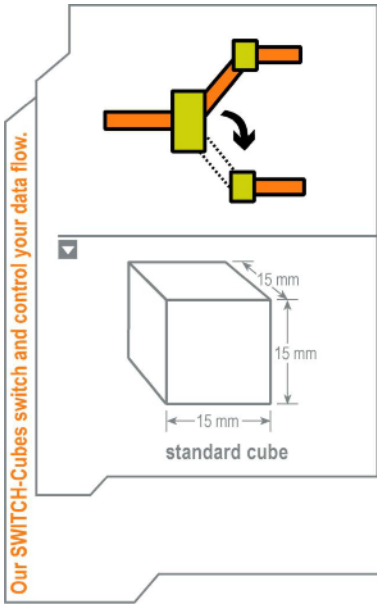
MEMS-SWITCH-Cubes
> 1x1, 1x2, 2x2, miniaturized (MI Series)

Overview

The MI-series are miniature opto-mechanical switches for fiber optic communication systems and sub-modules. The switch is available in latching or non-latching variants, with 1x1, 2x1 or 2x2 architecture. The switch offers very small size, ease of integration and the established solid state reliability of MEMS components. The plastic package is one of the smallest in the industry. It is optimized for low cost production while maintaining highest reliability comparable to a solid state device. The component is designed to exceed Telcordia 1221 quality standards.



Features

- 23 x 10 x 6 mm size
- Low Cost
- TTL or CMOS logic
- latching or non-latching
- 2x2, 2x1, 1x1 variants
- single or multimode

Applications

- Protection Switching
- Reconfiguration
- Optical Subsystems
- Array integration

Description

The Mems-Switches are composed of an optical subsystem and an electrical driver interface. The optical switching function is realized by a silicon MEMS chip, on which a mirror can be moved in and out of the optical path by electrostatic actuation. In the latching MI-L variants a bistable suspension mechanism keeps the last selected state in power off. In the non-latching MI-N variants the switch returns into the bar state when electrical power is removed.
To operate the switch 5V and 0V are applied on pins 1 and 2, which are used by the DC-DC converter of the internal driver to supply a high voltage for the actuator control. CMOS or TTL logic levels on pins 3-4 control the high voltage on the electrostatic actuator.
To set the switch state in the latching variant, pin 3 respectively pin 4 are set to logic high (5V) for 10 ms and the corresponding switch state is selected. At rest pins 3 and 4 should be pulled to 0 V and must not be floating.

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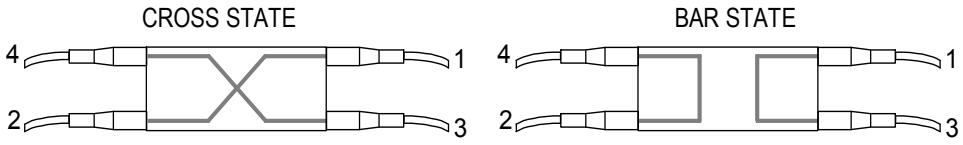
In the non-latching variant only pin 3 is used to set the state of the switch. To set the cross state pin 3 must be at logic high. When pin 3 goes to logic low, or at power off, the switch returns into the bar state. Technology by Sercalo™.



Technical Specifications (for single mode fibres [1])				
	Unit	Min	Typ	Max
Optical Switch				
Wavelength Range	nm	1240		1640
Insertion Loss [2]	dB		0,4	0,9
Crosstalk	dB		75	60
Polarisation Dependent Loss	dB		0,03	0,07
Repeatability [3]	dB			0,002
Switching Time	ms		0,5	1
Durability	cycles		10 ^9	
Integrated Driver				
Supply Voltage Vcc (pin 1)	V	4,75	5	5,25
Current Consumption Icc (pin 1)	mA		1	10
Logic Level Low (pins 3, 4)	V			0,3
Logic Level High (pins 3, 4)	V	3		
Selection Pulse Width	ms	2	10	
Package				
Operation Temperature	°C	0		70
Storage Temperature	°C	-40		85
Size (L x W x H)	mm		23,2 x 10,1 x 5,9	

1 for multimode: range: 600 – 1700 nm; IL @ 1300 nm: 1.2 dB max; CT max: 40 dB; RL max: 35 dB; Switching time: 5 ms.
2 value @ 25 °C, without connectors
3 for constant temperature and polarisation

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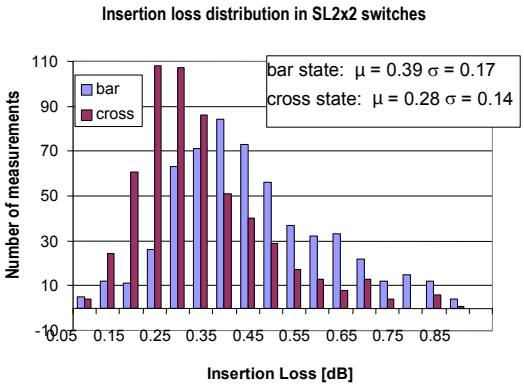


Figure 1: Insertion loss distribution

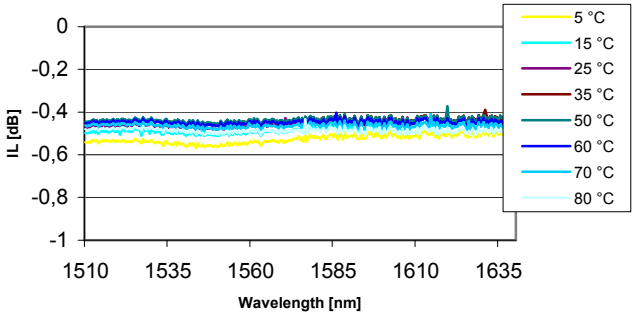
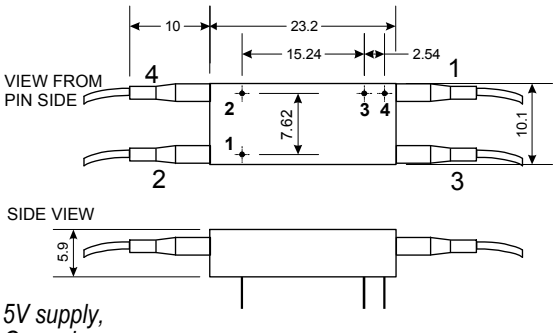
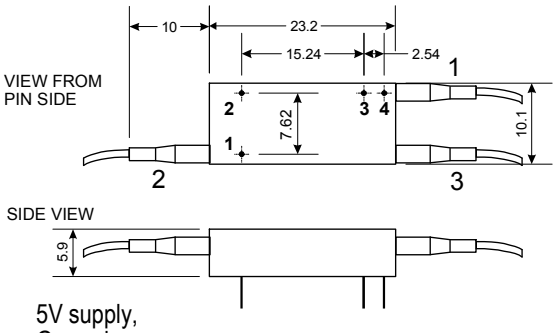


Figure 2: spectral response over temperature



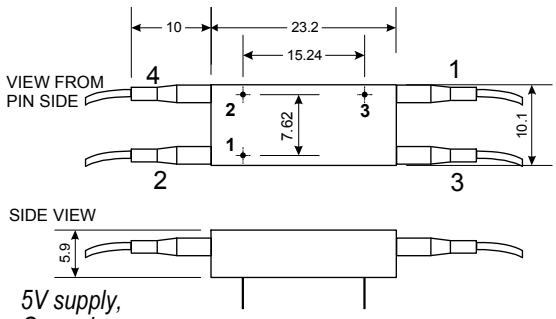
1 5V supply,
2 Ground
3 CR select, 5 V, 10 ms pulse sets cross state
4 BR select, 5 V, 10 ms pulse sets bar state

Figure 3: Pin layout MI-LT2x2 latching



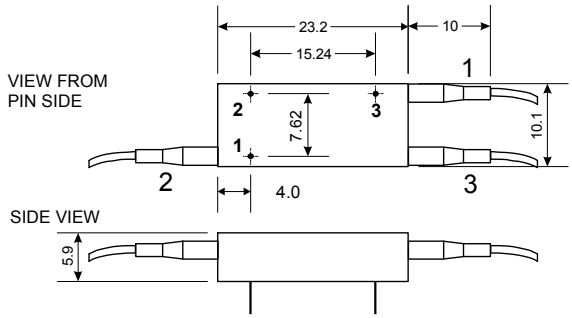
1 5V supply,
2 Ground
3 CR select, 5 V, 10 ms pulse sets cross state
4 BR select, 5 V, 10 ms pulse sets bar state

Figure 4: Pin layout MI-LT2x1 latching



1 5V supply,
2 Ground
3 CR select: 5 V logic level sets cross state
0 V logic level sets bar state

Figure 5: Pin layout MI-NT 2x2 non-latching



1 5V supply,
2 Ground
3 CR select: 5 V logic level sets cross state
0 V logic level sets bar state

Figure 6: Pin layout MI_NT 2x1 non-latching

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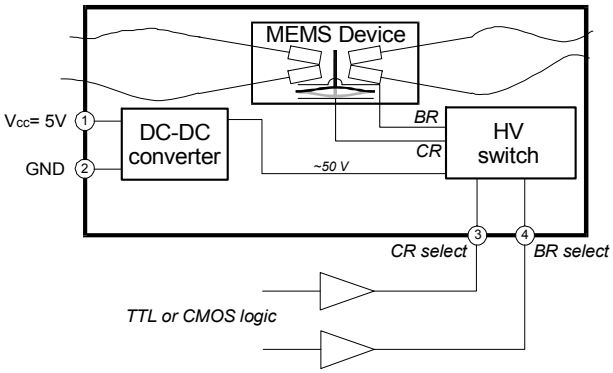

Figure 7: Electrical Schematic Diagram

Ordering Information

MI	-	L	T	-	2x2	-	9	N	-	1	2

Switch type
L = latching
N = non-latching

Driver Type
T = TTL / CMOS logic

Number of ports
2X2
2X1 *(no port 4)*
1X1 *(no ports 4,2)*

Fiber type
9 = SMF28
50= MM 50
62= MM 62

Fiber sleeve type
N = loose tube 900 µm
B = bare fiber 250 µm

Connector in/out

none	=	0
SC/PC	=	1
FC/PC	=	2
SC/APC *	=	3
FC/APC *	=	4
LC/PC	=	5
MU/PC	=	6
E2000	=	7
E20000/HRL *	=	8
ST/PC	=	9

* 8° angular polishing

Corporate Office:
Cube Optics AG
Robert-Koch-Strasse 30
55129 Mainz
Germany

Fon: +49-6131-69851-0
Fax: +49-6131-69851-79
e.mail: sales@cubeoptics.com