MD215

SPDT 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 MD215 is a Single-Pole Double-Throw (SPDT) reflective switch with integrated control circuit based on AlGaAs / GaAs PIN diode technology.

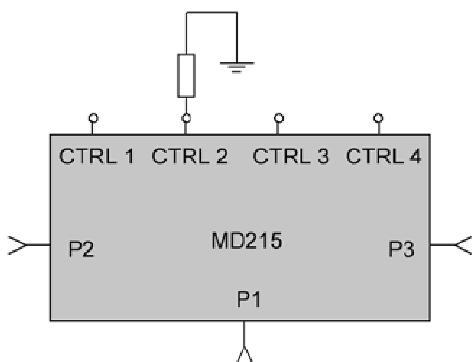
Electrical specifications (T = 25 °C)

Symbol	Parameter	Min.	Typ.	Max.	Unit
ΔF	Frequency range	4	—	27	GHz
IL_{ON}	Insertion loss	—	—	1.3	dB
IL_{OFF}	Isolation	40	—	—	dB
T_{SW}	Switching speed	—	—	20	ns

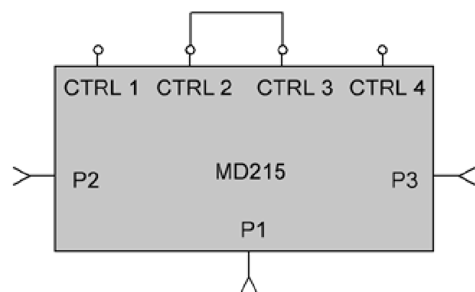
Absolute maximum ratings

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

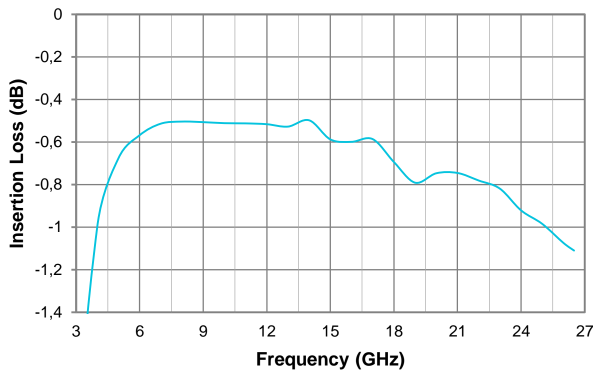
The MD215 is controlled with a use of an internal control circuit, corresponding to states table below. Die's metallized backside is an output for MMIC and DC.

State table

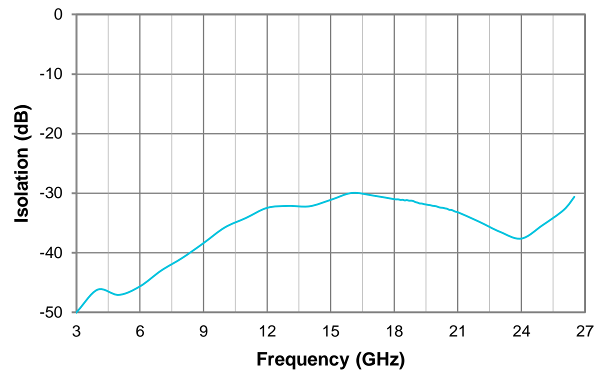
MMIC state	Control signal, mA		State description	
	CTRL 1	CTRL 4	P2↔P1	P3↔P1
St1	−10	+10	Low loss	Isolation
St2	+10	−10	Isolation	Low loss

Typical characteristics (T = 25 °C)

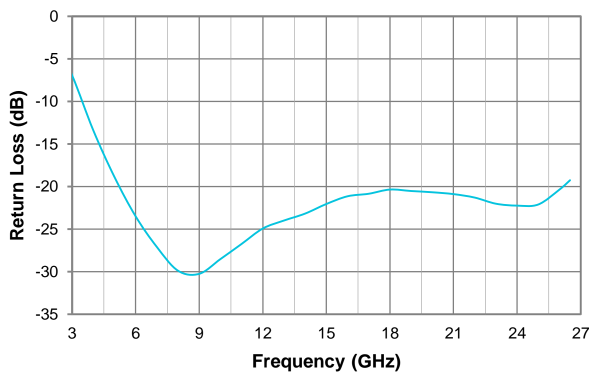
Insertion Loss



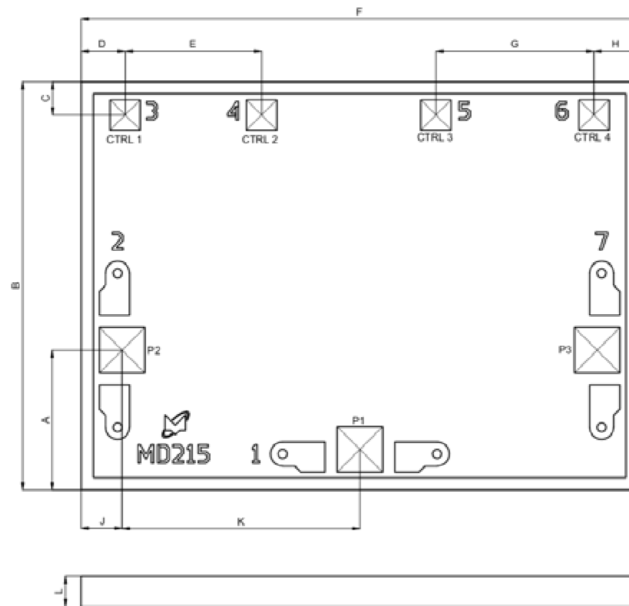
Isolation



Return Loss



Mechanical data



- Contact pads of ports P1…P3 150×150 µm.
- Contact pads of ports CTRL1…CTRL4 100×100 µm.
- Bond pad and backside are metallized with gold.

Size	Min.	Type	Max.	Units
A	440	450	460	µm
B	1 310	1 330	1 350	
C	90	100	110	
D	125	135	145	
E	445	450	455	
F	1 800	1 820	1 840	
G	515	520	525	
H	—	D	—	
J	115	125	135	
K	780	785	790	
L	90	100	110	

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 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.

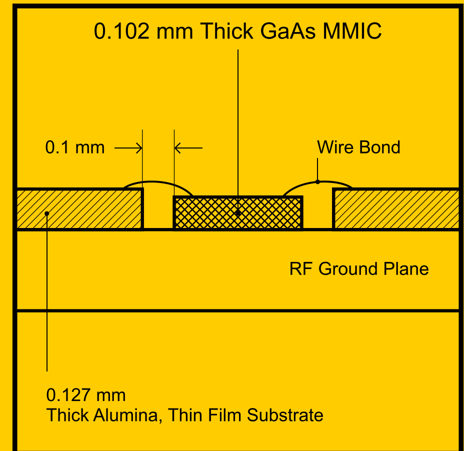


Figure 1.

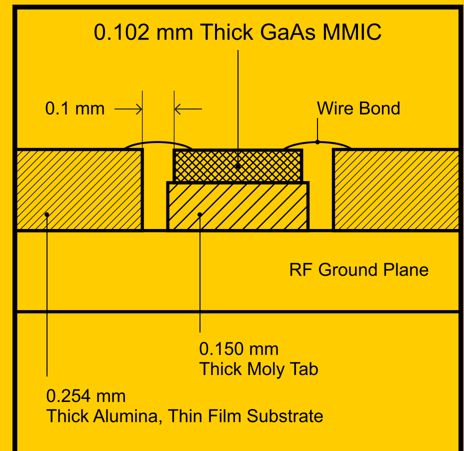


Figure 2.

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.

Specifications are subject to change without notice.

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