



# PRODUCT / PROCESS CHANGE NOTIFICATION

PCN-000753

Date: 12-29-2021

P1/9

Semtech Corporation, 200 Flynn Road, Camarillo CA 93012

## Change Details

Part Number(s) Affected:

TS13401ULTRT

Customer Part Number(s) Affected:  N/A

## Description, Purpose and Effect of Change:

Additional Source to Support Production Assembly and Final Test from Carsem Suzhou to Carsem Malaysia

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	12/29/2021	Work Week	WW53
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:

- TS13401ULTRT Site transfer Test Qual Data
- TS13401ULTRT Site 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 <a href="mailto:csierra@semtech.com">csierra@semtech.com</a>	

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



**Site Transfer**  
**TS13401ULTRT Carsem Ipoh Qualification Report**

From : Carsem Suzhou

To: Carsem Ipoh

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NOTE: all company non-public information must be kept confidential and should not be disclosed.






**COMPARISON BETWEEN CARSEM SUZHOU & CARSEM IPOH**

ITEM	Carsem Suzhou	Carsem Ipoh
ATE Tester	ETS364	ETS364
Handler	Manufacturer : SRM	Manufacturer: : SRM
	Model : XD248	Model: : XD248
	Type : Turret/Rotary	Type: : Turret/Rotary
	#Sites : Quad	#Sites: : Quad
Load Board	TS13401_FT	TS13401_FT
Test Program	EF1340102 (TP-001587)	EF1340102 (TP-001587)








## 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


## TS13401ULTRT- 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.	
<b>Bin-to-Bin Correlation:</b> - 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 Pareto) - Wafer map;	<b>PASS</b> Done. Attached is the data and summary. All samplings are matching for Bin to Bin Summary vs Physical	
<b>QA gate validation:</b> - 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.	<b>PASS</b> Done. Attached is the data and summary. All 100% Inline QA sampling test is PASS	

TS13401ULTRT- 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 Site 1 and Site3 from same tester.	 GRR

TS13401ULTRT- Qual Data



CPK Carsem Ipoh VS Carsem Suzhou

TW	name	units	SUZHOU				IPOH			
			exect	mean	stddev	cpk	exect	mean	stddev	cpk
600002	VREF_code	Code	1027	10.2992	1.8180	0.8426	1176.0000	10.5026	1.8204	0.8190
700001	ADC_REF_meas	Code	1027	63.9718	0.8882	0.7647	1176.0000	63.8997	0.8826	0.7294
700004	ADC_IN_meas	Code	1027	63.9396	0.9152	0.7064	1176.0000	64.0221	1.2273	0.5272
800001	DC_Norm_SW1_meas	mVCLTS	1018	510.1358	6.3859	1.0509	1127.0000	509.4680	6.1809	1.0535
900001	DC_IR_SW1_meas	mVCLTS	1018	865.7409	23.1994	0.6572	1127.0000	871.2479	23.9617	0.6782
900003	DC_IR_SW2_meas	mVCLTS	1018	850.4362	25.3203	0.6640	1127.0000	859.8587	25.5588	0.7607
1000004	IROC_Dealitch_code	Code	1016	0.4774	0.4995	0.3186	1126.0000	0.4505	0.4975	0.3017
1100001	IOUT_OC0	mVCLTS	1016	167.6165	5.2158	1.1047	1126.0000	166.3178	5.9620	0.8003
1200001	Reg8	Code	1016	170.0561	29.1223	0.9719	1109.0000	173.6619	30.5703	0.8869
1200007	RGTC_Trim_code	Code	1016	10.4026	1.8208	0.8417	1109.0000	10.6122	1.9098	0.7657
1700005	vmeas_step	V/Code	1016	0.4975	0.0054	0.7958	1109.0000	0.4924	0.0177	0.8147
1800005	Ipercode	mV/Code	1016	1.3256	0.0689	1.0812	1108.0000	1.2931	0.0723	0.8904
1800006	Ipercode	mV/Code	1016	2.6588	0.1104	1.1790	1036.0000	2.6080	0.1272	1.0690

**Conclusion:**

From the Cpk data most of the test are compatible between Suzhou and Ipoh.  
 Only above test are lower CPK on both site as well.  
 Therefore, the baseline for these test is comparable between Carsem Ipoh and Carsem Suzhou.

The Cpk result is acceptable.



**TS13401ULTRT– 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.



**TS13401ULTRT– Qual Data- Other**  
**Summary**



- No changes do to the Test Program, Limits:  
**FT Program:** *EF1340102 (TP-001587)*  
**QA Program:** *EF1340102 (TP-001587)*
- 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. 000753  
Qualification of Carsem Ipoh for TS13401IULTRT products

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## Introduction

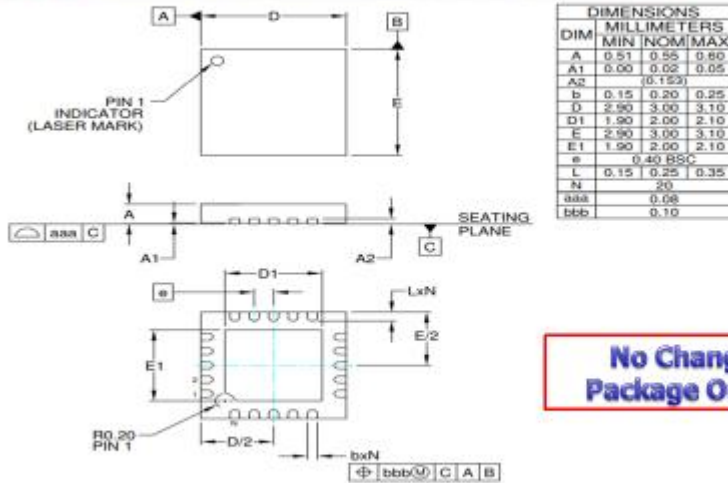


- TS13401IULTRT Series have been qualified in Carsem Ipoh, Malaysia as a site for assembly. Current Assembly is performed in Carsem SuZhou, China.
  
- The change affect applicable to products:  
TS13401IULTRT
  
- Qualification Vehicles selected are TS14002/ TS30042-M033QFNR/  
TS61002
  
- Schedule for Implementation  
Passing REL qualification MSL 1 under Rel job# 7198.

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### SEMTECH Package Outline on TS13401IULTRT CarsemSZ (Old) and CarsemIPH (New)



**No Change in Package Outline.**

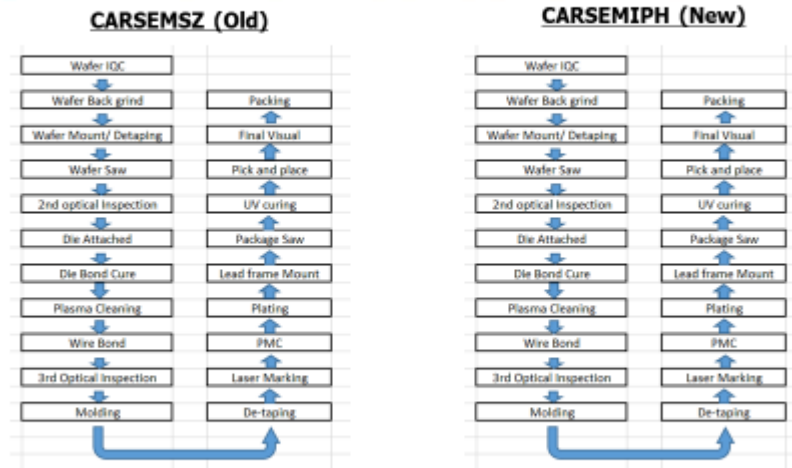
- NOTES:
- CONTROLLING DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).
  - COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

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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.

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**BOM Comparison CarsemSZ (Old) vs  
 CarsemIPH (New) for TS13401IULTRT**



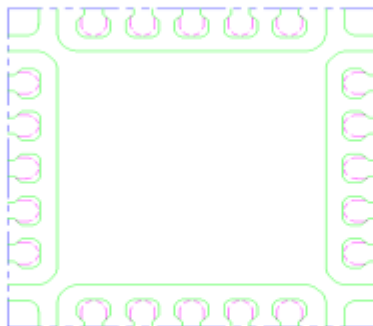
CarsemSZ (Old)				CarsemIPH (New)			
Epoxy	Leadframe	Wire Type	Mold compound	Epoxy	Leadframe	Wire Type	Mold compound
Hitachi EN-4900	Haesung NiPdAuAg LDF	1.0 mils PdCu wire	Sumitomo G770HCD	Hitachi EN-4900	Haesung NiPdAuAg LDF	1.0 mils PdCu wire	Sumitomo G770HCD

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

**Lead frame outline Comparison CARSEMSZ (OLD)  
 Vs CARSEMIPH(NEW) for TS13401IULTRT**



**Lead frame Outline**

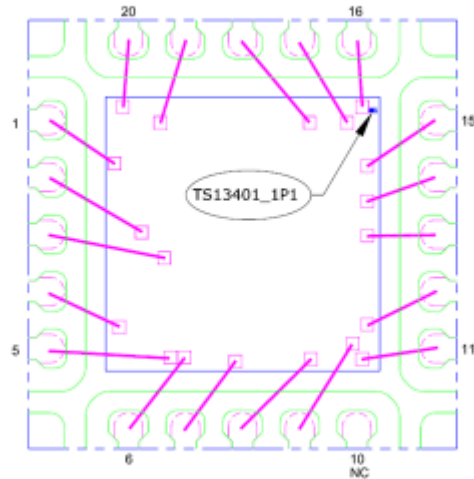


**Die Pad : 2.2 x 2.2mm**  
**Exposed Pad : 2.0 x 2.0mm**

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



**Bonding Layout (CarsemSZ vs  
CarsemIPH) for TS13401IULTRT**



**No Change in Bonding Layout.**