

# L-Band, GaN/SiC, RF Power Transistor

960 - 1220 MHz | 110W typ | 55% Efficiency typ | 17dB Gain typ | 100 V | 32μs Pulse Length, 4% Duty Cycle

IGN0912S110HV and IGN0912S110HVS are high power GaN-on-SiC RF power transistors that have been designed to suit the unique needs of IFF and TACAN/DME systems. They operate over the full 960 - 1220 MHz frequency range. Under 32μs, 4% duty cycle pulse conditions, they supply a minimum of 110 W of peak output power. They operate from a 100V supply voltage. For optimal thermal efficiency, the transistors are housed in a metal-based package with an epoxy-sealed ceramic lid.

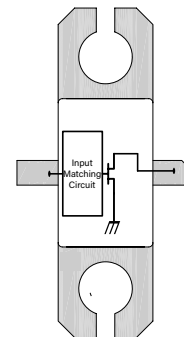


## FEATURES

- GaN on SiC HEMT Technology
- Output Power >110W
- Pre-matched Input Impedance
- High Efficiency - up to 65%
- 100% RF Tested Under 32μs, 4% duty cycle pulse conditions
- RoHS and REACH Compliant

## APPLICATIONS

- IFF and TACAN/DME Systems



**Table 1. RF Electrical Characteristics in Broadband Test Fixture (Case temperature = 30 °C unless otherwise stated)**

Parameter	Symbol	Min	Typ	Max	Units	Test Conditions
Gain	G	16	17.5	19	dB	$P_{OUT} = 110W$ $f = 960, 1090, 1220 \text{ MHz}$ 32μs pulse length, 4% duty cycle $V_{DS} = 100V, I_{DS} = 8mA$
Drain Efficiency	$\eta$	45	50	60	%	
Pulse Droop	D	-0.3	-0.2	+0.1	dB	
Load Mismatch Stability	VSWR-S		2:1			
VSWR Withstand	VSWR-LMT		5:1			

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	$V_{DS}$	200	V	25 °C
DC Gate-Source Voltage	$V_{GS}$	-8 to +1.0	V	25 °C
DC Drain Current	$I_D$	2	A	25 °C
DC Gate Current	$I_G$	2	mA	25 °C
RF Input Power	$P_{RFIN}$	5	W	25 °C
Operating Channel Temperature	$T_j$	-55 to +225	°C	
Storage Temperature	$T_{STG}$	-62 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)**

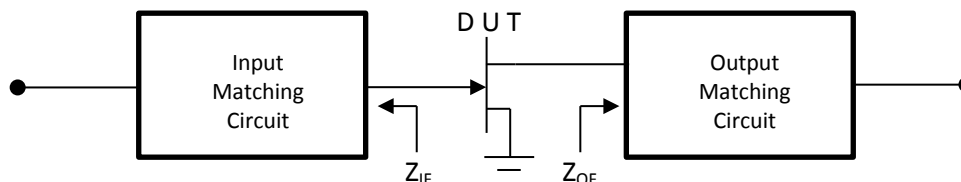
Parameter	Symbol	Min	Typ	Max	Units	Test Conditions
Gate Pinch-Off Voltage	$V_P$	-5.0			V	$V_{DS} = 100V, I_{DS} = 1mA$
Quiescent Gate Voltage	$V_Q$		-2.8		V	$V_{DS} = 100V, I_{DS} = 8mA$

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

Parameter	Symbol	Typ	Test Conditions
Peak Thermal Resistance, Channel to Case	$R_{TH}$	TBD	$P_{DISS} = 110W$ 32µs pulse length, 4% duty cycle $V_{DS} = 100V$

**Table 5. Test Fixture Source & Load Impedances**

Frequency (MHz)	$Z_{IF}$	$Z_{OF}$	Units	Test Conditions
960	6.93 - j 1.99	13.49 + j 13.47	$\Omega$	$P_{OUT} = 110W$ 32µs pulse length, 4% duty cycle $V_{DS} = 100V, I_{DS} = 8mA$
1090	6.91 + j 0.65	15.43 + j 12.77	$\Omega$	
1220	7.51 + j 3.29	16.73 + j 12.99	$\Omega$	



TYPICAL PERFORMANCE

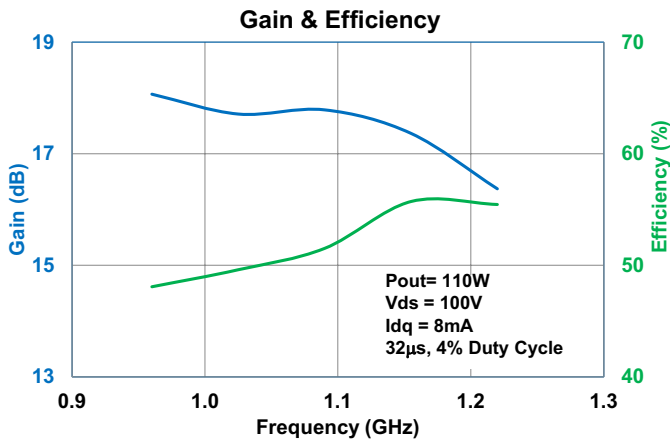


Figure 1

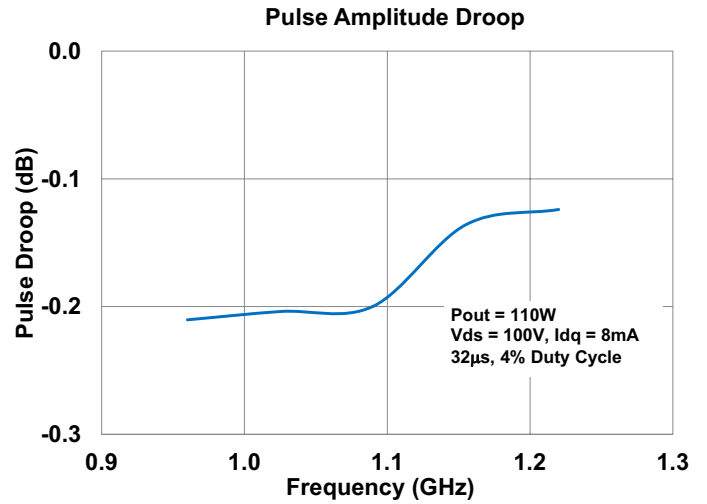


Figure 2

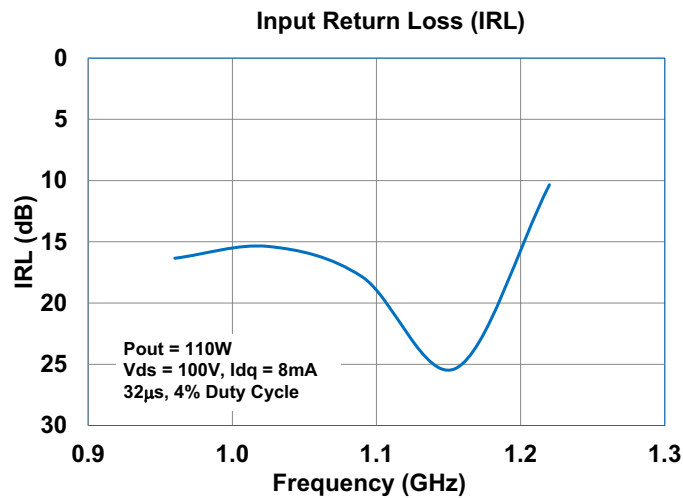
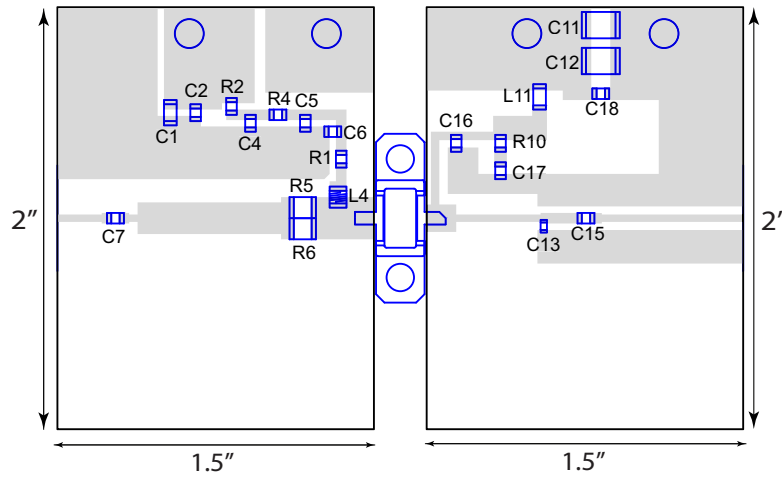


Figure 3

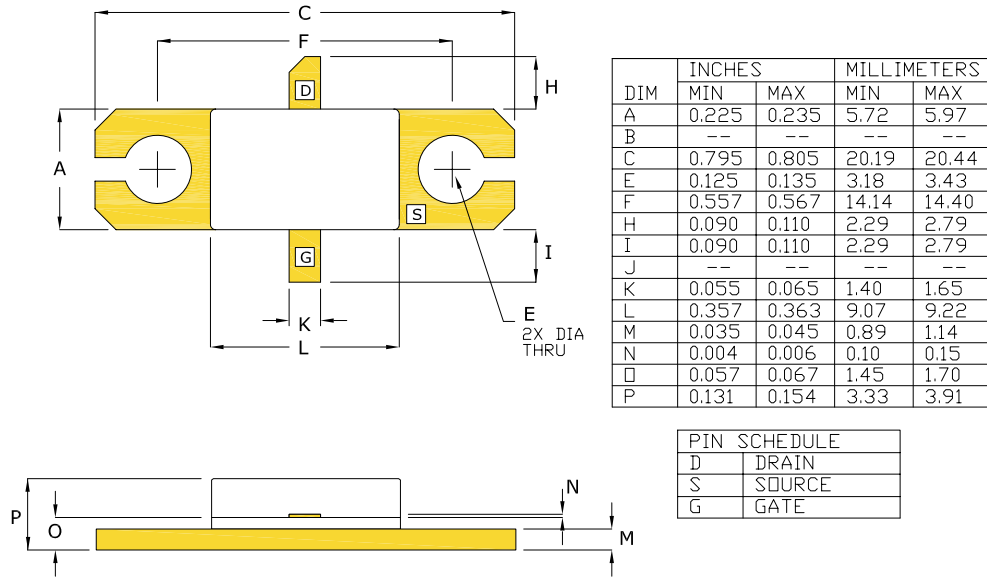
**TEST FIXTURE**



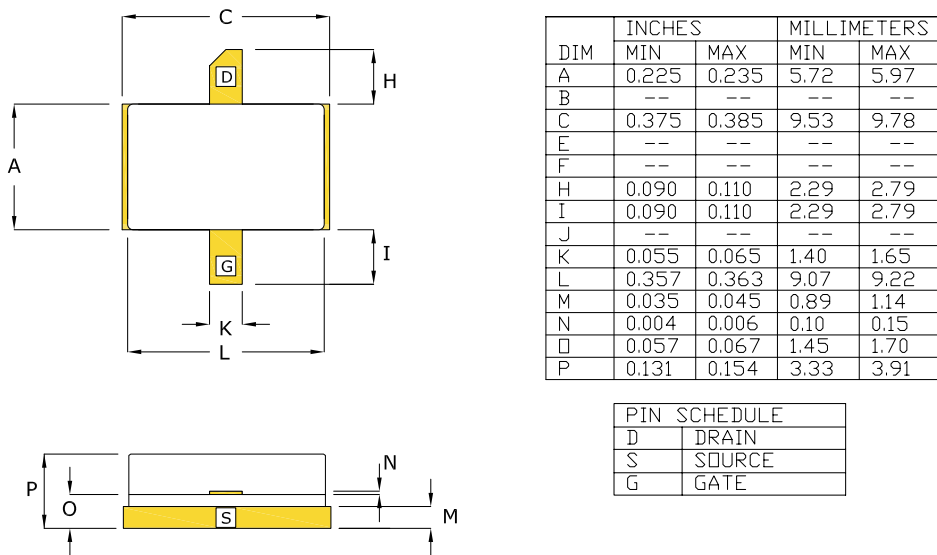
**Bill of Materials for IGN0912S110HV Test Fixture**

Designator	Description	Quantity	Part Number
C1	CAP 1 $\mu$ F, 100V, 1206, X7R	1	12061C105K4T2A
C2, C5, C18	CAP 1000pF, 100V, 0805	3	08051A102J4T2A
C4, C17	CAP 0.068 $\mu$ F, 250V, 0805, X7R	2	C0805C683KARAC#A
C6, C7, C16	CAP 33pF, 0805	3	600F330FT250XT
C11, C12	CAP 1 $\mu$ F, 200V, 1812, X7R	2	18122C105KAT2A
C13	CAP 0.7pF, 0603, 250V	1	600S0R7AT250XT
C15	CAP 18pF, 0805	1	600F180JT250XT
L4	IND 39nH, 1008	1	1008CS-390XJLB
L11	IND FB 1206, 6A, 33 OHM	1	BLM31PG330SN1L
R1, R10	RES 5.1 OHM, 0805	2	CRCW08055R1JNEA
R2	RES 200 OHM, 0805	1	CRCW0805200RFKTA
R4	RES 0 OHM, 0805	1	CRCW08050000ZSTA
R5, R6	RES 2 OHM, 1210	2	CRCW12102R00JNEA
PC Board Type	ROGERS RO3006, 25mil, 1/1oz. Copper	2	

**PACKAGE PL32C2**



**BOLT-DOWN FLANGE OPTION  
IGN0912S110HV**



**EARLESS FLANGE OPTION  
IGN0912S110HVS**

### 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

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#### 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.

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