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.

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Rev 02/29/24

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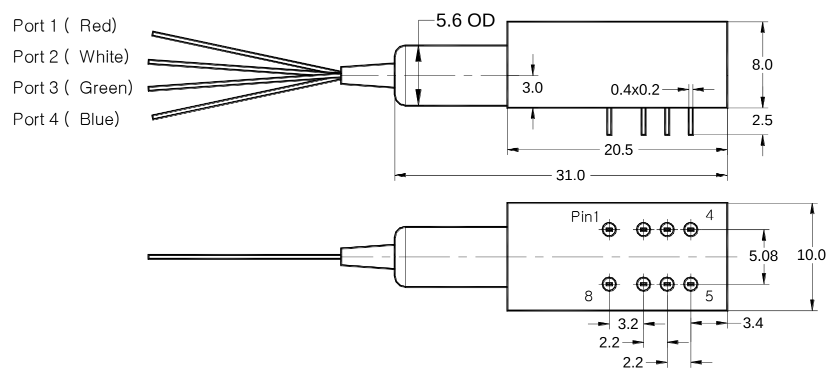
Mechanical Dimensions (Unit: mm)



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

Electrical Connector Configurations

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.

Latching Type

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.

LB Ultra-Mini 1x2 Switch

Optical Path	Electrical Drive		Status Sensor			
	Pin 1	Pin 8	Pin 2-3	Pin 3-4	Pin 5-6	Pin 6-7
Port 1 → Port 2	5V Pulse	0	Open	Close	Close	Open
Port 1 → Port 3	0	5V Pulse	Close	Open	Open	Close

LB Ultra-Mini 2x2 Bypass Switch

Optical Path	Electrical Drive		Status Sensor			
	Pin 1	Pin 8	Pin 2-3	Pin 3-4	Pin 5-6	Pin 6-7
Port 1 → Port 2 Port 4 → Port 3	5V Pulse	0	Open	Close	Close	Open
Port 1 → Port 3	0	5V Pulse	Close	Open	Open	Close

Non-Latching Type

LB Ultra-Mini 1x2 Switch

Optical Path	Electrical Drive		Status Sensor			
	Pin1	Pin8	Pin2-3	Pin3-4	Pin5-6	Pin 6-7
Port 1 → Port 2	5V	0	Open	Close	Close	Open
Port 1 → Port 3	No Power		Close	Open	Open	Close

LB Ultra-Mini 2x2 Bypass Switch

Optical Path	Electrical Drive		Status Sensor			
	Pin1	Pin8	Pin2-3	Pin3-4	Pin5-6	Pin 6-7
Port 1 → Port 2 Port 4 → Port 3	5V	0	Open	Close	Close	Open
Port 1 → Port 3	No Power		Close	Open	Open	Close

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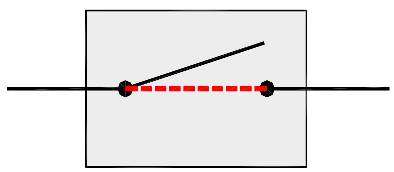
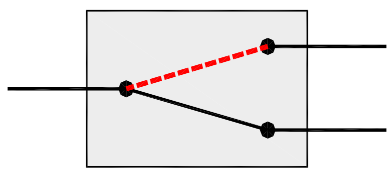
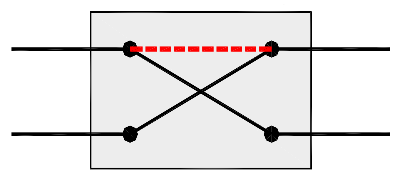
Functional Diagram



LB 1x1 Switch



LB 1x2 Switch



LB 2x2 Bypass Switch

Ordering Information

	☐☐	☐	☐	☐	☐	☐	☐	☐
Prefix	**Type**	**Wavelength**	**Switch**	**Package**	**Fiber Type**	**Fiber Cover**	**Fiber Length**	**Connector**
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 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**: **L**ighBend **U**ltra **M**ini Switch.
[2]. **N/T**: LB 1x1 Non-Latching Switch, **N**ormally **T**ransparence.
[3]. **N/D**: LB 1x1 Non-Latching Switch **N**ormally **D**ark.

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 how handling by expanding the core side at the fiber ends.

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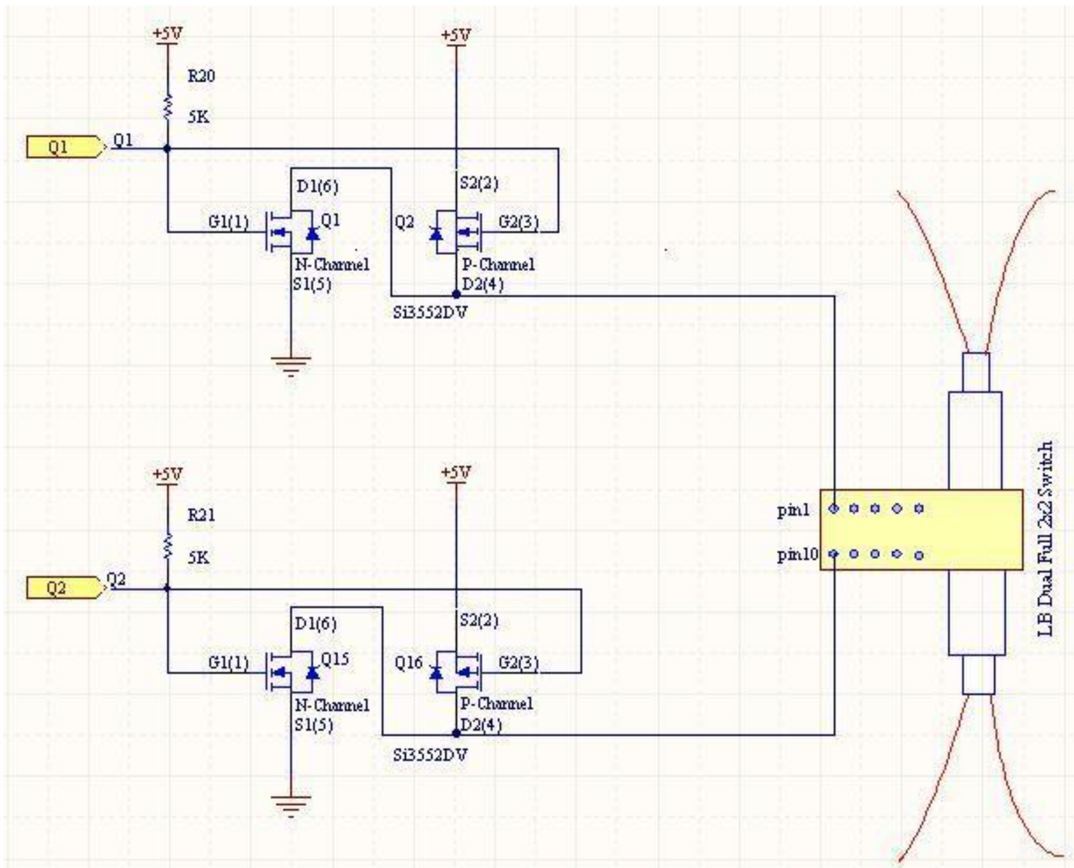
Driver Reference Design



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