

# LightBend™ 1x1, 1x2 High Power Series Fiber Optic Switch

(Bidirectional, PM, High Power, MM High Power PM High Power)



DATASHEET

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## Features

- Low Optical Distortions
- High Isolation
- High Reliability
- Fail-Safe Latching
- Epoxy-Free Optical Path

## Applications

- Fault Protection
- Channel Add/Drop
- Channel Switching
- Instrumentation

The LB series 1x2 PM, High power, PM High power fiber optic switch has a polarization- maintaining fiber switch, which connects optical channels by directing or blocking an incoming optical signal into the output fiber. This is achieved using a patent pending opto-mechanical configuration and achieved via an electrical control signal. A latching version preserves the selected optical path after the drive signal has been removed, while the non-latching version defaults to either the open or close state when power is removed. The switches integrated electrical position sensors.

The new material-based advanced design significantly reduces moving part position sensitivity, offering unprecedented high stability as well as an unmatched low cost. Electronic driver is available for this series of switches. The switch is bidirectional.

## Specifications

Parameter	Min	Typical	Max	Unit
Operation Wavelength	850±20, 1060±20, 1310±30, 1550±70			nm
Insertion Loss <sup>[1], [2]</sup>		0.6	1.0	dB
Wavelength Dependent Loss			0.25	dB
PDL <sup>[1], [2]</sup> (SM)			0.1	dB
Extinction Ratio <sup>[1], [2]</sup> (PM)	18	23		dB
Return Loss <sup>[1], [2]</sup>	SM, PM	50		dB
	MM	35		dB
Cross Talk <sup>[1], [2]</sup>	SM, PM	50		dB
	MM	35		dB
Switching Time		3	10	ms
Repeatability			± 0.05	dB
Durability	10 <sup>7</sup>			cycle
Operating Voltage	4.5	5	6	VDC
Operating Current		30	60	mA
Switching Type				
Operating Temperature	-5		70	°C
Storage Temperature	-40		85	°C
Optical Power Handling		5	10	W

### Notes:

- [1]. Exclude connectors
- [2]. Within operating temperature and SOP

**Warning:** This device must use the reference circuit to driver otherwise it is unstable

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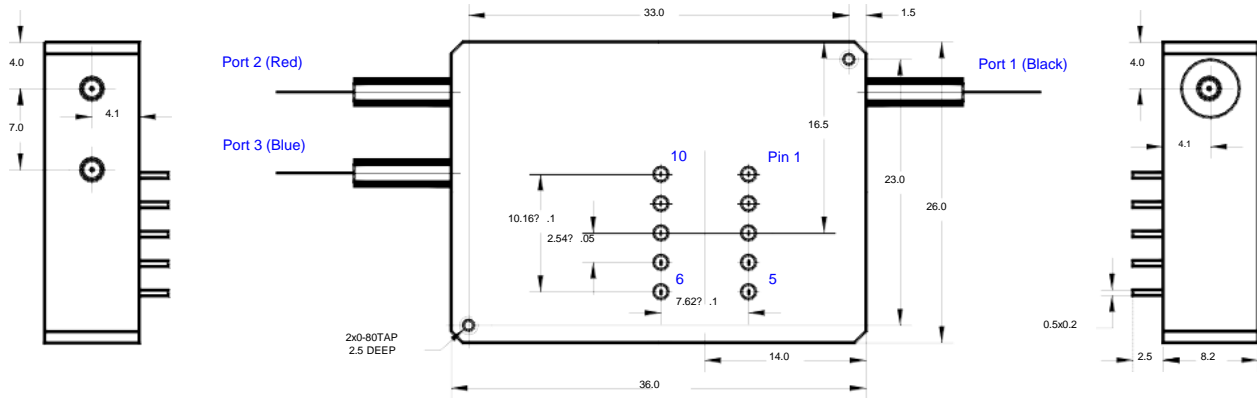
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### Mechanical Dimensions (mm)



\*Product dimensions may change without notice. This is sometimes required for non-standard specifications.

### Electrical Driving Requirements

The load is a resistive coil which is activated by applying 5V (draw ~ 40mA). However, the current flow direction must be correct otherwise it will cancel the permanent magnet inside causing instability. We strongly recommend to use the reference circuit to avoid major issues. We offer pushbutton elevation driver for verifications or convenient income inspection.

Application Note: Applying a constant driving voltage increases stability. The switches can also be driven by a pulse mode using Agiltron recommended circuit for energy saving.

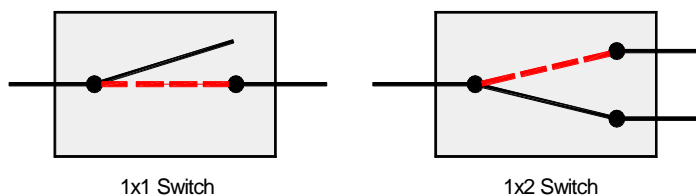
#### Latching Type

Optical Path	Electrical Drive				Status Sensor			
	Pin 1	Pin 10	Pin 5	Pin 6	Pin 2-3	Pin 3-4	Pin 7-8	Pin 8-9
Port 1 → Port 2	5V	0	N/A	N/A	Close	Open	Open	Close
Port 1 → Port 3	0	5V	N/A	N/A	Open	Close	Close	Open

#### Non-Latching Type

Optical Path	Electrical Drive				Status Sensor			
	Pin 1	Pin 10	Pin 5	Pin 6	Pin 2-3	Pin 3-4	Pin 7-8	Pin 8-9
Port 1 → Port 2	5V	0	N/A	N/A	Close	Open	Open	Close
Port 1 → Port 3	No Power		N/A	N/A	Open	Close	Close	Open

### Functional Diagram



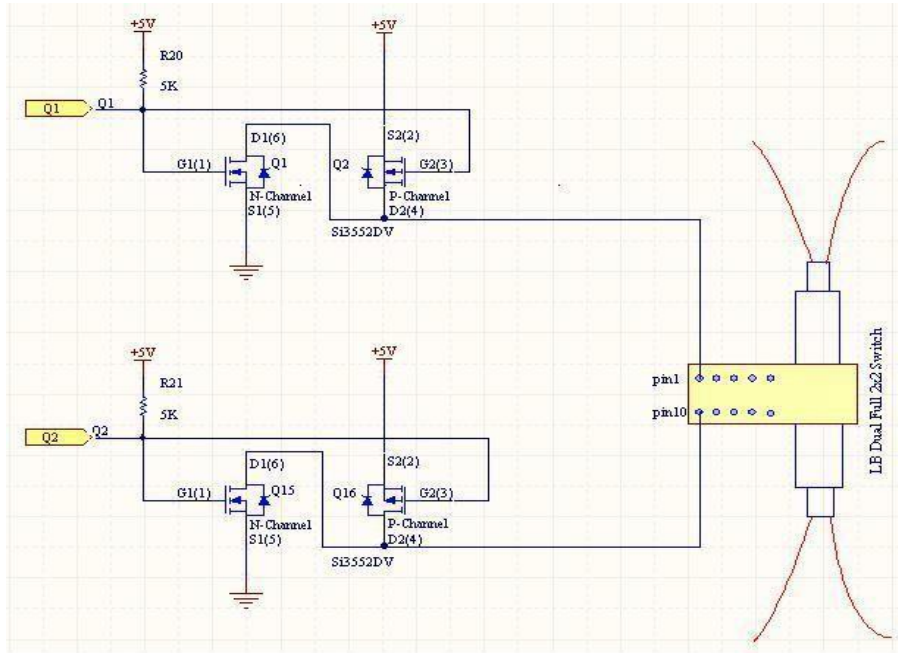
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### Driver Reference Design



### Ordering Information

Prefix	Type	Wavelength	Switch	Power	Fiber Type	Fiber Cover	Fiber Length	Connector
LBHP-	1x1 Transparent <sup>[1]</sup> = 1T	1060 = 1	Latching = 1	5W = 4	SMF-28 = 1	Bare Fiber = 1	0.25m = 1	None = 1
LBPM-	1x1 Opaque <sup>[2]</sup> = 1O	C+L = 2	Non-latching = 2	10W = 5	MM50/125 = 5	900um Tube = 3	0.5m = 2	FC/PC = 2
LBMH-	1x1 Latching = 11	1310 = 3		Special = 0	MM62.5/125 = 6	Special = 0	1.0m = 3	FC/APC = 3
LBPH-	1x2 = 12	1550 = 5			PM1550 = B		Special = 0	SC/PC = 4
	2x1 = 21	780 = 7			PM1310 = D			SC/APC = 5
		850 = 8			PM980 = E			ST/PC = 6
		Special = 0			PM850 = F			LC/PC = 7
					Special = 0			Duplex LC/PC = 8
								LC/APC = A
								LC/UPC = U
								Special = 0

**Note:**

- [1]. For Non-Latching type.
- [2]. For Non-Latching type.

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## Application Notes

### Fiber Core Alignment

Note that the minimum attenuation for these devices depends on excellent core-to-core alignment when the connectors are mated. This is crucial for shorter wavelengths with smaller fiber core diameters that can increase the loss of many decibels above the specification if they are not perfectly aligned. Different vendors' connectors may not mate well with each other, especially for angled APC.

### Fiber Cleanliness

Fibers with smaller core diameters ( $<5 \mu\text{m}$ ) must be kept extremely clean, contamination at fiber-fiber interfaces, combined with the high optical power density, can lead to significant optical damage. This type of damage usually requires re-polishing or replacement of the connector.

### Maximum Optical Input Power

Due to their small fiber core diameters for short wavelength and high photon energies, the damage thresholds for device is substantially reduced than the common 1550nm fiber. To avoid damage to the exposed fiber end faces and internal components, the optical input power should never exceed 20 mW for wavelengths shorter 650nm. We produce a special version to increase the how handling by expanding the core side at the fiber ends.