

APS SiC 650V JBS Diode Qualification Report

APS-QR-01-21

REVISION HISTORY

Revision	Description	Author	Date
1	Initial release	Wallace	08-Jan-2021

Summary

Scope of Qualification

<input type="checkbox"/> New Technology	<input type="checkbox"/> New Package	<input checked="" type="checkbox"/> Derivative	<input type="checkbox"/> Design change
<input checked="" type="checkbox"/> NPI	<input type="checkbox"/> Process Change	<input type="checkbox"/> New Subcon	
<input type="checkbox"/> Others, please specify:			

Qualification Summary

Qual Vehicle	ACD20PS065C ACD10PS065C ACD08PS065C ACD06PS065C
Part Number(s) covered	ACD20PS065C, ACD10PS065C, ACD08PS065C, ACD06PS065C
Max Junction Temperature	+175°C
Max Rating Current & Voltage	20A @ 650V
Target Package Type	TO-220-2L
Target Assembly Site	HTME & gEM

Qualification Conclusions

This qualification report documents the qualification and reliability test results for Alpha Power Solutions 650V Silicon Carbide (SiC) Junction Barrier Schottky(JBS) diode.

Upon completion of all pre-defined requirements and being supported by the XFAB JBS Process Qualification(ref: APS-QR-06-19), this report certifies that the subject JBS diode of 6A/650V, 10A/650V, 8A/650V, 20A/650V rating packaged in TO-220 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 500 units of 650V 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	ACD20PS065C	U11162	359BXEBC
Q2	ACD10PS065C	U12337	489BXMDJ
Q3	ACD08PS065C	U10303	279BEXAP
Q4	ACD06PS065C	U11919	469AXEDU

Qualification Test Results

Product Level Qualification Test Results

Test Items	# of Lots	SS per lot	Total units	Results (Fail/SS)	Qual point	Summary
High Temperature Reverse Bias (HTRB) JESD22-A108 @Tj=175°C, 100% rated voltage	Q1	77	77	0/77	1000hrs*1	PASSED
	Q2	77	77	0/77	500hrs*2	
	Q4	77	77	0/77	500hrs*2	
Intermittent Operating Life (IOL) JESD22-A122 / MIL-PRF-19500 @ΔTj=125°C	Q3	77	77	0/77	7.5Kcyc	PASSED
Parameter Verification (PV) @Ta=25°C & 175°C	Q1	25	75	0/75	-	PASSED
	Q2					
	Q4					
Temperature Cycling Test (TCT) JESD22-A104 @+150°C/-55°C	Q3	77	77	0/77	1000cyc	PASSED
Highly Accelerated Stress Test (HAST) JESD22-A110 @42V, Ta=130°C 33.5psia, 85%RH	Q3	77	77	0/77	96hrs	PASSED
Autoclave (AC) JESD22-A102 @121°C, 15psig, 100%RH	Q3	77	77	0/77	96hrs	PASSED
ESD Human Body Model(HBM) JS-001/Q101-001	Q1 Q2 Q4	10	30	0/30	8KV	PASSED

*1 Generic data from Foundry Master Qualification.

*2 Derivative device qualification