LightBend™ Quad 2x2 Bypass MultiMode Fiber Optic Switch

(Bidirectional)

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

AGILTRON®

DATASHEET

The LB Series Quad 2x2 Bypass multimode OptoMechanical Fiberoptic switch integrated 4 simultaneously activated 2x2 Bypass switches in a single compact format. The device connects optical channels by redirecting incoming optical signals into selected output fibers. 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 electrical position sensors. This novel design significantly reduces moving part position sensitivity, offering unprecedented high stability as well as an unmatched low cost. 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

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

Specifications

Parameter	Min	Typical	Max	Unit
Operation Wavelength	850, 1310, 1410, 1550			nm
Insertion Loss [1], [2], [3]		0.6	1.1	dB
Wavelength Dependent Loss			0.30	dB
Cross Talk [1], [3]	35			dB
Return Loss [1], [2], [3]	35			dB
Switching Time		3	10	ms
Repeatability			± 0.02	dB
Durability	10^7			cycle
Optical Power Handling		300	500 [4]	mW
Operating Voltage	4.5	5	6	VDC
Operating Current		30	60	mA
Voltage Pulse Width (Latching)		20		mS
Switching Type	Latching / Non-Latching			
Operating Temperature	-5		70	°C
Storage Temperature	-40		85	°C

Notes:

[1]. Insertion loss excludes connector.

[2]. Light source CPR<14dB.

[3]. Our device is designed and optimized for certain laser launch condition which is characterized as CPR value. In general, if application exceeds the specified CPR value, optical performance will become worsen.

[4]. Continuous operation, for pulse operation call.

Applications

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

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

Rev 01/06/24

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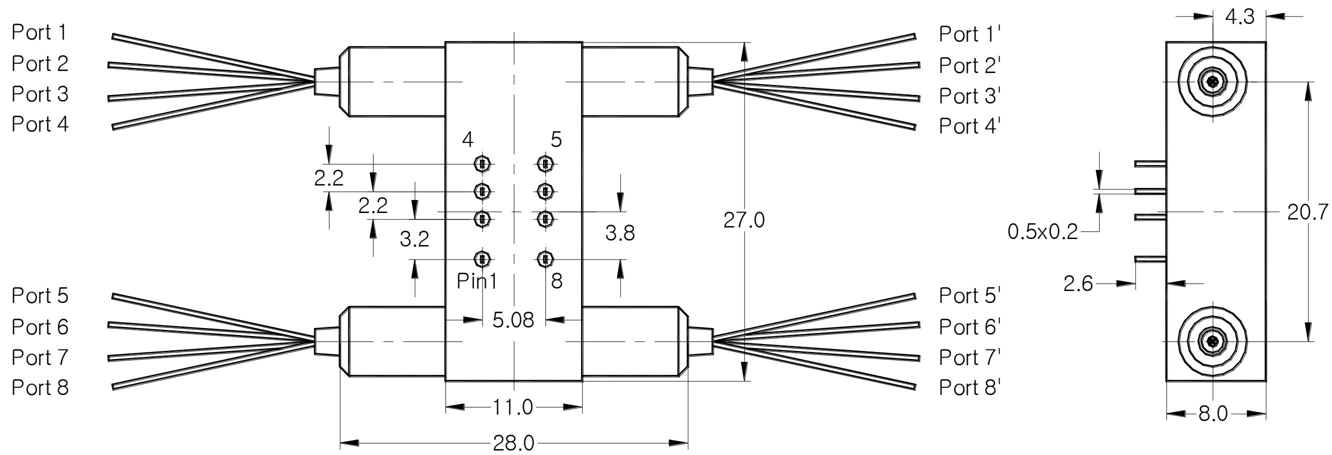
Mechanical Dimensions (mm)



*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.

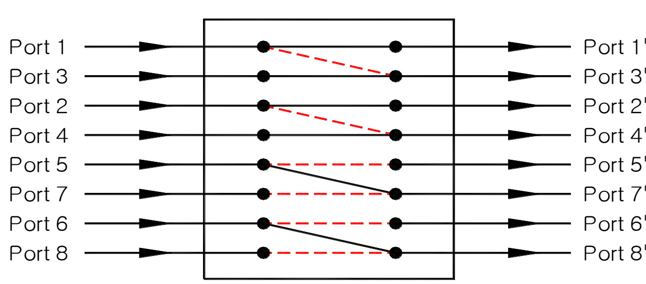
Latching Type

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

Non-Latching Type

Optical Path	Electrical Drive		Status Sensor			
	Pin 1	Pin 8	Pin 2-3	Pin 3-4	Pin 5-6	Pin 6-7
1→1', 2→2' 3→3', 4→4' 5→7', 6→8'	No Power		Close	Open	Open	Close
1→3', 2→4' 5→5', 6→6' 7→7', 8→8'	5V	0	Open	Close	Close	Open

Functional Diagram



LB Quad 2x2 Bypass MM

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Ordering Information

	□□	□	□	□	□	□	□	□
Prefix	**Type**	**Wavelength**	**Switch**	**Package**	**Fiber Type**	**Fiber Cover**	**Fiber Length**	**Connector**
LBQB- [1]	Quad 2x2 = 22 Special = 00	1060 = 1 C+L = 2 1310 = 3 1410 = 4 1550 = 5 650 = 6 780 = 7 850 = 8 1310 & 1550 = 9 Special = 0	Latching = 1 Non-latching = 2 Special = 0	Standard = 1 Special = 0	MM 50/125 = 5 MM 62.5/125 = 6 Special = 0	Bare fiber = 1 900µm 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/UPC = U Special = 0

[1]. LB: Light Bend switch. Q: Quad. B: Bypass.

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.

Driver Reference Design