

VHF-Band, GaN/SiC, RF Power Transistor

40 - 50 MHz | 1200W typ | 90% Efficiency typ | 29 dB Gain typ | 100 V | 100µs Pulse Length, 10% Duty Cycle

IGN145 and IGN145S are high power GaN-on-SiC RF power transistors that have been designed to suit the unique needs of VHF band systems. They operate over the full 40 - 50 MHz frequency range. Under 100µs, 10% duty cycle pulse conditions, they supply a minimum of 1000 W of peak output power, with typically >28 dB of gain and 83% efficiency. They operate from a 100 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 >1000W
- Exceptionally High Efficiency - up to 90%
- 100% RF Tested Under 100µs, 10% duty cycle pulse conditions
- RoHS and REACH Compliant
- IGN145 has a bolt-down flange, IGN145S is the earless flange option

APPLICATIONS

- VHF-band Systems

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

Parameter	Symbol	Min	Typ	Max	Units	Test Conditions
Gain	G	25	28	32	dB	$P_{OUT} = 1000W$ $f = 40, 45, 50 \text{ MHz}$ 100µs pulse length, 10% duty cycle $V_{DS} = 100V, I_{DS} = 30mA$
Drain Efficiency	η	75	83	90	%	
Pulse Droop	D	-0.6	-0.35	+0.2	dB	
Input Return Loss	IRL	8	17	20	dB	
Load Mismatch Stability	VSWR-S	2:1				
VSWR Withstand	VSWR-LMT	3:1				

Note: 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}	300	V	25 °C
DC Gate-Source Voltage	V_{GS}	-8 to +1.0	V	25 °C
DC Drain Current	I_D	30	A	25 °C
DC Gate Current	I_G	3.0	mA	25 °C
RF Input Power	$P_{RF,IN}$	2	W	25 °C
Operating Channel Temperature	T_J	-55 to +225	°C	
Storage Temperature	T_{STG}	-55 to +150	°C	
Soldering Temperature	T_{SOLDER}	260 for 60s	°C	

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

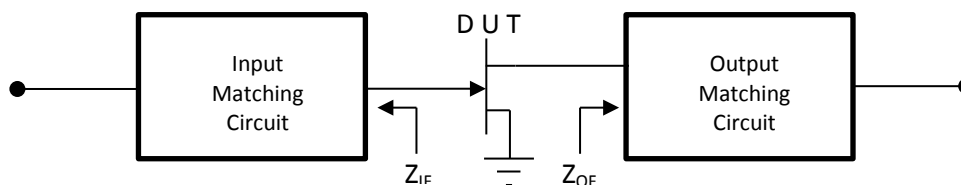
Parameter	Symbol	Min	Typ	Max	Units	Test Conditions
Gate Pinch-Off Voltage	V_P	-5.0			V	$V_{DS} = 100V, I_{DS} = 1mA$
Quiescent Gate Voltage	V_Q		-2.6		V	$V_{DS} = 100V, I_{DS} = 30mA$

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

Parameter	Symbol	Typ	Test Conditions
Peak Thermal Resistance, Channel to Case	R_{TH}	0.2	$P_{DISS} = 205W$ 100µs pulse length, 10% duty cycle $V_{DS} = 100V$

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

Frequency (MHz)	Z_{IF} Fundamental	Z_{OF} Fundamental	Units	Test Conditions
40	18.1 + j 5.1	8.2 + j 3.0	Ω	$P_{OUT} = 1000W$ 100µs pulse length, 10% duty cycle $V_{DS} = 100V, I_{DS} = 30mA$
45	18.75 + j 6.4	9.0 + j 3.3	Ω	
50	19.35 + j 7.2	7.7 + j 4.1	Ω	



TYPICAL PERFORMANCE

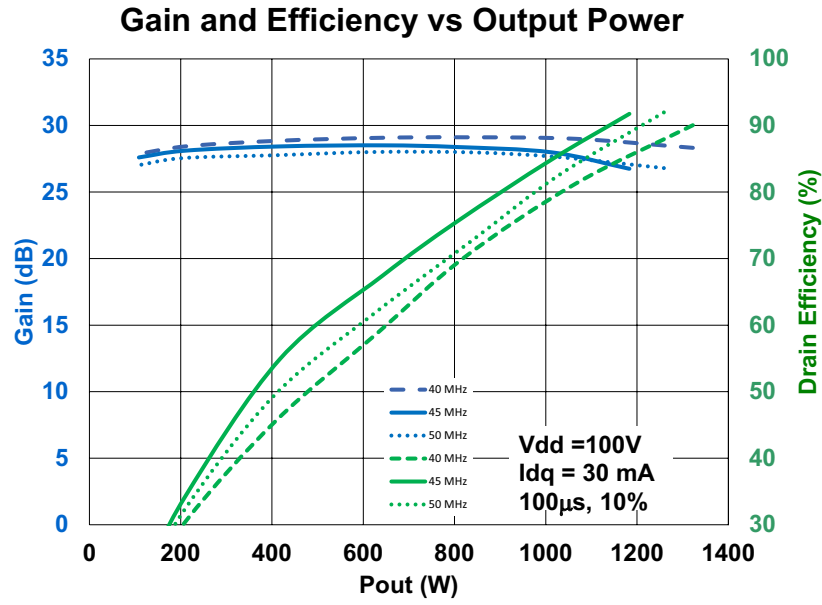
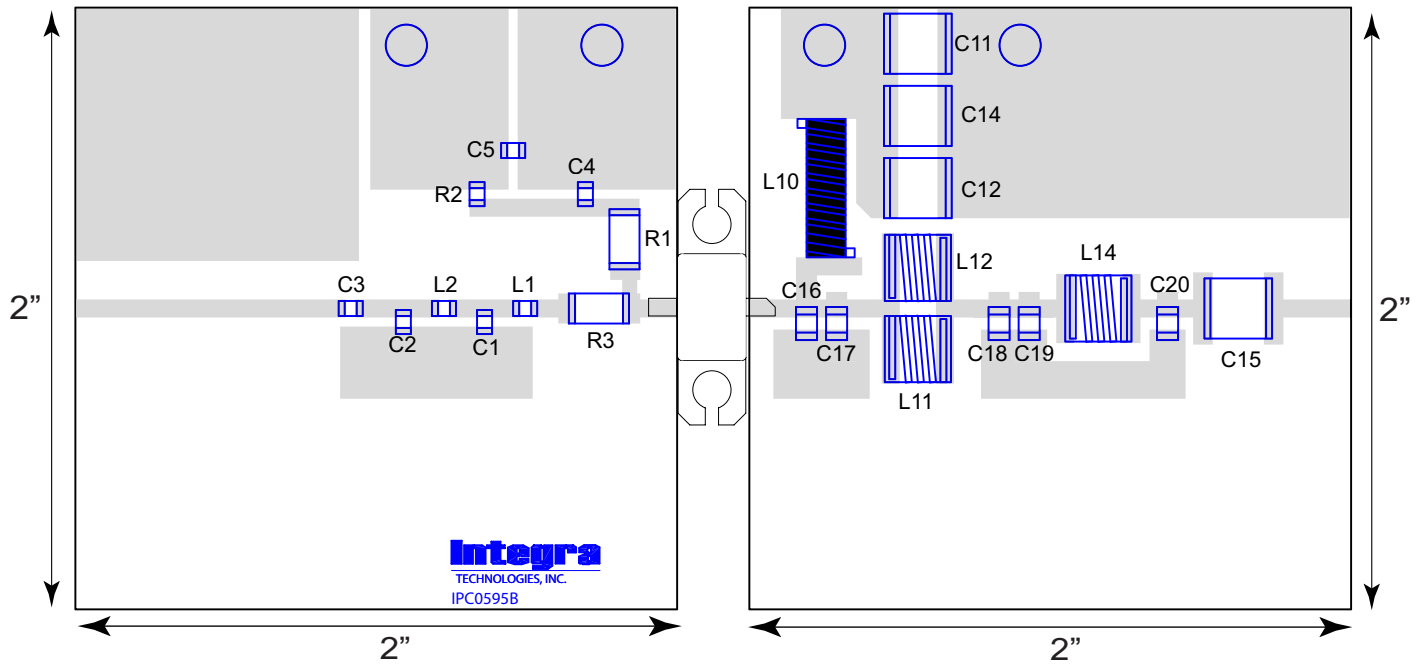


Figure 1

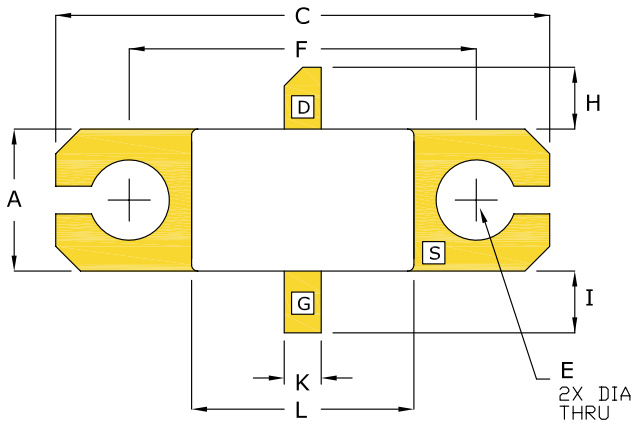
TEST FIXTURE



Bill of Materials for IGN145 Test Fixture

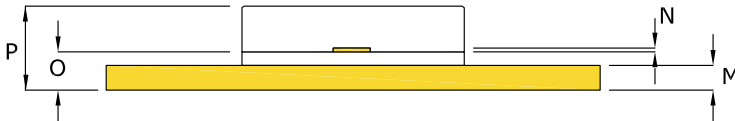
Designator	Description	Part Number
C1	CAP 150pF, 0805, 250V	C0805X103K1GCAUTO
C2	CAP 68pF, 0805, 250V	600F680GT250XT
C3, C4, C5	CAP 0.01μF, 0805, 100V	C0805X103K1GCAUTO
C11, C12	CAP 2.2μF, 2220, 250V, X7R	C5750X7T2E225K250KA
C14, C15	CAP 0.01μF, 2225, 500V	C2225C103JCGAC7800
C16	CAP 82pF, 1111, 500V	22201C106MAT2A
C17	CAP 47pF, 1111, 500V	800B470GT500XT
C18	CAP 180pF, 1111, 300V	800B181GT300XT
C19	CAP 150pF, 1111, 300V	800B181GT300XT
C20	CAP 100pF, 1111, 300V	800B101GT300XT
L1	IND 100nH, 0805	0805CS-101XGEC
L2	IND 120nH, 0805	0805CS-121XGEC
L10	IND 500nH	2929SQ-501JEC
L11, L12	IND 90nH	2222SQ-90NJEB
L14	IND 110nH	2222SQ111GEB
R1	RES 50 OHM, 2010	2010EW50R0G
R2	RES 200 OHM, 0805	ERJ-6ENF1000V
R3	RES 10 OHM, 2010	CRCW201010R0FKEF
PC Board Type	ROGERS RO4350B 30mil, 1/1oz. Copper	

PACKAGE PL32C2

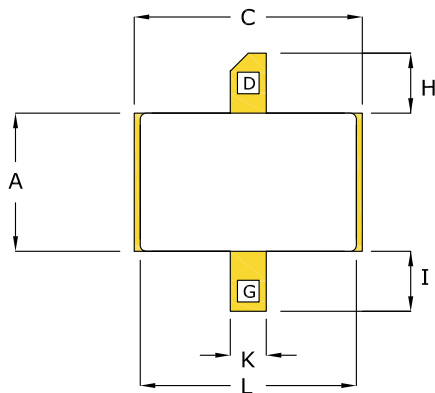


DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.225	0.235	5.72	5.97
B	--	--	--	--
C	0.795	0.805	20.19	20.44
E	0.125	0.135	3.18	3.43
F	0.557	0.567	14.14	14.40
H	0.090	0.110	2.29	2.79
I	0.090	0.110	2.29	2.79
J	--	--	--	--
K	0.055	0.065	1.40	1.65
L	0.357	0.363	9.07	9.22
M	0.035	0.045	0.89	1.14
N	0.004	0.006	0.10	0.15
O	0.057	0.067	1.45	1.70
P	0.131	0.154	3.33	3.91

PIN SCHEDULE	
D	DRAIN
S	SOURCE
G	GATE

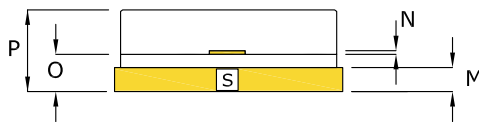


**BOLT-DOWN FLANGE OPTION
IGN145**



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.225	0.235	5.72	5.97
B	--	--	--	--
C	0.375	0.385	9.53	9.78
E	--	--	--	--
F	--	--	--	--
H	0.090	0.110	2.29	2.79
I	0.090	0.110	2.29	2.79
J	--	--	--	--
K	0.055	0.065	1.40	1.65
L	0.357	0.363	9.07	9.22
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	0.131	0.154	3.33	3.91

PIN SCHEDULE	
D	DRAIN
S	SOURCE
G	GATE



**EARLESS FLANGE OPTION
IGN145S**

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.

Integra Technologies, 321 Coral Circle, El Segundo, CA 90245-4620 | Phone: 310-606-0855 | Fax: 310-606-0865