tyco Electronics

M/ACOM

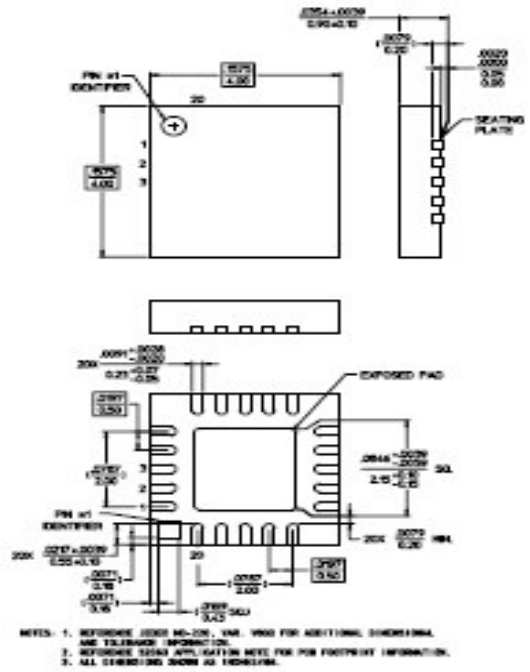
Voltage Variable Phase Shifter, 2.09 - 2.19 GHz

MACMCC0001
V6

Features

- 120° Phase Shift Minimum
- High IP3
- Very Low Insertion Loss
- Surface Mount CSP Package
- Low Cost/High Performance
- 50 Ohm Nominal Impedance

4 mm FQFP-N, 20 Lead



Description

M/A-COM's MACMCC0001 is an integrated assembly containing varactor diodes and a GaAs MMIC. This device is packaged in a 20 leaded surface mount CSP package. Using the suggested bias configuration, 120° of phase shift is achieved from +5V to 0V. The MACMCC0001 is ideally suited for UMTS communication applications requiring variable phase in the 2.09 to 2.19 GHz

Ordering Information

Part Number	Package
MACMCC0001	Bulk Packaging
MACMCC0001TR	Tape and Reel (1K Reel)
MACMCC0001-TB	Units Mounted on Test Board

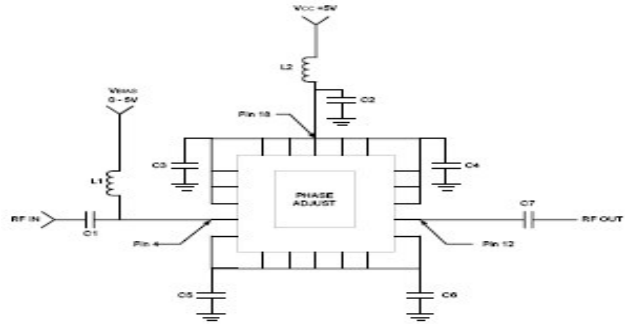
Electrical Specifications[1]: T_A = 25°C, Z_0 = 50Ω

Parameter	Test Conditions	Frequency	Units	Min	Typ	Max
Insertion Loss	Less Coupling	V_{BIAS} = 0V, V_{cc} = 5V V_{BIAS} = 1V, V_{cc} = 5V V_{BIAS} = 2V, V_{cc} = 5V V_{BIAS} = 3V, V_{cc} = 5V V_{BIAS} = 4V, V_{cc} = 5V V_{BIAS} = 5V, V_{cc} = 5V	dB dB dB dB dB dB	— — — — — —	2.0 1.9 1.7 1.5 2.2 3.8	2.3 2.2 2.0 1.8 2.5 4.4
VSWR	—	(V_{cc} = 5V, 0V ≤V_{BIAS} ≤5V)	Ratio	—	1.5:1	2.3:1
Phase Linearity vs. Frequency	—	(V_{cc} = 5V, 0V ≤V_{BIAS} ≤5V) 0 - 45° 0 - 90° 0 - 120°	deg deg deg	— — —	±2 ±4 ±6	— — —
Input IP3	—	Two Tones 2.15 GHz, 2.155 GHz, +5 dBm V_{BIAS} = 0V	dBm	—	25	—
Phase	—	V_{BIAS} = 0V, V_{cc} = 5V (Relative to V_{BIAS} = 5V,V_{cc} = 5V)	deg	120	135	—
Supply Voltage (V_{cc})	—		V	4.75	5.00	5.25
Control Voltage (V_{BIAS})	—	V_{cc} = 5V	V	0.0	—	5.0

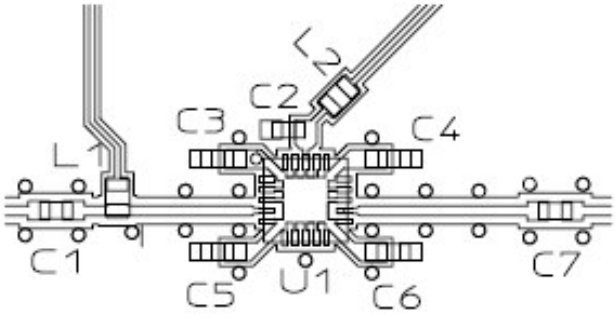
- **North America** Tel: 800.366.2266 / Fax: 978.366.2266
- **Europe** Tel: 44.1908.574.200 / Fax: 44.1908.574.300
- **Asia/Pacific** Tel: 81.44.844.8296 / Fax: 81.44.844.8298

Visit www.macom.com for additional data sheets and product information.

Functional Diagram and Bias Circuitry (Top View)



Recommended PCB Configuration



1. Circuit Material = FR-4, TETRA II, .010 ± .001 thick.
2. Line Width = 0.018 inches, Line Spacing = 0.016 inches for 50 ohm line.

Pin Configuration[3]

Pin No.	Function	Pin No.	Function
1	RF GND, V_{cc}	11	RF GND, V_{cc}
2	RF GND, V_{cc}	12	RF OUT
3	RF GND, V_{cc}	13	RF GND, V_{cc}
4	RF IN, V_{BIAS}	14	RF GND, V_{cc}
5	RF GND, V_{cc}	15	RF GND, V_{cc}
6	RF GND, V_{cc}	16	RF GND, V_{cc}
7	RF GND, V_{cc}	17	RF GND, V_{cc}
8	RF GND, V_{cc}	18	RF GND, V_{cc}
9	RF GND, V_{cc}	19	RF GND, V_{cc}
10	RF GND, V_{cc}	20	RF GND, V_{cc}

3. V_{CC} is +5 Volts, V_{BIAS} is 0 to 5 Volts.

Absolute Maximum Ratings [5]

Parameter	Absolute Maximum
Operating Voltage [6,7]	Breakdown Voltage
Operating Temperature	-65°C to +125°C
Storage Temperature	-65°C to +200°C

5. Operation of this device above any one of these parameters may cause permanent damage.
6. Breakdown Voltage = 22 volts minimum, measured at 10 microamps.
7. To operate this device above the recommended V_B = +5V; increase V_C to 22 volts maximum.

External Circuitry Parts [8]

Part	Value	Purpose
C1, C7	100pF	DC Block
C2, C3, C4, C5, C6	22 pF	Capacitors to float RF Ground
L1, L2	33 nH	RF Choke

8. All external circuitry parts are readily available, low cost surface mount components (.060 in. x .030 in or .080 in x .050 in.).

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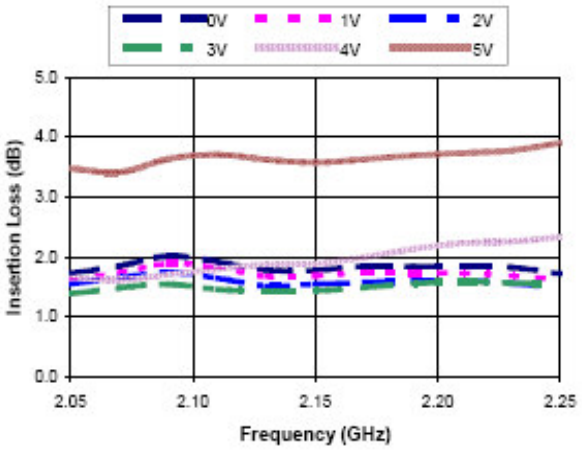
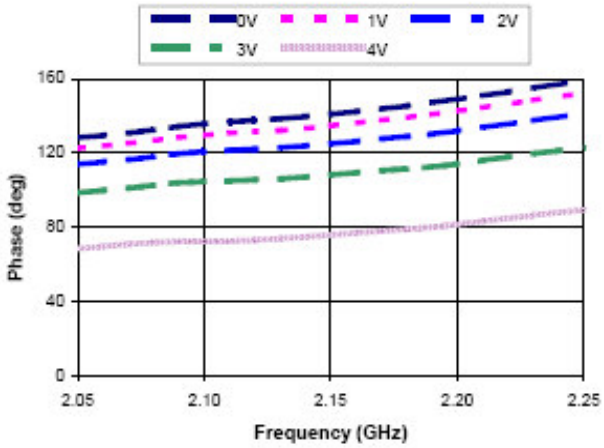
Typical Performance Curves

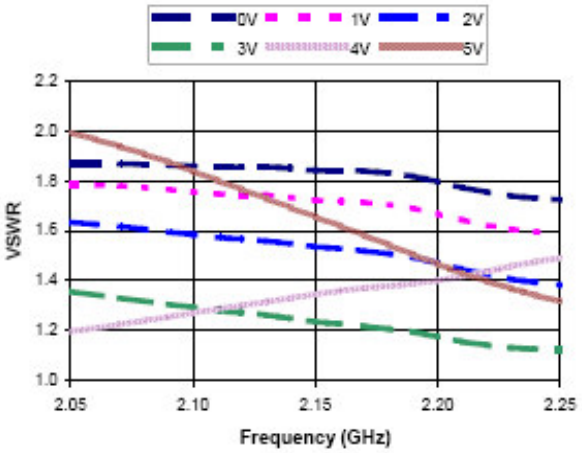
Insertion Loss



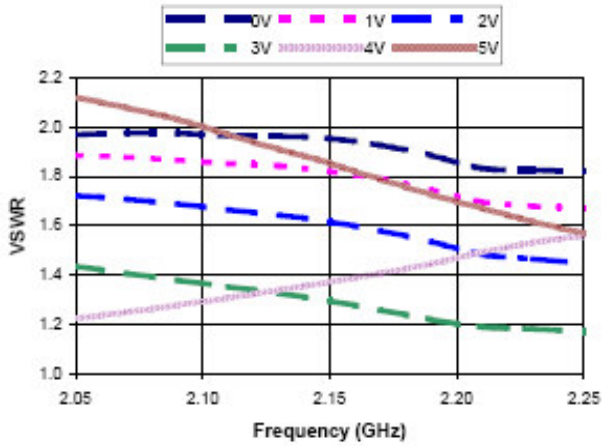
Phase (V_{BIAS} = 5V is 0° Reference)



Input VSWR



Output VSWR



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