

P-Band, GaN/SiC, RF Power Module

400-450 MHz | 1kW typ | 75% Efficiency typ | 20 dB Gain typ | 50 V | 300µs Pulse Length, 10% Duty Cycle

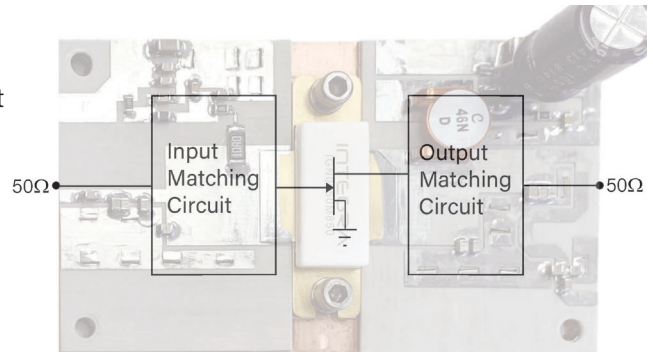
IGNP0450M850 is a high power GaN-on-SiC RF power module that has been designed to suit the unique needs of P band radar systems. It operates over the full 400-450 MHz frequency range. Under 300µs, 10% duty cycle pulse conditions, it supplies a minimum of 850 W of peak output power, with typically >20 dB of gain and 75% efficiency. It operates from a 50 V supply voltage.

FEATURES

- GaN on SiC HEMT Technology
- Output Power >850W
- Fully matched to 50Ω
- Exceptionally High Efficiency - up to 78%
- 100% RF Tested Under 300µs, 10% duty cycle pulse conditions

APPLICATIONS

- P-band Radar Systems



Block Diagram of IGPN0450M850 Module

Absolute Maximum Ratings (Not Simultaneous)

Parameter	Symbol	Value	Units	Test Conditions
DC Drain-Source Supply Voltage	V_{DS}	50	V	25 °C
DC Gate-Source Voltage	V_{GS}	-8 to +1.0	V	25 °C
DC Drain Current	I_D	81	A	25 °C
DC Gate Current	I_G	81	mA	25 °C
RF Input Power	$P_{RF,IN}$	9	W	25 °C
Operating Ambient Temperature	T_{AMB}	-40 to +85	°C	
Storage Temperature	T_{STG}	-55 to +150	°C	
Module Soldering temperature	T_{SOLDER}	280	°C	<50 sec at >200 °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

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	$V_{DS} = 50V, I_{DS} = 1mA$
Quiescent Gate Voltage	V_Q		-2.9		V	$V_{DS} = 50V, I_{DS} = 150mA$

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

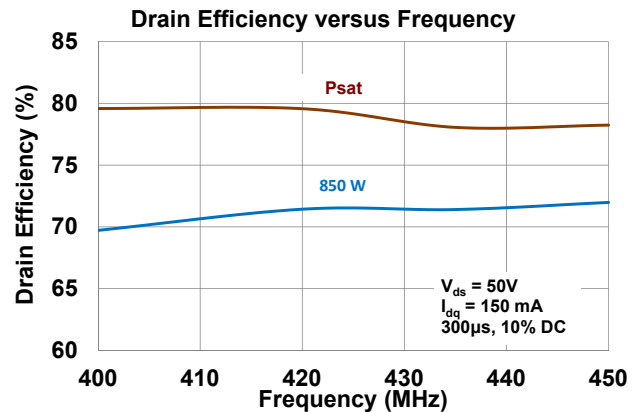
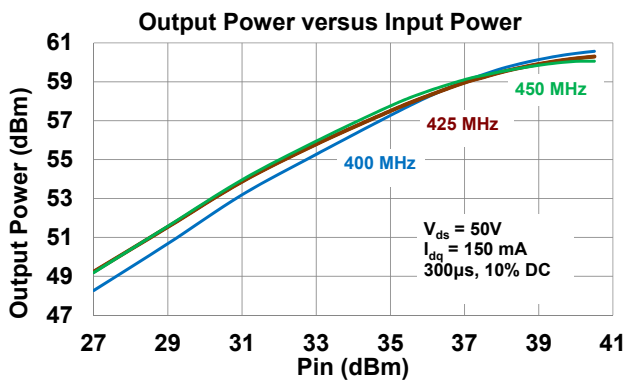
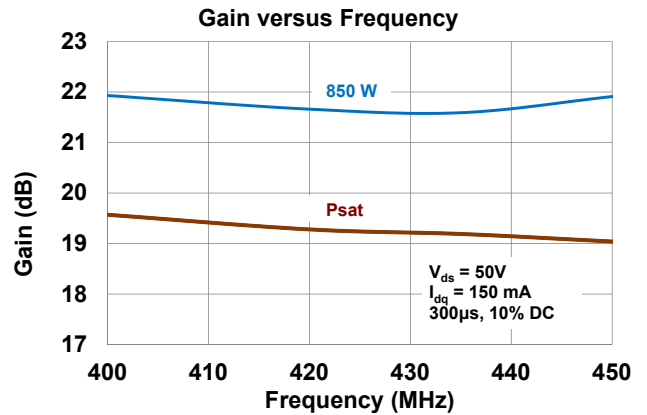
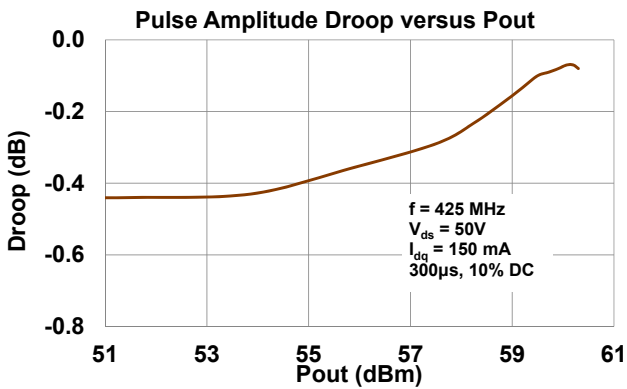
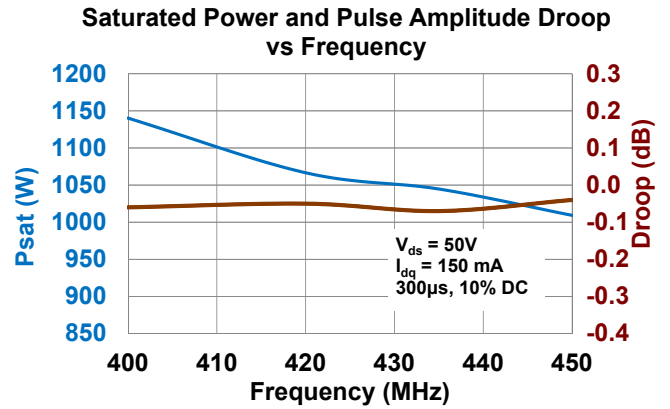
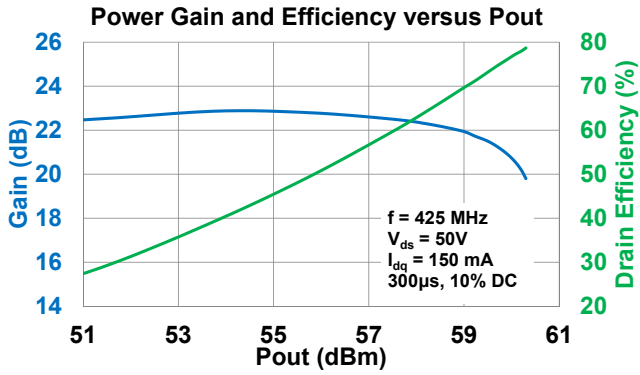
Parameter	Symbol	Min	Typ	Max	Units	Test Conditions
RF Output Power	$P_{OUT,RF}$	850	1000	1150	W	$P_{IN} = 9W$ $f = 400, 425, 450 \text{ MHz}$ 300µs pulse length, 10% duty cycle $V_{DS} = 50V, I_{DS} = 150mA,$
Gain	G	19.8	20.5	21.8	dB	
Drain Efficiency	η	70	75	85	%	
Pulse Droop	D	-0.4	-0.1	+0.2	dB	
Load 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.

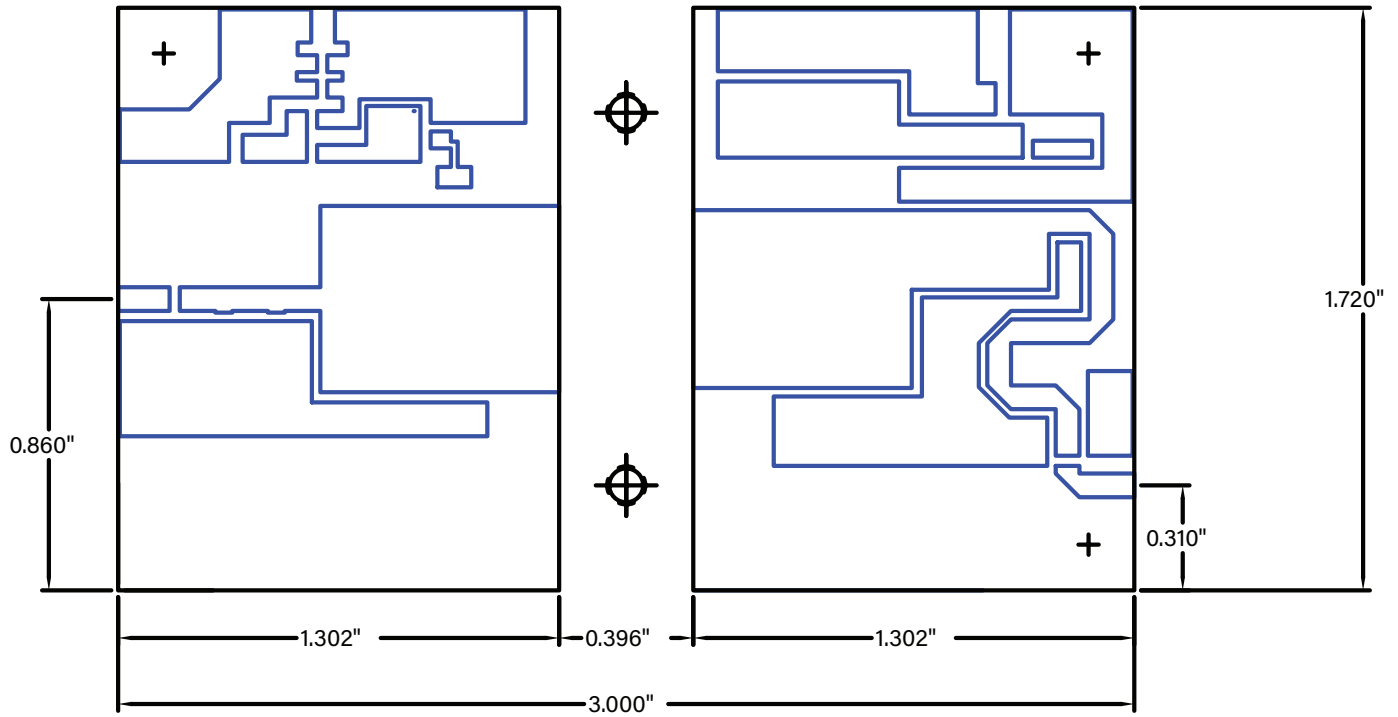
Thermal Resistance (Case temperature = 25 °C unless otherwise stated)

Parameter	Symbol	Min	Typ	Test Conditions
Peak Thermal Resistance, Junction to underneath side of module	$R_{TH(JC)}$		TBD	$P_{OUT} = 850W$ $f = 425 \text{ MHz}$ 300µs pulse length, 10% duty cycle $V_{DS} = 50V, I_{DS} = 150mA$

TYPICAL PERFORMANCE



DIMENSIONS



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	IPC/JEDEC J-STD-020

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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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