

S-Band, GaN/SiC, RF Power Transistor

3.3 - 3.8 GHz | 150 W typ | 50% Efficiency typ | 10 dB Gain typ | 28 V | CW

IGN3338CW150 and IGN3338CW150S are high power GaN-on-SiC RF power transistors that have been designed to suit the unique needs of S Band systems. They operate over the full 3.3 - 3.8 GHz frequency range. Under CW conditions, they typically supply a minimum of 150 W of output power, with typically > 10dB of associated gain and 47% efficiency. They operate from a 28 V supply voltage. For optimal thermal efficiency, the transistors are housed in a metal-based package with an epoxy-sealed ceramic lid.

FEATURES

- GaN on SiC HEMT Technology
- Output Power >150 W
- Pre-matched Input and Output Impedance
- High Efficiency - up to 50%
- 100% RF Tested
- RoHS and REACH Compliant

APPLICATIONS

- S-band Systems

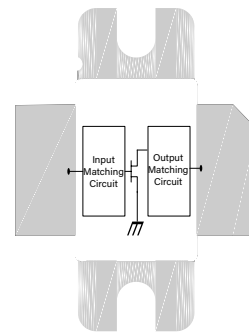


Table 1. RF Electrical Characteristics (Case temperature = 30 °C unless otherwise stated)

Parameter	Symbol	Min	Typ	Max	Units	Test Conditions
Gain	G	7.5	10	13	dB	$P_{OUT} = 150W$ $f = 3.3, 3.55, 3.8GHz$ CW $V_{DS} = 28V, I_{DS} = 80mA$
Drain Efficiency	η	43	47	50	%	
Input Return Loss	IRL	5	12	20	dB	
Load Mismatch Stability	VSWR-S	2:1				
VSWR Withstand	VSWR-LMT	3:1				

Note 1: Consult Integra Technologies Application Note 001 for information on how RF output power and pulse droop are measured.

Table 2. Absolute Maximum Ratings (Not Simultaneous)

Parameter	Symbol	Value	Units	Test Conditions
DC Drain-Source Voltage	V_{DS}	70	V	25 °C
DC Gate-Source Voltage	V_{GS}	-8 to +1.0	V	25 °C
DC Drain Current	I_D	15	A	25 °C
DC Gate Current	I_G	15	mA	25 °C
RF Input Power	$P_{RF,IN}$	14	W	25 °C
Operating Channel Temperature	T_{CH}	-55 to +225	°C	
Storage Temperature	T_{STG}	-55 to +150	°C	
Soldering Temperature	T_{SOLDER}	260 for 60s	°C	

Note: Operation outside the limits given in this table may cause permanent damage to the transistor

Table 3. DC Electrical Characteristics (Case temperature = 25 °C unless otherwise stated)

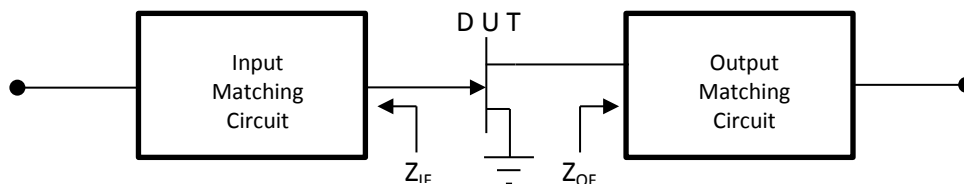
Parameter	Symbol	Min	Typ	Max	Units	Test Conditions
Gate Pinch-Off Voltage	V_P	-5.0			V	$V_{DS} = 28V, I_{DS} = 1mA$
Quiescent Gate Voltage	V_Q		-2.8		V	$V_{DS} = 28V, I_{DS} = 80mA$

Table 4. Thermal Resistance (Case temperature = 85 °C unless otherwise stated)

Parameter	Symbol	Typ	Units	Test Conditions
Peak Thermal Resistance (total device), Channel to Case	R_{TH}		°C/W	$P_{diss} = 169W$ CW $V_{DS} = 28V$

Table 5. Test Fixture One Side to Ground Source & Load Impedances (Case temperature = 25 °C unless otherwise stated)

Frequency (GHz)	Z_{IF}	Z_{OF}	Units	Test Conditions
3.3	3.0 - j 5.3	2.8 - j 1.9	Ω	$P_{OUT} = 150W$ CW $V_{DS} = 28V, I_{DS} = 80mA$
3.55	2.8 - j 4.4	2.7 - j 1.1	Ω	
3.8	2.5 - j 3.4	2.6 - j 0.2	Ω	



TYPICAL PERFORMANCE

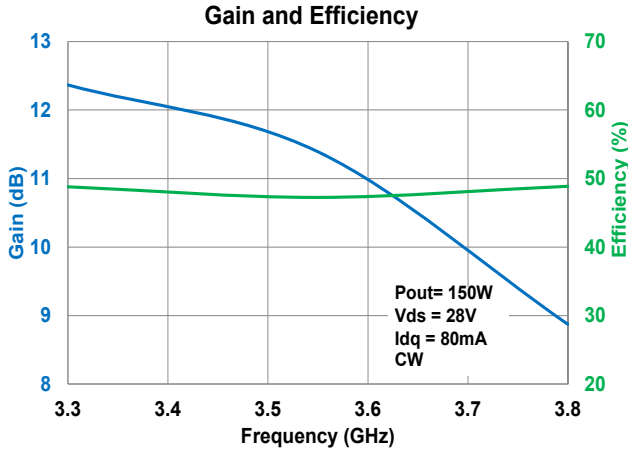


Figure 1

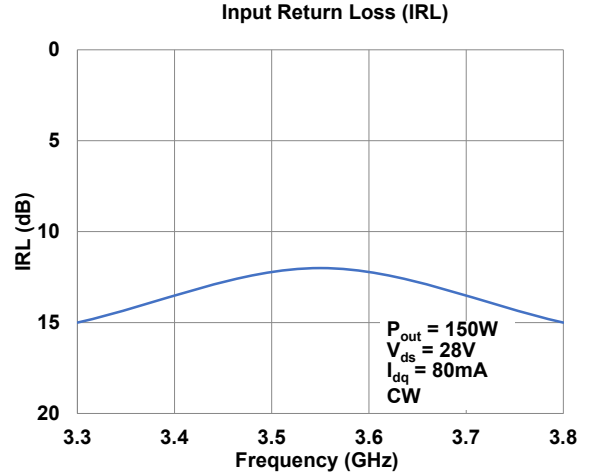


Figure 2

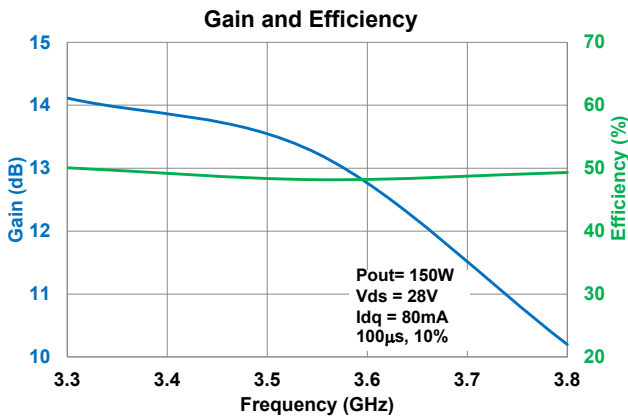


Figure 3

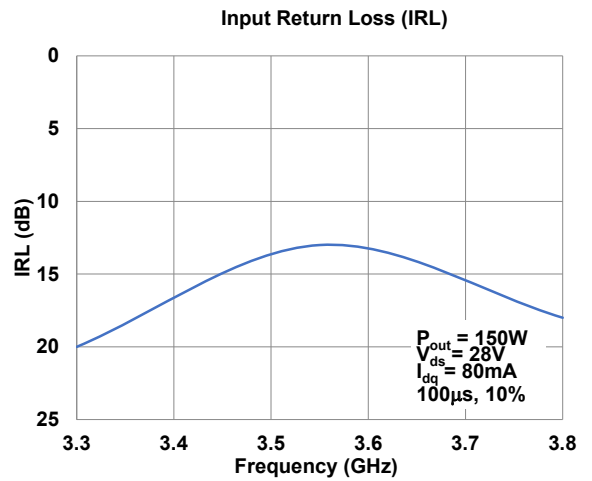
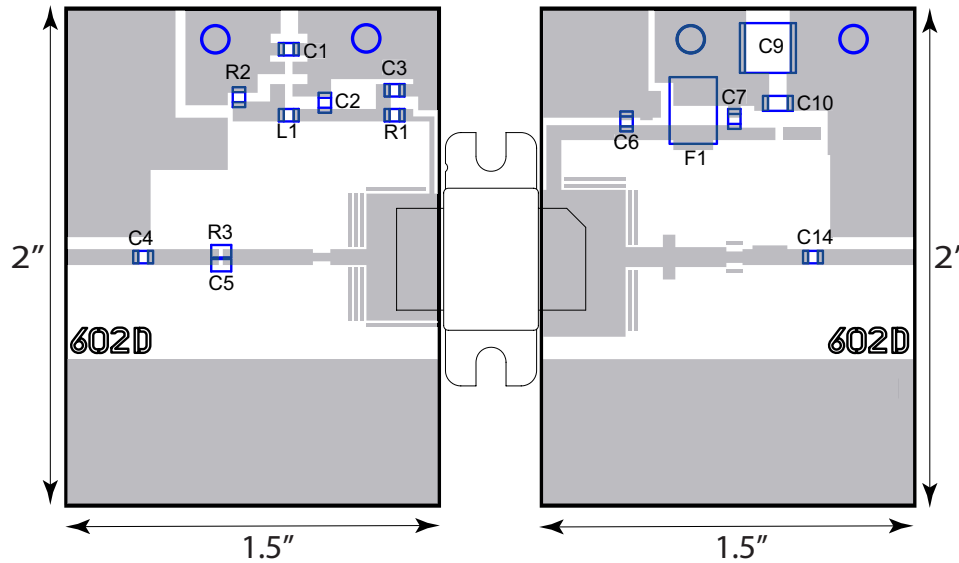


Figure 4

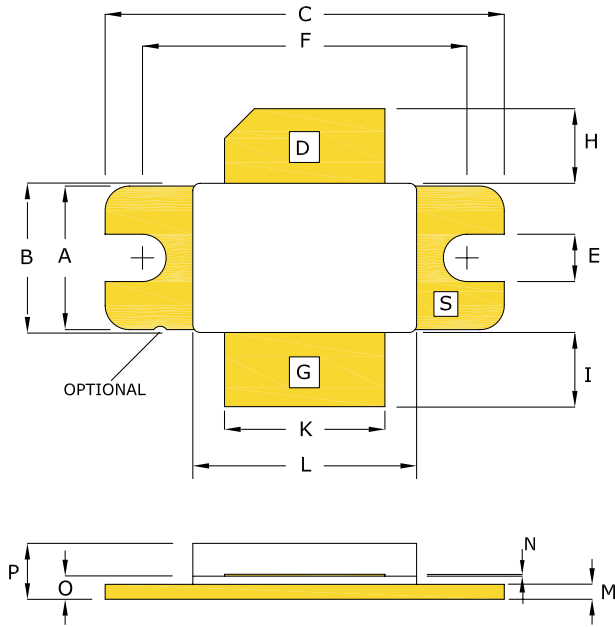
TEST FIXTURE



Bill of Materials for IGN3338CW150 Test Fixture

Designator	Description	Part Number
C1,C3, C14	CAP 10pF, 250V, 0805	ATC600F100JT250XT
C2	CAP 1000pF, 100V, 0805	ATC A102J4T2A
C4	CAP 27pF, 250V, 0805, Edge Mount	ATC600F270FT250XT
C5	CAP 20pF, 250V, 0603	ATC600S200JT250XT
C6, C7	CAP 5.6pF, 250V, 0805, Edge Mount	ATC600F5R6CT250XT
C9	CAP 10 μ F, 100V, 2220, X7R	22201C106MAT2A
C10	CAP 1 μ F, 100V, 1206, X7R	12061C105KAT2A
R1	RES, 10 OHM, 0805	ERJ-6ENF10R0V
R2	RES 200 OHM, 0805	ERJ-6ENF2000V
R3	RES 100 OHM, 0603	
L1	IND FB 120 OHM, 5A, 0805	ILHB0805ER121V
F1	FUSE 15A	CB61F15A-TR1
PC Board Type	ROGERS Ro4350B, 30mil, 1/1oz. Copper	

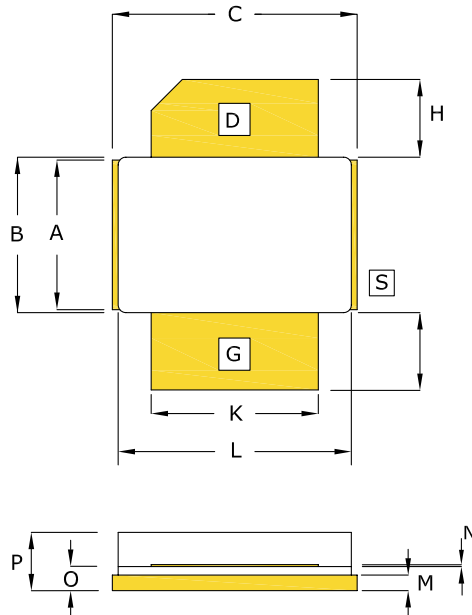
PACKAGE PL64B1



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.380	0.390	9.65	9.91
B	0.395	0.405	10.03	10.29
C	1.065	1.075	27.05	27.31
E	0.123	0.133	3.12	3.38
F	0.865	0.875	21.97	22.23
H	0.180	0.220	4.57	5.59
I	0.180	0.220	4.57	5.59
J	--	--	--	--
K	0.425	0.435	10.80	11.05
L	0.595	0.605	15.11	15.37
M	0.035	0.045	0.89	1.14
N	0.004	0.006	0.10	0.15
O	0.057	0.067	1.45	1.70
P	0.142	0.175	3.61	4.45

PIN SCHEDULE	
D	DRAIN
S	SOURCE
G	GATE

BOLT-DOWN FLANGE OPTION
IGN3338CW150



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.380	0.390	9.65	9.91
B	0.395	0.405	10.03	10.29
C	0.625	0.635	15.88	16.13
E	--	--	--	--
F	--	--	--	--
H	0.180	0.220	4.57	5.59
I	0.180	0.220	4.57	5.59
J	--	--	--	--
K	0.425	0.435	10.80	11.05
L	0.595	0.605	15.11	15.37
M	0.035	0.045	0.89	1.14
N	0.004	0.006	0.10	0.15
O	0.057	0.067	1.45	1.70
P	0.142	0.175	3.61	4.45

PIN SCHEDULE	
D	DRAIN
S	SOURCE
G	GATE

EARLESS FLANGE OPTION
IGN3338CW150S

ESD & MSL Rating

Parameter	Rating	Standard
ESD Human Body Model (HBM)	TBD	ESDA/JEDEC JS-001-2012
ESD Charged Device Model (CDM)	TBD	JEDEC JESD22-C101F
Moisture Sensitivity Level (MSL)	Unlimited Shelf Life	IPC/JEDEC J-STD-020

RoHS Compliance

Integra Technologies, Inc declares that its GaN and LDMOS Transistor Products comply with EU Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS2), as adopted by EU member states on January 2, 2013 and amended on March 31, 2015 by EU Directive 2015/863/EU.

REACH Compliance

Integra Technologies supports EU Regulation number 1907/2006 concerning the Registration, Evaluation, Authorization, and Restriction of Chemicals (REACH) as these apply to Integra semiconductor products, development tools, and shipping packaging.

In support of the REACH regulation, Integra will:

- Inform customers and recipients of Integra product if they contain any substances that are of very high concern (SVHC) per the European Chemical Agency (ECHA) website.
- Notify ECHA if any Integra product that contains any SVHCs which exceed guidelines for REACH chemicals by weight per part number and for total content weight per year for all products produced in or imported to the European market.
- Cease shipments of product containing REACH Annex XIV substances until authorization has been obtained.
- Cease shipment of product containing REACH Annex XVII chemicals when restrictions apply.

Integra has evaluated its materials, BOMs, and product specifications and product and has determined that this transistor conforms to all REACH and SVHC regulations and guidelines. Integra has implemented actions and control programs that will assure continued compliance.

Disclaimer

Integra Technologies Inc. reserves the right to make changes without further notice to any products herein. Integra Technologies Inc. makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Integra Technologies Inc. assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. Integra Technologies Inc. products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Integra Technologies Inc. customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Integra Technologies Inc. for any damages resulting from such improper use or sale.

DEFINITIONS:

DATA SHEET STATUS

Advanced Specification - This data sheet contains Advanced specifications.

Preliminary Specification - This data sheet contains specifications based on preliminary measurements and data.

Final Specification - This data sheet contains final product specifications.

MAXIMUM RATINGS Stress above one or more of the maximum ratings may cause permanent damage to the device. These are maximum ratings only operation of the device at these or at any other conditions above those given in the characteristics sections of the specification is not implied. Exposure to maximum values for extended periods of time may affect device reliability.