

LightBend™ Ultra-Mini 1x1, 1x2, 2x2 Bypass Fiber Optic Switch

(Bidirectional)

(Protected by U.S. patent 6823102 and pending patents)



DATASHEET

BUY NOW



The LB Series Ultra-mini fiber optic switch connects optical channels by redirecting incoming optical signals into selected output fibers, in 1x1, 1x2 and 2x2 Bypass configurations. This is achieved using a patented opto-mechanical configuration and activated via an electrical control signal. Latching operation preserves the selected optical path after the drive signal has been removed. The switch has integrated status contacts to provide an electrical readout of switch position. The new material based advanced design significantly reduces moving part position sensitivity, offering unprecedented high stability as well as an unmatched low cost. It is designed for use in reconfigurable OADM, optical cross-connect system and network switching for fault protection applications. Electronic driver is available for this series of switches. The switch is bidirectional.

We offer tight-bend-fiber version, which reduces the minimum bending radius from normal 15 mm to 7 mm. This feature enables smaller overall foot print.

Features

- Unmatched Low Cost
- Low Optical Distortions
- Low Cross Talk
- High Reliability
- Epoxy-Free Optical Path

Applications

- Channel Blocking
- Configurable Add/Drop
- System Monitoring
- Instrumentation

Specifications

Parameter		Min	Typical	Max	Unit
Operation Wavelength	Single Band	1260~1360 or 1510~1620			nm
	Dual Band	1260~1360 and 1510~1620			
	Broad Band	1260~1620			
Insertion Loss ^[1]	-5~+70 °C		0.4	0.7	dB
	-40~+85 °C		0.6	0.9	
Wavelength Dependent Loss	SW ^[2]			0.15	dB
	DW ^[3]			0.25	
Temperature Dependent Loss	-5~+70 °C			0.25	dB
	-40~+85 °C			0.40	
Polarization Dependent Loss				0.1	dB
Return Loss		55			dB
Cross Talk		55			dB
Switching Time			3	10	ms
Repeatability				± 0.02	dB
Durability		10 ⁷			Cycle
Operating Voltage		4.5	5	6	VDC
Operating Current			30	60	mA
Switching Type		Latching or Non-Latching			
Operating Temperature		-5		+70	°C
		-40		+85	
Storage Temperature		-40		+85	°C
Optical Power Handling ^[4]			300	500	mW

Notes:

- [1]. Exclude connectors.
- [2]. **SW**: Single window.
- [3]. **DW**: Dual window.
- [4]. Continuous operation, for pulse operation call

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

Note: The specifications provided are for general applications with a cost-effective approach. If you need to narrow or expand the tolerance, coverage, limit, or qualifications, please [click this link](#):

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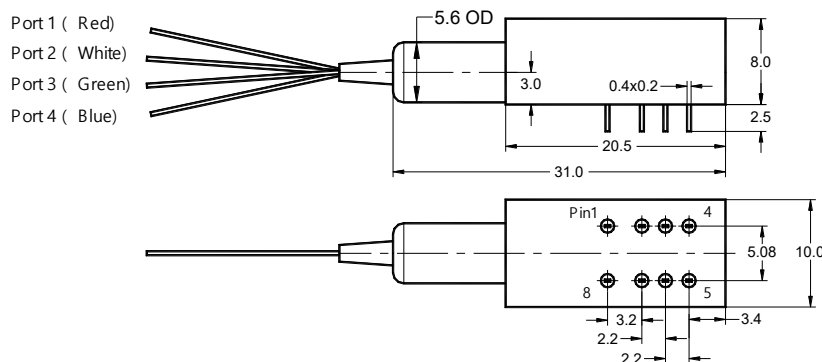
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Mechanical Dimensions (Unit: mm)



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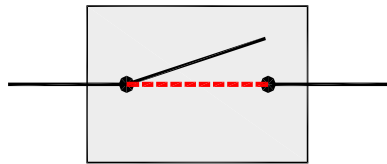
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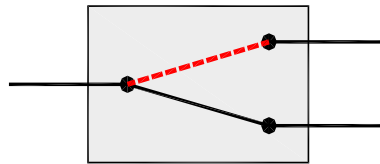


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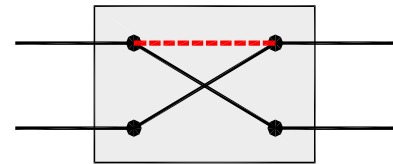
Functional Diagram



LB 1x1 Switch



LB 1x2 Switch



LB 2x2 Bypass Switch

Ordering Information (Part Number)

Prefix	Type	Wavelength	Switch	Package	Fiber Type	Fiber Cover	Fiber Length	Connector ^[4]
LBUM- ^[1]	1x1 Latching = 11 1x1 N/T ^[2] = 1T 1x1 N/D ^[3] = 1D 1x2 = 12 2x1 = 21 2x2 Bypass = 22 Special = 00	1060 = 1 C+L = 2 1310 = 3 1550 = 5 650 = 6 780 = 7 850 = 8 1310 & 1550 = 9 1260~1620 = B Special = 0	Latching = 1 Non-Latching = 2 Non-Latching = 5 Special = 0	-5~+70°C = 7 -40~+85°C = 8 Special = 0	SMF-28 = 1 Corning XB = 2 Draka BBE = 3 Special = 0	Bare fiber = 1 900µm loose tube = 3 Special = 0	0.25m = 1 0.5m = 2 1.0m = 3 Special = 0	None=1 FC/PC=2 FC/APC=3 SC/PC=4 SC/APC=5 ST/PC=6 LC/PC=7 Duplex LC/PC=8 LC/APC=A LC/UPC=U Special=0

[1]. **LBUM**: LightBend Ultra Mini Switch.

[2]. **N/T**: LB 1x1 Non-Latching Switch, Normally Transparent.

[3]. **N/D**: LB 1x1 Non-Latching Switch Normally Dark.

[4]. The default connector configuration uses fiber with 0.9 mm buffer protection. The connector cannot be installed directly onto bare fiber because the bare fiber is prone to damage during shipping. However, the connector can be assembled on bare fiber if a 3 cm protective loose tube is added for reinforcement. The customer may remove this protective tube after testing. The optical power handling of a standard connector is less than 0.5 W for SMF-28 fiber and decreases further for smaller-core fibers.

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 µm) 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 handling by expanding the core side at the fiber ends.

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Driver Reference Design

