



## 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

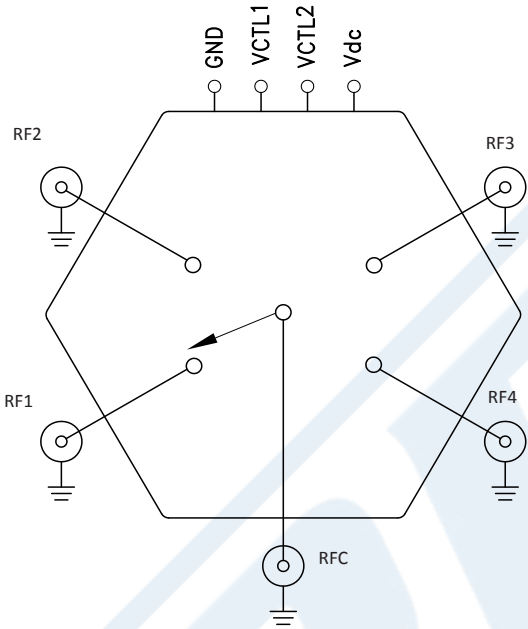
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Pin Descriptions

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 <sub>dc</sub> ).	
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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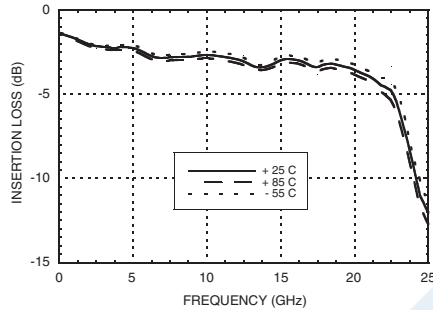
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## TECHNICAL DATA SHEET

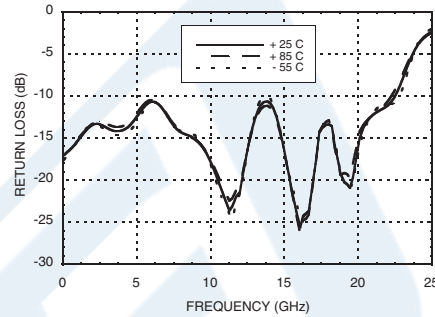
PE71S5006

### Typical Performance Data

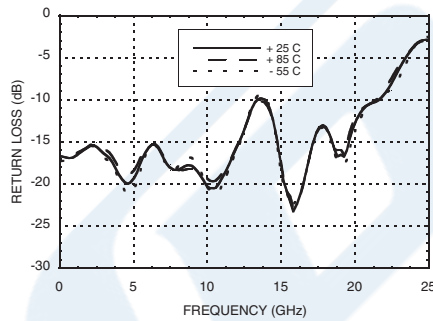
#### Insertion Loss



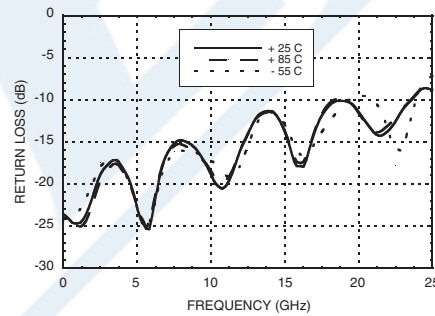
#### Return Loss RFC



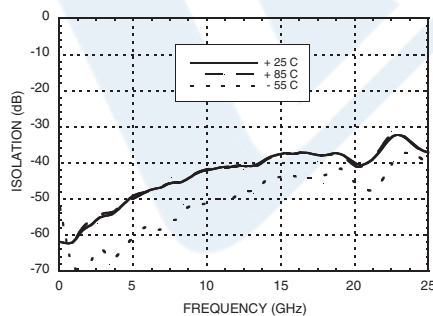
#### Return Loss RF1, RF2, RF3, RF4 On



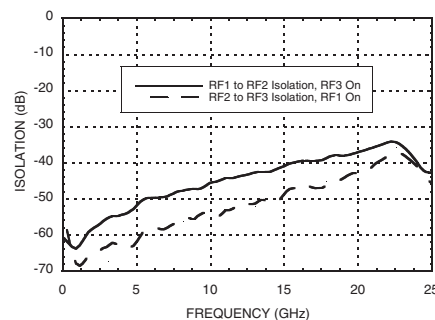
#### Return Loss RF1, RF2, RF3, RF4 Off



#### Isolation



#### Isolation Between Ports RF1 and RF2



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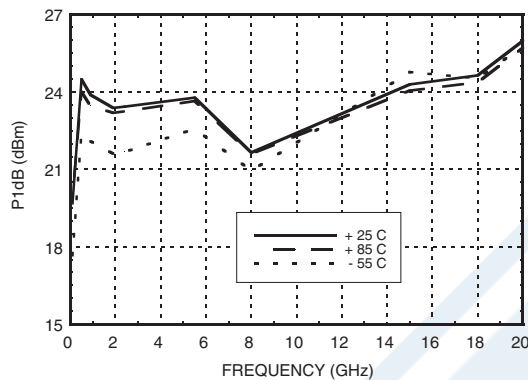


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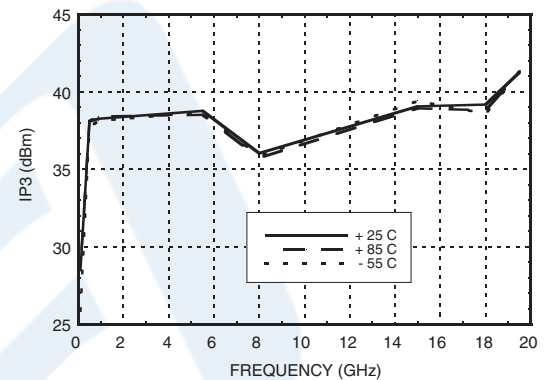
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**Input P1dB Compression Point**



**Input Third Order Intercept Point**



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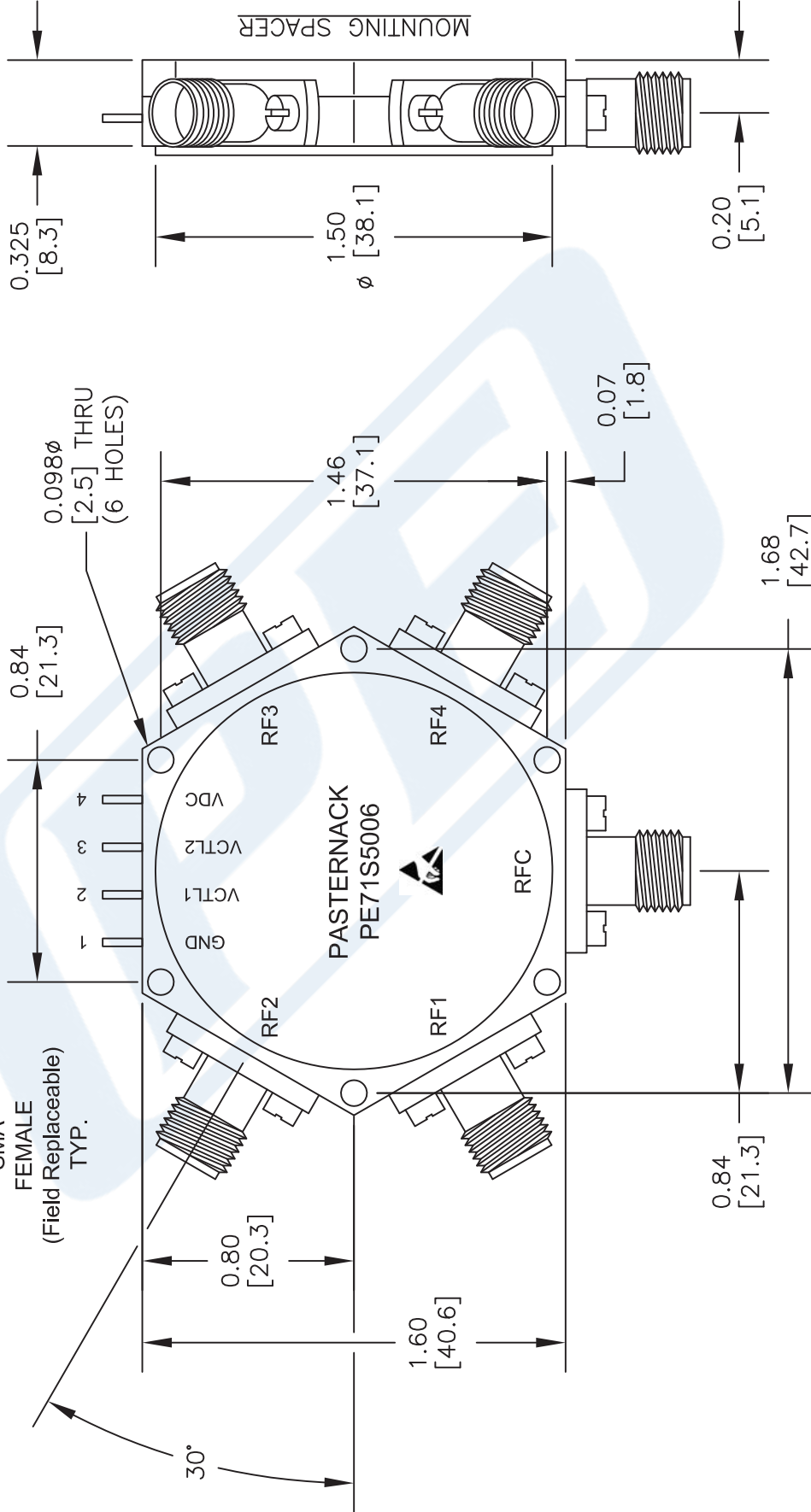
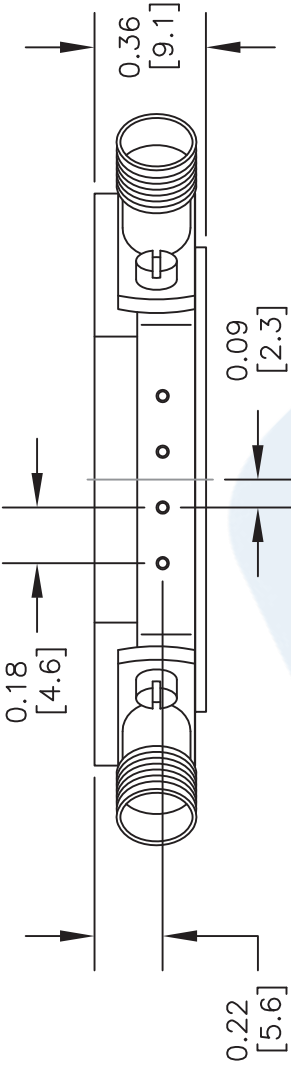
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# PE71S5006 CAD Drawing

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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].

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FSCM NO. 53919

CAD FILE 071916

SCALE N/A

SIZE A

2233