	0.000	19.311	215.3%	Forming Test
TW0000 5	vsoc_vs_trim_code	code	30	0.000	1.000	4.800	5.167	5.033	0.287	2	2	17.833	0.000	17.833	0.000	17.833	246.2%	Forming Test
TR0000 5	Flag2	code	30	0.000	255.000	174.467	183.133	178.750	8.807	2	2	580.185	0.000	580.185	0.000	580.185	221.2%	Forming Test
TR0000 1	vsoc_vs_threshold	%	30	100.000	104.000	102.500	102.714	102.500	0.024	2	2	2.894	0.000	2.894	0.000	2.894	84.8%	Insol Measurement, baseline issue
TR0000 0	vsoc_vs_threshold	%	30	95.000	94.000	92.833	92.875	92.854	0.040	2	2	1.795	0.000	1.791	0.000	1.791	59.1%	Insol Measurement, baseline issue
TW0000 0	vsoc_vs_meas_1	VOLTS	30	1.165	1.255	1.216	1.207	1.202	0.002	1	3	0.940	0.000	0.940	0.000	0.940	27.2%	Forming Test
TW0000 0	vsoc_vs_meas_0	VOLTS	30	1.168	1.266	1.220	1.222	1.222	0.002	1	3	0.939	0.000	0.939	0.000	0.939	66.9%	Forming Test
TW0000 0	vsoc_meas	HERTZ	30	910	1090	1029.616	1029.881	1029.809	0.003	1	3	88.367	0.000	88.367	0.000	88.367	43.0%	High Frequency, baseline issue
TR0000 1	vsoc_PRR_M000C	%	30	168.000	162.000	167.348	167.591	167.569	0.044	2	2	1.029	0.000	1.029	0.000	1.029	37.0%	Insol Measurement, baseline issue
TR0000 3	vsoc_vs_lowvdc_leak_data	uAmps	30	4800.000	800.000	-9.545	15.500	5.907	25.135	1	3	291.429	0.000	291.429	0.000	291.429	21.4%	Insol Measurement, baseline issue
TR0000 4	vsoc_vs_lowvdc_leak_post	uAmps	30	4800.000	800.000	-187.368	-74.809	-147.158	117.079	2	2	303.482	188.083	384.487	20.2%			
TW0000 0	vsoc_leak_3V	uAmps	30	-2.000	-0.400	-1.341	-1.333	-1.337	0.008	2	2	0.310	0.000	0.310	0.000	0.310	19.4%	
TR0000 3	vsoc_PRR_M000C	VOLTS	30	3.250	3.340	3.299	3.300	3.299	0.001	2	2	0.919	0.000	0.919	0.000	0.919	19.1%	Several factors affecting %GR&R > 25% that can be attributed to RTE capability, some minor differences on readboards, cables, sockets, interface boards, etc. These tests have historically high %GR&R > 10% since they are in Carsten SZ. These tests do not impact FT yield since the tests are obsolete with opt = 1.03. Test distribution between Carsten SZ and Carsten IPCH are comparable
TW0000 1	vsoc_leak_5V	uAmps	30	-4.000	-4.000	-0.647	-0.625	-0.636	0.023	2	2	1.362	0.000	1.361	0.000	1.361	17.0%	
TR0000 2	vsoc_vs_thermalis	%	30	0.150	2.700	1.354	1.320	1.311	0.016	2	2	0.423	0.000	0.423	0.000	0.423	16.6%	
TW0000 0	vsoc_vs_meas_3p3V	VOLTS	30	3.168	3.399	3.336	3.337	3.336	0.002	2	2	0.937	0.000	0.937	0.000	0.937	39.2%	
TR0000 2	vsoc_meas	VOLTS	30	3.250	3.340	3.300	3.301	3.301	0.000	2	2	0.919	0.000	0.919	0.000	0.919	19.1%	
TR0000 0	vsoc_PRR_M000C	uAmps	30	4.800	4.800	-0.309	-0.304	-0.313	0.004	2	2	1.364	0.000	1.364	0.000	1.364	19.0%	
TW0000 7	vsoc_vs_lowvdc_leak	uAmps	30	4800.000	800.000	-182.894	-88.639	-147.767	124.984	2	2	196.236	202.894	284.919	14.9%			
TR0000 4	Flag2	code	30	0.000	255.000	160.400	161.400	161.400	0.000	4	0	38.514	0.000	38.514	0.000	38.514	14.2%	
TW0000 1	vsocn_L5	mOhm	30	80.000	800.000	178.000	191.189	179.024	6.670	1	3	87.769	0.000	87.769	0.000	87.769	13.0%	
TW0000 1	vsocn_R5	mOhm	30	80.000	245.000	168.405	166.806	166.512	0.203	2	2	18.747	0.000	18.747	0.000	18.747	12.0%	
TW0000 1	vsocn_R6	mOhm	30	2.000	6.000	2.676	2.860	2.807	0.214	2	2	0.469	0.000	0.469	0.000	0.469	11.7%	
TR0000 2	vsocn_release_time	mSec/COND	30	0.000	14.000	10.632	10.638	10.633	0.003	3	1	0.908	0.000	0.908	0.000	0.908	11.4%	
TW0000 2	vsocn_R4	mOhm	30	80.000	800.000	203.880	246.123	236.050	6.246	3	1	58.912	0.000	58.912	0.000	58.912	11.2%	

## TS3004X Series – Qual Data

CPK Carsem Ipoh VS Carsem Suzhou



Ipoh Sample Production Data												SZ Sample Production Data																
Lot Number	Test Item	Mean	Std Dev	Min	Max	% Spec Pass	Spec High	% Bad	% Good	Field	Pot Def/Star	Cpk	Lot Number	Test Item	Mean	Std Dev	Min	Max	% Spec Pass	Spec High	% Bad	% Good	Field	Pot Def/Star	Cpk			
1000000005	Reg2	155.2	45.484	1	205	757	0	255	0	757	200	0	0.888	1000000005	Reg2	148.1	46.651	0	198	757	0	255	0	757	200	0	0.888	
1000000001	Vout_oh_threshold	102.48	0.54715	101.000	104	757	200.0	104	0	757	200	0	0.888	1000000001	Vout_oh_threshold	102.48	0.54715	101.000	104	757	0	200.0	104	0	757	200	0	0.888
9000000003	zarrn_code	3.129	0.349	0	7	757	0	7	0	757	200	0	0.888	9000000003	zarrn_code	3.129	0.349	0	7	757	0	7	0	757	200	0	0.888	
9000000000	err_meas	302	17.059	285.385	319.0	757	50	200	0	757	200	0	1.134	9000000000	err_meas	292.45	17.059	285.385	319.0	757	0	200	0	757	200	0	1.134	
9000000001	vout_ohm_code	13.78	14.332	0	31	757	0	31	0	757	200	0	0.424	9000000001	vout_ohm_code	13.78	14.332	0	31	757	0	31	0	757	200	0	0.424	
9000000001	vout_ohm_code	1.803	0.462	0	7	757	0	7	0	757	200	0	0.380	9000000001	vout_ohm_code	1.803	0.462	0	7	757	0	7	0	757	200	0	0.380	

Critical Parameter looks good

### Conclusion:

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



## TS3004X 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





## TS3004X Series – Qual Data- Other Summary



- No changes do to the Test Program, Limits:

**FT Program:** *ef3004x\_BC01 (TP-001224)*

**QA Program:** *ef3004x\_BC01 (TP-001224)*

- 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. 000712**  
**Qualification of Carsem Ipoh for TS3004X-M0XXQFNR products**

Semtech Confidential

## Introduction

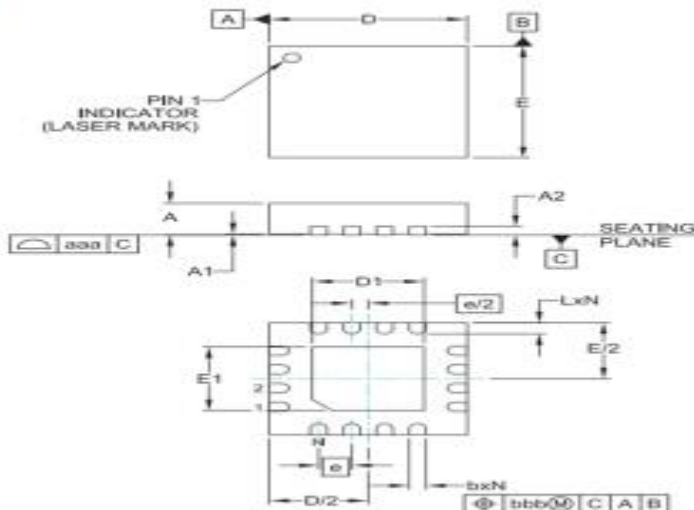


- ❑ TS3004X-M0XXQFNR Series have been qualified in Carsem Ipoh, Malaysia as a site for assembly. Current Assembly is performed in Carsem SuZhou, China.
- ❑ The change affect applicable to products:  
TS3004X-M0XXQFNR
- ❑ Qualification Vehicles selected are TS14002/ TS30042-M033QFNR/ TS61002
- ❑ Schedule for Implementation  
Passing REL qualification MSL 1 under Rel job# 7198.

Semtech Confidential

2

## SEMTECH Package Outline on TS3004X-M0XXQFNR CarsemSZ (Old) and CarsemIPH (New)



DIM	DIMENSIONS 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.

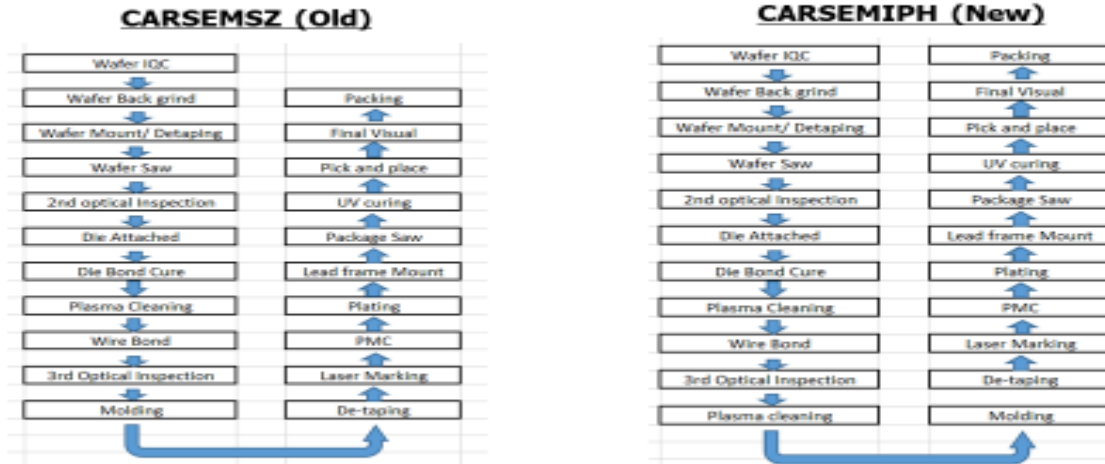
Semtech Confidential

3

## 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 Iph.

Semtech Confidential

## BOM Comparison CarsemSZ (Old) vs CarsemIPH (New) for TS3004X-M0XXQFNR



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

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

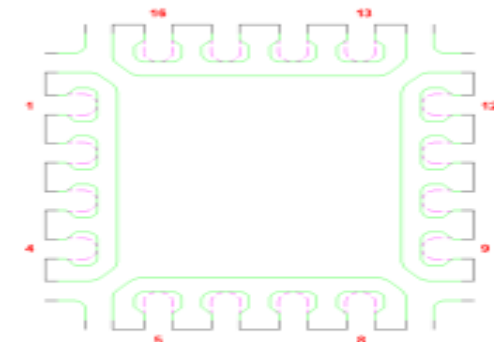
Semtech Confidential



**Lead frame outline Comparison CARSEMSZ (OLD)  
Vs CARSEMIPH(NEW) for TS3004X-M0XXQFNR**



**Lead frame Outline**



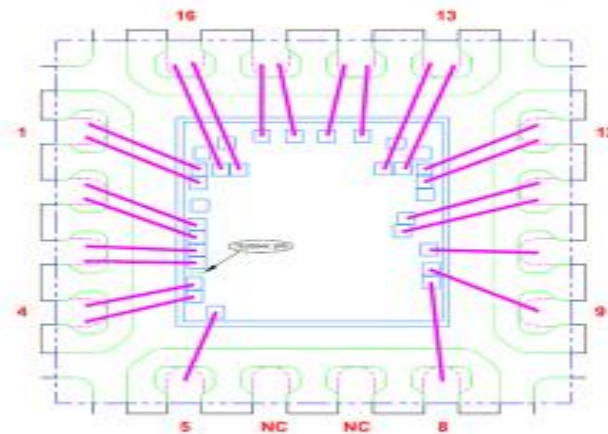
**Die Pad : 2.1 x 2.1mm**  
**Exposed Pad : 1.7 x 1.7mm**

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

Semtech Confidential

6

**Bonding Layout (CarsemSZ vs  
CarsemIPH) for TS3004X-M0XXQFNR**



**No Change in Bonding Layout.**

Semtech Confidential

7