

S-Band, GaN/SiC, 50-Ohm RF Power Transistor

2.7 - 2.9 GHz | 700 W typ | 54% Efficiency typ | 13 dB Gain typ | 100 V | 30µs Pulse Length, 1% Duty Cycle

IGT2729S700 is a high power GaN-on-SiC RF power transistor that is fully matched to 50Ω at both the input and output. It supplies a minimum of 700W of peak output power, with typically >13dB of gain and 54% efficiency. It operates from a 100 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 700W
- Fully matched to 50Ω at both input and output
- High Efficiency - 54% typical
- 100% RF Tested Under 30µs, 1% duty cycle pulse conditions
- RoHS and REACH Compliant

APPLICATIONS

- S-band Radar Systems

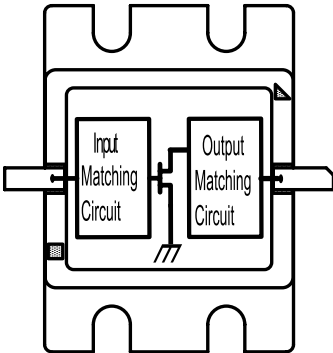


Table 1. RF Electrical Characteristics (Case temperature = 30 °C unless otherwise stated)

Parameter	Symbol	Min	Typ	Max	Units	Test Conditions
Gain	G	11.5	13	15.5	dB	P _{OUT} = 700W f = 2.7, 2.8, 2.9 GHz 30µs pulse length, 1% duty cycle V _{DS} = 100V, I _{DS} = 50mA
Drain Efficiency	η	45	54	65	%	
Pulse Droop	D	-0.8	-0.4	+0.2	dB	
Input Return Loss	IRL	7	12.5	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). Case temperature = 25 °C unless otherwise stated.

Parameter	Symbol	Value	Units	Test Conditions
DC Drain-Source Voltage	V_{DS}	350	V	
DC Gate-Source Voltage	V_{GS}	-8 to +1	V	
DC Drain Current	I_D	24	A	
DC Gate Current	I_G	2.4	mA	
RF Input Power	$P_{RF,IN}$	$P_{IN,MAX}$	W	$P_{IN,MAX}$ defined by $I_G = 0$ in forward direction under RF operation
Operating Channel Temperature	T_{CH}	-55 to +225	°C	
Storage Temperature	T_{STG}	-55 to +150	°C	
Soldering Temperature	T_{SOLDER}	260 for 10s	°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		-4.0		V	$V_{DS} = 100V, I_{DS} = 50mA$

Table 4. Thermal Resistance (Case temperature = 45 °C unless otherwise stated)

Parameter	Symbol	Min	Typ	Max	Units	Test Conditions
Peak Thermal Resistance, Channel to Case	R_{TH}		0.30		°C/W	$P_{DISS} = 596W$ 30µs pulse length, 1% duty cycle $V_{DS} = 100V$

TYPICAL PERFORMANCE

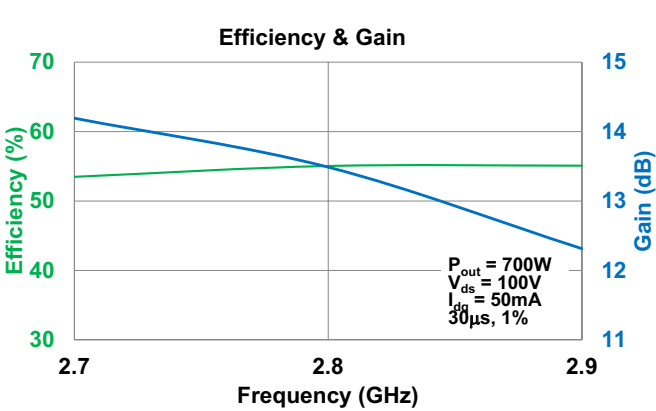


Figure 1

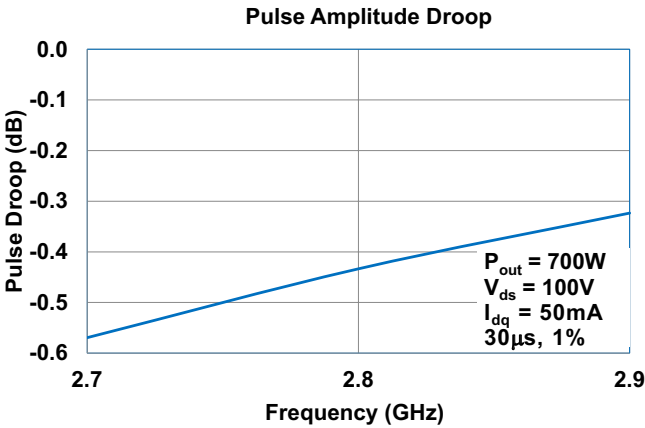


Figure 2

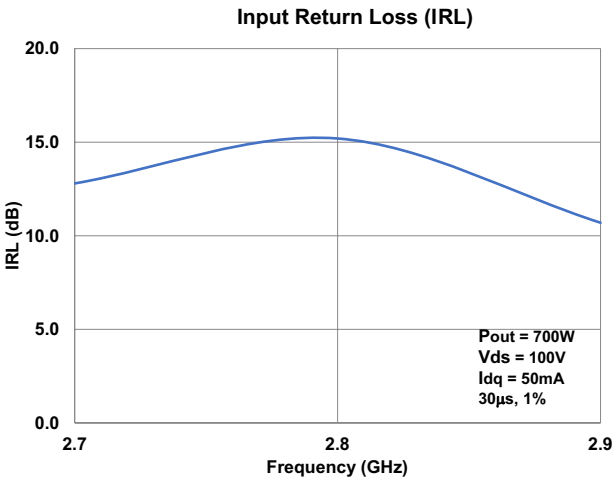
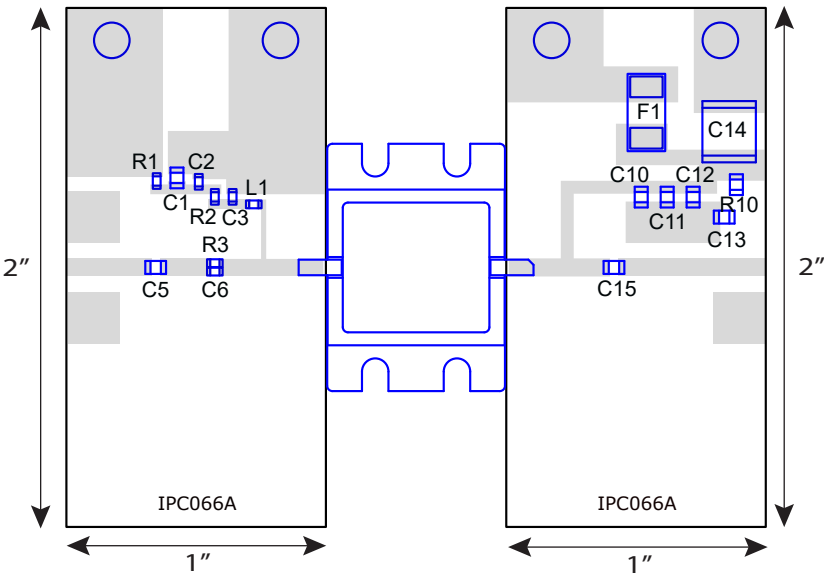


Figure 3

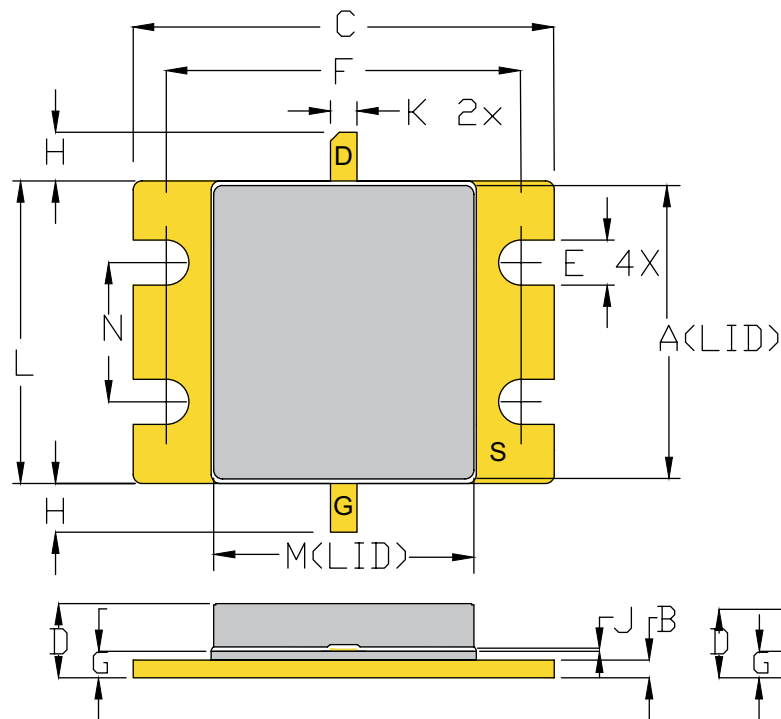
TEST FIXTURE



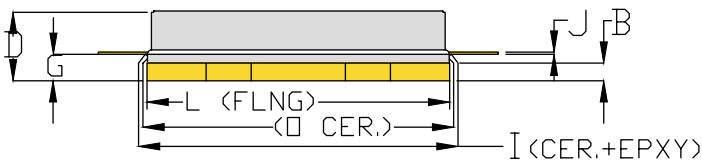
Bill of Materials for IGT2729S700 Test Fixture

Designator	Description	Quantity	Part Number
C1	CAP 1000pF, 0805	1	08051A102JAR1-EM
C2	CAP 100pF, 0603	1	600S101JW250XT
C3	CAP 10pF, 0603	1	600S100FT250XT
C5, C10, C15	CAP 18pF, 0805	3	600F180FT250XT
C6	CAP 18pF, 0603	1	600S180JT250XT
C11	CAP 100pF, 0805	1	600F101JT250XT
C12, C13	CAP 0.1μF, 2220	2	08051C104KAR1-EM
C14	CAP 10μF	1	KGM55CR72A106KV
L1	IND 6.8nH, 0603	1	0603HP-6N8XJRW
R1, R2	RES 5.11Ω, 0603	2	CRCW06035R11FKEA
R3	RES 100Ω, 0603	1	CRCW0603100RJNEAC
R10	RES 10Ω, 0805	1	CRCW080510R0JNEAC
PC Board	DK=3.5, 30 mils, 1oz/1oz Copper	2	TACONIC RF-35TC-0300-E-C1/C1

PACKAGE PM67A1



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.658	0.672	16.72	17.06
B	0.035	0.045	0.89	1.14
C	0.948	0.958	24.08	24.33
D	0.169	0.202	4.29	5.13
E	0.097	0.107	2.46	2.72
F	0.798	0.808	20.27	20.52
G	0.053	0.067	1.35	1.70
H	0.095	0.125	2.41	3.18
I	0.688	0.698	17.48	17.73
J	0.004	0.007	0.10	0.18
K	0.055	0.065	1.40	1.65
L	0.680	0.690	17.27	17.53
M	0.584	0.596	14.83	15.13
N	0.310	0.320	7.87	8.13
O	0.678	0.688	17.22	17.48



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.