



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_COP231.rpt

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

PRODUCT / PROCESS CHANGE NOTIFICATION


PCN-000711

Date: 12-15-2021

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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	Units	Sample Size	Min Spec	Max Spec	Average Min	Average Max	Average Mean	StDev	Max-Av	Min-Av	StDev	Mean	Max	Min	Repeatability	Reproducibility	GR	%GR	Remarks
10000101	brd_meas_val	AMPS	30	1.50	2.000	1.801	1.807	1.804	0.006	1	1	0.242	0.000	2.242	48.4%	0.000	0.000	2.242	48.4%	Leakage Test. Baseline issue. Test is capable with cpk = 1.33
100020101	cap_meas_val	KHERTZ	30	980.00	1050.000	997.904	999.026	998.002	0.036	1	1	43.059	0.000	43.059	47.2%	0.000	0.000	43.059	47.2%	High frequency, baseline issue. Test is capable with cpk = 1.33
101000411	en_val	VOLTS	30	3.96	4.700	4.452	4.454	4.453	0.002	1	1	0.383	0.000	0.383	37.3%	0.000	0.000	0.383	37.3%	Vout Measurement. Baseline issue. Test is capable with cpk = 1.33
100070101	ovv_meas_val	%	30	88.00	102.000	100.972	100.984	100.978	0.012	1	1	1.175	0.000	1.175	29.2%	0.000	0.000	1.175	29.2%	Several factors affecting GR&R = 10% that can be attributed to ATE
201000410	en_val	uA	30	-3.85	3.000	-1.068	-1.068	-1.067	0.019	1	1	1.985	0.000	1.985	27.3%	0.000	0.000	1.985	27.3%	Capacity, some noise
101000410	en_val	uA	30	-3.85	3.000	-1.068	-1.068	-1.067	0.019	1	1	1.985	0.000	1.985	26.5%	0.000	0.000	1.985	26.5%	Capacity, some noise
201000408	en_val	uA	30	-3.85	3.000	-1.068	-1.068	-1.067	0.019	1	1	1.985	0.000	1.985	24.6%	0.000	0.000	1.985	24.6%	Differences on boards
201000410	en_val	uA	30	-3.85	3.000	-1.068	-1.068	-1.067	0.019	1	1	1.985	0.000	1.985	21.6%	0.000	0.000	1.985	21.6%	Cables, sockets, interface boards, etc. These tests have historically high %GR = 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
100140103	vout_meas	VOLTS	30	3.25	3.340	3.299	3.300	3.300	0.001	1	1	0.010	0.000	0.010	19.6%	0.000	0.000	0.010	19.6%	
100010121	bg_tc_001	mVOLTS	30	-18.00	10.000	0.334	0.758	0.521	0.374	1	1	3.757	0.000	3.757	18.0%	0.000	0.000	3.757	18.0%	
201000410	PC_exposed_test_data	uA	30	-38.00	30.000	0.575	2.822	1.699	2.247	1	1	10.293	0.000	10.293	18.0%	0.000	0.000	10.293	18.0%	
101000412	en_val	uA	30	85.00	245.000	169.340	169.517	169.433	0.176	1	1	28.005	0.000	28.005	17.6%	0.000	0.000	28.005	17.6%	
101000409	en_val	uA	30	-1.80	0.000	-1.424	-1.427	-1.415	0.018	1	1	0.313	0.000	0.313	12.0%	0.000	0.000	0.313	12.0%	
201000407	en_val	uA	30	-2.00	1.000	-1.414	-1.389	-1.402	0.024	1	1	0.316	0.000	0.316	10.5%	0.000	0.000	0.316	10.5%	
101040408	pg_off_0_0	uA	30	-25.00	280.000	17.283	24.561	20.907	7.287	1	1	19.304	0.000	19.304	11.5%	0.000	0.000	19.304	11.5%	

TS3001X – Carsem Ipoh Qual Data



CPK Carsem SZ VS Carsem Ipoh - Summary

Test Name	Test Site	Min	Max	Mean	StDev	CPK	CPK (1.5)	CPK (2)	CPK (3)	CPK (4)	CPK (5)	CPK (6)	CPK (7)	CPK (8)	CPK (9)	CPK (10)	CPK (11)	CPK (12)	CPK (13)	CPK (14)	CPK (15)	CPK (16)	CPK (17)	CPK (18)	CPK (19)	CPK (20)	CPK (21)	CPK (22)	CPK (23)	CPK (24)	CPK (25)	CPK (26)	CPK (27)	CPK (28)	CPK (29)	CPK (30)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
100020101	cap_meas_val	980.00	1050.00	997.904	0.036	0.619	0.928	1.237	1.546	1.855	2.164	2.473	2.782	3.091	3.400	3.709	4.018	4.327	4.636	4.945	5.254	5.563	5.872	6.181	6.490	6.799	7.108	7.417	7.726	8.035	8.344	8.653	8.962	9.271	9.580	9.889	10.198	10.507	10.816	11.125	11.434	11.743	12.052	12.361	12.670	12.979	13.288	13.597	13.906	14.215	14.524	14.833	15.142	15.451	15.760	16.069	16.378	16.687	16.996	17.305	17.614	17.923	18.232	18.541	18.850	19.159	19.468	19.777	20.086	20.395	20.704	21.013	21.322	21.631	21.940	22.249	22.558	22.867	23.176	23.485	23.794	24.103	24.412	24.721	25.030	25.339	25.648	25.957	26.266	26.575	26.884	27.193	27.502	27.811	28.120	28.429	28.738	29.047	29.356	29.665	29.974	30.283	30.592	30.901	31.210	31.519	31.828	32.137	32.446	32.755	33.064	33.373	33.682	33.991	34.300	34.609	34.918	35.227	35.536	35.845	36.154	36.463	36.772	37.081	37.390	37.699	38.008	38.317	38.626	38.935	39.244	39.553	39.862	40.171	40.480	40.789	41.098	41.407	41.716	42.025	42.334	42.643	42.952	43.261	43.570	43.879	44.188	44.497	44.806	45.115	45.424	45.733	46.042	46.351	46.660	46.969	47.278	47.587	47.896	48.205	48.514	48.823	49.132	49.441	49.750	50.059	50.368	50.677	50.986	51.295	51.604	51.913	52.222	52.531	52.840	53.149	53.458	53.767	54.076	54.385	54.694	55.003	55.312	55.621	55.930	56.239	56.548	56.857	57.166	57.475	57.784	58.093	58.402	58.711	59.020	59.329	59.638	59.947	60.256	60.565	60.874	61.183	61.492	61.801	62.110	62.419	62.728	63.037	63.346	63.655	63.964	64.273	64.582	64.891	65.200	65.509	65.818	66.127	66.436	66.745	67.054	67.363	67.672	67.981	68.290	68.599	68.908	69.217	69.526	69.835	70.144	70.453	70.762	71.071	71.380	71.689	72.000	72.309	72.618	72.927	73.236	73.545	73.854	74.163	74.472	74.781	75.090	75.399	75.708	76.017	76.326	76.635	76.944	77.253	77.562	77.871	78.180	78.489	78.798	79.107	79.416	79.725	80.034	80.343	80.652	80.961	81.270	81.579	81.888	82.197	82.506	82.815	83.124	83.433	83.742	84.051	84.360	84.669	84.978	85.287	85.596	85.905	86.214	86.523	86.832	87.141	87.450	87.759	88.068	88.377	88.686	88.995	89.304	89.613	89.922	90.231	90.540	90.849	91.158	91.467	91.776	92.085	92.394	92.703	93.012	93.321	93.630	93.939	94.248	94.557	94.866	95.175	95.484	95.793	96.102	96.411	96.720	97.029	97.338	97.647	97.956	98.265	98.574	98.883	99.192	99.501	99.810	100.119	100.428	100.737	101.046	101.355	101.664	101.973	102.282	102.591	102.900	103.209	103.518	103.827	104.136	104.445	104.754	105.063	105.372	105.681	105.990	106.299	106.608	106.917	107.226	107.535	107.844	108.153	108.462	108.771	109.080	109.389	109.698	110.007	110.316	110.625	110.934	111.243	111.552	111.861	112.170	112.479	112.788	113.097	113.406	113.715	114.024	114.333	114.642	114.951	115.260	115.569	115.878	116.187	116.496	116.805	117.114	117.423	117.732	118.041	118.350	118.659	118.968	119.277	119.586	119.895	120.204	120.513	120.822	121.131	121.440	121.749	122.058	122.367	122.676	122.985	123.294	123.603	123.912	124.221	124.530	124.839	125.148	125.457	125.766	126.075	126.384	126.693	127.002	127.311	127.620	127.929	128.238	128.547	128.856	129.165	129.474	129.783	130.092	130.401	130.710	131.019	131.328	131.637	131.946	132.255	132.564	132.873	133.182	133.491	133.800	134.109	134.418	134.727	135.036	135.345	135.654	135.963	136.272	136.581	136.890	137.199	137.508	137.817	138.126	138.435	138.744	139.053	139.362	139.671	139.980	140.289	140.598	140.907	141.216	141.525	141.834	142.143	142.452	142.761	143.070	143.379	143.688	144.000	144.309	144.618	144.927	145.236	145.545	145.854	146.163	146.472	146.781	147.090	147.399	147.708	148.017	148.326	148.635	148.944	149.253	149.562	149.871	150.180	150.489	150.798	151.107	151.416	151.725	152.034	152.343	152.652	152.961	153.270	153.579	153.888	154.197	154.506	154.815	155.124	155.433	155.742	156.051	156.360	156.669	156.978	157.287	157.596	157.905	158.214	158.523	158.832	159.141	159.450	159.759	160.068	160.377	160.686	160.995	161.304	161.613	161.922	162.231	162.540	162.849	163.158	163.467	163.776	164.085	164.394	164.703	165.012	165.321	165.630	165.939	166.248	166.557	166.866	167.175	167.484	167.793	168.102	168.411	168.720	169.029	169.338	169.647	169.956	170.265	170.574	170.883	171.192	171.501	171.810	172.119	172.428	172.737	173.046	173.355	173.664	173.973	174.282	174.591	174.900	175.209	175.518	175.827	176.136	176.445	176.754	177.063	177.372	177.681	177.990	178.299	178.608	178.917	179.226	179.535	179.844	180.153	180.462	180.771	181.080	181.389	181.698	182.007	182.316	182.625	182.934	183.243	183.552	183.86

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-M0XXQFN*
& ef30011_BC_11 (ef30011_BC_11) – TS30012-M0XXQFN & TS30013-M0XXQFN
 - QA Program:** *ef30011XX_BC_10 (ECO-053461) – TS30011-M0XXQFN*
& ef30011_BC_11 (ef30011_BC_11) – TS30012-M0XXQFN & TS30013-M0XXQFN
- 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



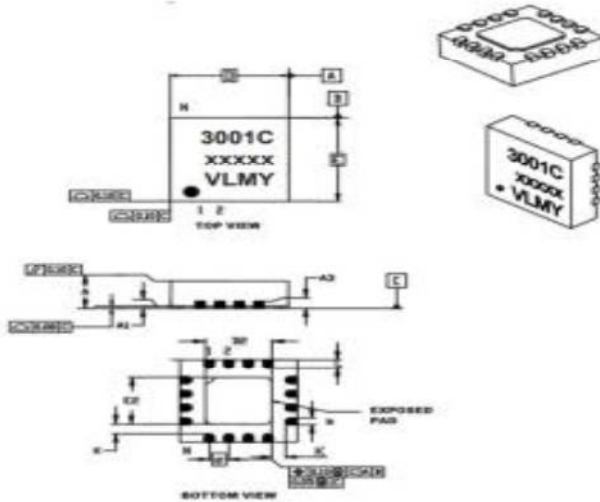
- TS3001X-M0XXQFNR Series have been qualified in Carsem Ipoh, Malaysia as a site for assembly. Current Assembly is performed in Carsem SuZhou, China.

- 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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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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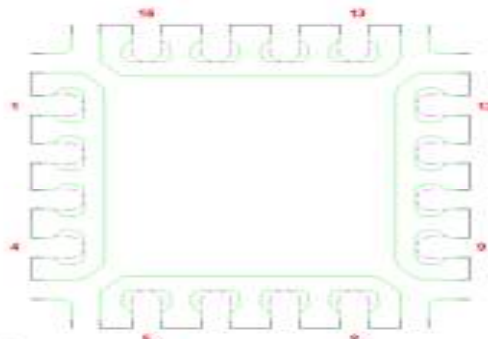
BOM Comparison CarsemSZ (Old) vs CarsemIPH (New)

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)

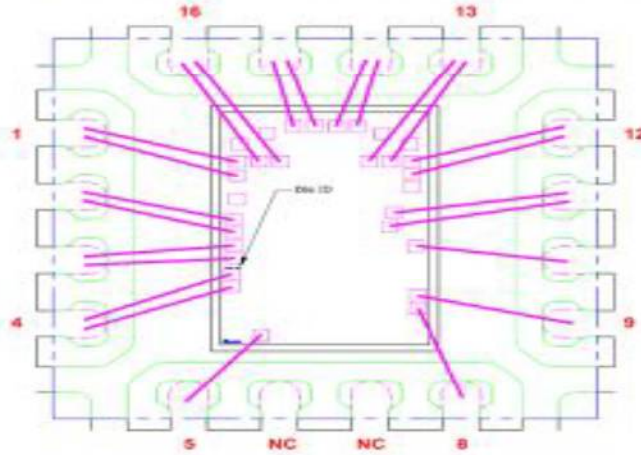
Lead frame Outline



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.