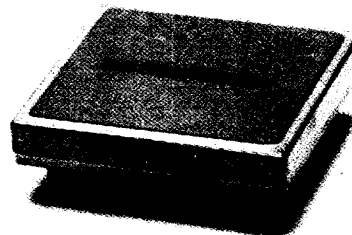
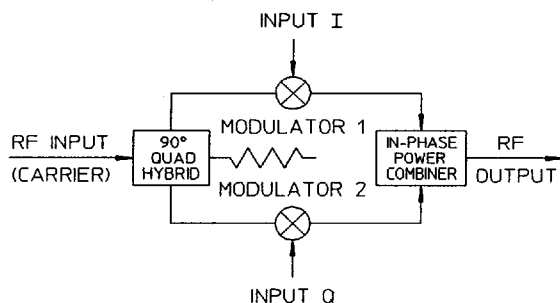




VQP-2S series

$\pi/4$ DQPSK OPTIMIZED MSK MODULATOR Microwave Modulator for 8 Phase States



- Custom Frequencies from 1.5 to 4 GHz
- Low Conversion Loss
- Minimal Size and Weight
- Space saving hermetic design

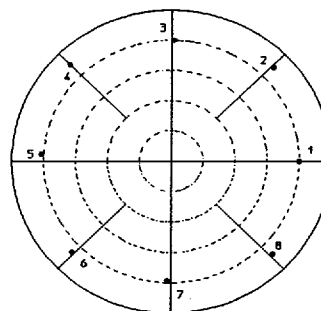
MERRIMAC $\pi/4$ DQPSK Vector Modulators are I & Q Networks which have been optimized for the eight possible vector states of $\pi/4$ DQPSK Modulation.

$\pi/4$ Differential Quadrature Phase Shift Keying defines each phase state relative to the last phase state plus 45°, which means that the possible phase states rotate 45° for each symbol. Thus the four quadrature symbols are represented by a change of 45°, 135°, -45° or -135°, resulting in eight possible constellation of points. This technique confines the spectral energy to a fairly small bandwidth for a given data rate compared to other modulation schemes.

The performance of all VQP-2S Vector Modulators is verified at the center frequency, and as specifically required by the customer.

MERRIMAC Vector Modulators are designed for high reliability in accordance with MIL-M-28837 requirements and can be supplied screened to meet specific military and space applications.

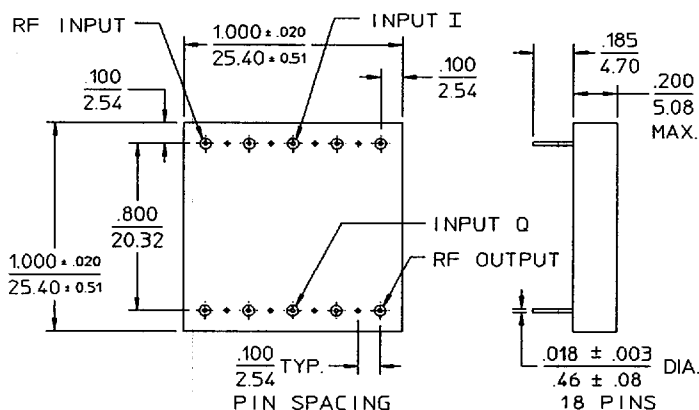
Typical Magnitude/Phase at plot at 1,800 MHz



| State | Ampl. dB | Phase |
|-------|----------|-------|
| 1 | -15.3 | 0° |
| 2 | -14.5 | 44° |
| 3 | -15.2 | 89° |
| 4 | -14.4 | 135° |
| 5 | -15.1 | -178° |
| 6 | -14.5 | -136° |
| 7 | -15.4 | -92° |
| 8 | -14.6 | -44° |

Unfiltered Phase Transitions for $\pi/4$ DQPSK Modulation

Meri-Pac™ S-Package Outline



- NOTES:
1. Tolerance on 3 place decimals $\pm .010(.25)$ except as noted.
 2. Dimensions in inches over millimeters.
 3. Lead dimensions apply only at body.
 4. All unmarked pin are case ground.

| Model Number | Center Frequency, f_0 | Operating Bandwidth |
|--------------|-------------------------|---------------------|
| VQP-2S-****B | 1500 to 4000 MHz | 10% of f_0 |

For complete Model Number replace *** with desired Center Frequency, f_0 in MHz

COMMON SPECIFICATIONS (All Tests performed at f_0)

| | |
|---|------------------|
| RF Input Level: | + 10 dBm nom. |
| VSWR, RF _{in} & RF _{out} : | 1.5:1 max. |
| Modulation Bandwidth: | 50 MHz nom. |
| Modulation Inputs: | 0 dBm max. |
| Impedance: | 50 Ω nom. |
| Insertion Loss : | 12 dB max. |
| (below modulation input) | |
| Modulation Accuracy (measured as 8-PSK, 0 dBm input) | |
| Amplitude Balance: | 1 dB |
| Phase Balance: | $\pm 5^\circ$ |
| Carrier Isolation: | 35 dB typ. |
| Weight, nominal: | 0.35 oz (10 g) |
| Operating Temperature: | -55° to +85°C |

Contact MERRIMAC for further details. (1/92)

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