PRODUCT / PROCESS CHANGE NOTIFICATION
PCN-000871
Date: NOV-17-2022

Semtech Corporation, 200 Flynn Road, Camarillo CA 93012

Change Details

Part Number(s) Affected:	**Customer Part Number(s) Affected:** ☒ N/A
GS6042-INE3 GS6042-INTE3 GS6042-INTE3D GS6042-INTE3V GS6042-INTE3Z	

Description, Purpose and Effect of Change:

Change of assembly supplier from ASE Malaysia to Greatek Taiwan.
This change is necessary because the lead frame used by ASEM has become obsolete.
Greatek is already qualified for assembly of similar products, using the bill of materials (BOM) similar to the BOM used by ASEM.
This change was qualified by bridging to qualification of product GN1157 & GN1158 already assembled at Greatek.
Please see enclosed supporting documentation on the following pages.

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:

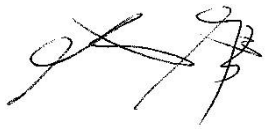
There is no impact to form, fit, function, performance, characteristics, or reliability.

Implementation Date	**JAN-17-2023**	**Work Week**	**03**
Last Time Ship (LTS) **Of unchanged product**	**N/A**	**Affecting Lot No. / Serial No. (SN)**	**N/A**
Sample Availability	**JAN-01-2023**	**Qualification Report Availability**	**NOV-10-2022**

Supporting Documents for Change Validation/Attachments:

- **PRODDOC024358 Reliability Qualification Report**

Issuing Authority

Semtech Business Unit:	Signal Integrity Product Group (SIP)	
Semtech Contact Info:	Pedro Jr. Bernas pbernas@semtech.com (289) 856-9326 x1162	

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- Bill of Material

OSAT	ASEM	Greatek
Lead frame	DCI - PRP	Shinko - MEP
Epoxy	CRM1076	CRM1076
Mold compound	G770HCD	G700H
Wire	1mil CuPd and 1mil Au	

  - Shinko – MEP lead frame is qualified for MSL1 and MSL3 package types.

- Process Flow & Machine List

Process	ASEM		Greatek	
	Machine maker	Machine model	Machine maker	Machine model
Back grind	Disco	PG300RMA	Disco	DFG 850, 8540, 8560
Wafer saw	Disco	D641	Disco	DFD-6340, 6361, 6560
Die Attach	ASM	ASM 898	BESI	2100 series
Wire Bond	KNS	Maxum series	KNS & ESEC	Iconn, ProCu, 3100, 3200
Molding	Daiichi	GP-PRO8	TOWA	Y1
Reflow	BTU International	Furnace_6	Tangteck	SMD-18-M10HA0
Package saw	Disco	D6340	TOWA	FMS 3040

  - ASEM & Greatek have the same assembly process flow.
  - All equipment at Greatek is qualified for QFN package type products in mass production.

4mm X 4mm 16L and 4mm x 5mm 32L QFN ASE-M Move to Greatek Reliability Qualification Report

Revision History

Version	ECO	Date	Modifications
0	ECO-056757	May 2021	New Release
1	ECO-057105	Jun 2021	Updates to product list and minor typo correction.
2	ECO-064026	Nov 2022	Updates to product list

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1 Background

ASE-M has plans to phase out the current Leadframe vendor DCI. (PCN- 000642) This change affects 4mm x 4mm 28L and 4mm x 5mm 32L packages at ASE-M. The material set is being ported to an existing and qualified BOMat Greatek to support the supply chain. The GN1157 and GN1158 is currently qualified using similar and available Shinko lead -frame at Greatek.

Specifics of the GN1157/GN1158 BOM being ported to are available in Table 1 below

2 Manufacturing Summary

Table 1.: GN1157/GN1158 Greatek BOM for ASE-M port.

Semtech Device Codes	GN1157/GN1158
Silicon Fab Technology	Jazz SiGe120 SBC18HA
Package Assembly	Greatek
Package Type	28 QFN, 4x4 mm, 0.4 mm pitch
Bond Wire	Copper Wire
Epoxy	CRM1076
Molding Compound	EME-G700H
Lead Frame	Shinko MEP
Lead Frame plating	Ag spot Plating
Lead Frame Pre-Etch Step	Yes

3 Product Scope

The existing ASE-M DCI lead frame products being ported to Greatek are as follows in Table 2 below:

Table 2.: Scope of 4x4mm 16L and 4x5mm 32L devices porting to Greatek

Package	Assembled Device	Finished Good	Qualification Vehicle
4x4mm 16L	GS3440-IE3	GS3440-INTE3Z	GN1157-INE3 / GN1158-INE3 (Greatek) 4mm x 4mm 28L
		GS3440-INTE3	
		GS3440-INE3	
	GS6042-IE3	GS6042-INE3	
		GS6042-INTE3	
		GS6042-INTE3D	
		GS6042-INTE3V	
		GS6042-INTE3Z	
	GS6080-IE3	GS6080-INTE3Z	
		GS6080-INTE3	
		GS6080-INE3	
	GS6081-IE3	GS6081-INTE3Z	
		GS6081-INTE3	
		GS6081-INE3	
	GV8601AIE3	GV8601AINE3	
	GV8601-IE3	GV8601-INE3	
4x5mm 32L	GN7355A-IE3	GN7355AINTE3Z	
		GN7355AINE3	

4 Qualification Approach

As GN1157/GN1158 is a fully qualified BOM at Greatek with a similar dimensions and lead-count, the qualification strategy is to port all products to the exiting GN1157 material set and fully bridge the qualification as a result. (GENDOC-058678) GN1158 is a similar chip in the exact same package with slightly lower power. GN1158 was selected for HAST testing during the initial 4x4mmm 28L Greatek qualification and provides additional qualification stress data for the packaging process. The differences in packages materials have been reviewed by packaging and assembly engineering, in conjunction with reliability engineering, and determined that there is no significant risks to this approach.

As only the material set of the package has changed, no additional silicon reliability stress are required to qualify this change. Specific details of the bridging stress items are on the next page Table 3.

5 Reliability Qualification Stresses

5.1 Environmental Tests

Table 3.: Environmental Tests

Stress	Conditions	Duration	Qualification Vehicle	Sample Size	Results
Temperature Cycling	JESD22-A104 MSL Preconditioning, -55 °C to +125 °C (Condition B)	1000 cycles	Bridged to GN1157 (Greatek)	135 (45 x 3 lots)	Pass
Highly Accelerated Stress Test (HAST)	JESD22-A110 MSL Preconditioning, 130 °C/85% R.H., V_{ccmax}	96 hours	Bridged to GN1158 (Greatek)	120 (40 x 3 lots)	Pass
Unbiased Highly Accelerated Stress Test	JESD22-A118 MSL Preconditioning, 130 °C/85% RH	96 hours	Bridged to GN1158 (Greatek)	120 (40 x 3 lots)	Pass
			Bridged to GN1157 (Greatek)	134** (45 x 3 lots)	Pass
High Temperature Storage	JESD22-A103 150 °C	1000 hours	Bridged to GN1157 (Greatek)	240 (80 x 3 lots)	Pass
Moisture Sensitivity Level	J-STD-020 MSL1, T_{max}=260 °C		Bridged to GN1157 (Greatek)	270 (90 x 3 lots)	Pass
			Bridged to GN1158 (Greatek)	240 (80 x 3 lots)	Pass

** One UHAST device removed from the sample set for damage that incurred during handling at test.

6 Conclusion

The following devices from ASE-M 4mm x 4mm 16L (GS2988-IE3-BMD, GS3440-IE3, GS6080-IE3, GS6042-IE3, GS6042-IE3 BMD, GS6081-IE3, GV8601AIE3, GV8601-IE3) and 4mm x 5mm 32L (GN7355A-IE3) devices are fully bridged to the qualified GN1157/GN1158 Greatek package. Therefore, the assembly site port from ASE-M to Greatek for these products is qualified by Semtech.