

# MP229

## SPDT reflective switch



- frequency range DC...40 GHz
- insertion loss 3 dB
- isolation 25 dB
- input return loss -13 dB
- output return loss -13 dB
- RF max power input  $P_{IN} = +30$  dBm

### Application

- test and measurement equipment
- telecommunications
- radars

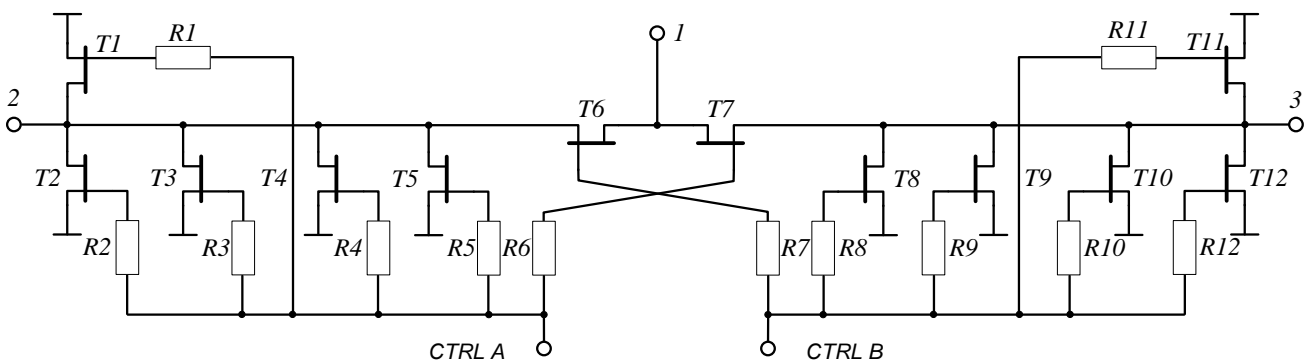
The MP229 is a MMIC Single-Pole Double-Throw (SPDT) ultra-wideband switch, based on 0.5  $\mu\text{m}$  GaAs pHEMT technology.

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

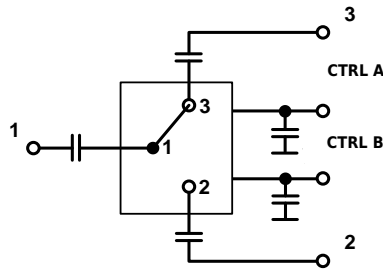
Symbol	Parameter	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Unit	
$\Delta F$	Frequency range	DC...10		10...25		25...40						GHz
TL	Transmission Loss	1.5	1.7	2	—	2.5	2.7	—	2.7	3	dB	
ISO	Isolation LO — RF	—	42	—	—	30	—	—	25	—	dB	
RL (S11)	Return loss	—	-15	—	—	-15	—	—	-13	—	dB	
RL (S22, S33)	Return loss	—	-15	—	—	-15	—	—	-13	—	dB	
IIP3	Input IP3	—	+36	—	—	+35	—	—	TBD	—	dBm	
P1*	Input power for 1 dB compression	+7	+29	—	—	+29	—	—	+29	—	dBm	
$P_{MAX}$	RF max power input	+30									dBm	

**NOTE** \*In frequency ranges below 1 GHz the 1 dB compression at the input does not exceed +7 dBm, due to the peculiarity of the pHEMT transistors.

### Circuit diagram



### Application circuit

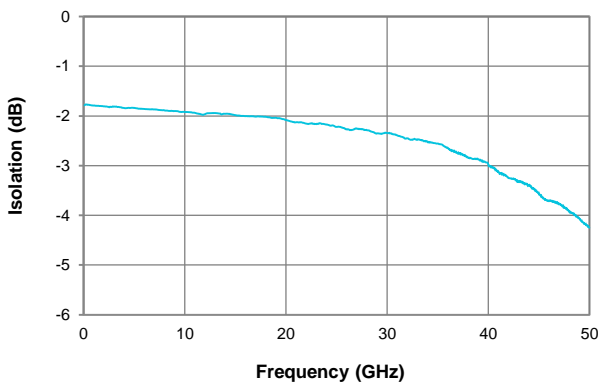


### Switch control table:

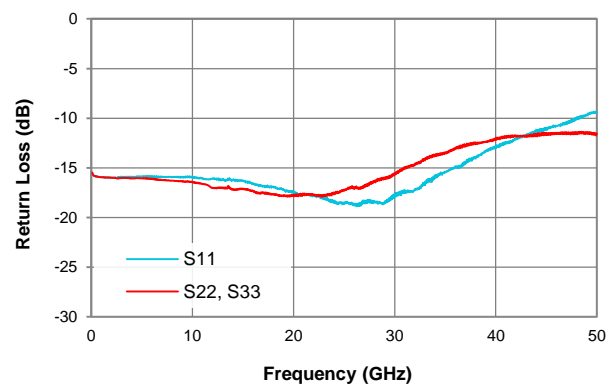
Control input		Signal path state	
CTRL A	CTRL B	1 – 2	1 – 3
-5 V	0	On	Off
0	-5 V	Off	On

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

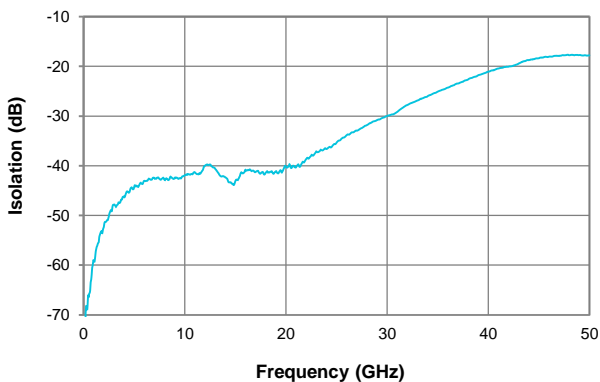
Isolation (1 to 2,3 in OFF state)



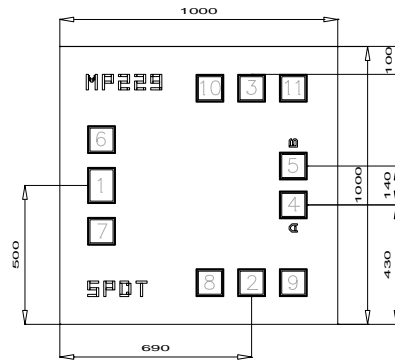
Return Loss



Isolation (1 to 2,3 in OFF state)



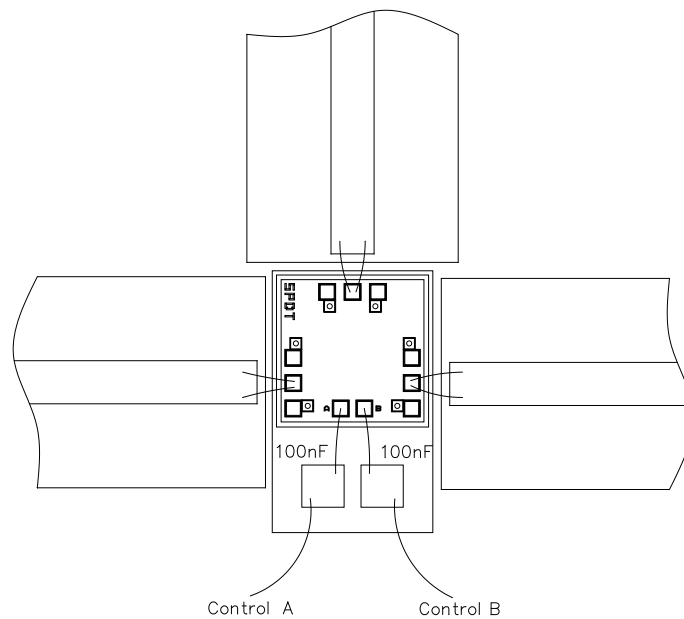
**Mechanical data**



- Chip size 1000 × 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	RF output
3	RF2	RF output
4	A	CTRL
5	B	CTRL
6	—	GND
7	—	GND
8	—	GND
9	—	GND
10	—	GND
11	—	GND

**Assembly diagram**



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 0.102mm thick die to a 0.150mm 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, 2,3) to use one wire 25 µm in diameter and no more than 300 µm in length

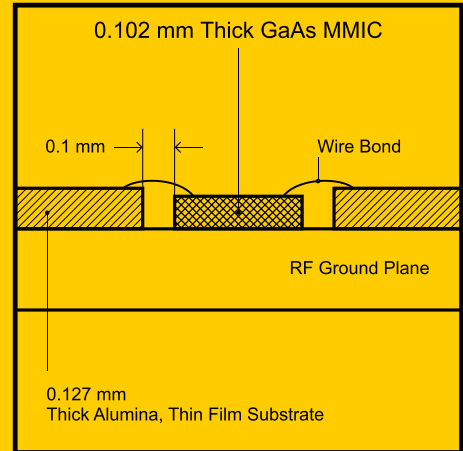


Figure 1.

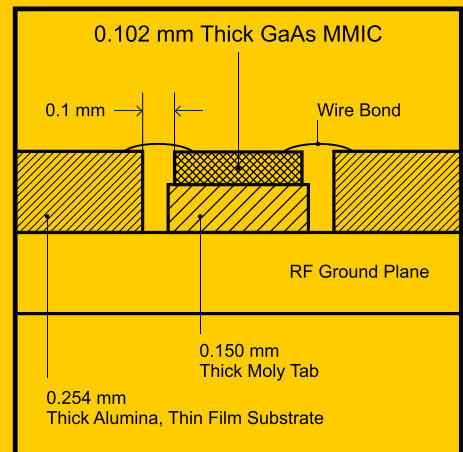


Figure 2.

**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.

