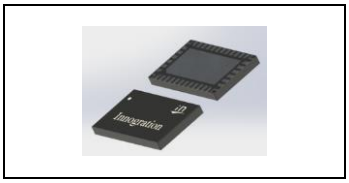
DC-9.5GHz, 2Wx2, 28V GaN Fully matched PA Module



Description

The GMAH0095-4 is a dual path 2W*2 ,single stage integrated Power Amplifier Module, designed for broad band applications, with frequencies from DC to 9.5GHz. The module is 50 Ω input/output matched and requires minimal external components.

It is to implement 2xGMAH0095-2 into the same package to minimize the design for external combination

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.

Vds=28V, Idq=30mA, CW in **typical 1-9GHz combination circuit**

Parameter	1 GHz	2GHz	4GHz	6GHz	7GHz	8GHz	9GHz	Units
Linear Gain	8.4	10.5	13.1	11.5	10.4	9.5	9.2	dB
Pout@Pin=28dBm	3.1	4.7	7.0	5.7	4.4	3.6	3.1	W
Gain@Pin=28dBm	7.0	8.7	10.4	9.6	8.4	7.5	7.0	dB
Eff@ Pin=28dBm	24	31	46	35	27	23	21	%

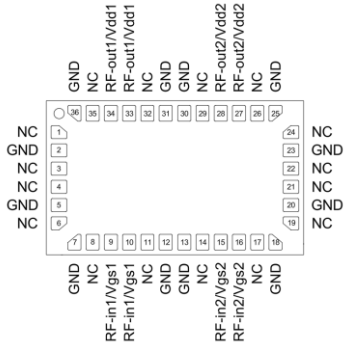
Product Features

- Operating Frequency Range: DC-9.5GHz and **typical combination within 1-9GHz**
- Operating Drain Voltage: +28 V
- 50 Ω Input/Output
- Psat: ⩾35 dBm
- Small signal gain:>8dB, Power gain:>7dB
- 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



Top View

Pin No.	Symbol	Description
33,34	RFout1/Vdd1	Transistor 1, Drain Bias & RF Output
9,10	RFin1/Vgs1	Transistor 1, RF Input &Gate Bias
27,28,	RFout2/Vdd2	Transistor 2, Drain Bias & RF Output
15,16	RFin2/Vgs2	Transistor 2, RF Input &Gate Bias
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}	150	Vdc
Gate--Source Voltage	V_{GS}	-10 to +2	Vdc
Operating Voltage	V_{DD}	+36	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= 87°C, T_J=175°C, DC test	$R_{\theta JC}$	4	°C/W

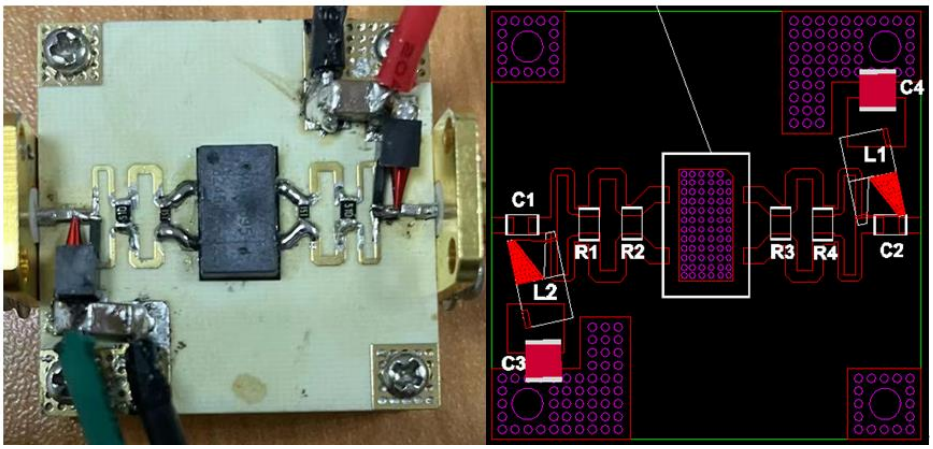
Table 3. Electrical Characteristics in typical 1-9GHz

Parameter	Condition	Min	Typ	Max	Unit
Frequency Range		1000		9500	MHz
Power Gain @ Psat		7			dB
P_{SAT}		35			dBm
Drain Efficiency @ P_{SAT}		20			%
Unless otherwise noted: TA = 25°C, V_{DD} =28 V, Pulse Width=100 us, Duty cycle=10%					

Load Mismatch of per Section (On Test Fixture, 50 ohm system): V_{DD} =28 V, I_{DQ} =0 mA, f = 3.5 GHz

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

Reference Circuit of Test Fixture Assembly Diagram



		Part·NO.	Vendor
C3,C4	10uF·100V·chip·Capacitor	C5750X7S2A106M230KB	TDK
C1,C2	3.9pF·Chip·Capacitor		
L1,L2	1.47·uH·694mA·Inductor	506WLSN1RR47KT694T	Kyocera·AVX
R1,R4	50·Ohm·Resistor		
R2,R3	150·Ohm·Resistor		
PCB	RO4350B,20mil,er=3.48		

Figure 1. Test Circuit Component Layout

TYPICAL CHARACTERISTICS

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

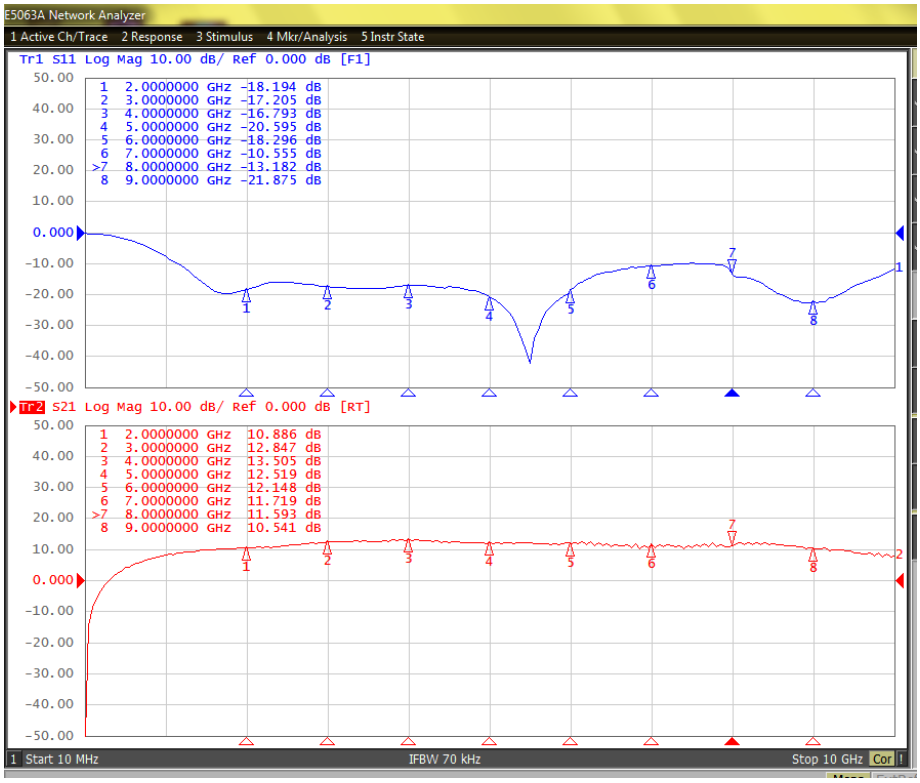
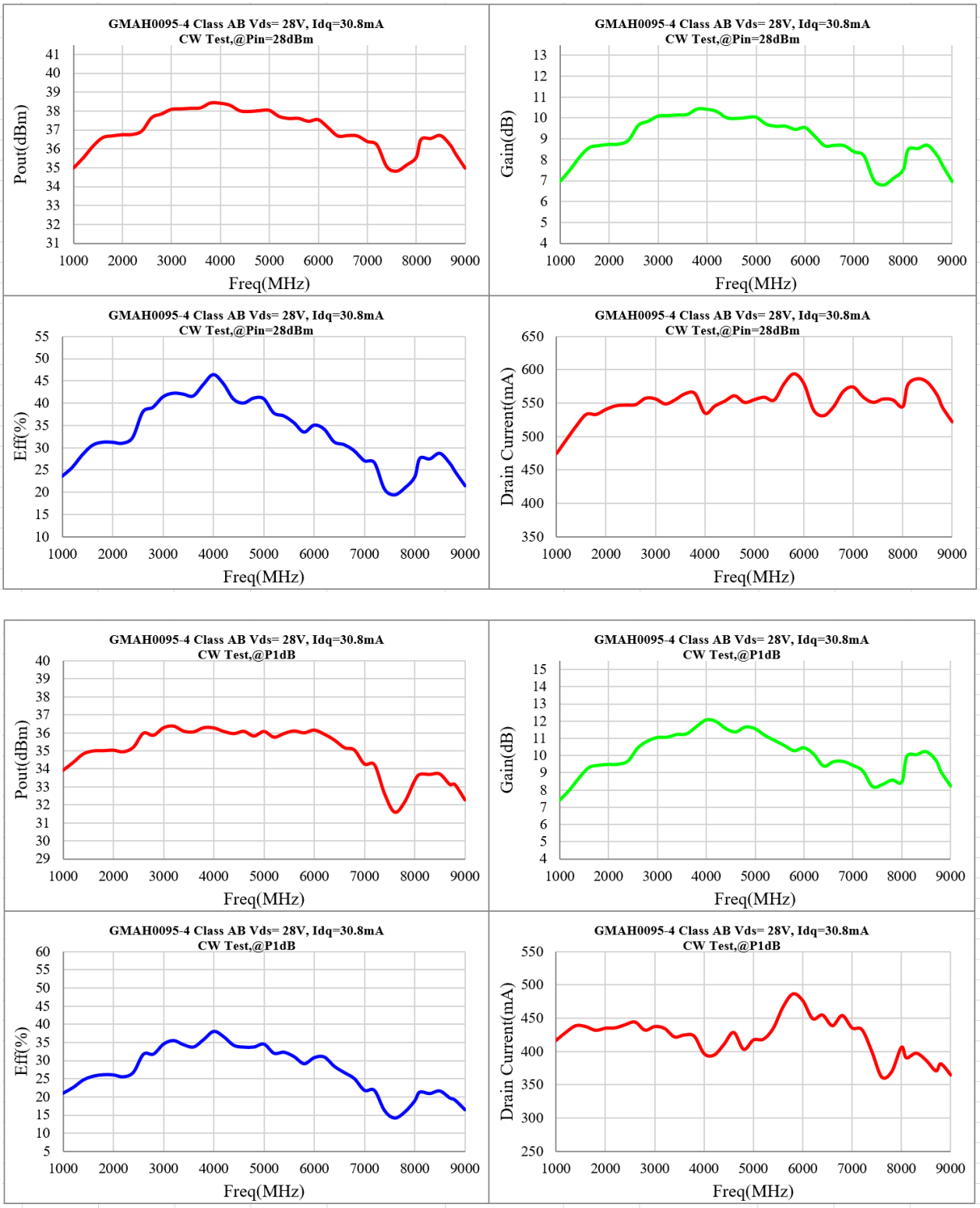
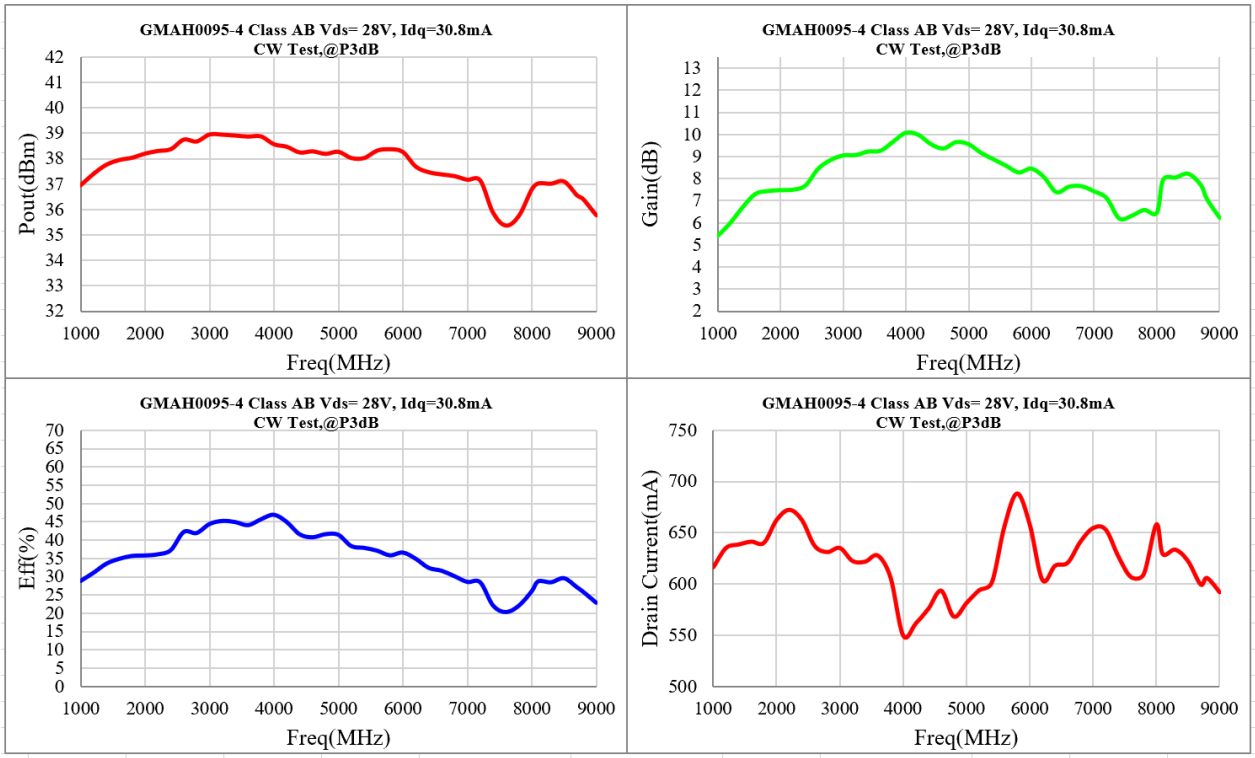


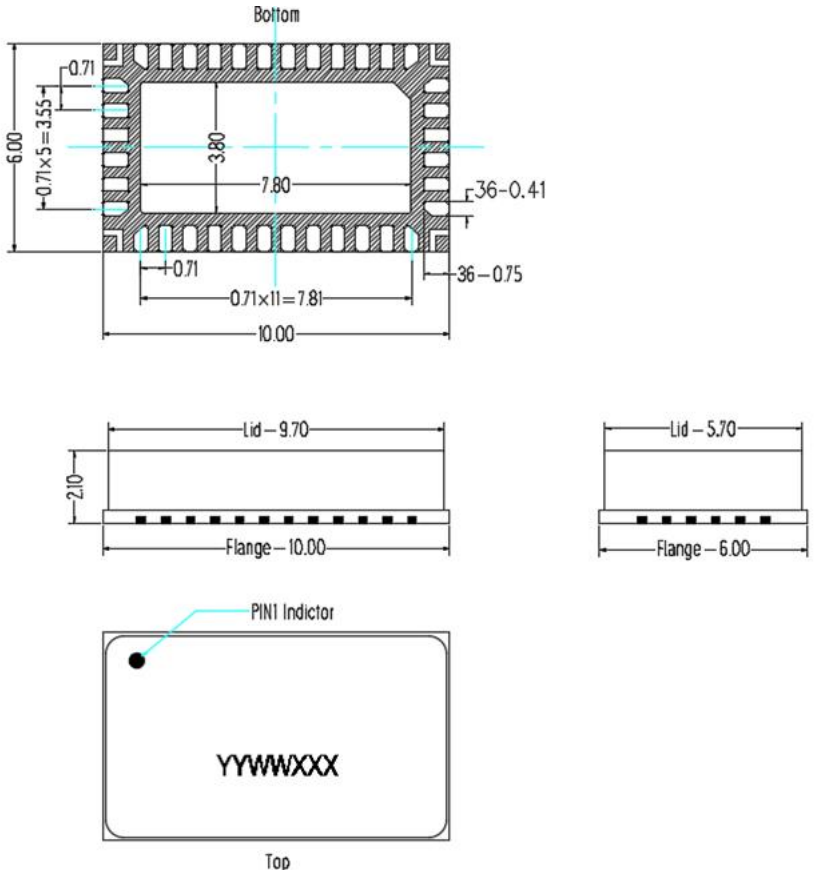
Figure. Power Gain and, efficiency and Pout @Pin=28dBm ,and P3dB vs. Frequency




GMAH0095-4 Class AB Vds= 28V, Idq=30.8mA
CW Test,@P3dB
Pout(dBm)
Freq(MHz)
GMAH0095-4 Class AB Vds= 28V, Idq=30.8mA
CW Test,@P3dB
Gain(dB)
Freq(MHz)
GMAH0095-4 Class AB Vds= 28V, Idq=30.8mA
CW Test,@P3dB
Eff(%)
Freq(MHz)
GMAH0095-4 Class AB Vds= 28V, Idq=30.8mA
CW Test,@P3dB
Drain Current(mA)
Freq(MHz)

Package Dimensions

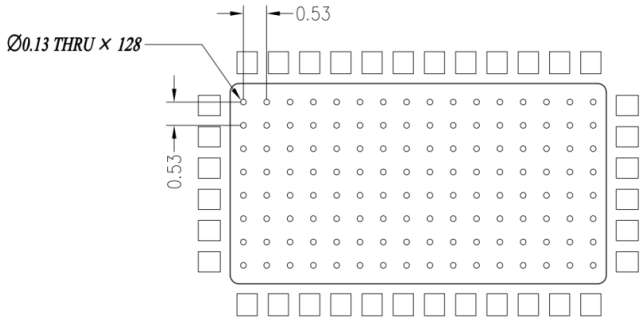
10*6 Plastic Package



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
2022/11/4	Rev 1.0	Production Datasheet

Application data based on ZHH-22-23

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