

Part Number	SWITCH TYPE
InPD1012-60	Solid State, InP-HEMT Active RF Switch Die

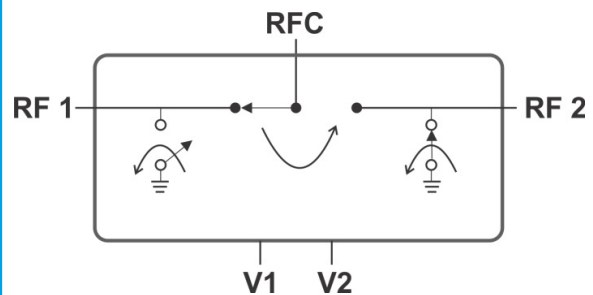
DESCRIPTION

The InPD1012-60 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 InPD1012-60 can also tolerate up to 100 krads of radiation, allowing it to be used in space applications.

The InPD1012-60 features:

- Broad frequency bandwidth, up to 60 GHz
- Low insertion loss
- Very High linearity
- Wide operating temperature
- Radiation tolerant up to 100 krads
- Very fast switching time of less than 100 ns

INTERNAL CONSTRUCTION

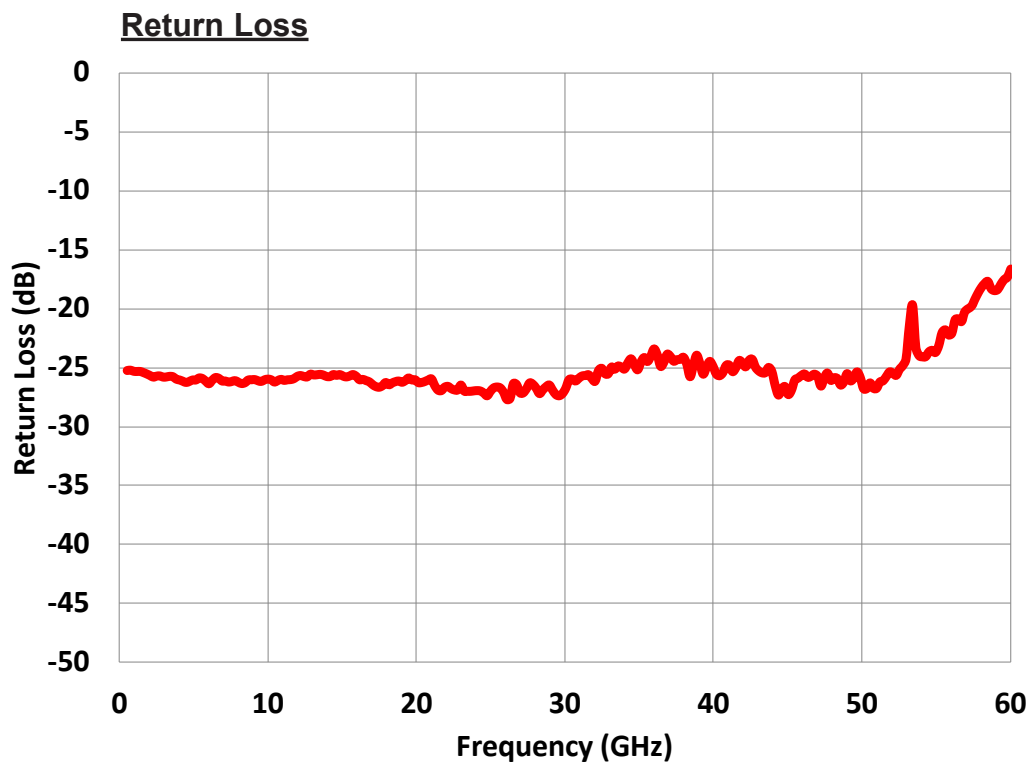
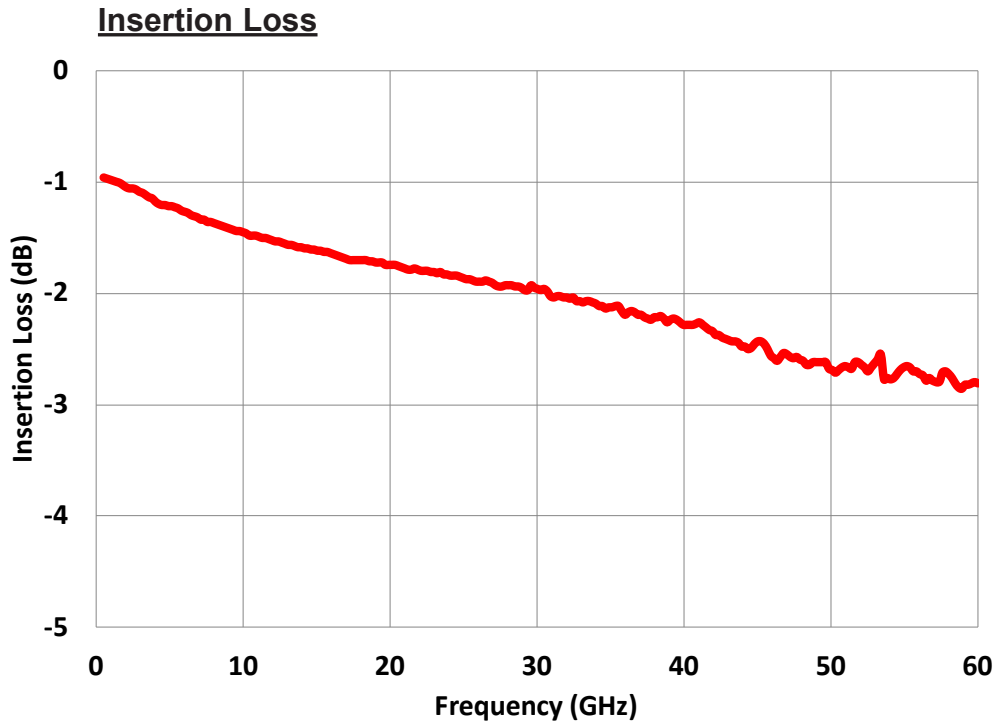


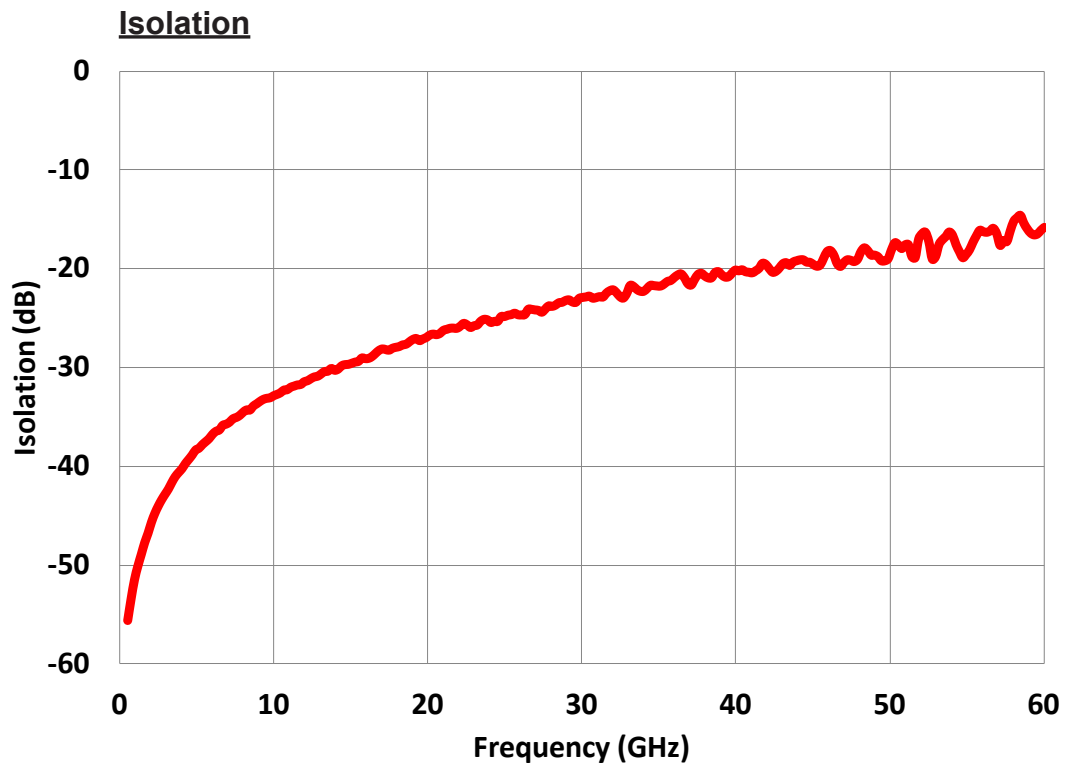
Electrical Specifications (@25°C, V1 = ON, V2 = OFF OR V1 = OFF, V2 = ON, Z_s = Z_L = 50 Ω)

Parameter/Condition	Frequency	Min.	Typ.	Max.	Unit
Insertion Loss	DC**		2.0		dB
	10kHz - 20 GHz		1.7	1.9	dB
	20 - 40 GHz		2.3	2.5	dB
	40 - 50 GHz		2.6	2.8	dB
	50 - 60 GHz		2.8	3.0	dB
Isolation	DC - 20 GHz	24	27		dB
	20 - 40 GHz	18	20		dB
	40 - 50 GHz	15	18		dB
	50 - 60 GHz	12	16		dB
Return Loss (active port)	DC - 50 GHz		26		dB
	50 - 60 GHz		17		dB
Switching Time			60	100	ns
Operating Power			1	2	mW
Input 0.1dB compression point	100 MHz		3.1		dBm
	6 GHz		15.7		dBm
	18 GHz		14.9		dBm
Input 1dB compression point	100 MHz		8.6		dBm
	6 GHz		21.1		dBm
	18 GHz		21.8		dBm
Input 3rd Order Intercept (IIP3)	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
Die Size, Singulated (x,y) maximum tolerance = ±10 μm	820 x 950	830 x 960	840 x 970	μm
Wafer Thickness	615	625	635	μm
Bump Pitch	150			μm
Bump Height	50	60	70	μm
Bump Diameter		79		μm
UBM Diameter	65	69	74	μm

Environmental Specifications

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

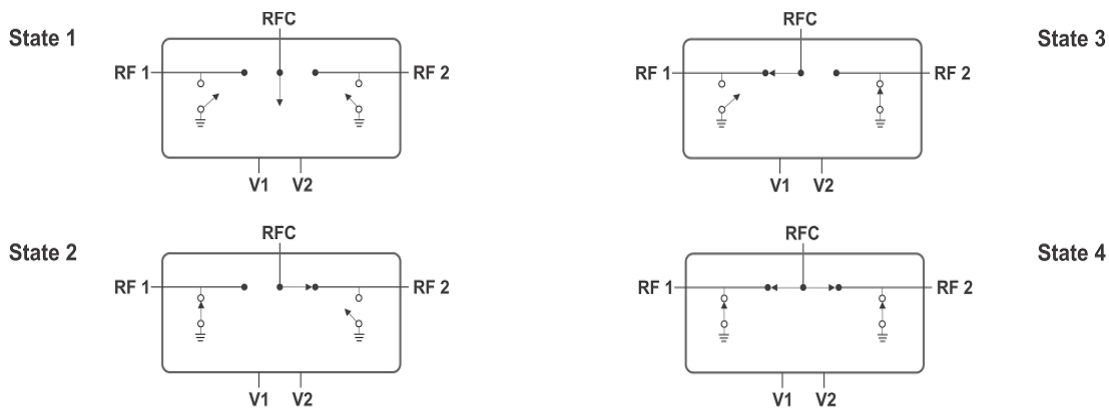
RECOMMENDED OPERATING CONDITIONS

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.