



# 1 MHz to 43.5 GHz Absorptive Digital Control Attenuator, 31.5 dB, 6 Bits, 0.5 dB Step Size, Field Replaceable 2.92mm

## TECHNICAL DATA SHEET

**PE70A5015**

The PE70A5015 is an Absorptive 6 Bit Digitally Controlled Programmable Attenuator that operates across a wide frequency band from 1 MHz to 43.5 GHz. The 50 Ohm design supports TTL control logic and has an attenuation range that covers 0 to 31.5 dB in 0.5 dB steps. Attenuation steps are 0.5, 1, 2, 4, 8, and 16 dB. Insertion loss is 6.5 dB typical with a maximum RF input power of +27 dBm. Additional typical performance includes attenuation flatness of +/- 0.6 dB, Input P0.1dB compression power of +26 dBm, input IP3 of 41.5 dBm, and switching speed of 200 nsec. The unit requires a DC bias supply of +5V with DC current of 10mA max. The low profile pin package is aluminum with Gold plating and supports field replaceable 2.92mm RF connectors and a Micro-D9 female connector for DC Bias and Command Control functions. The module has an operational temperature range from -40°C to +85°C and is guaranteed to meet a series of environmental test conditions for Altitude, Vibration, Humidity, and Shock.

### Features

- Absorptive Programmable Voltage Controlled Attenuator
- 1 MHz to 43.5 GHz
- Attenuation Range 0 to 31.5 dB typ
- 0.5 dB Step Size
- 6 Bits
- Digital TTL Logic Control
- Insertion Loss 7 dB typ
- Attenuation Flatness +/- 0.6 dB typ
- Input P0.1 dB Compression Power +26 dBm typ
- Input IP3 41 dBm
- Max RF Input Power (CW) +27 dBm
- Switching Speed 200 nsec typ
- DC Supply +5V/-5V @ 10 mA/10 mA
- 50 Ohm Design
- Field Replaceable 2.92mm Female RF Connectors
- Micro-D9 Female connector for DC Bias and Command Control
- Operational Temperature Range -40°C to +85°C
- Rugged and Compact Aluminum Gold Plated Package Design
- Guaranteed Environmental Test Conditions Altitude, Vibration, Humidity, Shock
- Single Positive Control Line Per Bit

### Applications

- Test & Measurement
- Military and Commercial Communications
- Military Electronic Systems
- Research & Development

### Electrical Specifications (Values at +25°C, sea level)

| Description                       | Minimum | Typical   | Maximum | Units |
|-----------------------------------|---------|-----------|---------|-------|
| Frequency Range                   | 0.001   |           | 43.5    | GHz   |
| Impedance                         |         | 50        |         | Ohms  |
| Attenuation Range                 |         | 31.5      |         | dB    |
| Insertion Loss                    |         | 7         | 10      | dB    |
| VSWR                              |         | 1.7:1     | 2.2:1   |       |
| Input at 0.1 dB Compression Point |         | +26       |         | dB    |
| Input IP3                         |         | +41       |         | dBm   |
| DC Voltage                        |         | 5         |         | Vdc   |
| Attenuation Flatness*             |         | 0.6       |         | dB    |
| TTL Low for Thru Path             |         | 0 to 0.8V |         | Vdc   |

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PE70A5015

|                            |       |          |
|----------------------------|-------|----------|
| TTL High for Attenuation   | 2-5V  | Vdc      |
| Step Size                  | 0.5   | dB       |
| Switching Speed            | 200   | ns       |
| RF Input Power             | 27    | dBm      |
| Control Bits               | 6     | Bits     |
| Bias Current               | 10/10 | mA       |
| IL Temperature Coefficient | 0.005 | dB/deg C |

\*Referenced to Insertion Loss

### Absolute Maximum Rating

| Parameter      | Rating  |
|----------------|---------|
| Biasing        | +5V±10% |
| RF Input power | +27dBm  |

### Mechanical Specifications

#### Size

|             |                                 |
|-------------|---------------------------------|
| Length      | 1.46 in [37.08 mm]              |
| Width       | 0.37 in [9.4 mm]                |
| Height      | 1.1 in [27.94 mm]               |
| Weight      | 0.05 lbs [22.68 g]              |
| Connector 1 | Field Replaceable 2.92mm Female |
| Connector 2 | Field Replaceable 2.92mm Female |

### Environmental Specifications

#### Temperature

|                 |  |
|-----------------|--|
| Operating Range | -40 to +85 deg C                                       |
| Storage Range   | -50 to +105 deg C                                      |
| Humidity        | 100% RH at 35°C, 95% RH at 40°C                        |
| Shock           | 20G for 11 msec half sine wave, 3 axis both directions |
| Vibration       | 25g RMS (15 degrees 2KHz) endurance, 1 hour per axis   |
| Altitude        | 30,000 Feet  |

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

### Plotted and Other Data

Notes:

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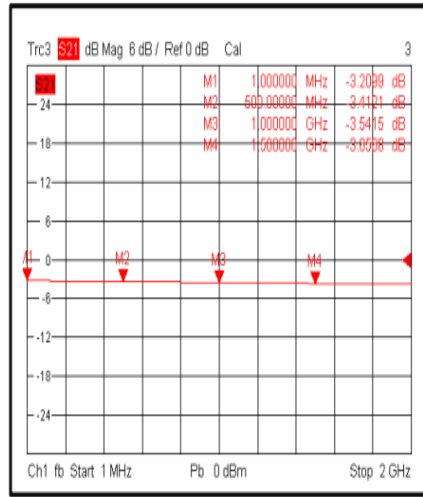
1 MHz to 43.5 GHz Absorptive Digital Control Attenuator,  
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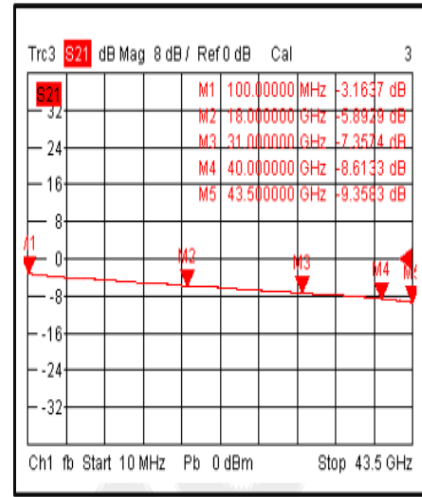
**PE70A5015**

**Performance Data**

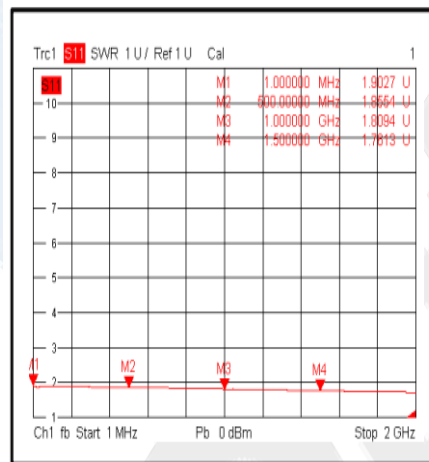
**Insertion Loss(1MHz-1.5GHz) @+25°C**



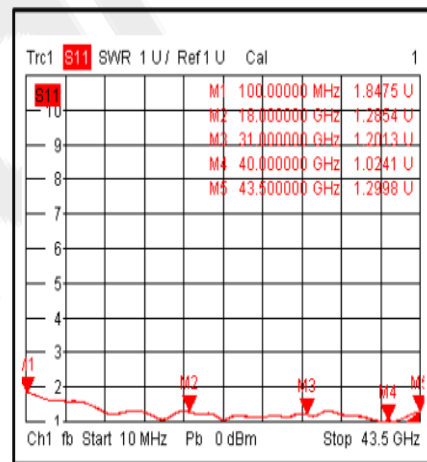
**Insertion Loss(100MHz-43.5GHz) @+25°C**



**Input VSWR(1MHz-1.5GHz) @+25°C**



**Input VSWR(100MHz-43.5GHz) @+25°C**



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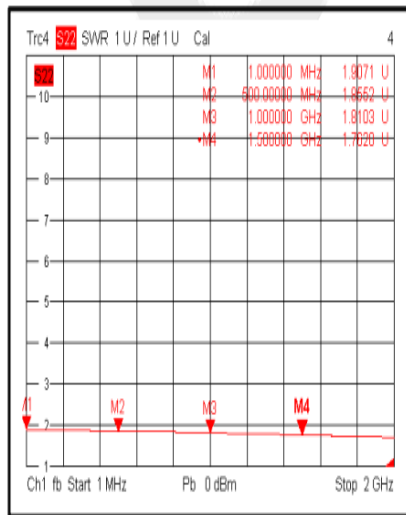


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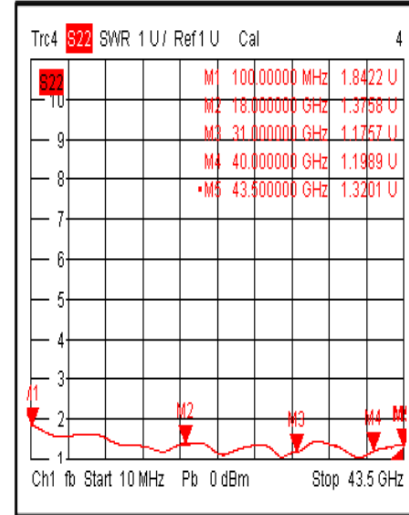
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**PE70A5015**

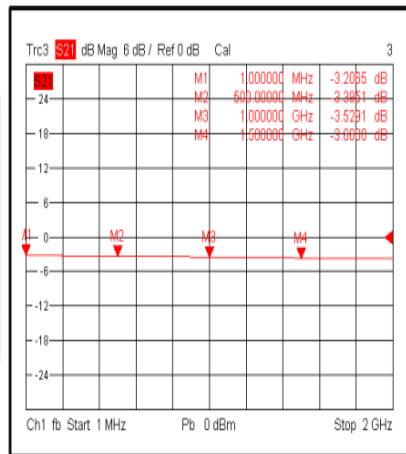
Output VSWR(1MHz-1.5GHz) @+25°C



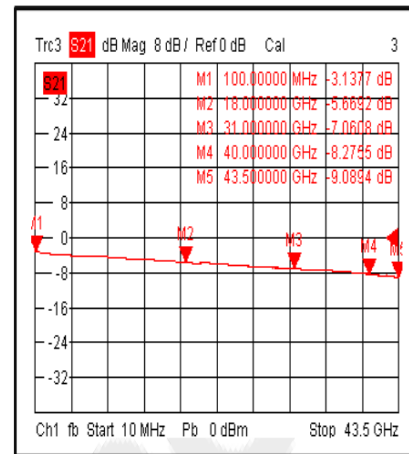
Output VSWR(100MHz-43.5GHz) @+25°C



Insertion Loss(1MHz-1.5GHz) @-40°C



Insertion Loss(100MHz-43.5GHz) @-40°C



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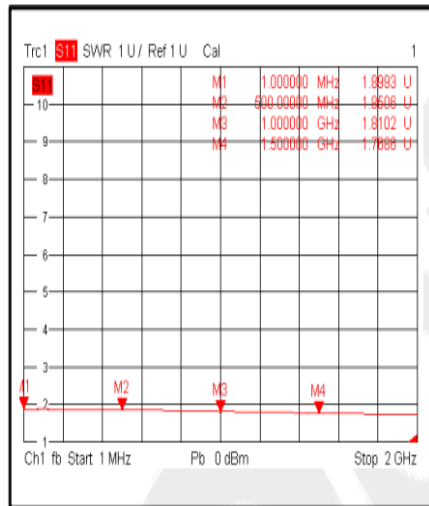


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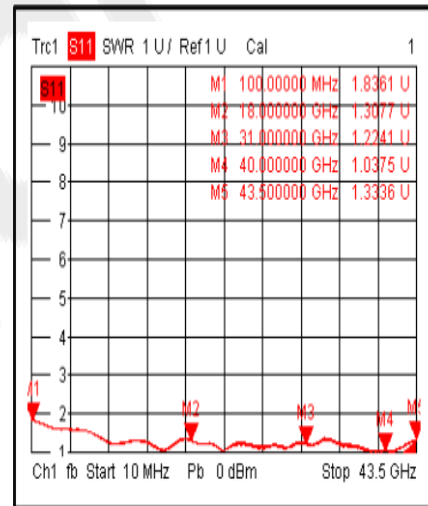
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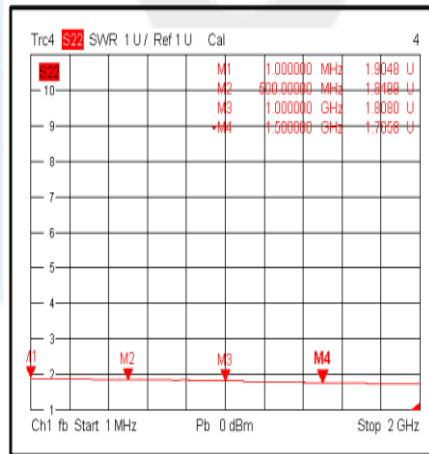
**Input VSWR(1MHz-1.5GHz) @-40°C**



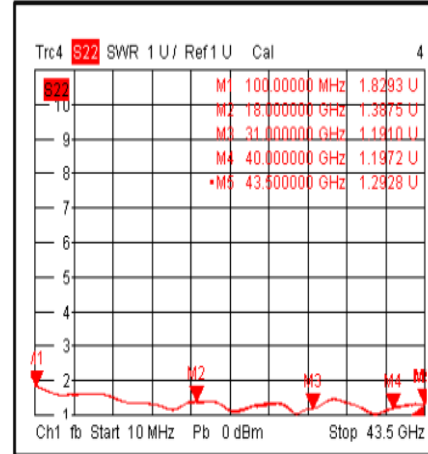
**Input VSWR(100MHz-43.5GHz) @-40°C**



**Output VSWR(1MHz-1.5GHz) @-40°C**



**Output VSWR(100MHz-43.5GHz) @-40°C**



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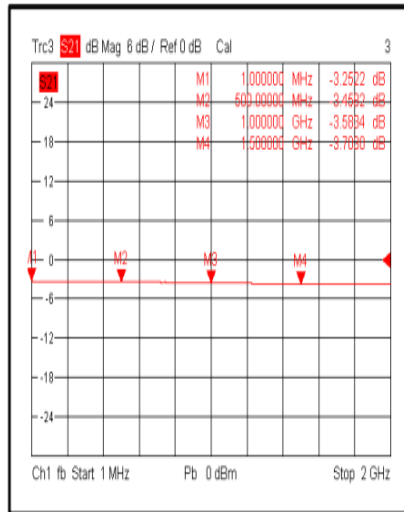


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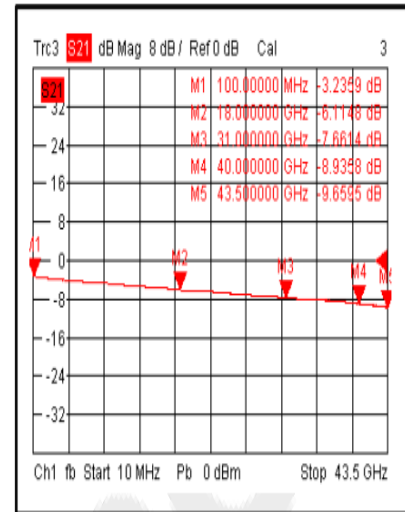
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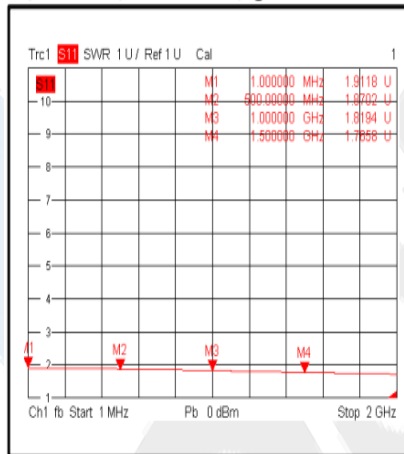
**Insertion Loss(1MHz-1.5GHz) @+85°C**



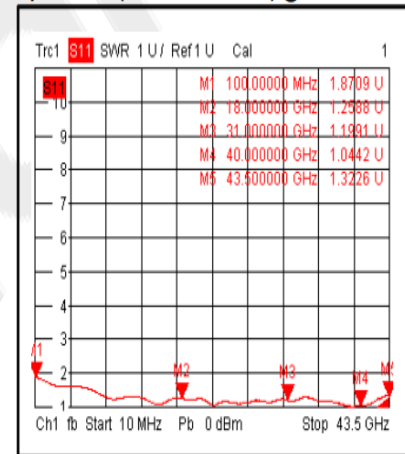
**Insertion Loss(100MHz-43.5GHz) @+85°C**



**Input VSWR(1MHz-1.5GHz) @+85°C**



**Input VSWR(100MHz-43.5GHz) @+85°C**



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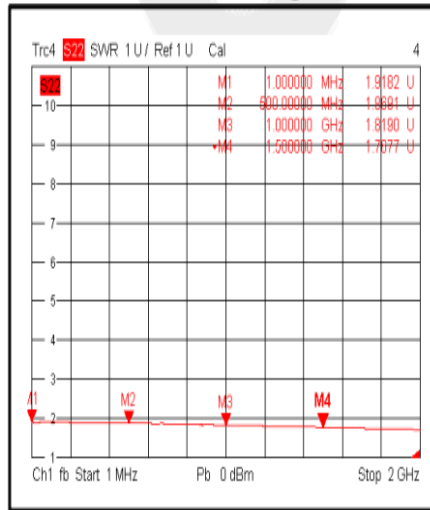


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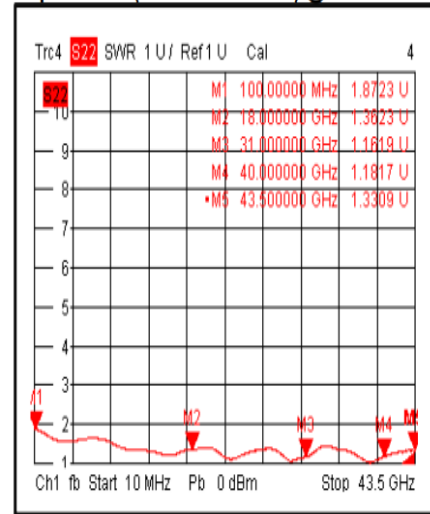
**TECHNICAL DATA SHEET**

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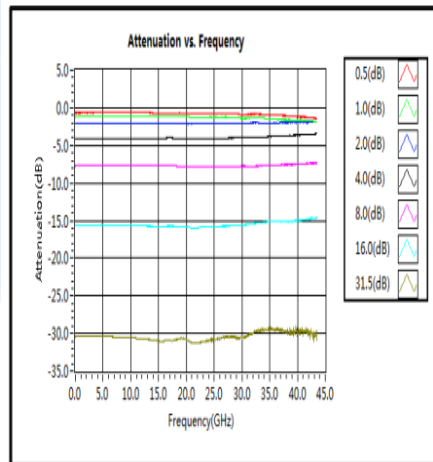
**Output VSWR(1MHz-1.5GHz) @+85°C**



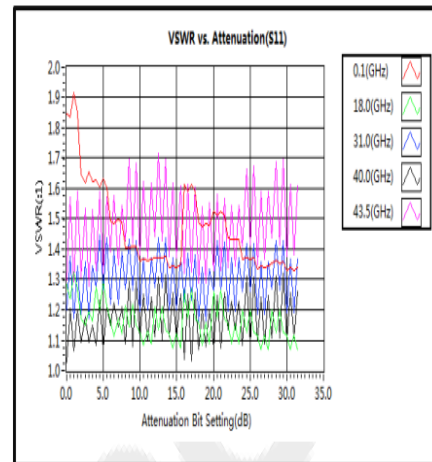
**Output VSWR(100MHz-43.5GHz) @+85°C**



**Attenuation vs. Frequency**



**VSWR vs. Attenuation (S11)**



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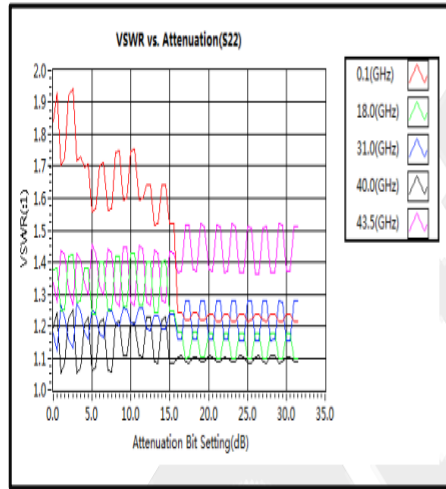


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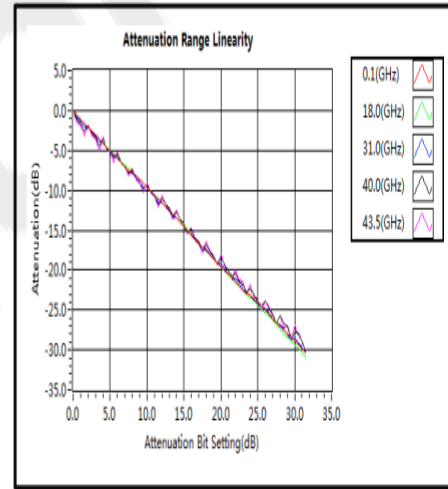
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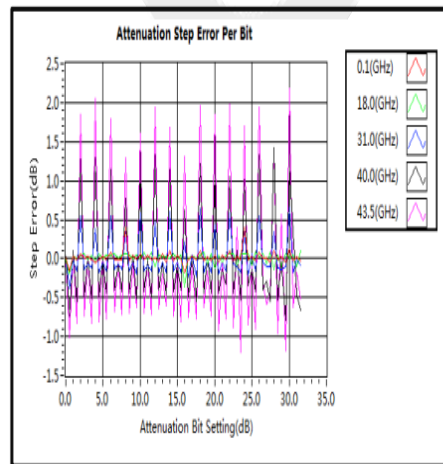
**VSWR vs. Attenuation (S22)**



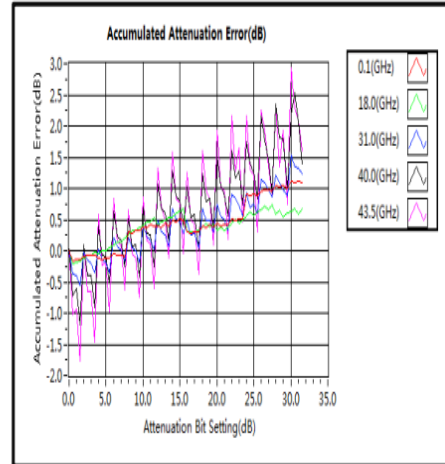
**Attenuation Range Linearity**



**Attenuation Step Error Per Bit (dB)**



**Accumulated Attenuation Error (dB)**



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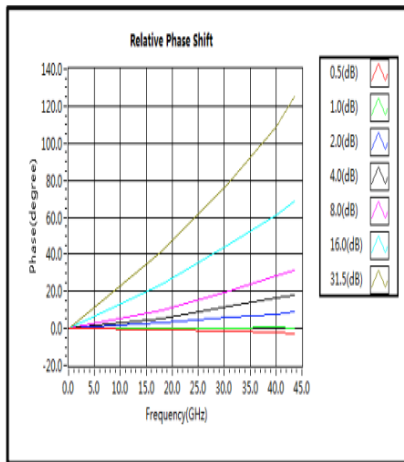


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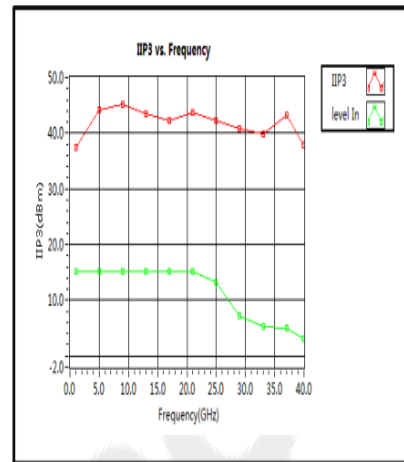
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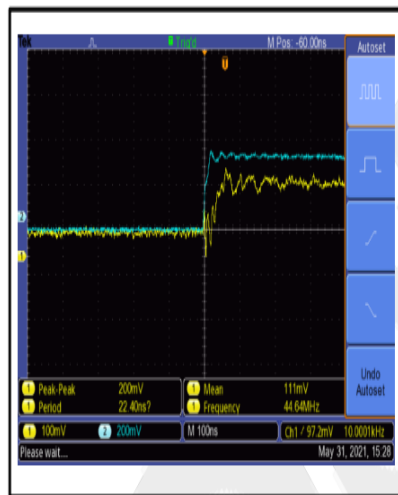
**Relative Phase Shift**



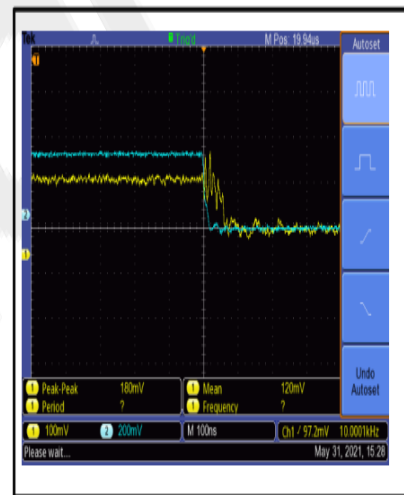
**IIP3**



**Speed**



**Speed**



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1 MHz to 43.5 GHz Absorptive Digital Control Attenuator, 31.5 dB, 6 Bits, 0.5 dB Step Size, Field Replaceable 2.92mm from Pasternack Enterprises has same day shipment for domestic and International orders. Our RF, microwave and millimeter wave products maintain a 99.4% availability and are part of the broadest selection in the industry.

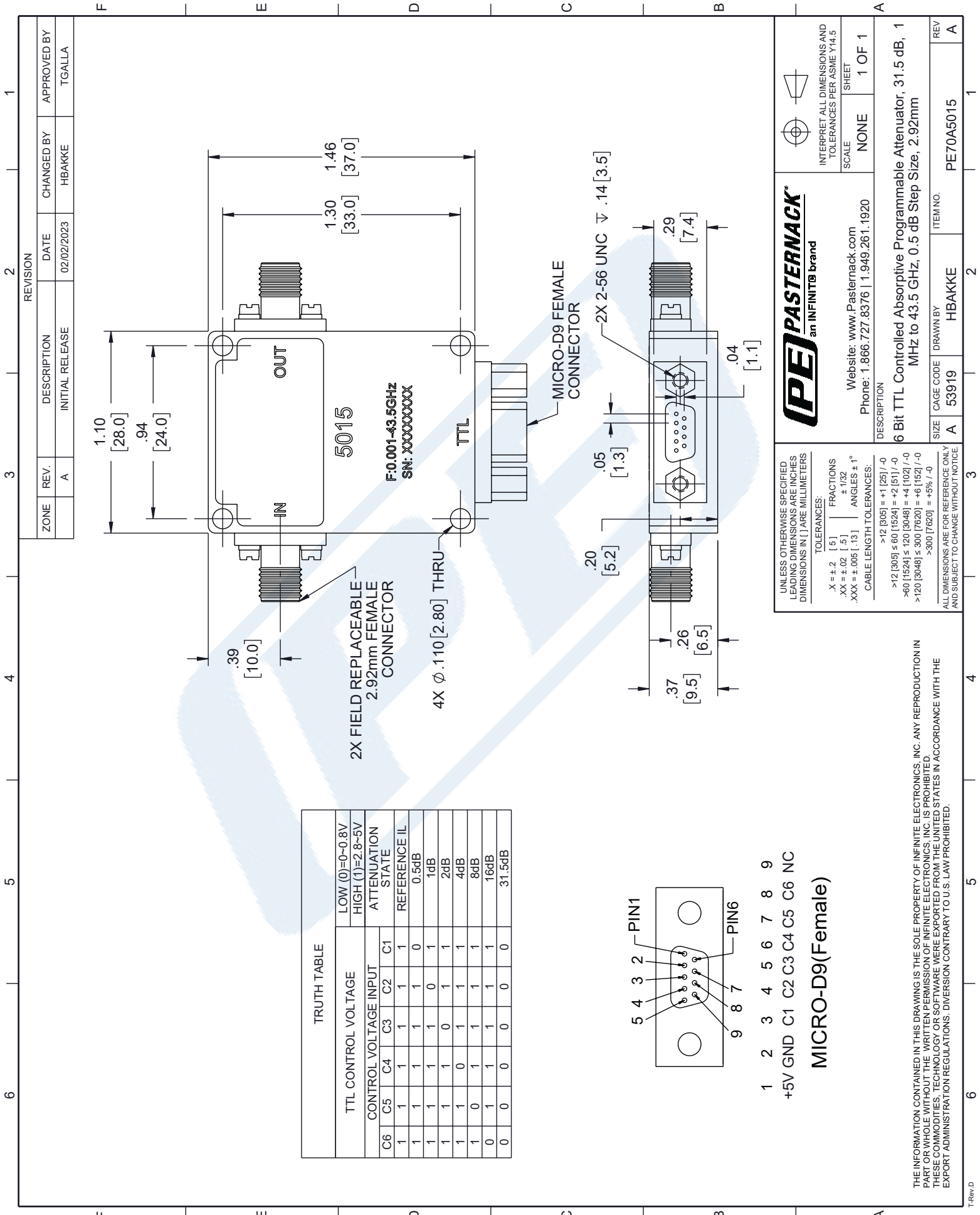
Click the following link (or enter part number in "SEARCH" on website) to obtain additional part information including price, inventory and certifications: [1 MHz to 43.5 GHz Absorptive Digital Control Attenuator, 31.5 dB, 6 Bits, 0.5 dB Step Size, Field Replaceable 2.92mm PE70A5015](https://www.pasternack.com/bench-top-31.5db-ttl-controlled-2.92mm-female-2.92mm-female-0-watts-attenuator-pe70a5015-p.aspx)

URL: <https://www.pasternack.com/bench-top-31.5db-ttl-controlled-2.92mm-female-2.92mm-female-0-watts-attenuator-pe70a5015-p.aspx>

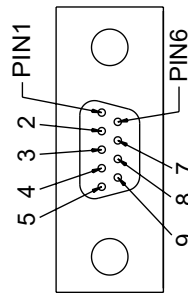
The information contained in this document is accurate to the best of our knowledge and representative of the part described herein. It may be necessary to make modifications to the part and/or the documentation of the part, in order to implement improvements. Pasternack reserves the right to make such 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.

# PE70A5015 CAD Drawing

1 MHz to 43.5 GHz Absorptive Digital Control Attenuator, 31.5 dB,  
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| TRUTH TABLE           |    |                |    |                 |    |                   |    |              |  |
|-----------------------|----|----------------|----|-----------------|----|-------------------|----|--------------|--|
| TTL CONTROL VOLTAGE   |    | LOW (0)=0-0.8V |    | HIGH (1)=2.8-5V |    | ATTENUATION STATE |    | REFERENCE IL |  |
| CONTROL VOLTAGE INPUT |    | C3             |    | C2              |    | C1                |    |              |  |
| C6                    | C5 | C4             | C3 | C2              | C1 | C1                | C1 |              |  |
| 1                     | 1  | 1              | 1  | 1               | 1  | 1                 | 0  | 0.5dB        |  |
| 1                     | 1  | 1              | 1  | 1               | 0  | 1                 | 1  | 1dB          |  |
| 1                     | 1  | 1              | 0  | 1               | 1  | 1                 | 1  | 2dB          |  |
| 1                     | 1  | 0              | 1  | 1               | 1  | 1                 | 1  | 4dB          |  |
| 1                     | 0  | 1              | 1  | 1               | 1  | 1                 | 1  | 8dB          |  |
| 0                     | 1  | 1              | 1  | 1               | 1  | 1                 | 1  | 16dB         |  |
| 0                     | 0  | 0              | 0  | 0               | 0  | 0                 | 0  | 31.5dB       |  |



1 2 3 4 5 6 7 8 9  
+5V GND C1 C2 C3 C4 C5 C6 NC  
MICRO-D9(Female)

**PE PASTERNAK**  
an INFINITIB brand

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Phone: 1.866.727.8376 | 1.949.261.1920

UNLESS OTHERWISE SPECIFIED LEADING DIMENSIONS ARE INCHES DIMENSIONS IN [ ] ARE MILLIMETERS

TOLERANCES:  
 .X = ±.2 [5] FRACTIONS ± 1/32  
 .XX = ±.02 [1.5] ANGLES ± 1°  
 .XXX = ±.005 [13] CABLE LENGTH TOLERANCES:  
 >12 [305] = +1 [25] / -0  
 >60 [1524] = +2 [51] / -0  
 >120 [3048] = +4 [102] / -0  
 >300 [7620] = +6 [152] / -0  
 >300 [7620] = +5% / -0

INTERPRET ALL DIMENSIONS AND TOLERANCES PER ASME Y14.5  
SCALE NONE SHEET 1 OF 1

DESCRIPTION: 6 Bit TTL Controlled Absorptive Programmable Attenuator, 31.5 dB, 1 MHz to 43.5 GHz, 0.5 dB Step Size, 2.92mm

SIZE A CAGE CODE 53919 DRAWN BY HBAKKE ITEM NO. PE70A5015 REV A

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