

# MP203

## SPDT Non-Reflective Switch



- frequency range 0.01...20 GHz
- insertion loss 1.7 dB at 10 GHz, 2.4 dB at 20 GHz
- high Isolation > 40 dB

### Application

- test and measurement equipment
- telecommunications
- radars

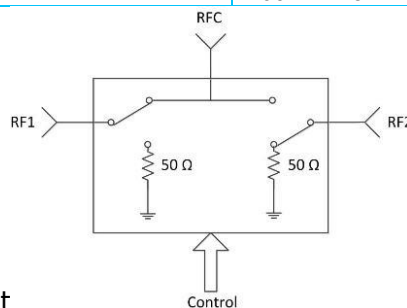
The MP203 is a high-performance MMIC SPDT Non-Reflective Switch, which covers the frequency range from DC to 20 GHz and can be used in telecommunications, test and measurement equipment and radar applications. The on-chip control driver allows parallel data input. This chip is manufactured using 0.5  $\mu\text{m}$  GaAs pHEMT. The MP203 is ideal for hybrid-integrated microwave modules with general sealing. The MMIC uses gold bond pads and backside metallization and is fully protected with Silicon Nitride passivation to obtain the highest level of reliability. The switch is controlled by negative polarity voltage.

### Electrical specifications (T = 25 °C)

Symbol	Parameter	Min.	Typ.	Max.	Unit
$\Delta F$	Frequency range	0.01	—	20	GHz
$IL_{ON}$	Insertion loss DC to 10 GHz	—	1.7	1.8	dB
$IL_{ON}$	Insertion loss DC to 20 GHz	—	2.4	2.5	dB
$IL_{OFF}$	Isolation	40	—	—	dB
RL	Return Loss	12	—	—	dB
P1dB	Input Power at 1 dB Compression Point	20	—	—	dBm
$t_{RISE}, t_{FALL}$	Switching speed (10/90% RF)	—	—	60	ns
VSS	Supply voltage for driver	—	-5	—	V
VLH	Control voltage high	-0.2	0	—	V
VLL	Control voltage low	-2.5	-5	-7	V
I_VL	DC	—	0.01	0.1	mA

### Absolute maximum ratings

Parameter	Value	Unit
Supply voltage	+0.5...-6.5	V
Operating temperature	-60...+85	°C
Storage temperature	-60...+125	°C



Wiring sheet

Specifications are subject to change without notice.

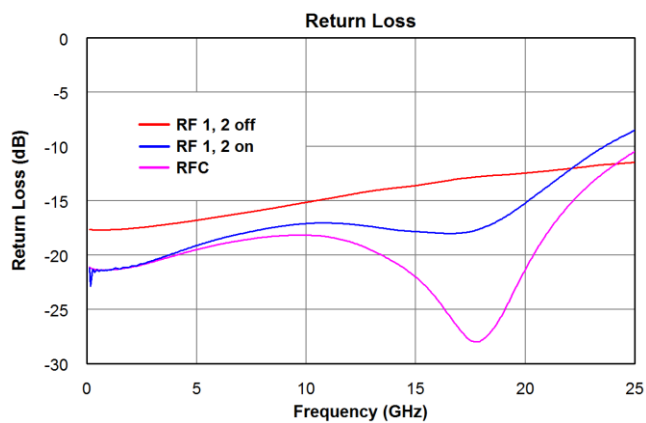
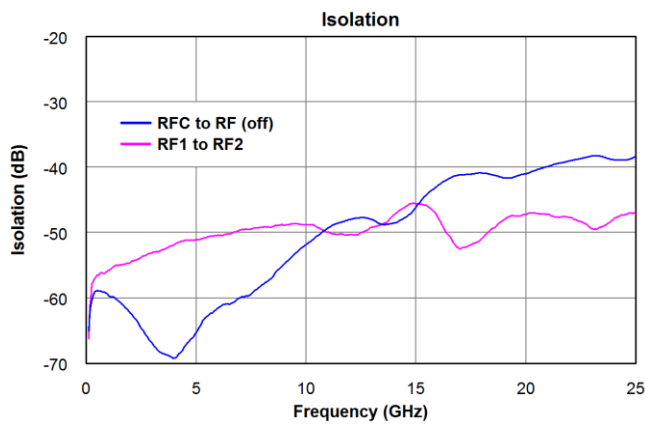
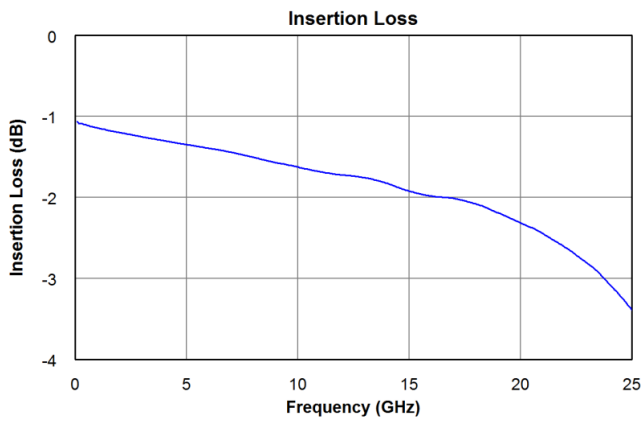
## Switch Control Bias

Control driver is integrated in the device to supply the necessary internal switching voltages for the switch cells. A control table for the switch is presented below.

### State table

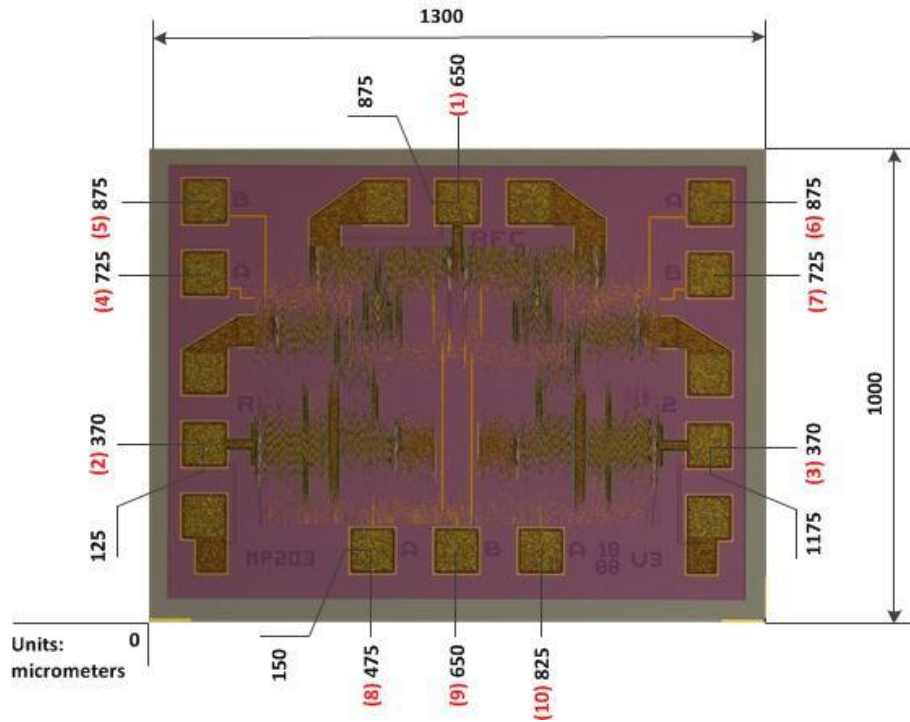
MMIC state	Control voltage (A), V	Control voltage(B), V
Path 1	-5	0
Path 2	0	-5

### Typical characteristics (T = 25 °C)



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**Mechanical data**



- Chip size 1300 × 1000 μm (before wafer dicing), thickness 100 μm.
- Position coordinates are shown for the bond pad center; Bond pad and backside are metallized with gold.
- RF pads are 100 × 100 μm.

Pad number	Port	Description
1	RFC	Common RF port
2	RF1	Output RF port №1
3	RF2	Output RF port №2
4	A	Control of switch cells state
5	B	
6	A	
7	B	
8	A	
9	B	
10	A	

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**Application notes**

**Mounting**

The chip is back-metallized with gold and can be die mounted with AuSn eutectic alloy or with electrically conductive adhesive. The mounting surface should be clean and flat. The 50 Ohm Microstrip transmission, mounted on 0.127 mm thick alumina and thin film substrates, is recommended for bringing RF to and from the chip (Figure 1). One way to accomplish this is to attach the 0.102 mm thick die to a 0.150 mm thick molybdenum heat spreader (molytab) which is then attached to the ground plane (Figure 2). Microstrip substrates should be located as close to the die as possible in order to minimize bond wire length. Typical die-to-substrate spacing is 0.1mm.

**Wire Bonding**

It is recommended for RF pads (1...3) to use one wire 25 µm in diameter, 400 µm in length. The recommendation A for DC and control pads (4...10) is one wire 25 µm in diameter and 700...1 000 µm in length.

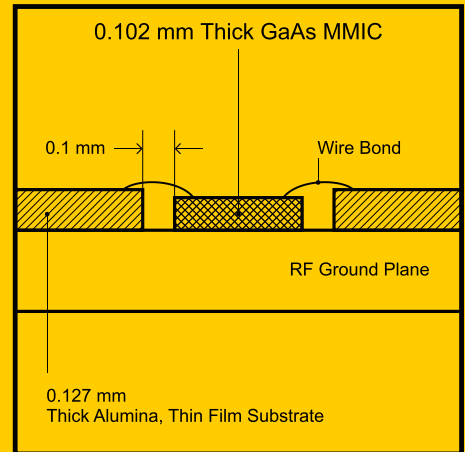


Figure 1.

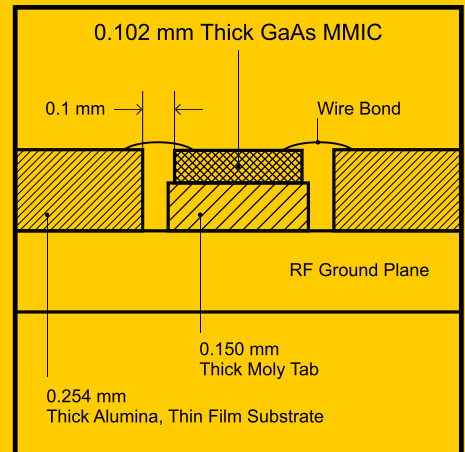


Figure 2.

**Recommended ESD Management**

This device is susceptible to electrostatic and mechanical damage. Dies are supplied in antistatic containers, which should be opened in cleanroom conditions at an appropriately grounded antistatic workstation. Devices need careful handling using correctly designed collets, vacuum pickups or, with care, sharp tweezers.

