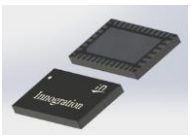
0.1-8.0GHz,2 stages, 2W, 28V GaN Fully matched PA Module



Description

The G2MAH0180-2 is a 2watt ,2 stage integrated Power Amplifier Module, designed for broad band applications, **frequencies tunable from 100MHz to 8.0GHz with different bias conditions** . 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, Idq1=10 mA, Idq2=10 mA CW **with different drain bias inductors**

Output Bias DC feed Inductor L4: BCR-531JLC 530nH

Parameter	0.1GHz	1.0GHz	2.0GHz	3.0GHz	4.0GHz	5.0GHz	6.0GHz	7.0GHz	8.0GHz	Units
Linear Gain	27.0	24.3	23.5	21.5	20.8	20.7	20.4	19.5	19.3	dB
Gain@Pin=16dBm	20.8	21.3	20.2	19.4	19.2	18.3	17.3	17.3	16.5	dB
Pout@Pin=16dBm	4.1	5.4	4.2	3.5	3.3	2.7	2.1	2.2	2.2	W
Eff@Pin=16dBm	41	37	31	25	26	22	17	16	16	%

Output Bias DC feed Inductor L4: 1812SMS-R15GLC 150nH

Parameter	0.3GHz	1.0GHz	2.0GHz	3.0GHz	4.0GHz	5.0GHz	6.0GHz	7.0GHz	8.0GHz	Units
Linear Gain	25.8	23.9	23.2	21.3	20.0	21.4	21.1	18.4	19.0	dB
Gain@Pin=16dBm	21.5	21.3	20.3	18.9	18.8	18.6	17.4	17.3	16.4	dB
Pout@Pin=16dBm	5.7	5.4	4.3	3.1	3.0	2.9	2.2	2.1	1.7	W
Eff@Pin=16dBm	41	36	31	23	24	24	17	16	14	%

Output Bias DC feed Inductor L4: 0807SQ-10N_L_ 10nH

Parameter	0.5GHz	1.0GHz	2.0GHz	3.0GHz	4.0GHz	5.0GHz	6.0GHz	7.0GHz	8.0GHz	Units
Linear Gain	23.5	25.4	25.0	22.2	21.0	21.2	22.1	19.5	19.5	dB
Gain@Pin=16dBm	19.3	21.5	21.0	19.8	19.5	18.9	18.3	17.8	17.2	dB
Pout@Pin=16dBm	3.4	5.6	5.0	3.8	3.5	3.1	2.7	2.4	2.1	W
Eff@Pin=16dBm	23	40	37	27	27	24	19	19	15	%

Notice: Above inductors due to SRF difference, have significant cost difference, please make right choice for the band interested

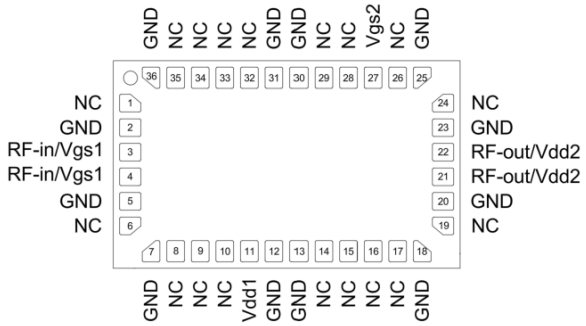
Product Features

- Operating Frequency Range: 0.1-8.0GHz
- Operating Drain Voltage: +28 V (Up to 32V)
- 50 Ω Input/Output
- Psat: ⩾33dBm @28V, ⩾34dBm @32V
- Small signal gain:>19dB, Power gain:>17dB @Pin=16dBm
- Minimum efficiency:>15%
- 6x10 mm Surface Mount Package

Applications

- Ultra Broadband Amplifiers
- Fiber Drivers
- Test Instrumentation
- EMC Amplifier Drivers
- 2-way Radios

Pin Configuration and Description



Top View

Pin No.	Symbol	Description
21,22	RFout/Vdd2	Transistor 1, Drain Bias2 & RF Output
3,4	RFin/Vgs1	Transistor 1, Gate Bias1 & RF Input
27	Vgs2	Transistor 1, Gate Bias2
11	Vdd1	Transistor 1, Drain Bias1
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
Input CW Power	RFin	22	dBm
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, FEA T_C= 25°C, DC test	$R_{\theta JC}$	7.5	°C/W

Table 3. Electrical Characteristics

Parameter	Condition	Min	Typ	Max	Unit
Frequency Range		100		8000	MHz
Power Gain		17			dB
P_{OUT}	Pin=16dBm		33		dBm
Drain Efficiency @ P_{SAT}		15			%
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_{DQ1+2} =10+10 mA, f = 3.5 GHz

VSWR 10:1 at pulse CW Output Power @Pin=16dBm	No Device Degradation

Reference Circuit of Test Fixture Assembly Diagram

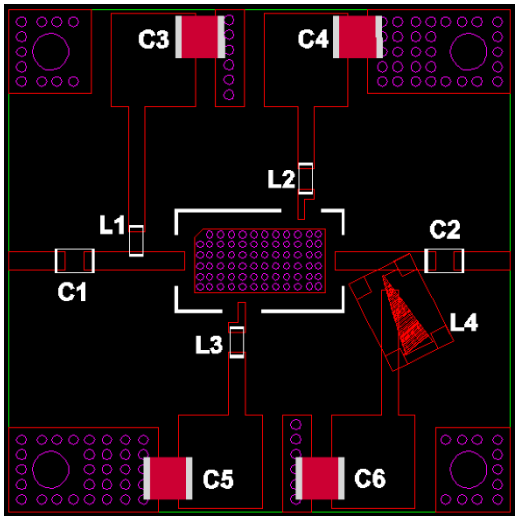


Figure 1. Test Circuit Component Layout

		Part NO.	Vendor
C1, C2	50V 1uF Chip Capacitor	GRM21BR71H105KA12L	muRata
C3,C4,C5,C6	10uF 100V Chip Capacitor	C5750X7S2A106M230KB	TDK
L1, L2,L3	470 nH Capacitor(0603)	LQW18CNR47J00D	muRata
L4	530 nH 1.06A Inductor 150nH 1.2A Inductor 10nH 2.7A Inductor	BCR-531JLC 1812SMS-R15GLC 0807SQ-10N_L_	Coilcraft
PCB	RO4350B,20mil,er=3.48		

TYPICAL CHARACTERISTICS

Figure 2. Network analyzer output S11/S21 (VDS= 28V, IDQ1=10 mA IDQ1=40 mA，Pin=0dBm)

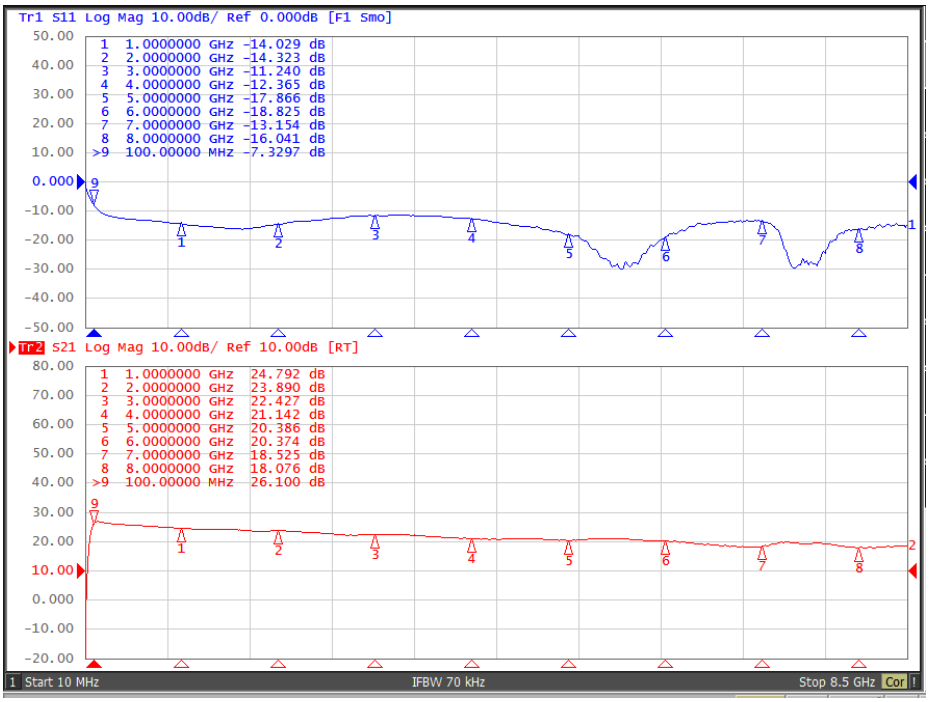
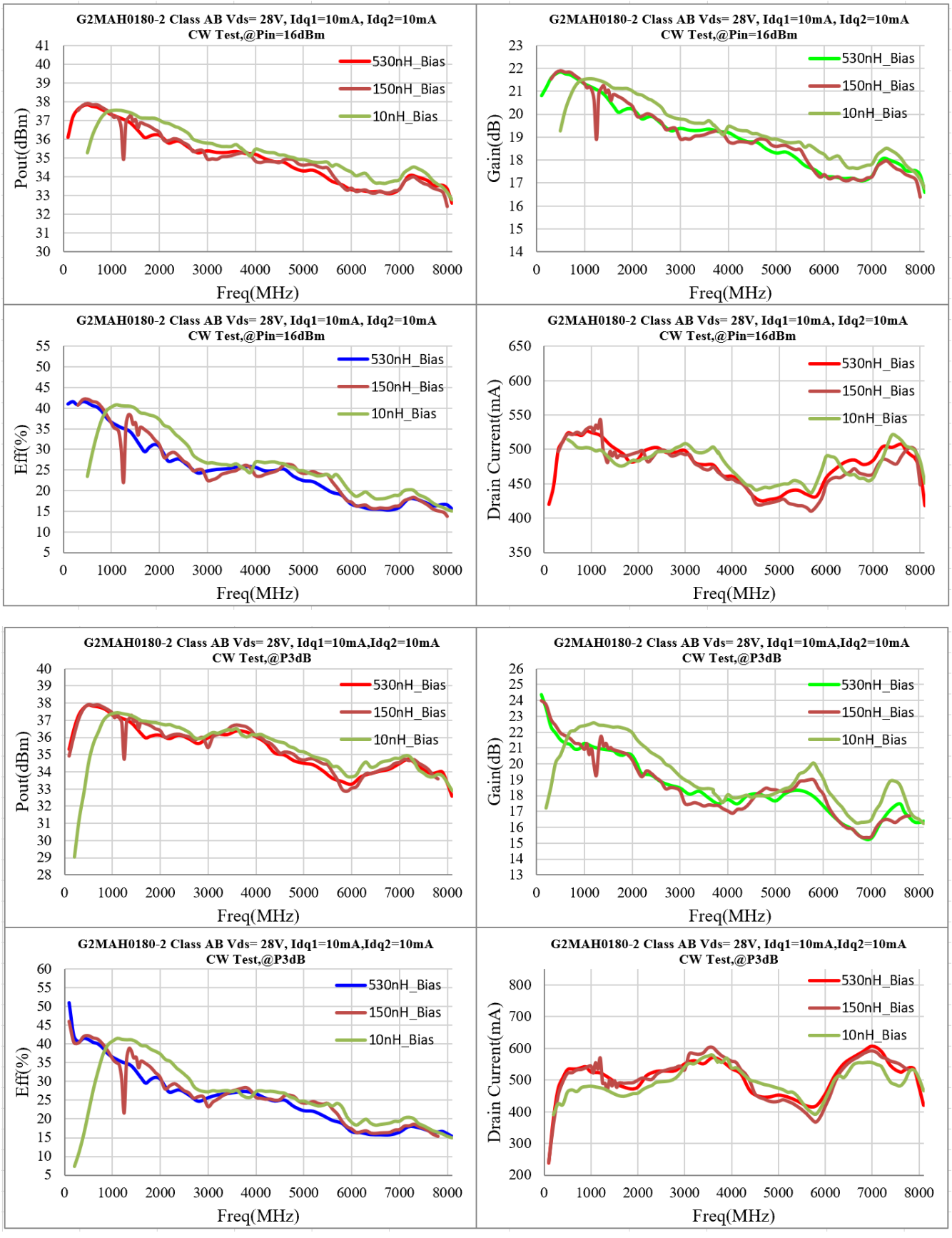
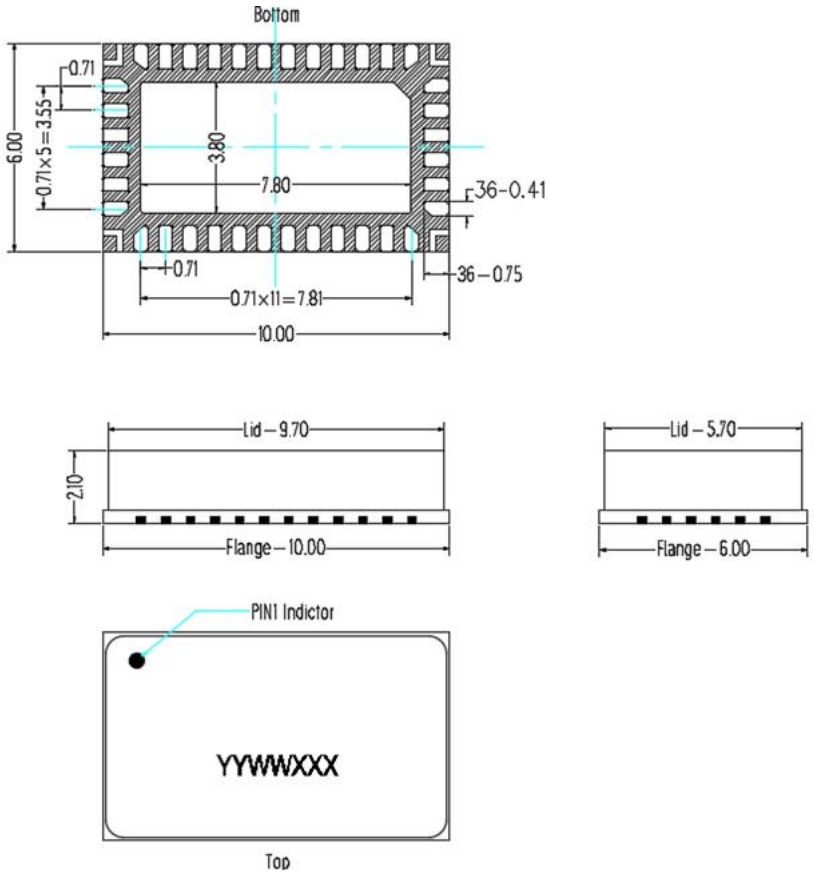


Figure 3. Power Gain and, efficiency and Pout @Pin=16dBm with L4=10nH, P4dB with L4=10&56nH vs. Frequency



Package Dimensions

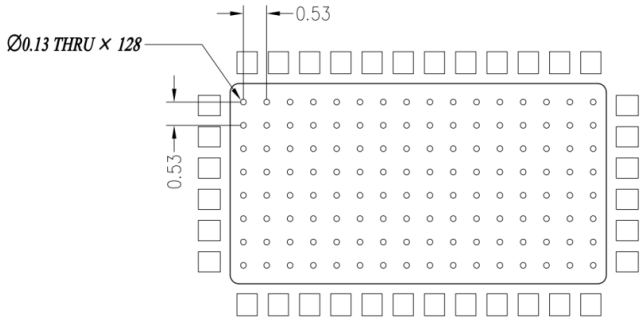
10*6 Plastic Package



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
2023/11/13	Rev 1.0	Preliminary Datasheet Creation

Application data based on ZHH-25-28

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