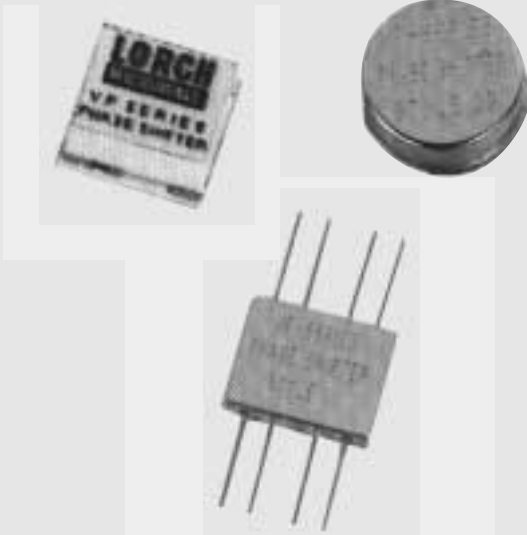


Voltage Controlled Phase Shifters



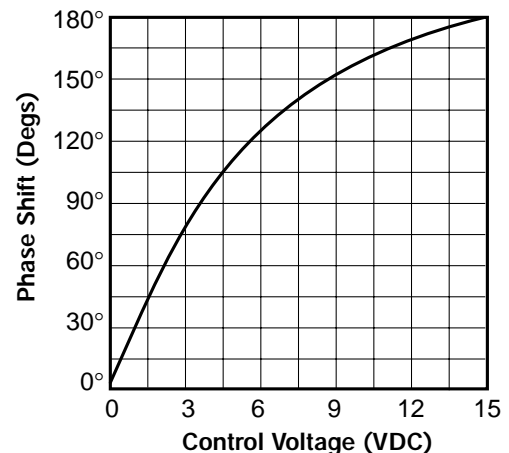
- 1-3000 MHz Frequency Range
- 10%, 20% and 30% Bandwidths
- 0-90°, 0-180° and 0-360° Phase Shift Ranges
- Low Insertion Loss
- High Phase Stability
- Surface Mount, PC Mount, Flatpack and Connectorized

Applications

- Closed-Loop Tracking Systems
- Fine Grain Phase Control
- Path Equalization or Balance
- Electronic Steering Arrays

Lorch Microwave's VP-Series, Voltage Controlled Phase Shifters, are wideband miniature components available in a wide range of center frequencies and bandwidths. Standard models are available with 0-90°, 0-180° and 0-360° continuously adjustable phase range. These devices use voltage variable capacitors (varactor diodes) to achieve the desired phase shift.

FIGURE 1
TYPICAL PHASE SHIFT VS CONTROL VOLTAGE



Definition of Terms

Phase Shift

The minimum total phase shift in degrees occurring when control voltage is varied from minimum (0 VDC) to maximum. For standard models the phase shift is positive.

Insertion Phase

The difference in phase between input and output ports as the device is inserted in line with the control voltage set at 0 volts.

Control Voltage

The DC voltage range required to shift the phase from the minimum to the maximum specified amounts.

Description

Lorch Microwave's VP-Series Phase Shifters are voltage variable devices offering a continuously variable phase shift over a 0-90, 0-180 or 0-360 degree range. Phase control is achieved by the application of a control signal. The control voltage varies the capacitance of two matched varactor diodes which form LC resonant circuits connected to the output ports of a 90 degree Hybrid. The change in diode reactance causes a shift in phase of the RF signal.

LORCH
MICROWAVE

1725 N. Salisbury Blvd. · PO Box 2828 · Salisbury, MD 21802
Ph. 800-780-2169, 410-860-5100 · Fax 410-860-1949
Web <http://www.lorch.com> · E-mail lorchsales@lorch.com

Voltage Controlled Phase Shifters

The units listed are designed to provide optimum performance over the full bandwidth listed. If the bandwidth of interest is narrower than listed, it should be indicated when ordering (See "Creating a Part Number"). Performance will be optimized over the band of interest and improved performance may be offered at no extra cost.

TYPICAL PERFORMANCE SPECIFICATIONS

| Center Frequency (MHz) | % Bandwidth | Phase Shift (Deg) | Insertion Loss (dB) | VSWR | Max Input Power (dBm) | Control Voltage (VDC) | Package (See note below) |
|------------------------|-------------|-------------------|---------------------|-------|-----------------------|-----------------------|--------------------------|
| 0.5-50 | 10 | 0-90 | 1.0 | 1.4:1 | 0 | 0-30 | S, P, 3 |
| 0.5-50 | 10 | 0-180 | 1.5 | 1.5:1 | 0 | 0-30 | S, P, 3 |
| 0.5-50 | 10 | 0-360 | 3.0 | 1.6:1 | 0 | 0-30 | S, P, 4A |
| 0.5-50 | 20, 30 | 0-90 | 1.0 | 1.5:1 | 0 | 0-30 | S, P, 3 |
| 0.5-50 | 20, 30 | 0-180 | 1.5 | 1.6:1 | 0 | 0-30 | S, P, 3, 4A |
| 0.5-50 | 20, 30 | 0-360 | 3.0 | 1.7:1 | 0 | 0-30 | S, P, 4A |
| 50-300 | 10 | 0-90 | 1.0 | 1.4:1 | +5 | 0-15 | S, P, 3 |
| 50-300 | 10 | 0-180 | 1.5 | 1.5:1 | +5 | 0-15 | S, P, 3 |
| 50-300 | 10 | 0-360 | 3.0 | 1.6:1 | +5 | 0-15 | S, P, 4A |
| 50-300 | 20, 30 | 0-90 | 1.0 | 1.5:1 | +5 | 0-15 | S, P, 3, 4A |
| 50-300 | 20, 30 | 0-180 | 1.5 | 1.6:1 | +5 | 0-15 | S, P, 3, 4A |
| 50-300 | 20, 30 | 0-360 | 3.0 | 1.7:1 | +5 | 0-15 | S, P, 4A |
| 300-1000 | 10 | 0-90 | 1.3 | 1.5:1 | +7 | 0-10 | S, P, 3, 4A |
| 300-1000 | 10 | 0-180 | 1.6 | 1.5:1 | +7 | 0-10 | S, P, 3, 4A |
| 300-1000 | 10 | 0-360 | 3.0 | 1.6:1 | +7 | 0-10 | S, P, 4A |
| 300-1000 | 20, 30 | 0-90 | 1.5 | 1.5:1 | +7 | 0-10 | S, P, 3, 4A |
| 300-1000 | 20, 30 | 0-180 | 1.7 | 1.6:1 | +7 | 0-10 | S, P, 3, 4A |
| 300-1000 | 20, 30 | 0-360 | 3.2 | 1.7:1 | +7 | 0-10 | S, P, 4A |
| 1000-2000 | 10 | 0-90 | 1.5 | 1.6:1 | +10 | 0-10 | S, P, 4A |
| 1000-2000 | 10 | 0-180 | 2.0 | 1.8:1 | +10 | 0-10 | S, P, 4A |
| 1000-2000 | 10 | 0-360 | 4.0 | 1.8:1 | +10 | 0-10 | S, P |
| 1000-2000 | 20, 30 | 0-90 | 1.7 | 1.6:1 | +10 | 0-10 | S, P, 4A |
| 1000-2000 | 20, 30 | 0-180 | 2.2 | 1.8:1 | +10 | 0-10 | S, P, 4A |
| 1000-2000 | 20, 30 | 0-360 | 4.0 | 2.0:1 | +10 | 0-10 | S, P |
| 2000-3000 | 10 | 0-90 | 1.8 | 1.7:1 | +10 | 0-5 | S, P |
| 2000-3000 | 10 | 0-180 | 2.3 | 1.8:1 | +10 | 0-5 | S, P |
| 2000-3000 | 10 | 0-360 | 4.5 | 2.0:1 | +10 | 0-5 | S, P |
| 2000-3000 | 20, 30 | 0-90 | 2.0 | 1.8:1 | +10 | 0-5 | S, P |
| 2000-3000 | 20, 30 | 0-180 | 2.6 | 1.8:1 | +10 | 0-5 | S, P |
| 2000-3000 | 20, 30 | 0-360 | 5.0 | 2.0:1 | +10 | 0-5 | S, P |

Notes:

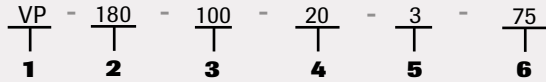
Packages: S-SMA Connectorized, P-PC Mount, 3-Surface Mount, 4A-Surface Mount

1725 N. Salisbury Blvd. · PO Box 2828 · Salisbury, MD 21802
 Ph. 800-780-2169, 410-860-5100 · Fax 410-860-1949
 Web <http://www.lorch.com> · E-mail lorchsales@lorch.com

LORCH
MICROWAVE

Voltage Controlled Phase Shifters

Part Number Description

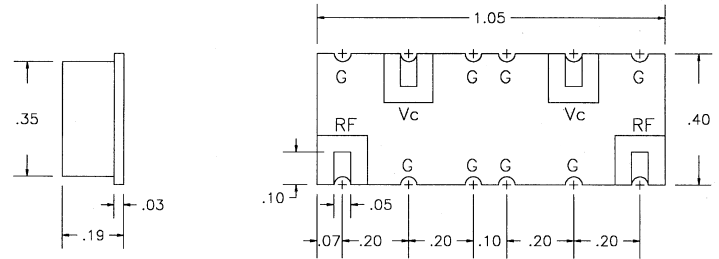


- 1 VP** Series, Voltage Controlled Phase Shifter
- 2 180** Phase Shift in Degrees
- 3 100** Center Frequency in MHz
- 4 20** Bandwidth in MHz
- 5 3** Package Style, See Outlines
- 6 75** Input Impedance, if other than 50 Ohms

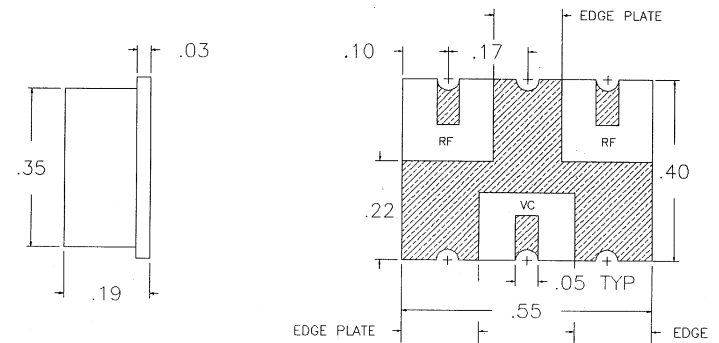
Creating a Part Number

Lorch Microwave's VP-Series, Voltage Controlled Phase Shifters, have descriptive part numbers indicating the important electrical characteristics that define the unit. A list of typical performance specifications are given in the preceding section. For specifications outside these operating parameters, please contact the factory.

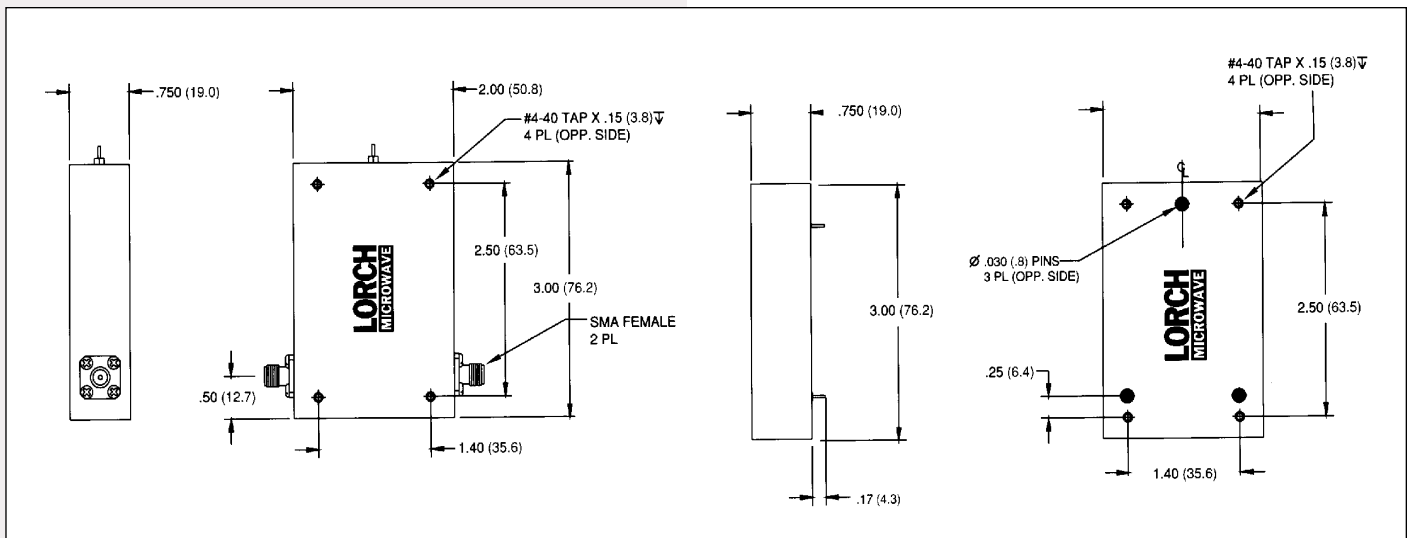
OUTLINE, STYLE 4A



OUTLINE, STYLE 3



OUTLINE, SMA CONNECTOR AND PC MOUNT



1725 N. Salisbury Blvd. · PO Box 2828 · Salisbury, MD 21802
 Ph. 800-780-2169, 410-860-5100 · Fax 410-860-1949
 Web <http://www.lorch.com> · E-mail lorchsales@lorch.com