

MD216

SP3T switch with integrated control circuit



- frequency range 4...27 GHz
- insertion loss < 1.3 dB
- isolation > 40 dB

Application

- telecommunications
- radars
- test and measurement equipment

The MD216 is a Single-Pole Three-Throw (SP3T) reflective switch with integrated control circuit, based on AlGaAs / GaAs PIN diode technology.

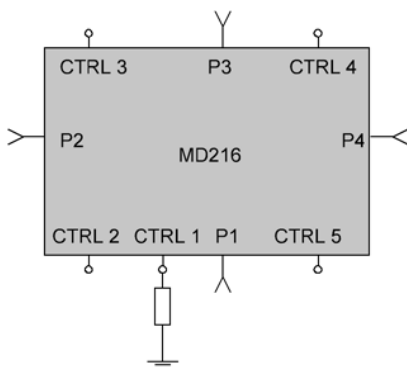
Electrical specifications (T = 25 °C)

Symbol	Parameter	Min.	Typ.	Max.	Unit
ΔF	Frequency range	4	—	27	GHz
IL_{ON}	Insertion loss	—	—	1.3	dB
IL_{OFF}	Isolation	35	—	—	dB
T_{SW}	Switching speed	—	—	20	ns

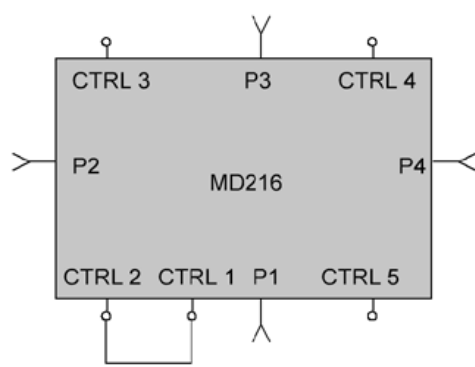
Absolute maximum ratings

Parameter	Value	Unit
RF Input Power	250	mW
Breakdown voltage	20	V
Operating temperature	30	mA
Storage temperature	-60...+85	°C

Application circuit



MD215 connection using external resistor



MD215 connection using integrated resistor R = 60 Ohm

Operation

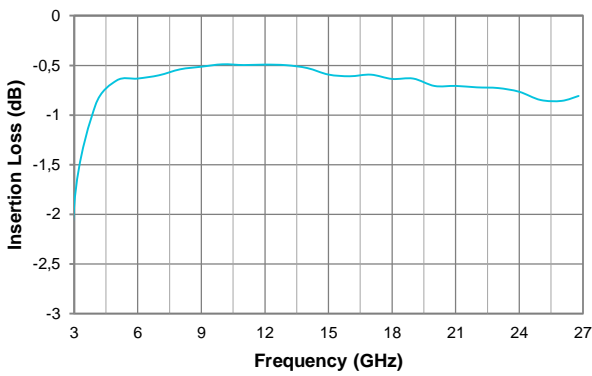
MD216 is controlled with use of internal control circuit corresponding to states table below. Die's metallized backside is an output for MMIC and DC.

State table

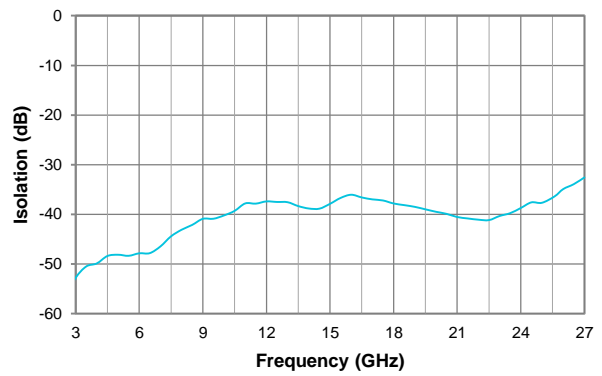
MMIC state	Control signal, mA			State description		
	CTRL 1	CTRL 4	CTRL 5	P2↔P1	P3↔P1	P4↔P1
St1	-10	+10	+10	Low loss	Isolation	Isolation
St2	+10	-10	+10	Isolation	Low loss	Isolation
St3	+10	+10	-10	Isolation	Isolation	Low loss

Typical characteristics (T = 25 °C)

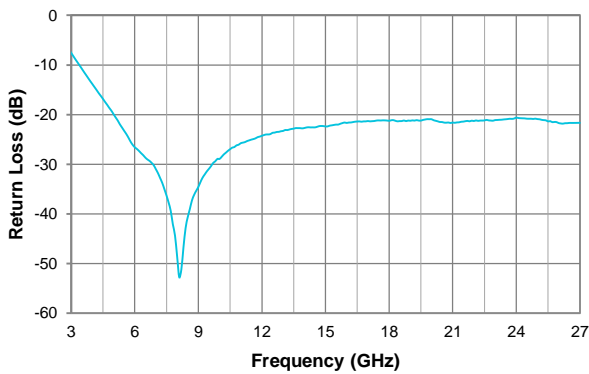
Insertion Loss



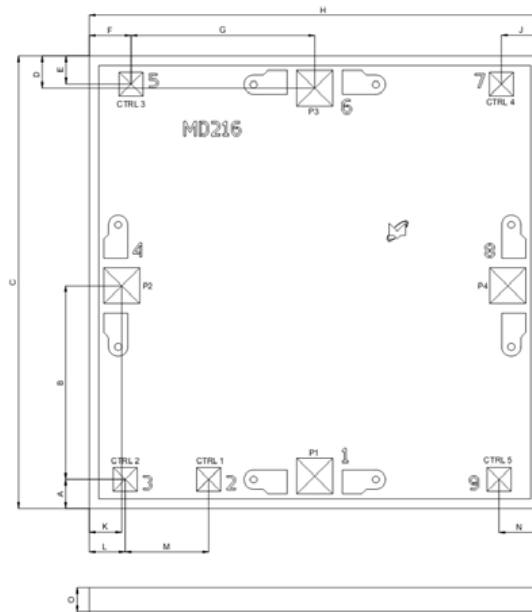
Isolation



Return Loss



Mechanical data



- Contact pads of ports P1...P3 150 × 150 μm.
- Contact pads of ports CTRL1...CTRL5 100 × 100 μm.
- Bond pad and backside are metallized with gold.

Size	Min.	Type	Max.	Units
A	100	110	120	μm
B	800	805	810	
C	1 840	1 860	1 880	
D	115	125	135	
E	95	105	115	
F	155	165	175	
G	90	100	110	
H	—	C	—	
J	140	150	160	
K	—	D	—	
L	130	140	150	
M	345	350	355	
N	150	160	170	
O	90	100	110	

Specifications are subject to change without notice.

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). Typical die-to-substrate spacing is 0.1mm.

Wire Bonding

Microstrip substrates should be brought as close to the die as possible in order to minimize ribbon bond length. 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.

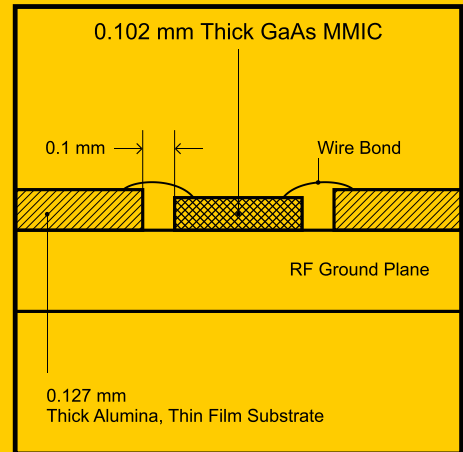


Figure 1.

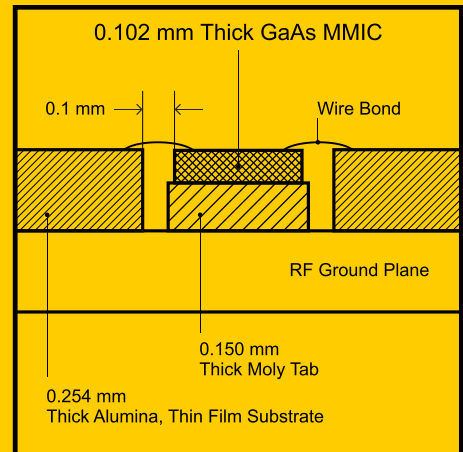


Figure 2.

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.

