

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

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

Product Description

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

Performance Specifications

LB U-Mini 1x1, 1x2, 2x2 BP Switch	Min	Typical	Max	Unit
Operation Wavelength	Single Band	1260-1360 and 1510-1620		nm
	Dual Band	1260-1360 or 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 (Latching/Non-		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
Package Dimension		31.0L x 10.0W x 8.0H		mm

[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.

Applications

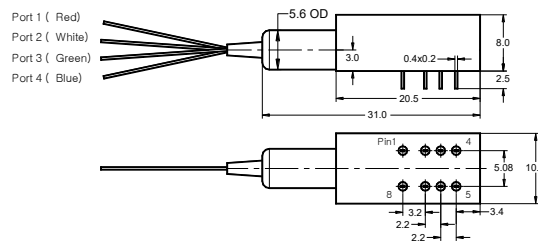
- Channel Blocking
- Configurable Add/Drop
- System Monitoring
- Instrumentation



Revised on 06/29/22

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

Mechanical Dimensions (Unit: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.

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	GND	Open	Close	Close	Open
Port 1 → Port 3	GND	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	GND	Open	Close	Close	Open
Port 1 → Port 3	GND	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	GND	Open	Close	Close	Open
Port 1 → Port 3	No Power		Close	Open	Open	Close

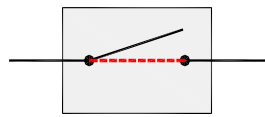
LB Ultra-Mini 2x2 Bypass Switch

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	GND	Open	Close	Close	Open
Port 1 → Port 3	No Power		Close	Open	Open	Close

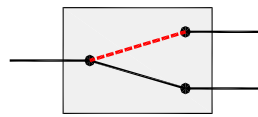


LightBend™ Ultra-Mini 1x1, 1x2, 2x2 Bypass Fiber Optic Switch

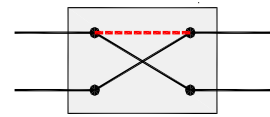
Functional Diagram



LB 1x1 Switch



LB 1x2 Switch



LB 2x2 Bypass Switch

Ordering Information

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

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

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

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



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

Driver Reference Design

