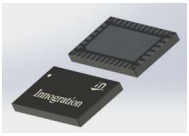
DC-150MHz, 15W, 36V LDMOS Fully matched PA Module



Description

The IMGV0001-15 is a 15-watt ,single stage integrated Power Amplifier Module, designed for broad band applications, with frequencies from DC to 150MHz. The module is 50 Ω input/output matched and requires minimal external components.

The module is used to the driver for RF Generator or ISM application running at HF/VHF, with one unique design to cover all typical frequencies like 13.56/27.12/40.68/60/64/88-108/128MHz etc

V_{DS}= 36V, I_{DQ}=225 mA

Vgs =3.75V

Parameter	13.56MHz	27.12MHz	40.68MHz	60MHz	128MHz	150MHz	Units
Linear Gain	19.1	19.5	19.9	20.7	20.0	19.6	dB
Gain@Pin=26dBm	15.7	15.6	15.7	15.8	15.6	15.6	dB
Pout@Pin=26dBm	14.9	14.6	14.6	15.0	14.5	14.4	W
Eff@Pin=26dBm	73	75	76	77	70	67	%

V_{DS}= 40V, I_{DQ}=225 mA

Vgs =3.75V

Parameter	13.56MHz	27.12MHz	40.68MHz	60MHz	128MHz	150MHz	Units
Linear Gain	19.2	19.6	19.9	20.8	20.2	19.8	dB
Gain@Pin=27dBm	15.6	15.5	15.5	15.6	15.5	15.5	dB
Pout@Pin=27dBm	18.4	18.0	18.1	18.5	17.8	17.7	W
Eff@Pin=27dBm	73	75	76	77	70	67	%

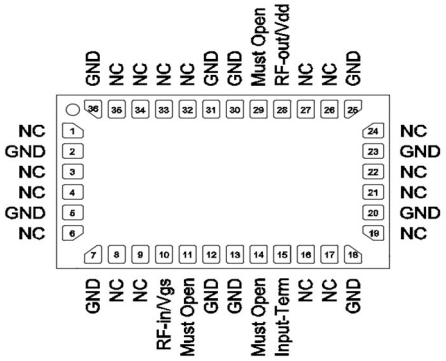
Product Features

- Operating Frequency Range: DC-150MHz
- Operating Drain Voltage: +36 V up to 40V
- 50 Ω Input/Output
- Psat: ≥15W
- Small signal gain:>19dB, Power gain:>14dB
- Minimum efficiency:>70%
- 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

- RF Generotor
- HF Communication
- FM radio

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
Drain--Source Voltage	V_{DSS}	115	Vdc
Gate--Source Voltage	V_{GS}	-10 to +10	Vdc
Operating Voltage	V_{DD}	+42	Vdc
Storage Temperature Range	Tstg	-65 to +150	°C
Case Operating Temperature	T_C	+150	°C
Operating Junction Temperature	T_J	+200	°C

Table 2. Thermal Characteristics

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case T_C= 25°C, DC test	$R_{\theta JC}$	1.7	°C/W

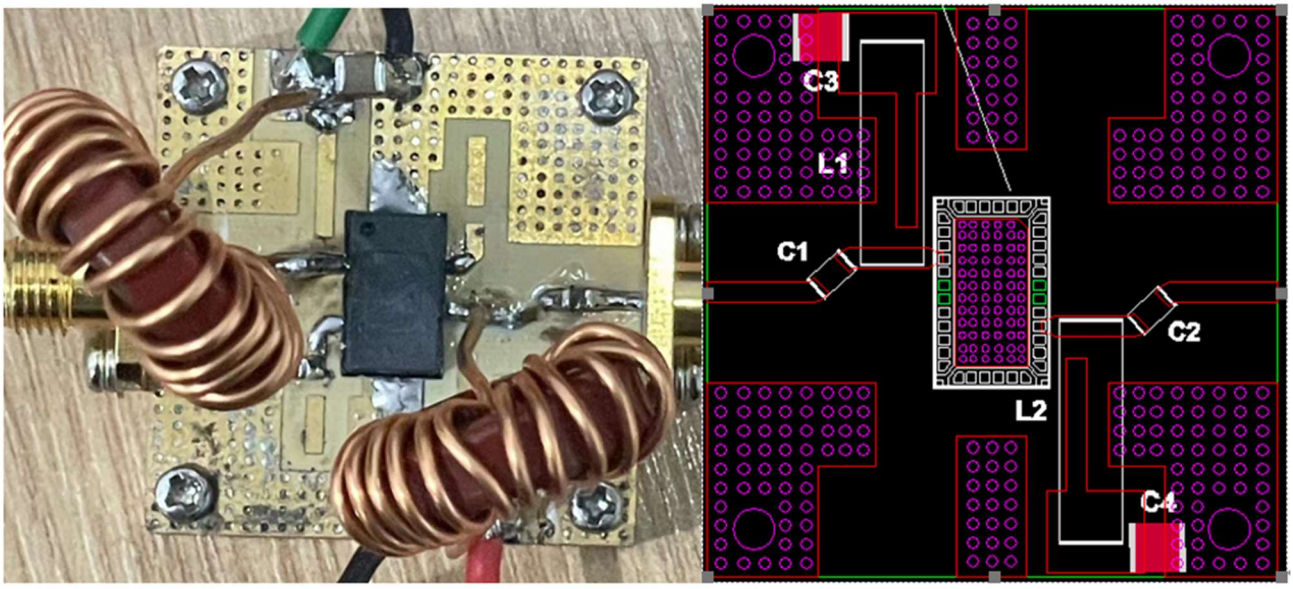
Table 3. Electrical Characteristics

Parameter	Condition	Min	Typ	Max	Unit
Frequency Range	Pin=26dBm	1		150	MHz
Power Gain @ Psat	Pin=26dBm	14			dB
P_{SAT}	Pin=26dBm		42		dBm
Drain Efficiency @ P_{SAT}	Pin=26dBm	70			%
Unless otherwise noted: TA = 25°C, V_{DD} =36 V, Pulse Width=100 us, Duty cycle=10%					

Load Mismatch of per Section (On Test Fixture, 50 ohm system): V_{DD} =36 V, I_{DQ} =225 mA, f = 150MHz

VSWR 10:1 at Psat pulse CW Output Power	No Device Degradation

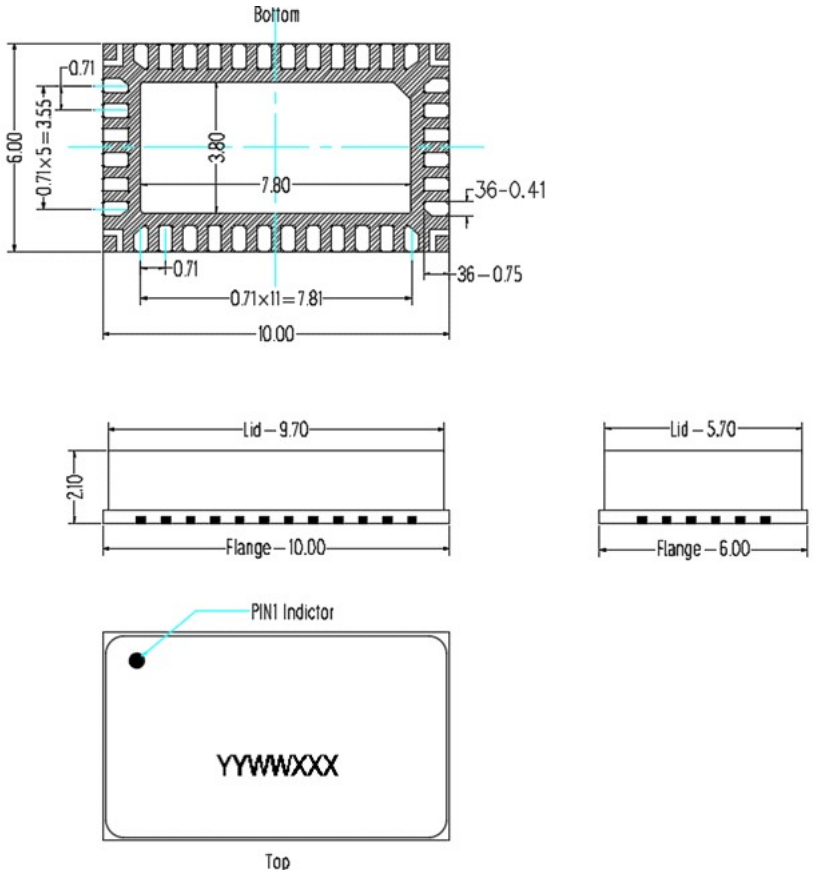
Reference Circuit of Test Fixture Assembly Diagram



		Part NO.	Vendor
C3,C4	10uF 100V Chip Capacitor	C5750X7S2A106M230KB	TDK
C1,C2	50V 1uF Chip Capacitor	GRM21BR71H105KA12L	muRata
L1,L2	Inductor	T68-2 wire 1mm	
PCB	RO4350B,20mil,er=3.48		

Package Dimensions

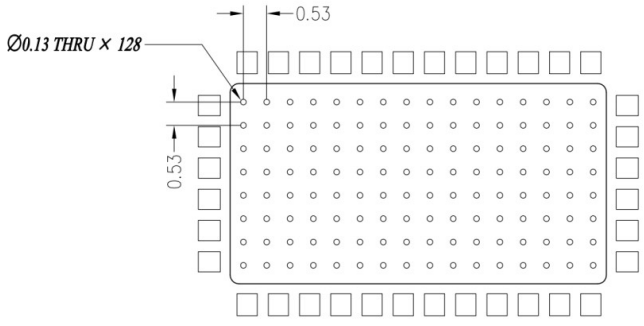
10*6 Plastic Package



Notes:

1. All dimensions are in mm;
2. The tolerances unless specified are ±0.2mm.

Mounting Footprint Pattern



Notes:

1. All dimensions are in mm;
2. Vias are required under the backside paddle of this device for proper RF/DC grounding and thermal dissipation. ALL vias are PTH to ground.

Revision history

Table 6. Document revision history

Date	Revision	Datasheet Status
2024/4/8	Rev 1.0	Production Datasheet

Application data based on ZHH-24-05

Disclaimers