



LATCHING FIBER OPTIC 2x1 SWITCH

OVERVIEW

The *s/* series are opto-mechanical latching switches for the most demanding applications in fiber optic communication networks. The switch is available in 1x1, 2x1 and 2x2 variants and offers solid state reliability, accurate precision and fast response time. The switch mechanism is latching and has a very fast response time below 0.5 ms and only 0.5 dB insertion loss.

The miniature package withstands rugged environments and is well suited for direct mounting on printed circuit boards. The switch is qualified according to Telcordia GR 1221.

FEATURES

- reliable
- 0.5 dB insertion loss
- 0.5 ms response time
- low PDL
- 60 dB crosstalk
- miniature size
- latching

APPLICATIONS

- Protection Switching
- Reconfiguration
- WDM

ORDERING INFORMATION

SL2x1-9n

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Distributor

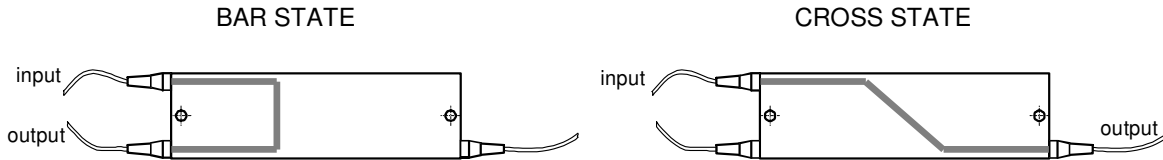
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DESCRIPTION

The switches are powered by a voltage between 4.0-5.25 V on the supply pin. The switch state is selected with a CMOS or TTL signal on the selector pins. A high pulse during at least 2 ms on one of the selector pins toggles the switch into either cross state or bar state. At 0 V on the selector pins or at power off, the switch remains in the last selected state.

The switching mechanism offers the reliability of a solid state device; it neither wears out nor degrades over time. Even after billions of cycles the switching quality stays constant.



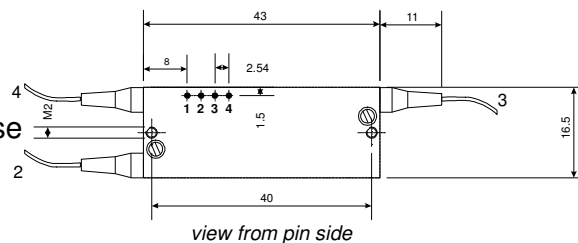
TECHNICAL SPECIFICATIONS

	Unit	Min	Typ	Max
Switch				
Wavelength Range	nm	1240		1640
Insertion Loss	dB		0.5	0.9
Crosstalk	dB		75	60
Backreflection	dB		55	50
Polarisation Dependent Loss	dB		0.03	0.07
Repeatability ¹	dB			0.002
Switching Time	ms		0.5	1
Fiber Pigtail	µm		9/125/900	
Durability	cycles		no wear out	
Package				
Voltage	V	4	5	5.25
Power Consumption	mW		5	25
Selection Pulse Width	ms	2		
Operation Temperature	°C	0		70
Storage Temperature	°C	-40		85
Size (L x W x H)	mm		43 x 16.5 x 9.5	

¹ value for constant temperature and polarisation

PIN CONNECTIONS

- 1 5 V supply
- 2 bar state (port 2-4) 5 V, 2 ms pulse
- 3 cross state (port 2-3) 5 V, 2 ms pulse
- 4 ground 0 V



view from pin side

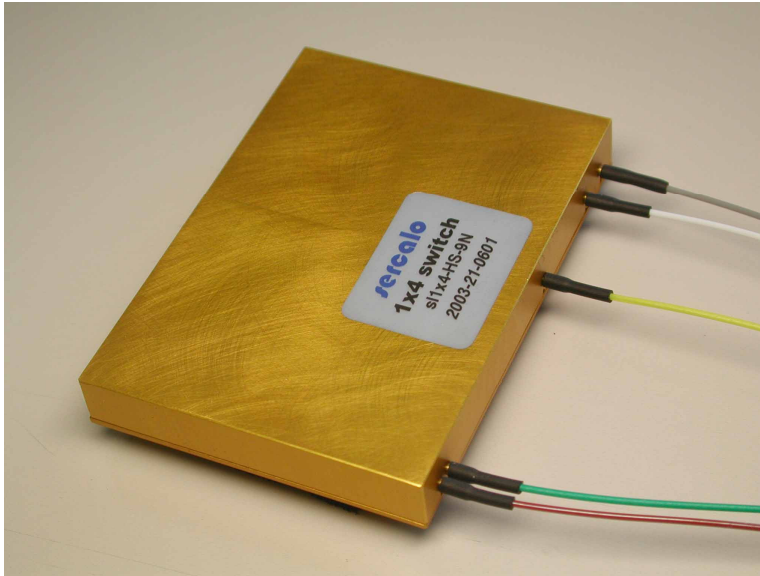
ORDERING INFORMATION

- SL2x1-9n (900 µm loose tube)
- SL2x1-9c (2 mm cable)

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sercalo



LATCHING FIBER OPTIC MEMS SWITCH

*driven by 5V
TTL/CMOS*

OVERVIEW

The *s/1x4* switch is a opto-mechanical latching switch. At power off it stays in the last selected state. The switch offers solid state reliability, accurate precision and fast response time. The switch mechanism is latching and has a very fast response time below 1 ms and below 1.0 dB insertion loss.

The miniature package withstands rugged environments and is well suited for direct mounting on printed circuit boards. The switch is built by cascading 1x2 switches which are qualified according to Telcordia GR1221.

FEATURES

- reliable
- 0.7 dB insertion loss
- 0.5 ms response time
- low PDL
- 60 dB crosstalk
- miniature size
- latching

APPLICATIONS

- Source Selection
- Protection Switching
- Monitoring
- Wavelength provisioning

ORDERING INFORMATION

SL1x4-9N

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DESCRIPTION

The **Sercalo** switches of the SL series use 5V CMOS or TTL levels to set the state of the switch. At rest the selection pins S1-S6 should be set to ground. A high pulse during at least 2 ms on one of the selector pins toggles the switch into the corresponding state as given in the table below.

TECHNICAL SPECIFICATIONS

	Unit	Min	Typ	Max
Switch				
Wavelength Range	nm	1240		1640
Insertion Loss	dB			1.2
Crosstalk	dB		75	60
Backreflection	dB		55	50
Polarisation Dependent Loss	dB			0.10
Repeatability ¹	dB			0.002
Switching Time	ms		0.3	1
Fiber Pigtail	µm		9/125/900	
Durability	cycles		no wear out	
Package				
Voltage	V	4	5	5.25
Power Consumption	mW		5	30
Selection Pulse Width	ms	2		
Operation Temperature	°C	0		70
Storage Temperature	°C	-40		85
Size (L x W x H)	mm		70 x 50 x 9.5	

¹ value for constant temperature and polarisation

MECHANICAL OUTLINE

Contact pins :

Length : 4 ±0.5mm

Diameter: 0.59mm

Pitch: 2.54 mm

Centering: 0.2mm

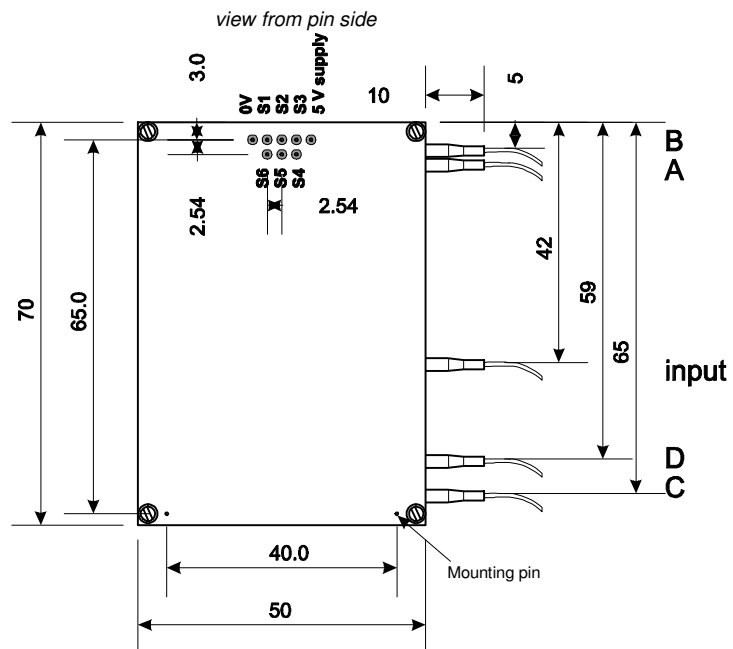
Optical Port Selection Table:

1 : 2 ms pulse, high CMOS / TTL

0: low CMOS / TTL

x: either 0 or 5 V

	B	A	D	C
S1	1	0	0	1
S2	X	0	1	X
S3	1	X	X	0
S4	0	X	X	1
S5	X	1	0	X
S6	0	1	1	0





LATCHING FIBER OPTIC 1xN SWITCHES

OVERVIEW

Sercalo's latching fiber optic 1xM switches are very fast bidirectional opto-mechanical switches. The underlying MEMS technology permits to obtain low insertion loss combined with high crosstalk between channels. The switch communicates over a UART interface with TTL or RS-232 voltage levels and over a secondary SMBus/I²C or USB interface.

Sercalo's highly reliable switching mechanism uses integrated micro-mirrors that can be moved in or out of the optical path by electrostatic actuation. The latching mechanism offers the best repeatability and long term stability. The component is designed to conform to Telcordia 1221 reliability standards. The miniature package withstands rugged environments and is well suited for direct mounting on printed circuit boards.

FEATURES

- *Fast switching time*
- *Highest repeatability*
- *Reliable*
- *UART, I²C/SMBus and USB interfaces*
- *Custom networks available on request*
- *Evaluation board with Ethernet interface available on request*

APPLICATIONS

- *Optical reconfiguration*
- *Optical network protection/restoration*
- *Instrumentation*
- *Test and measurement*

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DESCRIPTION

Sercalo's latching type fiber optic 1xN switches are based on a bidirectional architecture. The component makes an optical connection between a common port and either one of N ports; an optional 1x1 switch enables or disables the common port. A microcontroller supervises the routing configuration and communicates through an UART interface with TTL (option A) or RS-232 (option B) voltage levels and over a secondary SMBus/I²C (option I) or USB (option U) interface. User can choose the factory preset and change this configuration whenever needed. An evaluation board with Ethernet interface is available on request.

TECHNICAL SPECIFICATIONS

	Unit	Min	Typ	Max
Optic				
Wavelength Range ¹	nm	1240		1640
Insertion Loss (up to 1x4) ²	dB		0.7	1.2
Insertion Loss (up to 1x8) ²	dB		1.2	1.6
Insertion Loss (up to 1x16) ²	dB		1.3	2.0
Crosstalk ³	dB	50	75	
Return loss	dB	50	55	
Switching Time, power saving enabled	ms		5	6
Switching Time, power saving disabled	ms		0.5	1
Repeatability ⁴	dB			0.01
Polarisation Dependent Loss	dB		0.10	0.18
Durability	cycles		No wear out	
Electric				
Supply Voltage (Vdd)	V	4.75	5	5.25
Power Consumption	mW			150
UART speed	baud	9600		115200
UART Logic Level 0 (option A)	V		0	0.3
UART Logic Level 1 (option A)	V	3.0	5	
UART Mark voltage (option B)	V	-30		0.8
UART Space voltage (option B)	V	2.4		30
SMBus/I ² C bus speed	kbps			400
Reset inactive voltage	V	2.4	5	
Reset active voltage ⁵	V		0	0.9
Reset pulse duration	µs	15		
Package				
Operation Temperature	°C	0		70
Storage Temperature	°C	-40		70
Pigtail length	cm	50		100
Dimensions	mm		95 x 127 x 14.5	

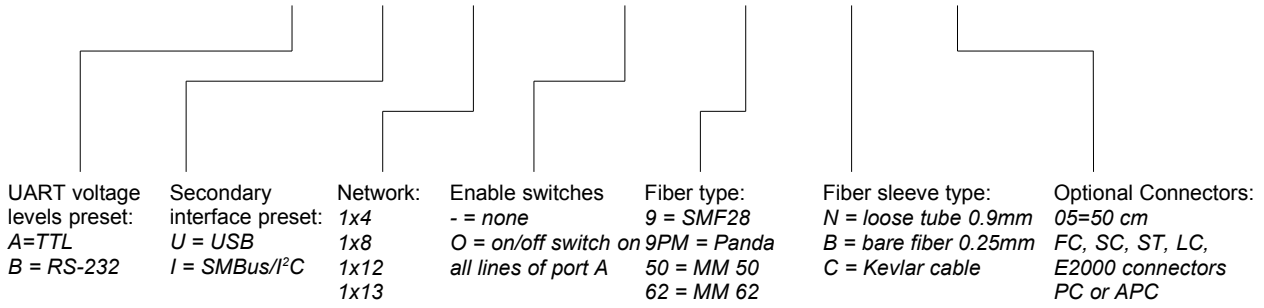
¹range for multimode: 600 – 1700 nm; ²value @ 25 °C, without connectors;

³for single mode fiber and angled connectors. For multimode fiber RL > 35 dB;

⁴for constant temperature and polarisation; ⁵through onboard pull-up resistor

ORDERING INFORMATION

SL	A	I	1x8	-	9	N	05-FC/APC
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AB1

Adapter board (RS-232, USB)

EB

Evaluation board (Ethernet)

CONNECTOR PINOUT

Pin number	Description	
	With option SMBus/I ² C	With option USB
1	Ground (GND)	Ground (GND)
2	Supply voltage (V _{DD})	Supply voltage (V _{DD})
3	Reserved ⁵	Reserved ⁵
4	UART TX data	UART TX data
5	Reserved ⁵	Reserved ⁵
6	UART RX data	UART RX data
7	System reset (/RST)	System reset (/RST)
8	SMBus/I ² C SDA	USB D+
9	SMBus/I ² C SCL	USB D-
10	Ground (GND)	Ground (GND)

⁵Let reserved pins unconnected.

FUNCTIONAL BLOC DIAGRAM

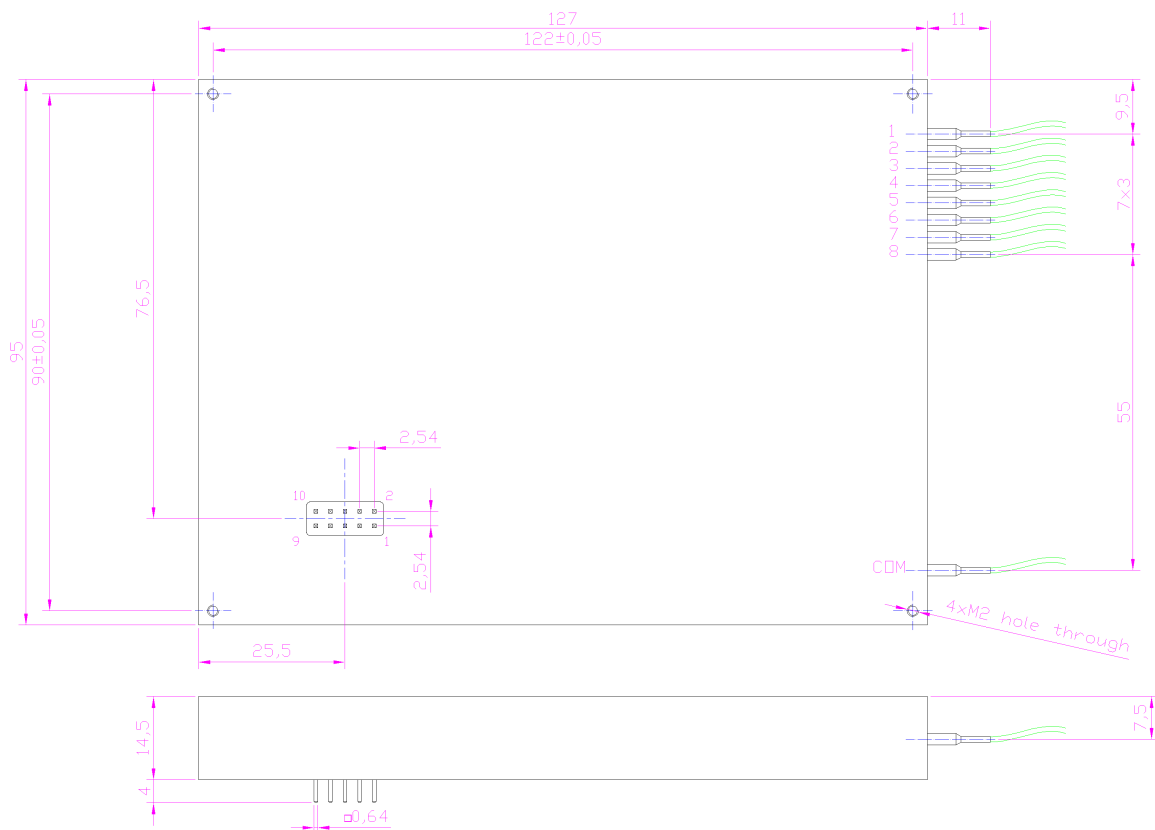
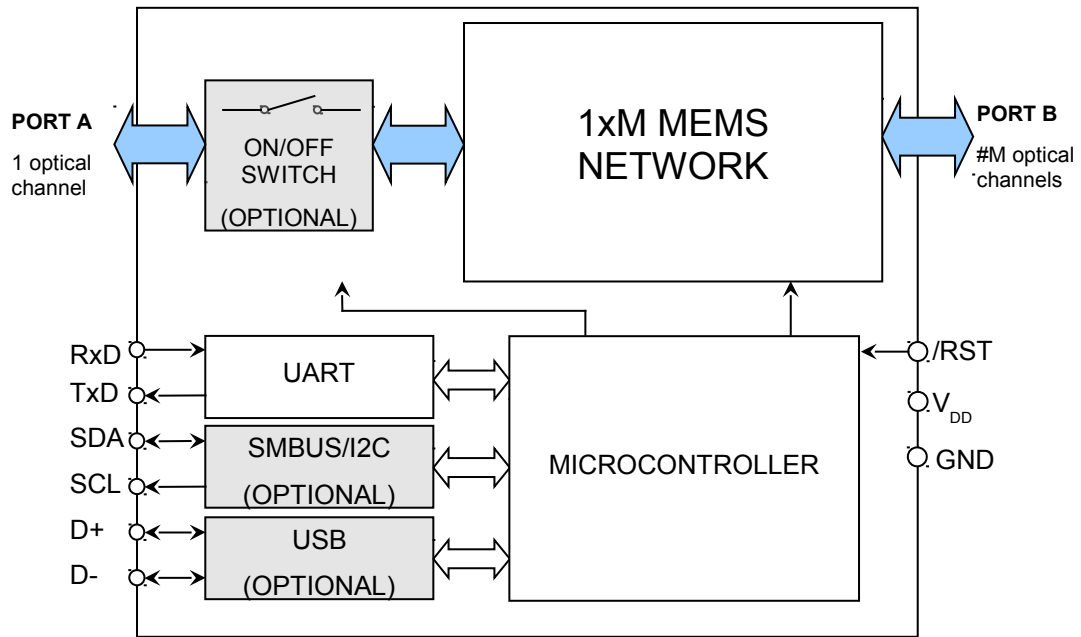


Figure 1 – SL1x8 (view from pin side)

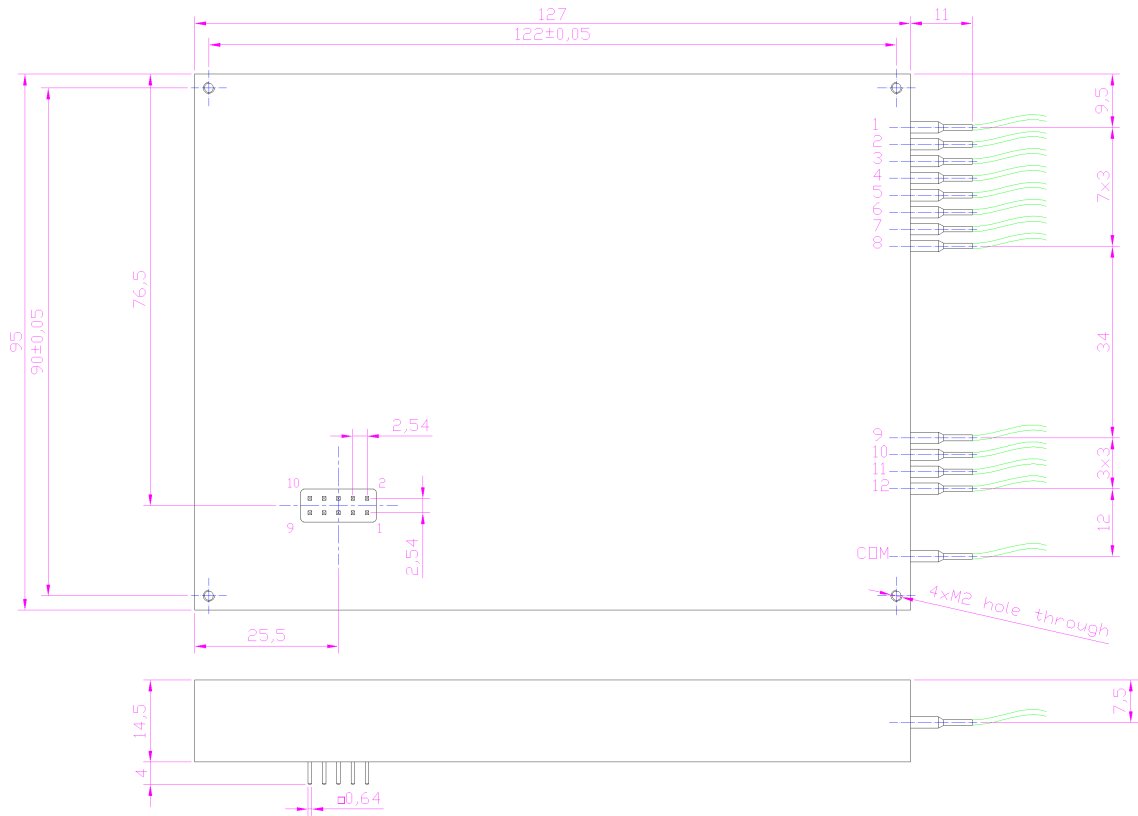


Figure 2 – SL1x12 (view from pin side)

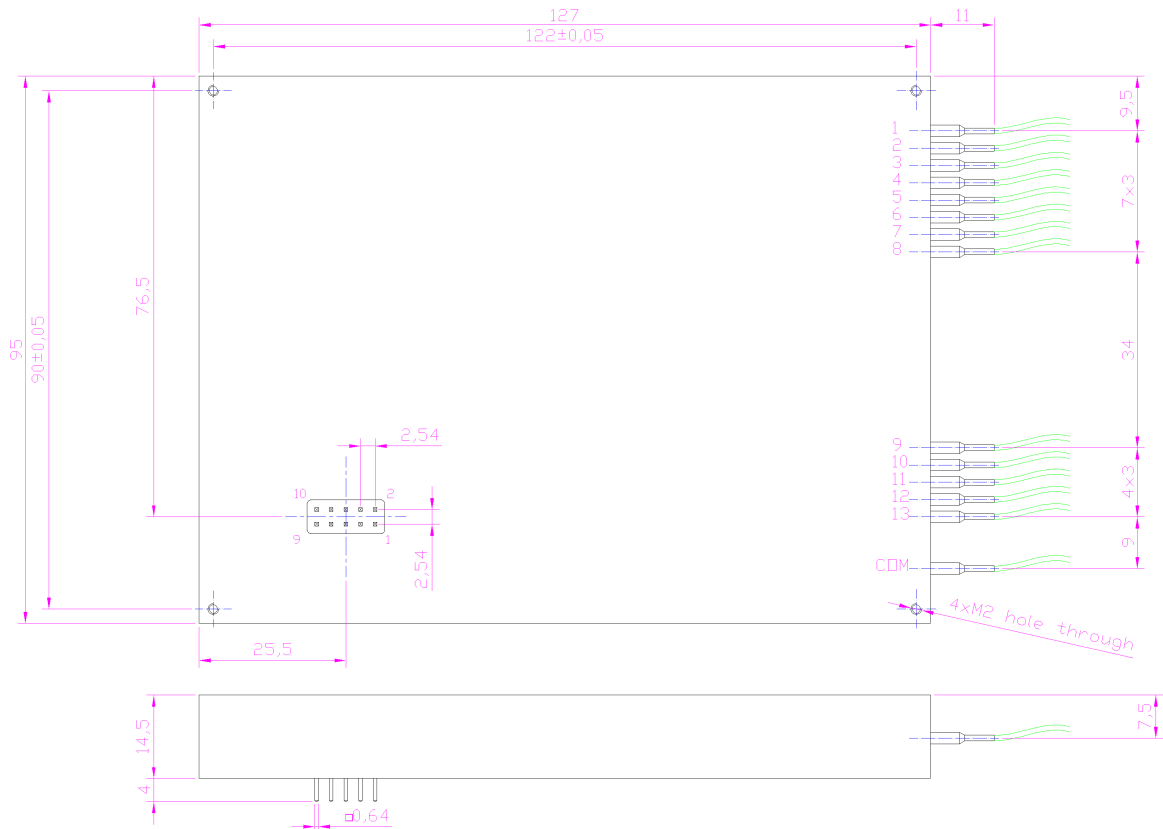


Figure 3 – SL1x13 (view from pin side)

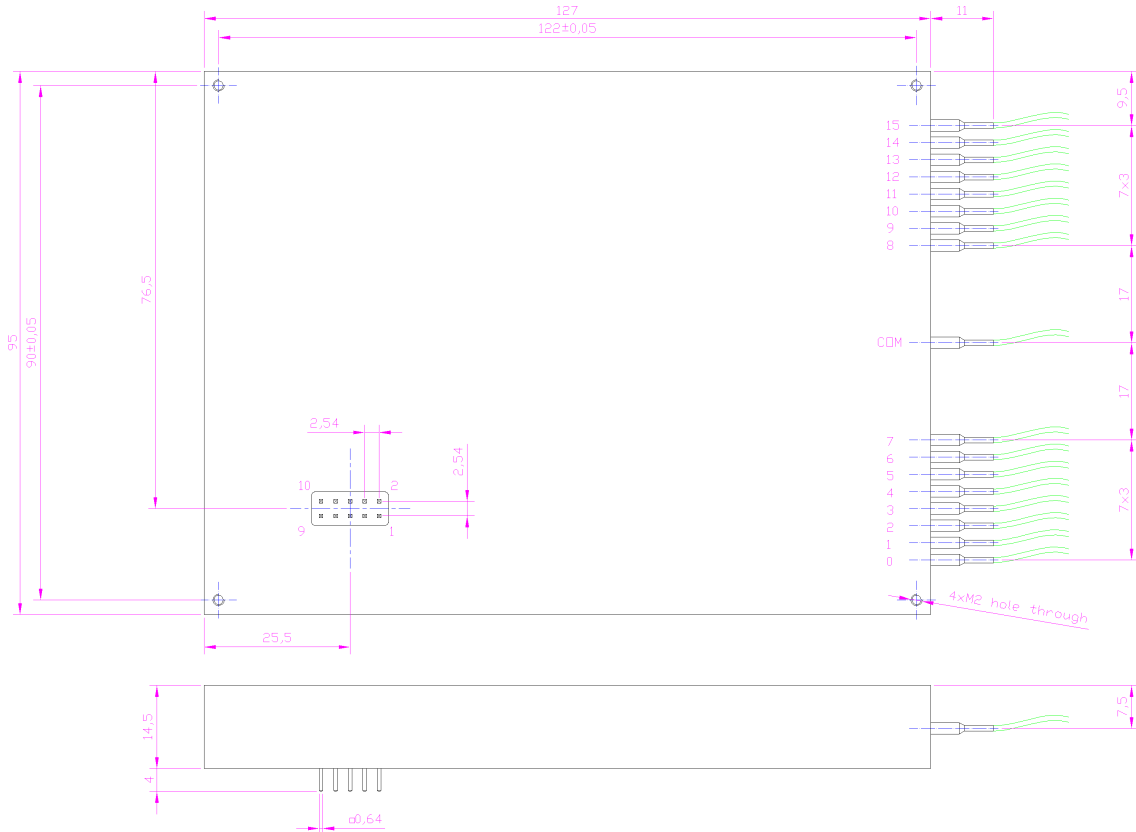


Figure 4 – SL1x16 (view from pin side)

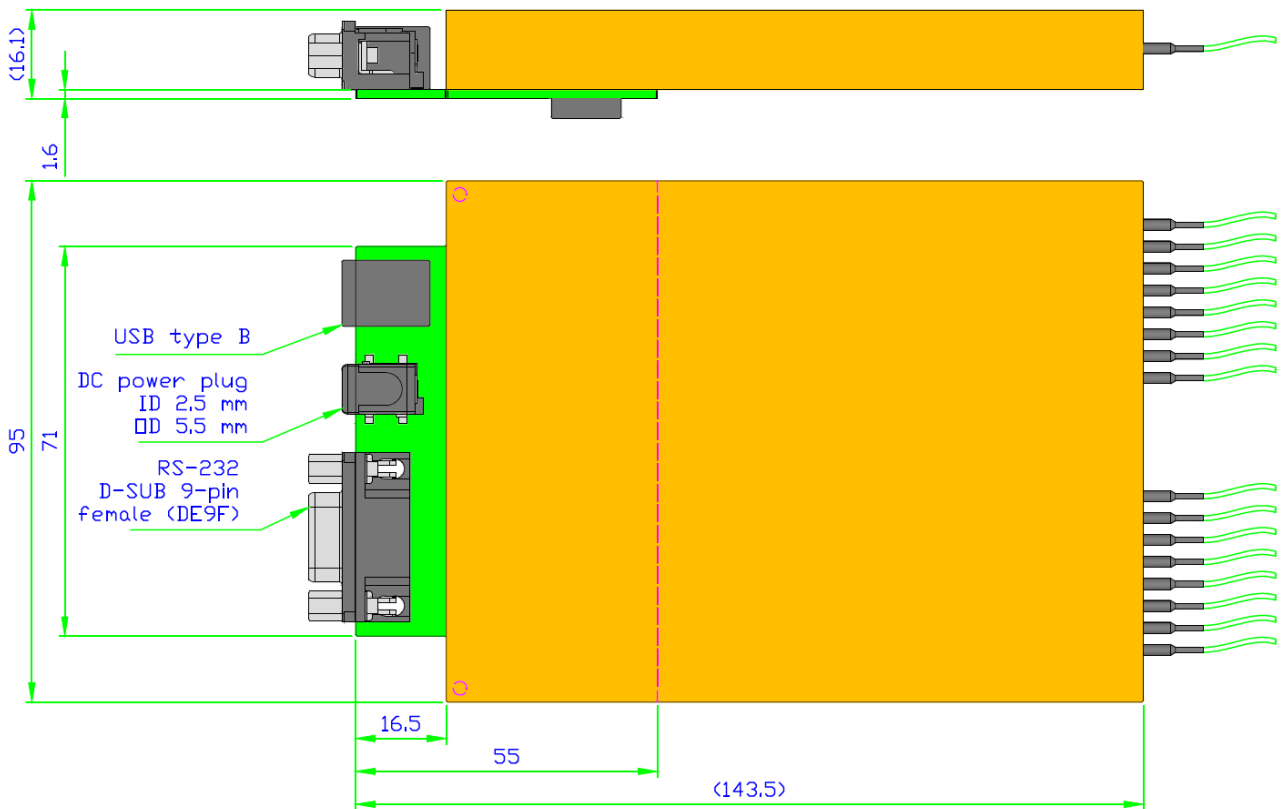
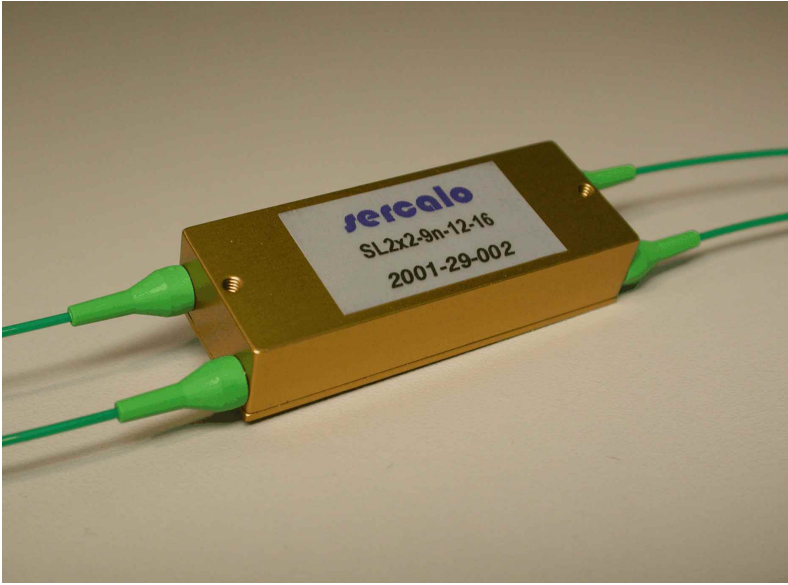


Figure 5 – Adapter board (optional)



LATCHING FIBER OPTIC MEMS SWITCH

OVERVIEW

The *s/* series are opto-mechanical latching switches for the most demanding applications in fiber optic communication networks. The switch is available in 1x1, 2x1 and 2x2 variants and offers solid state reliability, accurate precision and fast response time. The switch mechanism is latching and has a very fast response time below 1 ms and only 0.5 dB insertion loss.

In the *SLTS* variant the switch comes with a built in position monitor to sense the state of the switch.

The miniature package withstands rugged environments and is well suited for direct mounting on printed circuit boards. The switch is qualified according to Telcordia GR 1221.

FEATURES

- reliable
- 0.5 dB insertion loss
- 0.5 ms response time
- low PDL
- 60 dB crosstalk
- miniature size
- latching
- 2x2, 2x1, 1x1 variants

APPLICATIONS

- Protection Switching
- Reconfiguration
- WDM

ORDERING INFORMATION

SL2x2-9N (900 um loose tube)

SL2x2-9B (bare fiber)

SL2x2-9C (2 mm cable)

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DESCRIPTION

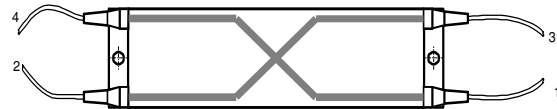
The **Sercalo** switches are powered by a voltage between 4.0-5.25 V on the supply pin. The switch state is selected with a CMOS or TTL signal on the selector pins. A high pulse during at least 2 ms on one of the selector pins toggles the switch into either cross state or bar state. At 0 V on the selector pins or at power off, the switch remains in the last selected state.

The switching mechanism offers the reliability of a solid state device; it neither wears out nor degrades over time. Even after billions of cycles the switching quality stays constant.

BAR STATE



CROSS STATE



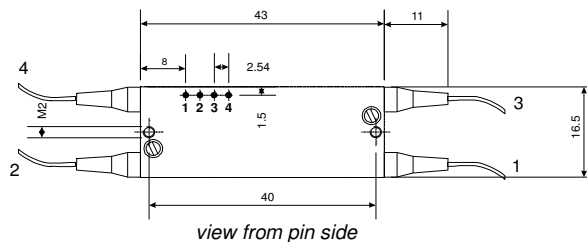
TECHNICAL SPECIFICATIONS

	Unit	Min	Typ	Max
Switch				
Wavelength Range	nm	1240		1640
Insertion Loss	dB		0.5	0.9
Crosstalk	dB		75	50
Backreflection	dB		55	50
Polarisation Dependent Loss	dB		0.03	0.07
Repeatability ¹	dB			0.002
Switching Time	ms		0.5	1
Fiber Pigtail	µm		9/125/900	
Durability	cycles		no wear out	
Package				
Voltage	V	4	5	5.25
Power Consumption	mW		5	30
Selection Pulse Width	ms	2		
Operation Temperature	°C	0		70
Storage Temperature	°C	-40		85
Size (L x W x H)	mm		43 x 16.5 x 9.5	

¹ value for constant temperature and polarisation

PIN CONNECTIONS

- 1 5 V supply
- 2 bar state selector
- 3 cross state selector
- 4 ground 0 V



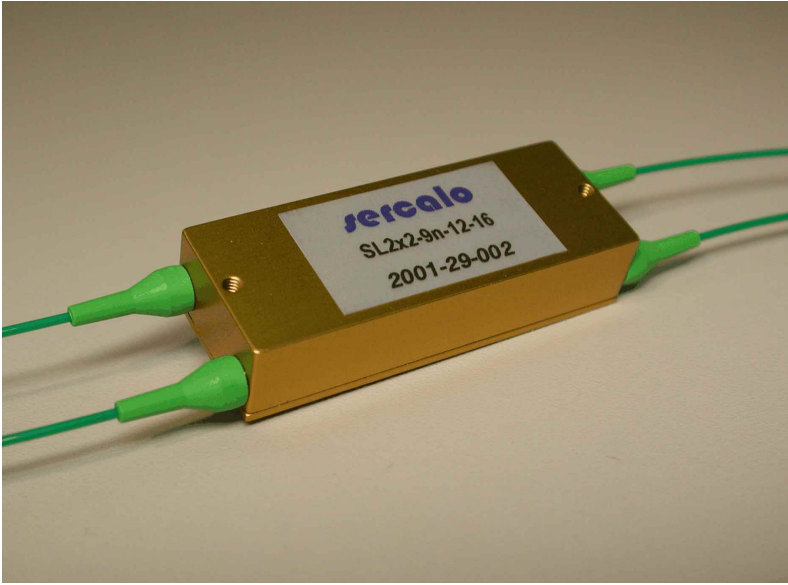
ORDERING INFORMATION

- SL2x2-9N
- SL2x1-9N (port 1 internally terminated)
- SL1x1-9N (ports 1,3 internally terminated)

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FIBER OPTIC MEMS SWITCH

*SLTS variant with
position monitor*

OVERVIEW

The *s/ts* series are opto-mechanical latching switches for the most demanding applications in fiber optic communication networks. The switch is available in 1x1, 2x1 and 2x2 variants and offers solid state reliability, accurate precision and fast response time. The switch mechanism has a very fast response time below 10 ms and below 0.9 dB insertion loss.

The small package withstands rugged environments and is well suited for direct mounting on printed circuit boards. The switch is qualified according to Telcordia GR 1221. The latching variant is available with an integrated state sensor which gives a read-out of the switch position for selftest and monitoring.

APPLICATIONS

- Protection Switching
- Reconfiguration
- WDM

FEATURES

- reliable
- 10 ms speed
- latching
- capacitive state sensor
- 2x2, 2x1, 1x1 variants



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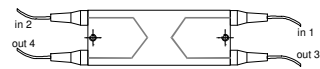
DESCRIPTION

The **Sercalo** SL switches are powered by a 4.75 – 5.25 V voltage on the supply pin. To set the state of the switch TTL or CMOS logic levels are applied on the selector pins: When the logic level on bar selector pin 2 is set to high (5V) for at least 20 ms, the switch toggles into the bar state. To set the cross state a HIGH pulse is applied on pin 3. At rest pin 1 to 4 should be set to a defined potential.

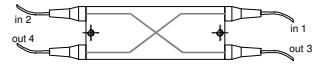
A capacitive sensor allows to read out the switch position. The sensor's output is a pulled-up collector. The sensor output is LOW (0V) in cross and HIGH (5V) in bar state.

Available as bare fiber (250µm) and loose tube (900µm) configuration.

Bar state (Sensor = 5 V)



Cross state (sensor = 0 V)



TECHNICAL SPECIFICATIONS

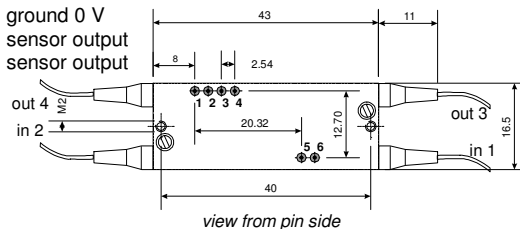
	Unit	Min	Typ	Max
Optical Switch				
Wavelength Range	nm	1240		1640
Insertion Loss	dB		0.4	0.9 ¹
Crosstalk	dB		75	60
Backreflection	dB		55	50
Polarisation Dependent Loss	dB		0.03	0.07
Repeatability ²	dB			0.002
Switching Time	ms		2	10
Fiber Pigtail	µm		9/125/250	
Durability	cycles		no wear out	
Integrated Driver				
Supply Voltage V_{cc}	V	4.75	5	5.25
Current Consumption I_{cc}	mA		2	10
Current sink Sensor I_{sensor}	mA			10
Logic Level Low (BR and CR select)	V			0.5
Logic Level High (BR and CR select)	V	3.0		
Selection Pulse Width	ms	20		
Response Time SENSOR OUTPUT			15	30
Package				
Operation Temperature	°C	-5		70
Storage Temperature	°C	-40		85
Size (L x W x H)	mm		43 x 16.5 x 9.5	

¹ value excluding connectors. Add 0.25 dB to account for temperature and wavelength dependent loss.

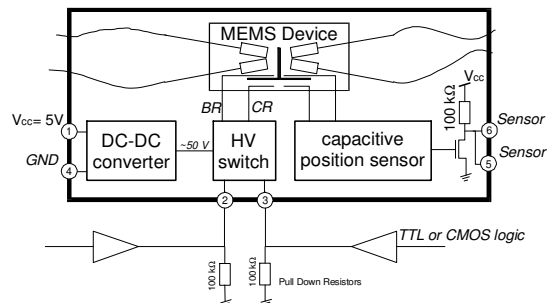
² value for constant temperature and polarisation

Pin Location and Outline (dimensions in mm)

- 1 5 V supply
- 2 bar select
- 3 cross select
- 4 ground 0 V
- 5 sensor output
- 6 sensor output



Electrical Schematic Diagram



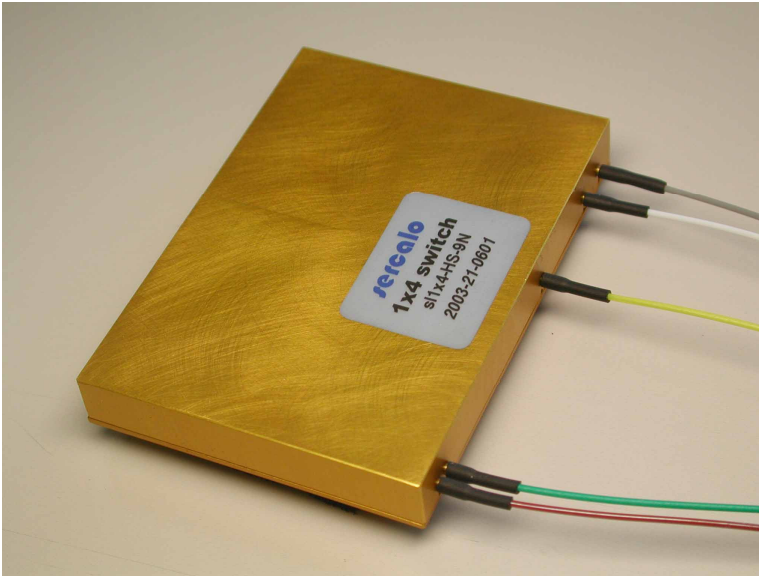
ORDERING INFORMATION

- SLTS-2x2-9N (-9B instead of -9N for bare fiber)
- SLTS-2x1-9N (port 1 internally terminated)
- SLTS-1x1-9N (ports 1,3 internally terminated)

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Sercalo



LATCHING FIBER OPTIC MEMS SWITCH

*driven by 5V
TTL/CMOS*

OVERVIEW

The *s/1x4* switch is an opto-mechanical latching switch. At power off it stays in the last selected state. The switch offers solid state reliability, accurate precision and fast response time. The switch mechanism is latching and has a very fast response time below 10 ms and below 1.2 dB insertion loss.

The miniature package withstands rugged environments and is well suited for direct mounting on printed circuit boards. The switch is built by cascading 1x2 switches which are qualified according to Telcordia GR1221.

FEATURES

- reliable
- 1.2 dB insertion loss
- 10 ms response time
- low PDL
- 60 dB crosstalk
- miniature size
- latching

APPLICATIONS

- Source Selection
- Protection Switching
- Monitoring
- Wavelength provisioning

ORDERING INFORMATION

SLTS1x4-9N

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TECHNICAL SPECIFICATIONS

	Unit	Min	Typ	Max
Optical Switch				
Wavelength Range	nm	1240		1640
Insertion Loss	dB		0.7	1.2 ¹
Crosstalk	dB		75	60
Backreflection	dB		55	50
Polarisation Dependent Loss	dB		0.06	0.10
Repeatability ²	dB			0.002
Switching Time	ms		2	10
Fiber Pigtail	µm		9/125/900	
Durability	cycles		no wear out	
Integrated Driver				
Supply Voltage V_{cc}	V	4.75	5	5.25
Current Consumption I_{cc}	mA		2	10
Current sink Sensor I_{sensor}	mA			10
Logic Level Low (<i>BR and CR select</i>)	V			0.5
Logic Level High (<i>BR and CR select</i>)	V	3.0		
Selection Pulse Width	ms	20		
Response Time SENSOR OUTPUT			15	30
Package				
Operation Temperature	°C	0		70
Storage Temperature	°C	-40		85
Size (L x W x H)	mm		43 x 16.5 x 9.5	
¹ value excluding connectors. Add 0.25 dB to account for temperature and wavelength dependent loss.				
² value for constant temperature and polarisation				

MECHANICAL OUTLINE

Contact pins :

Length : 3.5 ±0.5mm

Diameter: 0.59mm

Pitch: 2.54 mm

Centering: 0.2mm

Optical Port Selection Table:

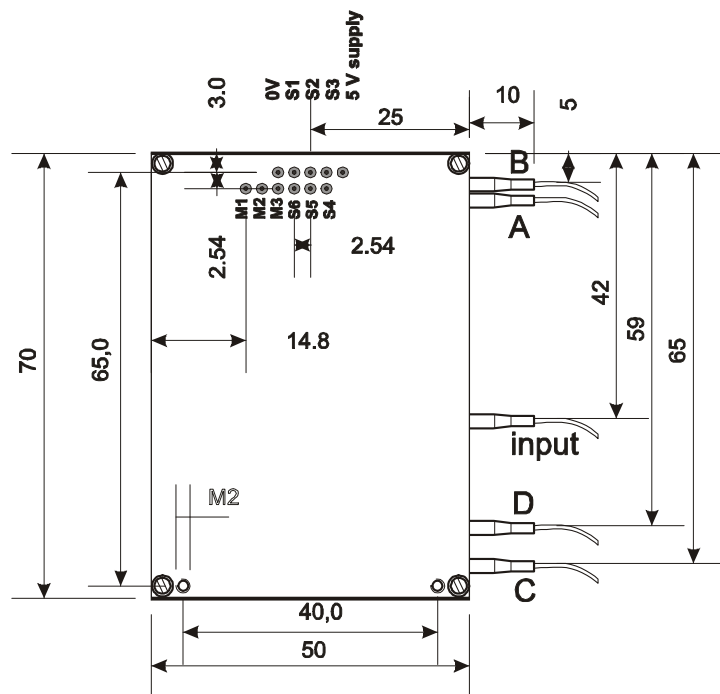
1 : 20 ms pulse, high CMOS / TTL

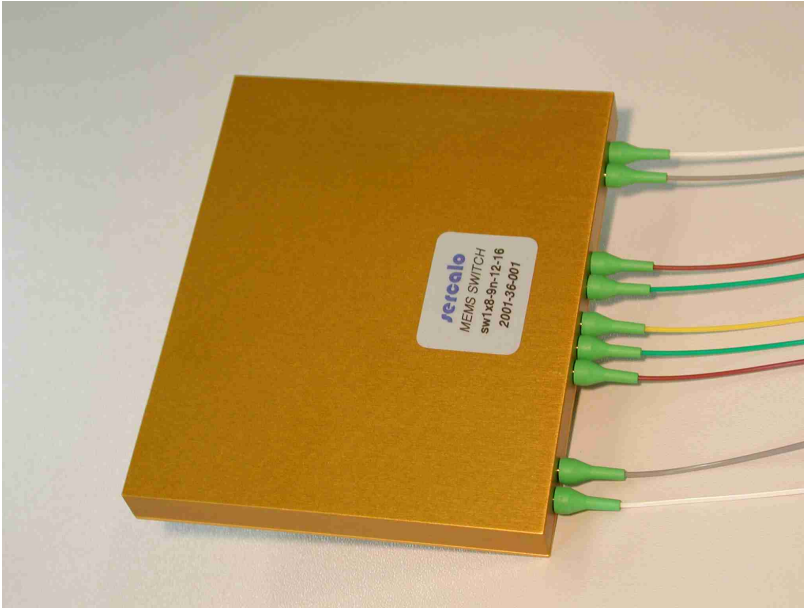
0: low CMOS / TTL

x: either 0 or 5 V

	B	A	D	C
S1	1	0	0	1
S2	X	0	1	X
S3	1	X	X	0
S4	0	X	X	1
S5	X	1	0	X
S6	0	1	1	0
M1	0	1	1	0
M2	x	1	0	x
M3	0	x	x	1

VIEW FROM PIN SIDE





Latching FIBER OPTIC 1x8 SWITCH

*with capacitive state
monitor*

OVERVIEW

The *slts1x8* switch is an opto-mechanical latching switch. At power off it stays in the last selected state. The switch offers solid state reliability, accurate precision and fast response time. The switch mechanism is latching and has a very fast response time below 10 ms and below 1.6 dB insertion loss.

The switch is powered by a 5 V supply voltage. A 5 V TTL or CMOS drive signal is used to control the switching state.

The small package withstands rugged environments and is well suited for direct mounting on printed circuit boards.

The switch state is read out using a capacitive position sensor.

FEATURES

- reliable
- 1.6 dB insertion loss
- 10 ms response time
- 60 dB crosstalk
- latching

APPLICATIONS

- Optical Reconfiguration
- Instrumentation
- Provisioning

ORDERING INFORMATION

SLTS 1x8-9N single mode with state monitor



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