



PRODUCT / PROCESS CHANGE NOTIFICATION

PCN-000839

Date: JUN-08-2023

Change Details							
Part Number(s) Affected: Please see the next page for a list of affected part numbers.		Customer Part Number(s) Affected: ☒ N/A					
Description, Purpose and Effect of Change: DUAL SOURCING Semtech has qualified Greatek in Taiwan as a second assembly source for the affected part numbers listed on the following page. This change applies to 16MLPQ 4x4mm and 32MLPQ 5x5mm packages, currently assembled by UNSIEM(M) in Malaysia. Please see the following pages for comparisons on process flow, material, and equipment. Test platform and test programs are unchanged. <table border="1" data-bbox="318 1281 1334 1386"><thead><tr><th>Current assembly source</th><th>Secondary assembly source</th></tr></thead><tbody><tr><td>UNSIEM(M)</td><td>GREATEK</td></tr></tbody></table>				Current assembly source	Secondary assembly source	UNSIEM(M)	GREATEK
Current assembly source	Secondary assembly source						
UNSIEM(M)	GREATEK						
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: Overall qualification meets the requirements for assembly, testing, and reliability. The change has no effect on performance, characteristics, or reliability.							



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Implementation Date	SEP-08-2023	Work Week	36
Last Time Ship (LTS) Of unchanged product	N/A	Affecting Lot No. / Serial No. (SN)	N/A
Sample Availability	JUN-08-2023 GS2974ACNE3 GS2965-INE3 GS2994-INE3 GS2988-INE3	Qualification Report Availability	JUN-08-2023
Supporting Documents for Change Validation/Attachments: PRODDOC028450 Reliability Qualification Report			

Quality Assurance		
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Part Number(s) Affected

1	GS1574ACNE3	16	GS2984-INE3
2	GS1574ACTE3	17	GS2984-INTE3
3	GS1578ACNE3	18	GS2984-INTE3D
4	GS1578ACTE3	19	GS2984-INTE3Z
5	GS1674-INE3	20	GS2988-INE3
6	GS1674-INTE3	21	GS2988-INTE3
7	GS1678-INE3	22	GS2988-INTE3D
8	GS1678-INTE3	23	GS2988-INTE3Z
9	GS2964-INE3	24	GS2989-INE3
10	GS2964-INTE3	25	GS2989-INTE3
11	GS2965-INE3	26	GS2994-INE3
12	GS2965-INTE3	27	GS2994-INTE3
13	GS2974ACNE3	28	GS2994-INTE3Z
14	GS2974ACNTE3Z	29	GS9074ACNE3
15	GS2974ACTE3	30	GS9074ACTE3

Comparisons

➤ MATERIAL

Material	UNSIEM(M)	GREATEK
Lead frame Material	Copper	Copper
Molding Compound	EMEG770HCD	Sumitomo G700H
D/A Epoxy	CRM1076NS	Sumitomo 1076DJ
Wire Material	Gold	Gold



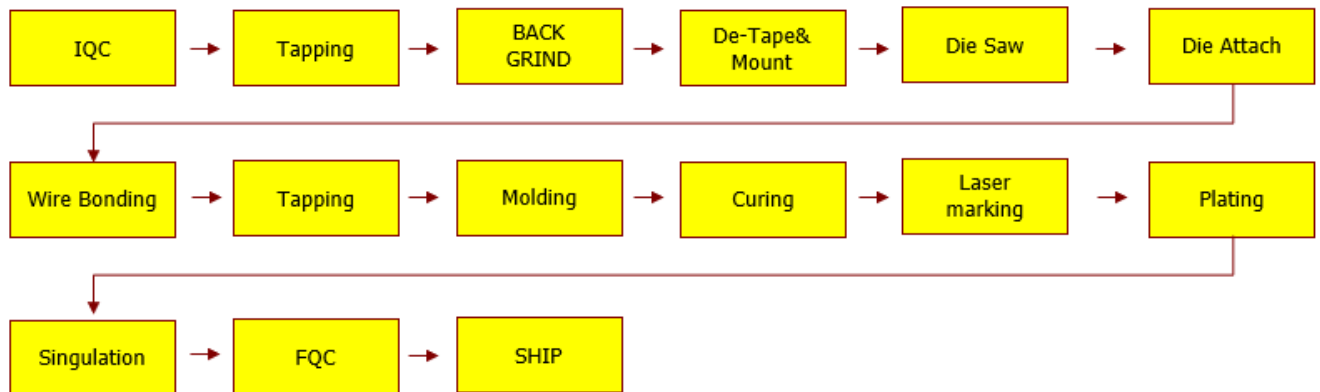
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➤ PROCESS FLOW

- GREATEK and UNSIEM(M) follow the same process flow, which is outlined below.



➤ EQUIPMENT

- UNSIEM(M) GREATEK equipment is standard mass production equipment that can meet package requirements.

Process step	UNSIEM(M)	GREATEK
Wafer Grinding	DISCO	DISCO
Wafer sawing	DISCO Auto Saw	DISCO Auto Saw
Die attached	ESEC / Alphasem	ESEC
Wire bonding	KNS Wire bonder	ESEC / KNS
Molding	Dai-Ichi Auto- Mold	TOWA Auto- Mold
Post mold Cure	Despatch Oven	SHINY Oven
Laser marking	EO technics	EO technics
Package Sawing	Disco Auto Saw	KNS Auto Saw



Reliability Qualification Report for 16MLPQ 4x4mm and 32MLPQ 5x5mm Products at Greatek

Revision History

Version	ECO	Date	Modifications
0	ECO-066288	Mar 2022	New Release

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1 Background

Semtech's 16MLPQ 4x4mm and 32MLPQ 5x5mm products are currently being assembled at UNSIEM, Malaysia. To meet customer demand and to ensure timely delivery, a dual source qualification at Greatek was initiated. The purpose of this qualification is to qualify Greatek as a second assembly site for 16MLPQ 4x4mm and 32MLPQ 5x5mm products.

2 Product Scope

A total of 6 products will be affected by this process change. The products affected, and their package type, are listed in table 1

Table 1: all products covered in this qualification and their package type.

Products	Package type	Qualification Vehicle
GS1574ACNE3/ACTE3	4x4 16L MLPQ	GS2974A
GS1578ACNE3/ACTE3	4x4 16L MLPQ	
GS1674-INE3/INTE3	4x4 16L MLPQ	
GS1678-INE3/INTE3	4x4 16L MLPQ	
GS2964-INE3/INTE3	4x4 16L MLPQ	
GS2974ACNE3/ACNTE3Z/ACTE3	4x4 16L MLPQ	
GS2984-INE3/INTE3/INTE3D/INTE3Z	4x4 16L MLPQ	GS2994
GS2988-INE3/INTE3/INTE3D/INTE3Z	4x4 16L MLPQ	
GS2989-INE3/INTE3	4x4 16L MLPQ	
GS2994-INE3/INTE3Z	4x4 16L MLPQ	
GS9074ACNE3/ACTE3	4x4 16L MLPQ	
GS2965-INE3/INE3	5x5 32L MLPQ	GS2965

3 Qualification Approach

All products listed in table 1 have already been fully qualified previously (see table 2 for product document number of each qualification report). Out of all affected products, GS2974A, GS2994, and GS2965 were selected as qualification vehicle based on their package size/type and sales volume. This qualification only intends to assess the reliability impact of having 16MLPQ 4x4mm and 32MLPQ 5x5mm products assembled at Greatek. Thus, die-level reliability stresses (HTOL, ESD and LU) were not planned. TC, UHAST and HTS were carried out on three lots of each product. CSAM was performed on 22 randomly selected parts from each lot and stresses at T0, post MSL (if applicable) and post stresses. For more information about the conditions of the qualification stresses and sample size, please refer to table 3 in section 4.

Table 2: product document number of qualification reports for all product affected by this process change.

Product	Qualification Report
GS1574A/GS9075A	GENDOC-035645
GS1578A	GENDOC-035582
GS1674	GENDOC-055335
GS1678	GENDOC-055337
GS2964	GENDOC-052506
GS2974A	GENDOC-043319
GS2984	GENDOC-052342
GS2988	GENDOC-053666
GS2989	
GS2994	GENDOC-055408
GS9074A	GENDOC-034403
GS2965	GENDOC-053156

4 Reliability Qualification Stresses

Table 3: Reliability qualification stresses for GS2974A, GS2994 and GS2965 assembled at Greatek

Stress Test	Conditions	Duration	Qualification Vehicle	Sample Size	Result
High Temperature Storage (HTS)	JESD22-A103 CSAM T=150 °C	1000 hours	GS2974A	35 pcs/lots (3 lots)	Pass
			GS2994	35 pcs/lots (3 lots)	Pass
			GS2965	35 pcs/lots (3 lots)	Pass
UHASt	JESD22-A118 MSL3 preconditioning and CSAM 130°C, 85 % RH,	96hrs	GS2974A	35 pcs/lots (3 lots)	Pass
			GS2994	35 pcs/lots (3 lots)	Pass
			GS2965	35 pcs/lots (3 lots)	Pass
TC	JESD22-A104 MSL3 preconditioning and CSAM -°65C to +150°C (Condition C)	500 cycles	GS2974A	35 pcs/lots (3 lots)	Pass
			GS2994	35 pcs/lots (3 lots)	Pass
			GS2965	35 pcs/lots (3 lots)	Pass

5 Conclusion

In conclusion, GS2974A, GS2994 and GS2965 assembled at Greatek successfully passed required reliability stresses. Thus, Greatek can be considered as a qualified assembly site for Semtech's 16MLPQ 4x4mm and 32MLPQ 5x5mm products.