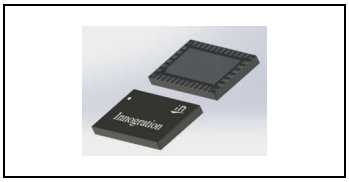
DC-6.5GHz, 2W, 28V GaN Fully matched PA Module



Description

The GMAH0065-2 is a 2-watt ,single stage integrated Power Amplifier Module, designed for broad band applications, with frequencies from DC to 6.5GHz. 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	0.5GHz	1.0GHz	2.0GHz	3.0GHz	4.0GHz	5.0GHz	6.0GHz	6.5GHz	Units
Small signal Gain	15.2	14.9	14.8	14.4	14.7	13.8	14.0	15.6	15.1	dB
Psat	4.3	4.5	4.6	3.9	4.1	3.2	3.1	2.5	3.3	W
Gain@Psat	12.2	11.9	11.8	11.4	11.7	10.8	11.0	12.6	12.1	dB
Eff@Psat	58	55	51	46	46	41	36	35	47	%

Vds=32V, Idq=10mA, CW

Parameter	30MHz	0.5GHz	1.0GHz	2.0GHz	3.0GHz	4.0GHz	5.0GHz	6.0GHz	6.5GHz	Units
Small signal Gain	15.3	14.9	15.1	14.5	14.5	14.0	14.2	15.9	15.6	dB
Psat	4.8	5.0	4.9	4.3	4.3	3.9	3.4	2.9	3.8	W
Gain@Psat	12.3	11.9	12.1	11.5	11.5	11.0	11.2	12.9	12.6	dB
Eff@Psat	54	51	47	43	40	41	34	34	45	%

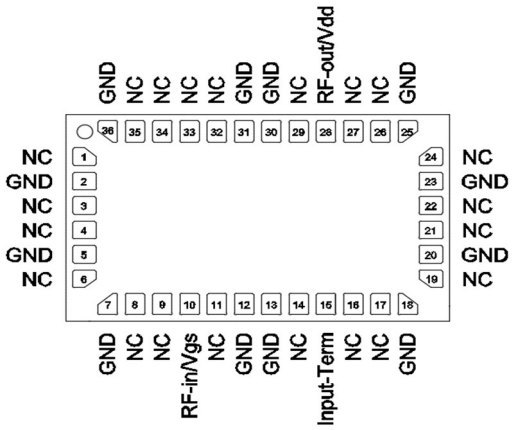
Product Features

- Operating Frequency Range: DC-6.5GHz
- Operating Drain Voltage: +28 V
- 50 Ω Input/Output
- P3dB: ⩾33 dBm
- Small signal gain:>13dB, Power gain:>10dB
- Minimum efficiency:>30%
- 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
28	RFout/Vdd	Transistor 1, Drain Bias & RF Output
10	RFin/Vgs	Transistor 1, RF Input &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_{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	$R_{\theta JC}$	5	°C/W

Table 3. Electrical Characteristics

Parameter	Condition	Min	Typ	Max	Unit
Frequency Range		30		6500	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 P3dB pulse CW Output Power	No Device Degradation

Reference Circuit of Test Fixture Assembly Diagram

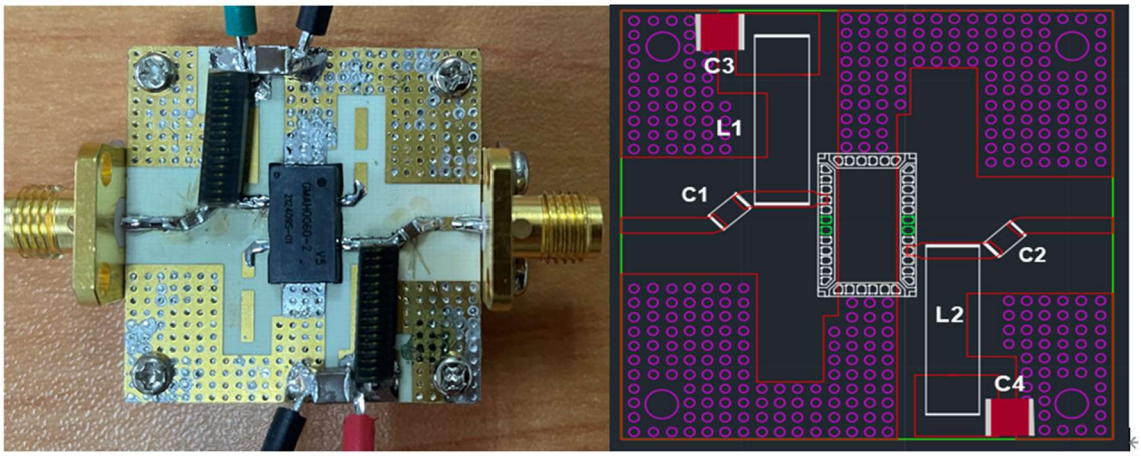


Figure 1. Test Circuit Component Layout

C3, C4	10uF 100V chip Capacitor
C1, C2	1uF Chip Capacitor
L1, L2	1.3 uH 4.2A Inductor
PCB	R04350B, 20mil, er=3.48

TYPICAL CHARACTERISTICS

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

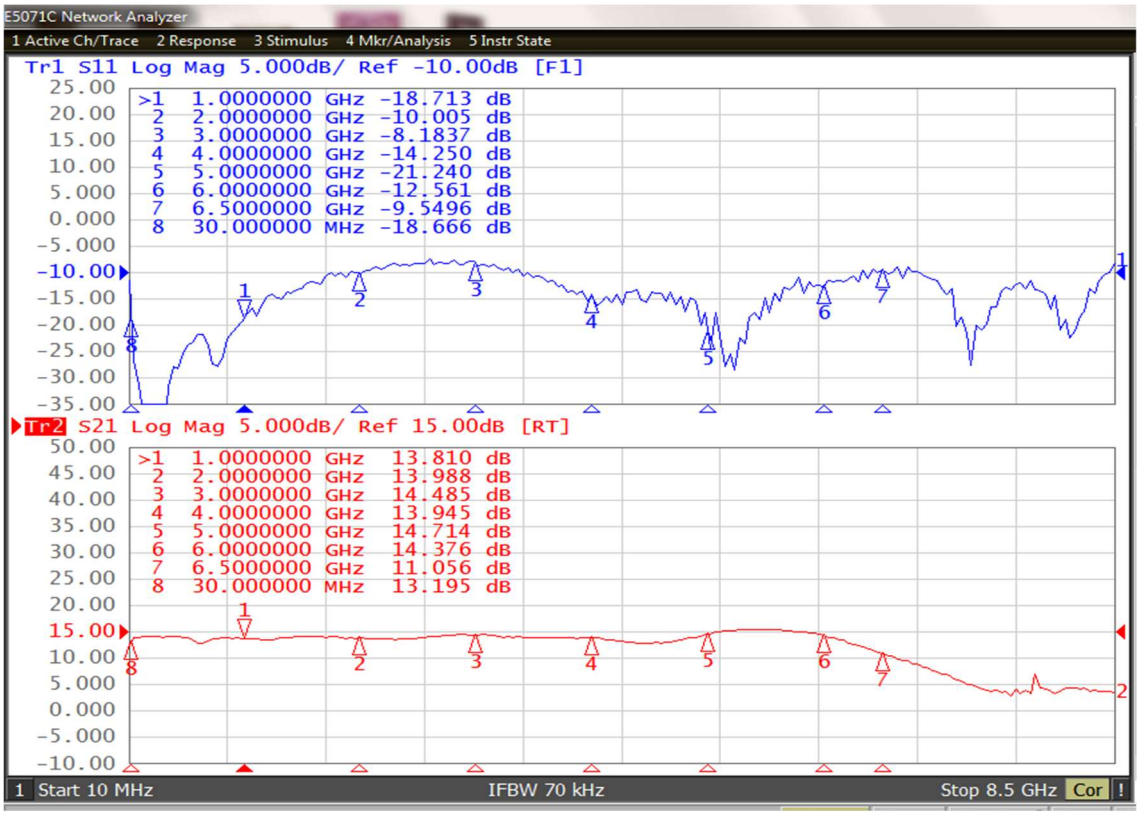
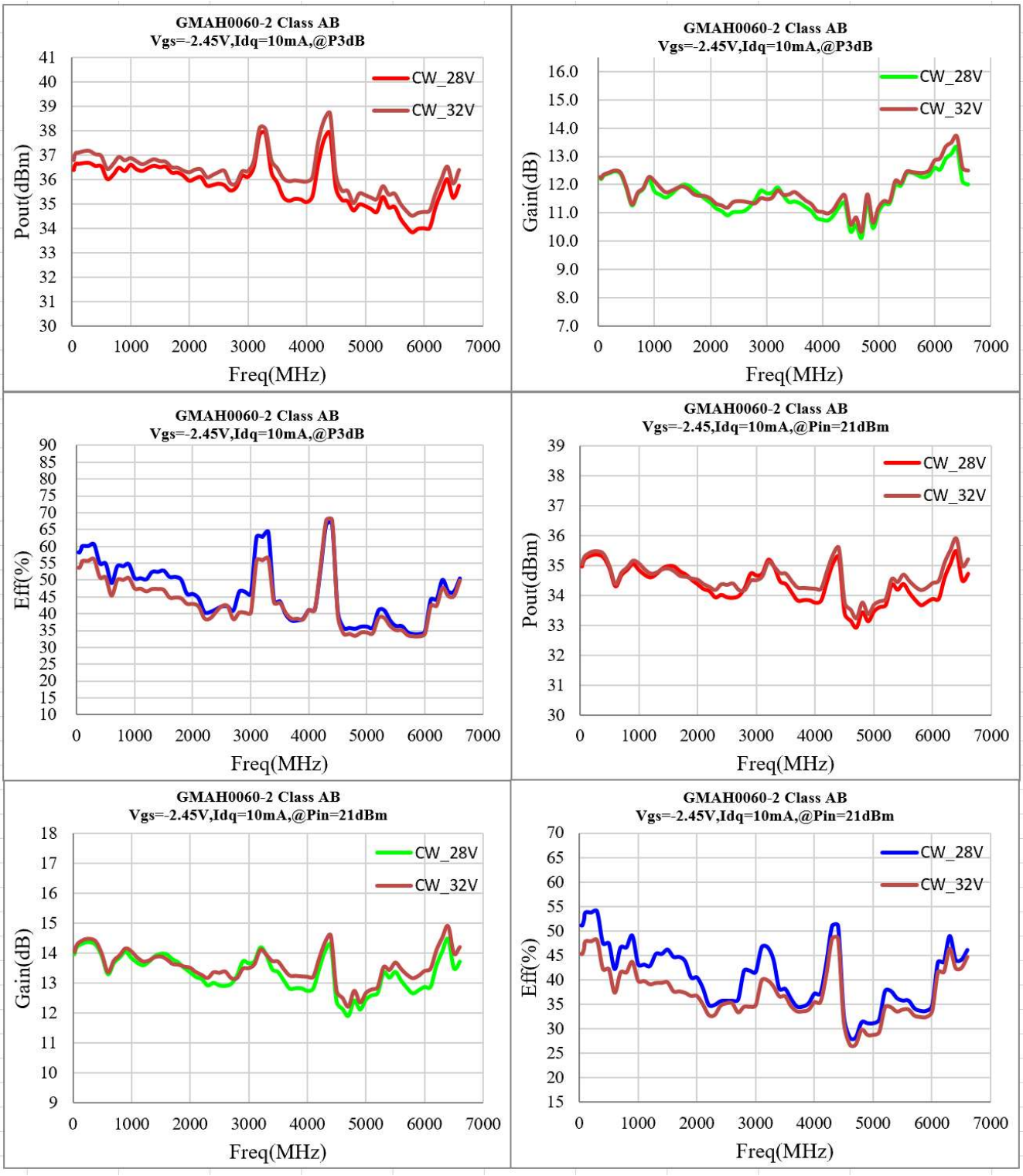
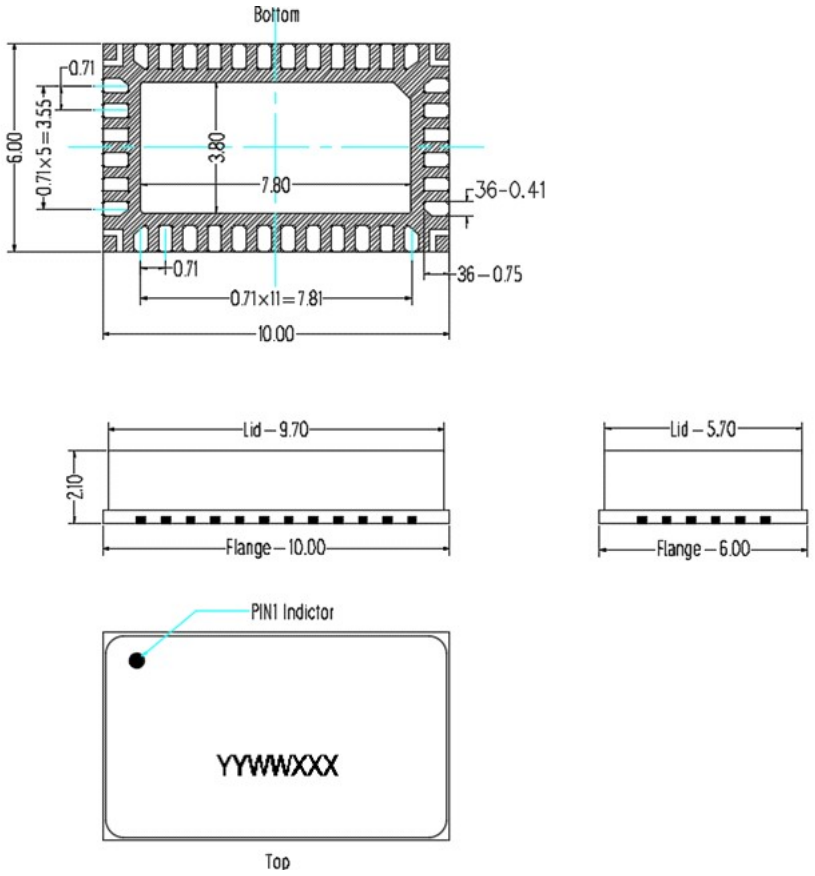


Figure 3. Psat, Power Gain and, efficiency and Pout @Pin=21dBm vs. Frequency



Package Dimensions

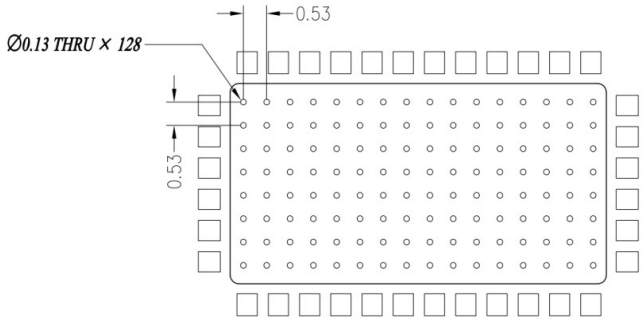
10*6 Plastic Package



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-21-10

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