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

## Description

The GMAH0095-2 is a 2-watt ,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.

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=10mA, CW

| Parameter | 30MHz | 2.0GHz | 4.0GHz | 6.0GHz | 7.0GHz | 8.0GHz | 9.0GHz | 9.5GHz | Units |
|---|---|---|---|---|---|---|---|---|---|
| Linear Gain | 12.7 | 12.2 | 11.9 | 11.1 | 11.7 | 11.8 | 11.4 | 11.2 | dB |
| Pout@Pin=25dBm | 3.8 | 3.5 | 2.9 | 2.6 | 2.5 | 2.7 | 2.3 | 2.1 | W |
| Gain@Pin=25dBm | 10.8 | 10.4 | 9.6 | 9.1 | 8.9 | 9.3 | 8.7 | 8.3 | dB |
| Eff@ Pin=25dBm | 57 | 47 | 36 | 34 | 30 | 33 | 30 | 28 | % |

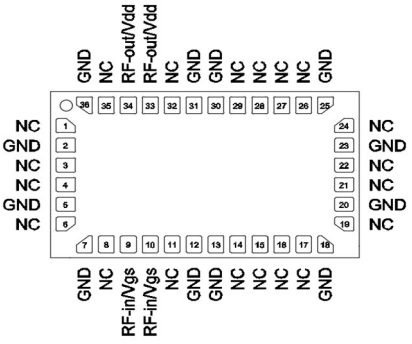
## Product Features

- Operating Frequency Range: DC-9.5GHz
- Operating Drain Voltage: +28 V
- 50 Ω Input/Output
- Psat: ⩾33 dBm
- Small signal gain:>11dB, Power gain:>8dB
- Minimum efficiency:>25%
- 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 | RFout/Vdd | Transistor 1, Drain Bias & RF Output |
| 9,10 | RFin/Vgs | Transistor 1, 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<br>$T_C$= 87°C, $T_J$=175°C, DC test | $R_{\theta JC}$ | 8 | °C/W |

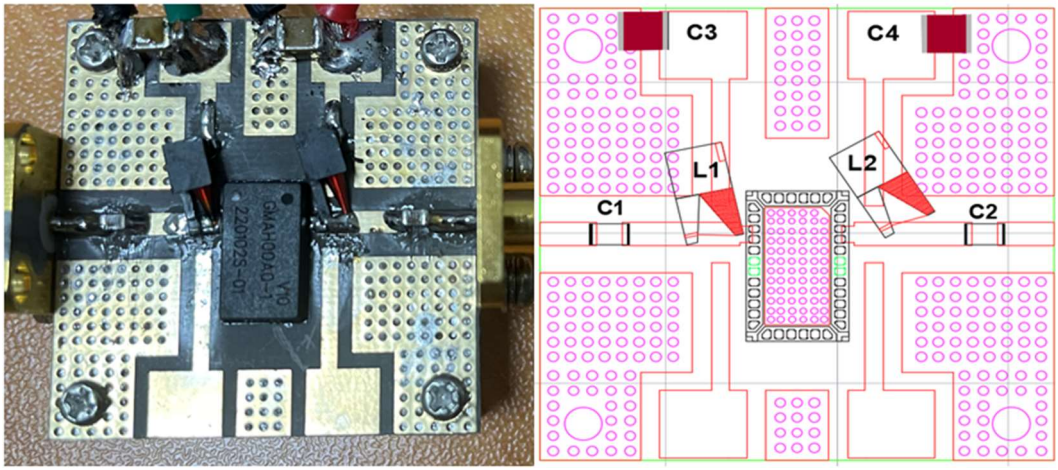
**Table 3. Electrical Characteristics**

| Parameter | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| Frequency Range | | 30 | | 9500 | MHz |
| Power Gain @ Psat | | 8 | | | dB |
| $P_{SAT}$ | | 33 | | | dBm |
| Drain Efficiency @ $P_{SAT}$ | | 25 | | | % |
| 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, $I_{DQ}$ =10 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 | 50V 1uF Chip Capacitor | GRM21BR71H105KA12L | MuRata |
| L1,L2 | 1.47 uH 694mA Inductor | 506WLSN1R47KT694T | Kyocera AVX |
| PCB | RO5880,20mil,Er=2.2 | | |

**Figure 1. Test Circuit Component Layout**

# TYPICAL CHARACTERISTICS

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

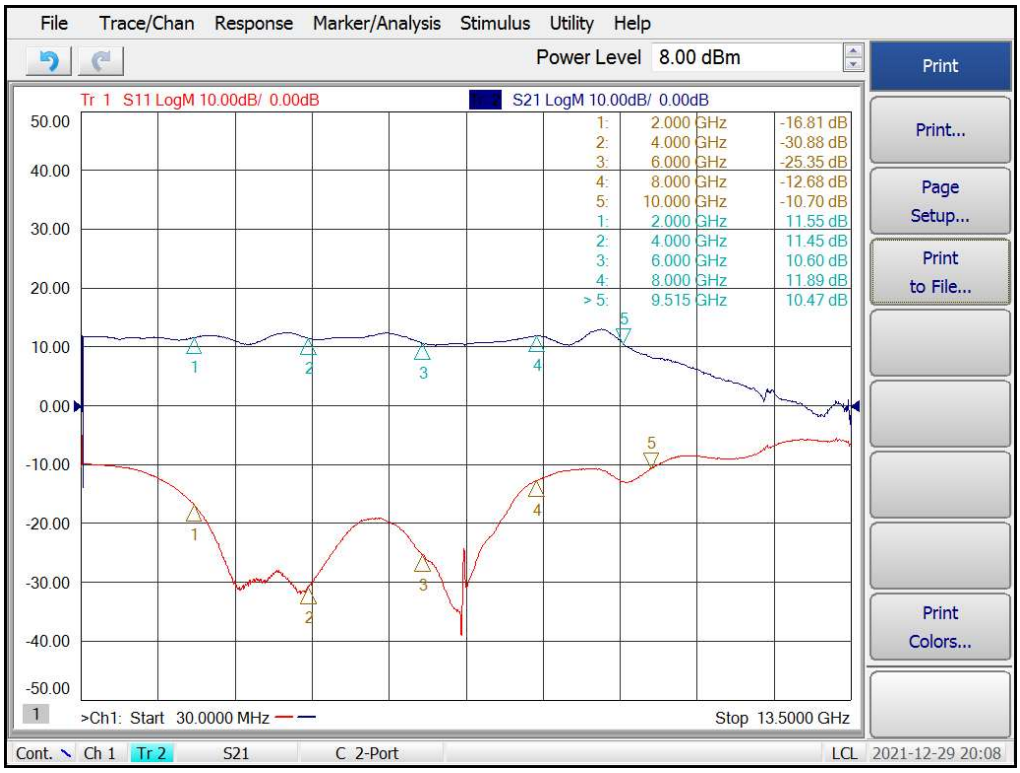
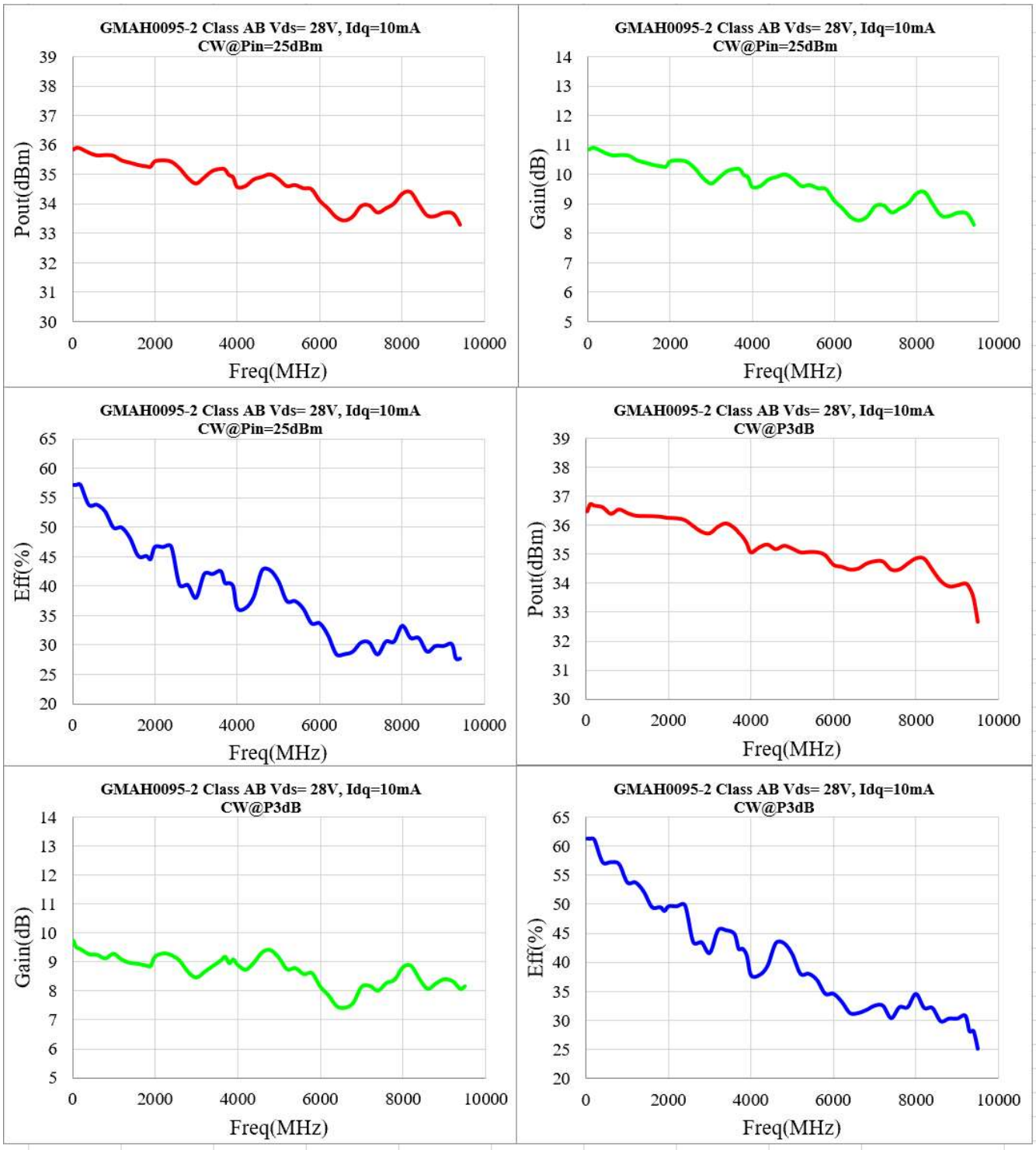
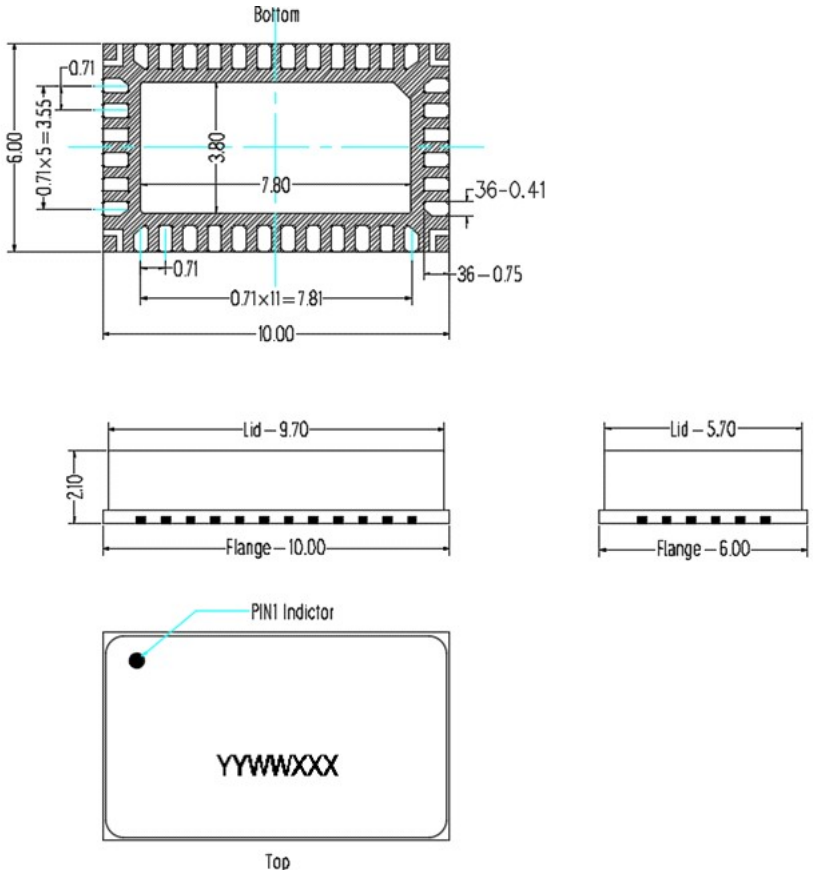


**Figure. Power Gain and, efficiency and Pout @Pin=25dBm ,and P3dB vs. Frequency**



# Package Dimensions

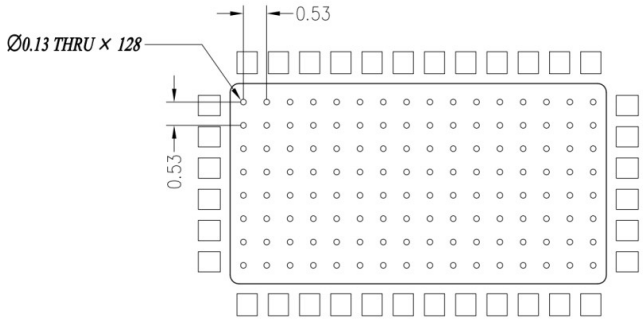
**10*6 Plastic Package**




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 |
|---|---|---|
| 2022/12/9 | Rev 1.0 | Production Datasheet |
| | | |
| | | |

**Application data based on ZHH-21-24**

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