



## 0.1-7GHz, 8W, 28V GaN Fully matched PA Module

### Description

The GMAH0170-8 is a 8-watt ,single stage integrated Power Amplifier Module, designed for broad band applications, with frequencies from 100MHz to 7GHz. The module is 50  $\Omega$  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<sub>ds</sub>=28V, I<sub>dq</sub>=50mA, CW



| Parameter        | 0.1GHz | 1.0GHz | 2.0GHz | 3.0GHz | 4.0GHz | 5.0GHz | 6.0GHz | 7.0GHz | Units |
|------------------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| Linear Gain      | 9.4    | 9.4    | 9.9    | 10.2   | 9.6    | 10.0   | 10.7   | 11.0   | dB    |
| Gain@Pin=32.5dBm | 7.0    | 7.7    | 8.0    | 8.5    | 7.9    | 8.1    | 8.5    | 7.1    | dB    |
| Pout@Pin=32.5dBm | 9.0    | 10.4   | 11.3   | 12.6   | 11.1   | 11.6   | 12.5   | 9.1    | W     |
| PAE@Pin=32.5dBm  | 55     | 51     | 46     | 45     | 36     | 36     | 40     | 29     | %     |

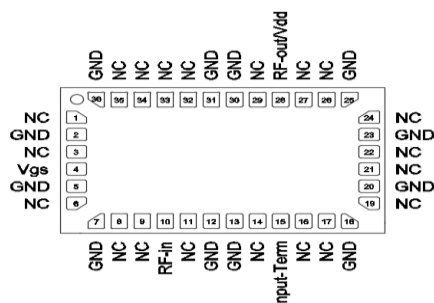
### Product Features

- Operating Frequency Range: 0.1-7GHz
- Operating Drain Voltage: +28 V (Up to 32V)
- 50  $\Omega$  Input/Output
- P<sub>sat</sub>:  $\geq 39$ dBm @28V
- Small signal gain:>9dB, Power gain:>7dB @Pin=32.5dBm
- 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



| 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  |
| Input CW Power                 | RFin      | 35          | dBm  |
| 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, FEA<br>$T_c = 25^\circ\text{C}$ , DC test | $R_{\theta JC}$ | 5     | °C/W |

**Table 3. Electrical Characteristics**

| Parameter                    | Condition       | Min | Typ | Max  | Unit |
|------------------------------|-----------------|-----|-----|------|------|
| Frequency Range              |                 | 100 |     | 7000 | MHz  |
| Power Gain @ Psat            |                 | 6   | 7   |      | dB   |
| $P_{SAT}$                    | 3dB compression |     | 39  |      | dBm  |
| Drain Efficiency @ $P_{SAT}$ |                 | 25  |     |      | %    |

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):**  $V_{DD} = 28\text{ V}$ ,  $I_{DQ} = 50\text{ mA}$ ,  $f = 3.5\text{ GHz}$ 

|                                         |                       |
|-----------------------------------------|-----------------------|
| VSWR 10:1 at P3dB pulse CW Output Power | No Device Degradation |
|-----------------------------------------|-----------------------|

## Reference Circuit of Test Fixture Assembly Diagram

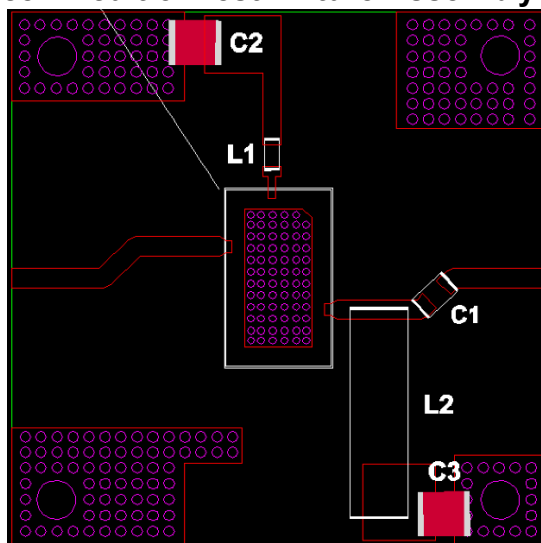


Figure 1. Test Circuit Component Layout

|       |                          | 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    | 1.3uH 4.2A Inductor      | 4310LC-132KEC       | Coilcraft |
| PCB   | RO4350B,20mil,er=3.48    |                     |           |

## TYPICAL CHARACTERISTICS

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

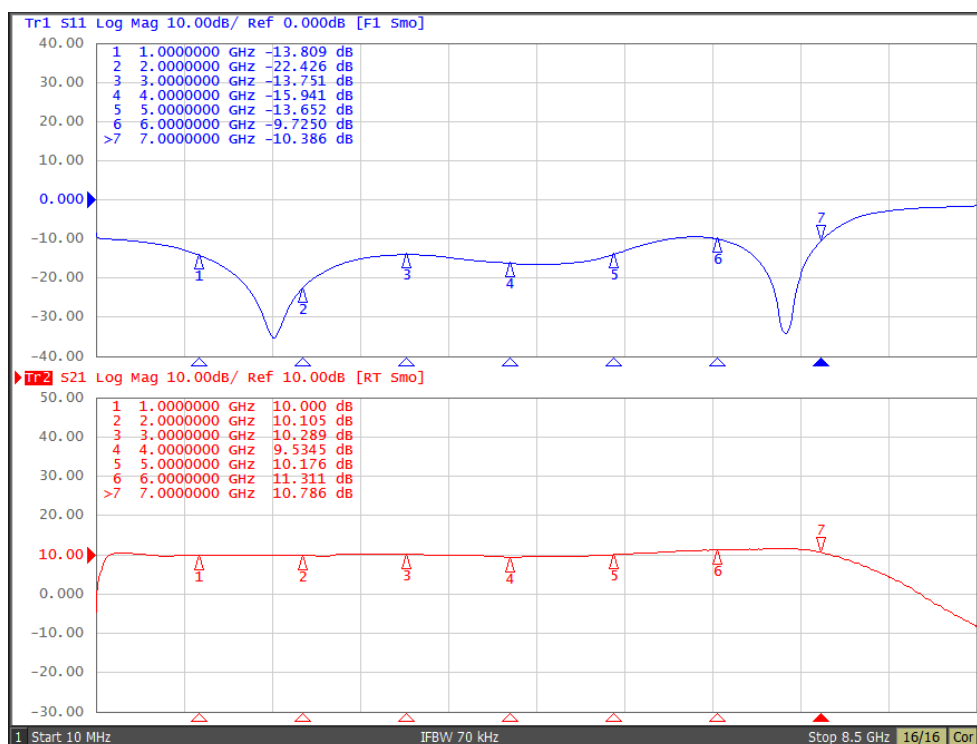
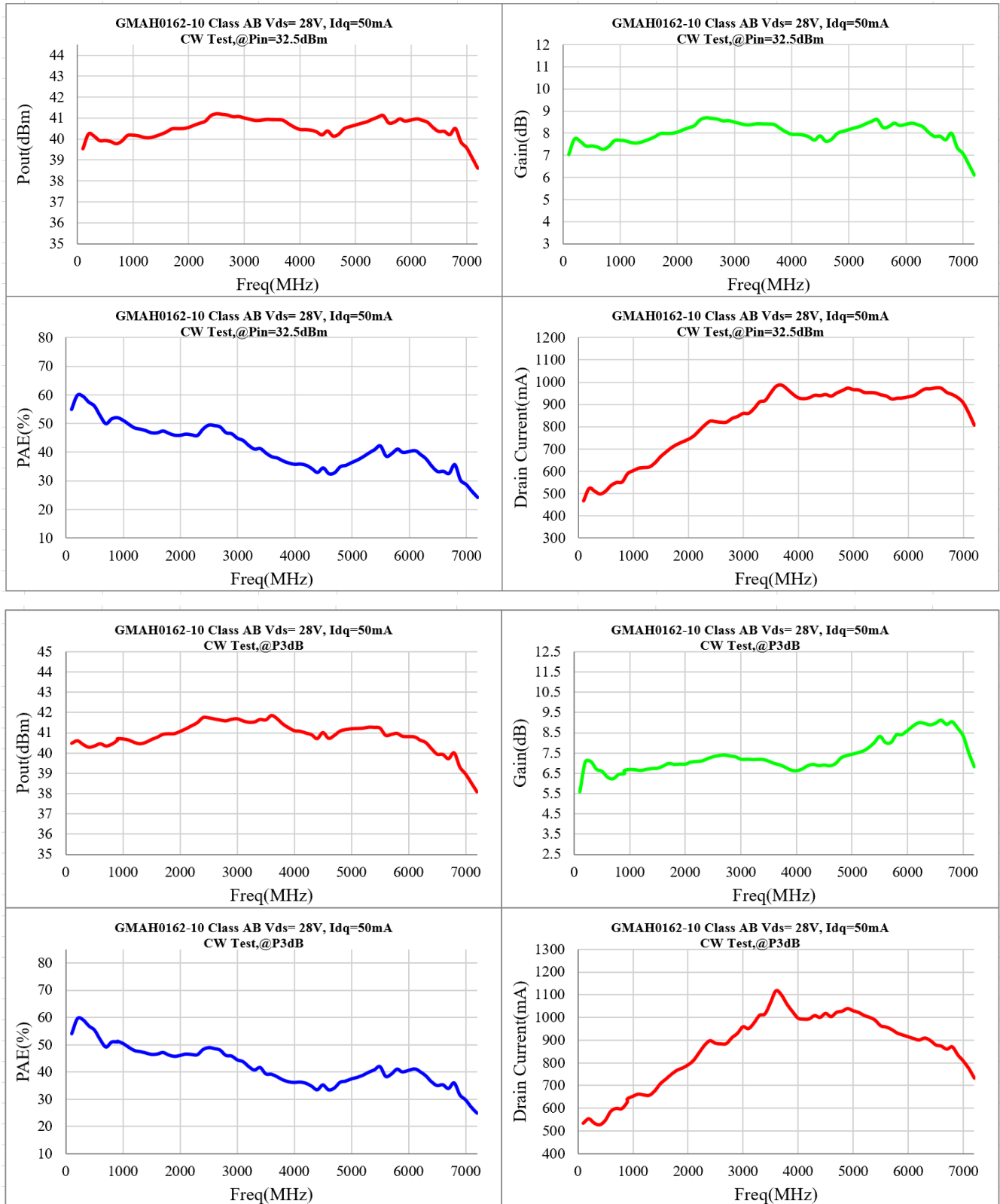


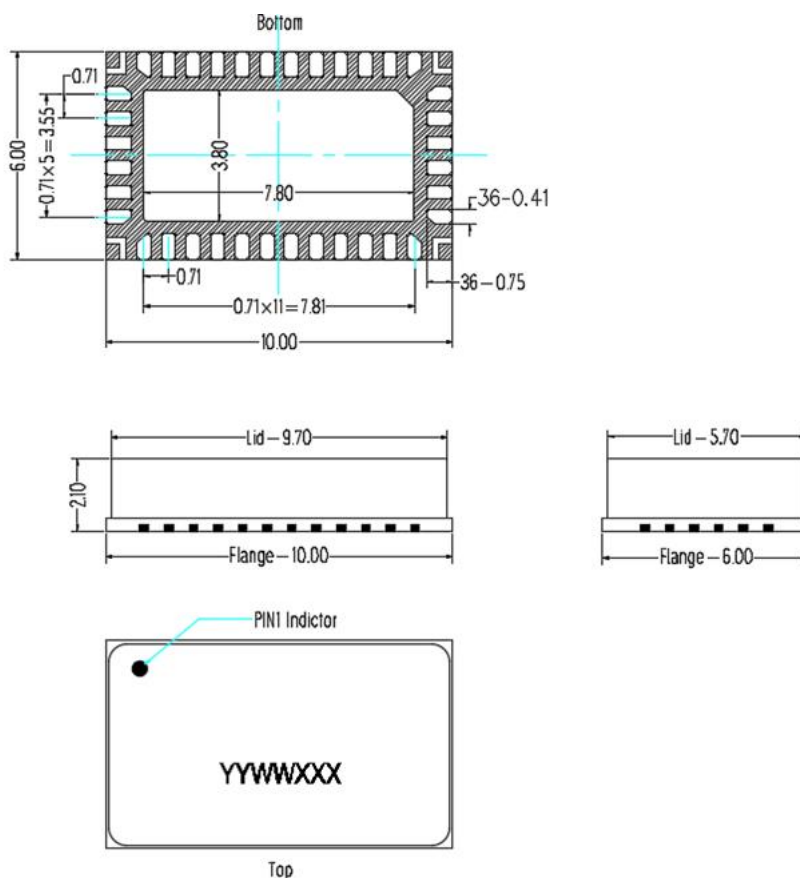


Figure 3. Power Gain and, efficiency and Pout @Pin=32.5dBm, P3dB vs. Frequency



## Package Dimensions

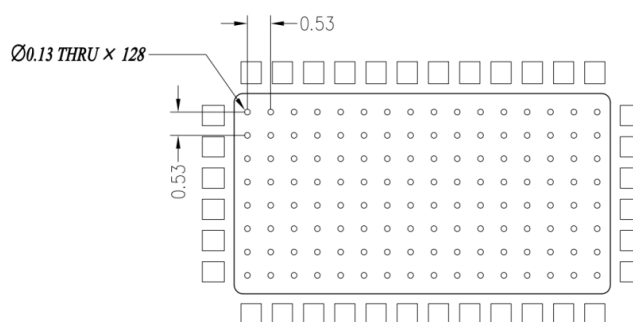
### 10\*6 Plastic Package



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     |
|-----------|----------|----------------------|
| 2025/6/27 | Rev 1.0  | Production Datasheet |
|           |          |                      |
|           |          |                      |

Application data based on ZHH-25-13

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