



## 0.2-6GHz, 25W, 2 stages 50V GaN Fully matched PA Module

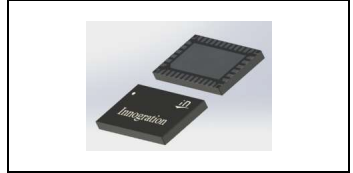
### Description

The S2MAV0240-25 is a 25-watt ,2 stage integrated Power Amplifier Module, designed for broad band applications, with frequencies from 200MHz to 4GHz. The module is 50  $\Omega$  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.**

Vds=50V, Idq=85(20+65)mA, Pulsed CW, 20us, 10%



Parameter	0.2GHz	1.0GHz	2.0GHz	3.0GHz	4.0GHz	Units
Linear Gain	15.3	16.4	16.2	16.4	16.0	dB
Gain@Pin=31dBm	13.5	14.3	14.3	14.1	13.3	dB
Pout@Pin=31dBm	28.3	34.2	33.9	32.5	27.0	W
Eff@Pin=31dBm	40	41	36	35	34	%

Recommended driver: SMAV0038-8

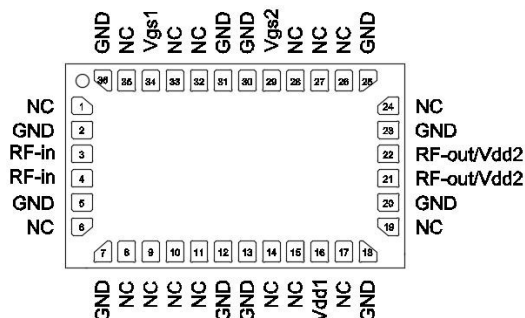
### Product Features

- Operating Frequency Range: 200MHz-4GHz
- Operating Drain Voltage: +50 V
- 50  $\Omega$  Input/Output
- Psat:  $\geq 25$ W (Pulsed only)
- Small signal gain:>15dB, Power gain:>13dB
- Minimum efficiency:30%
- 6x10 mm Surface Mount Package
- Compliant to Restriction of Hazardous Substances (RoHS) Directive 2002/95/EC

### Applications

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

### Pin Configuration and Description





Pin No.	Symbol	Description
21,22	RFout/Vdd2	Transistor 1, Drain Bias2 & RF Output
3,4	RFin	Transistor 1, RF Input
34	Vgs2	Transistor 1, Gate Bias1
29	Vgs2	Transistor 1, Gate Bias2
16	Vdd1	Transistor 1, Drain Bias1
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	$R_{\theta JC}$	2.9	°C/W

**Table 3. Electrical Characteristics**

Parameter	Condition	Min	Typ	Max	Unit
Frequency Range		200		4000	MHz
Power Gain @ Psat		13			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):**  $V_{DD} = 50\text{ V}$ ,  $I_{DQ} = 85\text{ mA}$ ,  $f = 4\text{ GHz}$

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

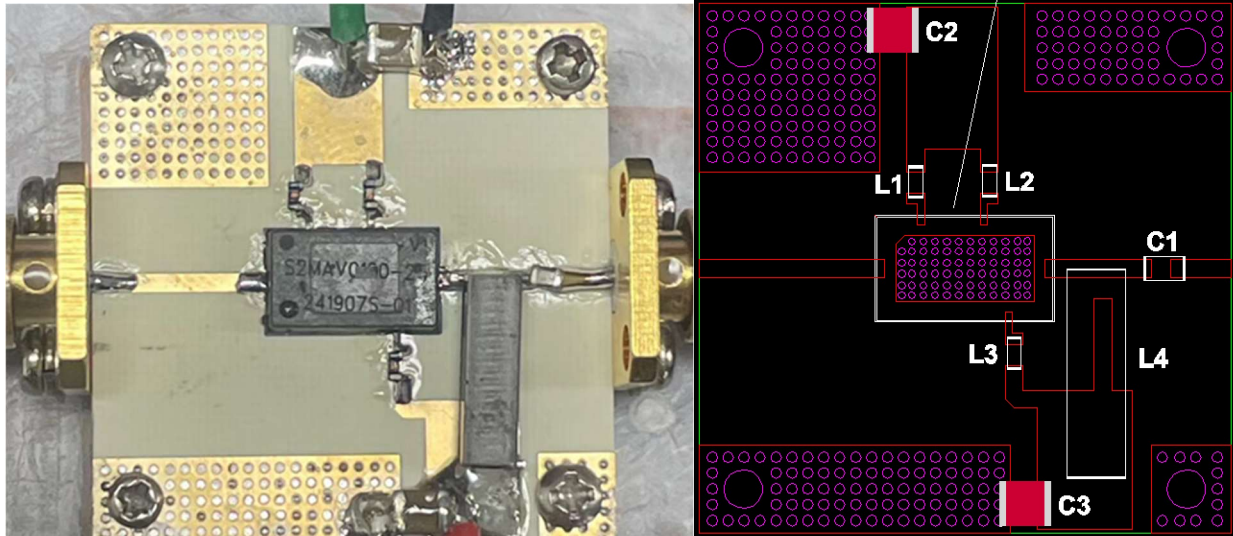


Figure 1. Test Circuit Component Layout

		Part NO.	Vendor
C1	50V 1uF Chip Capacitor	GRM21BR71H105KA12L	muRata
C2,C3	10uF 100V Chip Capacitor	C5750X7S2A106M230KB	TDK
L1, L2, L3	470 nH Capacitor(0603)	LQW18CNR47J00D	muRata
L4	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)

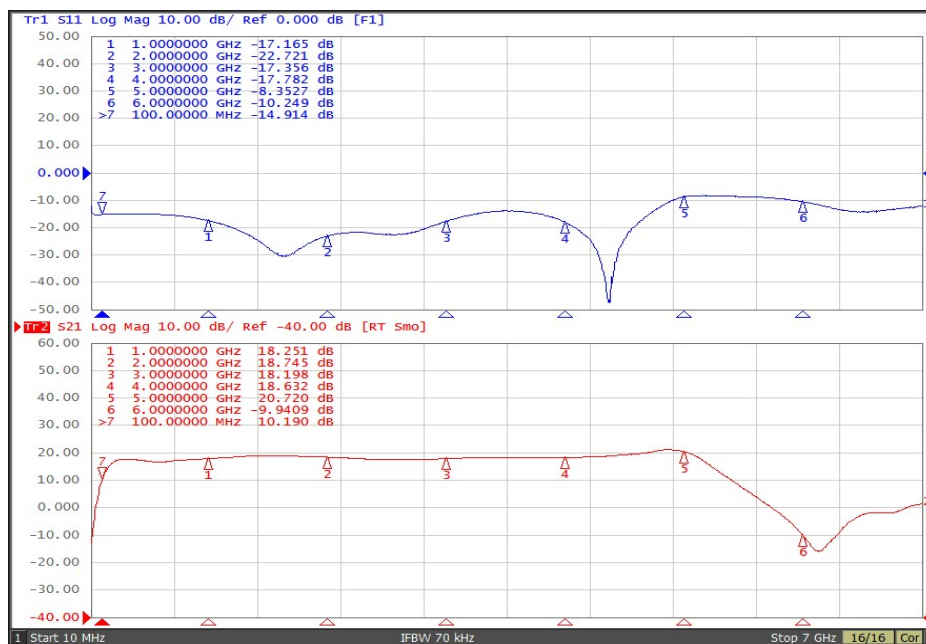
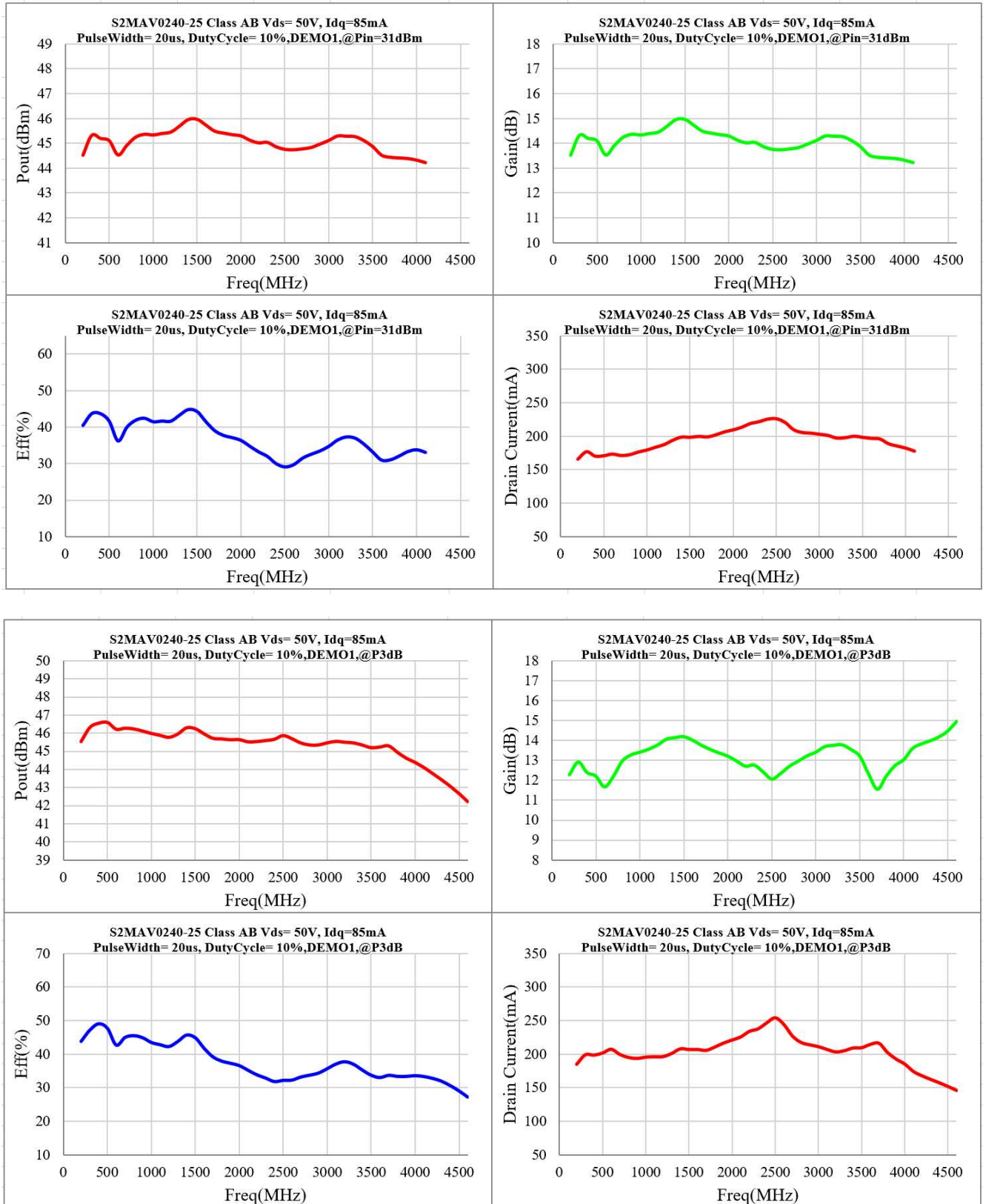


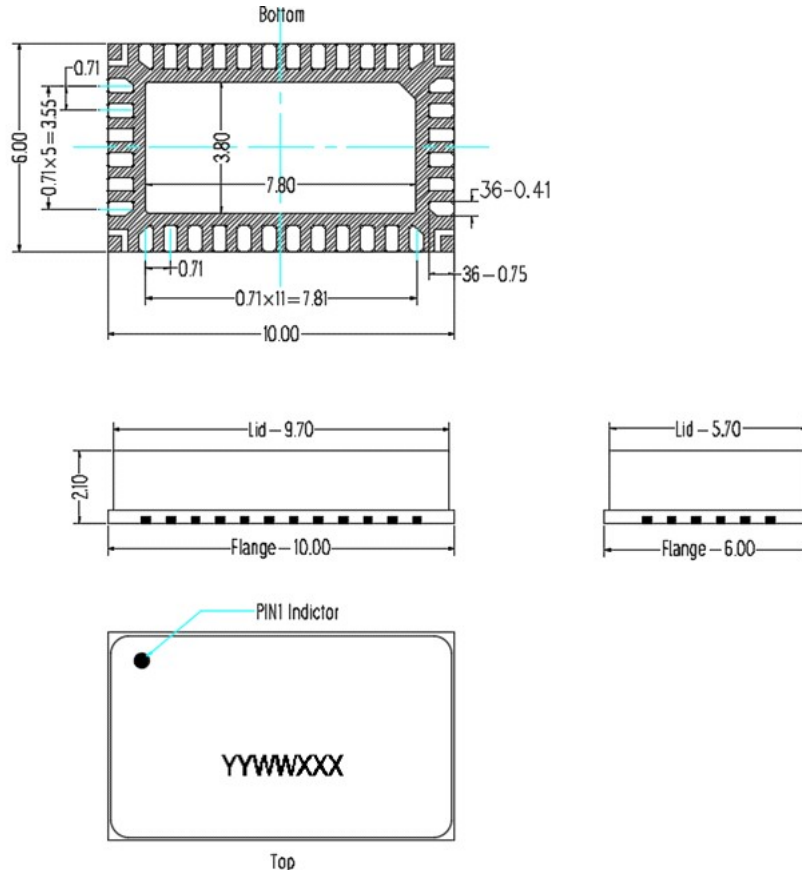


Figure 3. Psat, Power Gain and, efficiency vs. Frequency



## Package Dimensions

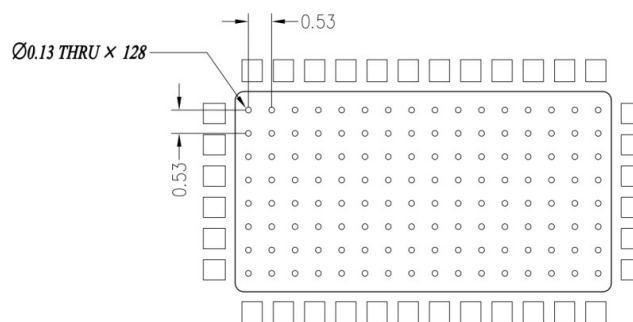
## 10\*6 Plastic Package



Notes:

1. All dimensions are in mm;
2. The tolerances unless specified are  $\pm 0.2\text{mm}$ .

## 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
2024/5/1	V1.0	Production datasheet

Application data based on ZHH-24-07 (2\*2)

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