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

Operation Wavelength (¹¹) 1520 1550 1580 nm Insertion Loss [²] 1295 1310 1325 nm Crosstalk (²²) Single Stage 17 25 dB Bidirectional Series Dual Stage 35 50 dB Crosstalk (²²) Dual Stage 20 25 dB B Eturn Loss [²] 50 55 dB PDL (SM Series Switch only) 18 25 dB Extinction Ratio (PM Series Switch only) 18 25 dB POlarization Mode Dispersion 5 10 µs Optical Switching Speed (Rise, Fall) 5 10 µs Repetition Rate 2K Hz Durability 10¹5 cycle Optic Power Handling Standard 300 500 mW Operating Temperature -5 70 °C Storage Temperature -40 85 °C Fiber Type SMF-28, Panda PM, or equivalent	CL 1x4 Se	ries Swi	tch	Min	Typical	Max	Unit
1295 1310 1325 nm 1325 nm	Operation Wayslandth [1]	7,5	X/>'	1520	1550	1580	nm
Single Stage Dual Stage 17 25 dB Dual Stage Crosstalk [2] Unidirectional Series Unidirectional Series Single Stage 35 50 dB Single Stage Dual Stage 20 25 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 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 Operating Temperature -5 70 °C Operating Temperature -40 85 °C Fibre Type	Operation wavelength			1295	1310	1325	nm
Bidirectional Series Dual Stage 35 50 dB Crosstalk I²² Single Stage 20 25 dB Dual Stage 40 50 dB Return Loss I²² 50 55 dB PDL (SM Series Switch only) 18 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 10¹5 cycle Optic Power Handling Standard 300 500 mW Operating Temperature -5 70 °C Storage Temperature -40 85 °C Fiber Type	Insertion Loss [2]				1.2	1.7	dB
Crosstalk [2] Dual Stage 35 50 dB Unidirectional Series Single Stage 20 25 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 1015 cycle Optic Power Handling Standard 300 500 mW Operating Temperature -5 70 °C Operating Temperature -40 85 °C Fiber Type	Bidirectional Series		Single Stage	17	25		dB
Single Stage 20 25 dB	- 3777	ii Series	Dual Stage	35	50		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 Operating Temperature -5 70 °C Storage Temperature -40 85 °C Fiber Type SMF-28, Panda PM, or equivalent	O. Ooota	ol Corioo	Single Stage	20	25		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 1015 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	Official ection	Unidirectional Series		40	50		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 1015 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	Return Loss [2]	50	55		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	PDL (SM Series Switch o	PDL (SM Series Switch only)			0.15	0.25	dB
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	Extinction Ratio (PM Serie	es Switch	only)	18	25		dB
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	Polarization Mode Dispers	sion				0.2	ps
Durability 1015 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	Optical Switching Speed (Rise, Fall)	5		10	μs
Standard 300 500 mW Operating Temperature -5 70 °C Storage Temperature -40 85 °C Fiber Type SMF-28, Panda PM, or equivalent	Repetition Rate				2K		Hz
Optic Power Handling High Power Series 2 W Operating Temperature -5 70 °C Storage Temperature -40 85 °C Fiber Type SMF-28, Panda PM, or equivalent	Durability			10 ¹⁵			cycle
High Power Series 2 W Operating Temperature -5 70 °C Storage Temperature -40 85 °C Fiber Type SMF-28, Panda PM, or equivalent	Ontic Power Handling	Standar	·d		300	500	mW
Storage Temperature -40 85 °C Fiber Type SMF-28, Panda PM, or equivalent	Optic Fower Handling	High Po	wer Series			2	W
Fiber Type SMF-28, Panda PM, or equivalent	Operating Temperature			-5		70	°C
	Storage Temperature			-40		85	°C
Package Dimension 53.5L x 38.3W x 8.5H mm	Fiber Type			SMF-28, F	Panda PM, or e	quivalent	
	Package Dimension			53.5	L x 38.3W x 8	.5H	mm

Note:

- [1]. Agiltron can achieve same SPEC at L band
- [2]. Measured without connectors.

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CrystaLatch[™] 1x4 Series Fiber Optical Switch



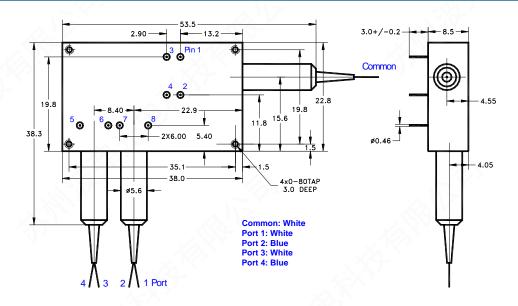


SM High Power Bidirectional, PM High Power Bidirectional)



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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 WindowsTM 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

Out at Dath	Pin G	roup 1	Pin Group 2		
Optical Path	Pin 1	2 3 4		4	
$Common \longleftrightarrow Port \ 1$	+ *	-	+	-	
Common ↔ Port 2	-	+	-	+	
Common ↔ Port 3	+	-	-	+	
Common ↔ Port 4	-	+	+	-	

^{* &}quot;+": 2.25~2.75 V pulse, "-": Ground.

Dual Stage

Optical Path	Pin Gı	Group 1 Pin Group 2		roup 2	Pin Gı	roup 3	Pin Group 4	
Optical Patil	Pin 1	2	3	4	5	6	7	8
Common \leftrightarrow Port 1	+ *	-	+	- 1		+	+	-
Common \leftrightarrow Port 2	-	+	-	+	-	+	+	-
Common \leftrightarrow Port 3	+	-	-	+	+	-	-	+
Common \leftrightarrow Port 4	-	+	+	<u> </u>	+	-	-	+

^{* &}quot;+": 2.25~2.75 V pulse, "-": Ground.

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Unidirectional Series 1x4 Switch Driving Table

Single Stage

Optical Path	Pin Gı	oup 1	Pin Group 2		
Optical Path	Pin 1	2	3 4		
Common → Port 1	+ *	-	+	- X	
Common → Port 2	-	+	-	+	
Common → Port 3	+	-	-, 1	+	
Common → Port 4	-	+	+	-	

^{* &}quot;+": 2.25~2.75 V pulse, "-": Ground.

Dual Stage

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

^{* &}quot;+": 2.25~2.75 V pulse, "-": Ground.

Unidirectional Series 4x1 Switch Driving Table

Single Stage

Optical Path	Pin Gr	oup 1	Pin Group 2		
Optical Patri	Pin 1	2	3	4	
Port 1 → Common	- *	+	-	+	
Port 2 → Common	+	-	+	A.	
Port 3 → Common	-	+	+	>'-	
Port 4 → Common	+	-50	7-	+	

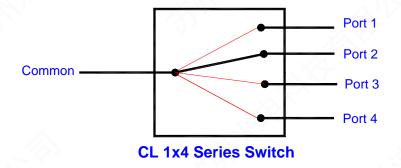
^{* &}quot;+": 2.25~2.75 V pulse, "-": Ground.

Dual Stage

Optical Path	Pin Gr	roup 1 Pin Group		iroup 2	Pin Group 3		Pin Group 4	
Optical Patil	Pin 1	2	3	4	5	6	7	8
Port 1 → Common	- *	+	-	+	+	-	\	+
Port 2 → Common	+	7 -	+	-	+	-	-	+
Port 3 → Common	K- ^	+	+	-	-	+	+	-
Port 4 → Common	+	-	-	+	-	+	+	-

^{* &}quot;+": 2.25~2.75 V pulse, "-": Ground.

Functional Diagram



Driving PCB (RS232 or USB, 200ms response)

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



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CrystaLatch™ 1x4 Series Fiber Optical Switch

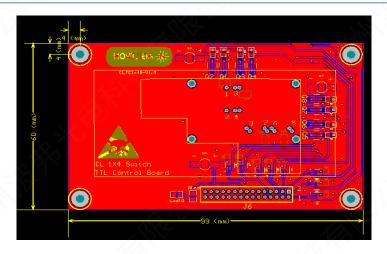






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Driving PCB (TTL, µs response)



***** AGILTRON

Inputs	Min	Тур	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	+	-	+	\ <u>'</u>	-	+	+	-
2	-	+	-377	+	-	+	+	-
3	+	-	-	+	+	-	-	+
4	-	+	+	-	+	-	-	+

Note: + ---- Logic "1" - ---- Logic "0"

For each +, it requires a square wave, of which pulse wide ≥ 200µs

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Ordering Information

Prefix	Туре	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	Device = 2 RS232 = 3 USB = 4 TTL = 5 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 = 7 Duplex LC = 8 MTP = 9 Special = 0

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