The MRFIC Line

900 MHz GaAs Antenna Switch

MRFIC2003

900 MHz GaAs ANTENNA SWITCH GaAs MONOLITHIC INTEGRATED CIRCUIT

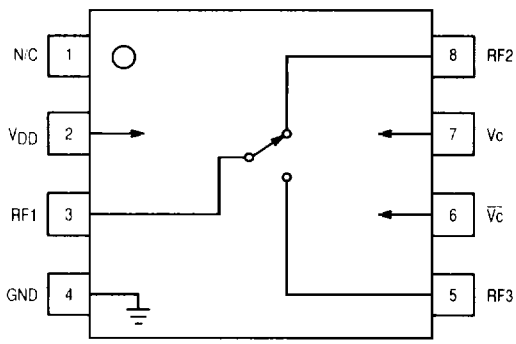
The MRFIC2003 is an integrated GaAs SPDT Antenna Switch designed for transceivers operating in the 800 MHz to 1.0 GHz frequency range. The design utilizes Motorola's CS-1 advanced GaAs RF process to yield superior performance in a cost effective monolithic device. Applications for the MRFIC2003 include CT-2 and the ISM band cordless telephones.

- Surface Mount SO-8 Package
- Low Power Consumption
- 50 mW Power Handling Capability
- Single Source Low Operating Supply Voltage (2.8 – 6.0 Volts)
- Low Cost
- Available in Tape and Reel by Adding R2 suffix to Part Number. R2 suffix = 2,500 Units per 12 mm, 13 inch Reel.
- Device Marking = M2003

CASE 751-05
(SO-8)

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C unless otherwise noted)

Rating	Symbol	Value	Unit
Operating Voltages, Supply and Control	V_{DD}, Vc, $\overline{Vc}$	6.5	Vdc
Supply Current	I_D	100	μA
Input Power, All Ports (V_{DD} = 3.0 V)	RF1, RF2, RF3	25	dBm
Operating Ambient Temperature	T_A	– 35 to + 85	°C
Storage Temperature	T_{stg}	– 65 to +150	°C



Pin Connections and Functional Block Diagram

REV 1

RECOMMENDED OPERATING RANGES

Parameter	Symbol	Value	Unit
Nominal Impedance	Z_O	50	Ω
Supply Voltage Range	V_{DD}	2.8 to 6.0	Vdc
Control Voltage Range, High	Vc, Vc	2.8 to 6.0	Vdc
Control Voltage Range, Low	Vc, Vc	0 to 0.2	Vdc
Frequency Range	f	100–1000	MHz

ELECTRICAL CHARACTERISTICS (V_{DD} = 3.0 V, T_A = 25 C, f = 900 MHz, P_{in} = 50 mW (17 dBm) unless otherwise noted)

Characteristic (1)	Min	Typ	Max	Unit
RF1 to RF2 on:				
RF1 SWR	—	1.1:1	1.4:1	
RF2 VSWR	—	1.2:1	1.4:1	
Insertion Loss (RF1/RF2)	—	0.8	1.0	dB
Isolation	19	23	—	dB
RF1 to RF3 on:				
RF1 SWR	—	1.1:1	1.4:1	
RF3 SWR	—	1.1:1	1.4:1	
Insertion Loss (RF1/RF3)	—	0.5	0.8	dB
Isolation	17	20	—	dB
Input Power @ 1.0 dB Compression	—	21	—	dBm

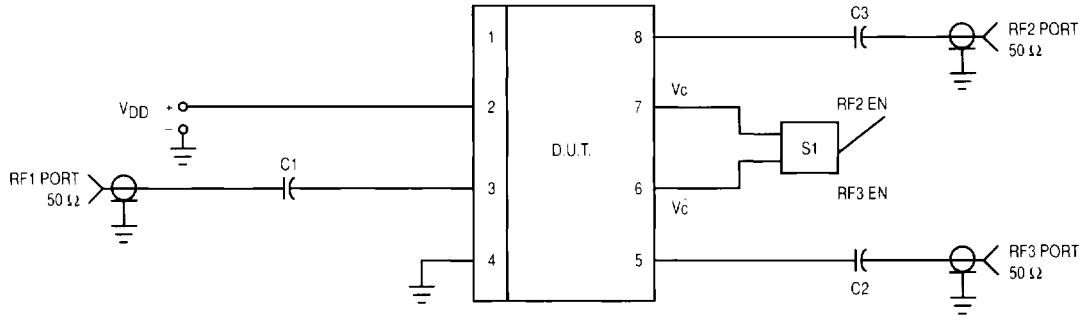
NOTE:
1. All Electrical Characteristics measured in test circuit schematic shown in Figure 1 below.

EVALUATION BOARDS

Evaluation boards are available for RF Monolithic Integrated Circuits by adding a "TF" suffix to the device type. For a complete list of currently available boards and ones in development for newly introduced poduct, please contact your local Motorola Distributor or Sales Office.

Vc	Vc	RF1 – RF2	RF1 – RF3
V_{DD}	0 Volts	Isolation	Insertion Loss
0 Volts	V_{DD}	Insertion Loss	Isolation

Table 1. Logic Table



C1, C2, C3 — 100 pF 50 mil Chip Capacitor
S1 — DPDT Switch with Aluminum Switch Bracket
RF Connectors SMA Type
Board Material — 0.025" Thick Duriod, 0.5 oz. Copper, ϵ_r = 10.2

Figure 1. Test Circuit Configuration

TYPICAL CHARACTERISTICS

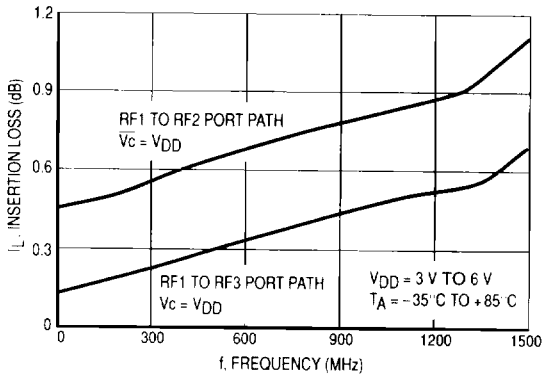


Figure 2. Insertion Loss versus Frequency

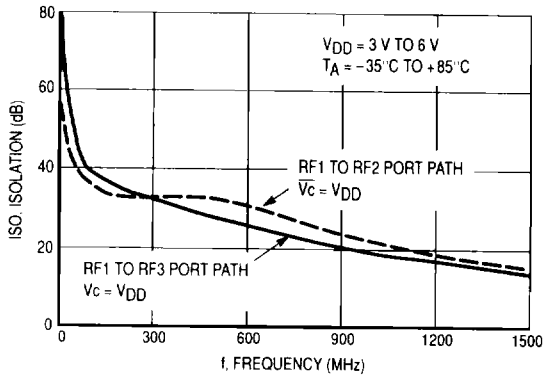


Figure 3. Isolation versus Frequency

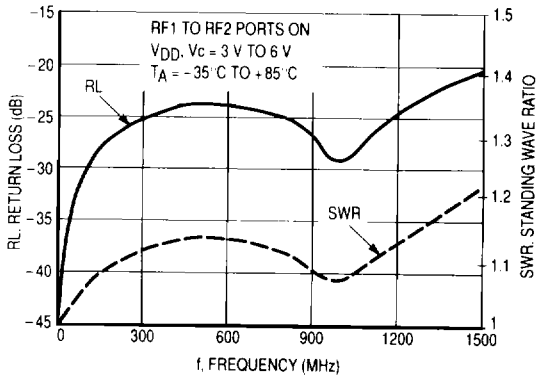


Figure 4. RF1 Port Return Loss and SWR versus Frequency

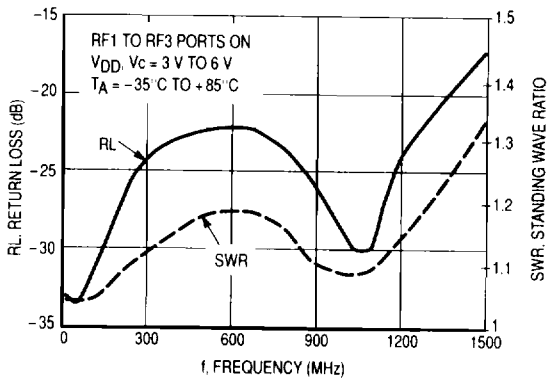


Figure 5. RF1 Port Return Loss and SWR versus Frequency

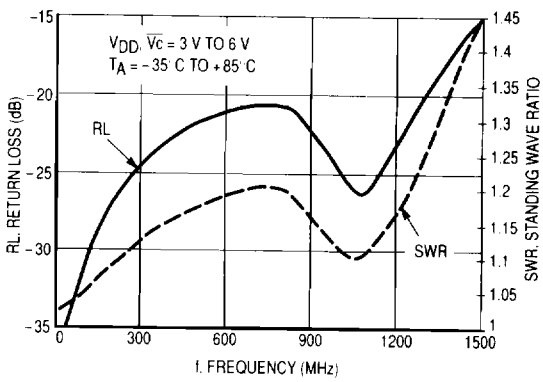


Figure 6. RF2 Port Return Loss and SWR versus Frequency

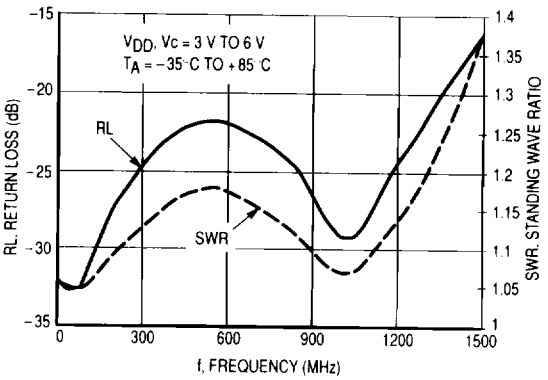


Figure 7. RF3 Port Return Loss and SWR versus Frequency