

# CrystalLatch™ 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)

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

## Product Description

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.



## Performance Specifications

CL 1x4 Series Switch	Min	Typical	Max	Unit	
Operation Wavelength <sup>[1]</sup>	1520	1550	1580	nm	
	1295	1310	1325	nm	
Insertion Loss <sup>[2]</sup>		1.2	1.7	dB	
Crosstalk <sup>[2]</sup>	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 <sup>[2]</sup>	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	
Switch Speed (Rise, Fall)		50	200	µs	
Repetition Rate		2K		Hz	
Durability	10 <sup>14</sup>			cycle	
Optic Power Handling	Standard	300	500	mW	
	High Power Series		2	W	
Switch type	Solid-State Latching				
Operating Temperature	-5		70	°C	
Storage Temperature	-40		85	°C	
Fiber Type	SMF-28, Panda PM, or equivalent				
Package Dimension	53.5L x 38.3W x 8.5H mm				

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

[2]. Measured without connectors.

## Features

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

## Applications

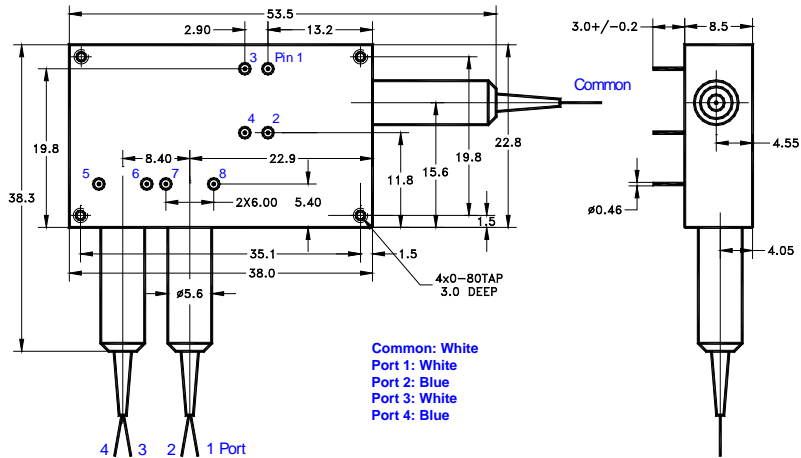
- Optical Signal Routing
- Network Protection
- Burst Switching
- Configurable Add/Drop
- Signal Monitoring
- Instrumentation



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## Mechanical Dimensions (Unit: mm)



## 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.

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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	-	+	+	-

\* "+": 2.25~2.75V 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	-	+	+	-	+	-	-	+

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

## Unidirectional Series 4x1 Switch Driving Table

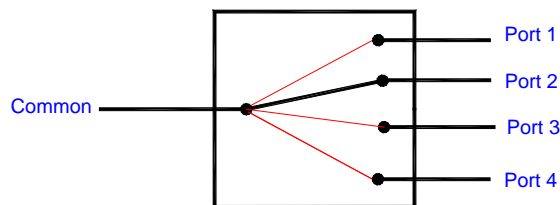
### Single Stage

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	+	-	-	+

### 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	+	-	-	+	-	+	+	-

## Functional Diagram



CL 1x4 Series Switch

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## Ordering Information

<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> - <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Type	Wavelength	Switch	Package	Fiber Type		Fiber Length	Connector
CLSW <sup>[1]</sup>	1x4=14	1310=3	Single Stage=1	Special=0	SMF-28=1 Panda PM 250=B Special=0	Bare fiber=1 900µm loose tube=3 Special=0	0.25m=1	None=1
CLPM <sup>[2]</sup>	4x1=41	1550=5	Dual Stage=2				0.5m=2	FC/PC=2
CLHP <sup>[3]</sup>	1x3=13	Special=0	Special=0				1.0m=3	FC/APC=3
CLBD <sup>[4]</sup>	3x1=31						Special=0	SC/PC=4
CLPH <sup>[5]</sup>	Special=00							SC/APC=5
CLHB <sup>[6]</sup>								ST/PC=6
CLPB <sup>[7]</sup>								LC=7
CPHB <sup>[8]</sup>								Duplex LC=8 MTP=9 Special=0

- [1]. CLSW: CrystaLatch Dual Stage 1x4 SWITCH.
- [2]. CLPM: CrystaLatch Dual Stage 1x4 PM Switch.
- [3]. CLHP: CrystaLatch Dual Stage 1x4 High Power Switch.
- [4]. CLBD: CrystaLatch Dual Stage 1x4 BIDIRECTIONAL Switch.
- [5]. CLPH: CrystaLatch Dual Stage 1x4 PM High Power Switch.
- [6]. CLHB: CrystaLatch Dual Stage 1x4 High Power Bidirectional Switch.
- [7]. CLPB: CrystaLatch Dual Stage 1x4 PM Bidirectional Switch.
- [8]. CPHB: CrystaLatch Dual Stage 1x4 PM High Power Bidirectional Switch.

