

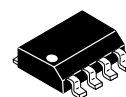
The MRFIC Line 900 MHz GaAs Antenna Switch

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

MRFIC2003

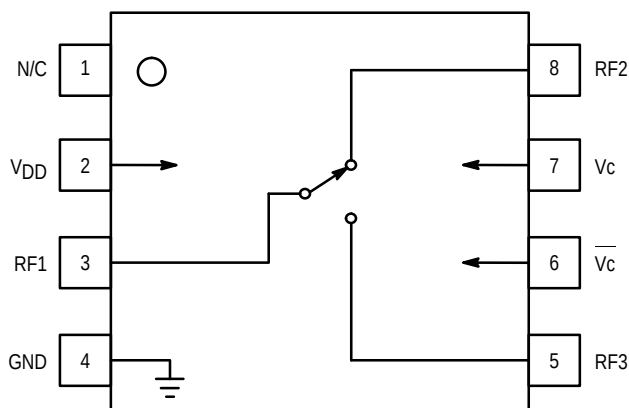
900 MHz GaAs
ANTENNA SWITCH
GaAs MONOLITHIC
INTEGRATED CIRCUIT



CASE 751-05
(SO-8)

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

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



Pin Connections and Functional Block Diagram

RECOMMENDED OPERATING RANGES

Parameter	Symbol	Value	Unit
Nominal Impedance	Z_0	50	Ω
Supply Voltage Range	V_{DD}	2.8 to 6.0	Vdc
Control Voltage Range, High	$V_c, \bar{V}_c$	2.8 to 6.0	Vdc
Control Voltage Range, Low	$V_c, \bar{V}_c$	0 to 0.2	Vdc
Frequency Range	f	100–1000	MHz

ELECTRICAL CHARACTERISTICS ($V_{DD} = 3.0$ V, $T_A = 25^\circ\text{C}$, $f = 900$ 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:

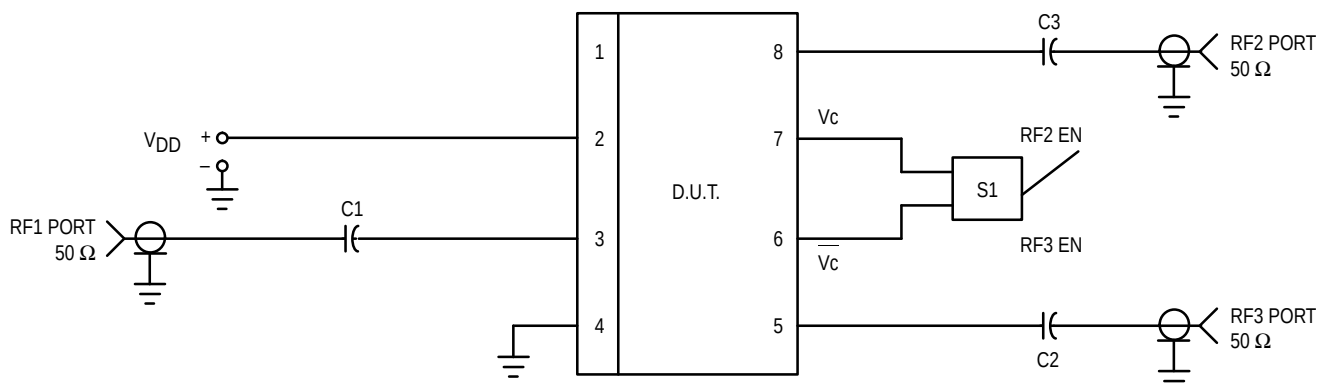
1. All Electrical Characteristics measured in test circuit schematic shown in Figure 1 below.

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 product, please contact your local Motorola Distributor or Sales Office.

V_c	$\bar{V}_c$	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, $\epsilon_r = 10.2$

Figure 1. Test Circuit Configuration

TYPICAL CHARACTERISTICS

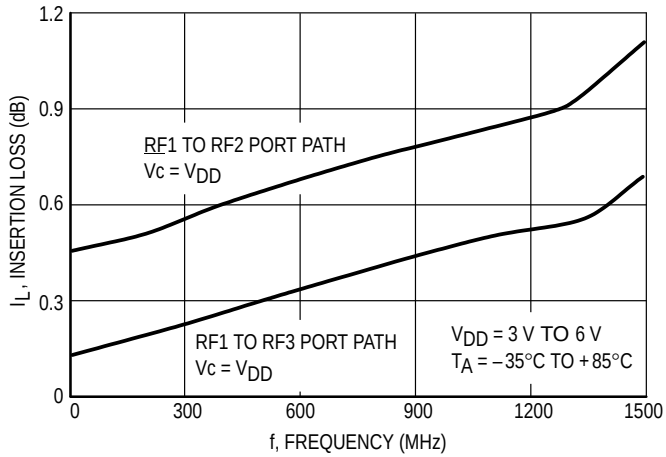


Figure 2. Insertion Loss versus Frequency

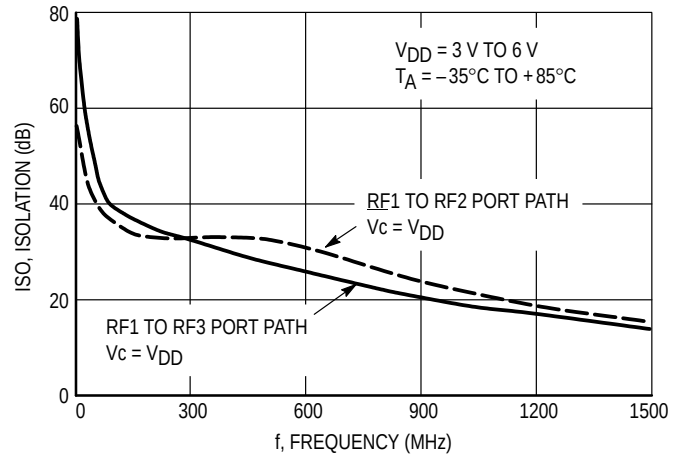


Figure 3. Isolation versus Frequency

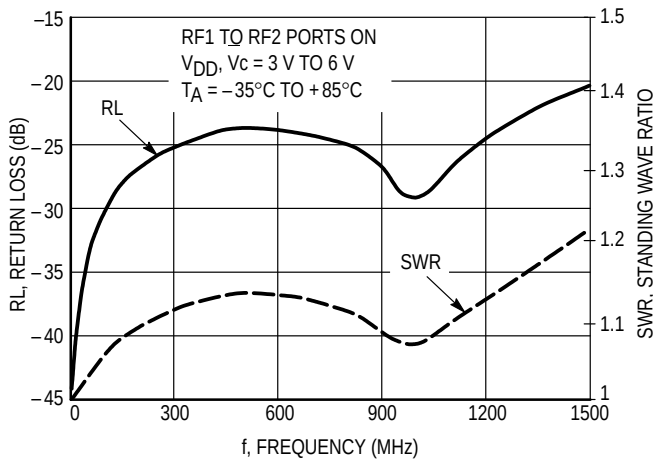


Figure 4. RF1 Port Return Loss and SWR versus Frequency

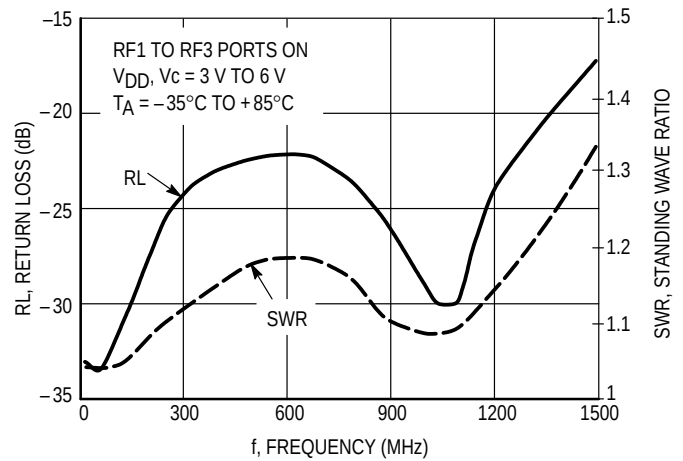


Figure 5. RF1 Port Return Loss and SWR versus Frequency

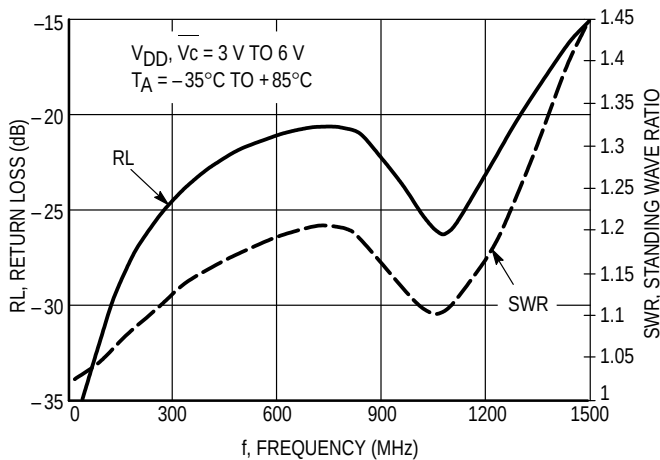


Figure 6. RF2 Port Return Loss and SWR versus Frequency

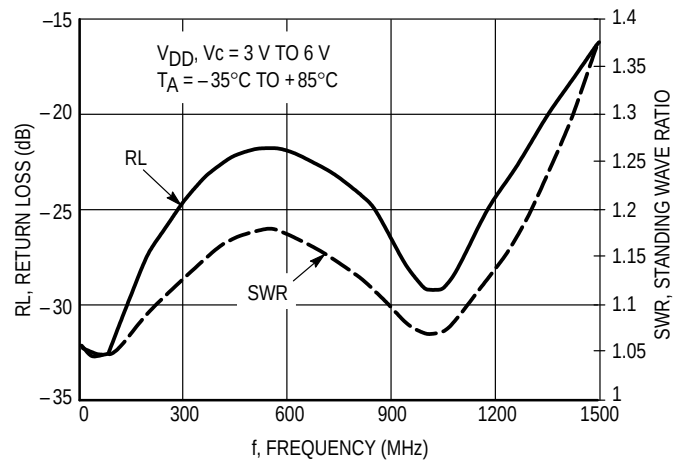
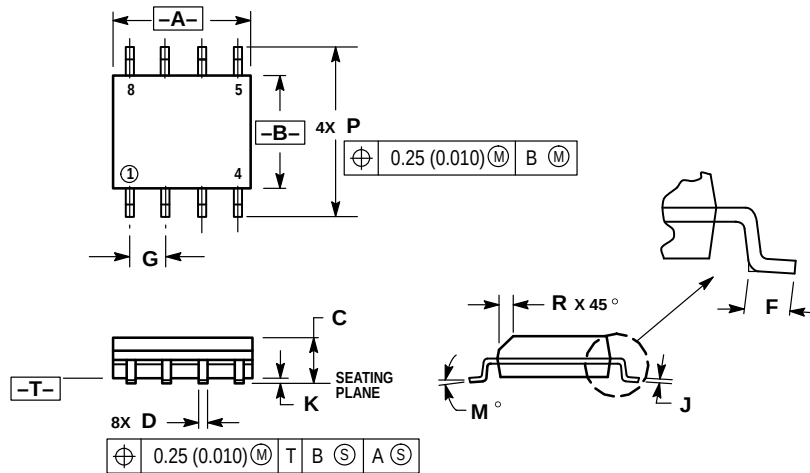


Figure 7. RF3 Port Return Loss and SWR versus Frequency

PACKAGE DIMENSIONS



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.80	5.00	0.189	0.196
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.054	0.068
D	0.35	0.49	0.014	0.019
F	0.40	1.25	0.016	0.049
G	1.27 BSC		0.050 BSC	
J	0.18	0.25	0.007	0.009
K	0.10	0.25	0.004	0.009
M	0°	7°	0°	7°
P	5.80	6.20	0.229	0.244
R	0.25	0.50	0.010	0.019

CASE 751-05 ISSUE N

Motorola reserves the right to make changes without further notice to any products herein. Motorola makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Motorola assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. "Typical" parameters can and do vary in different applications. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. Motorola does not convey any license under its patent rights nor the rights of others. Motorola products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Motorola product could create a situation where personal injury or death may occur. Should Buyer purchase or use Motorola products for any such unintended or unauthorized application, Buyer shall indemnify and hold Motorola and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Motorola was negligent regarding the design or manufacture of the part. Motorola and  are registered trademarks of Motorola, Inc. Motorola, Inc. is an Equal Opportunity/Affirmative Action Employer.

How to reach us:

USA / EUROPE: Motorola Literature Distribution;
P.O. Box 20912; Phoenix, Arizona 85036. 1-800-441-2447

MFAX: RMFAX0@email.sps.mot.com - TOUCHTONE (602) 244-6609
INTERNET: <http://Design-NET.com>

JAPAN: Nippon Motorola Ltd.; Tatsumi-SPD-JLDC, Toshikatsu Otsuki,
6F Seibu-Butsuryu-Center, 3-14-2 Tatsumi Koto-Ku, Tokyo 135, Japan. 03-3521-8315

HONG KONG: Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park,
51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852-26629298



MRFIC2003/D

