



35 dB High Isolation SPDT PIN Diode Switch DC to 20 GHz, 4 dB Insertion Loss with SMA

TECHNICAL DATA SHEET

PE71S5000

The PE71S5000 is a Single Pole Double Throw (SPDT) Absorptive Switch that covers a wide frequency band from DC to 20 GHz. This general purpose design utilizes GaAs MESFET MMIC technology that has extremely fast switching speed levels of 5 nsec. Additional typical performance includes 45 dB Isolation up to 5 GHz, and 2 dB Insertion Loss at 12 GHz. The design also incorporates CMOS driver circuitry that allows a single +5V biased voltage at very low DC current levels. The drop-in package is hermetically sealed with field replaceable SMA connectors. Operating temperature range is -55°C to +85°C. And for added confidence, this rugged package assembly is designed to meet MIL-STD-883 test conditions for Hermeticity and Temperature Cycle.

Features

- SPDT Non-Reflective Switch Design
- GaAs MESFET MMIC Technology
- Ultra Fast Switching Speed 5 nsec typical
- High Isolation 45 dB typical up to 5 GHz
- Low Insertion Loss 2 dB typical at 12 GHz
- CMOS Driver Circuit
- Hermetically Sealed Module
- Field Replaceable SMA Connectors
- -55°C to +85°C Operating Temperature
- Designed to meet MIL-STD-883 Conditions

Applications

- Electronic Warfare
- Electronic Countermeasures
- Microwave Radio
- VSAT
- Radar
- Fiber Optic
- Space Systems
- Test Instrumentation
- Telecom Infrastructure
- Base station Infrastructure

Electrical Specifications

Description	Minimum	Typical	Maximum	Units
Frequency Range	DC		20	GHz
Insertion Loss		4		dB
Isolation		35		dB
Switching Speed		5		ns
Control Input		TTL		
Power Handling		+23		dBm

Click the following link (or enter part number in "SEARCH" on website) to obtain additional part information including price, inventory and certifications: [35 dB High Isolation SPDT PIN Diode Switch DC to 20 GHz, 4 dB Insertion Loss with SMA PE71S5000](#)



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Performance by Frequency

Description	Frequency	Min.	Typ.	Max.	Units
Insertion Loss	DC - 4.0 GHz		1.8	2.3	dB
	DC - 12.0 GHz		2.0	2.5	dB
	DC - 16.0 GHz		2.5	3.5	dB
	DC - 20.0 GHz		4	4.9	dB
Isolation	DC - 4.0 GHz	41	46		dB
	DC - 8.0 GHz	35	40		dB
	DC - 20.0 GHz	25	35		dB
Return Loss	DC - 12.0 GHz		15		dB
	DC - 20.0 GHz		10		dB
Return Loss RF1, RF2	DC - 10.0 GHz		20		dB
	DC - 15.0 GHz		15		dB
	DC - 20.0 GHz		10		dB
Input Power For 1 dB Compression	0.5 - 20.0 GHz	+20	+23		dBm
Input Third Order Intercept	0.5 - 10.0 GHz		+48		dBm
(Two-Tone Input Power= +7 dBm Each Tone)	0.5 - 20.0 GHz		+45		dBm
Switching Characteristics					
Trise, Tfall (10/90% RF)	DC - 20 GHz		1.3		ns
Ton, Toff (50% Ctl To 10/90% RF)			5		ns
Switching Transients	DC - 20 GHz		20		mVpp

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TTL Logic Table

Absolute Maximum Rating

RF Input Power	+27 dBm
Supply Voltage (Vdc)	+7 Vdc
Control Voltage Range (Vctl)	-0.5V to Vdd +0.5V
Hot Switch Power Level	+23 dBm
Storage Temperature	-65 to +150 °C
Operating Temperature	-55 to +85 °C

Control Voltages

State	Bias Condition
High	+3.5 to Vdc @ 1 mA Typ.
Low	0 to +1.5V @ 20 µA Typ.

Bias Voltage & Current

Vdc Range = +5 Vdc ± 10%	
Vdc (Vdc)	Idc (Typ.) (mA)
+5.0	1.4

(Bias current increases with switching rate to 15 - 20 mA.)

Truth Table

Control Input	Signal Path State	
	RFC to RF1	RFC to RF2
Vctl		
High	On	Off
Low	Off	On

Mechanical Specifications

Size

Length	0.89 in [22.61 mm]
Width/Dia.	0.68 in [17.27 mm]
Height	0.235 in [5.97 mm]
Weight	0.079 lbs [35.83 g]

Environmental Specifications By Design

Temperature

Operating Range	-55 to +85 deg C
Storage Range	-65 to +150 deg C

Temperature Cycling
Hermetic Seal

MIL-STD-883, Method 101C, Cond B
Gross Leak MIL-STD-883 Method 1014C1/Fine Leak
MIL-STD-883, Method 1014A2, 5 x 10-8 atm cc
ESD Sensitive Material, Transport material in Approved
ESD bags. Handle only in ESD Workstation.

ESD Sensitivity



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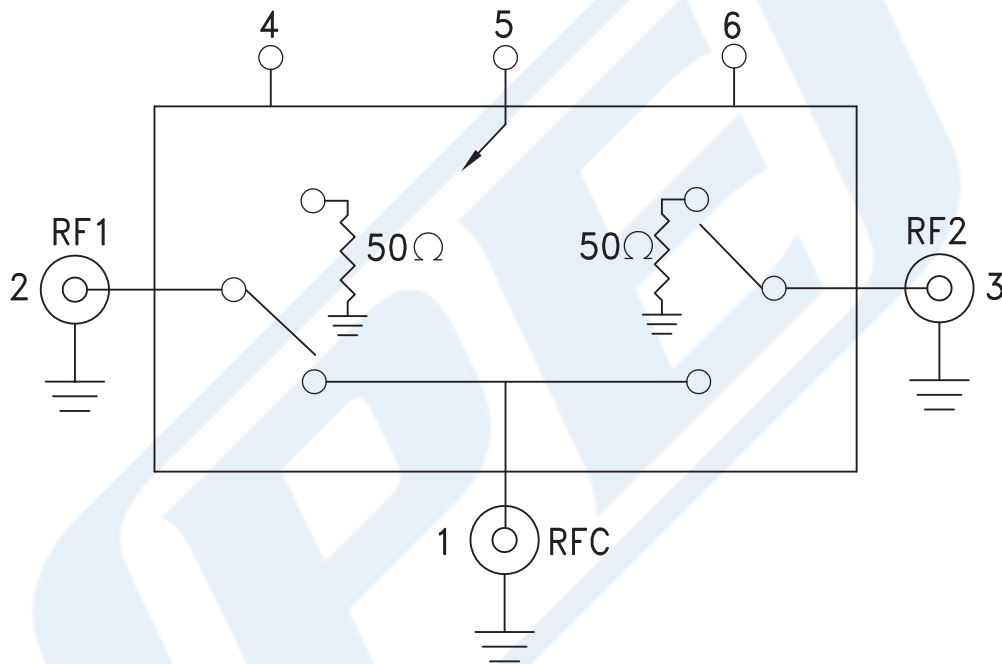
Compliance Certifications (see [product page](#) for current document)

Plotted and Other Data

Notes:

- Values at +25 °C, sea level

Functional Block Diagram



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TECHNICAL DATA SHEET

PE71S5000

Pin Descriptions

Pin Number	Function	Description	Interface Schematic
1, 2, 3	RFC, RF1, RF2	RF connector, SMA female, field replaceable. These pins are DC coupled and matched to 50 Ohms. DC blocking capacitors are required if external RF line potential is not equal to 0V.	
4	GND	Power supply ground.	
5	Vctl	CMOS interface, control voltages per table. Requires active pullup to +5V (V_{dc}).	
6	Vdc	Supply voltage	

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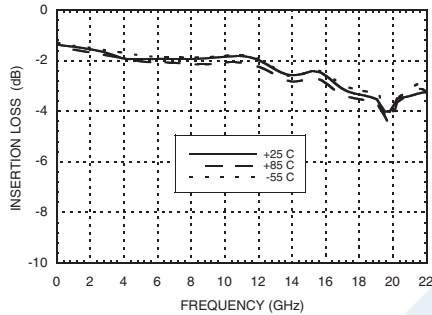
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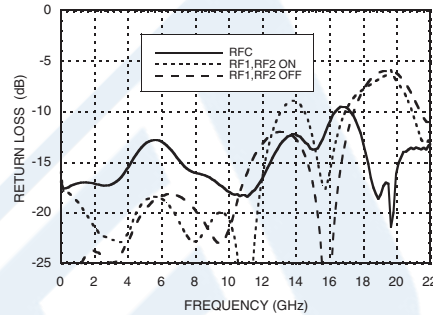
PE71S5000

Typical Performance Data

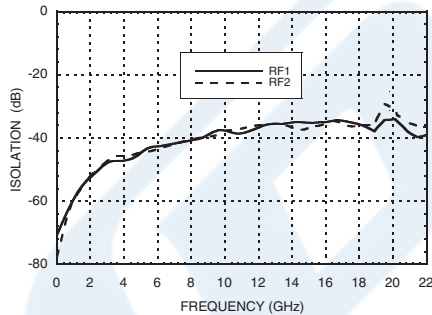
Insertion Loss



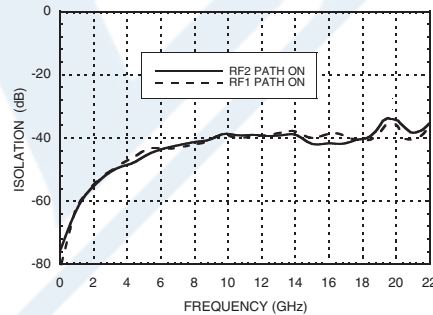
Return Loss



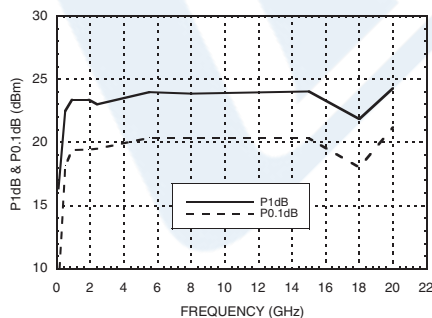
Isolations



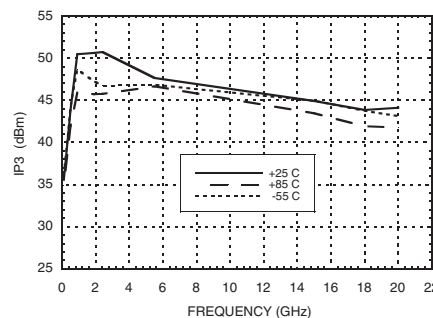
Isolation Between Ports RF1 and RF2



Input P1dB & P0.1dB Compression Point



Input Third Order Intercept Point



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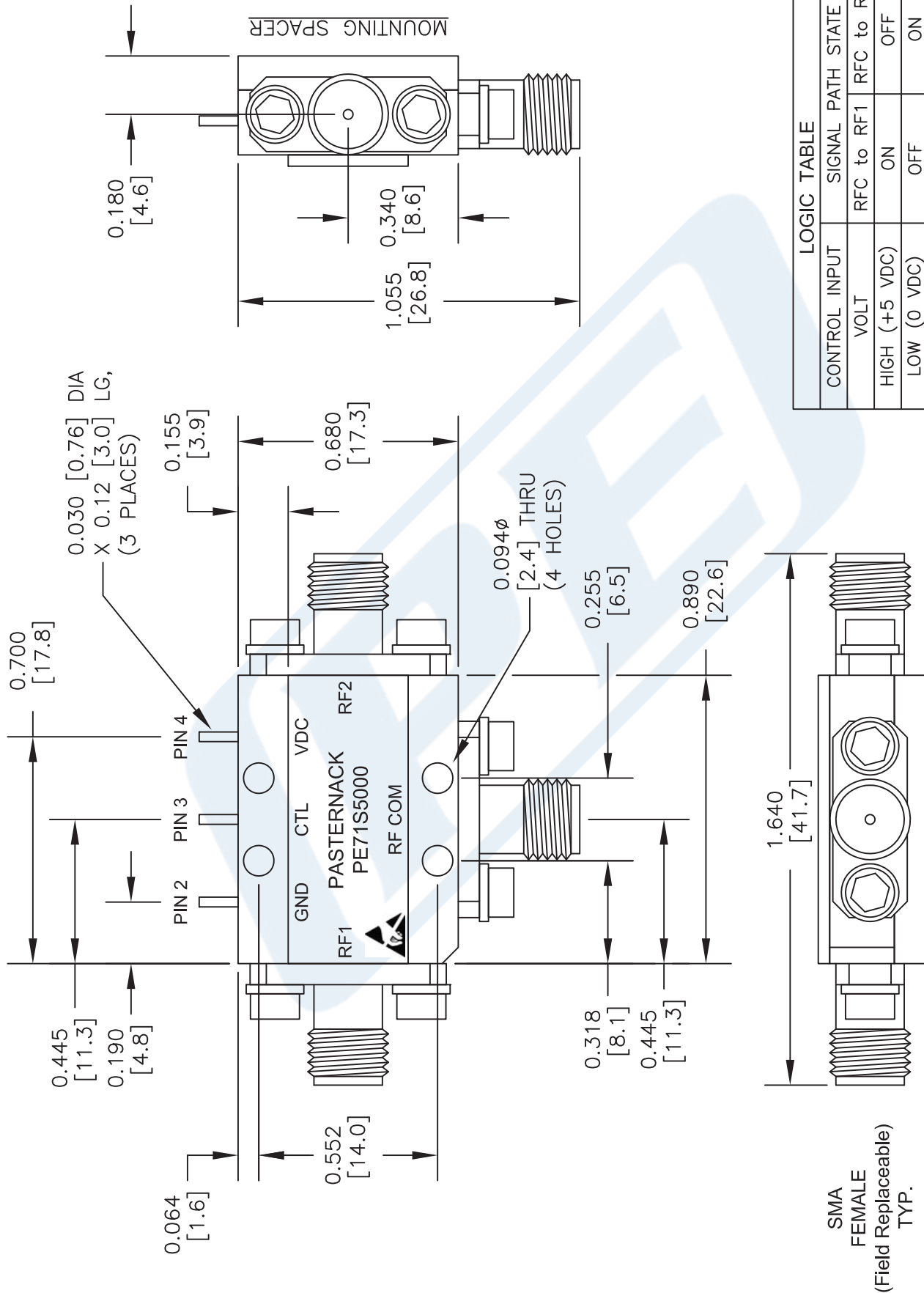
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PE71S5000 CAD Drawing

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LOGIC TABLE		
CONTROL INPUT	SIGNAL PATH STATE	
VOLT	RF1 to RF2	RF2 to RF1
HIGH (+5 VDC)	ON	OFF
LOW (0 VDC)	OFF	ON

NOTES:
 1. UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE NOMINAL.
 2. ALL SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE AT ANY TIME.
 3. DIMENSIONS ARE IN INCHES [mm].

DWG TITLE
PE71S5000

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SCALE N/A

SIZE A

2233