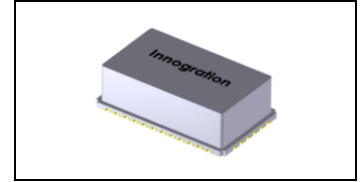




30MHz-700MHz, 20W, 28V GaN PA Module

Description

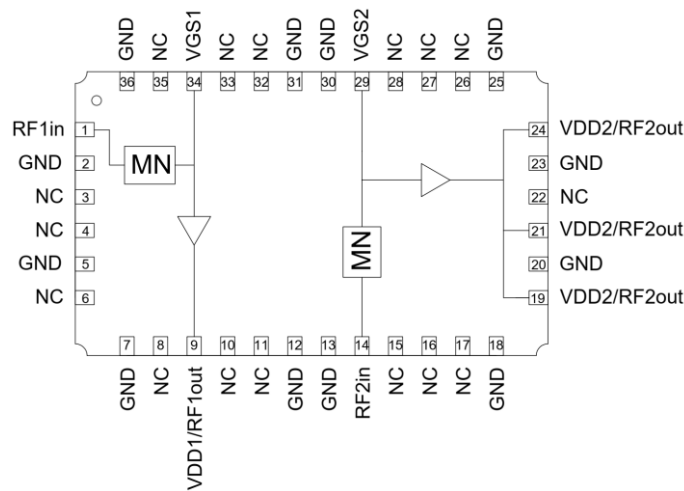
The GMAHR307-20B is a 20-watt peak power, integrated Power Amplifier Module, designed for broad band and broadcast applications, with frequencies from 30 to 700 MHz. The module is 50 Ω input and requires minimal external components. The module offers a much smaller footprint than traditional discrete component solutions.



Product Features

- Operating Frequency Range: 30 - 700 MHz
- Operating Drain Voltage: +28 V (Up to 32V)
- 50 Ω Input
- Gain at 6 W avg.: ≥ 34 dB
- Saturated Power: ≥ 43 dBm
- Single Ended Device
- 6x10 mm Surface Mount Package
- Compliant to Restriction of Hazardous Substances (RoHS) Directive 2002/95/EC

Pin Configuration and Description



Top View

Pin No.	Symbol	Description
9	VDD1/RF OUT	Transistor 1, Drain Bias & RF1 Output
34	VGS1	Transistor 1, Gate Bias
1	RF1 IN	Transistor 1, RF Input
19, 21, 24	VDD2/RF OUT	Transistor 2, Drain Bias & RF2 Output
29	VGS2	Transistor 2, Gate Bias
14	RF2 IN	Transistor 2, RF2 Input
3, 4, 6, 8, 10, 11, 15-17, 22, 26-28, 32, 33, 35	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}	+40	Vdc
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 $T_c=87^\circ\text{C}$, $T_j=175^\circ\text{C}$, DC test	$R_{\theta JC}$	TBD	°C/W

Table 3. ESD Protection Characteristics

Test Methodology	Class
Human Body Model(HBM) (JEDEC Standard JS-001-2012)	TBD
Charged Device Model (CDM) (JEDEC Standard JESD22-C101F)	TBD

Table 4. Electrical Characteristics

Parameter	Condition	Min	Typ	Max	Unit
Frequency Range		30		700	MHz
Power Gain @ $P_{out}=6\text{W Avg.}$	Driver + Final Stage		34		dB
P_{SAT}			45		dBm
Drain Efficiency @ P_{SAT}			55		%

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): $V_{DD}=28\text{ V}$, $I_{DQ}=130\text{ mA}$, $f = 0.7\text{ GHz}$

VSWR 10:1 at P3dB pulse CW Output Power	No Device Degradation
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Reference Circuit of Test Fixture Assembly Diagram

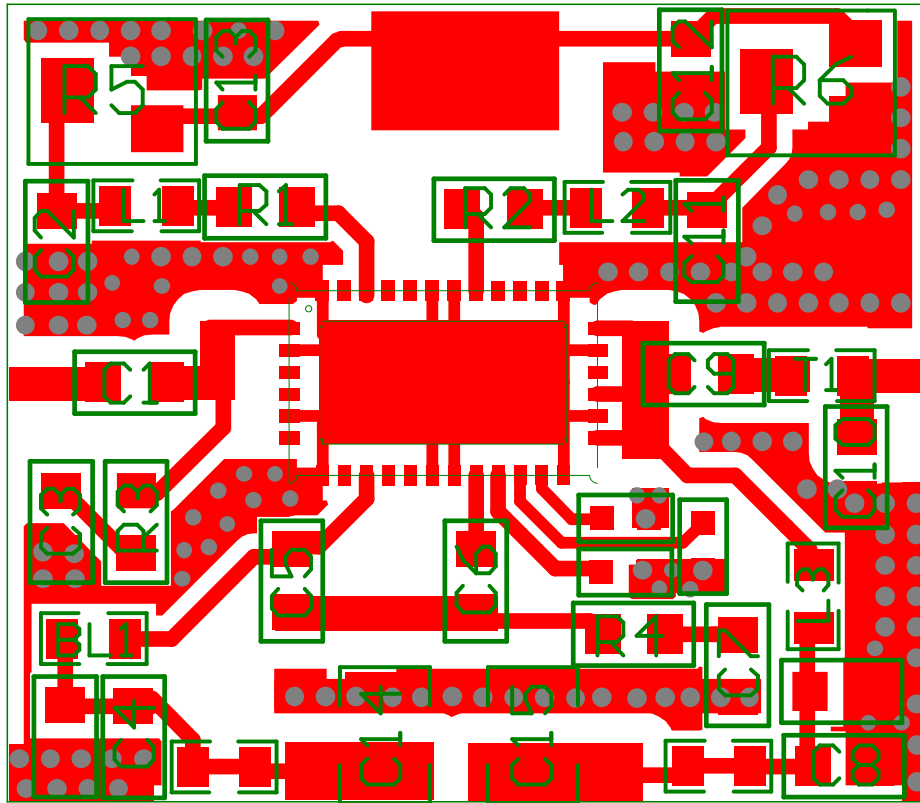


Figure 1. Test Circuit Component Layout

Table 5. Test Circuit Component Designations and Values

Part	description	Model
C1, C9	2.2NF	ATC800B
C5, C6	180PF	DLC70B
C2, C4, C8, C11	240pF	DLC70B
C3, C7, C12, C13	1NF	50V/1NF
C14, C15	10UF	50V/10UF
C10	3.9pF	DLC70B
R1, R2, R3, R4	36Ω	0603
R5, R6	5000Ω	3224W
L1, L2	33NH	0805
BL1	BLM MPZ 470R	1206
L3	100NH	线艺
T1	4:1 40mm	SF-86-50,BN-61-2402
PCB	0.508mm [0.020"] thick, εr=3.48, Rogers RO4350B, 1 oz. copper	



TYPICAL CHARACTERISTICS

Figure 2. Power Gain and Output Power vs. Frequency (Pin=15dBm)

Test Condition: Pulse CW, Pulse width=100us, Duty Cycle=10%

Drive Stage: VGS1=-2.08V, VDS1=12V, IDQ1=100mA

Output Stage: VGS2=-2.38V, VDS2=28V, IDQ2=130mA

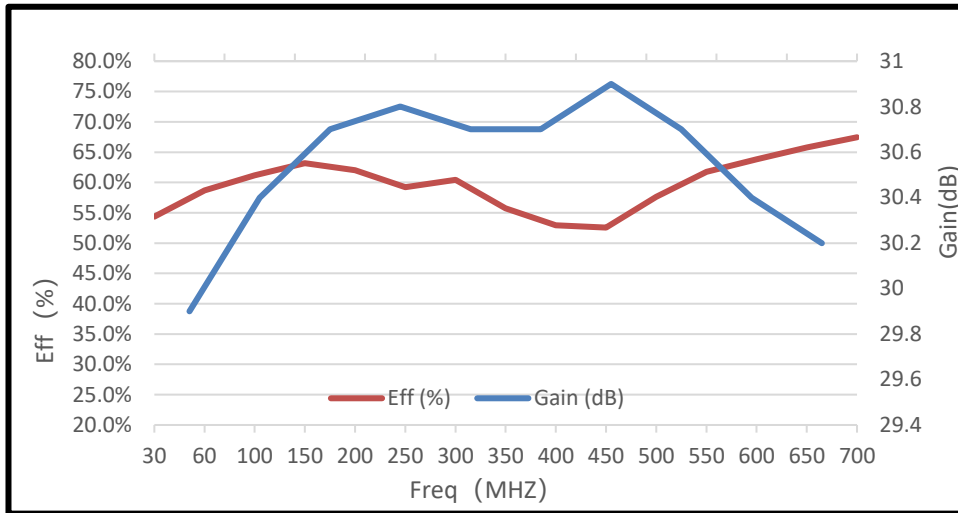
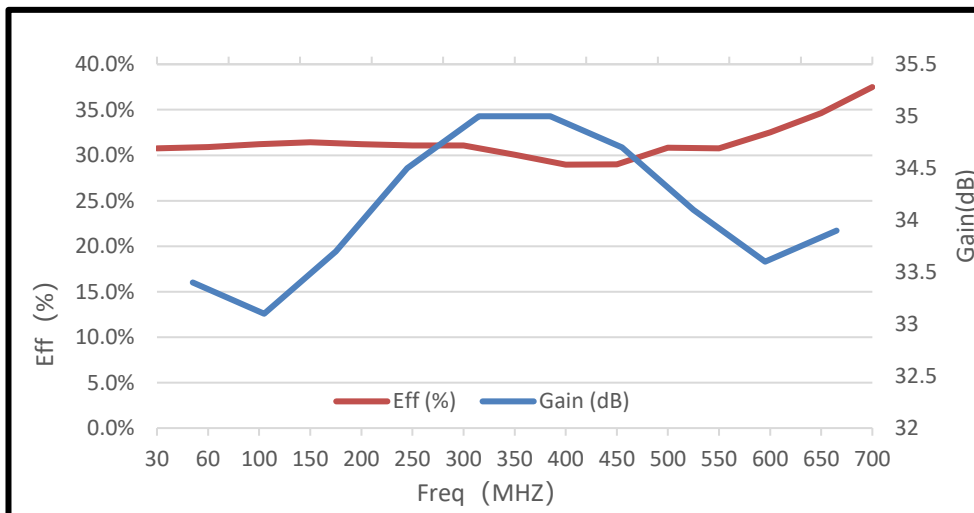


Figure 3. Power Gain and Added efficiency vs. Frequency at Pout=38dBm (WCDMA signal, PAR=5.6dB)

Test Condition:

Drive Stage: VGS1=-2.08V, VDS1=12V, IDQ1=100mA

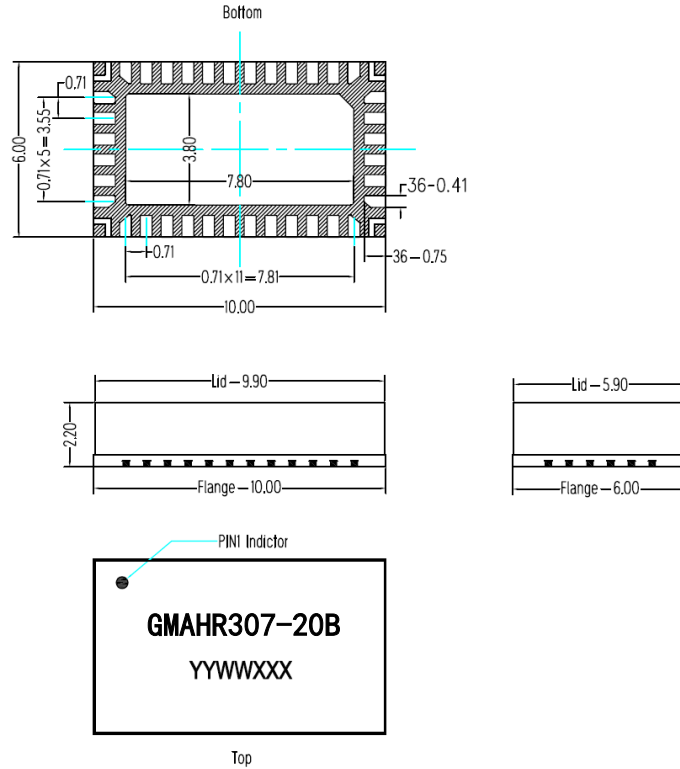
Output Stage: VGS2=-2.38V, VDS2=28V, IDQ2=130mA





Package Dimensions

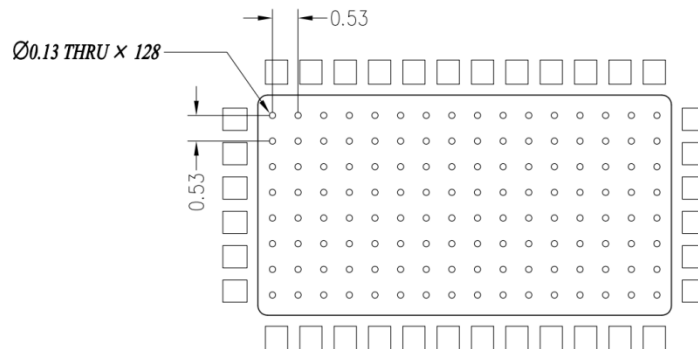
10*6 Ceramic QFN Package



Notes:

- 1. All dimensions are in mm;
- The tolerances unless specified are ± 0.2 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
2019/09/23	Rev 1.0	Preliminary Datasheet
2022/03/15	Rev 1.1	Preliminary Datasheet

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