APS SiC 1200V JBS Diode

Qualification Report

APS-QR-03-21

REVISION HISTORY

Revision	Description	Author	Date
1	Initial release	Wallace Cheng	8-Jan-2021

Summary

Scope of Qualification

☐New Technology	☐New Package	☒Derivative	☐Design change
☒NPI	☐Process Change	☐New Subcon	
☐Others, please specify:			

Qualification Summary

Qual Vehicle	ACD28PS120A ACD20PS120A ACD10PS120A
Part Number(s) covered	ACD28PS120A ACD20PS120A ACD10PS120A
Max Junction Temperature	+175°C
Max Rating Current & Voltage	28A & 1200V
Target Package Type	TO-247
Target Assembly Site	HYME & GEM

Qualification Conclusions

This qualification report documents the qualification and reliability test results for Alpha Power Solutions 1200V Silicon Carbide (SiC) Junction Barrier Schottky(JBS) diode.

Upon completion of all pre-defined requirements, this report certifies that the subject JBS diode of 10A/1200V, 20A/1200V, 28A/1200V rating packaged in TO247 are successfully qualified as per international standard JESD47 and with conditional reference to AEC-Q101.

In summary a qualification has been conducted which covered a variety of operating life and environmental stresses to assess the quality and reliability performance of device over its useful life span. Total over 1500 units of 1200V JBS diode were stressed and electrically verified, zero failure was reported as per the device datasheet limits.

Qualification Lot Information

Qual Lot ID	Device	Wafer Lot Number	Top Marking
Q1	ACD28PS120A	U11454	379XXEAA
Q2	ACD28PS120A	U11454	379XXEAB
Q3	ACD28PS120A	U11454	379XXEAC
Q4	ACD28PS120A	U12598	459BXMCL
Q5	ACD20PS120A	U11002	309BEXAQ
Q6	ACD10PS120A	U11855	369BXEBE

Qualification Test Results

Product Level Qualification Test Results

<table>
<tr><th colspan="2">Test Items</th><th># of Lots</th><th>SS per lot</th><th>Total units</th><th>Results (Fail/SS)</th><th>Qual point</th><th>Summary</th></tr>
<tr><td colspan="2">External Visual Inspection(EVI)
JESD22-B101</td><td>Q1-5</td><td>100%</td><td>100%</td><td>0/100%</td><td>---</td><td>PASSED</td></tr>
<tr><td colspan="2" rowspan="2">High Temperature Reverse Bias (HTRB)
JESD22-A108 @Tj=175°C,</td><td>Q1
Q2
Q3
Q4
Q5</td><td>77</td><td>385</td><td>0/385</td><td>1000hrs</td><td rowspan="2">PASSED</td></tr>
<tr><td>Q6</td><td>77</td><td>77</td><td>0/77</td><td>500hrs</td></tr>
<tr><td colspan="2">Intermittent Operating Life (IOL)
MIL-STD-750 Method 1037 @ΔTj=125°C</td><td>Q1
Q2
Q4</td><td>77</td><td>231</td><td>0/231</td><td>7.5Kcyc</td><td>PASSED</td></tr>
<tr><td colspan="2">Parameter Verification (PV)
@ 25°C and 175°C</td><td>Q1
Q5
Q6</td><td>25</td><td>75</td><td>0/75</td><td>---</td><td>PASSED</td></tr>
<tr><td colspan="2">Temperature Cycling Test (TCT)
JESD22-A104 @+150°C/-55°C</td><td>Q1
Q2
Q3</td><td>77</td><td>231</td><td>0/231</td><td>1000cyc</td><td>PASSED</td></tr>
<tr><td colspan="2">Highly Accelerated Stress Tes t(HAST)
JESD22-A110 @42V, Ta=130°C 33.5psia, 85%RH</td><td>Q1
Q2
Q3</td><td>77</td><td>231</td><td>0/231</td><td>96hrs</td><td>PASSED</td></tr>
<tr><td colspan="2">Autoclave (AC)
JESD22-A102 @121°C, 15psig, 100%RH</td><td>Q1
Q2
Q3</td><td>77</td><td>231</td><td>0/231</td><td>96hrs</td><td>PASSED</td></tr>
<tr><td rowspan="2">ESD</td><td>Human Body Model (HBM)
JS-001</td><td>Q1
Q5</td><td>10</td><td>20</td><td>0/10
0/10</td><td>8KV
6KV</td><td>PASSED</td></tr>
<tr><td>Charged Device Model (CDM)
JS-002</td><td>Q2
Q5</td><td>10</td><td>20</td><td>0/10
0/10</td><td>1KV
1KV</td><td>PASSED</td></tr>
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- End of Report -