PRODUCT / PROCESS CHANGE NOTIFICATION

PCN-000644

Date: March 15, 2021

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☒	Semtech Canada Corporation, 4281 Harvester Road, Burlington, Ontario L7L 5M4 Canada
☐	Semtech Irvine, 5141 California Ave., Suite 100, Irvine CA 92617
☐	Semtech Neuchatel Sarl, Route des Gouttes d'Or 40, CH-2000 Neuchatel Switzerland
☐	Nanotech Semiconductor, Semtech Corporation, 2 West Point Court, Bristol, United Kingdom, BS32 4PY
☐	Semtech Corpus Christi SA de CV, Carretera Matamorros Edificio 7, Reynosa, Tamaulipas, Mexico 88780
☐	

Change Details

Part Number(s) Affected:

- GS3490-INE3
- GS3490-INTE3
- GS3490-INTE3D
- GS3490-INTE3V
- GS3490-INTE3Z

Customer Part Number(s) Affected: ☒ N/A

Description, Purpose and Effect of Change:

GS3490 is currently assembled at ASEM. Semtech is qualifying alternative source in Taiwan, Greatek, for 5x5mm 32L QFN package assembly. The purpose is capacity expansion.

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:

No impact to product performance, characteristics and reliability. Package outline dimensions remain identical, no impact to form fit and function.

Implementation Date	**June 15, 2021**	**Work Week**	**N/A**
Last Time Ship (LTS) Of unchanged product	**N/A**	**Affecting Lot No. / Serial No. (SN)**	**N/A**
Sample Availability	**Available**	**Qualification Report Availability**	

Supporting Documents for Change Validation/Attachments:

- **PRODDOC004353 Reliability Report rev 1**

Bill of Material of GS3490

SEMTECH

OSAT	ASEM	Greatek
Leadframe	DCI - MEP	Shinko - MEP
Epoxy (Die 1)	CRM1076	Hitachi 4900 GC
DAF (Die 2)	Hitachi HR5104	Hitachi HR5104
Mold compound	G770HCD	G700H
Wire	1mil CuPd wire	

Process Flow & Machine list

SEMTECH

Process	ASEM		Greatek	
	Machine maker	Machine model	Machine maker	Machine model
Backgrind	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

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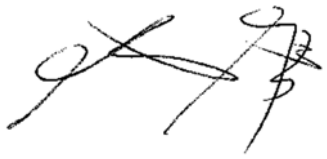
Issuing Authority		
Semtech Business Unit:	Signal Integrity Product Group (SIP)	
Semtech Contact Info:	Pedro Jr. Bernas Product Quality Engineer Semtech Canada Corporation (289) 856-9326 x1162 pbernas@semtech.com	
FOR FURTHER INFORMATION & WORLDWIDE SALES COVERAGE: http://www.semtech.com/contact/index.html#support		

GS3490
Reliability Qualification Report

Revision History

Version	ECO	Date	Modifications / Changes
0	ECO-017993	Feb. 2014	New document
1	ECO-055930	Mar. 2021	Adding Greatek as a second source for packaging qualification details (PCN-000644). Plus minor formatting updates.

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1 Device Specifics

1.1 Manufacturing Summary

Table 1. Manufacturing Summary

Semtech Device Codes	GS3490	
Silicon Fab Technology	Jazz Semi SiGe 0.18 µm SBC18H2A	
Assembly House	ASE-M	Greatek
Package Type	32QFN, 5x5 mm, 0.5 mm pitch	
Leadframe	DCI-MEP (ASE-M)	Shinko- MEP (Greatek)
Epoxy (Die 1)	CRM1076 (ASE-M)	Hitachi 4900 GC (Greatek)
DAF (Die 2)	Hitachi HR5104 (ASE-M)	Hitachi HR5104 (Greatek)
Mold Compound	G770HCD (ASE-M)	G700H (Greatek)
Wire	1 mil CuPd wire	

1.2 Product Information

The GS3490 is a high-speed integrated circuit featuring adaptive cable equalization and cable driver functionality. The GS3490 is optimized for applications with limited I/O space. With its configurable EQ and Cable driver functionality, the GS3490 can be utilized as a single-device solution in applications where the interface connector can be configured as either an input or output. The GS3490's cable equalizer is optimized for operation at 2.97Gb/s, 1.485Gb/s and 270Mb/s while providing typical cable reach of 140m at 2.97Gb/s, 260m at 1.485Gb/s and 500m at 270Mb/s.

The GS3490 is Pb-free, and the encapsulation compound does not contain halogenated flame retardant. This component and all homogeneous subcomponents are RoHS compliant.

1.3 Process Qualification

The GS3490 is manufactured in Jazz Semiconductor 0.18um SiGe SBC18H2A process. The Jazz qualification report is accepted on Agile# GENDOC-048070.

1.4 Product Qualification Approach

The GS3490 contains two co-packaged previously qualified silicon die, EQ – GS3440 and CblDrv – GS2988. The GS3440 is a subset of the GS3441 and the GS2988 is a subset of the GS2989. As both individually qualified die are placed in a stacked configuration, and each die operates independently, there is very low risk of thermal runaway from combined self heating. HTOL data from GS3441 and GS2989 is considered representative of the GS3490. Therefore GS3490 HTOL is bridged to the GS3441 and GS2989.

The GS3490 is utilizing a DAF (die-attach-film) between the two vertically stacked die with standard die attach epoxy between the lower GS3440 die and the die paddle. Due to its new packaging design full package qualification, ESD and LU were executed. LTS was added specifically for the DAF qualification.

Greatek is being qualified as a second source for packaging assembly of the stacked die 32L QFN. As the BOM is changing, a full packaging qualification is underway. LTS was not repeated as the DAF is the same as used at ASE-M.

Specific details can be found in table 2 on the next page.

2 Reliability Qualification Stresses

2.1 Environmental Tests

Table 2. Environmental Tests

Stress	Conditions	Duration	Qualification Vehicle	Sample Size	Result
High Temperature Operating Life	JESD22-A108 $T_j \geq 125^oC$, $V_{cc} \geq V_{ccmax}$	1000 hrs	GS3441	80	Pass
		1000 hrs	GS2989	80	Pass
Temperature Cycling	JESD22-A104 MSL Preconditioning, -55°C to +125°C (Condition B)	1000 cycles	GS3490 (ASE-M)	25 each from 3 lots	Pass
	JESD22-A104 MSL Preconditioning, -65°C to +125°C (Condition C)	1000 cycles	GS3490 (Greatek)	79 from 1 lot 25 each from 2 lots	Pass In Progress
High Temperature Storage	JEDSE22-A103 150 °C	1000 hours	GS3490 (ASE-M)	25 each from 3 lots	Pass
			GS3490 (Greatek)	80 pcs 1 lot 25 each from 2 lots	Pass In Progress
Unbiased HAST	JESD22-A118 MSL Preconditioning, 130°C/85% RH	96 hours	GS3490 (ASE-M)	25 each from 3 lots	Pass
			GS3490 (Greatek)	79 pcs 1 lot 25 each from 2 lots	Pass In Progress
Moisture Sensitivity Level	J-STD-020 MSL3, Tmax=260 °C		GS3490 (ASE-M)	50 each from 3 lots	Pass
			GS3490 (Greatek	238 from 1 lot 50 each from 2 lots	Pass In Progress
Low Temperature Storage	JESD22-A119 -55 °C	168hrs	GS3490 (ASE-M)	25 each from 3 lots	Pass

2.2 Electrostatic Discharge and Latch Up Tests

Table 3. Electrostatic Discharge and Latch Up Tests

Stress	Conditions	Qualification Vehicle	Stress Level	Sample Size	Results
Human Body Model ESD	JESD22-A114	GS3490	1, 2, 2.5KV, 3 kV	3	Pass
Machine Model ESD	JESD22-A115	GS3490	100, 150, 200 V	3	Pass
Charged Device Model ESD	JESD22-C101	GS3490	1, 1.5, 2 kV	3	Pass
Latch Up	JESD78 V_{cc}=3.5 V, 5.25 V; +/- 100 mA Level II, Class A	GS3490	25ºC	3	Pass
			85ºC	3	

3 Conclusion

The GS3490 product passed all reliability testing and is fully qualified in the ASE-M 32L stacked die QFN package.

Greatek has been added as a second source for GS3490 packaging assembly. 1 lot has completed qualification and no performance degradation was observed during the evaluation so far. This report will be updated upon completion of Greatek qualification.