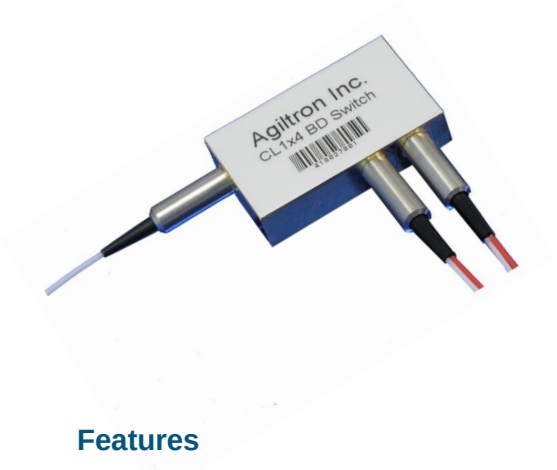
CrystaLatch™ 1x4 Series Fiber Optical Switch

(SM, PM, SM High Power, PM High Power, SM Bidirectional, PM Bidirectional SM High Power Bidirectional, PM High Power Bidirectional)

DATASHEET

BUY NOW



The CL Series 1x4 Series fiber optical switch connects optical channels by redirecting an incoming optical signal into a selected output fiber. This is achieved using patented non-mechanical configurations and activated via an electrical control signal. Latching operation preserves the selected optical path after the drive signal has been removed. The CL 1x4 series fiber optic switch feature low insertion loss, high extinction ratio, high channel isolation, and extremely high reliability and repeatability. It is designed to meet the most demanding switching requirements of continuous operation without failure, longevity, operation under shock/vibration environment and large temperature variations, and fast response time.

The switch also has build-in circulator and isolator functions. Electronic driver is available for this series of switches.

The magneto-optical crystals used in the CL switches have no fatigue nor drift effect.

Features

- High Speed
- Non-Mechanical
- High Reliability
- Fail-Safe Latching
- Low Insertion Loss
- Rugged
- Compact
- Cost Effective
- Direct Low Voltage Drive

Applications

- Optical Signal Routing
- Network Protection
- Burst Switching
- Configurable Add/Drop
- Signal Monitoring
- Instrumentation

Specifications

Parameter			Min	Typical	Max	Unit
Operation Wavelength [1]			1520	1550	1580	nm
			1295	1310	1325	nm
Insertion Loss [2]				1.2	1.7	dB
Crosstalk [2]	Bidirectional Series	Single Stage	17	25		dB
		Dual Stage	35	50		dB
	Unidirectional Series	Single Stage	20	25		dB
		Dual Stage	40	50		dB
Return Loss [2]			50	55		dB
PDL (SM Series Switch only)				0.15	0.25	dB
Extinction Ratio (PM Series Switch only)			18	25		dB
Polarization Mode Dispersion					0.2	ps
Optical Switching Speed (Rise, Fall)			5		10	µs
Repetition Rate				2K		Hz
Durability			10^{15}			cycle
Optic Power Handling	Standard			300	500	mW
	High Power Series				2	W
Operating Temperature			-5		70	°C
Storage Temperature			-40		85	°C
Fiber Type			SMF-28, Panda PM, or equivalent			

Notes:

[1]. Agiltron can achieve same SPEC at L band

[2]. Measured without connectors.

Rev 11/09/23

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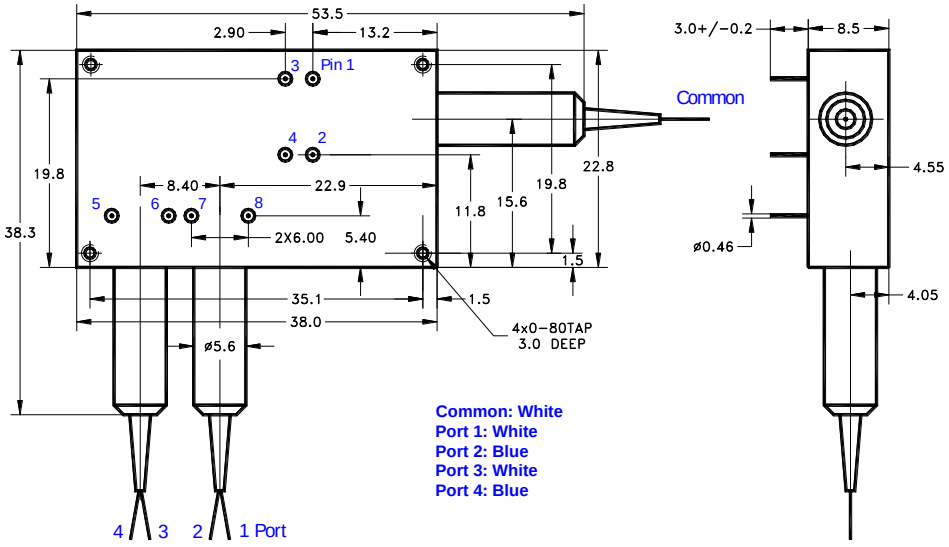
Mechanical Dimensions (Unit: mm)



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

Electrical Driving Information

Each switching point is actuated by applying a voltage pulse. Applying one polarity pulse, one light path will be connected and latched to the position. Applying a reversed polarity pulse, another light path will be connected and latched to the position after pulse removed.

Parameter	Minimum	Typical	Maximum	Unit
Resistance (each group)	15	18	22	Ω
Switch Voltage	2.25	2.5	2.75	V
Pulse Duration	0.2	0.3	0.5	ms

Driving kit with USB and TTL interfaces and Windows™ GUI is available. We also offer RS232 interface as an option – please contact Agiltron sales.

Bidirectional Series 1x4, or 4x1 Switch Driving Table

Single Stage

Optical Path	Pin Group 1		Pin Group 2	
	Pin 1	2	3	4
Common ↔ Port 1	+ *	-	+	-
Common ↔ Port 2	-	+	-	+
Common ↔ Port 3	+	-	-	+
Common ↔ Port 4	-	+	+	-

* "+": 2.25~2.75 V pulse, "-": Ground.

Dual Stage

Optical Path	Pin Group 1		Pin Group 2		Pin Group 3		Pin Group 4	
	Pin 1	2	3	4	5	6	7	8
Common ↔ Port 1	+ *	-	+	-	-	+	+	-
Common ↔ Port 2	-	+	-	+	-	+	+	-
Common ↔ Port 3	+	-	-	+	+	-	-	+
Common ↔ Port 4	-	+	+	-	+	-	-	+

* "+": 2.25~2.75 V pulse, "-": Ground.

P +1 781-935-1200 E sales@photonwares.com W www.agiltron.com

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Unidirectional Series 1x4 Switch Driving Table

Single Stage

Optical Path	Pin Group 1		Pin Group 2	
	Pin 1	2	3	4
Common → Port 1	+ *	-	+	-
Common → Port 2	-	+	-	+
Common → Port 3	+	-	-	+
Common → Port 4	-	+	+	-

* "+": 2.25~2.75 V pulse, "-": Ground.

Dual Stage

Optical Path	Pin Group 1		Pin Group 2		Pin Group 3		Pin Group 4	
	Pin 1	2	3	4	5	6	7	8
Common → Port 1	+ *	-	+	-	-	+	+	-
Common → Port 2	-	+	-	+	-	+	+	-
Common → Port 3	+	-	-	+	+	-	-	+
Common → Port 4	-	+	+	-	+	-	-	+

* "+": 2.25~2.75 V pulse, "-": Ground.

Unidirectional Series 4x1 Switch Driving Table

Single Stage

Optical Path	Pin Group 1		Pin Group 2	
	Pin 1	2	3	4
Port 1 → Common	- *	+	-	+
Port 2 → Common	+	-	+	-
Port 3 → Common	-	+	+	-
Port 4 → Common	+	-	-	+

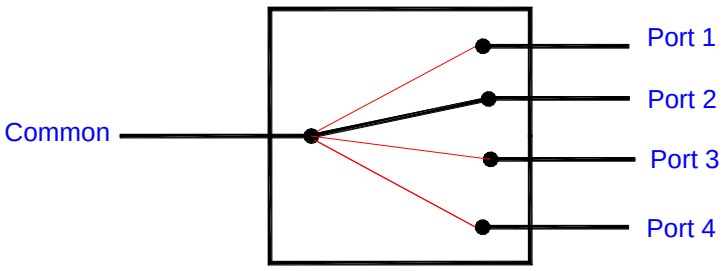
* "+": 2.25~2.75 V pulse, "-": Ground.

Dual Stage

Optical Path	Pin Group 1		Pin Group 2		Pin Group 3		Pin Group 4	
	Pin 1	2	3	4	5	6	7	8
Port 1 → Common	- *	+	-	+	+	-	-	+
Port 2 → Common	+	-	+	-	+	-	-	+
Port 3 → Common	-	+	+	-	-	+	+	-
Port 4 → Common	+	-	-	+	-	+	+	-

* "+": 2.25~2.75 V pulse, "-": Ground.

Functional Diagram



CL 1x4 Series Switch

Driving PCB (RS232 or USB, 200ms response)

https://agiltron.com/product/cl-series-electronic-driver/

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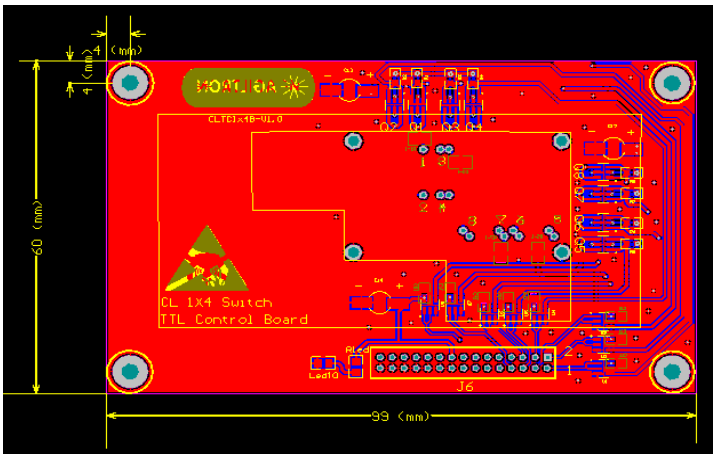
Driving PCB (TTL, µs response)



Inputs	Min	Typ	Max	Pulse Duration
Power	4.8V	5.0V	5.5V	DC
Logic “1”	2.8V	3.3V	5.0V	>200µs
Logic “0”	0V	0V	0.8V	>200µs

TTL Operation Instruction

Pin Definition

Pin #	Function
1-8	TTL
18	5V
19, 21-30	GND

Driving Logic

Optical Path	TTL1	TTL2	TTL3	TTL4	TTL5	TTL6	TTL7	TTL8
1	+	-	+	-	-	+	+	-
2	-	+	-	+	-	+	+	-
3	+	-	-	+	+	-	-	+
4	-	+	+	-	+	-	-	+

Note: + ---- Logic “1”
- ---- Logic “0”
For each +, it requires a square wave, of which pulse wide ≥ 200µs

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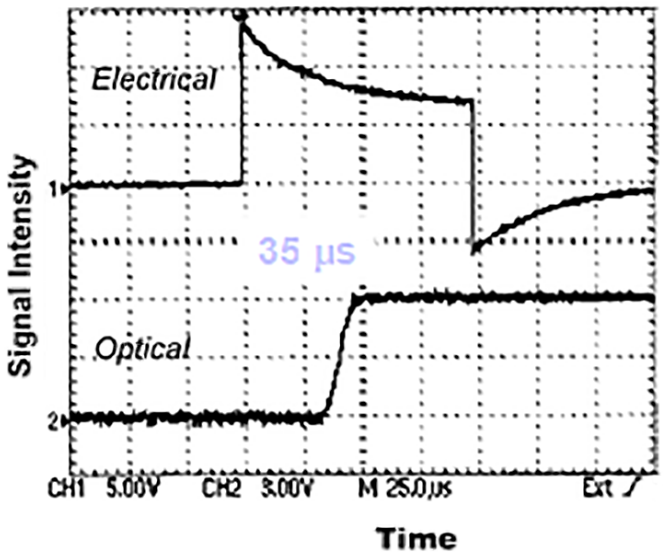
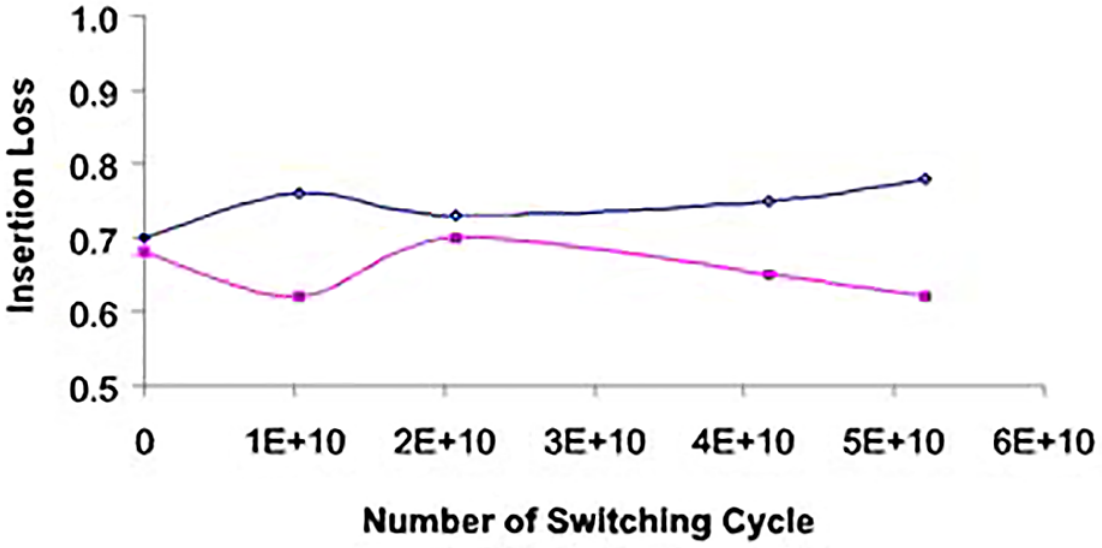
Typical Switching Response



Typical Loss Change of 1x2 vs Switching Numbers



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Ordering Information

	☐☐	☐	☐	☐	☐	☐	☐	☐
Prefix	**Type**	**Wavelength**	**Switch**	**Package**	**Fiber Type**	**Fiber Cover**	**Fiber Length**	**Connector**
CLSW- [1] **CLPM-** [2] **CLHP-** [3] **CLBD-** [4] **CLPH-** [5] **CLHB-** [6] **CLPB-** [7] **CPHB-** [8]	1x4 = 14 4x1 = 41 1x3 = 13 3x1 = 31 Special = 00	1310 = 3 1550 = 5 Special = 0	Single Stage = 1 Dual Stage = 2 Special = 0	Standard = 2 Special = 0	SMF-28 = 1 PM 1550 = B 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 MTP = 9 LC/UPC = U Special = 0

[1]. **CLSW**: **C**rysta**L**atch 1x4 **SW**ITCH.
[2]. **CLPM**: **C**rysta**L**atch 1x4 **PM** Switch.
[3]. **CLHP**: **C**rysta**L**atch 1x4 **H**igh **P**ower Switch.
[4]. **CLBD**: **C**rysta**L**atch 1x4 **BI**DIRECTIONAL Switch.
[5]. **CLPH**: **C**rysta**L**atch 1x4 **P**M **H**igh Power Switch.
[6]. **CLHB**: **C**rysta**L**atch 1x4 **H**igh Power **B**idirectional Switch.
[7]. **CLPB**: **C**rysta**L**atch 1x4 **P**M **B**idirectional Switch.
[8]. **CPHB**: **C**rysta**L**atch 1x4 **P**M **H**igh Power **B**idirectional Switch.

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.