

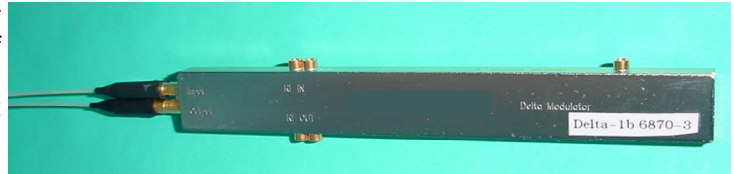


PSI-3600 SERIES MICROWAVE PHOTONIC COMPONENTS

PSI-3600-D1 Low V_{π} MODULATOR

DESCRIPTION

The PSI-3600-MOD-D1 Lithium Niobate, Mach-Zehnder interferometer modulator provides intensity modulation of light in the 1550 nm region for use in very low noise figure, wide dynamic range photonic systems. Offering the lowest drive voltage (V_{π}) on the market, this modulator serves a critical role in defense antenna remoting, phased array radar, radio astronomy and other applications that demand the highest level of system performance. With a V_{π} of 1.2V at 1 GHz, this modulator may be used to construct microwave photonic links with unprecedented positive intrinsic link gain, low noise figure and wide dynamic range. These modulators are available in versions capable of operation to 6, 12 or 18 GHz. The PSI-3600-MOD-D1 includes complementary optical outputs and may be used in either single or dual RF drive configurations.

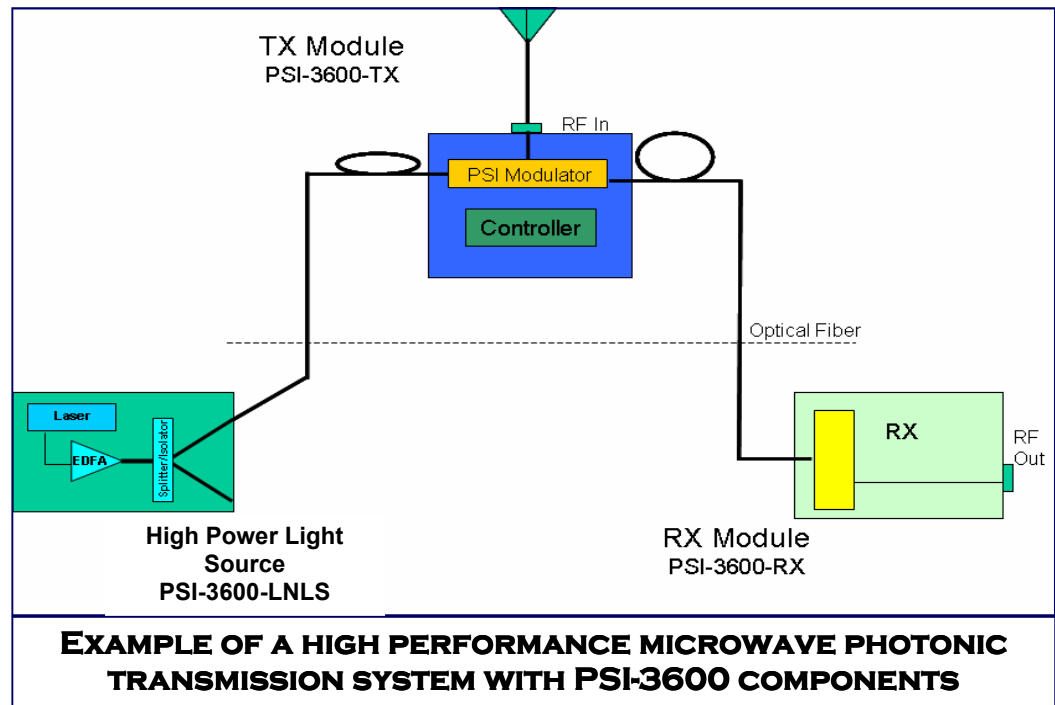


| PSI-3600-D1 Feature | Benefit |
|--|--|
| Very low V_{π} : 1.2 V at 1 GHz, 2.7 V at 18 GHz | Enables highly linear intensity modulation with minimal drive components |
| Available in 18, 12 or 6 GHz versions | Flexibility for various system applications |
| Dual complementary outputs | Enables balanced fiber links for optimum link noise figure |

When used in conjunction with the PSI-3600-DET detector, PSI-3600-LNLS low noise light source, PSI-2600-11 photonic controller and PSI-0204-11 modulator bias controller, the PSI-3600-D1 completes a best-in-class microwave photonic system, capable of record-setting photonic link dynamic range, noise figure and positive intrinsic link gain.

Applications

- Antenna remoting
- Phased array radar
- Signal Distribution
- Remote imaging
- ELINT/EW



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Photonic Systems, Inc. (PSI) is a recognized expert in the design, analysis, development and production of high performance fiber optic systems.

With decades of collective experience, the PSI team offers comprehensive fiber optic engineering solutions to government, military and commercial customers.



PSI-3600-MOD-D1-18/-12/-6 Specifications

| Parameter | Typical Value | | | Units |
|---|---------------------|------------|-----------|-------|
| Operating Wavelength | 1525- 1605 | | | nm |
| Optical Insertion Loss | 9 | | | dB |
| Optical Return Loss | 40, min | | | dB |
| Optical Output | Dual complementary | | | -- |
| Extinction Ratio | 20, min | | | dB |
| V_{π} , DC | 0.9 | | | V |
| RF V_{π}, 18, 12 or 6 GHz model | -18 | -12 | -6 | |
| V_{π} , 1GHz (single drive) | < 1.2 | < 1.2 | < 1.2 | V |
| V_{π} , 6GHz (single drive) | < 1.7 | < 2 | < 2 | V |
| V_{π} , 12GHz (single drive) | < 2.2 | < 3 | - | V |
| V_{π} , 18GHz (single drive) | < 2.7 | - | - | V |
| Storage Temperature Range | -40 to +85 | | | °C |
| Operating Temperature Range | 0 to 70 | | | °C |
| RF Port Connectors (dual drive) | GPO | | | -- |
| Bias Connector | GPO | | | -- |
| Optical Connector | FC/APC | | | -- |
| Output Optical Fiber | SMF (PMF available) | | | -- |

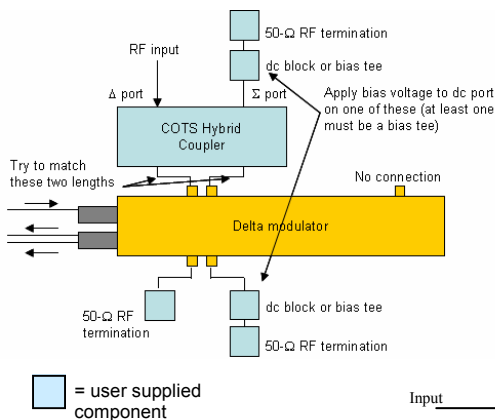
USING THE PSI-3600-MOD-D1 MODULATOR

These modulators may be used in a variety of high performance microwave photonic applications. With dual RF drive inputs as well as dual complementary optical outputs, the modulator offers application flexibility that allows the user to optimize link performance.

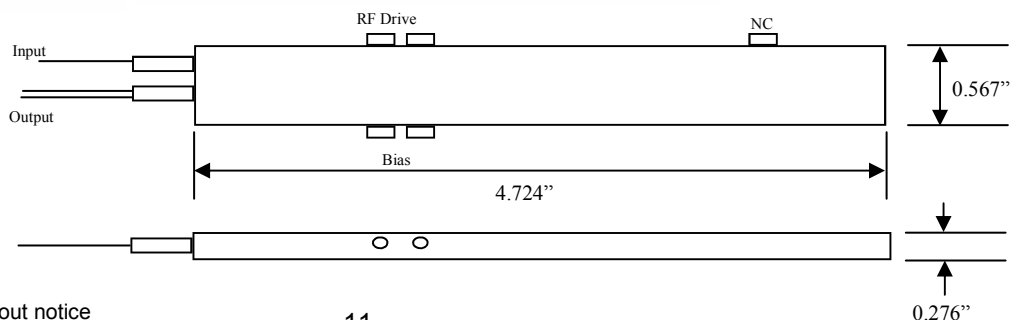
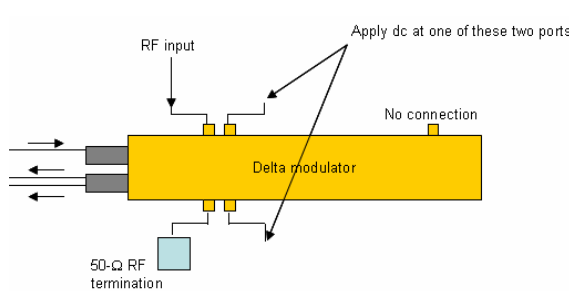
In applications where the lowest possible drive voltage is required, users may take advantage of the dual RF drive capability to realize a ~30% V_{π} reduction. Dual drive requires the use of a hybrid 180° coupler connected in conjunction with a bias-T and 50W terminations as shown below. Single drive operation is achieved with fewer components and results in a more practical solution for wideband link applications.

In order to minimize the effects of source laser RIN, the dual complementary optical outputs may be used in conjunction with the PSI-3600-BPD balanced detector. This link arrangement requires careful matching of optical fiber lengths but offers substantial improvement in wideband link noise figure. Contact PSI for more information on balanced detection.

DUAL RF DRIVE



SINGLE RF DRIVE



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