



4 GHz to 8 GHz, Bi-Phase Modulator, 0/180 Degrees,
TTL Control, 30nsec Speed, SMA

TECHNICAL DATA SHEET

PE86GM2004

The PE86GM2004 is a 0° to 180° Bi-Phase Modulator that operates across a frequency range from 4000 MHz to 8000 MHz. This modulator takes a TTL level digital bit stream and encodes it onto the RF carrier using 2 Phase Shift Keying (2PSK). 2 Phase Shift Keying utilizes 2 phases which are separated by 180°. Impressive typical performance includes low insertion loss of 2.5 dB, 30 nsec switching speed, 20 dB carrier suppression, and 0.5W CW maximum RF input power. The design is bidirectional with input and output RF ports, and employs dual bias voltages (+5/-5 Vdc) and integrated TTL processing to phase modulate the control data onto the RF, and operates across a wide temperature range of -55°C to +85°C. The rugged and compact package uses TTL, Bias, Ground pins, and field replaceable SMA female connectors. The high reliability design meets MIL-STD-202 environmental test conditions for Humidity, Shock, Vibration, Altitude, and Temperature Cycle.

Features

- 0° to 180° Bi-Phase Modulator module
- 2 Phase Shift Keying (2PSK) Modulation
- Frequency Range: 4000 MHz to 8000 MHz
- Insertion Loss: 2.5 dB typ
- Switching Speed: 30 ns typ
- Carrier Suppression: 20 dB
- Compact Package Design
- SMA Connectors
- Dual Bias Voltage: +5/-5 Vdc
- Integrated TTL Driver
- -55°C to +85°C Operating Temperature
- Designed to meet MIL-STD-202 Test Conditions
- Bi-Directional Operation

Applications

- Communication Systems
- Microwave Radio
- Radar
- High Data Rate Test & Measurement
- Serial Data Transmission
- Basestation Infrastructure

Electrical Specifications

| Description | Minimum | Typical | Maximum | Units |
|---|---------|---------|---------|---------|
| Frequency Range | 4 | | 8 | GHz |
| RF Input Power (CW) | | | +20 | dBm |
| Maximum Peak RF (Survival) 1µs Pulse Width | | | 0.5 | Watts |
| Impedance | | 50 | | Ohms |
| VSWR | | 2:1 | | |
| Insertion Loss | | 2.5 | 3 | dB |
| Carrier Suppression | | 20 | | dB |
| Switch Speed (Risetime) | | 30 | 75 | ns |
| Phase State (Off) | | 0 | | degrees |
| Phase State (On) | | 180 | | degrees |
| Bias Voltage (+) | | 5 | | Volts |
| Bias Voltage (-) | | -5 | | Volts |
| Bias Current @ +5 VDC | | 33 | 75 | mA |
| Bias Current @ -5 VDC | | 8 | 20 | mA |

Click the following link (or enter part number in "SEARCH" on website) to obtain additional part information including price, inventory and certifications: [4 GHz to 8 GHz, Bi-Phase Modulator, 0/180 Degrees, TTL Control, 30nsec Speed, SMA PE86GM2004](#)



4 GHz to 8 GHz, Bi-Phase Modulator, 0/180 Degrees,
TTL Control, 30nsec Speed, SMA

TECHNICAL DATA SHEET

PE86GM2004

Mechanical Specifications

Size

| | | |
|--------|-----------|-----------|
| Length | 1.5 in | [38.1mm] |
| Width | 1.5 in | [38.1 mm] |
| Height | 0.5 in | [12.7 mm] |
| Weight | 0.125 lbs | [56.7 g] |

Configuration

| | |
|------------------|--------------------|
| Design | Bi-Phase Modulator |
| Connector Option | Field Replaceable |
| RF Connector | SMA Female |

Environmental Specifications

Temperature

| | |
|-----------------|-----------------|
| Operating Range | -55°C to +85°C |
| Storage Range | -65°C to +125°C |

| | |
|-------------------|-----------------------------------|
| Humidity | MIL-STD-202F, Method 103B Cond. B |
| Shock | MIL-STD-202F, Method 213B Cond. B |
| Vibration | MIL-STD-202F, Method 204D Cond. B |
| Altitude | MIL-STD-202F, Method 105C Cond. B |
| Temperature Cycle | MIL-STD-202F, Method 107D Cond. A |

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

Plotted and Other Data

Notes:

Click the following link (or enter part number in "SEARCH" on website) to obtain additional part information including price, inventory and certifications: [4 GHz to 8 GHz, Bi-Phase Modulator, 0/180 Degrees, TTL Control, 30nsec Speed, SMA PE86GM2004](#)

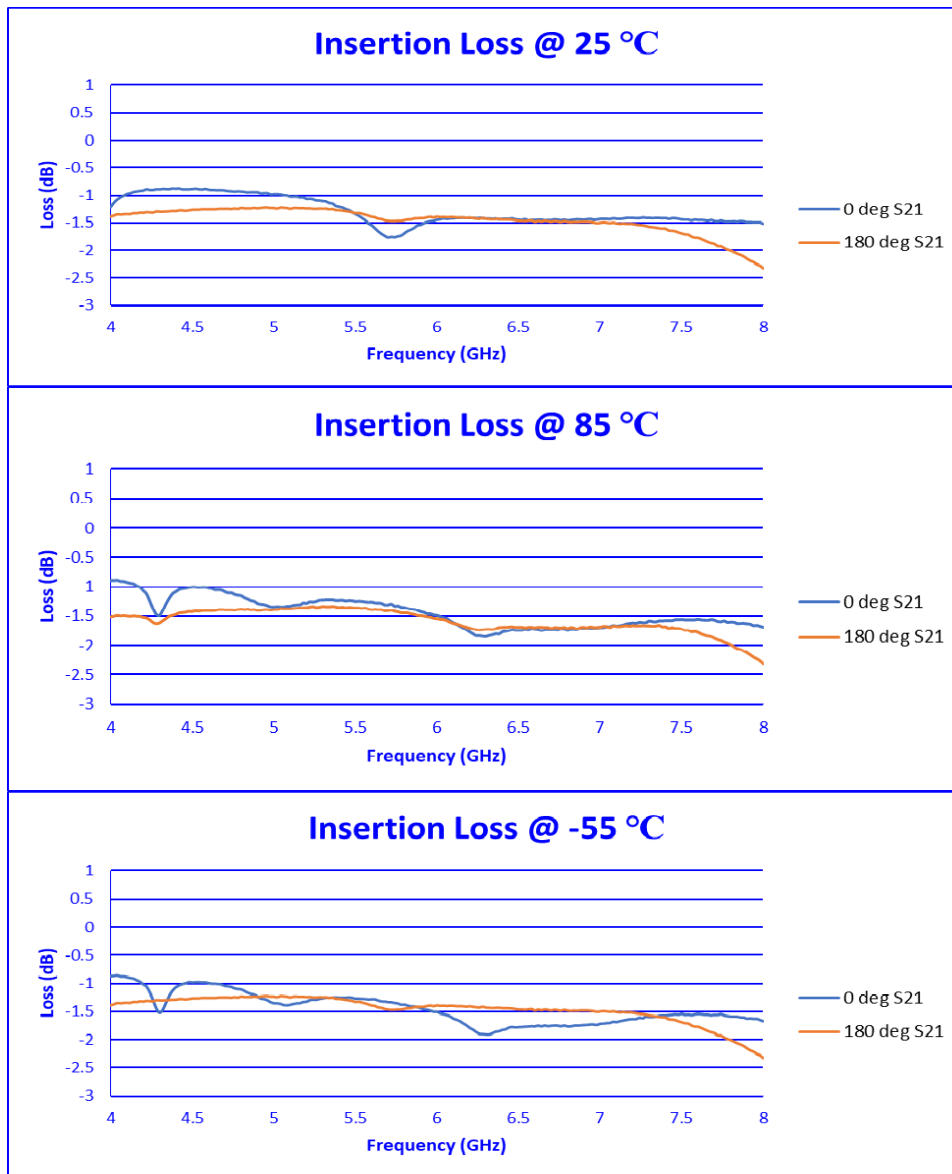


4 GHz to 8 GHz, Bi-Phase Modulator, 0/180 Degrees, TTL Control, 30nsec Speed, SMA

TECHNICAL DATA SHEET

PE86GM2004

Typical Performance Data



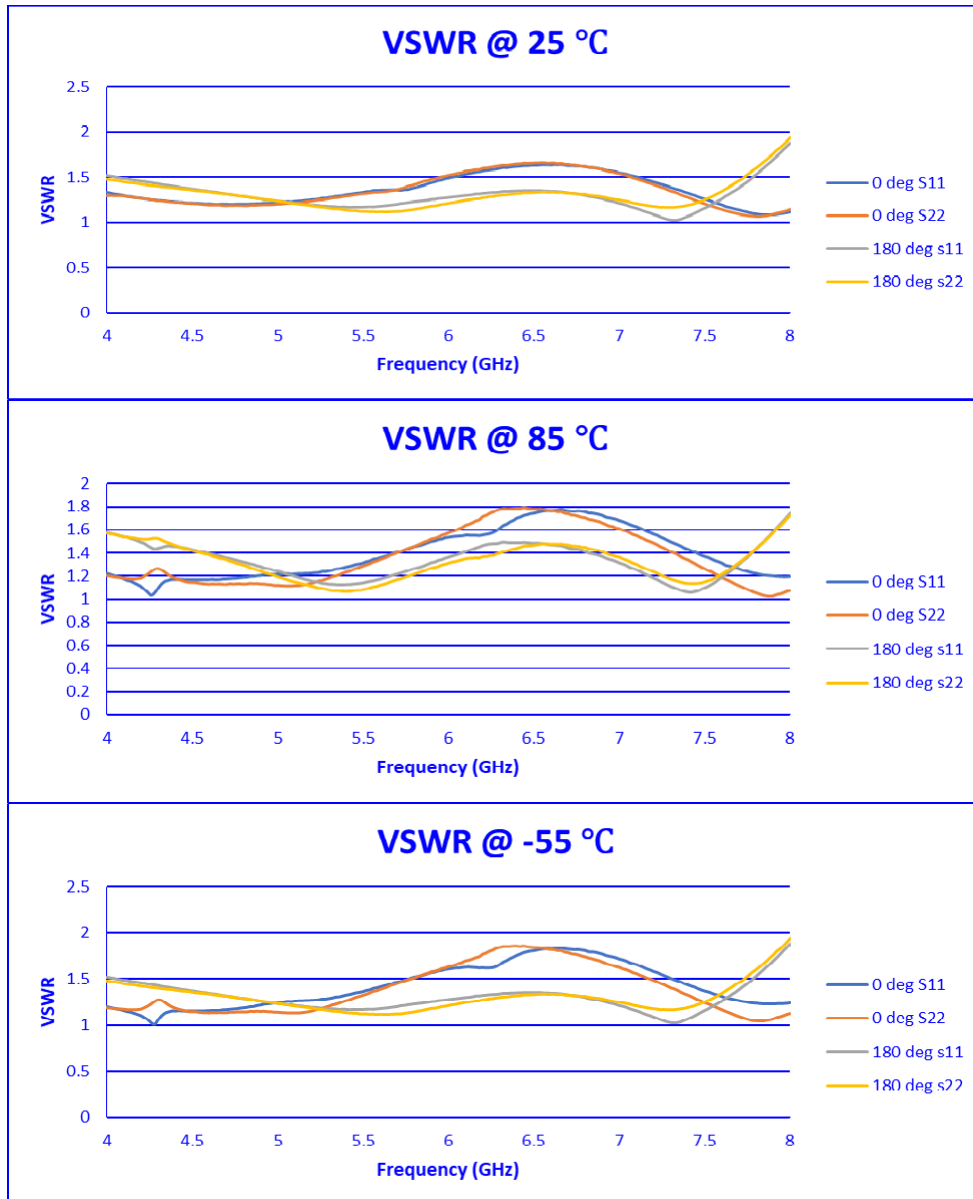
Click the following link (or enter part number in "SEARCH" on website) to obtain additional part information including price, inventory and certifications: [4 GHz to 8 GHz, Bi-Phase Modulator, 0/180 Degrees, TTL Control, 30nsec Speed, SMA PE86GM2004](#)



4 GHz to 8 GHz, Bi-Phase Modulator, 0/180 Degrees, TTL Control, 30nsec Speed, SMA

TECHNICAL DATA SHEET

PE86GM2004



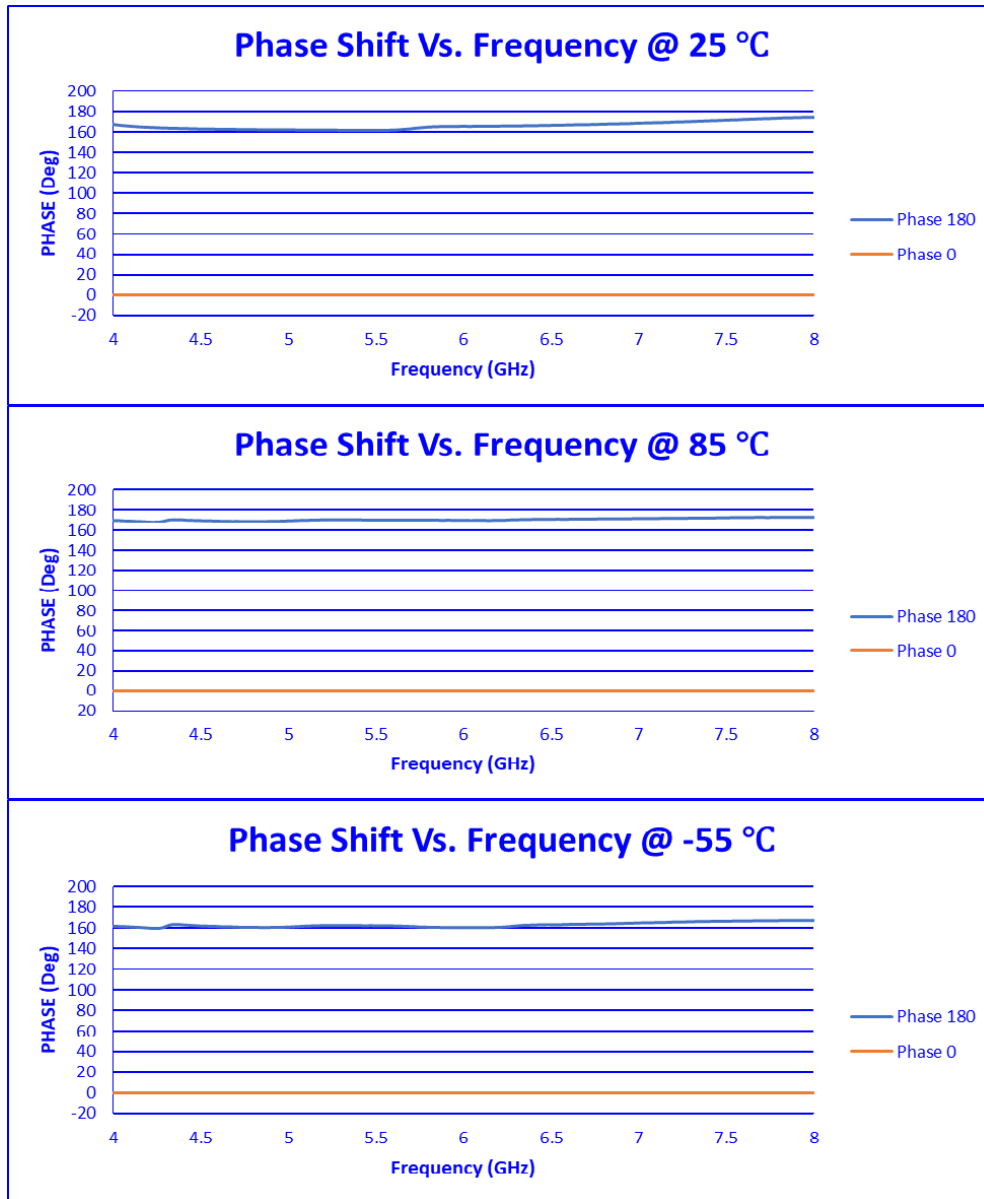
Click the following link (or enter part number in "SEARCH" on website) to obtain additional part information including price, inventory and certifications: [4 GHz to 8 GHz, Bi-Phase Modulator, 0/180 Degrees, TTL Control, 30nsec Speed, SMA PE86GM2004](#)



4 GHz to 8 GHz, Bi-Phase Modulator, 0/180 Degrees,
TTL Control, 30nsec Speed, SMA

TECHNICAL DATA SHEET

PE86GM2004



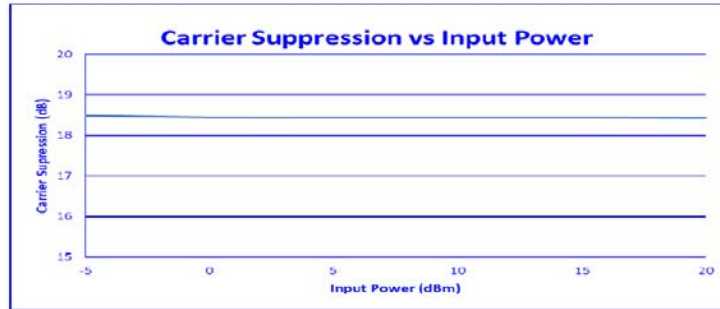
Click the following link (or enter part number in "SEARCH" on website) to obtain additional part information including price, inventory and certifications: [4 GHz to 8 GHz, Bi-Phase Modulator, 0/180 Degrees, TTL Control, 30nsec Speed, SMA PE86GM2004](#)



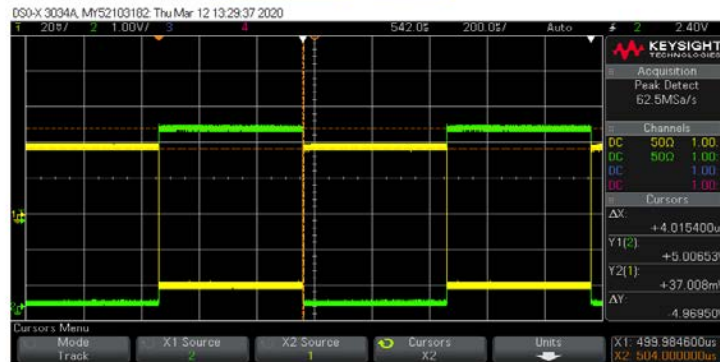
4 GHz to 8 GHz, Bi-Phase Modulator, 0/180 Degrees,
TTL Control, 30nsec Speed, SMA

TECHNICAL DATA SHEET

PE86GM2004

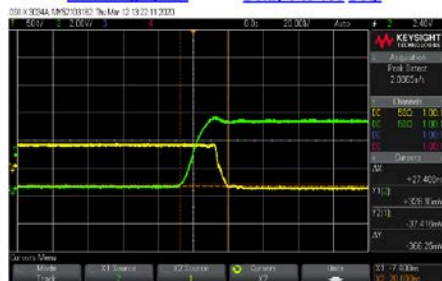


Switching Speed Full Pulse



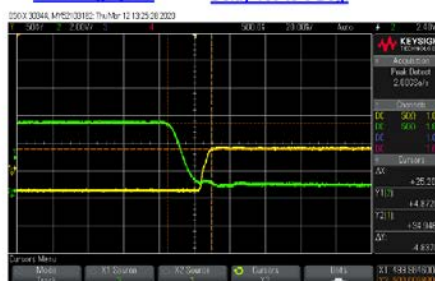
Green Trace: TTL Signal
Yellow Trace: RF Signal

Switching Speed Delay 0 to 180 Deg.



Green Trace: TTL Signal Yellow Trace: RF Signal

Switching Speed Delay 180 to 0 Deg.



Green Trace: TTL Signal Yellow Trace: RF Signal

Click the following link (or enter part number in "SEARCH" on website) to obtain additional part information including price, inventory and certifications: [4 GHz to 8 GHz, Bi-Phase Modulator, 0/180 Degrees, TTL Control, 30nsec Speed, SMA PE86GM2004](#)



4 GHz to 8 GHz, Bi-Phase Modulator, 0/180 Degrees,
TTL Control, 30nsec Speed, SMA

TECHNICAL DATA SHEET

PE86GM2004

4 GHz to 8 GHz, Bi-Phase Modulator, 0/180 Degrees, TTL Control, 30nsec Speed, 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.

Click the following link (or enter part number in "SEARCH" on website) to obtain additional part information including price, inventory and certifications: [4 GHz to 8 GHz, Bi-Phase Modulator, 0/180 Degrees, TTL Control, 30nsec Speed, SMA PE86GM2004](https://www.pasternack.com/pe86gm2004-p.aspx)

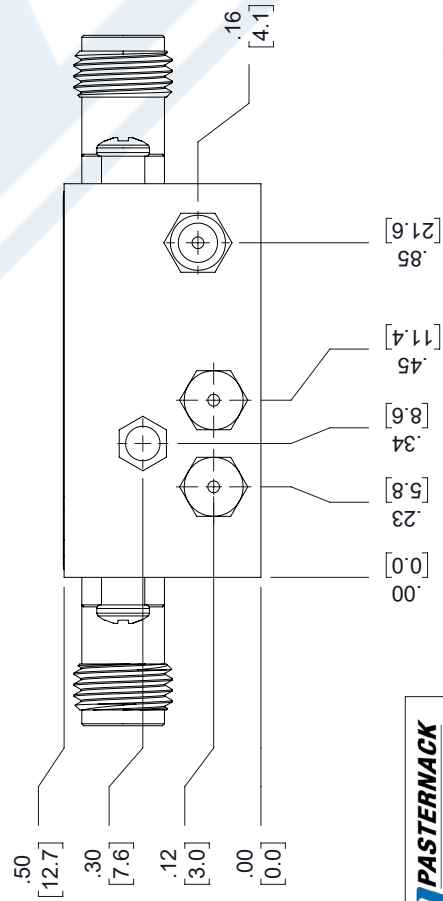
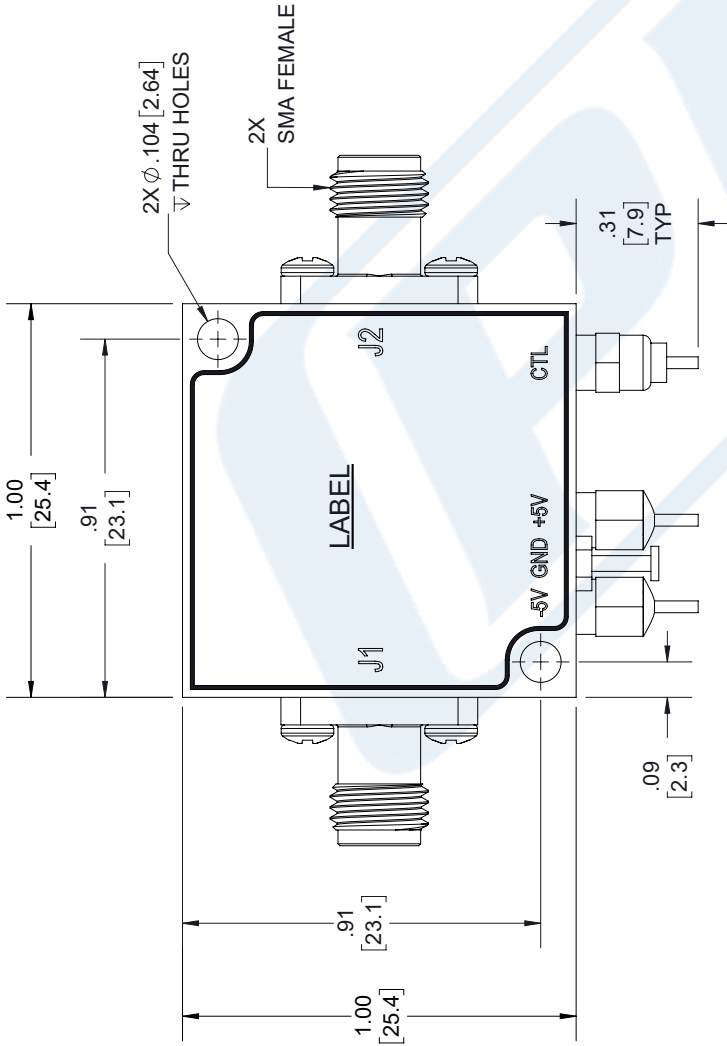
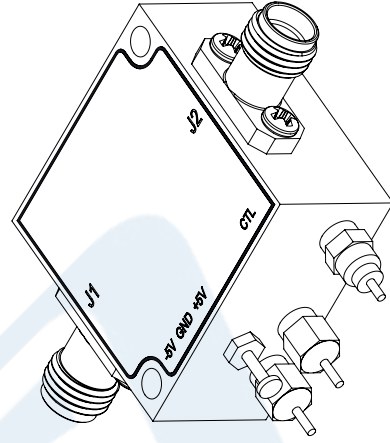
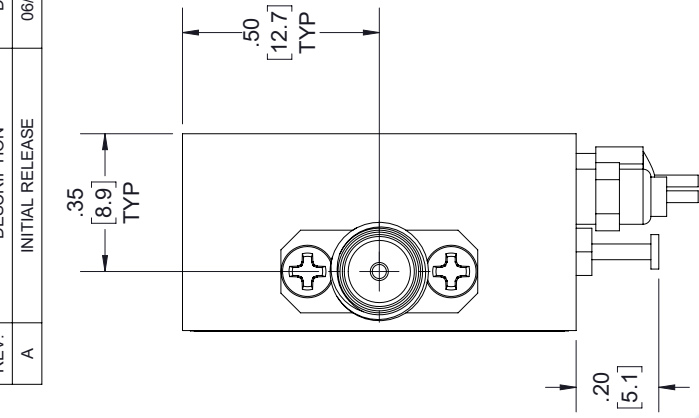
URL: <https://www.pasternack.com/pe86gm2004-p.aspx>

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.

PE86GM2004 CAD Drawing

4 GHz to 8 GHz, Bi-Phase Modulator, 0/180 Degrees, TTL Control, 30nsec Speed, SMA

| REVISIONS | | | |
|-----------|-----------------|----------|----------|
| REV. | DESCRIPTION | DATE | APPROVED |
| A | INITIAL RELEASE | 06/06/19 | T. GALLA |



LABEL:

PE PASTERNAK
an INFINITO brand

PHASE SHIFTER
MODEL NO:
PE86GM2004
SERIAL NO:
PLXXXX/XXXX



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

TOLERANCES:
X±.2 [5.08]
XX±.01 [0.25]
XXX±.005 [0.13]

FRACTIONS
±1/32
±1/16

ANGLES ± 1°

ALL DIMENSIONS SHOWN
ARE FOR REFERENCE ONLY.

THIRD-ANGLE PROJECTION

PE PASTERNAK
an INFINITO brand

Pasternack Enterprises, Inc.
P.O. Box 16759, Irvine, CA 92623.
Phone: 1.949.261.1920 | 1.866.727.8376
Fax: 1.949.261.7451
www.pasternack.com | e-mail: sales@pasternack.com

SIZE [CAGE] DRAWN BY PART NUMBER
A 53919 K.DANG PE86GM2004

THESE COMMODITIES, TECHNOLOGY OR SOFTWARE WERE EXPORTED FROM THE UNITED STATES IN ACCORDANCE WITH THE EXPORT ADMINISTRATION REGULATIONS. DIVERSION CONTRARY TO U.S. LAW PROHIBITED.