

S-Band, GaN/SiC, RF Power Transistor

2.6 - 3.1 GHz | 1400 W | 55% Efficiency typ | 13.5 dB Gain typ | 100 V | 100µs Pulse Length, 1% Duty Cycle

IGN2631M1400 and IGN2631M1400S are high power GaN-on-SiC RF power transistors. They operate over 2.6 - 3.1 GHz. Under 100µs, 1% duty cycle pulse conditions they supply a minimum of 1400 W of peak output power, with typically 13.5 dB of associated gain and 55% 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 >1400 W
- Pre-matched Input Impedance
- High Efficiency - up to 60%
- RoHS and REACH Compliant

APPLICATIONS

- S-band radar

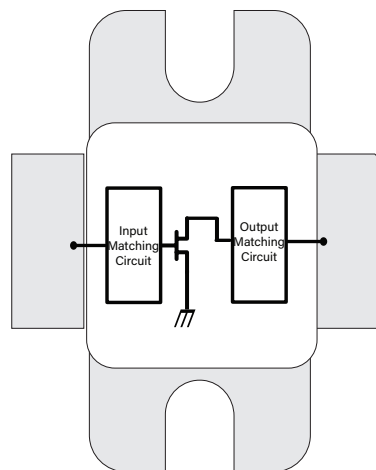


Table 1. RF Electrical Characteristics (Case temperature = 30 °C unless otherwise stated)

Parameter	Symbol	Min	Typ	Max	Units	Test Conditions
Gain	G	11	13.5	16	dB	$P_{OUT} = 1400W$ $f = 2.6, 2.85, 3.1 \text{ GHz}$ $V_{DS} = 100V, I_{DQ} = 50mA$ $100\mu s, 1\%$
Drain Efficiency During the Pulse	η	50	55	65	%	
Input Return Loss	IRL	7	17	25	dB	
Pulse Droop	D	-0.2	-0.5	-0.8	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.

Note: IGN2631M1400 was tested with the gate bias pulsed in synch with the RF signal to minimise dissipated power in the RF-off state.

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	V	25 °C
DC Drain Current	I_D	45	A	25 °C
DC Gate Current	I_G	45	mA	25 °C
RF Input Power	$P_{RF,IN}$	150	W	25 °C
Operating Channel Temperature	T_{CH}	-55 to +225	°C	
Storage Temperature	T_{STG}	-55 to +110	°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
Drain Leakage Current	I_{DS-OFF}			9	mA	$V_{DS} = 100V, V_{GS} = -6V$
Quiescent Gate Voltage	V_Q		-3.8		V	$V_{DS} = 100V, I_{DS} = 50mA$

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

Parameter	Symbol	Typ	Units	Test Conditions
Peak Thermal Resistance, Channel to Case	R_{TH}	TBD	°C/W	$P_{DISS} = 1045 W$ 100µs Pulse length, 1% Duty Cycle $V_{DS} = 100V$

TYPICAL PERFORMANCE

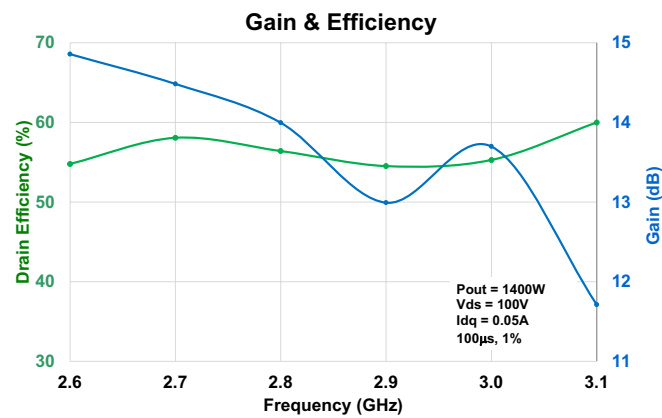


Figure 1.

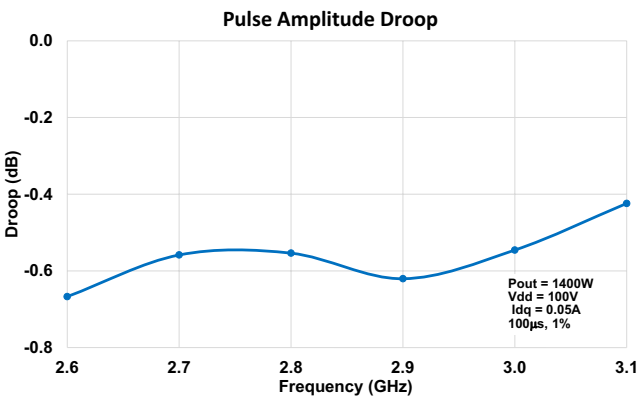


Figure 2.

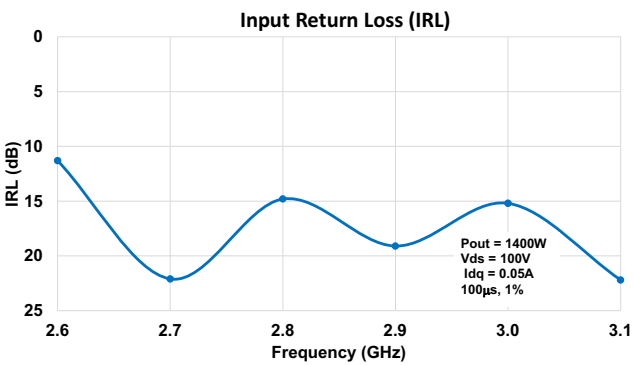
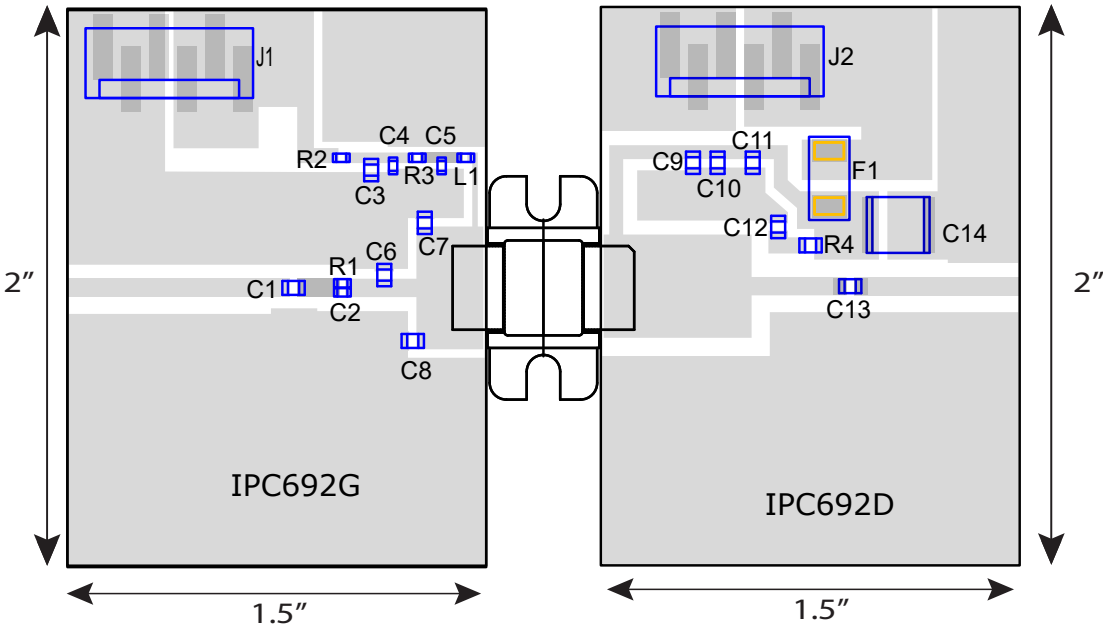


Figure 3.

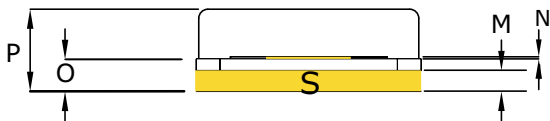
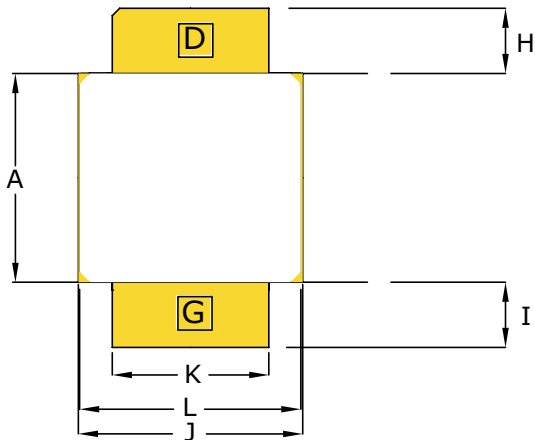
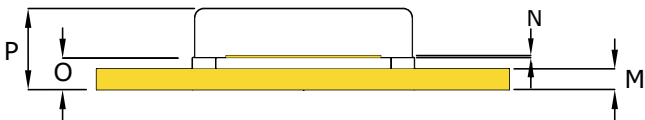
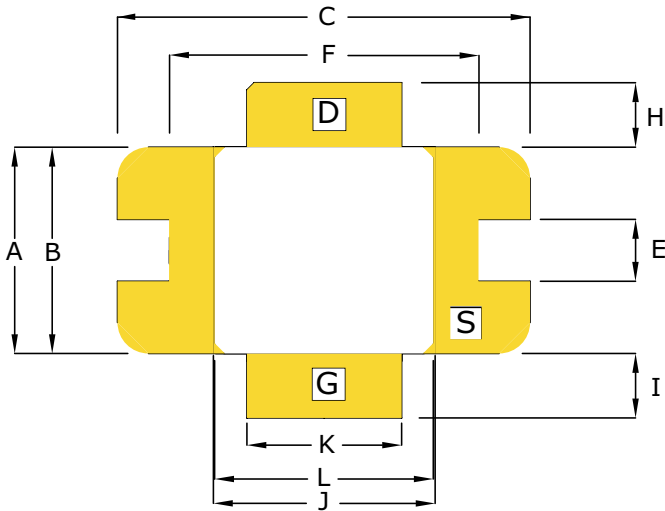
TEST FIXTURE



Bill of Materials for IGN2631M1400 Test Fixture

Designator	Description	Quantity
C1, C9, C13	CAP 18pF, 0805, 250V	3
C2	CAP 18pF, 0603, 250V	1
C3	CAP 1000pF, 0805, 100V	1
C4	CAP 100pF, 0603, 250V	1
C5	CAP 10pF, 0603, 250V	1
C6	CAP 0.5pF, 0805, 250V	1
C7, C8	CAP 0.7pF, 0805, 250V	2
C10	CAP 100pF, 0805, 250V	1
C11, C12	CAP 0.1μF, X7R, 100V	2
C14	CAP 10μF, 2220, 100V	1
F1	FUSE 10A	1
R2, R3	RES 5.1 OHM, 0603	2
R4	RES, 10 OHM, 0805	1
PC Board Type	RF-35TC-0300-E-C1/C1	2

PACKAGE PL44E1 FLANGED AND EARLESS VERSIONS



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.395	0.405	10.03	10.29
B	0.395	0.405	10.03	10.29
C	0.795	0.805	20.19	20.45
E	0.115	0.125	2.92	3.18
F	0.595	0.605	15.11	15.37
H	0.110	0.140	2.79	3.56
I	0.110	0.140	2.79	3.56
J	0.425	0.435	10.80	11.05
K	0.295	0.305	7.49	7.75
L	0.420	0.428	10.67	10.87
M	0.035	0.045	0.89	1.14
N	0.004	0.007	0.10	0.18
O	0.055	0.069	1.40	1.75
P	0.143	0.179	3.63	4.55

PIN SCHEDULE	
D	DRAIN
S	SOURCE
G	GATE

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.392	0.408	9.96	10.36
H	0.110	0.140	2.79	3.56
I	0.110	0.140	2.79	3.56
J	0.422	0.438	10.72	11.13
K	0.295	0.305	7.49	7.75
L	0.420	0.428	10.67	10.87
M	0.035	0.045	0.89	1.14
N	0.004	0.007	0.10	0.18
O	0.055	0.069	1.40	1.75
P	0.143	0.179	3.63	4.55

PIN SCHEDULE	
D	DRAIN
S	SOURCE
G	GATE

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.

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