



1.0-4.0GHz, 30W, 50V GaN Fully matched PA Module

Description

The SMAV1040-30C9 is a 30-watt, single stage integrated Power Amplifier Module, designed for broad band applications, with frequencies from 1 to 4GHz. The module is 50 Ω input/output matched and requires minimal external components.

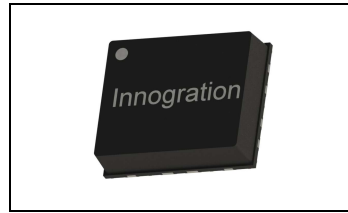
When used at 28V ,it can enable >15W CW Psat across the same 1 to 4GHz.

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

Please notice that

For CW, it is strongly recommended to solder device onto the heatsink directly

For Pulse, it is acceptable to solder device through high density metalized grounding vias



$V_{ds} = 50V, V_{gs} = -3.04V, I_{dq} = 30mA$					
Pulse Peak Power, 100us, 10%					
Freq(MHz)	P-1(dBm)	P-1Gain(dB)	P-3(dBm)	P-3(W)	EFF (%)
1000	44.77	12.7	45.44	35.0	49.5
1500	44.49	13.3	45.52	35.6	46.2
2000	43.78	12.4	44.86	30.6	36.0
2500	43.97	13.1	45.41	34.7	41.0
3000	44.97	13.7	45.83	38.3	47.2
3500	45.07	14.0	45.90	38.9	51.2
4000	44.60	13.4	45.70	37.1	56.6

$V_{ds} = 50V, V_{gs} = -3.04V, I_{dq} = 30mA$					
CW Power					
Freq(MHz)	P-1(dBm)	P-1Gain(dB)	P-3(dBm)	P-3(W)	EFF (%)
1000	44.07	11.8	45.03	31.9	47.6
1500	43.43	12.3	44.94	31.2	43.9
2000	43.01	11.1	44.18	26.2	35.1
2500	42.24	12.3	44.78	30.0	39.0
3000	43.46	13.1	45.41	34.8	46.1
3500	44.43	13.2	45.60	36.3	50.1
4000	44.33	12.9	45.56	35.9	56.3

Product Features

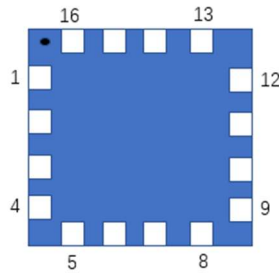
- Operating Frequency Range: 1-4GHz
- Operating Drain Voltage: +50 V / 28V
- 50 Ω Input/Output
- $Psat \geq 30W$ (Pulse or CW)/ 15W(CW)
- Small signal gain:>13dB, Power gain:>9dB @50V
- Minimum efficiency:>35% @50V
- 12x10 mm Surface Mount Package
- Compliant to Restriction of Hazardous Substances (RoHS) Directive 2002/95/EC

Applications

- Ultra Broadband Amplifiers
- Fiber Drivers
- Test Instrumentation
- EMC Amplifier Drivers
- 2-way Radios



Pin Configuration and Description (Top view)



Pin No.	Symbol	Description
4	RF IN	RF Input
9	RF OUT	RF Output
6	Vgs	Gate bias
7	Vdd	Drain bias
Others	NC	No connection
Package Base	GND	DC/RF Ground. Proposed to be soldered to heatsink plane directly for the best CW thermal and RF performance. Soldered through high density vias or copper coin also allowed ,but will result in excessive junction temperatures and different RF performance

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 $T_C = 85^\circ\text{C}$, DC test, soldered on heatsink directly	$R_{\theta JC}$	2.8	°C/W

Table 3. Electrical Characteristics

Parameter	Condition	Min	Typ	Max	Unit
Frequency Range		1000		4000	MHz
Power Gain @ Psat		10			dB
P_{SAT}	Pulse		45		dBm
Drain Efficiency @ P_{SAT}		35			%

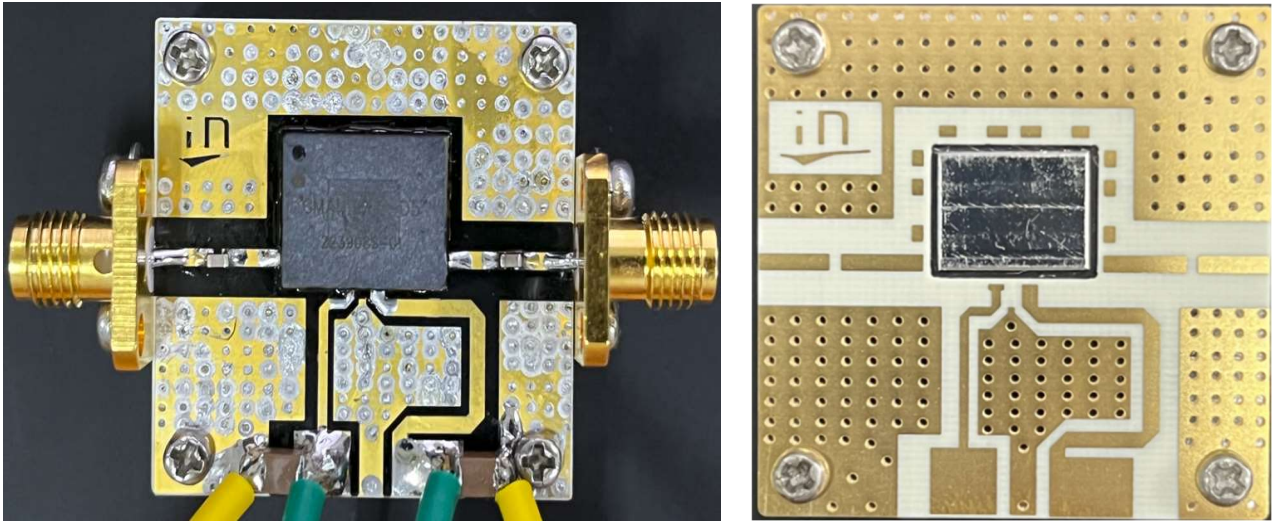
Unless otherwise noted: $T_A = 25^\circ\text{C}$, $V_{DD} = 50\text{ V}$, Pulse Width=100 us, Duty cycle=10%

Load Mismatch of per Section (On Test Fixture, 50 ohm system): $V_{DD} = 50\text{V}$, $I_{DQ} = 30\text{ mA}$, $f = 3.5\text{ GHz}$

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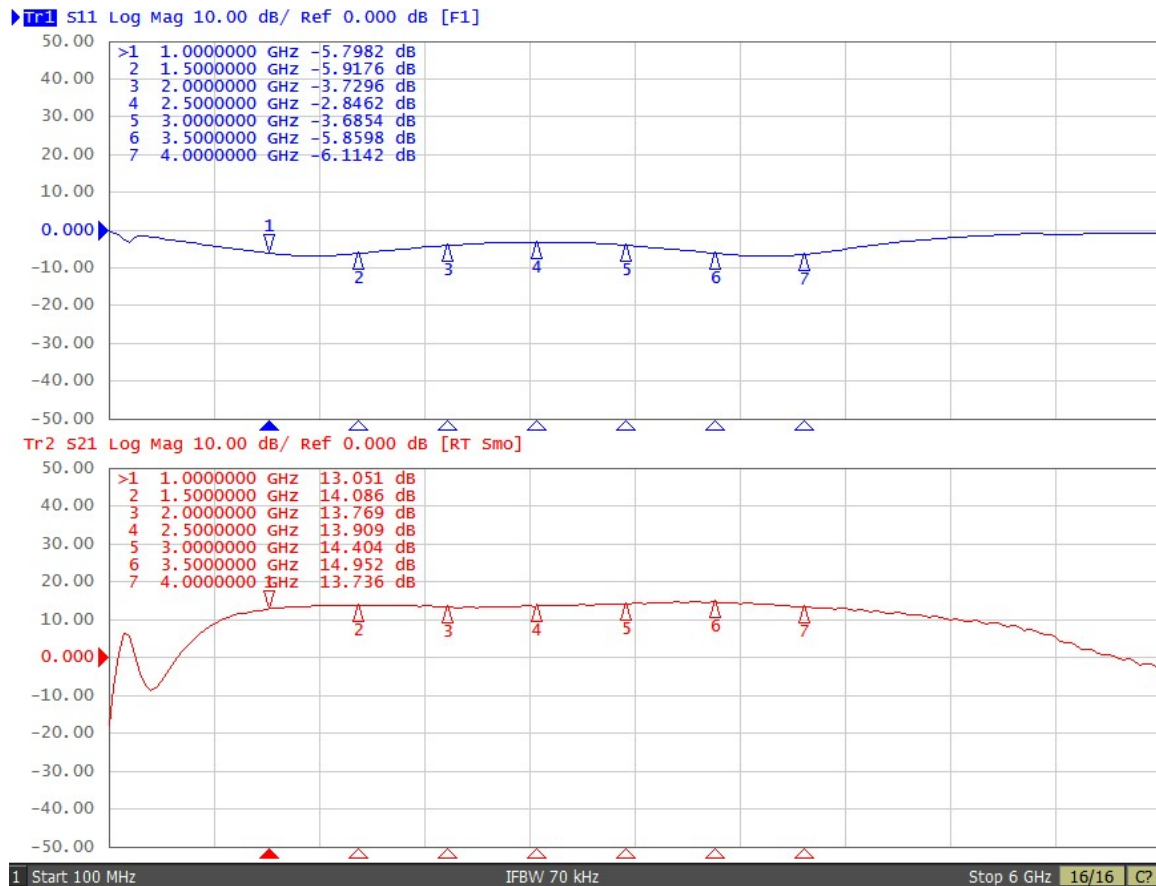
Reference Circuit of Test Fixture Assembly Diagram

Figure 1. Test Circuit Component Layout



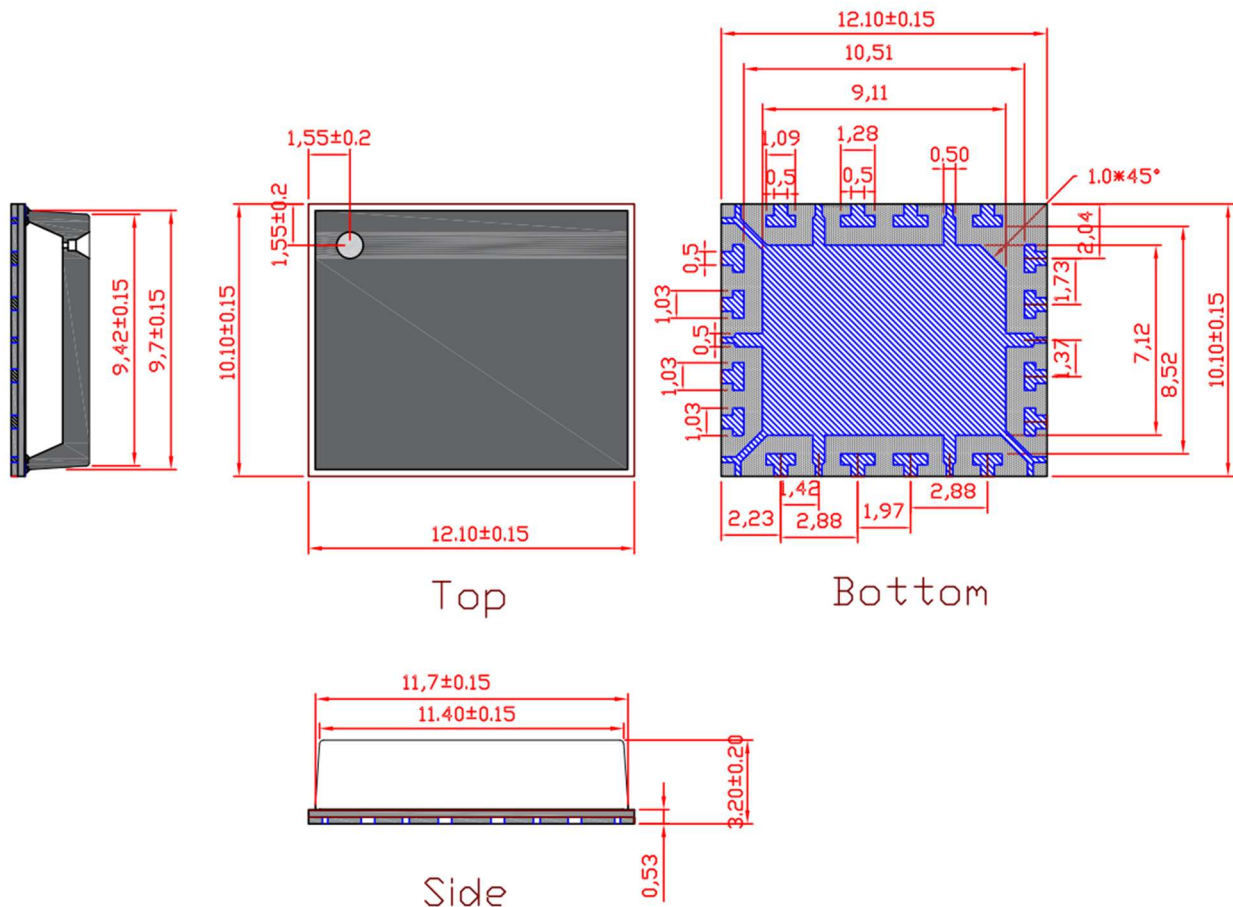
TYPICAL CHARACTERISTICS

Figure 2. Network analyzer output S11/S21 (Pin=0dBm) at 50V





Package Dimensions (Unit:mm)



Revision history

Table 6. Document revision history

Date	Revision	Datasheet Status
2023/5/5	Rev 1.0	Preliminary Datasheet
2024/8/21	Rev 2.0	Update to be CW capable by soldering device onto heatsink

Application data based on HJ-23-07

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