Product Qualification Report

IGT40R070D1 E8220

Cool GaN™

Description

This product qualification report describes the characteristics of the product with respect to quality and reliability.

The qualification sample selection was done on production lots which were manufactured and tested on standard production processes and meet the defined requirements.

The qualification test results of those products as outlined in this document are based on **JEDEC** for target applications and may reference existing qualification results of similar products. Such referencing is justified by the structural similarity of the products.

Qualification Assessment

Fully qualified according to **JEDEC** for **Industrial Applications** and assessed as PASS

For further information about comparable products, please contact the nearest Infineon Technologies office (www.infineon.com).

IGT40R070D1 E8220 qualified 2018
PG-HSOF-8
MSL: 1; 260°C

Electrical Stress Test Results:

Test Description	Abbr.	Condition	Duration	Lots/SS	Fail/Qty	Result
High Temperature Storage Life *JESD22-A103*	HTSL	T_a = 150 °C	1000 h	3 x 45	0 / 135	PASS
High Temperature Reverse Bias *JESD22-A108*	HTRB[1]	T_a = 150 °C V_{DS} = 600 V	1000 h	3 x 77	1[2] / 231	Cond. PASS
Positive High Temperature Gate Stress *JESD22-A108*	HTGF[1]	T_a = 150 °C I_G = 50 mA	1000 h	3 x 77	0 / 231	PASS
Negative High Temperature Gate Stress *JESD22-A108*	HTGS[1]	T_a = 150 °C V_{GS} = -10 V	1000 h	3 x 77	0 / 231	PASS
Intermittent Operational Life Test *MIL-STD 750 / Meth.1037*	IOL[1]	ΔT = 100 K	15,000x	3 x 77	0 / 231	PASS
ESD (HBM) *JESD22-A114*	HBM	Class 2 (2000 V to <4000 V)		1 x 3 (per voltage level)	0 / 3	PASS
ESD (CDM) *JESD22-C101*	CDM	Class C3 (1000 V or greater)		1 x 3 (per voltage level)	0 / 3	PASS

Environmental Stress Test Results:

Test Description	Abbr.	Condition	Duration	Lots/SS	Fail/Qty	Result
Pre-Conditioning *J-STD020 / JESD22 A113*	PC	MSL and 3 x reflow		3	0	PASS
High Humidity, High Temperature Reverse Bias *JESD22 A101*	H^{3}TRB[1]	T_a = 85 °C r.h. = 85% V_{DS} = 100 V	1000 h	3 x 77	0 / 231	PASS
Biased Highly Accelerated Stress Test *JESD22 A110*	HAST[1]	T_a = 130 °C r.h. = 85% V_{DS} = 480 V	192 h	3 x 77	0 / 231	PASS
Temperature Cycling *JESD22 A104*	TC[1]	-25 °C to +150 °C	1500x	3 x 77	0 / 231	PASS

Mechanical Stress Test Results:

Test Description	Abb	Condition	Duration	Lots	Fail/Qty	Result
Moisture Sensitivity Level *IPC / J-STD-020*	MSL	MSL 1 @ 260 °C			0 / 22	PASS

[1] For SMD devices, a preconditioning (PC) according to JESD22 was performed prior to selected reliability stress tests.

[2] Early life failure(s). An appropriate screening has been implemented into the production test after completion of this product qualification. The effectiveness has been confirmed at an initial study and will be monitored at regular reliability stress tests.

Additional, Non-Standard Reliability Test Data

Test Description	Abbr.	Condition	Duration	Lots/SS	Fail/Qty	Result
Dynamic High Temperature Reverse Bias	dynHTRB[1]	T_a = 150 °C V_{DS} = 600 V f = 100 kHz	1000 h	3 x 77	0 / 231	PASS
Dynamic Gate Current Bias	dynGCB	T_a = 150 °C f = 100 kHz	1000 h	1 x 14	0 / 14	PASS
High Voltage, High Humidity, High Temperature Reverse Bias	HV-H^3TRB[1]	T_a = 85 °C r.h. = 85% V_{DS} = 480 V	1000 h	3 x 77	1[2] / 231	Cond. PASS
Unbiased Highly Accelerated Stress Test *JESD22 A118*	uHAST[1]	T_a = 130 °C r.h. = 85%	192 h	3 x 77	0 / 231	PASS
Low Temperature Reverse Bias	LTRB[1]	T_a = 0 °C V_{DS} = 600 V	1000 h	1 x 77	0 / 77	PASS
Positive Low Temperature Gate Stress	LTGF[1]	T_a = 0 °C I_G = 50 mA	1000 h	1 x 77	0 / 77	PASS
Negative Low Temperature Gate Stress	LTGS[1]	T_a = 0 °C V_{GS} = -10 V	1000 h	1 x 77	0 / 77	PASS
Positive High Humidity, High Temperature Gate Stress	H^3TGF[1]	T_a = 85 °C r.h. = 85% I_G = 50 mA	1000 h	1 x 77	0 / 77	PASS
Negative High Humidity, High Temperature Gate Stress	H^3TGS[1]	T_a = 85 °C r.h. = 85% V_{GS} = -10 V	1000 h	1 x 77	0 / 77	PASS
High Load Test		T_a = 25 °C $V_{DS} \leq$ 600 V I_D = 15 A (mean) f = 100 kHz	1000 h	1 x 10	0 / 10	PASS
Autoclave JESD22 A102	AC[1]	Ta = 121 °C r.h. = 100%	192 h	3 x 77	0 / 231	PASS

[1] For SMD devices, a preconditioning (PC) according to JESD22 was performed prior to selected reliability stress tests.

[2] Early life failure(s). An appropriate screening has been implemented into the production test after completion of this product qualification. The effectiveness has been confirmed at an initial study and will be monitored at regular reliability stress tests.

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Document reference

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