

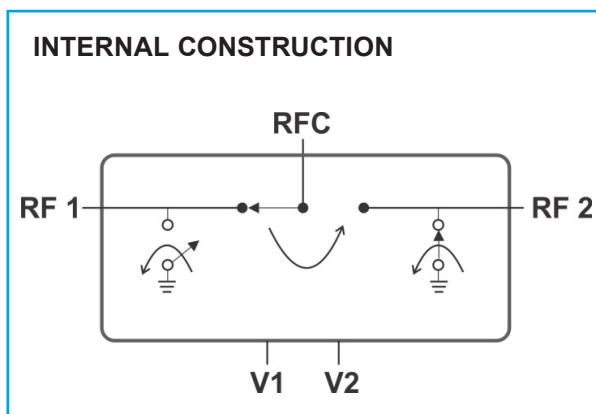
Part Number	SWITCH TYPE
InPD1012-14	Solid State, InP-HEMT Active RF Switch Die

### DESCRIPTION

The InPD1012-14 is a wideband, reflective SPDT Active RF Switch Die, manufactured using Teledyne's high-speed, low-loss InP HEMT process—making this switch ideal for test and measurement, microwave communications, and radar applications. The InPD1012-14 can also tolerate up to 100 krads of radiation, allowing it to be used in space applications.

#### The InPD1012-14 features:

- Broad frequency bandwidth
- Low insertion loss
- Very High linearity
- Wide operating temperature
- Radiation tolerant up to 100 krads
- Very fast switching time of less than 100 ns

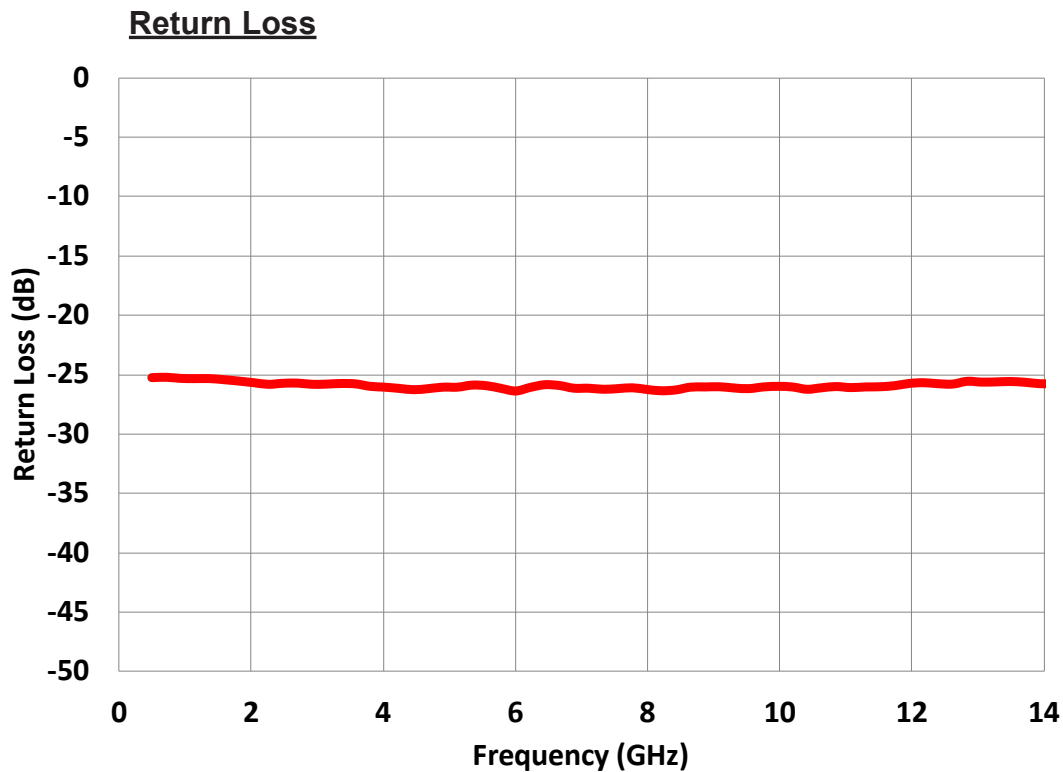
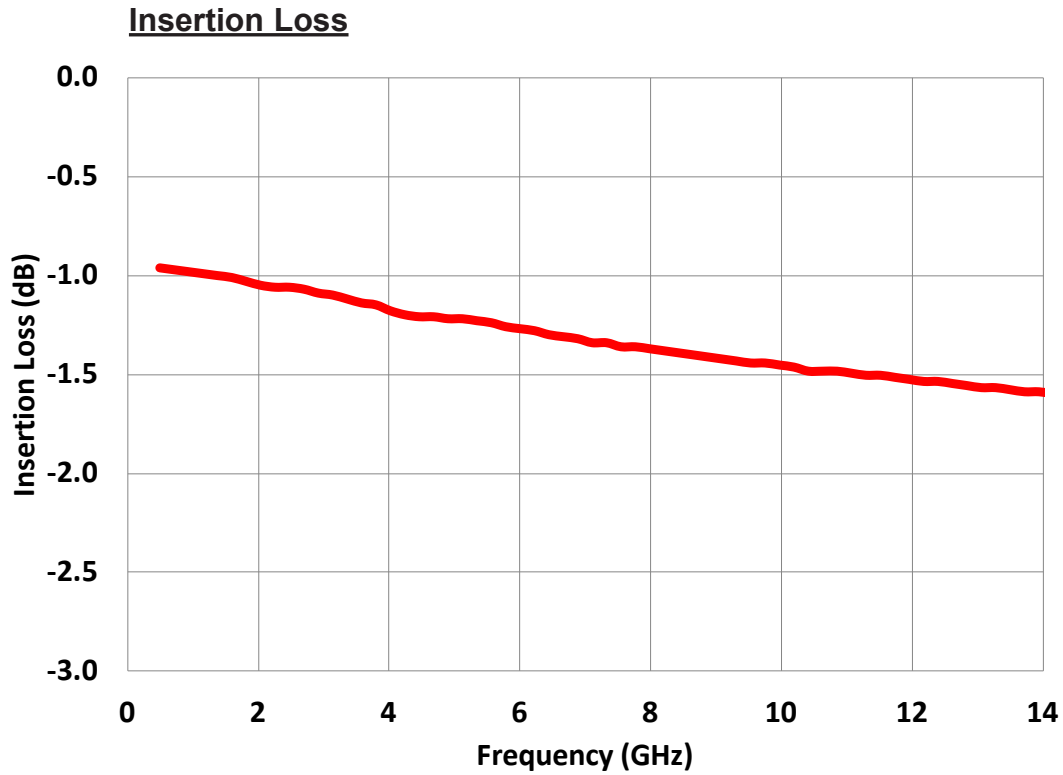


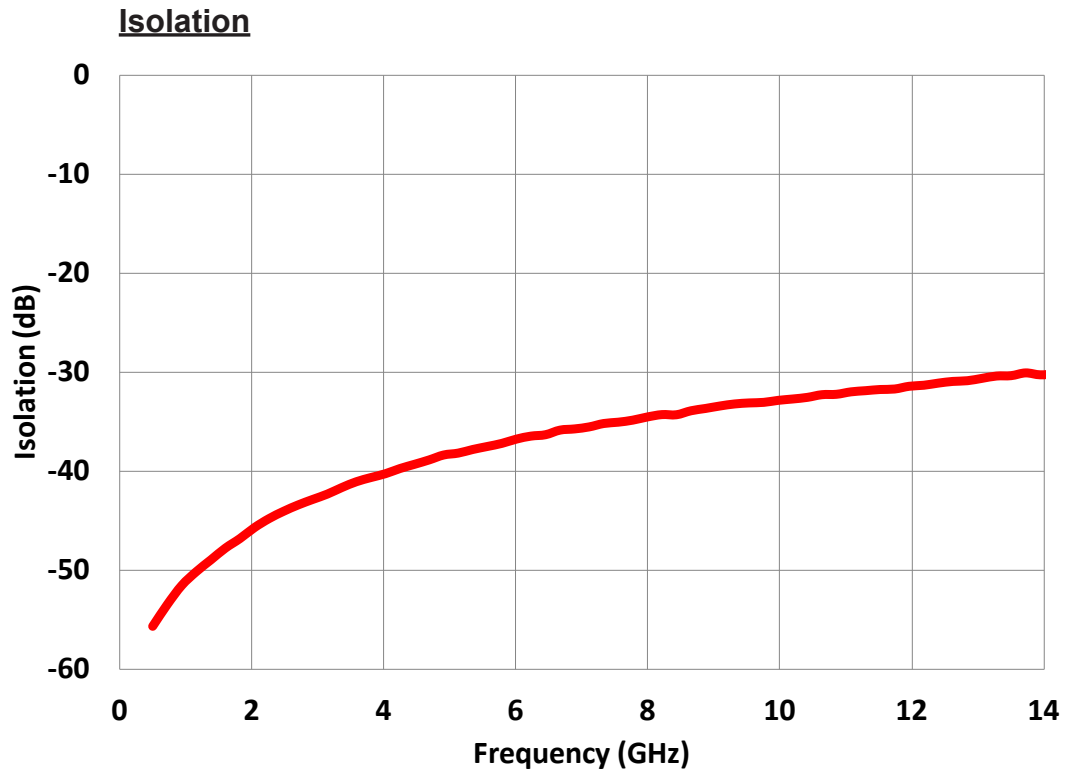
#### Electrical Specifications (@25°C, V1 = ON, V2 = OFF OR V1 = OFF, V2 = ON, Z<sub>s</sub> = Z<sub>L</sub> = 50 Ω)

Parameter/Condition	Frequency	Min.	Typ.	Max.	Unit
<b>Insertion Loss</b>	DC **		2.0		dB
	10 kHz - 6 GHz		1.3	1.5	dB
	6 - 8 GHz		1.4	1.6	dB
	8 - 14 GHz		1.6	1.8	dB
<b>Isolation</b>	DC - 6 GHz	34	36		dB
	6 - 8 GHz	32	34		dB
	8 - 14 GHz	27	29		dB
<b>Return Loss (active port)</b>	DC - 14 GHz		26		dB
<b>Switching Time</b>			60	100	ns
<b>Operating Power</b>			1	2	mW
<b>Input 0.1dB compression point</b>	100 MHz		3.1		dBm
	6 GHz		15.7		dBm
<b>Input 1dB compression point</b>	100 MHz		8.6		dBm
	6 GHz		21.1		dBm
<b>Input 3<sup>rd</sup> Order Intercept (IIP3)</b>	10GHz		37.5		dBm

\*\* RF input power (20mV - 200mV), Insertion loss increases with higher DC offset, up to 2.5Vdc max.

### RF Characteristics Plots





**Physical Specifications**

Parameter	Min.	Typ.	Max.	Unit
<b>Die Size, Singulated (x,y)</b> maximum tolerance = ±10 μm	820 x 950	830 x 960	840 x 970	μm
<b>Wafer Thickness</b>	615	625	635	μm
<b>Bump Pitch</b>	150			μm
<b>Bump Height</b>	50	60	70	μm
<b>Bump Diameter</b>		79		μm
<b>UBM Diameter</b>	65	69	74	μm

**Environmental Specifications**

<b>Operating Temperature Range</b>	-65	+125	°C
<b>Storage Temperature Range*</b>	-65	+125	°C
<b>ESD Sensitivity (HBM)</b>	Class 1		
<b>MSL Sensitivity</b>	TBD		
<b>Radiation Tolerance</b>	100 krads		

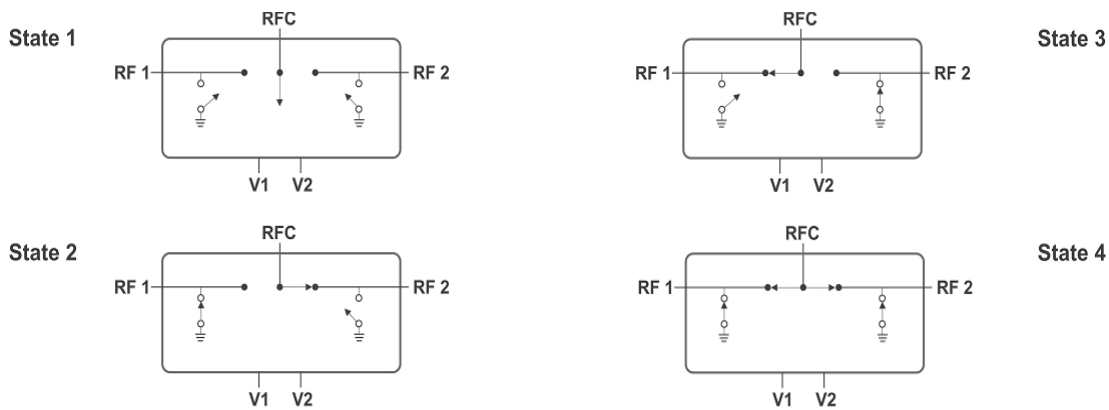
**RECOMMENDED OPERATING CONDITIONS**

Parameter	MIN	TYPICAL	MAX	UNIT
Control ON (V1,V2)	-0.3	0	+0.3	V
Control OFF (V1,V2)	-2.0	-2.5	-3.0	V
Control Current		200	700	μA

**Note:** Operation between -0.3V and -2.0V is not recommended.

**SWITCH STATES**

V1	V2	RF1	RF2	STATE
-2.5V	-2.5V	OFF	OFF	1
-2.5V	0V	OFF	ON	2
0V	-2.5V	ON	OFF	3
0V	0V	ON	ON	4



**Handling Guidelines for Active RF Switches (InP Die Series)**

1. Do not drop, throw, or in any way mishandle cartons containing switches.
2. Store switches in a humidity-controlled, shock- and vibration-free environment. Storage temperature range limits are -65°C to +125°C, however, when possible, switches should be stored in an ambient environment.
3. Do not expose switches to humid condition such that condensation may be formed due to sudden drop in temperature. Switches shall be stored in condensation free condition.
4. Active RF switches shall be treated as Electrostatic Discharge (ESD) sensitive and shall be handled accordingly. Always work in ESD protected station and wear wrist strap before handling the device.
5. When removing switches from packs, do so with extreme care. Do not allow the switches to fall onto any hard surface during unpacking. Do not “pour” the switches from the packing. Do not allow switches to fall onto the floor.
6. When transferring switches to a production area after unpacking, do so only in a suitable container, transport the devices in anti-static container, taking care not to drop the switches into the container, or to drop, throw or mishandle the container in any way.
7. Never subject switches to ultrasonic cleaning environment.
8. Unless otherwise specified, do not subject switches to reflow solder temperatures above 245°C, 6 seconds maximum.
9. If reshipping product do so in original packaging from factory.
10. Switches should not be exposed to any process or environment that exceeds any limits within this guideline or any published specification that applies to the switch.