

# MD210

## SPST reflective switch



- frequency range 0.2...40 GHz
- insertion loss < 1.5 dB
- isolation < 25 dB

### Application

- telecommunications
- radars
- test and measurement equipment

The MD210 is a Single-Pole Single-Throw (SPST) reflective switch, based on AlGaAs / GaAs PIN diode technology.

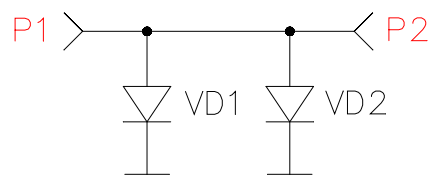
### Electrical specifications (T = 25 °C)

Symbol	Parameter	Min.	Typ.	Max.	Unit
$\Delta F$	Frequency range	0.2	—	40	GHz
$IL_{ON}$	Insertion loss	—	—	1.5	dB
$IL_{OFF}$	Isolation	25	—	—	dB
$T_{SW}$	Switching speed	—	—	20	ns

### Absolute maximum ratings

Parameter	Value	Unit
RF Input Power	+24	dBm
Breakdown voltage	-20	V
Bias current	40	mA
Operating temperature	-40...+85	°C
Storage temperature	-55...+150	°C

### Circuit diagram



## Operation

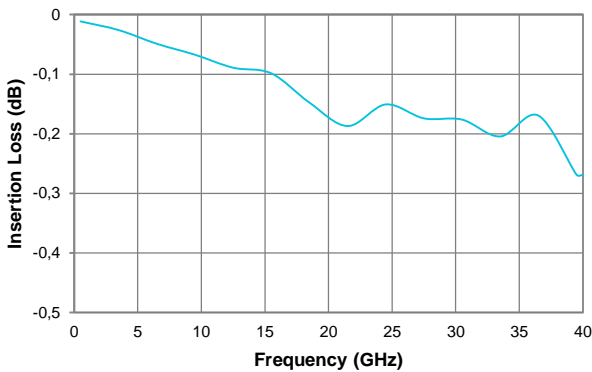
The switch is controlled by using external power circuits in accordance with the MMIC switching diagram and the state table. To comply with the required operating frequency range, the values of external capacitances and inductances should be selected. Resistor is installed to limit the forward current through diodes. In order to obtain a forward current in the range of +10...+20 mA, it is necessary to apply a total voltage in the range of +1.2...+1.7 V to the port P1 or P2. Due to the symmetry of a MMIC, both ports can be used as a microwave input. To control the microwave signal with power exceeding 7 dBm, use external power circuits with reverse voltage supplied.

## State table

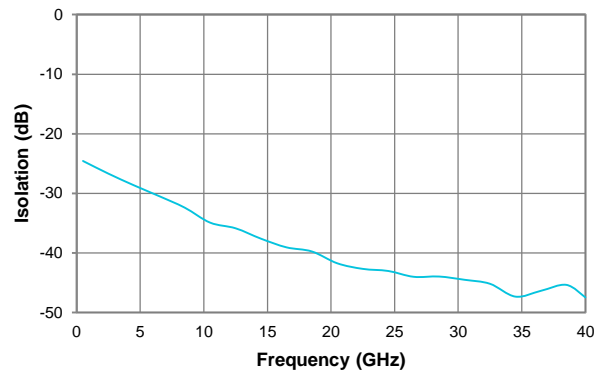
MMIC state	Control signal	State description
	CTRL 1	P1↔P2
St1	0...-10 V	Low loss
St2	+10...+20 mA	Isolation

## Typical characteristics (T = 25 °C)

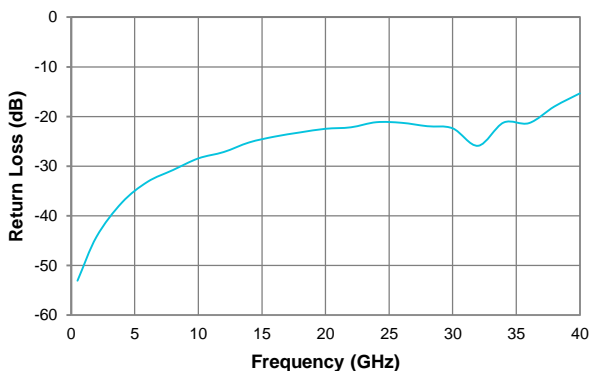
Insertion Loss



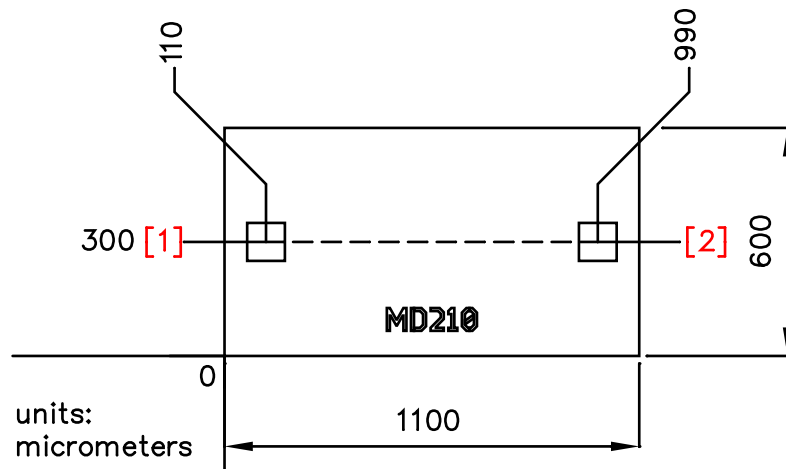
Isolation



Return Loss



**Mechanical data**



- These parameters are specified for the switch before die separation;
- Bond pad and backside are metallized with gold;
- Die thickness: 100  $\mu\text{m}$ ;
- RF pads: 100  $\times$  100  $\mu\text{m}$ .

Pad number	Port	Description	Pad size (X, Y), $\mu\text{m}^2$
1	P1	RF input / output	100 $\times$ 100
2	P2	RF input / output	

**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 0.1 mm. Do not expose die to a temperature above 300 degrees for more than 10 seconds.

**Wire Bonding**

It is recommended for RF pads to use two wires 25 µm in diameter or a foil stripe with minimal length.

**DC coupling**

All ports are DC coupled. RF Input port should be DC blocked externally, using a series capacitor, whose value has been chosen to pass the necessary frequency range.

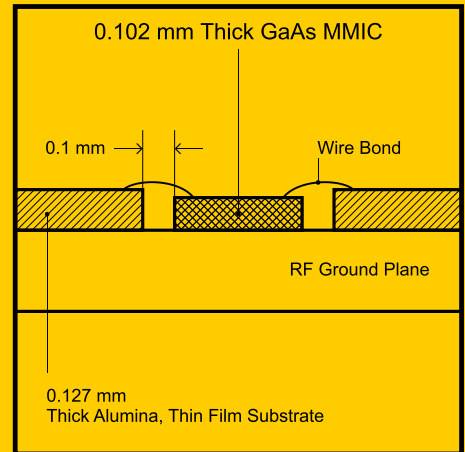


Figure 1.

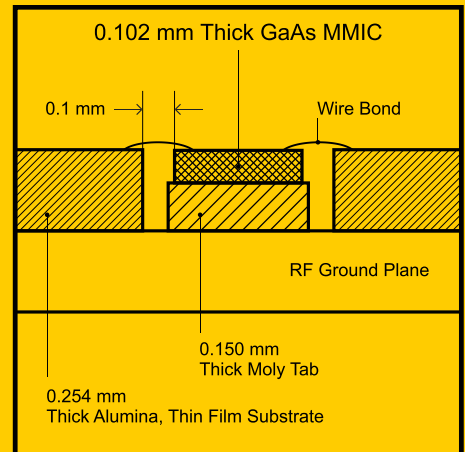


Figure 2.

**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.

