



38 dB High Isolation SP4T PIN Diode Switch DC to 20 GHz, 3.8 dB Insertion Loss with SMA

TECHNICAL DATA SHEET

PE71S5006

The PE71S5005 is a Single Pole Four Throw (SP4T) 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 17 nsec. Additional typical performance includes 42 dB Isolation up to 12 GHz, and 2.7 dB Insertion Loss at 6 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

- SP4T Absorptive Switch Design
- GaAs MESFET MMIC Technology
- Ultra Fast Switching Speed 17 nsec typical
- High Isolation 42 dB typical up to 12 GHz
- Low Insertion Loss 2.7 dB typical at 6 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		3.8		dB
Isolation		38		dB
Control Input		TTL		
Power Handling		+24		dBm

Click the following link (or enter part number in "SEARCH" on website) to obtain additional part information including price, inventory and certifications: [38 dB High Isolation SP4T PIN Diode Switch DC to 20 GHz, 3.8 dB Insertion Loss with SMA PE71S5006](#)



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Performance by Frequency

Description	Frequency	Min.	Typ.	Max.	Units
Insertion Loss	DC - 6 Ghz		-2.7	-3.2	dB
	DC - 12 Ghz		-2.8	-3.2	
	DC - 20 Ghz		-3.8	-4.5	
Isolation	DC - 6 Ghz	44	48		dB
	DC - 12 Ghz	36	42		
	DC - 20 Ghz	35	38		
Return Loss	DC - 12 Ghz		12		dB
	DC - 20 Ghz		10		
Return Loss RF1, RF2	DC - 12 Ghz		15		dB
	DC - 20 Ghz		10		
Input Power for 1 dB Compression	0.5 - 20 Ghz	+20.5	+24		dBm
Input Third Order Intercept (Two-Tone Input Power = +7 dBm Each Tone)	0.5 - 20 Ghz	+36.5	+40		dBm
Switching Characteristics					
tRISE, tFALL (10/90% RF)	DC - 20 Ghz		17		ns
tON, tOFF (50% CTL to 10/90% RF)			130		

TTL Logic Table

Absolute Maximum Rating

RF Input Power	+24 dBm
Supply Voltage (Vdc)	+7V
Control Voltage Range (Vctl)	-0.5V to Vdc +1V
Storage Temperature	-65 to +150 °C
Operating Temperature	-55 to +85 °C

Control Voltages

State	Bias Condition
High	+3.0 to Vdc @ 1 mA Typ.
Low	0 to +1.5V @ 20 µA Typ.

Bias Voltage & Current

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

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

Truth Table

Control Input	Signal Path State	
VCTL1	VCTL2	RFC to:
LOW	LOW	RF1
LOW	HIGH	RF2
HIGH	LOW	RF3
HIGH	HIGH	RF4

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Mechanical Specifications

Size

Length	1.68 in [42.67 mm]
Width/Dia.	1.6 in [40.64 mm]
Height	0.325 in [8.26 mm]
Weight	0.222 lbs [100.7 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



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

Plotted and Other Data

Notes:

- Values at +25 °C, sea level

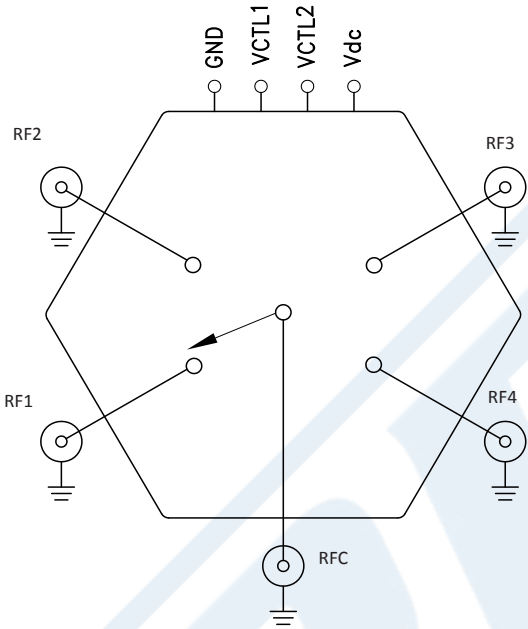
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Pin Descriptions

Pin Number	Function	Description	Interface Schematic
1	GND	Power supply ground.	
2, 3	Vctl1, 2	CMOS interface, control voltages per table. Requires active pull up to +5V (V _{dc}).	
4	Vdc	Supply voltage	
5 - 9	RFC, RF1, RF2, RF3, RF4	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.	

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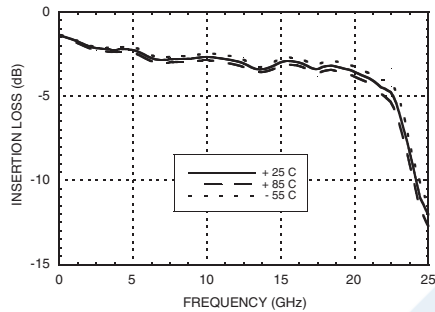
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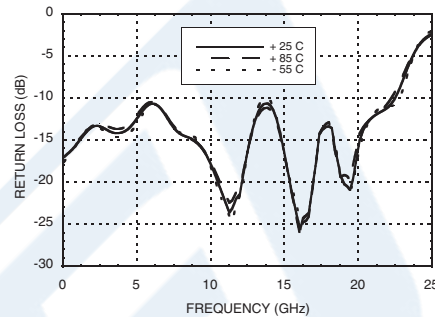
PE71S5006

Typical Performance Data

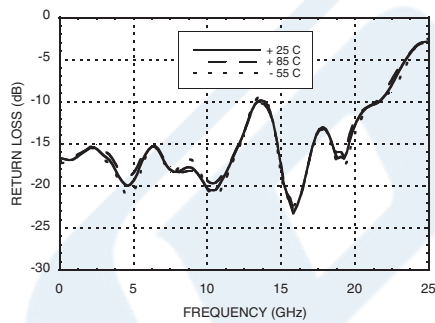
Insertion Loss



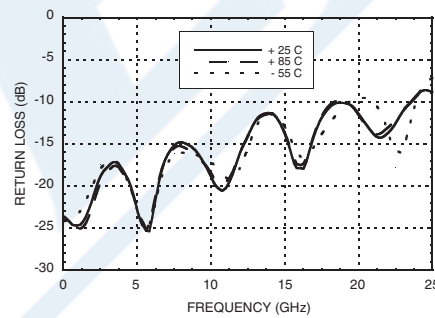
Return Loss RFC



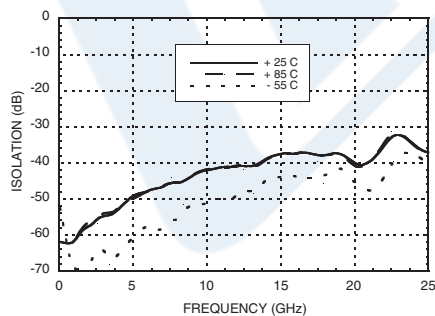
Return Loss RF1, RF2, RF3, RF4 On



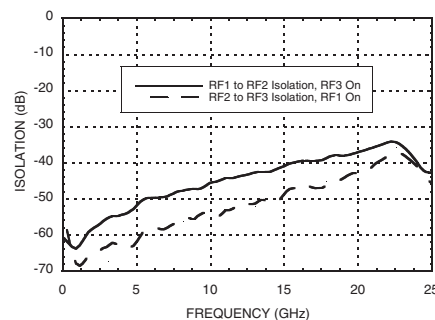
Return Loss RF1, RF2, RF3, RF4 Off



Isolation



Isolation Between Ports RF1 and RF2



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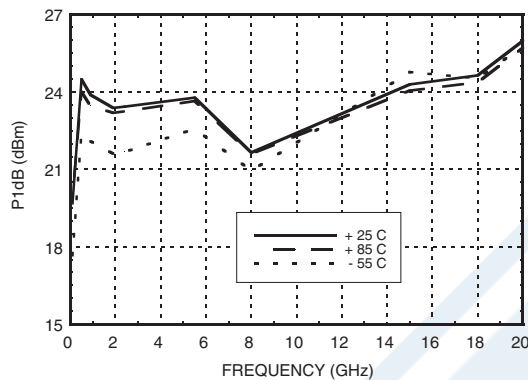


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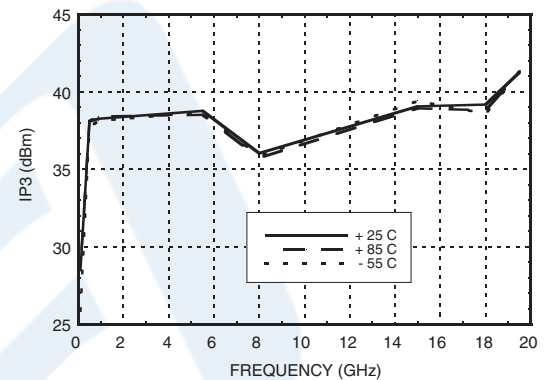
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Input P1dB Compression Point



Input Third Order Intercept Point



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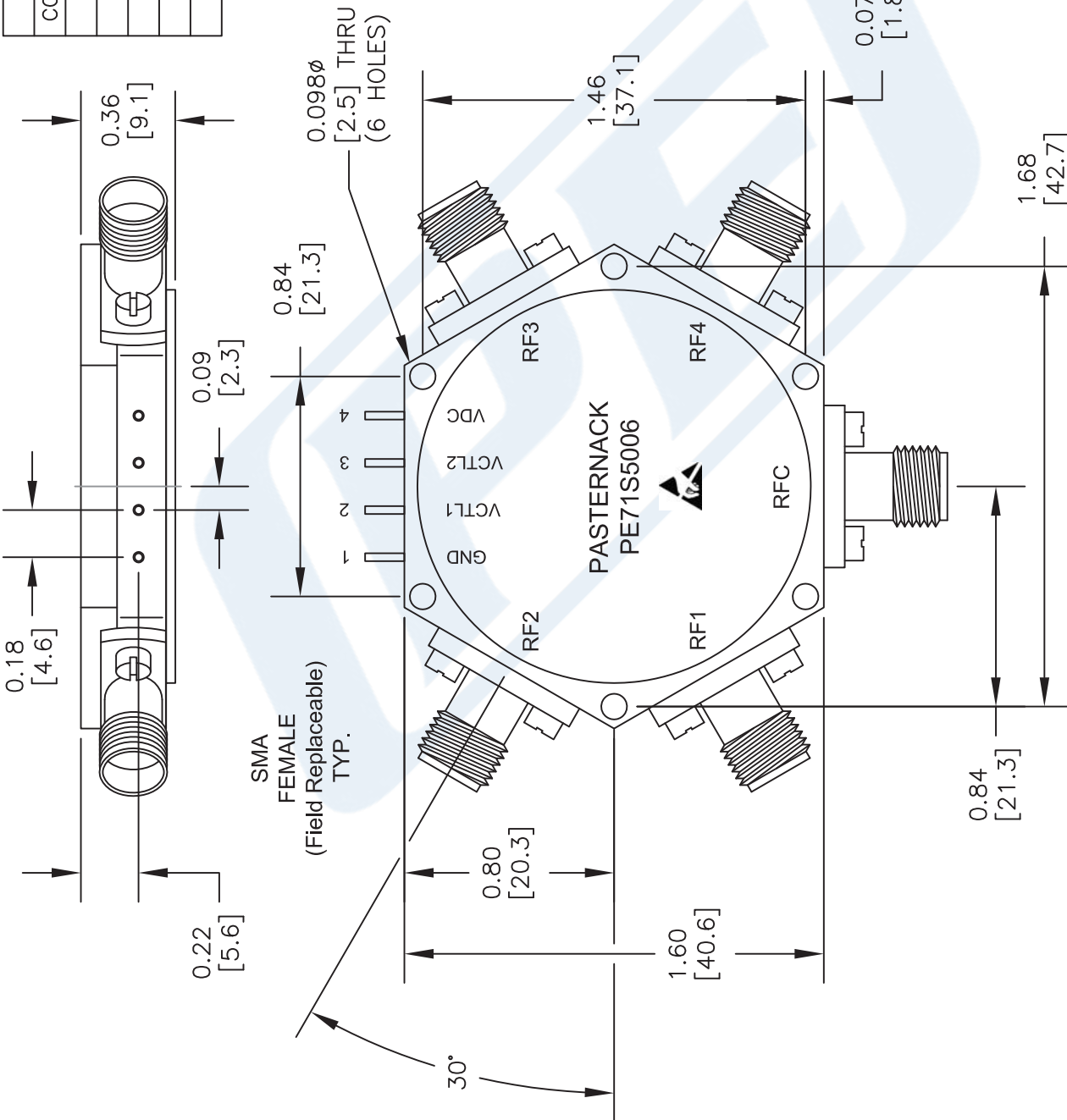
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The information contained in this document is accurate to the best of our knowledge and representative of the part described herein. It may be necessary to make modifications to the part and/or the documentation of the part, in order to implement improvements. Pasternack reserves the right to make such changes as required. Unless otherwise stated, all specifications are nominal. Pasternack does not make any representation or warranty regarding the suitability of the part described herein for any particular purpose, and Pasternack does not assume any liability arising out of the use of any part or documentation.

PE71S5006 CAD Drawing

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TRUTH TABLE			
CONTROL INPUT	SIGNAL PATH	STATE	
VCTL1	VCTL2	RFC to:	
LOW	LOW	RF1	
LOW	HIGH	RF2	
HIGH	LOW	RF3	
HIGH	HIGH	RF4	



DWG TITLE

PE71S5006

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].

PE PASTERNAK
THE ENGINEER'S RF SOURCE

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FSCM NO. 53919

CAD FILE 071916

SCALE N/A

SIZE A

2233