FAIRCHILD SEMICONDUCTOR®

May 2004

RMM2080

2-18 GHz Wideband Variable-Gain Driver Amplifier

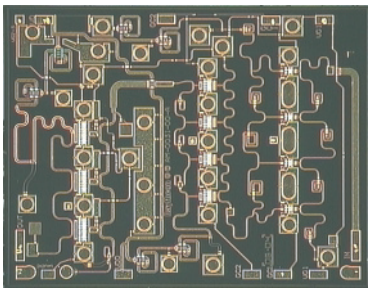
General Description

The Fairchild Semiconductor's 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 (4x125µm & 4x250µm). The third stage is a 3-cell distributed dual-gate FET amplifier designed for high output power and efficiency (3x500µm). The RMM2080 amplifier is designed for interconnection with microstrip transmission media using fully automatic assembly techniques.

Features

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

Device



Absolute Ratings

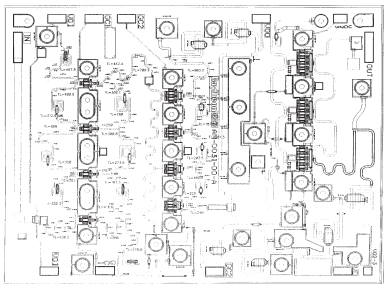
Symbol	Parameter	Ratings	Units
Vd	Positive Drain DC Voltage (+7V Typ)	+8	V
Vg	Negative DC Voltage	-2	V
Vgd	Simultaneous (Vd-Vg)	10	V
Id	Positive DC Current	400	mA
P_{IN}(CW)	RF Input Power (from 50Ω source)	+8	dBm
T_{CASE}	Operating Baseplate Temperature	-30 to +85	°C
$T_{STORAGE}$	Storage Temperature Range	-55 to +125	°C
R_{JC}	Thermal Resistance (Channel to Backside)	22	°C/W

Electrical Characteristics (at 25°C)

50Ω system, Vd = +7V, quiescent current (Idq) = 300 mA, GC1, GC2 = +1.5V

Parameter	Min	Typ	Max	Units
Frequency Range	2	–	18	GHz
Gate Supply Voltage (Vg)[1]		-0.7		V
RF Output Power @ -1dB		20		dBm
Small Signal Gain	18	24		dB
Gain Flatness vs. Freq.		±2		dB
Input/Output Return Loss		7		dB
Gain Control Range	70			dB
Gain Control Voltage, GC1&2[2]	-5		+1.5	V

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.



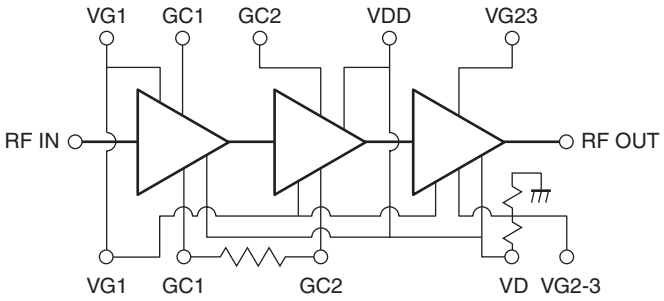


Figure 1. Block Diagram and Circuit Schematic

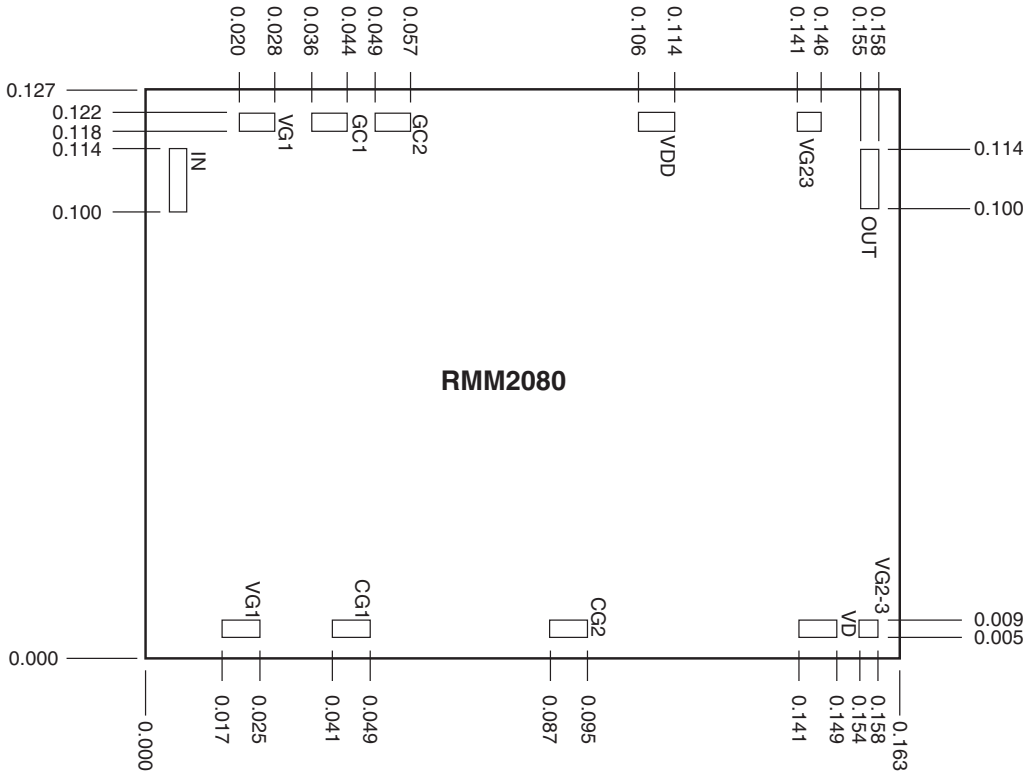


Figure 2. Location and Size of Bonding Pads (Dimensions in Inches)

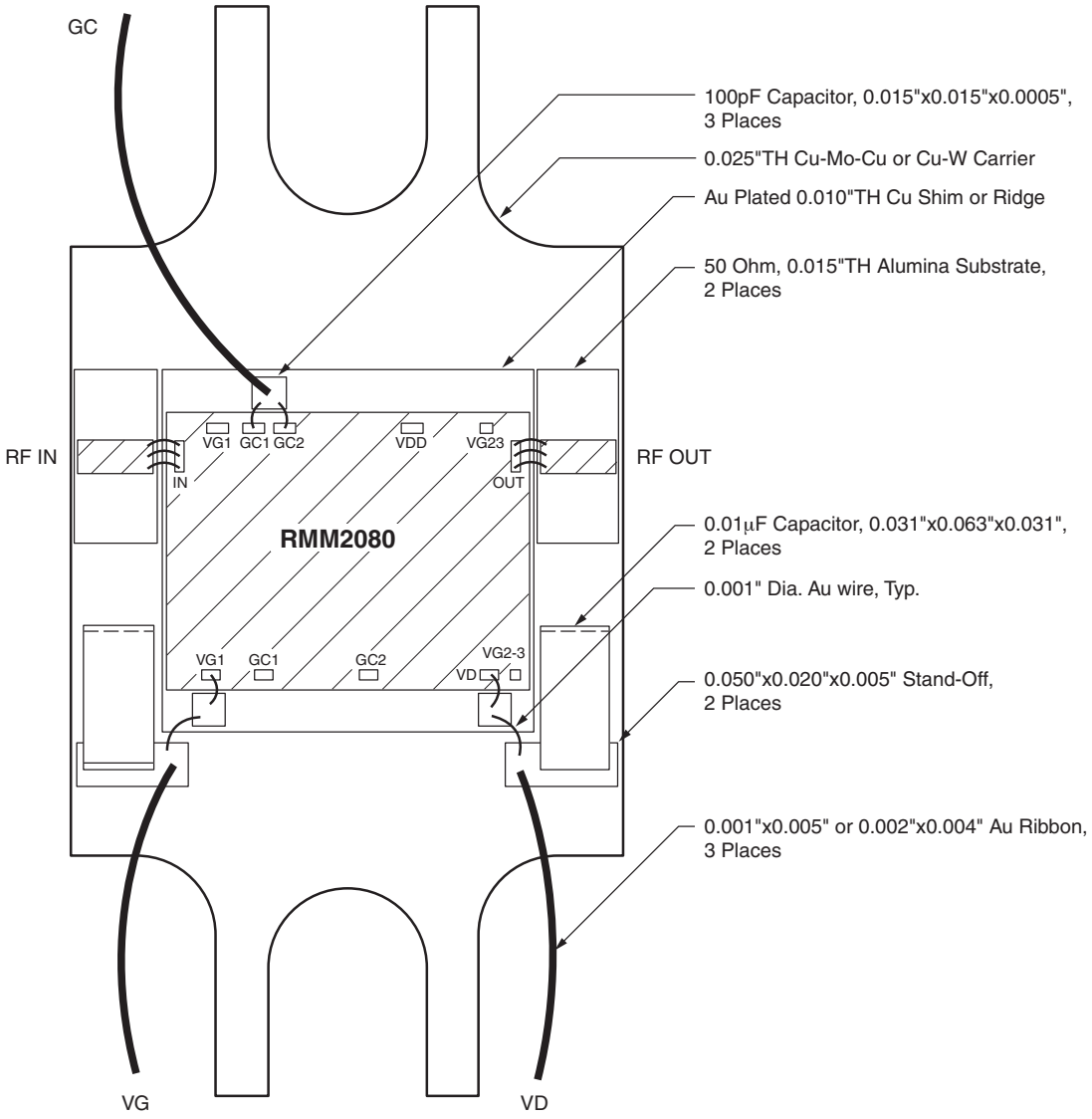
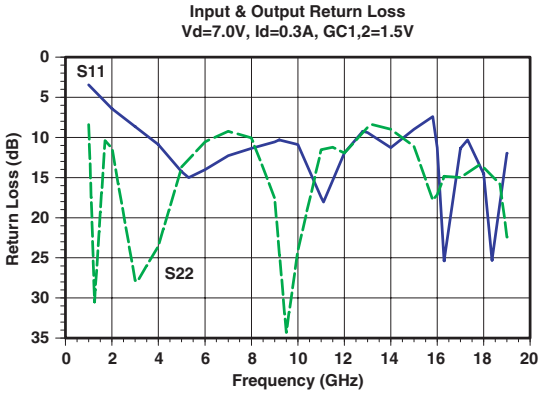
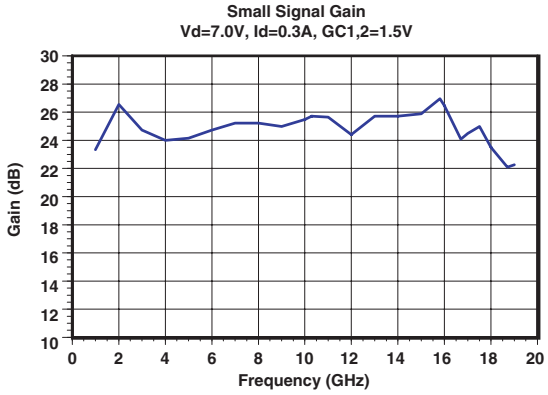
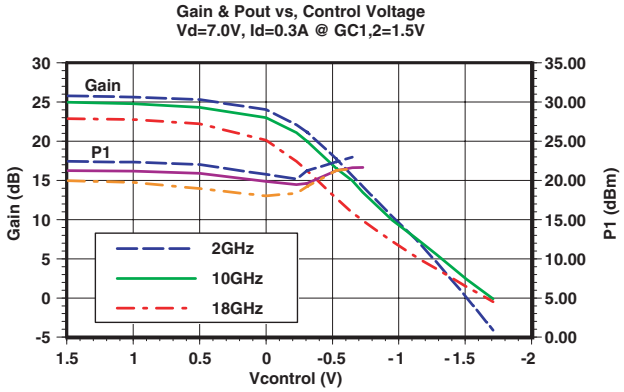


Figure 3. Example of Assembled Module

Performance Data







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 @ 1dB compression increases to approximately 0.45 A. The dc supply should be able to support the required current to achieve the above performance.

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E²CMOS™	I²C™	MSXPro™	RapidConfigure™	TruTranslation™
EnSigna™	*i-Lo*™	OCX™	RapidConnect™	UHC™
FACT™	ImpliedDisconnect™	OCXPro™	µSerDes™	UltraFET®
FACT Quiet Series™		OPTOLOGIC®	SILENT SWITCHER®	VCX™
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The Power Franchise®		PACMAN™	SPM™	
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