

Vector Modulator, 925 to 960 MHz

**MAMDCC0005
V1**

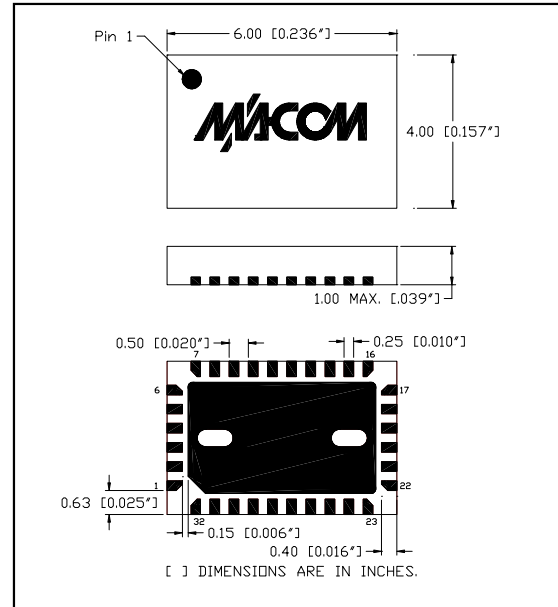
CSP-6

Features

- Operates 925 to 960 MHz
- Chip Scale Package.
- Low Amplitude Ripple
- Linear Phase
- 50 Ohm Nominal Impedance
- Continuously Variable Across a Full 360 degree range
- Test Boards to be Available

Description

M/A-COM's MAMDCC0005 is a Vector Modulator that significantly reduces the required board space compared to hybrid solutions. The monolithic passive elements will lead to greater repeatability lot-to-lot. Low amplitude ripple will provide superior performance. High intercept and compression points will contribute to more linear system performance. MAMDCC0005 is ideally suited for wireless infrastructure applications. M/A-COM's MADRCC0002 Dual Linearizer is designed to simplify the control of Vector Modulators. See Figure 1 and App Note AN3001.



Electrical Specifications: $T_A = +25^\circ\text{C}$

Parameter	Test Conditions	Frequency	Units	Min	Typical	Max
Impedance	—	—	Ohms	—	50	—
Reference Loss	$Z = 50\Omega$	925—960 MHz	dB	-14.5	—	-11.5
Attenuation Range	$Z = 50\Omega$ Above Reference Loss	925—960 MHz	dB	10	—	—
Phase Shift Range	$Z = 50\Omega$, Over minimum Attenuation Range	925—960 MHz	deg	0	—	360
Amplitude Ripple	$Z = 50\Omega$ Ref Loss to 10 dB above Ref Loss	925—960 MHz	dB	—	± 0.05	± 0.15
Deviation from Lin- ear Phase	$Z = 50\Omega$ Ref Loss to 10 dB above Ref Loss	925—960 MHz	deg	—	—	± 0.75
Return Loss-Input	Ref Loss 5 to 10 dB above Ref Loss	925—960 MHz	dB	12	16	—
Return Loss-Output	Ref Loss	925—960 MHz	dB	8.5	16	—
	5 dB	925—960 MHz	dB	11.5	18	—
	10 dB	925—960 MHz	dB	14	18	—
Input IP_3	Over 10 dB Attenuation Range	925—960 MHz	dBm	—	+41	—
Input P_{1dB}	Over 10 dB Attenuation Range	925—960 MHz	dBm	—	+29	—
Noise Figure	Over 10 dB Attenuation Range	925—960 MHz	dB	—	—	Note 1
Switching Speed	50% Control to 10%/90% RF	—	ns	—	1000	—
I Supply	—	—	mA	—	—	25

1. Noise figure is approximately equal to the absolute attenuation.

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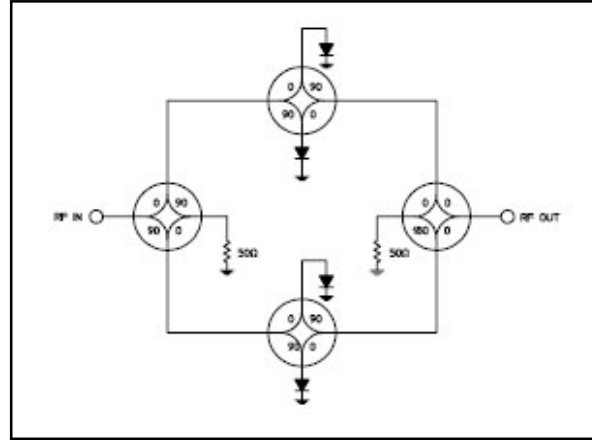
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Absolute Maximum Ratings ²

Parameter	Absolute Maximum
Max. Input Power 0.8 to 1.1 GHz Other Frequencies	+30 dBm +24 dBm
DC Voltages ³ Vbias1 or Vbias2	+1.0V
DC Current	50 mA Max per Bias
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +125°C

2. Operation of this device above any one of these parameters may cause permanent damage.
3. Note that external dropping resistors are required to limit the current and voltage on the PIN diodes.

Schematic



Pad Configuration

Pin #	Function	Pin #	Function
1	NC	17	NC
2	NC	18	NC
3	NC	19	NC
4	NC	20	NC
5	NC	21	NC
6	NC	22	NC
7	NC	23	NC
8	NC	24	Bias 2B
9	Bias 1A	25	NC
10	NC	26	GND
11	GND	27	RF OUT
12	RF IN	28	GND
13	GND	29	NC
14	NC	30	Bias 1B
15	Bias 2A	31	NC
16	NC	32	NC

Recommended PCB Layout

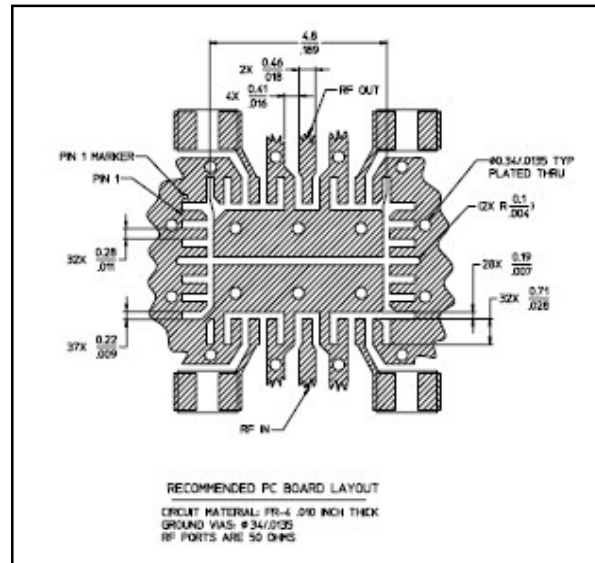


Figure 1A - Phase and Attenuation of MAMDCC0005, Vector Modulator Linearized with MADRCC0005 Dual Linearizer

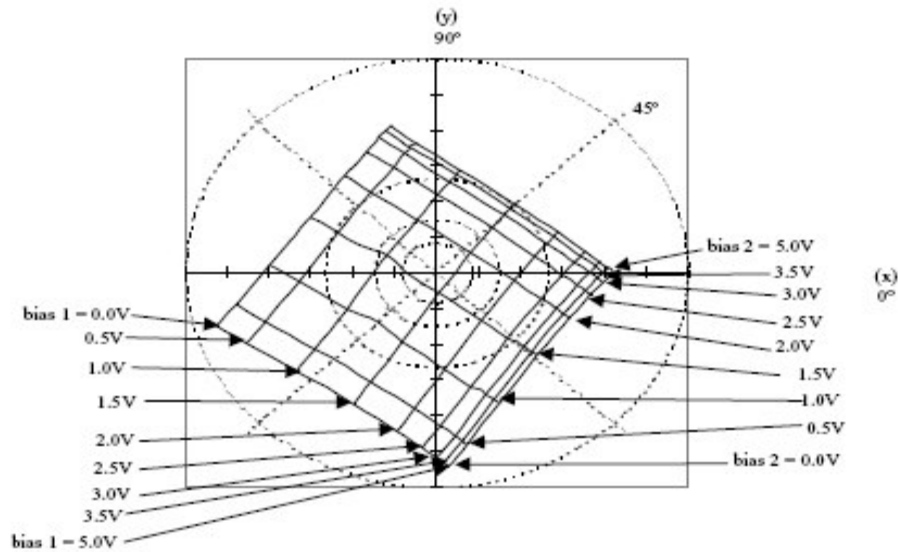
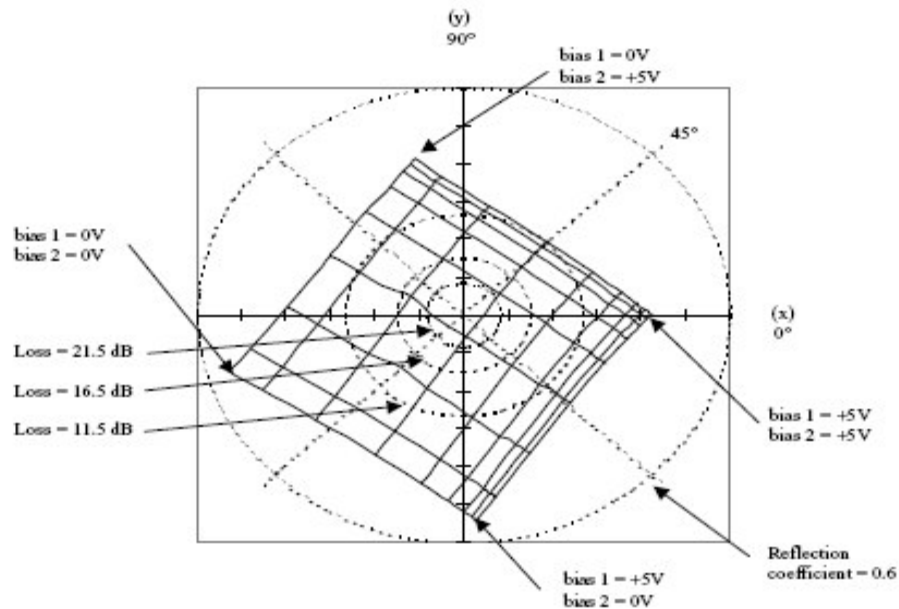


Figure 1B



4. Tic marks on x,y axes refer to reflection coefficient in increments of 0.1V. Reflection coefficients vary from -0.5 to +0.5 on both the x and y axes.
5. Data is for vector modulators driven by linearizers. See Application Note AN3001.
6. Inputs to the linearizers vary from 0 to 5V.
7. The phase with the inputs to both linearizers set to +5V is arbitrarily called zero degrees.

Figure 2A - Phase and Attenuation of MAMDCC0005, Vector Modulator with Current Drive

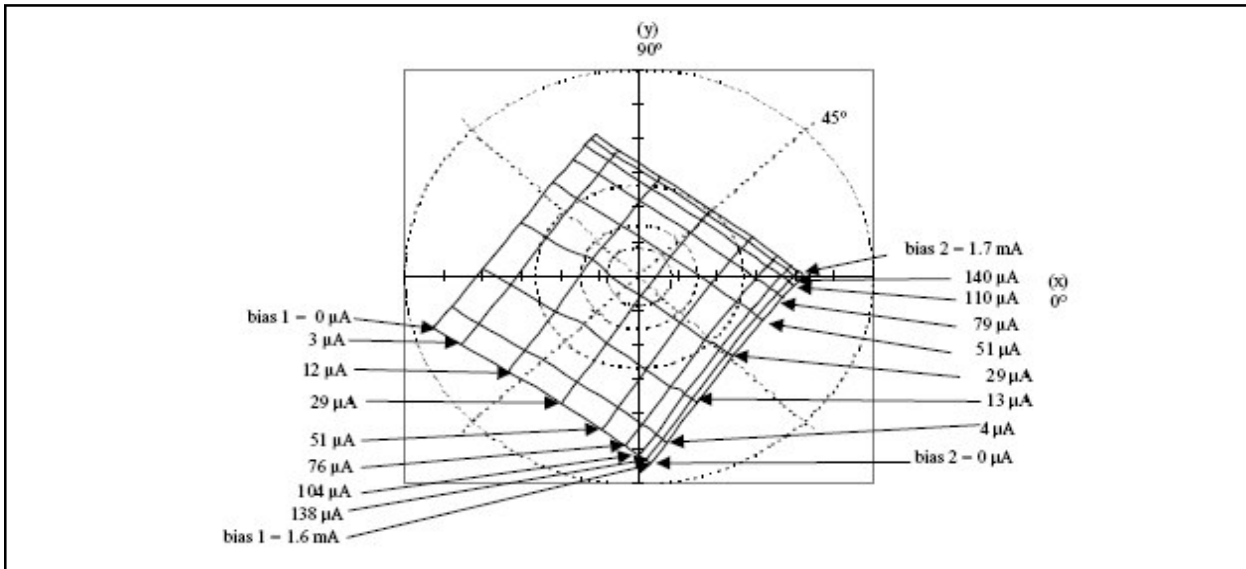
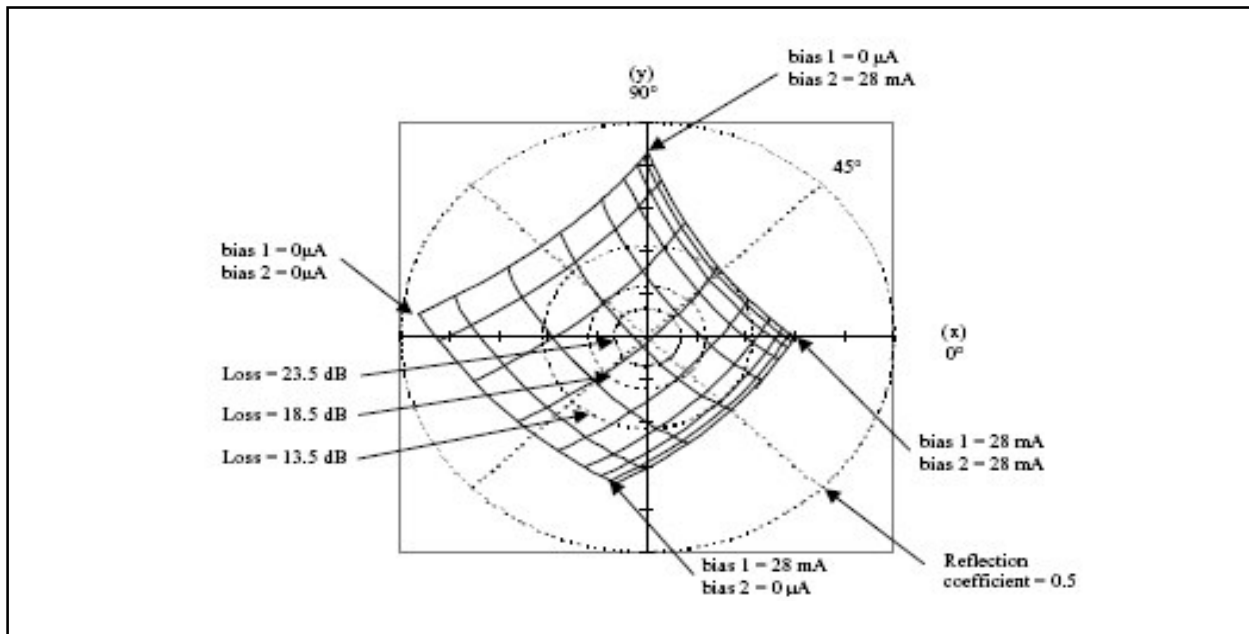


Figure 2B



8. Tic marks on x,y axes refer to reflection coefficient in increments of 0.1. Reflection coefficients vary from -0.5 to +0.5 on both the x and y axes.
9. The phase with the inputs to both linearizers set to +28 mA is arbitrarily called zero degrees.

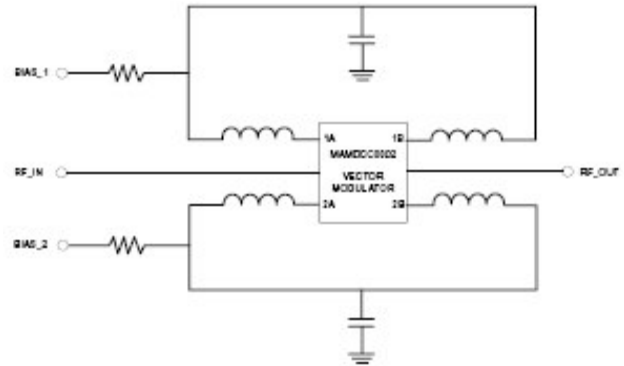
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Ordering Information

Part Number	Package
MAMDCC0005	Bulk Packaging
MAMDCC0005TR	Tape and Reel
MAMDCC0005-DC000	Units Mounted on Test Board with Driver

Functional Block Diagram



NOTES
 CAPACITORS ARE 100 PF
 INDUCTORS ARE COILCRAFT SMD025-07MM50 OR EQUIVALENT