

## Product Change Notice (PCN)

**Subject:** Alternate wafer fab site of Schottky Diode used in the listed Renesas HDA module

**Publication Date:** 2/11/2022

**Effective Date:** 5/8/2022

### Revision Description:

Initial Release

### Description of Change:

This notice is to inform you Diodes Incorporated (Diode Incorp) announced Wafer Fab production transfer from Phenitec's 'HQ Fab' to '1st Fab'. Diode Incorp supplies Schottky Diode to Renesas Electronics Americas (REA), that is currently used for assembly of the listed Renesas HDA Module. Renesas Electronics Americas will begin to use new Schottky Diode from 1st Fab.

### Affected Device List

|                    |                    |
|--------------------|--------------------|
| ZL9006MAIRZ        | ZL9010MAIRZ-T      |
| ZL9006MAIRZ-T      | ZL9010MAIRZ-TR5686 |
| ZL9006MAIRZ-TS2490 | ZL9010MAIRZ-TS2490 |
| ZL9006MAIRZR5755   | ZL9010MAIRZR5686   |
| ZL9006MIRZ         | ZL9010MIRZ         |
| ZL9006MIRZ-T       | ZL9010MIRZ-T       |
| ZL9010MAIRZ        | < blank >          |

### Reason for Change:

The qualification plan for new Wafer Fab of Schottky Diode follows JEDEC and other applicable industry standards to confirm there is no impact to form, fit, function or interchangeability of the product. Qualification result of the Schottky Diode (supplier result) and Renesas HDA module are included for reference. Refer Appendix A and B.

### Impact on fit, form, function, quality & reliability:

The change will have no impact on the form, fit, function, quality, reliability and environmental compliance of the devices.

### Product Identification:

Product affected by this change is identifiable via Renesas's internal traceability system.

**Qualification status:** Complete, see attached

**Sample availability:** 2/28/2022

**Device material declaration:** Available upon request

Note : Due to limited availability of sample, Sample request will subject to Renesas's approval. Please contact local Sales Representative should any clarification be required.

Note:

1. Acknowledgement must be received by Renesas within 30 days or Renesas will consider the change as approved.
2. If timely acknowledgement is provided by Customer, then Customer shall have 90 days from the date of receipt of this PCN to make any objections to this PCN. If Customer fails to make objections to this PCN within 90 days of the receipt of the PCN then Renesas will consider the PCN changes as approved.
3. If customer cannot accept the PCN then customer must provide Renesas with a last time buy demand and purchase order.

Questions or requests pertaining to this change notice, including additional data or samples, must be sent to Renesas within 30 days of the publication date.

| For additional information regarding this notice, please contact your regional change coordinator (below) |                                                                    |                                                                   |                                                                          |
|-----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|-------------------------------------------------------------------|--------------------------------------------------------------------------|
| Americas: <a href="mailto:PCN-US@renesas.com">PCN-US@renesas.com</a>                                      | Europe: <a href="mailto:PCN-EU@renesas.com">PCN-EU@renesas.com</a> | Japan: <a href="mailto:PCN-JP@renesas.com">PCN-JP@renesas.com</a> | Asia Pac: <a href="mailto:PCN-APAC@renesas.com">PCN-APAC@renesas.com</a> |

## Appendix A – Diode Incorporate Schottky Diode (Component level) Qualification Results (see attached)

| Category          |                                 |                                                                                          |                                          |                                               |                 | QBS Source Device 1 |                   |
|-------------------|---------------------------------|------------------------------------------------------------------------------------------|------------------------------------------|-----------------------------------------------|-----------------|---------------------|-------------------|
|                   | Product                         | Part Number                                                                              |                                          |                                               |                 | BAT54LPS            |                   |
|                   | Assembly                        | Package Type                                                                             |                                          |                                               |                 | DFN1006H4-2         |                   |
| # in AEC-Q101 (D) | Test                            | Test Conditions                                                                          | Duration / Limits                        | Accept on # Failed/<br>Sample Size per Lot    | # of Lots       | X = Test Needed     | Results Pass/Fail |
| 2                 | MSL1 Pre-conditioning           | Bake 125C                                                                                | 24 Hrs                                   | SMD only,<br>for Test #7,<br>8, 9 & 10        | 3 Assembly lots | X                   | Pass              |
|                   |                                 | Soak 85C, 85% RH                                                                         | 168Hrs                                   |                                               |                 | X                   | Pass              |
|                   |                                 | IR reflow 260C                                                                           | 3 cycles                                 |                                               |                 | X                   | Pass              |
| 3                 | EXTERNAL VISUAL (EV)            | MIL-STD-750 METHOD 2071                                                                  | PER SPEC                                 | All qualification parts submitted for testing |                 | X                   | Pass              |
| 4                 | PARAMETRIC VERIFICATION (PV)    | Test all parameters per Data Sheet including AC & DC across data sheet temperature range | Operating Range, Per Data Sheet (AC, DC) | 0/25                                          | 3 wafer lots    | X                   | Pass              |
|                   | FORWARD SURGE                   | MIL-750D, METHOD 4066                                                                    | PER DATA SHEET                           | 0/50                                          | 3 wafer lots    | X                   | Pass              |
| 5                 | HTRB                            | Ta=150°C or Max Tj, Vd=100%, PER MIL-STD-750-1                                           | 168 Hrs                                  | 0/77                                          | 3 wafer lots    | X                   | Pass              |
|                   |                                 |                                                                                          | 500 Hrs                                  | 0/77                                          |                 | X                   | Pass              |
|                   |                                 |                                                                                          | 1000 Hrs                                 | 0/77                                          |                 | X                   | Pass              |
| 7                 | TC                              | Ta=-55C to 150C or Max Tj, PER JESD22A-104                                               | 168 Cycles                               | 0/77                                          | 3 Assembly lots | X                   | Pass              |
|                   |                                 |                                                                                          | 500 Cycles                               | 0/77                                          |                 | X                   | Pass              |
|                   |                                 |                                                                                          | 1000 Cycles                              | 0/77                                          |                 | X                   | Pass              |
| 8 (alt)           | PCT/AC                          | Ta=121°C 15PSIG 100%RH; PER JESD22-A102                                                  | 96 Hrs                                   | 0/77                                          | 3 Assembly lots | X                   | Pass              |
| 9 alt             | H3TRB                           | Ta=85°C, 85% RH, with 80% Maximum Reverse Bias. JESD22A-101                              | 168 Hrs                                  | 0/77                                          | 3 wafer lots    | X                   | Pass              |
|                   |                                 |                                                                                          | 500 Hrs                                  | 0/77                                          |                 | X                   | Pass              |
|                   |                                 |                                                                                          | 1000 Hrs                                 | 0/77                                          |                 | X                   | Pass              |
| 10                | IOL                             | MIL-STD-750 Method 1037 (Not required for TVS)                                           | 2520 Cycles                              | 0/77                                          | 3 wafer lots    | X                   | Pass              |
|                   |                                 |                                                                                          | 7560 Cycles                              | 0/77                                          |                 | X                   | Pass              |
|                   |                                 |                                                                                          | 15000 Cycles                             | 0/77                                          |                 | X                   | Pass              |
| 11                | ESD                             | HBM (AEC-Q101-001)                                                                       | PER DATA SHEET                           | 0/30                                          | 1 wafer lot     | X                   | Pass              |
|                   |                                 | CDM (AEC-Q101-005)                                                                       | PER DATA SHEET                           | 0/30                                          | 1 wafer lot     |                     |                   |
| 12                | DPA                             | AEC Q101-004 SEC. 4                                                                      |                                          | 0/2                                           | 1 Assembly lot  | X                   | Pass              |
| 20                | RESISTANCE TO SOLDER HEAT (RSH) | JESD22 A-111 (SMD), B-106 (PTH) (260C @10S)                                              | PER SPEC                                 | 0/30                                          | 1 Assembly lot  | X                   | Pass              |
| 21                | Solderability                   | J-STD-002; JESD22B102 (245C +0/5S)                                                       | 5 Seconds                                | 0/10                                          | 1 Assembly lot  | X                   | Pass              |
| 22                | THERMAL RESISTANCE (TR)         | JESD 24-3, 24-4, 24-6 AS APPROPRIATE                                                     | PER SPEC                                 | 0/10                                          | 1 Assembly lot  | X                   | Pass              |
| 23                | Wire Bond Strength              | MIL-STD-750 METHOD 2037 (JESD22-B116B)                                                   | Cpk>1.66                                 | 0/ min of 5                                   | 1 Assembly lot  | X                   | Pass              |
| 24                | BOND SHEAR                      | AEC-Q101-003                                                                             | Cpk>1.66                                 | 0/ min of 5                                   | 1 Assembly lot  | X                   | Pass              |
| 25                | Die Shear                       | MIL-STD-750 (2017)                                                                       | Cpk>1.66                                 | 0/5                                           | 1 Assembly lot  | X                   | Pass              |

## Appendix B – Renesas HDA module Qualification Results (see attached)

| Test Description                                       | Condition  | ZL9006MAIRZ<br>32 Lead HDA Module ,<br>17.2mm x 11.45mm x 2.5mm Custom HDA |
|--------------------------------------------------------|------------|----------------------------------------------------------------------------|
| Hot Temperature Operating Life (HTOL)                  | 168 hours  | N=80<br>Acc=0                                                              |
|                                                        | 1000 hours | N=80<br>Acc=0                                                              |
| Moisture Sensitivity Classification                    | Level 3    | N=156<br>Acc=0<br>L3 Pb-Free                                               |
| Unbias High Accelerated Stress Test<br>+130°C / 85% RH | 96 hours   | N=78<br>Acc=0<br>L3 Pb-Free                                                |
| Hot Temperature Storage (HTS)<br>+150°C                | 48 hours   | N=80<br>Acc=0                                                              |
|                                                        | 500 hours  | N=80<br>Acc=0                                                              |
|                                                        | 1000 hours | N=80<br>Acc=0                                                              |
| Temperature Cycling Test (TCT)<br>-55°C / +125°C       | 200 cycles | N=78<br>Acc=0                                                              |
|                                                        | 500 cycles | N=78<br>Acc=0                                                              |
|                                                        |            | Completed and Passed                                                       |