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## DC-1.5GHz, 20W, 50V LDMOS Fully matched PA Module

#### **Description**

The IMGV0015-20 is a 20-watt, single stage integrated Power Amplifier Module, designed for broad band applications, with frequencies from DC to 1.5GHz. The module is 50  $\Omega$  input/output matched and requires minimal external components. It is recommended for pulsed amplifier ONLY when used at 50V.

# Toronton 12

#### When used at 28V ,it can enable >8W CW across the same DC to 1.5GHz.

The module implements distributed power amplifier in form of multi chips, housed in cost effective plastic open cavity package, offers a much lower cost than traditional MMIC solutions.

#### Vds=50V, Idq=150mA, Pulsed CW 10us, 10%

Parameter	100MHz	500MHz	800MHz	1200MHz	1500MHz	1700MHz	Units
Linear Gain	18.0	18.5	18.0	16. 2	19.0	17.9	dB
Gain@Pin=30dBm	14.5	14.8	14. 1	12.8	14. 5	13.5	dB
Pout@Pin=30dBm	28.4	29.8	25.5	20.0	28.0	22. 3	W
Eff@Pin=30dBm	74	50	35	27	44	43	%

#### Vds=28V, Idq=150mA, CW

Parameter	30MHz	100MHz	300MHz	600MHz	1200MHz	1500MHz	Units
Linear Gain	19.0	18.2	18.0	17.7	15.9	18.9	dB
Gain@Pin=25dBm	14. 7	14.6	15. 1	14.5	14.7	14.4	dB
Pout@Pin=25dBm	9.3	9.2	10.2	8.9	9.4	8. 7	W
Eff@Pin=25dBm	79	74	60	43	37	43	%

#### **Product Features**

Operating Frequency Range: DC-1.5GHz
Operating Drain Voltage: +50 V / 28V

• 50 Ω Input/Output

• Psat: ≥20W(Pulse)/8W(CW)

• Small signal gain:>16dB, Power gain:>12dB @50V

• Minimum efficiency:>25% @50V

• 6x10 mm Surface Mount Package

• Compliant to Restriction of Hazardous Substances (RoHS) Directive 2002/95/EC

• Much lower cost than GaN-based ultrawide band PA, due to LDMOS technology used

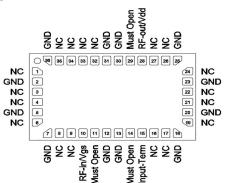
#### **Applications**

- Ultra Broadband Amplifiers
- Driver for ISM, FM
- Test Instrumentation
- EMC Amplifier Drivers
- HF/VHF 2-way Radios



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## **Pin Configuration and Description**



Top View

Pin No. Symbol		Description		
28 RFout/Vdd		Transistor 1, Drain Bias & RF Output		
10	RFin/Vgs	Transistor 1, RF Input &Gate Bias		
15	Input-Term	Transistor 1, Input 50 ohm term		
Others	NC	No connection		
11, 14, 29	Must Open	Keep the pin open, no GND		
2,5,7,12,13,16,20,23,25, 30, 31,36 Package Base	GND	DC/RF Ground. Must be soldered to EVB ground plane over array of vias for thermal and RF performance. Solder voids under Pkg Base will result in excessive junction temperatures causing permanent damage.		

#### **Table 1. Maximum Ratings**

Rating	Symbol	Value	Unit	
DrainSource Voltage	V <sub>DSS</sub>	115	Vdc	
GateSource Voltage	V <sub>GS</sub>	-10 to +10	Vdc	
Operating Voltage	V <sub>DD</sub>	+50	Vdc	
Storage Temperature Range	Tstg	-65 to +150	°C	
Case Operating Temperature	Tc	+150	°C	
Operating Junction Temperature	TJ	+200	°C	

#### **Table 2. Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case	Do 10	4.5	00/14/
T <sub>C</sub> = 25°C, Pulsed CW Pout=20W@0.5GHz	R⊕JC	1.5	°C/W

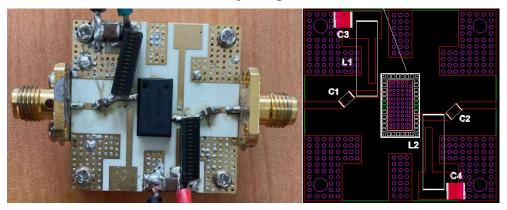
#### **Table 3. Electrical Characteristics**

Parameter	Condition	Min	Тур	Max	Unit
Frequency Range	Pin=30dBm	1		1500	MHz
Power Gain @ Psat	Pin=30dBm	12			dB
P <sub>SAT</sub>	Pin=30dBm	43			dBm
Drain Efficiency @ P <sub>SAT</sub> Pin=30dBm 25 %					
Unless otherwise noted: TA = 25°C, V <sub>DD</sub> =50 V, Pulse Width=100 us, Duty cycle=10%					

 $\textbf{Load Mismatch of per Section (On Test Fixture, 50 ohm system):} \quad V_{DD} = 50 \text{ V}, \ I_{DQ} = 150 \text{ mA}, \ f = 0.5 \text{GHz}$ 

VSWR 10:1 at Psat pulse CW Output Power No Device Degradation	
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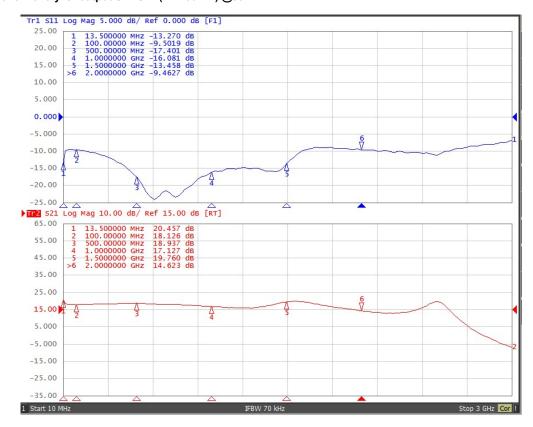
## **Reference Circuit of Test Fixture Assembly Diagram**



		Part NO.	Vendor
C3,C4	10uF 100V Chip Capacitor	C5750X7S2A106M230KB	TDK
C1,C2	50V 1uF Chip Capacitor	GRM21BR71H105KA12L	muRata
L1,L2	1.3uH 4.2A Inductor	4310LC-132KEC	Coilcraft
РСВ	RO4350B,20mil,er=3.48		

#### TYPICAL CHARACTERISTICS

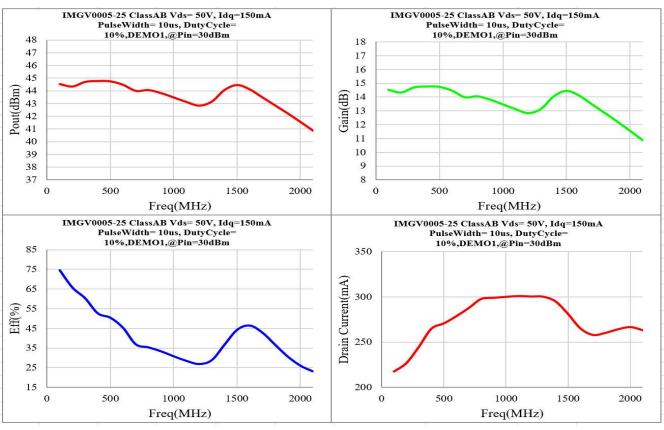
Figure 1. Network analyzer output S11/S21 (Pin=0dBm) @50V

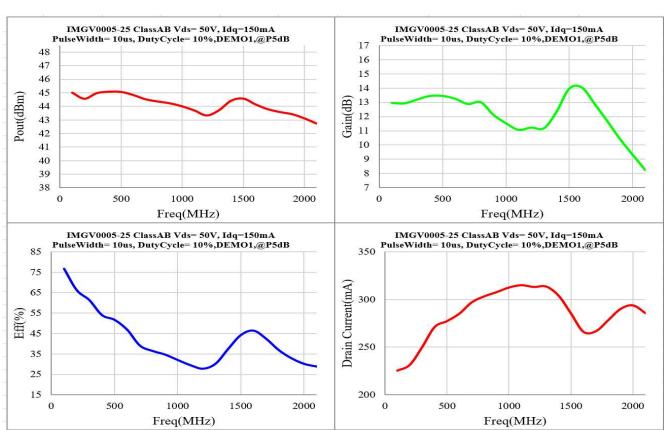




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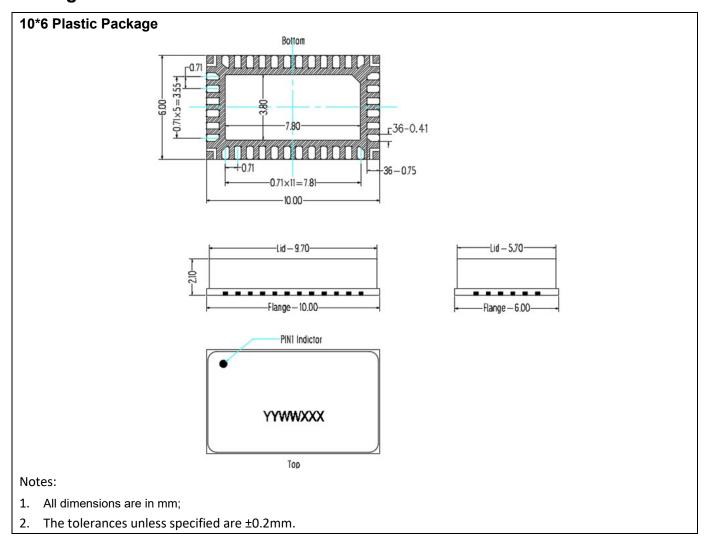
Figure. Power Gain and, efficiency and Pout @Pin=30dBm ,and P5dB vs. Frequency @50V



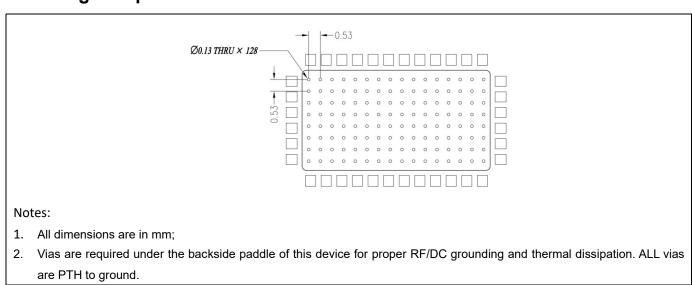


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## **Package Dimensions**



## **Mounting Footprint Pattern**



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#### **Revision history**

#### Table 6. Document revision history

Date	Revision	Datasheet Status
2023/5/13	Rev 1.0	Production Datasheet

Application data based on ZHH-23-07/08

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