

Moving Fiber Optical Switches

The unique moving fiber design of CORALIGN™ switches make them independent of wavelength and suitable for many high power applications while achieving very high coupling between fibers.



FEATURES

- Low Losses
- Wavelength independent
- High power capable
- Singlemode and multimode
- Low back reflection (angled gap)
- Epoxy-free optical path
- Compact package with cables on one side
- PCB component style mounting
- Inline switch driver available (TTL/CMOS)

LOW LOSSES

The simplicity of the direct fiber to fiber connection through an air or oil filled gap allow CORALIGN™ switches to achieve the lowest insertion losses in the industry.

The low loss version uses indexing matching oil in the gap to achieve a lower insertion loss. In certain circumstances such as high power applications, oil cannot be used in the gap and we recommend using the normal loss version with an air gap.

WAVELENGTH INDEPENDENT

The elimination of any lenses in the moving fiber design mean the CORALIGN™ switch is wavelength independent

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and can handle any wavelength compatible with the fiber used.

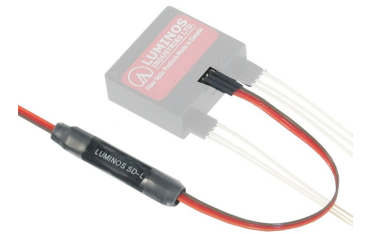
HIGH POWER APPLICATION

Another advantage of the CORALIGN™ moving fiber design is that there is no epoxy or lenses between fibers, making it suitable for high power applications.

The singlemode switches can be used with powers as high as 20 dBm and the multimode switches can handle up to 23 dBm.

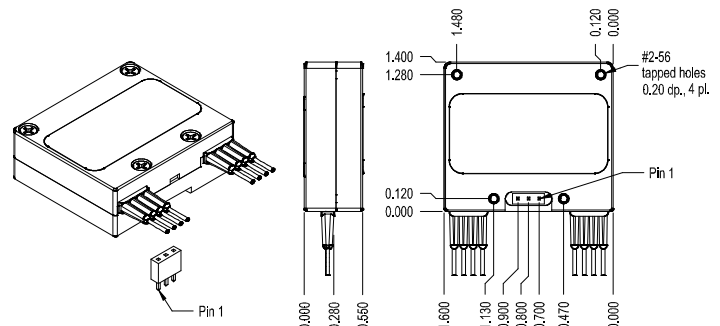
INLINE SWITCH DRIVER (TTL/CMOS COMPATIBLE)

The optional switch driver allows CORALIGN™ switches to be easily controlled using a common TTL or CMOS input for testing or prototyping. The electronics for the control are built inline as part of the 1 meter ribbon cable. One end of the cable is equipped with an IDC connector, ready to be connected to our optical switches. At the other end, a bare ribbon leaves the connectorization up to the user.



Full schematics are available at www.luminos.com/inline-switch-driver.

DIMENSIONAL DRAWINGS



ORDERING INFORMATION

Please see the website for a complete list of options and to request a quote (www.luminos.com).

Switch Specification Summary

Characteristic	Comments	Singlemode 9/125 μm		Multimode 62.5/125 μm		Units	Notes
		Low Loss	Normal Loss	Low Loss	Normal Loss		
Insertion Loss * 1550 nm	Typical, no connector	0.25	0.7	0.05	0.5	dB	1
	Maximum, no connector	0.6	1.2	0.20	0.8	dB	1
Insertion Loss * 1310 nm	Typical, no connector	0.25	0.8	0.05	0.5	dB	1
	Maximum, no connector	0.6	1.3	0.20	0.8	dB	1
Insertion Loss * 850 nm	Typical, no connector			0.10	0.6	dB	1
	Maximum, no connector			0.25	0.9	dB	1
Switching Time	Typical	7				ms	2
	Max at 25 °C	10				ms	3
	Max 0 to 70 °C	12				ms	3
Back Reflection	Typical	-65	-60	-60		dB	
	Minimum	-55	-50	-50		dB	
Cross-talk	Max	-70				dB	4
Temperature Stability	Typical (0–70°C)	± 0.1				dB	
	Max (0–70°C)	± 0.3				dB	
Lifetime Drift	Max @ 10 ⁷ cycles	± 0.2				dB	
Repeatability	Max	0.01				dB	
Optical Power	Max	+17	+20	+20	+23	dBm	5
Temperature Range	Operational	0 to 70°C				°C	
	Storage	-30 to 70°C				°C	
Relative Humidity	Non-condensing	90				%	
Vibration	Max (power on)	20				g	6
Shock	Max (non-operational)	50				g	7
Fiber Types	50/125 available for MM	9/125		62.5/125		μm	
Cable Type	Tight buffer	900				μm	8
Connector Types Available	Pigtail (standard), FC, SC, LC, or ST						
Lead Length	Others available	1				meter	
	Design value	5 or 3				volts	
Switch Driver 5V or 3V Option	Typical current	50 or 86				mA	
	5V one half-winding	4.2 – 6.0				volts	
Switch Voltage	3V one half-winding	or 2.5 to 4				volts	
	Coil Resistance	$\pm 10\%$ per half-winding	100 or 35		ohm	9	
Electrical Interface	3 pin header 0.1 spacing						10
Package Dimensions	Width	1.6				inch	
	Depth	1.4				inch	
	Height	0.55				inch	
Weight	Excluding connectors	1.6				ounce	

Table 1: Switch Specification Summary

* In 2X2 version, path 1-4 has two air gaps and twice the insertion loss indicated above.

Specifications are subject to change without notification

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NOTES:

1. Insertion loss is specified per air gap. For 2X2 Switch only: when the switch is in state 1 as shown in table 3, Optical State Diagram, the optical path from 1 to 4 is a loop-back path with two optical gaps, and twice the insertion loss.
2. The switch has a typical electrical to optical transition time of about 6 milliseconds with a settling time of about 1 millisecond at the design drive voltage. See Figure 5 for a plot of a typical real-time switching cycle.
3. The maximum is specified to account for minor variations in each switch. At the extremes of temperature, the settling time will increase by about 3 milliseconds due to the damping characteristics of the switch.
4. Cross-talk is specified for any two fibers not in optical alignment.
5. The maximum power is limited only by the power handling of the fiber ends prepared with a polished 8° angled end face. (+17, +20 and +23 dBm are respective reference test levels only.) For higher power qualification levels, please consult the factory.
6. Optical continuity maintained. For the latching option state change does not occur: this value is reduced to 10 G's when power is not applied.
7. Half-sine impulse, optical continuity not guaranteed. For the latching option state change may occur. Direction of maximum sensitivity to acceleration: X
8. Winding configured as a center-tapped 200-ohm coil, 100 ohms nominal per coil for 5-volt operation. For the non-latching option the center-tap is not required and the full coil can be driven. A center-tapped 70 ohm, $\pm 10\%$ per coil option is available for nominal 3-volt operation.
9. The switch has three 0.025 " square pins on 0.100" centers recessed into the body designed for use with a low profile socket (SAMTEC #SSA-103-S-G or equivalent). One socket is supplied with each switch.

SWITCHING DIAGRAMS

	STATE 1	STATE 2
Single 1X2	1 —○— 3 ○— 2	1 —○— 3 ○— 2
Single 2X2	1 —○— 4 2 —○— 3	1 —○— 4 2 —○— 3
Dual 1X2 (D12N)	1 —○— 6 NC —○— 5 2 —○— NC 3 —○— 4	1 —○— 6 NC —○— 5 2 —○— NC 3 —○— 4
Dual 1X2 Custom (D12C)	1 —○— 6 2 —○— 5 3 —○— 4	1 —○— 6 2 —○— 5 3 —○— 4
Dual 2x2 Half Duplex	5 —○— 4 3 —○— 6 7 —○— 2 1 —○— 8	5 —○— 4 3 —○— 6 7 —○— 2 1 —○— 8

ELECTRICAL CONNECTIVITY

Switch option	State 1			State 2		
	Pin 1	Pin 2	Pin 3	Pin 1	Pin 2	Pin 3
Latching	V+	Gnd	V = 0	V = 0	Gnd	V+
Non-latching	Gnd	V = 0	V = 0	Gnd	V = 0	V+