



DC-2.7GHz, 15W, 50V GaN Fully matched PA Module

Description

The SMAV0027-15 itself is a 15-watt ,single stage integrated Power Amplifier Module, designed for broad band applications, with frequencies from 30MHz to 2.7GHz. 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 the modification of SMAV0030-15 mainly for further combination purpose to increase the broadband power. In its typical application by combining 2 pieces in parallel, it can deliver 25W CW power from HF to 2700MHz,with highly simple and compact reference design

Vds=50V, Idq=50mA, CW, ---(SMAV0027-15)*2 combination reference design

Parameter	30MHz	500MHz	1000MHz	1500MHz	2000MHz	2500MHz	2700MHz	Units
Linear Gain	16.4	15.3	15.8	15.2	15.9	15.6	14.8	dB
Gain@Pin=31dBm	13.5	13.3	13.7	13.5	13.1	13.6	13.1	dB
Pout@Pin=31dBm	28.5	26.8	29.6	28.2	25.5	29.1	25.9	W
Eff@Pin=31dBm	81	62	52	42	38	43	41	W

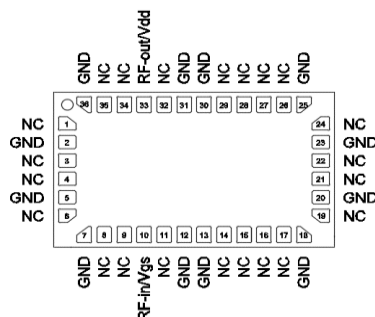
Product Features of (SMAV0027-15)*2 combination reference design

- Operating Frequency Range: 30MHz-2.7GHz
- Operating Drain Voltage: +50 V
- 50 Ω Input/Output
- Psat: \geq 25W
- Small signal gain:>13dB
- Minimum efficiency:35%
- 6x10 mm Surface Mount Package for single device
- Compliant to Restriction of Hazardous Substances (RoHS) Directive 2002/95/EC

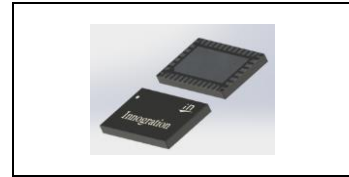
Applications

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

Pin Configuration and Description



Top View





Pin No.	Symbol	Description
33	RFout/Vdd	Transistor 1, Drain Bias & RF Output
10	RFin/Vgs	Transistor 1, RF Input & Gate Bias
1,3,4,6,8,9,11,14-17,19,21,22,24,26-29,32,34,35	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 of single device

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, of single device

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case $T_C = 25^\circ\text{C}$, DC test	$R_{\theta JC}$	6.5	°C/W

Table 3. Electrical Characteristics of 2 pieces combination reference design

Parameter	Condition	Min	Typ	Max	Unit
Frequency Range		30		2700	MHz
Power Gain @ Psat			13		dB
P_{SAT}			25		W
Drain Efficiency @ P_{SAT}		35			%

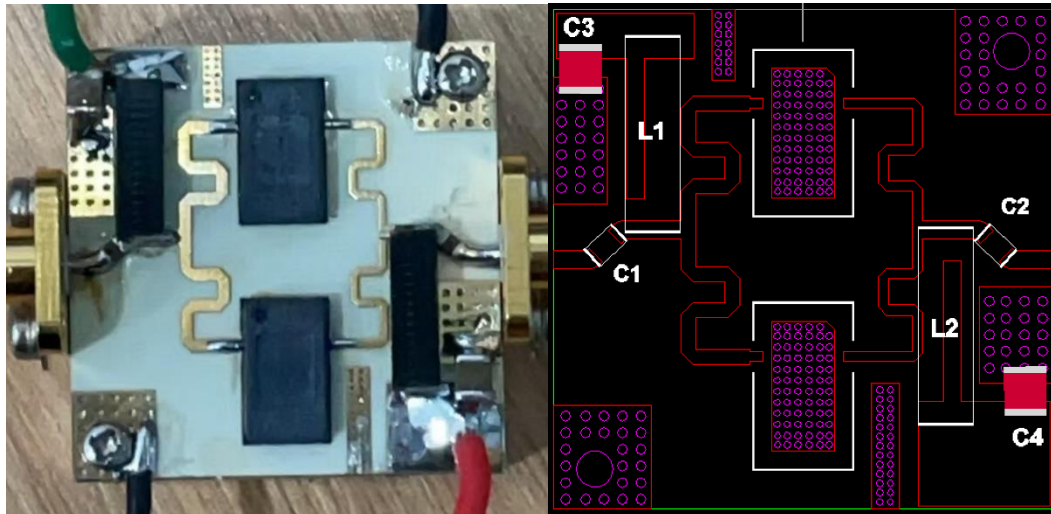
Unless otherwise noted: $T_A = 25^\circ\text{C}$, $V_{DD} = 50\text{ V}$, Pulse Width=100 us, Duty cycle=10%

Load Mismatch of per Section (On Test Fixture, 50 ohm system): $V_{DD} = 50\text{ V}$, $I_{DQ} = 25\text{ mA}$, $f = 2.7\text{ GHz}$

VSWR 10:1 at P3dB pulse CW Output Power	No Device Degradation
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Test Fixture Assembly Diagram (SMAV0027-15)*2 combination reference design



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

TYPICAL CHARACTERISTICS

Figure 1. Network analyzer output S11/S21 (Pin=0dBm)

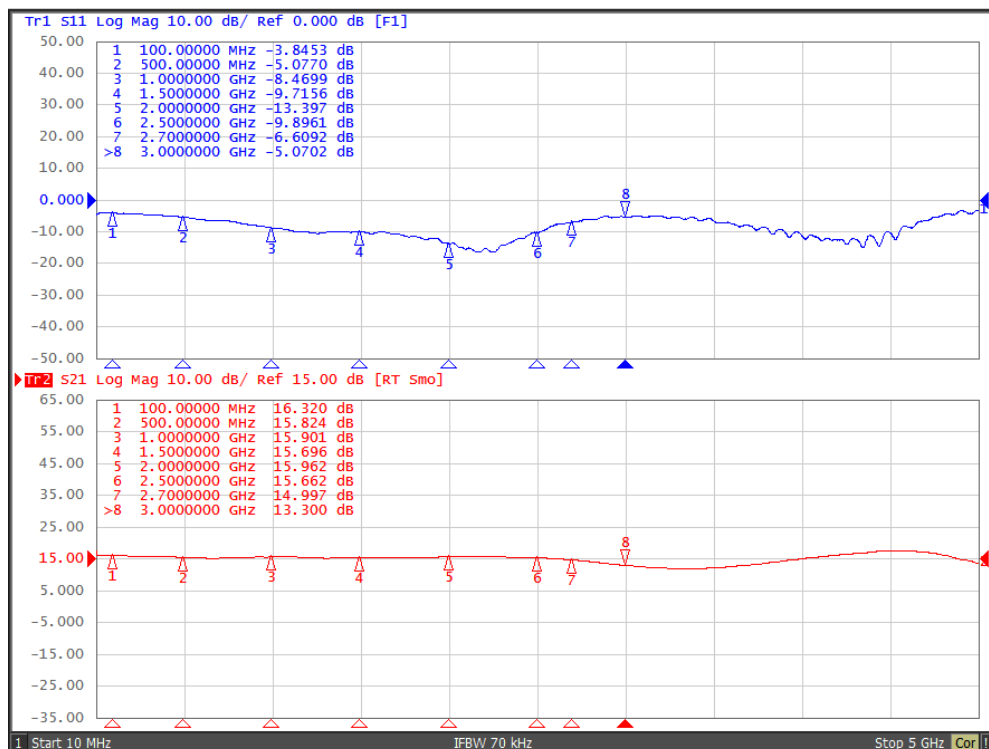
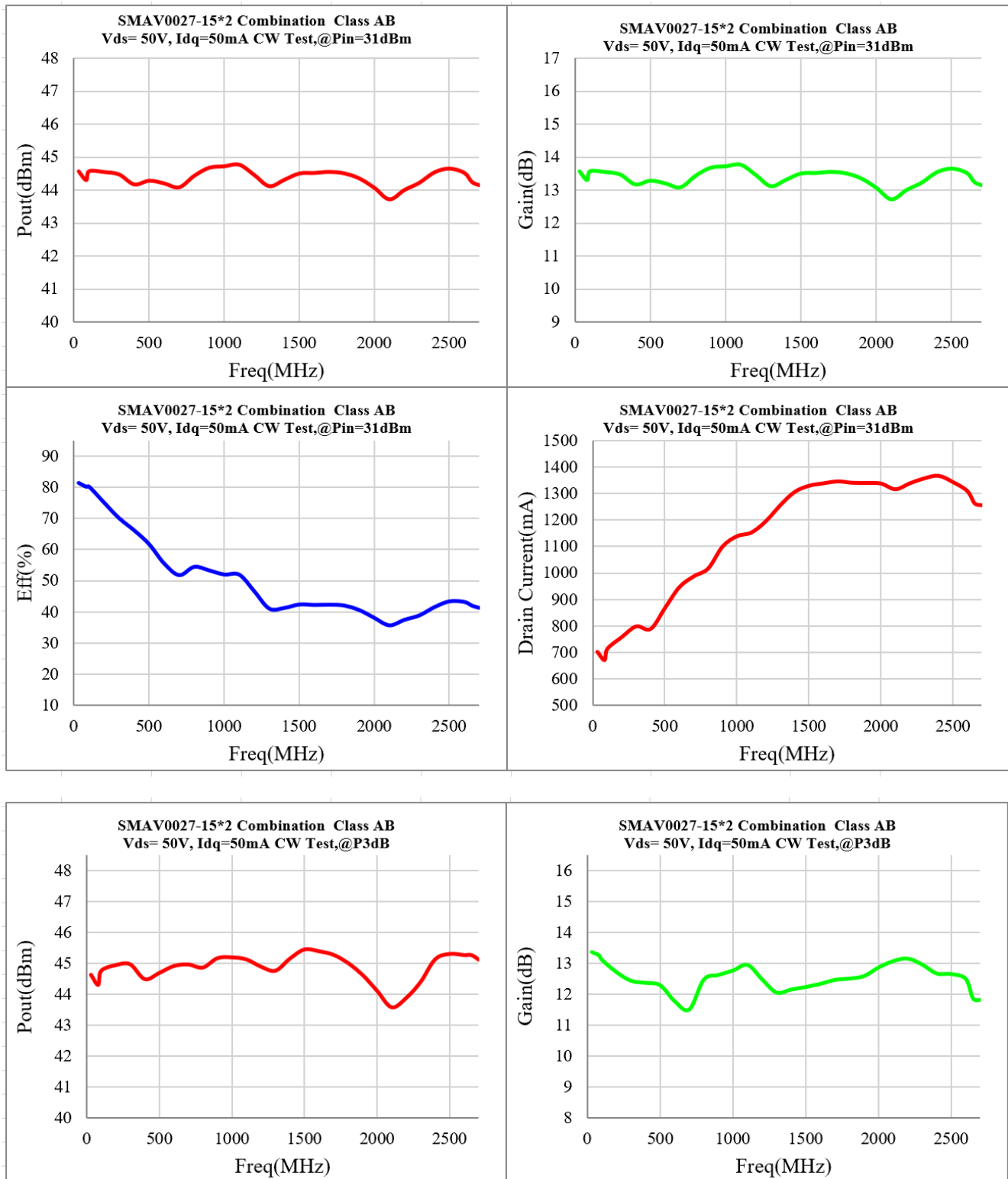
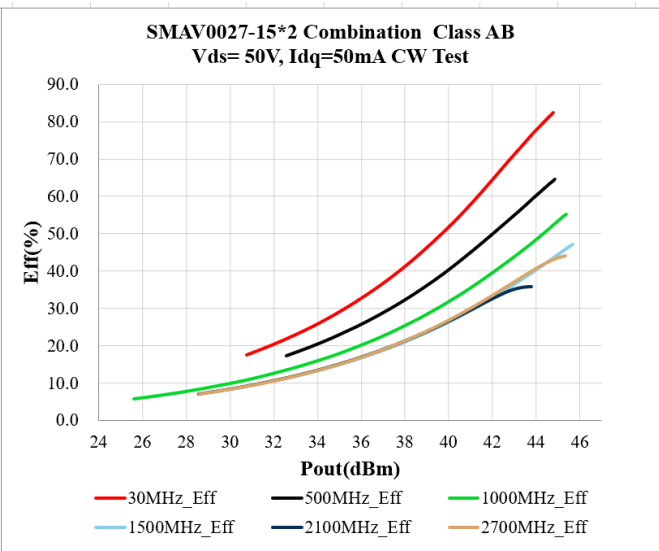
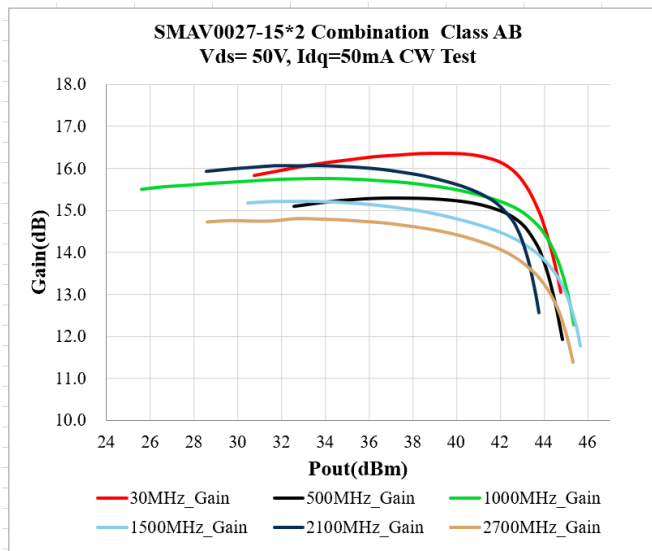
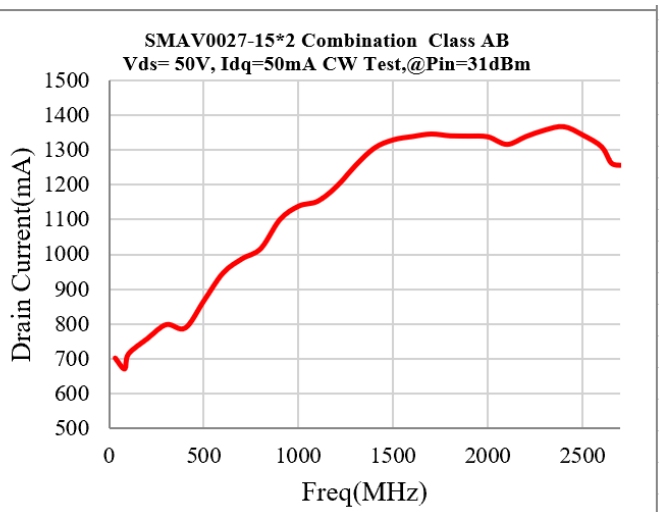
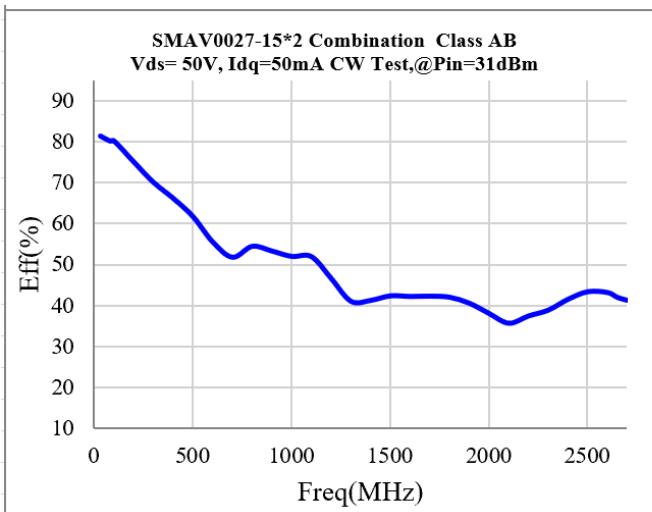




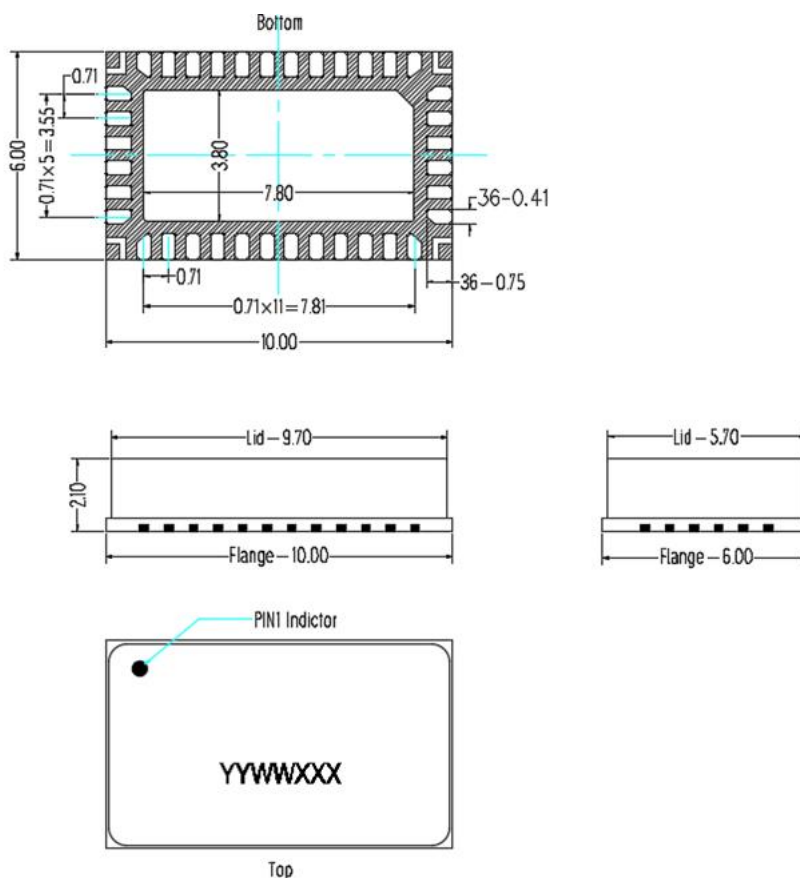
Figure 3. Pout, Power Gain and, efficiency vs. Frequency





Package Dimensions

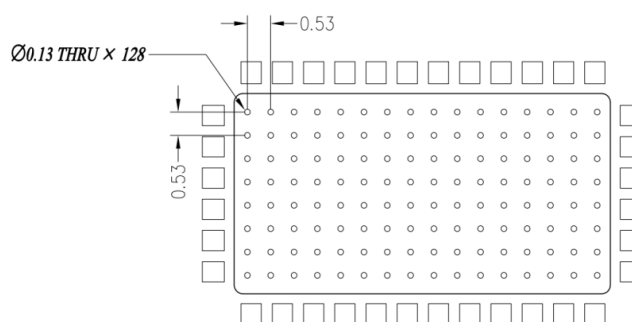
10*6 Plastic Package



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
2024/11/23	V1.0	Production datasheet

Application data based on ZHH-24-11 (2*1.2)

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