



DC-9.5GHz, 5W, 28V GaN Fully matched PA Module

Description

The SMAH0095-5 is a 5-watt ,single stage integrated Power Amplifier Module, designed for broad band applications, with tunable bandwidth within DC to 9.5GHz, **depending on different DC bias inductor**. 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.

V_{ds}=28V, I_{dq}=45mA, CW, DC inductor :DIY details in later pages

Parameter	0.5GHz	1.0GHz	2.0GHz	4.0GHz	5.0GHz	6.0GHz	7.0GHz	8.0GHz	9.0GHz	Units
Linear Gain	8.1	9.5	9.6	8.8	8.0	8.5	8.3	7.5	7.4	dB
Gain@Pin=31dBm	6.5	7.6	7.6	7.2	6.5	6.7	6.7	6.1	6.0	dB
Pout@Pin=31dBm	5.7	7.2	7.2	6.6	5.7	5.9	5.9	5.2	5.0	W
PAE@Pin=31dBm	35	60	49	35	28	30	29	24	24	%

*By changing DC inductor, application demonstrating down to 100MHz upon request

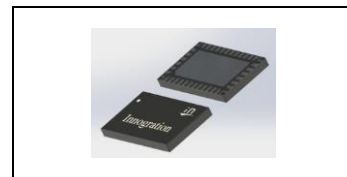
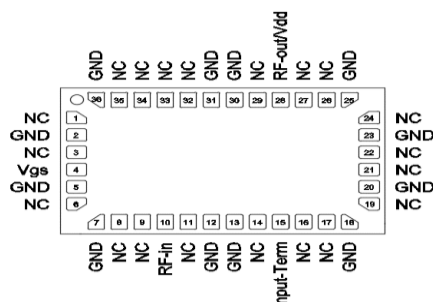
Product Features

- Operating Frequency Range: **0.5-9GHz** (DC-9.5GHz tunable)
- Operating Drain Voltage: +28 V
- 50 Ω Input/Output
- Psat: ≥ 37 dBm
- Small signal gain:>7.5dB, Power gain:>6dB
- Minimum efficiency:>20%
- 6x10 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





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}	150	Vdc
Gate--Source Voltage	V_{GS}	-10 to +2	Vdc
Operating Voltage	V_{DD}	+36	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 $T_c = 87^\circ\text{C}$, $T_j = 175^\circ\text{C}$, DC test	$R_{\theta JC}$	5.5	°C/W

Table 3. Electrical Characteristics

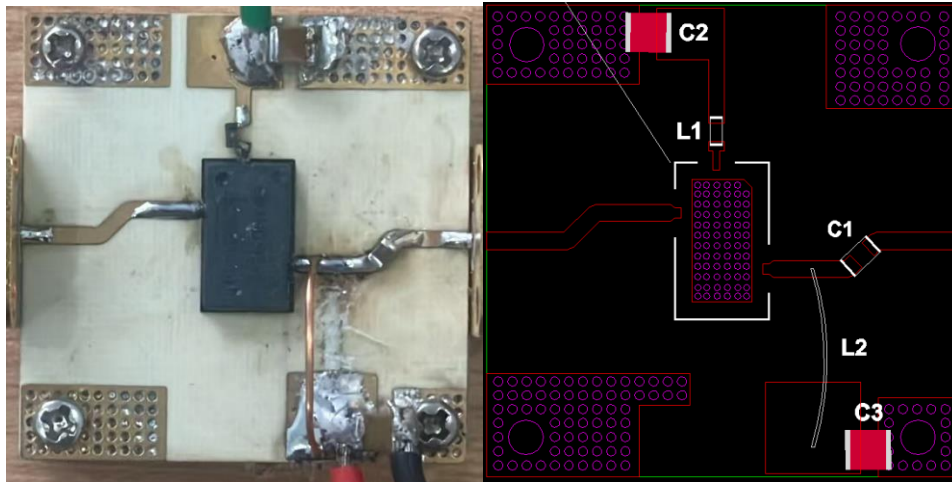
Parameter	Condition	Min	Typ	Max	Unit
Frequency Range		100		9500	MHz
Power Gain @ Psat	Upon bands tuned		TBD		dB
P_{SAT}			37		dBm
Drain Efficiency @ P_{SAT}		20			%

Unless otherwise noted: $T_A = 25^\circ\text{C}$, $V_{DD} = 28\text{ V}$, Pulse Width=100 us, Duty cycle=10%

Load Mismatch of per Section (On Test Fixture, 50 ohm system): $V_{DD} = 28\text{ V}$, $I_{DQ} = 10\text{ mA}$, $f = 3.5\text{ GHz}$

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



		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
L2	L=12mm Φ =0.5mm Cu Wire		
PCB	RO4350B,20mil,er=3.48		

TYPICAL CHARACTERISTICS

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

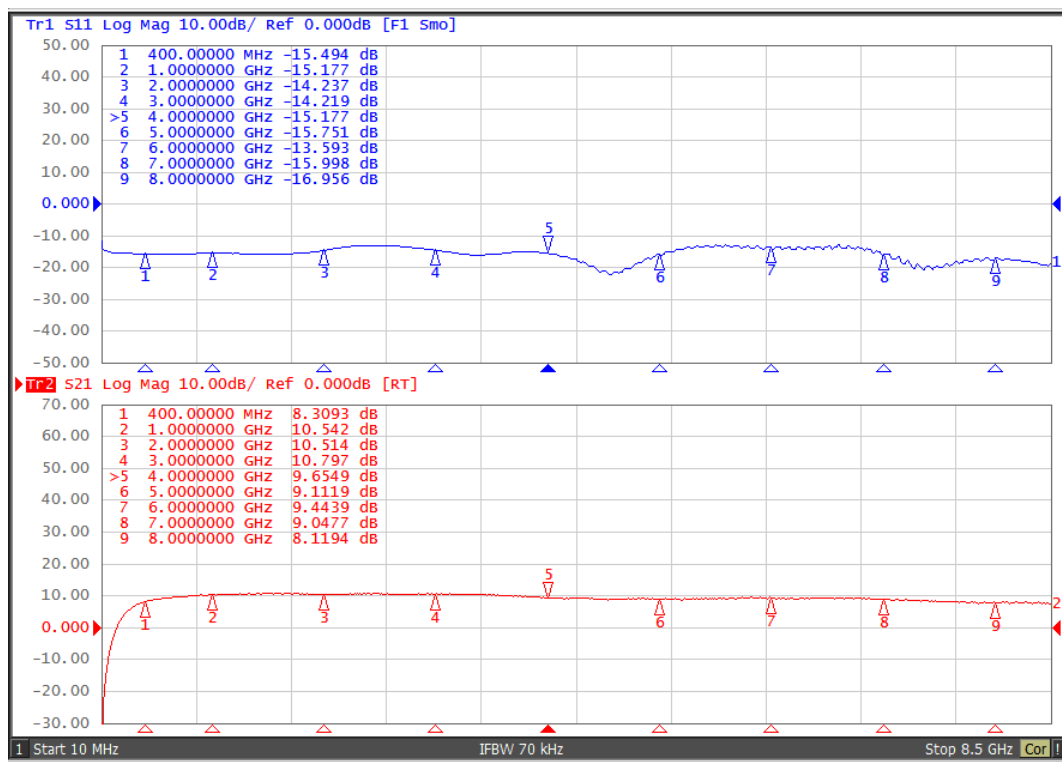
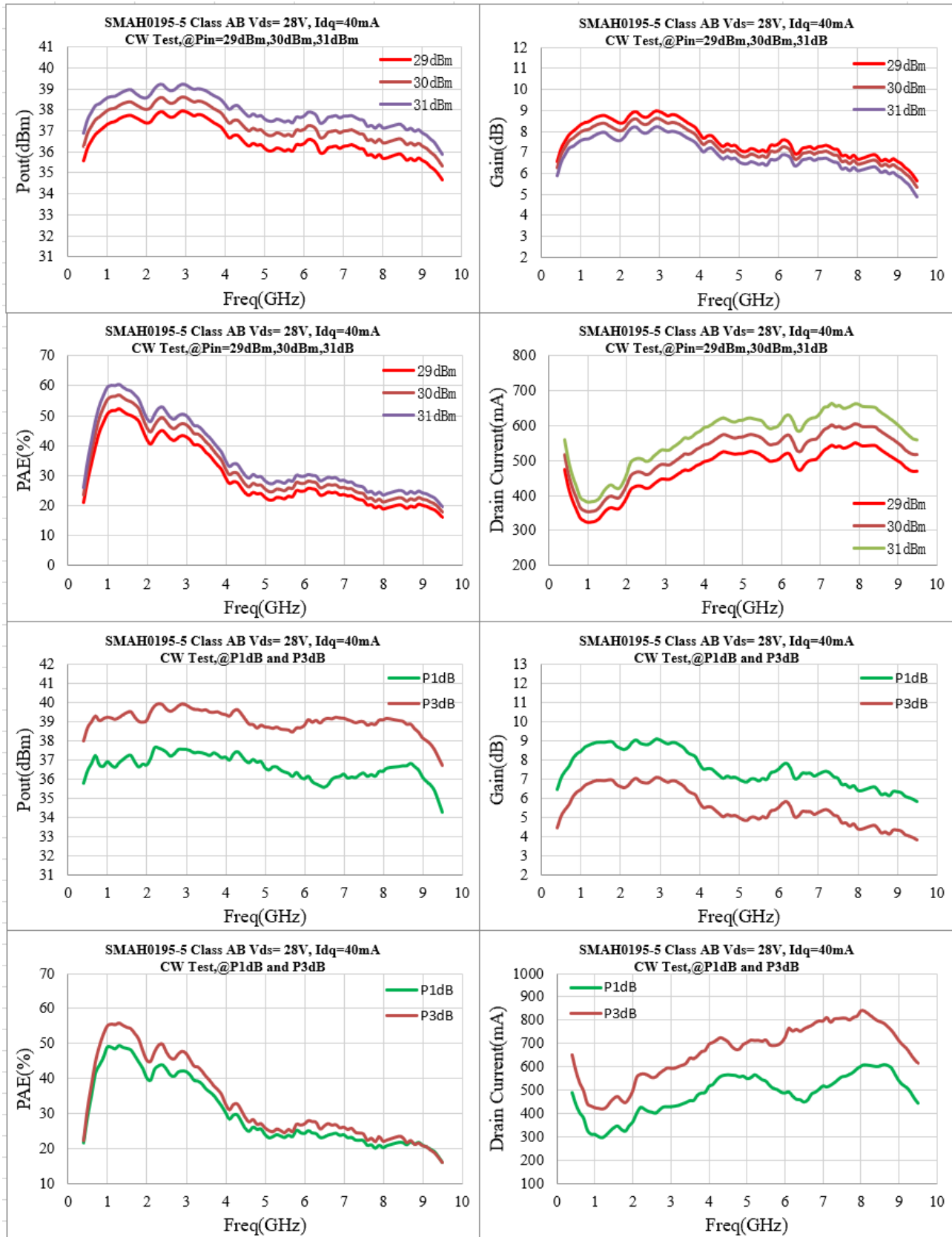


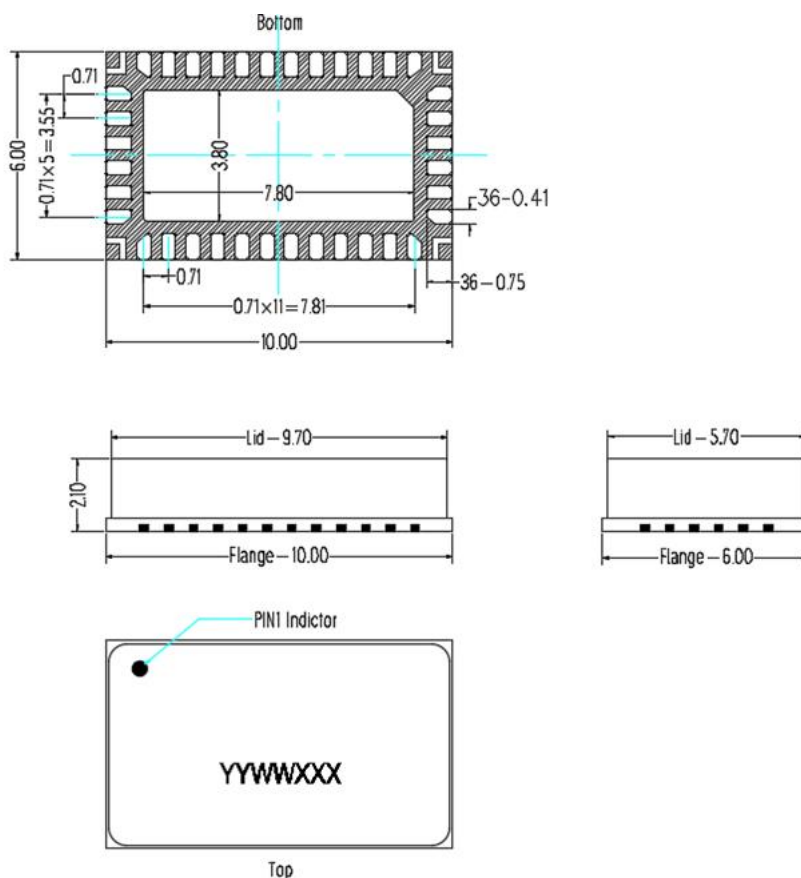


Figure 3. Power Gain and, efficiency and Pout @Pin=30/31dBm ,and P3dB vs. Frequency



Package Dimensions

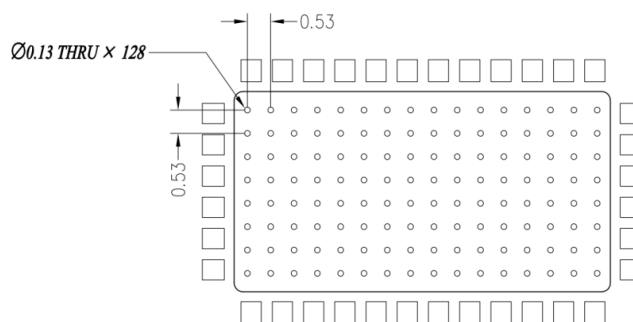
10*6 Plastic Package



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
2026/6/30	Rev 1.0	Production Datasheet

Application data based on ZHH-26-03/05

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