



0.1-6GHz, 25W, 50V GaN Fully matched PA Module

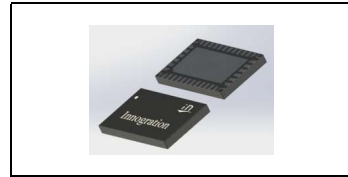
Description

The SMAV0160-25 is a 25-watt ,single stage integrated Power Amplifier Module, designed for broad band applications, with frequencies from 100MHz to 6GHz. The module is 50 Ω input/output matched and requires minimal external components.

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.

It is recommended for pulse or back off condition, **NOT for CW operation**.

V_{ds}=50V, I_{dq}=65mA, Pulsed CW, 20us, 10%



Parameter	0.1GHz	1.0GHz	2.0GHz	3.0GHz	4.0GHz	5.0GHz	6.0GHz	Units
Linear Gain	9.1	9.4	10.1	10.0	9.5	10.6	10.2	dB
Gain@Pin=37dBm	7.2	7.9	8.4	8.4	7.9	8.0	7.3	dB
Pout@Pin=37dBm	26.5	30.7	34.9	34.4	30.9	31.6	26.8	W
Eff@Pin=37dBm	68	61	56	45	38	38	31	%

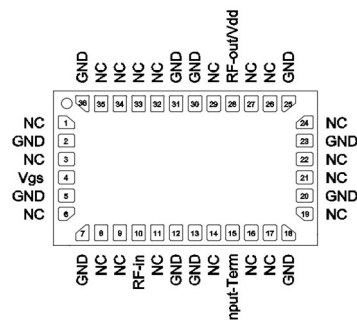
Product Features

- Operating Frequency Range: 100MHz-6GHz
- Operating Drain Voltage: +50 V
- 50 Ω Input/Output
- P_{sat}: $\geq$ 25W (Pulsed only)
- Small signal gain:>9dB, Power gain:>7dB
- Minimum efficiency:30%
- 6x10 mm Surface Mount Package
- Compliant to Restriction of Hazardous Substances (RoHS) Directive 2002/95/EC

Applications

- Ultra Broadband Amplifiers
- L band pulsed power Amplifier
- Test Instrumentation
- EMC Amplifier Drivers
- 2-way Radios

Pin Configuration and Description



Top View



Pin No.	Symbol	Description
28	RFout/Vdd	Transistor 1, Drain Bias & RF Output
10	RFin	Transistor 1, RF Input
4	Vgs	Transistor 1, Gate Bias
15	Input-Term	Transistor 1, Input 50 ohm term
Others	NC	No connection
2,5,7,12, 13,18,20,23,25, 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_{DS}	200	Vdc
Gate--Source Voltage	V_{GS}	-10 to +2	Vdc
Operating Voltage	V_{DD}	+55	Vdc
Storage Temperature Range	T_{stg}	-65 to +150	°C
Case Operating Temperature	T_c	+150	°C
Operating Junction Temperature	T_j	+225	°C

Table 2. Thermal Characteristics

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case $T_c = 25^\circ\text{C}$, DC test	$R_{\theta JC}$	3	°C/W

Table 3. Electrical Characteristics

Parameter	Condition	Min	Typ	Max	Unit
Frequency Range		100		6000	MHz
Power Gain @ Psat		7			dB
P_{SAT}			25		W
Drain Efficiency @ P_{SAT}		30			%

Unless otherwise noted: $T_A = 25^\circ\text{C}$, $V_{DD} = 50\text{ V}$, Pulse Width=20 us, Duty cycle=10%

Load Mismatch of per Section (On Test Fixture, 50 ohm system): $V_{DD} = 50\text{ V}$, $I_{DQ} = 65\text{ mA}$, $f = 6\text{ GHz}$

VSWR 10:1 at P3dB pulse CW Output Power	No Device Degradation
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Reference Circuit of Test Fixture Assembly Diagram

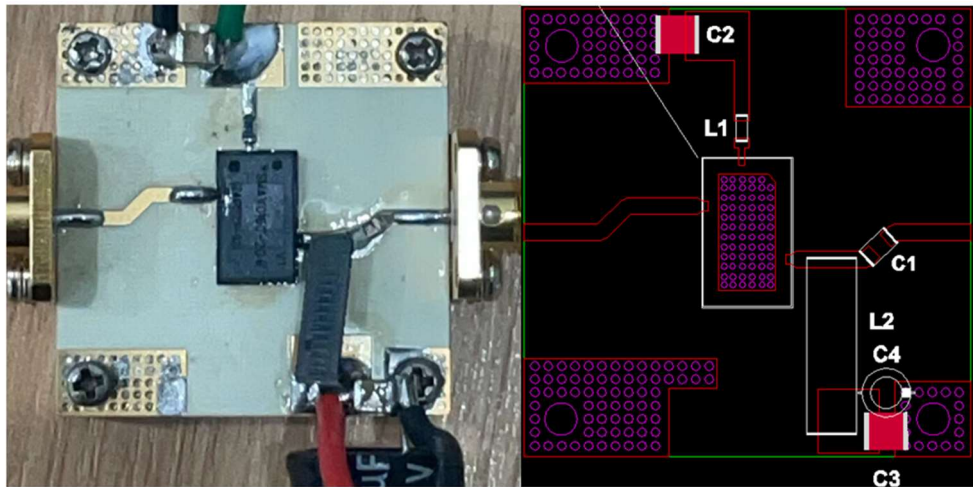


Figure 1. Test Circuit Component Layout

		Part NO.	Vendor
L1	100 nH Inductor(0603)	LQW18CNR10K00D	muRata
C1	50V 1uF Chip Capacitor	GRM21BR71H105KA12L	muRata
C2,C3	10uF 100V Chip Capacitor	C5750X7S2A106M230KB	TDK
C4	100uF Capacitor		
L2	1.3uH 4.2A Inductor	4310LC-132KEC	Coilcraft
PCB	RO4350B,20mil,er=3.48		

TYPICAL CHARACTERISTICS

Figure 2. Network analyzer output S11/S21 (Pin=0dBm)

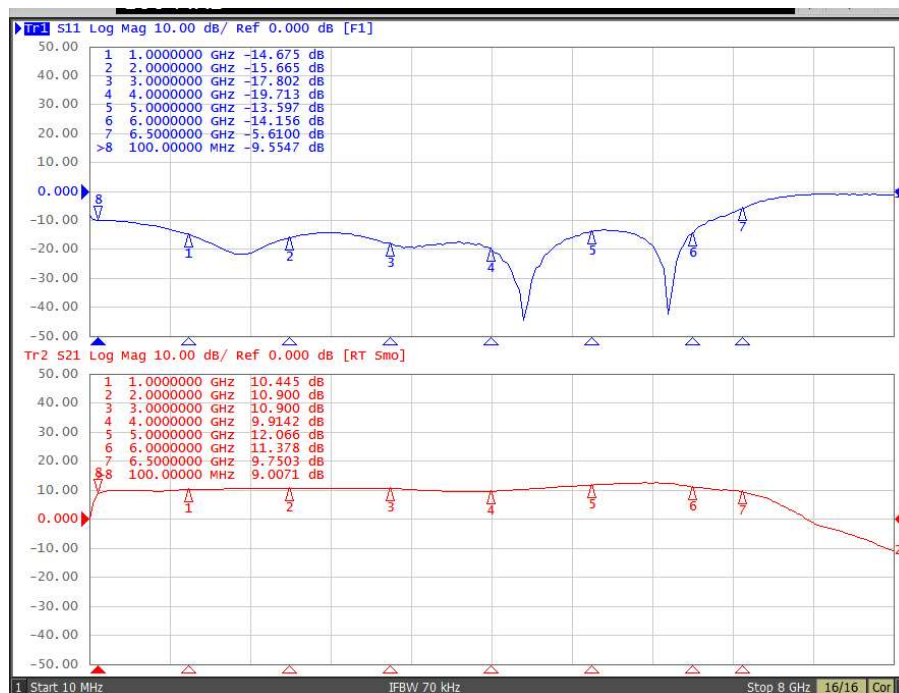
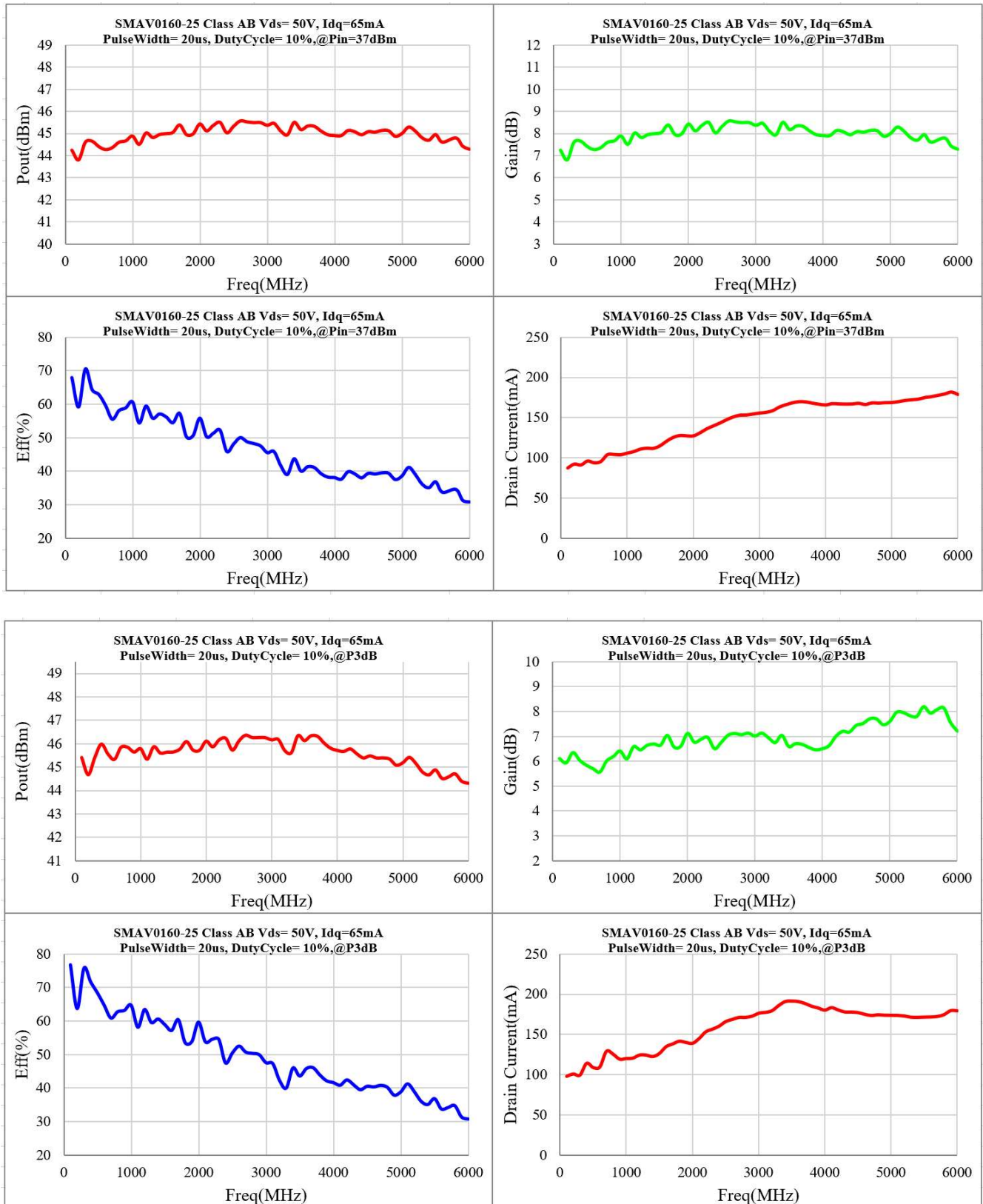
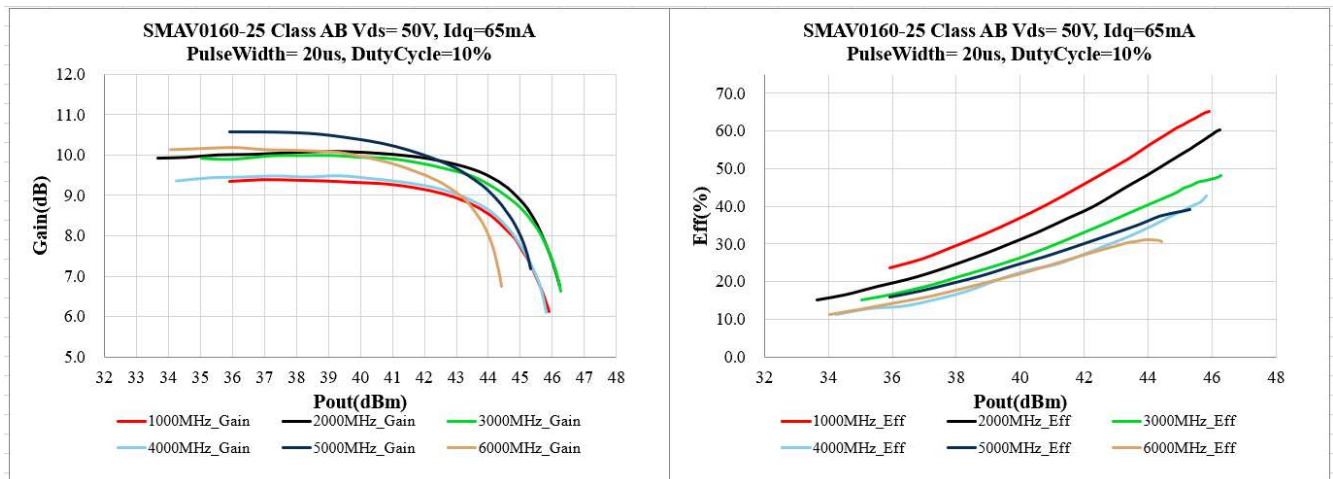




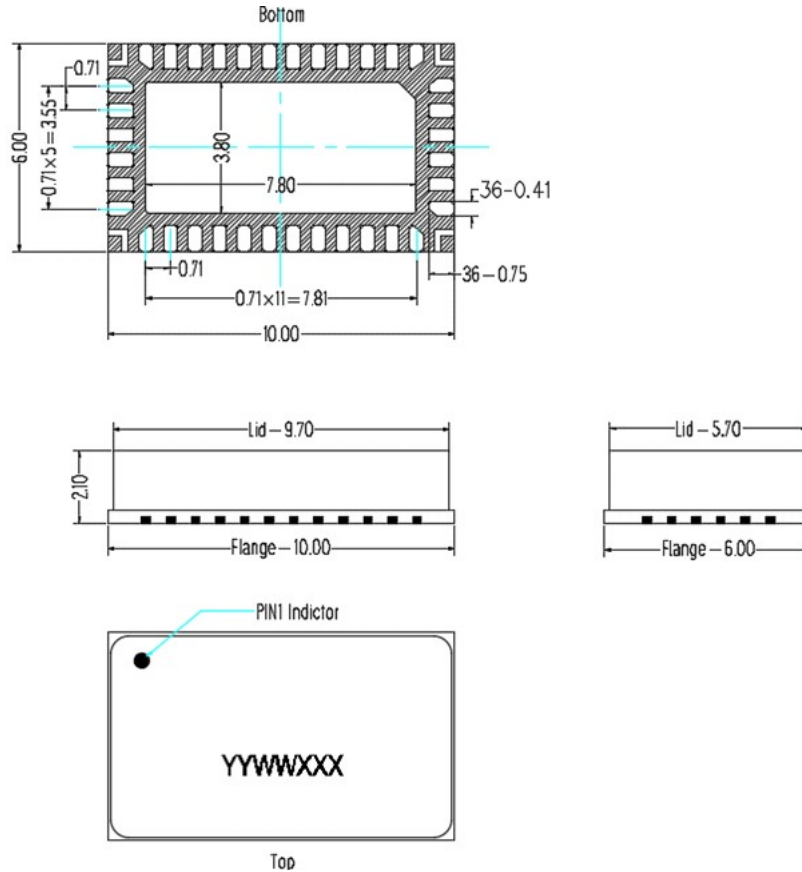
Figure 3. Psat, Power Gain and, efficiency vs. Frequency





Package Dimensions

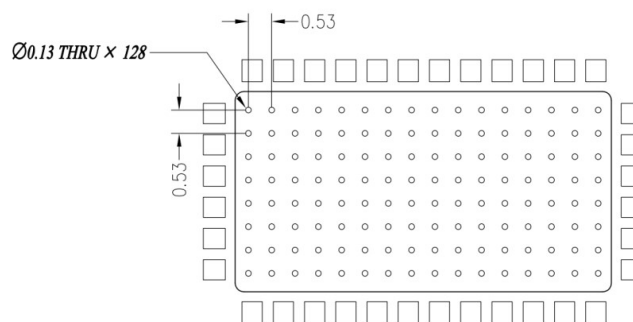
10*6 Plastic Package



Notes:

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

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
2024/3/	V1.0	Production datasheet
2024/7/30	V1.1	Add the missing info of Vgs of Pin 4 on 1 st page

Application data based on ZHH-24-03 (2*2)

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