



1 GHz to 20 GHz Digital Control Attenuator, 127.5 dB, 8 Bits, 0.5 dB Step Size, Field Replaceable SMA

TECHNICAL DATA SHEET

PE70A5018

The PE70A5018 is an Absorptive 8 Bit Digitally Controlled Programmable Attenuator that operates across a broadband frequency from 1 GHz to 20 GHz. The 50 Ohm design supports TTL control logic and has an attenuation range that covers 0 to 127.5 dB in 0.5 dB steps. Attenuation steps are 0.5, 1, 2, 4, 8, 16, 32, and 64 dB. Insertion loss is 11 dB typical with a maximum RF input power of +27 dBm. Additional typical performance includes attenuation flatness of +/- 4 dB, Input P0.1dB compression power of +25 dBm, input IP3 of 44 dBm, and switching speed of 200 nsec. The unit requires a dual bias supply of +5V/-5V with DC current of 250mA/130 mA max. The low profile pin package is aluminum with Gold plating and supports field replaceable SMA RF connectors and a Micro-D15 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 GHz to 20 GHz
- Attenuation Range 0 to 127.5 dB typ
- 0.5 dB Step Size
- 8 Bits
- Digital TTL Logic Control
- Insertion Loss 11 dB
- Attenuation Flatness +/- 4 dB typ
- Input P0.1 dB Compression Power +25 dBm typ
- Input IP3 44 dBm typ
- Max RF Input Power (CW) +27 dBm
- Switching Speed 200 nsec typ
- Dual DC Supply +5V/-5V @ 250mA/130mA
- 50 Ohm Design
- Field Replaceable SMA Female RF Connectors
- Micro-D15 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	1		20	GHz
Impedance		50		Ohms
Attenuation Range		127.5		dB
Insertion Loss		11	15	dB
VSWR		1.9:1	2.3:1	
Input at 0.1 dB Compression Point		+25		dB
Input IP3		+44		dBm
DC Voltage		5		Vdc
Attenuation Flatness*		4		dB
TTL Low for Thru Path		0 to 0.8V		Vdc

Click the following link (or enter part number in "SEARCH" on website) to obtain additional part information including price, inventory and certifications: [1 GHz to 20 GHz Digital Control Attenuator, 127.5 dB, 8 Bits, 0.5 dB Step Size, Field Replaceable SMA PE70A5018](#)



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TTL High for Attenuation	2-5V	Vdc
Step Size	0.5	dB
Switching Speed	200	ns
RF Input Power	27	dBm
Control Bits	8	Bits
Bias Current	250/130	mA
IL Temperature Coefficient	0.01	dB/deg C

*Referenced to Insertion Loss

Absolute Maximum Rating

Parameter	Rating
Biasing	+5V±10%/-5V±10%
RF Input power	+30dBm

Mechanical Specifications

Size

Length	1.5 in [38.1 mm]
Width	0.37 in [9.4 mm]
Height	1.42 in [36.07 mm]
Weight	0.05 lbs [22.68 g]
Connector 1	Field Replaceable SMA Female
Connector 2	Field Replaceable SMA 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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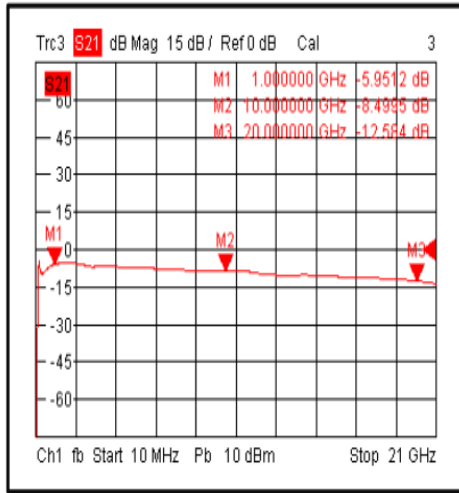
1 GHz to 20 GHz Digital Control Attenuator, 127.5 dB,
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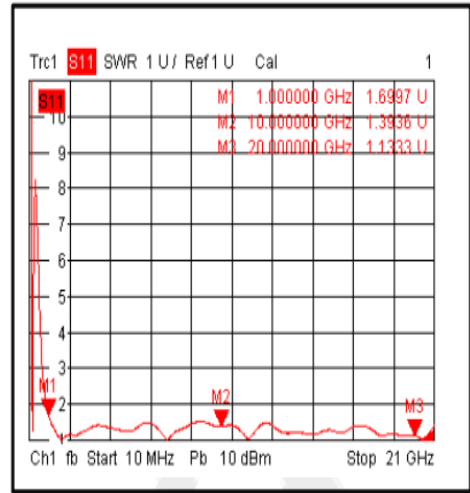
PE70A5018

Performance Data

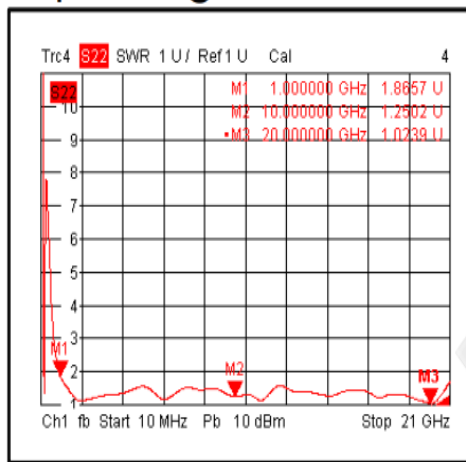
Insertion Loss @+25°C



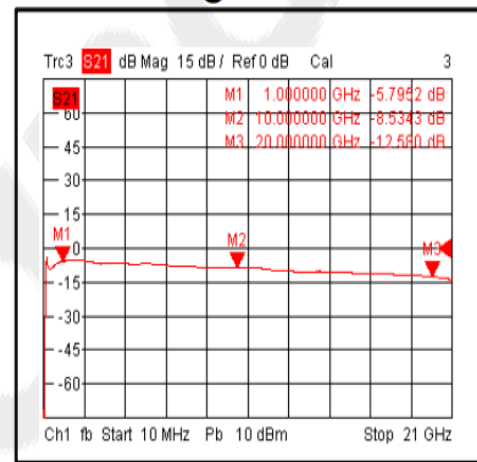
Input VSWR @+25°C



Output VSWR @+25°C



Insertion Loss @-40°C



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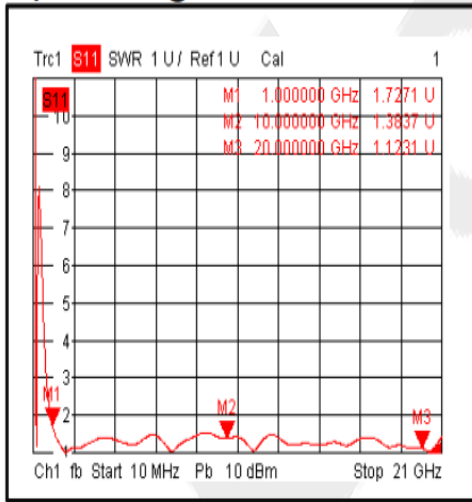


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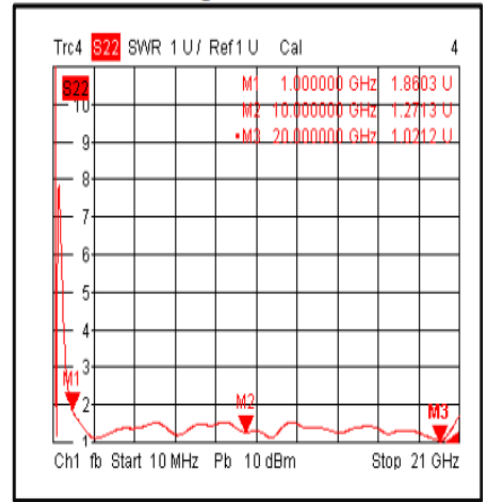
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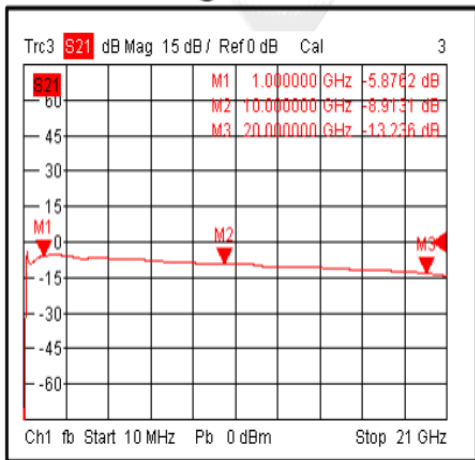
Input VSWR @-40°C



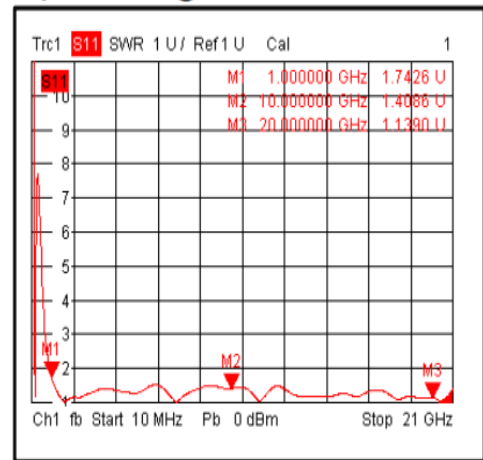
Output VSWR @-40°C



Insertion Loss @+85°C



Input VSWR @+85°C



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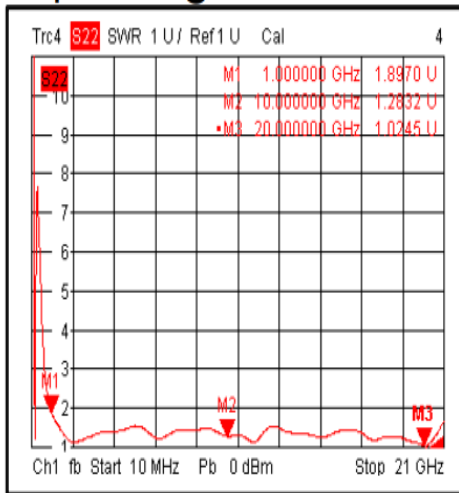


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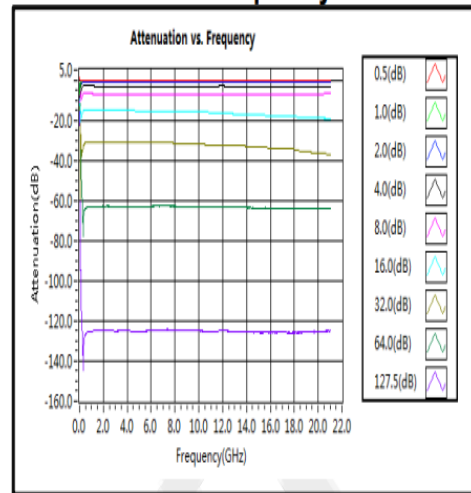
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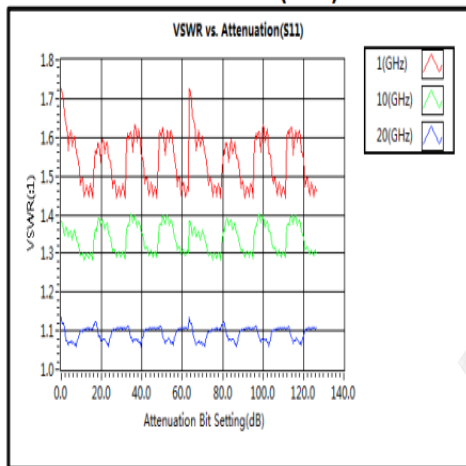
Output VSWR @+85°C



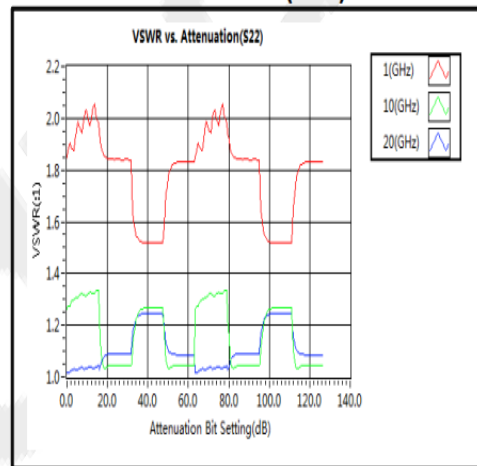
Attenuation vs. Frequency



VSWR vs. Attenuation(S11)



VSWR vs. Attenuation(S22)



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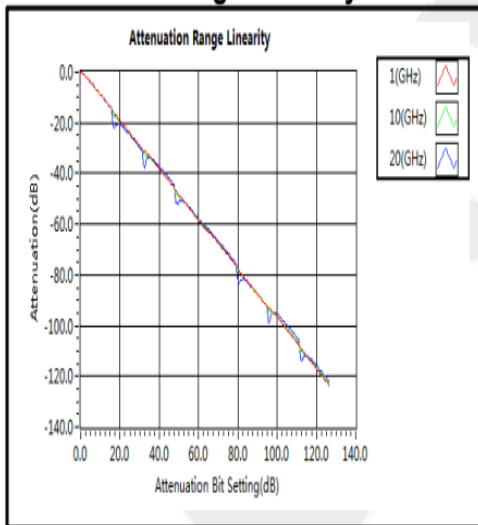


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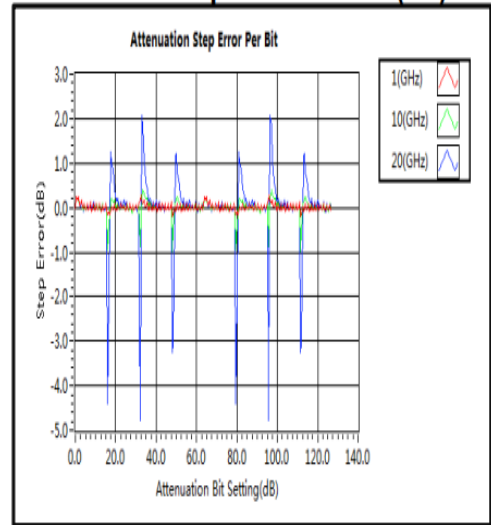
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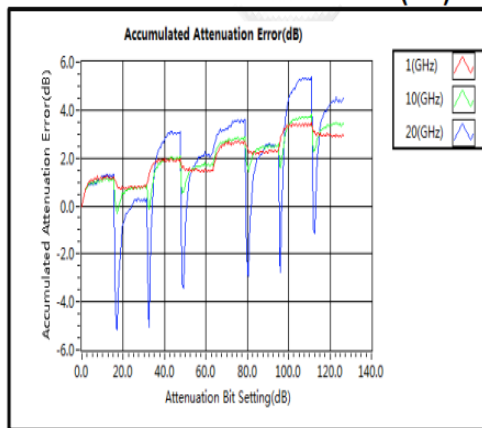
Attenuation Range Linearity



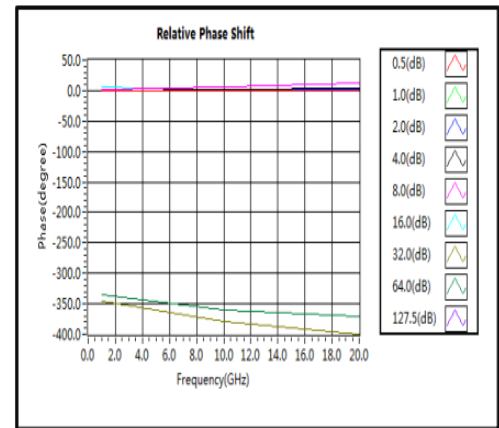
Attenuation Step Error Per Bit (dB)



Accumulated Attenuation Error (dB)



Relative Phase Shift



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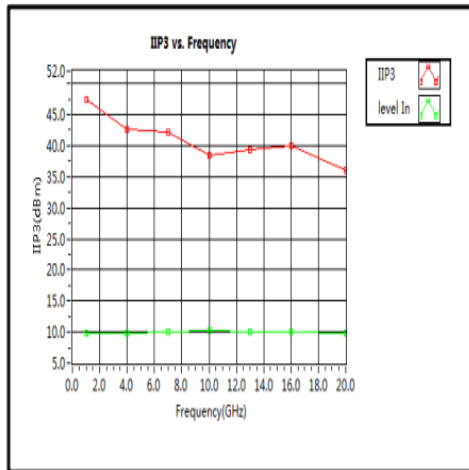


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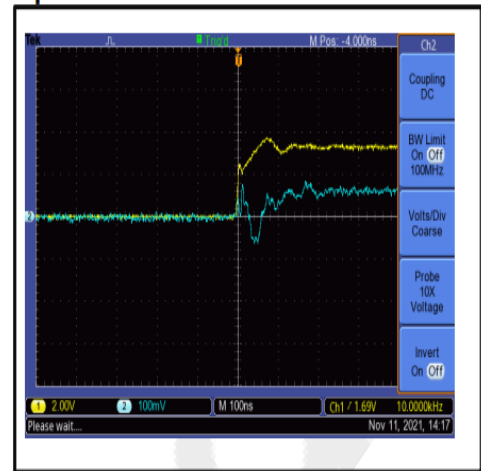
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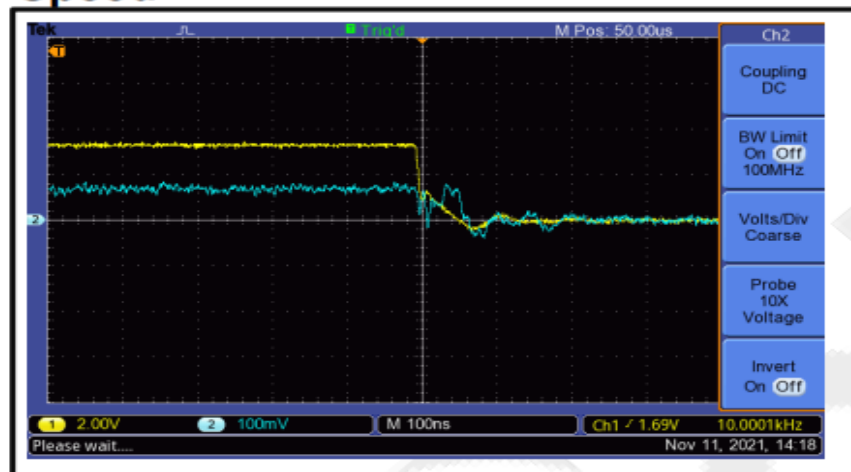
IIP3



Speed



Speed



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1 GHz to 20 GHz Digital Control Attenuator, 127.5 dB, 8 Bits, 0.5 dB Step Size, Field Replaceable SMA 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.

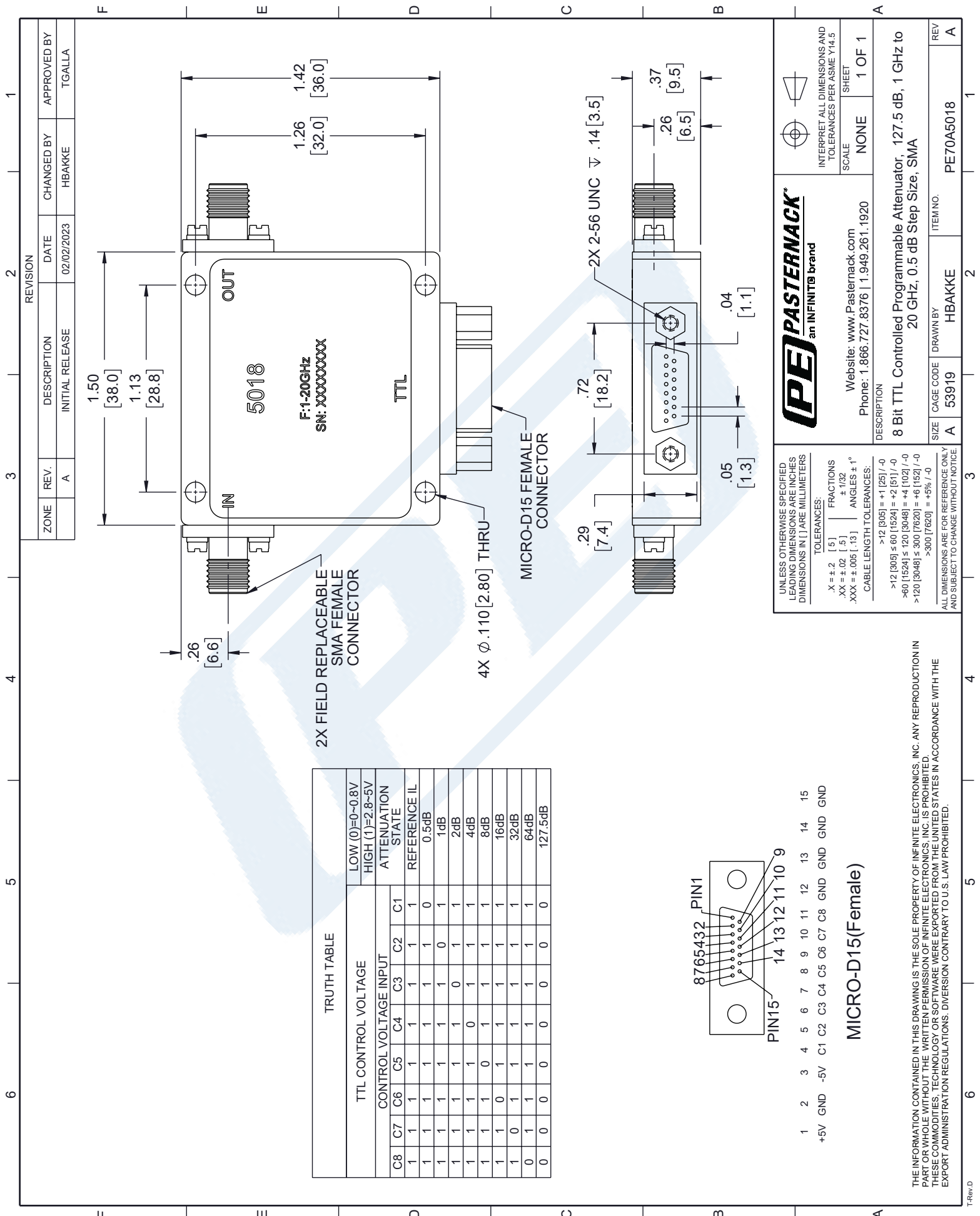
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The information contained in this document is accurate to the best of our knowledge and representative of the part described herein. It may be necessary to make modifications to the part and/or the documentation of the part, in order to implement improvements.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

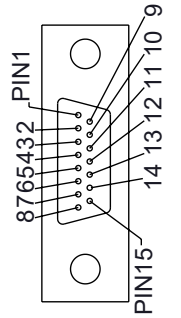
PE70A5018 CAD Drawing

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TRUTH TABLE

TTL CONTROL VOLTAGE								LOW (0)=0-0.8V	HIGH (1)=2.8-5V
CONTROL VOLTAGE INPUT								ATTENUATION STATE	
C8	C7	C6	C5	C4	C3	C2	C1	REFERENCE IL	
1	1	1	1	1	1	1	1	0.5dB	
1	1	1	1	1	1	1	0	1dB	
1	1	1	1	1	1	0	1	2dB	
1	1	1	1	1	0	1	1	4dB	
1	1	1	1	0	1	1	1	8dB	
1	1	0	1	1	1	1	1	16dB	
1	0	1	1	1	1	1	1	32dB	
0	1	1	1	1	1	1	1	64dB	
0	0	0	0	0	0	0	0	127.5dB	



MICRO-D15(Female)

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
+5V GND -5V C1 C2 C3 C4 C5 C6 C7 C8 GND GND GND GND

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
 >60 [1524] ≤ 120 [3048] = +4 [102] / -0
 >120 [3048] ≤ 300 [7620] = +6 [152] / -0
 >300 [7620] = +5% / -0

ALL DIMENSIONS ARE FOR REFERENCE ONLY AND SUBJECT TO CHANGE WITHOUT NOTICE

PE PASTERNAK
an INFINITIB brand

Website: www.Pasternack.com
Phone: 1.866.727.8376 | 1.949.261.1920

DESCRIPTION:
8 Bit TTL Controlled Programmable Attenuator, 127.5 dB, 1 GHz to 20 GHz, 0.5 dB Step Size, SMA

INTERPRET ALL DIMENSIONS AND TOLERANCES PER ASME Y14.5

SCALE: NONE SHEET 1 OF 1

ZONE	REV.	DESCRIPTION	DATE	CHANGED BY	APPROVED BY
A	A	INITIAL RELEASE	02/02/2023	HBAKKE	TGALLA