

L-Band, GaN/SiC, RF Power Transistor

960-1250 MHz | 300W typ | 70% Efficiency typ | 15 dB Gain typ | 36 V | CW

IGN0912CW300 is a high power GaN-on-SiC RF power transistor that has been designed for use in both CW and pulsed applications in the 960-1250 MHz frequency range. It supplies a minimum of 300 W of CW output power, with typically >15dB of gain and 70% efficiency. It operates from a 36 V supply voltage. For optimal thermal efficiency, the transistor is housed in a metal-based package with an epoxy-sealed ceramic lid.



FEATURES

- GaN on SiC HEMT Technology
- Output Power >300 W
- Pre-matched Input and Output Impedances
- Exceptionally High Efficiency - up to 70%
- 100% RF Tested Under CW conditions
- RoHS and REACH Compliant

APPLICATIONS

- L-band Avionics IFF & SSR Systems
- Suitable for both uplink and downlink (Transponder)
- Also suitable for Standard Mode S applications
- TACAN/DME Systems

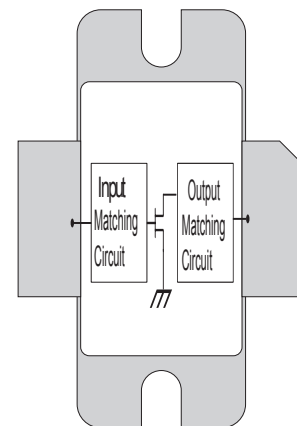


Table 1. Absolute Maximum Ratings (Not Simultaneous)

Parameter	Symbol	Value	Units	Test Conditions
DC Drain-Source Voltage	V_{DS}	160	V	25 °C
DC Gate-Source Voltage	V_{GS}	-8 to +1.5	V	25 °C
DC Drain Current	I_D	40	A	25 °C
DC Gate Current	I_G	40	mA	25 °C
RF Input Power	$P_{RF,IN}$	32	W	25 °C
Operating Junction Temperature	T_J	-55 to +200	°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 2. 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	$V_{DS} = 36V, I_{DS} = 1mA$
Quiescent Gate Voltage	V_Q		-2.8		V	$V_{DS} = 36V, I_{DS} = 100mA$

Table 3. RF Electrical Characteristics (Case temperature = 30 °C unless otherwise stated)

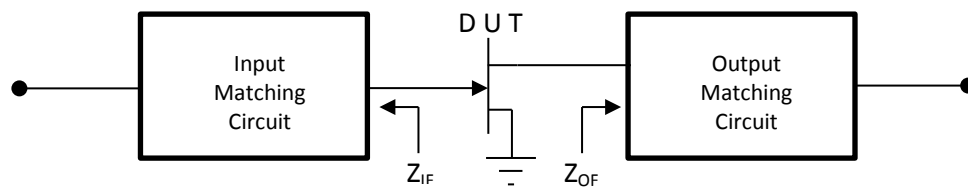
Parameter	Symbol	Min	Typ	Max	Units	Test Conditions
RF Input Power	$P_{IN,RF}$		13.4	16.9	W	$P_{OUT} = 300W$ $f = 960, 1090, 1250 \text{ MHz}$ CW $V_{DS} = 36V, I_{DS} = 100mA,$
Gain	G	12.5	15		dB	
Drain Efficiency	η	60	70		%	
Input return Loss	IRL	-18	-12	-7	dB	
Load Mismatch Stability	VSWR-S	2:1				
VSWR Withstand	VSWR-LMT	3:1				

Table 4. Thermal Resistance (Case temperature = 25 °C unless otherwise stated)

Parameter	Symbol	Min	Typ	Max	Units	Test Conditions
Peak Thermal Resistance, Junction to Case	$R_{TH(JC)}$			0.75	°C/W	$P_{OUT} = 300W, 70\% \text{ Efficiency}$ $f = 960, 1090, 1250 \text{ MHz}$ CW $V_{DS} = 36V, I_{DS} = 100mA$

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

Frequency (MHz)	Z_{IF}	Z_{OF}	Units	Test Conditions
960	1.4 - j 0.4	1.9 - j 1.8	Ω	$P_{OUT} = 300W$ $f = 960, 1090, 1250 \text{ MHz}$ CW $V_{DS} = 36V, I_{DS} = 100mA$
1090	1.7 - j 0.0	2.0 - j 1.2	Ω	
1250	1.7 + j 0.15	2.1 - j 0.6	Ω	



TYPICAL PERFORMANCE

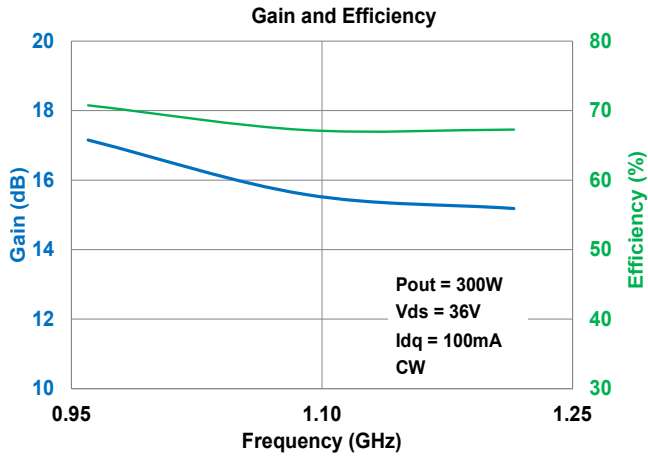


Figure 1

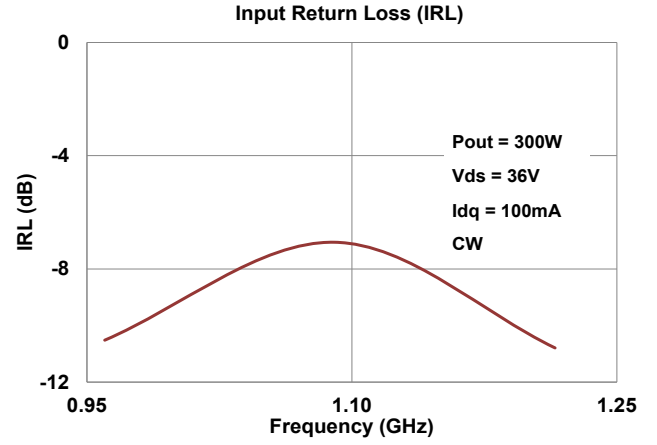
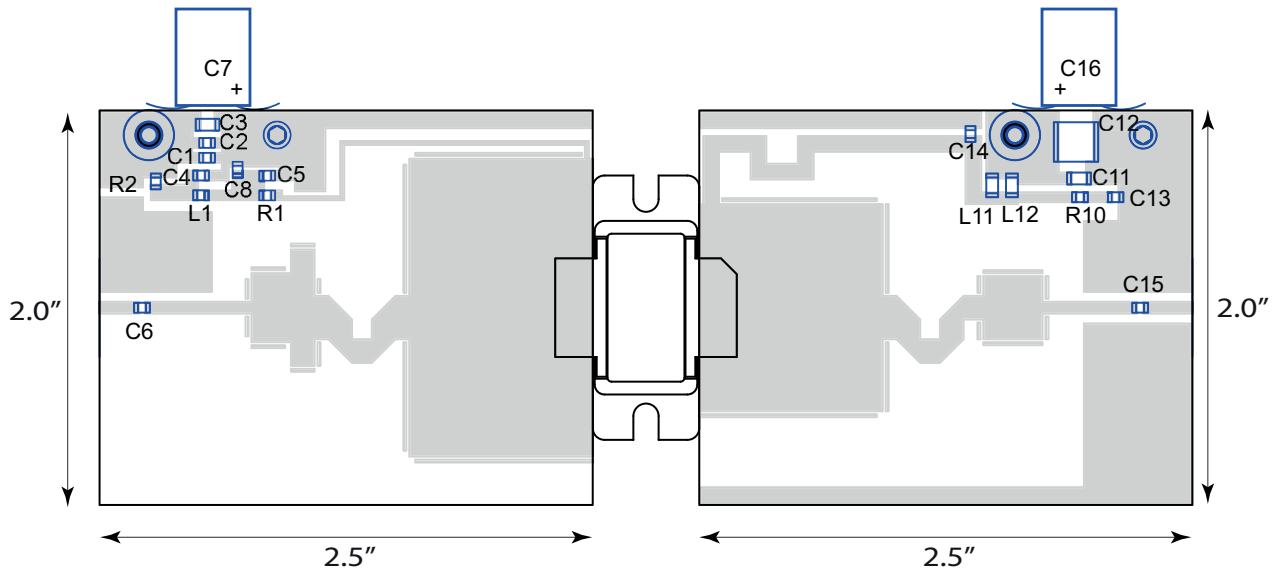


Figure 2

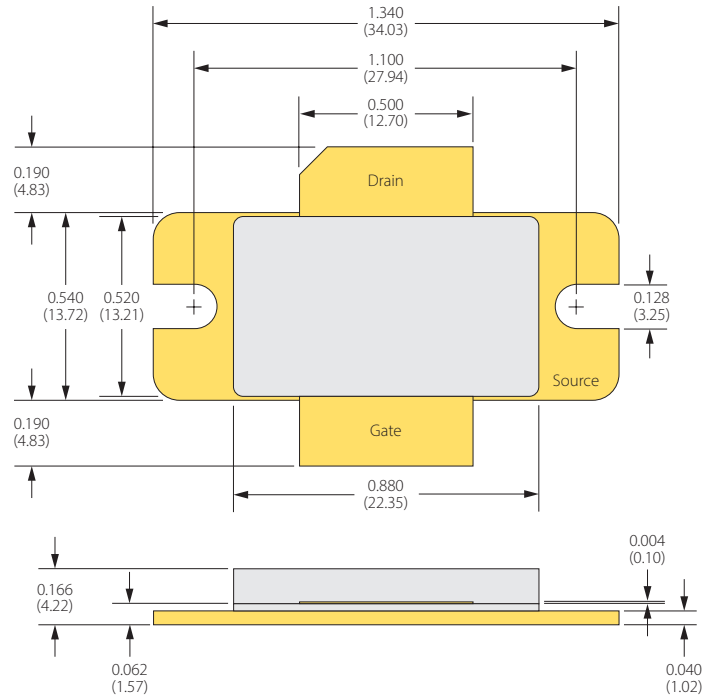
TEST FIXTURE



Bill of Materials for IGN0912CW300 Test Fixture

Designator	Description	Quantity	Part Number
C1, C4, C13	CAP 0.1μF, 0805, 50V	3	C0805C104K5RACTU
C2	CAP 33pF	1	ATC600F330
C5 ,C6, C14, C15	CAP 33pF, Edge Mounted	4	ATC600F330
C3, C12	CAP 1μF, 1206	2	C1206C105K5RACTU
C11	CAP 10μF, 2220, 50V, X7R	1	C2220X106K5RACTU
C7, C16	CAP Electrolytic, 68μF, 63V (mounted external to pcb)	2	UPJ1J680MPD6TD
C8	CAP 1000pF, 0805, 50V, X7R	1	C0805C102M5RACTU
L1	IND, FB, 120 OHM, 0805, 5A	1	ILHB0805ER121V
L11, L12	IND , FB, 33 OHM, 1206, 6A	2	BLM31PG330SN1L
R1, R10	RES, 15R0, 0805	2	ERJ-6ENF15R0V
R2	RES, 200 OHM, 0805	1	ERJ-6ENF1000V
PC Board Type	ROGERS, 30mil, 1/1oz. Copper	2	RO4350B-030

PACKAGE PL95A1



Dimensions: Inches (mm)

ESD 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)	0	Unlimited Shelf Life

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.

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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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