CrystaLatch™ 1x10 Series Fiber Optic Switch

① SM, PM. ② SM High Power, PM High Power. ③ SM Bidirectional, PM Bidirectional. ④ SM High Power Bidirectional, PM High Power Bidirectional

(Protected by U.S. patents 7224860, 6757101, 6577430 and pending patents)

DATASHEET

Return to the Webpage

The CL Series 1x10 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. The latching operation preserves the selected optical path after removing the drive signal. The CL 1x10 series fiber optic switch can be made in different versions with various fibers. These switches feature low insertion loss, high extinction ratio, high channel isolation, and high reliability and repeatability.

It is designed to meet the most demanding switching requirements of continuous operation without failure, longevity under harsh environments, and significant temperature variations. The switch has built-in circulation functions.

An electronic driver is available for this series of switches separately.

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	2.2	dB
Cross Talk On/Off Ratio [2]	Bidirectional Series Switch	35	50		dB
	Other Series	40	50		dB
Return Loss [2]		50	55		dB
Polarization Dependent Loss (SM)			0.15	0.35	dB
Extinction Ratio (PM)		18	25		dB
Polarization Mode Dispersion (SM)				0.2	ps
Switch Speed			50	200	µs
Repetition Rate			2K		Hz
Durability		10^{11}			cycle
Optical Power Handling	High Power Series			2	W
	Others		300	500	mW
Switch type		Solid-State Latching			
Operating Temperature		-5		+70	°C
		-40		+85	°C
Storage Temperature		-40		+85	°C
Fiber Type	SM	SMF-28 fiber, or equivalent			
	PM	Panda PM 250 fiber, or equivalent			

Notes:

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

[2]. Measured without connectors

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]:

Rev 02/13/25

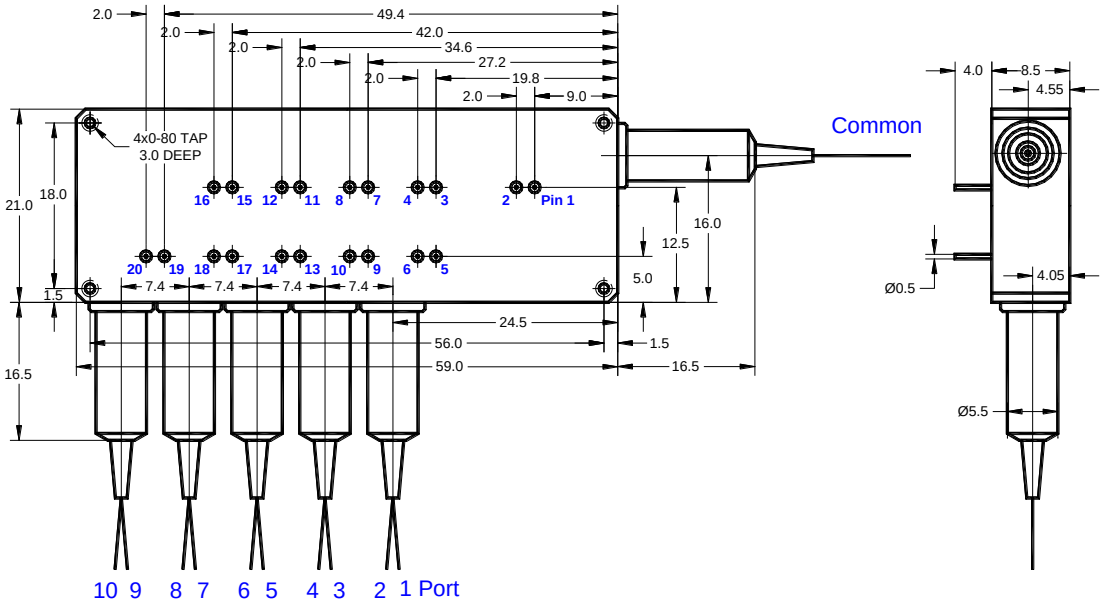
CrystaLatch™ 1x10 Series Fiber Optic Switch

① SM, PM. ② SM High Power, PM High Power. ③ SM Bidirectional, PM Bidirectional.
④ SM High Power Bidirectional, PM High Power Bidirectional

(Protected by U.S. patents 7224860, 6757101, 6577430 and pending patents)

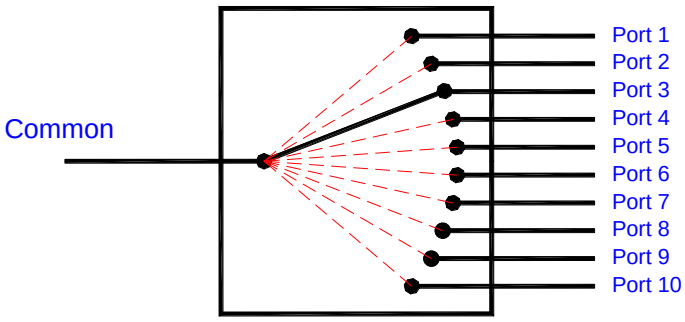
DATASHEET

Mechanical Dimensions (Unit: mm)



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

Functional Diagram



CL 1x10 Series Switch

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 Pin group)	15	18	22	Ω
Switch Voltage	2.25	2.5	2.75 [1]	V
Pulse Duration	0.2	0.3	0.5	ms

[1]. Over this value will damage the device

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

CrystaLatch™ 1x10 Series Fiber Optic Switch

① SM, PM. ② SM High Power, PM High Power. ③ SM Bidirectional, PM Bidirectional.
④ SM High Power Bidirectional, PM High Power Bidirectional

(Protected by U.S. patents 7224860, 6757101, 6577430 and pending patents)

DATASHEET

Electrical Driving Information (continue 1)

Bidirectional Series 1x10, or 10x1 Switch Driving Table

Optical Path	PG 1 [1]		PG 2		PG 3		PG 4		PG 5		PG 6		PG 7		PG 8		PG 9		PG 10	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
C ↔ P1 [2]	+ [3]	0	+	0	+	0	+	0	0	+	+	0	0	+	+	0	0	+	0	+
C ↔ P2	0	+	0	+	+	0	+	0	0	+	+	0	0	+	+	0	0	+	0	+
C ↔ P3	+	0	0	+	0	+	+	0	+	0	+	0	0	+	+	0	0	+	0	+
C ↔ P4	0	+	+	0	0	+	+	0	+	0	+	0	0	+	+	0	0	+	0	+
C ↔ P5	+	0	0	+	0	+	0	+	+	0	+	0	+	0	+	0	0	+	0	+
C ↔ P6	0	+	+	0	0	+	0	+	+	0	+	0	+	0	+	0	0	+	0	+
C ↔ P7	+	0	0	+	0	+	0	+	0	+	0	+	0	+	+	0	+	0	0	+
C ↔ P8	0	+	+	0	0	+	0	+	0	+	0	+	0	+	+	0	+	0	0	+
C ↔ P9	+	0	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	+	0
C ↔ P10	0	+	+	0	0	+	0	+	0	+	0	+	0	+	0	+	0	+	+	0

[1]. **PG**1: **P**in **G**roup 1.
[2]. **C**: **C**ommon Port. **P**1: **P**ort 1.
[3]. "+": 2.25~2.75 V Pulse, Typical is 2.5V Pulse. "0": Ground.

Unidirectional Series 1x10 Switch Driving Table

Optical Path	PG 1 [1]		PG 2		PG 3		PG 4		PG 5		PG 6		PG 7		PG 8		PG 9		PG 10	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
C → P1 [2]	+ [3]	0	+	0	+	0	+	0	0	+	+	0	0	+	+	0	0	+	0	+
C → P2	0	+	0	+	+	0	+	0	0	+	+	0	0	+	+	0	0	+	0	+
C → P3	+	0	0	+	0	+	+	0	+	0	+	0	0	+	+	0	0	+	0	+
C → P4	0	+	+	0	0	+	+	0	+	0	+	0	0	+	+	0	0	+	0	+
C → P5	+	0	0	+	0	+	0	+	+	0	+	0	+	0	+	0	0	+	0	+
C → P6	0	+	+	0	0	+	0	+	+	0	+	0	+	0	+	0	0	+	0	+
C → P7	+	0	0	+	0	+	0	+	0	+	0	+	0	+	+	0	+	0	0	+
C → P8	0	+	+	0	0	+	0	+	0	+	0	+	0	+	+	0	+	0	0	+
C → P9	+	0	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	+	0
C → P10	0	+	+	0	0	+	0	+	0	+	0	+	0	+	0	+	0	+	+	0

[1]. **PG**1: **P**in **G**roup 1.
[2]. **C**: **C**ommon Port. **P**1: **P**ort 1.
[3]. "+": 2.25~2.75 V Pulse, Typical is 2.5V Pulse. "0": Ground.

Unidirectional Series 10x1 Switch Driving Table

Optical Path	PG 1 [1]		PG 2		PG 3		PG 4		PG 5		PG 6		PG 7		PG 8		PG 9		PG 10	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
P1 → C [2]	0 [3]	+	0	+	0	+	0	+	+	0	0	+	+	0	0	+	+	0	+	0
P2 → C	+	0	+	0	0	+	0	+	+	0	0	+	+	0	0	+	+	0	+	0
P3 → C	0	+	+	0	+	0	0	+	0	+	0	+	+	0	0	+	+	0	+	0
P4 → C	+	0	0	+	+	0	0	+	0	+	0	+	+	0	0	+	+	0	+	0
P5 → C	0	+	+	0	+	0	+	0	0	+	0	+	0	+	0	+	+	0	+	0
P6 → C	+	0	0	+	+	0	+	0	0	+	0	+	0	+	0	+	+	0	+	0
P7 → C	0	+	+	0	+	0	+	0	+	0	+	+	+	0	0	+	0	+	+	0
P8 → C	+	0	0	+	+	0	+	0	+	0	+	+	+	0	0	+	0	+	+	0
P9 → C	0	+	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	0	+
P10 → C	+	0	0	+	+	0	+	0	+	0	+	0	+	0	+	0	+	0	0	+

[1]. **PG**1: **P**in **G**roup 1.
[2]. **C**: **C**ommon Port. **P**1: **P**ort 1.
[3]. "+": 2.25~2.75 V Pulse, Typical is 2.5V Pulse. "0": Ground.

CrystaLatch™ 1x10 Series Fiber Optic Switch

① SM, PM. ② SM High Power, PM High Power. ③ SM Bidirectional, PM Bidirectional.
④ SM High Power Bidirectional, PM High Power Bidirectional

(Protected by U.S. patents 7224860, 6757101, 6577430 and pending patents)

DATASHEET

Ordering Information

	☐☐	☐	☐	☐	☐	☐	☐	☐
Prefix	**Type**	**Wavelength**	**Switch**	**Package**	**Fiber Type**	**Fiber Cover**	**Fiber Length**	**Connector** [10]
CLSW- [1] **CLPM-** [2] **CLHP-** [3] **CLBD-** [4] **CLPH-** [5] **CLHB-** [6] **CLPB-** [7] **CPHB-** [8]	1x9 = 19 9x1 = 91 1x10 = 10 10x1 = 01 Special = 00	1310 = 3 1550 = 5 Special = 0	Dual Stage = 2 Special = 0	Standard = 1 -40~+85˚C [9] = A -40~+70˚C = B -20~+85˚C = C -20~+70˚C = D Special = 0	SFM-28 = 1 PM1550 = 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/APC = A LC/UPC = U Special = 0

[1]. **CLSW**: **C**rysta**L**atch 1x10 Dual Stage **SW**ITCH.
[2]. **CLPM**: **C**rysta**L**atch 1x10 **PM** Dual Stage Switch.
[3]. **CLHP**: **C**rysta**L**atch 1x10 **H**igh **P**ower Dual Stage Switch.
[4]. **CLBD**: **C**rysta**L**atch 1x10 **BiD**i Dual Stage Switch.
[5]. **CLPH**: **C**rysta**L**atch 1x10 **PM H**igh Power Dual Stage Switch.
[6]. **CLHB**: **C**rysta**L**atch 1x10 **H**igh Power **B**idirectional Dual Stage Switch.
[7]. **CLPB**: **C**rysta**L**atch 1x10 **PM B**idirectional Dual Stage Switch.
[8]. **CPHB**: **C**rysta**L**atch 1x10 **PM H**igh Power **B**idirectional Dual Stage Switch.
[9]. Operating temperature is -40 to +85˚C.
[10]. There isn't any connector in the high power switches normally. Please contact us for high power connectors.

Application Notes

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.