

23–26 GHz GaAs MMIC 6 Port Reflective PIN Switch



AP025R6-00

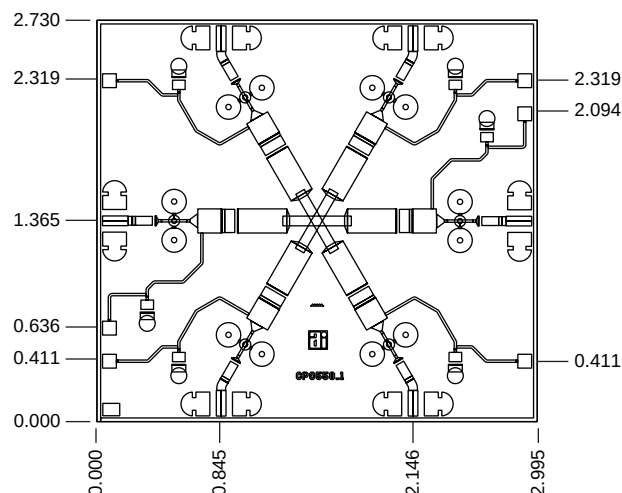
Features

- Low Loss
- Excellent Return Loss
- Fast Switching Speed
- High Power Handling

Description

Alpha's 6 port PIN diode switch is a robust, high performance switch which allows signal routing between any two RF ports. It is ideal for low loss, high isolation applications, particularly where high power handling is required. The chip uses Alpha's proven PIN diode technology, and is based upon MBE layers for the highest uniformity and repeatability. The diodes employ surface passivation to ensure a rugged, reliable part with through-substrate via holes and gold-based backside metallization to facilitate an epoxy die attach process. The GaAs MMIC employs a shunt PIN diode in each arm and an on-chip bias network. Chips are measured on a 100% basis for DC diode breakdown voltage, turn-on voltage and RF parameters on selected paths.

Chip Outline



Dimensions indicated in mm.
All RF pads are 0.07 x 0.150 mm. All DC pads are 0.1 x 0.1 mm.
Chip thickness = 0.1 mm.

Absolute Maximum Ratings

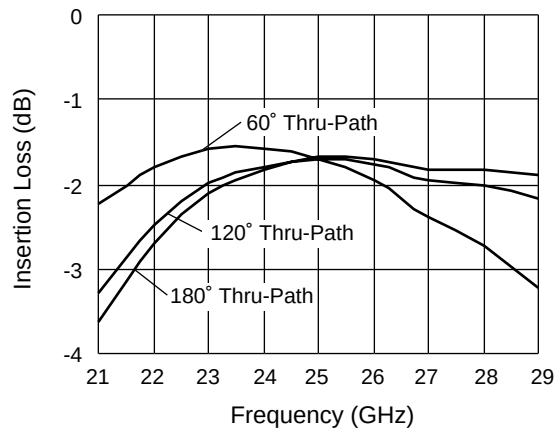
Characteristic	Value
Operating Temperature (T_C)	-55°C to +125°C
Storage Temperature (T_{ST})	-65°C to +150°C
DC Reverse Bias	-70 V (-10 μ A)
DC Forward Bias	1.3 V (50 mA)
P_{IN}	10 W

Electrical Specifications at 25°C

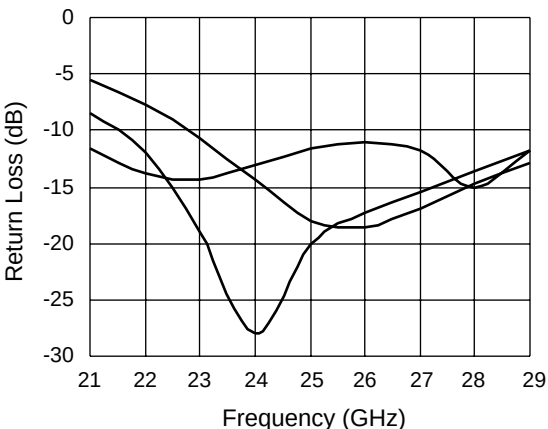
Parameter	Condition	Symbol	Min.	Typ.	Max.	Unit
Insertion Loss	F = 23–26 GHz	IL		1.5	2.3	dB
Isolation	F = 23–26 GHz	Iso	28	30		dB
Input Return Loss	F = 23–26 GHz	RL _I	10	15		dB
Output Return Loss	F = 23–26 GHz	RL _O	10	15		dB
Breakdown Voltage	I _R = 10 μ A	V _{BR}	20	60		V
Forward Voltage	I _F = 10 mA	V _F	0.9	1.25	1.3	V
Switching Speed ¹				2		ns
Output Power at 1 dB Compression ¹	F = 23–26 GHz	P _{1 dB}		33		dBm

1. Not measured on a 100% basis.

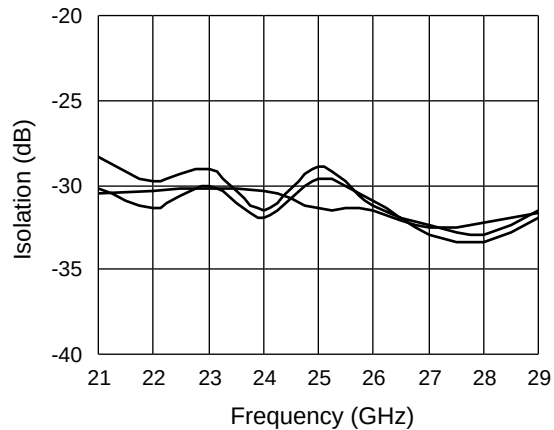
Typical Performance Data



Insertion Losses for Multiple Paths
Bias Conditions: $I_F = 10\text{ mA}$, $V_R = -5\text{ V}$

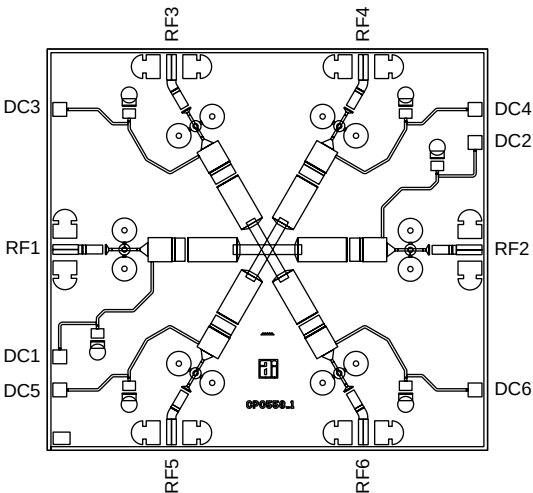


Return Losses for Multiple Paths
Bias Conditions: $I_F = 10\text{ mA}$, $V_R = -5\text{ V}$



Isolation Losses for Multiple Paths
Bias Conditions: $I_F = 10\text{ mA}$, $V_R = -5\text{ V}$

Bias Arrangement



Truth Table

DC1	DC2	DC3	DC4	DC5	DC6	Insertion Loss Path
-5 V	-5 V	10 mA	10 mA	10 mA	10 mA	RF1–RF2
-5 V	10 mA	-5 V	10 mA	10 mA	10 mA	RF1–RF3
-5 V	10 mA	10 mA	-5 V	10 mA	10 mA	RF1–RF4
-5 V	10 mA	10 mA	10 mA	-5 V	10 mA	RF1–RF5
-5 V	10 mA	10 mA	10 mA	10 mA	-5 V	RF1–RF6
10 mA	-5 V	-5 V	10 mA	10 mA	10 mA	RF2–RF3
10 mA	-5 V	10 mA	-5 V	10 mA	10 mA	RF2–RF4
10 mA	-5 V	10 mA	10 mA	-5 V	10 mA	RF2–RF5
10 mA	-5 V	10 mA	10 mA	10 mA	-5 V	RF2–RF6
10 mA	10 mA	-5 V	-5 V	10 mA	10 mA	RF3–RF4
10 mA	10 mA	-5 V	10 mA	-5 V	10 mA	RF3–RF5
10 mA	10 mA	-5 V	10 mA	10 mA	-5 V	RF3–RF6
10 mA	10 mA	10 mA	-5 V	-5 V	10 mA	RF4–RF5
10 mA	10 mA	10 mA	-5 V	10 mA	-5 V	RF4–RF6
10 mA	10 mA	10 mA	10 mA	-5 V	-5 V	RF5–RF6