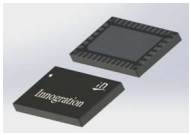
0.1-4GHz, 25W, 2 stages 50V GaN Fully matched PA Module

Description



The S2MAV0140-25 is a 25-watt ,2 stage integrated Power Amplifier Module, designed for broad band applications, with frequencies from 100MHz to 4GHz. The module is 50 Ω input/output matched and requires minimal external components.

It can also output 40W up to 1GHz and 30W up to 2GHz when used for lower bands

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, **I_{DQ1}=15 mA，I_{DQ2}=90 mA**, Vgs=-3.08V, Pulsed CW, 100us, 10%

Parameter	100MHz	500MHz	1.0GHz	1.5GHz	2.0GHz	3.0GHz	3.5GHz	4.0GHz	Units
Linear Gain	26.3	23.9	24.9	25.5	24.8	25.0	26.2	27.7	dB
Gain@Psat	22.3	19.9	20.9	21.5	20.8	21.0	22.2	23.7	dB
Pout@Psat	47.2	46.1	44.9	38.3	34.6	32.0	29.1	25.6	W
Eff@sat	55	48	45	39	31	32	35	38	%

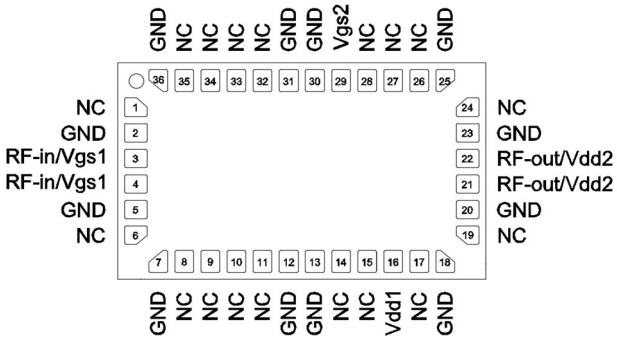
Product Features

- Operating Frequency Range: 100MHz-4GHz
- Operating Drain Voltage: +50 V
- 50 Ω Input/Output
- Psat: ⩾25W (Pulsed only) up to 4GHz
  ⩾30W (Pulsed only) up to 2GHz
  ⩾40W (Pulsed only) up to 1GHz
- Small signal gain:>23dB, Power gain:>20dB
- Minimum efficiency:25%
- 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/Vgs1	Transistor 1, Gate Bias1 & RF Input
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_{DSS}	200	Vdc
Gate--Source Voltage	V_{GS}	-10 to +2	Vdc
Operating Voltage	V_{DD}	+55	Vdc
Storage Temperature Range	Tstg	-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°C, DC test	$R_{\theta JC}$	2.8	°C/W

Table 3. Electrical Characteristics

Parameter	Condition	Min	Typ	Max	Unit
Frequency Range		100		4000	MHz
Power Gain @ Psat		19			dB
P_{SAT}	P4dB		25		W
Drain Efficiency @ P_{SAT}		30			%
Unless otherwise noted: TA = 25°C, V_{DD} =50 V, Pulse Width=100 us, Duty cycle=10%					

Load Mismatch of per Section (On Test Fixture, 50 ohm system): V_{DD} =50 V, I_{DQ1+2} =15+90mA, f = 4GHz

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

Reference Circuit of Test Fixture Assembly Diagram

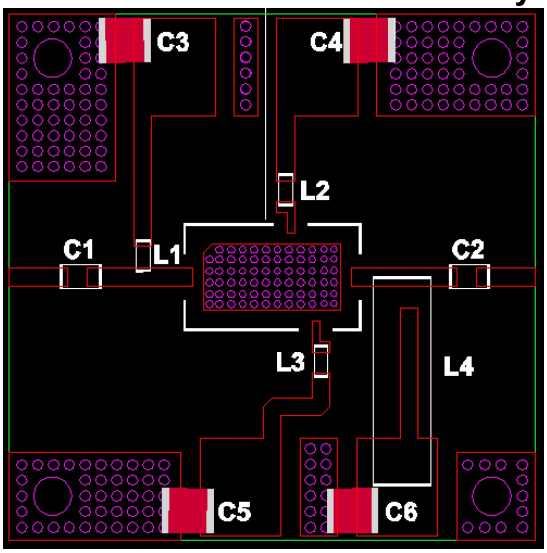


Figure 1. Test Circuit Component Layout

		Part NO.	Vendor
C1, C2	50V 1uF Chip Capacitor	GRM21BR71H105KA12L	muRata
C3,C4,C5,C6	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)

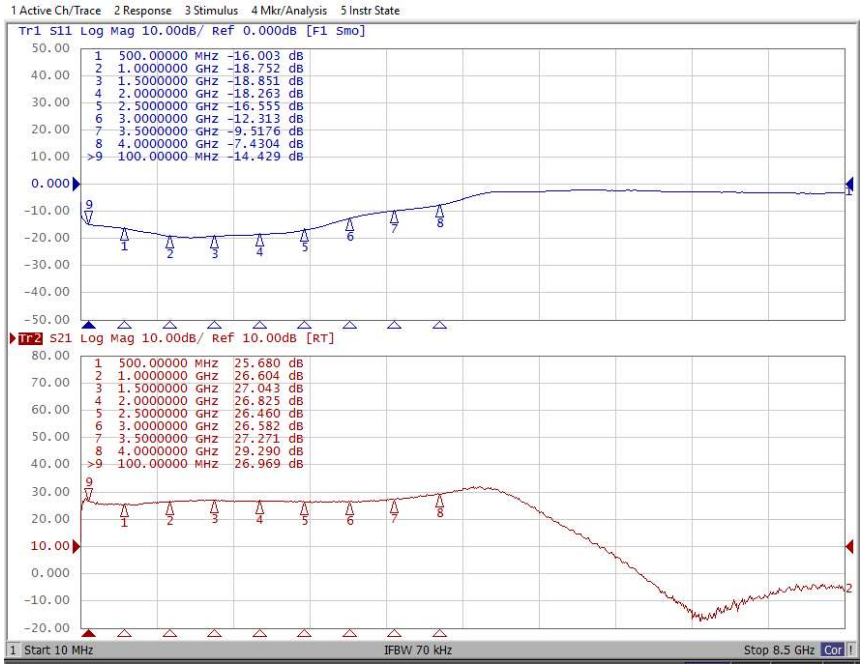
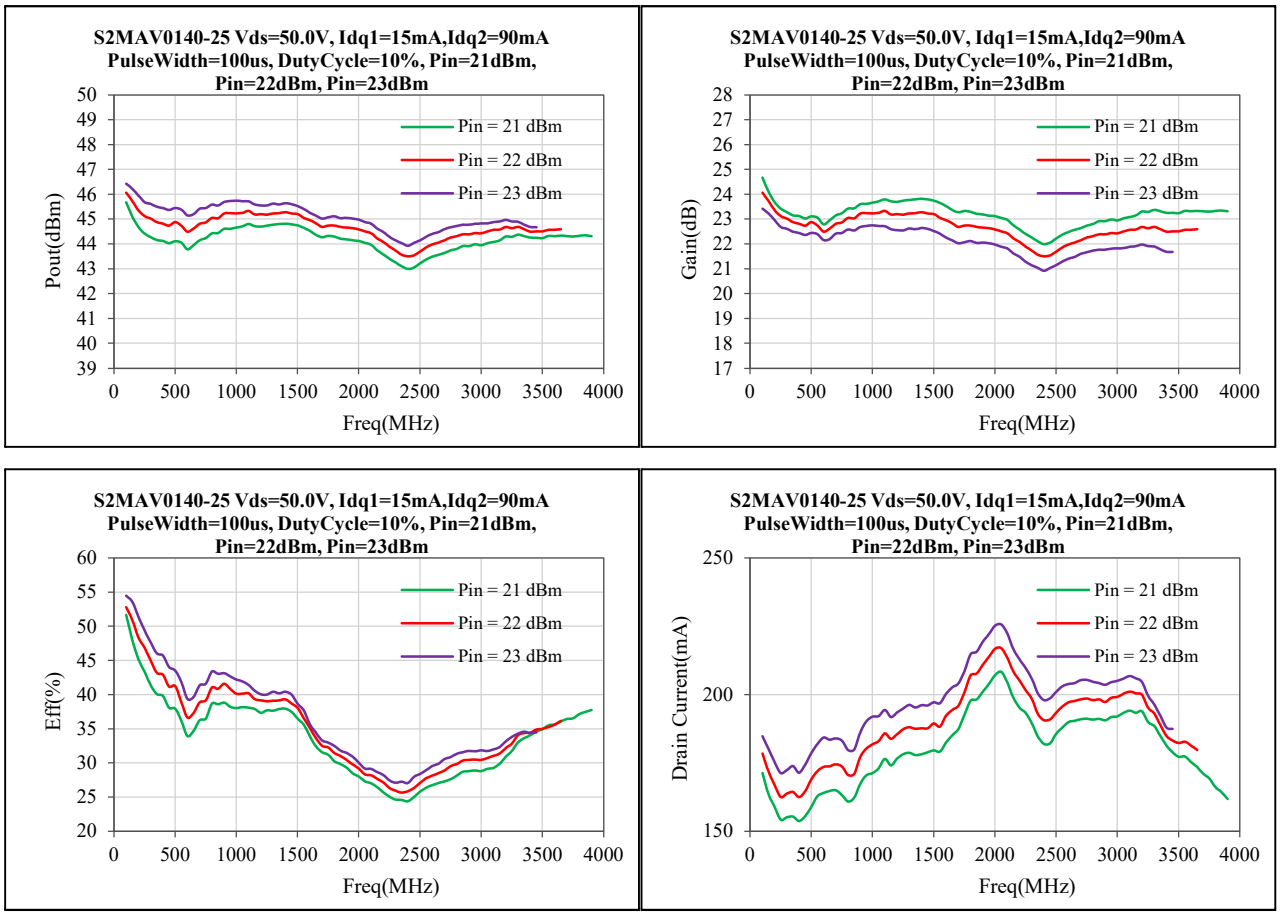
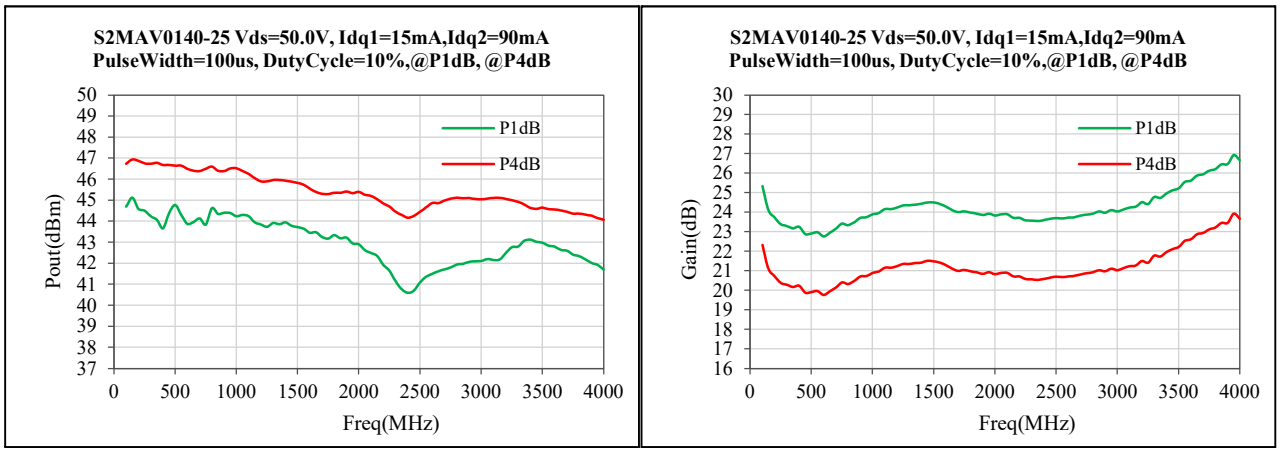


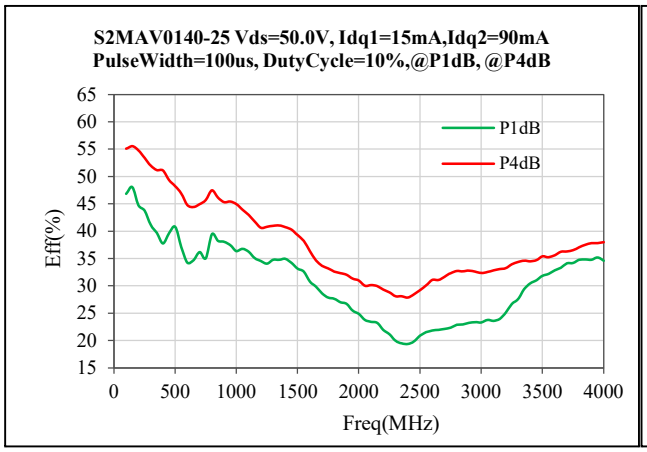
Figure 3. Pout, Power Gain and, efficiency vs. Frequency at different Pin and P1/P4dB (P4dB defined as Psat)

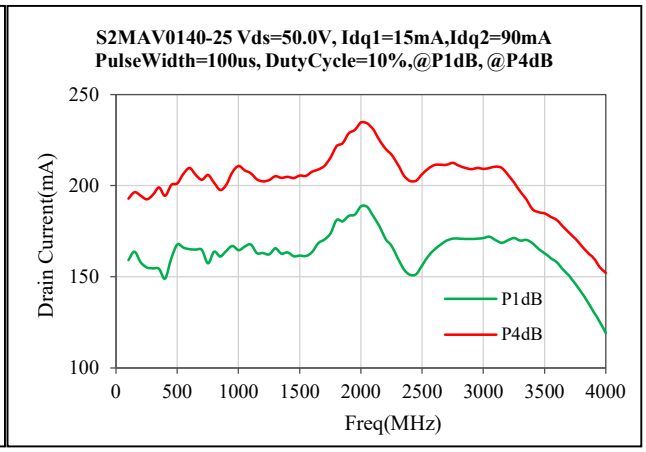


P1dB / P4dB

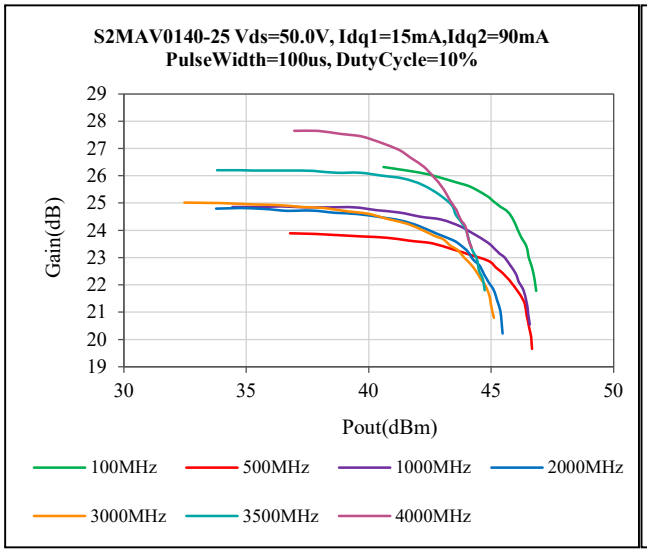


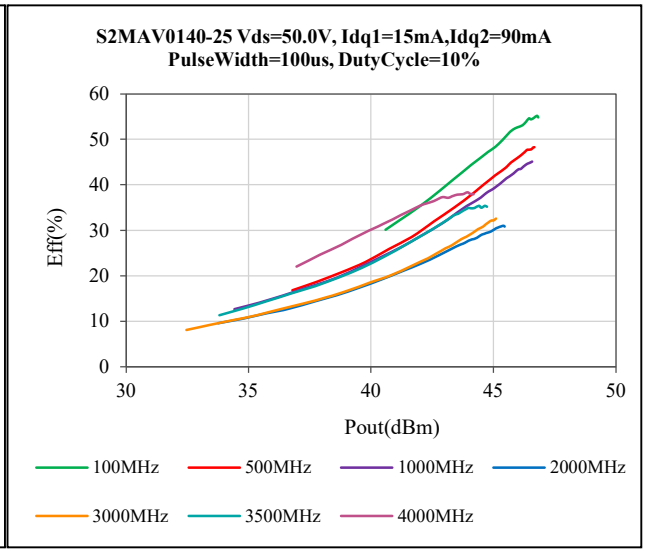
P1dB / P4dB

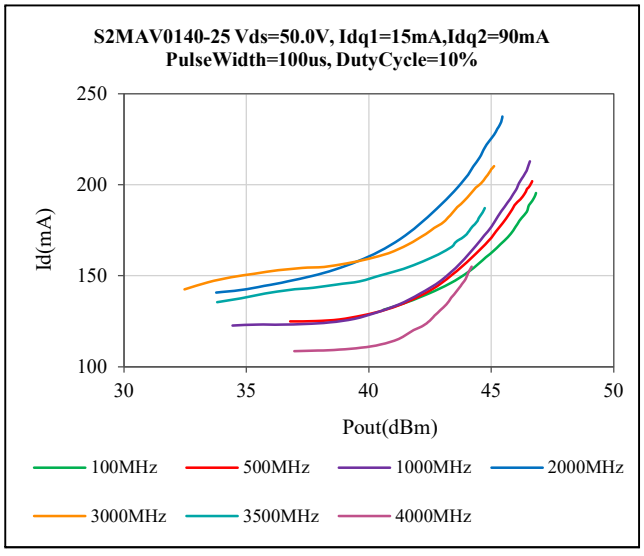




AM-AM

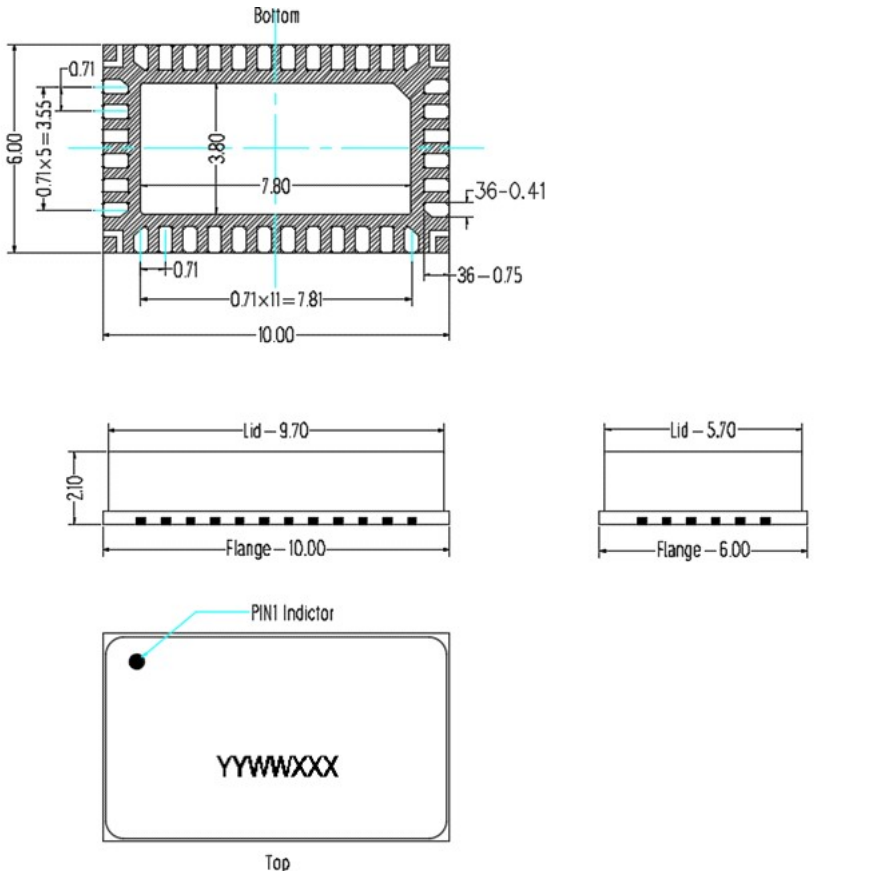






Package Dimensions

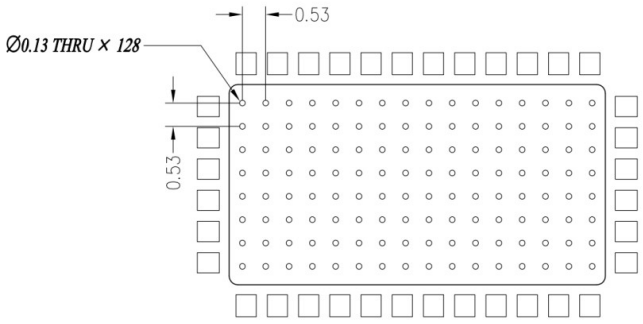
10*6 Plastic Package



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
2026/11/3	V1.0	Production datasheet

Application data based on ZHH-26-08

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