

RMM2080

2-18 GHz Wideband Variable-Gain Driver Amplifier

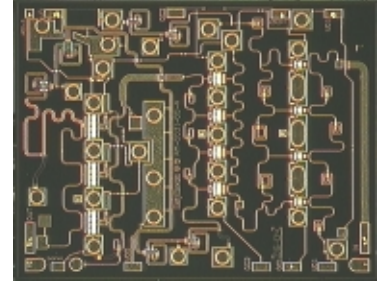
PRODUCT INFORMATION

Description

The Raytheon RMM2080 GaAs MMIC device is a three-stage distributed medium-power amplifier with gain control capability. The circuit incorporates ion-implanted, 0.5- μm gate MESFET devices fabricated on a semi-insulating GaAs substrate. The first two stages are 4-cell distributed amplifiers utilizing dual-gate FETs for improved gain per stage and to facilitate gain control (4x125 μm & 4x250 μm). The third stage is a 3-cell distributed dual-gate FET amplifier designed for high output power and efficiency (3x500 μm). The RMM2080 amplifier is designed for interconnection with microstrip transmission media using fully automatic assembly techniques.

Features

- ◆ 2-18 GHz Bandwidth
- ◆ 24 dB Typical Gain
- ◆ ± 2 dB Gain Flatness
- ◆ 20 dBm Output Power Typical
- ◆ Three Stages of Distributed Amplification
- ◆ Gain Control of up to 70 dB range
- ◆ Dual-Gate Ion-Implanted 0.5 μm FETs
- ◆ Chip Size: 4.14mm x 3.22mm x 0.1mm



Absolute Maximum Ratings

| Parameter | Symbol | Value | Unit |
|--|----------------------|------------|-----------------------------|
| Positive Drain DC Voltage (+7V typ) | Vd | +8 | V |
| Negative DC Voltage | Vg | -2 | V |
| Simultaneous (Vd-Vg) | Vgd | 10 | V |
| Positive DC Current | Id | 400 | mA |
| RF Input Power (from 50 Ω source) | P _{IN} (CW) | +8 | dBm |
| Operating Baseplate Temperature | T _{case} | -30 to 85 | $^{\circ}\text{C}$ |
| Storage Temperature Range | T _{storage} | -55 to 125 | $^{\circ}\text{C}$ |
| Thermal Resistance (channel to backside) | R _{jc} | 22 | $^{\circ}\text{C}/\text{W}$ |

Electrical Characteristics

(At 25 $^{\circ}\text{C}$)
 50 Ω system,
 Vd=+7 V,
 Quiescent current (Idq)
 =300 mA
 GC1, GC2= +1.5 V

| Parameter | Min | Typ | Max | Unit |
|---------------------------------------|-----|---------|-----|-------|
| Frequency Range | 2 | - | 18 | GHz |
| Gate Supply Voltage (Vg) ¹ | | -0.7 | | Volts |
| RF Output Power @ -1 dBc | | 20 | | dBm |
| Small Signal Gain | 18 | 24 | | dB |
| Gain Flatness vs. Freq. | | ± 2 | | dB |
| Input/Output Return Loss | | 7 | | dB |

| Parameter | Min | Typ | Max | Unit |
|--|-----|-----|------|-------|
| Gain Control Range | 70 | | | dB |
| Gain Control Voltage, GC1&2 ² | -5 | | +1.5 | Volts |

Notes:

1. Typical range of the negative gate voltage is -0.9 to 0.0V to set typical Idq of 300 mA.
2. GC1 and GC2 of +1.5V and VG23=open corresponds to maximum gain and power.

Characteristic performance data and specifications are subject to change without notice.

RMM2080

2-18 GHz Wideband Variable-Gain Driver Amplifier

Figure 1
Block Diagram and
Circuit Schematic

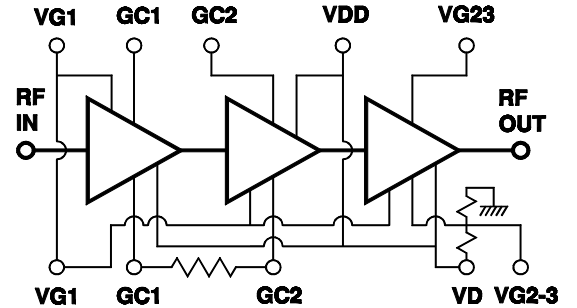
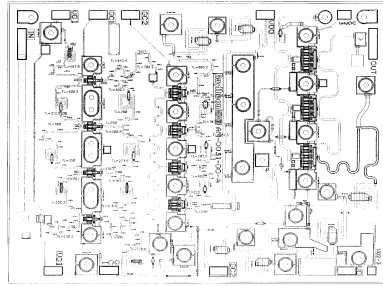
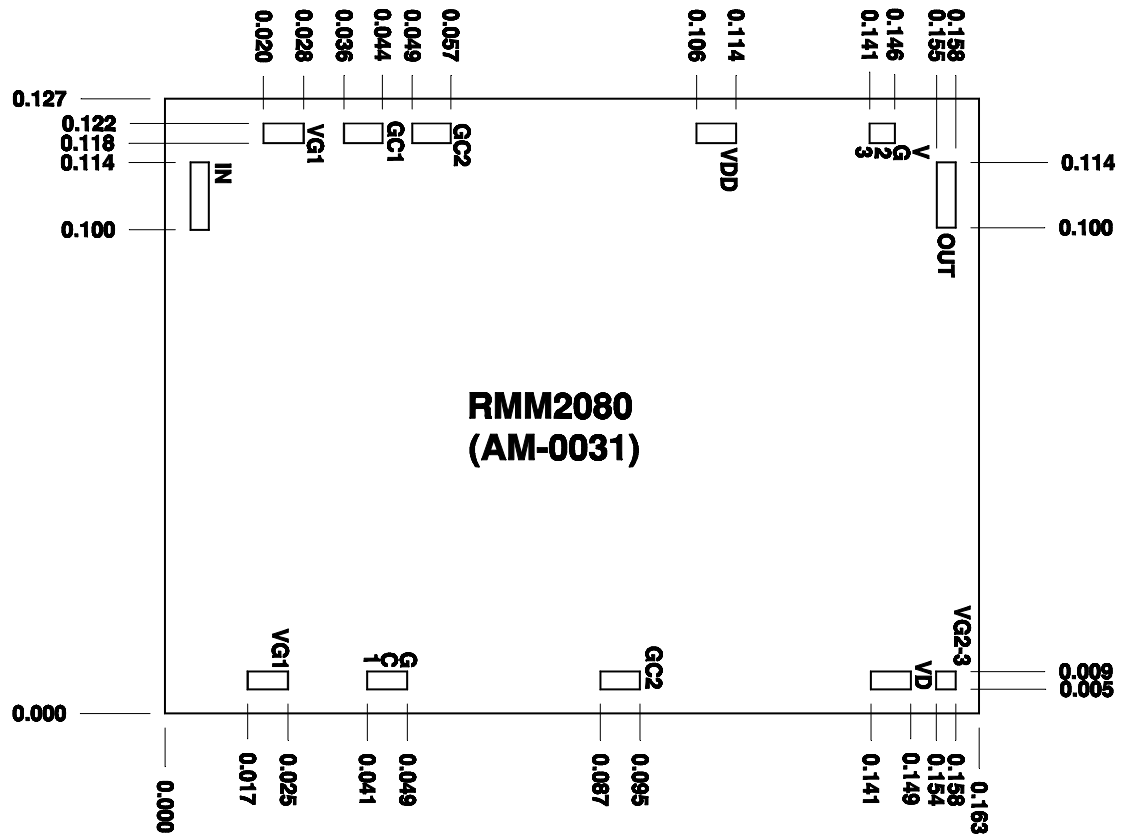


Figure 2
Location and Size of
Bonding Pads

Dimensions in inches

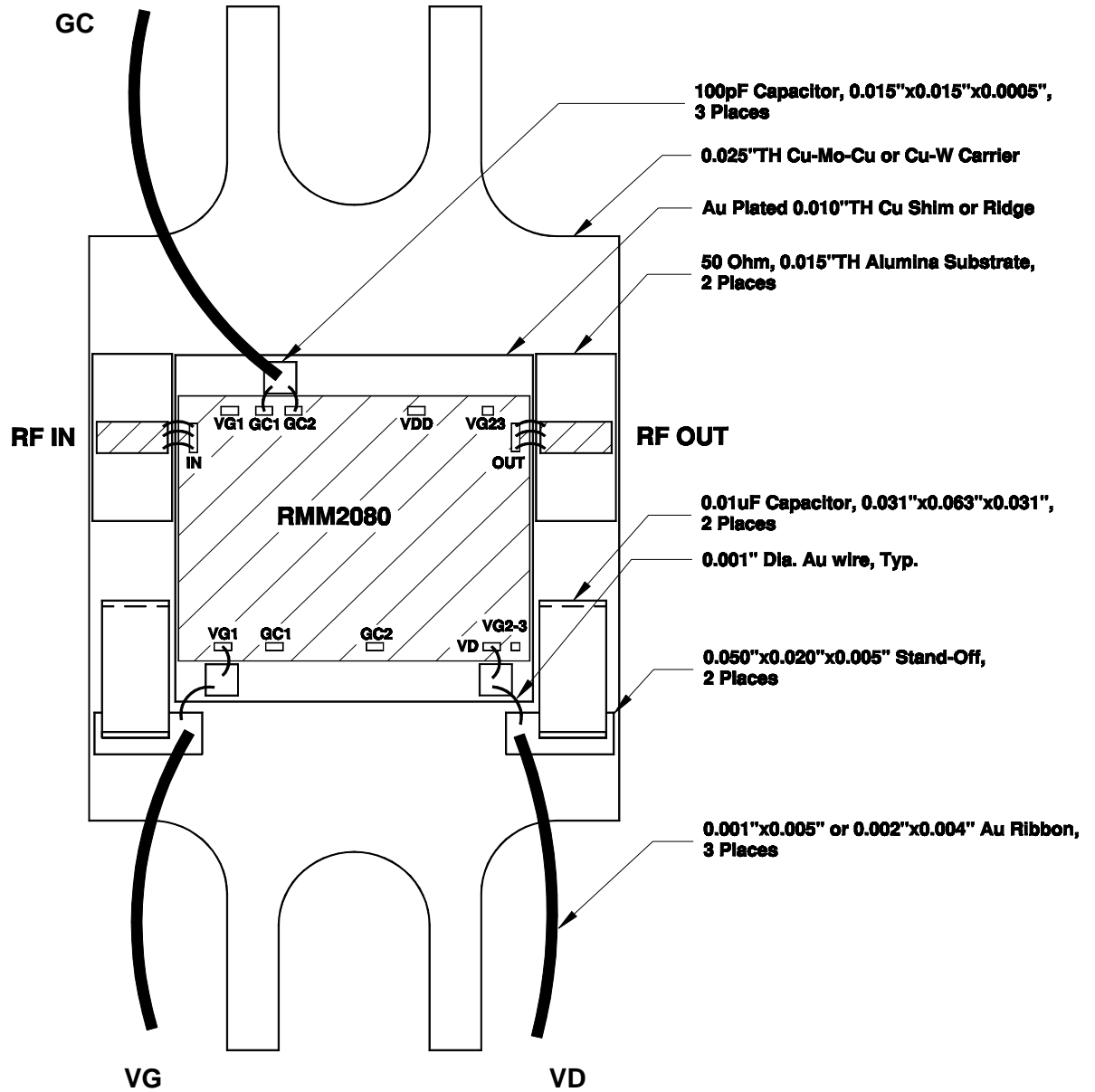


Characteristic performance data and specifications are subject to change without notice.

RMM2080

2-18 GHz Wideband Variable-Gain Driver Amplifier

Figure 3
Example of
Assembled Module



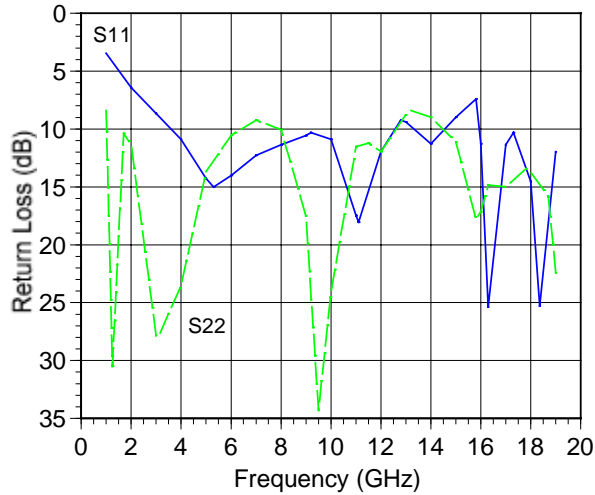
Characteristic performance data and specifications are subject to change without notice.

RMM2080

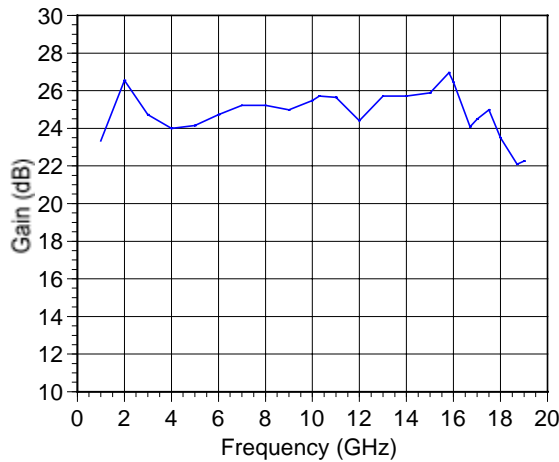
2-18 GHz Wideband Variable-Gain Driver Amplifier

Performance Data

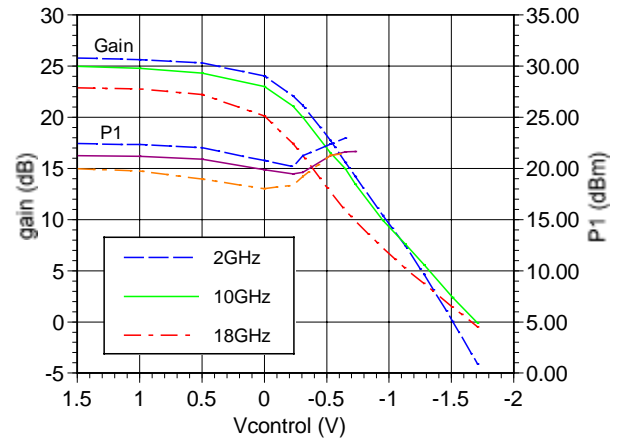
Input & Output Return Loss
Vd=7.0V, Id=0.3A, GC1,2=1.5V



Small Signal Gain
Vd=7.0V, Id=0.3A, GC1,2=1.5V



Gain & Pout vs, Control Voltage
Vd=7.0V, Id=0.3A @ GC1,2=1.5V



The above data is derived from fixtured measurements which include 3 parallel, 1 mil diameter, 15 mil long, gold bond wires connected to the RF input and output.
 The Id @ 1 dB compression increases to approximately 0.45 A. The dc supply should be able to support the required current to achieve the above performance.

Characteristic performance data and specifications are subject to change without notice.