

# MEMS 1xN OPTICAL SWITCH



**SM 1x64/256/2048**

**MM**

**1x16/48**

**PM**

**1x4/8/64**



## **MEMS OPTIC 1xN SWITCH - SM** *cylindrical package*

### **DESCRIPTION**

MEMS 1xN optical switch is based on micro-electro-mechanical system technology. It allows channel selection between an input fiber and up to N output fibers by rotating the MEMS mirror.

The switch is bi-directional and can also be used as a Nx1 selector switch. The optical switch offers highly reliable, durable, long-life operation in a compact package.

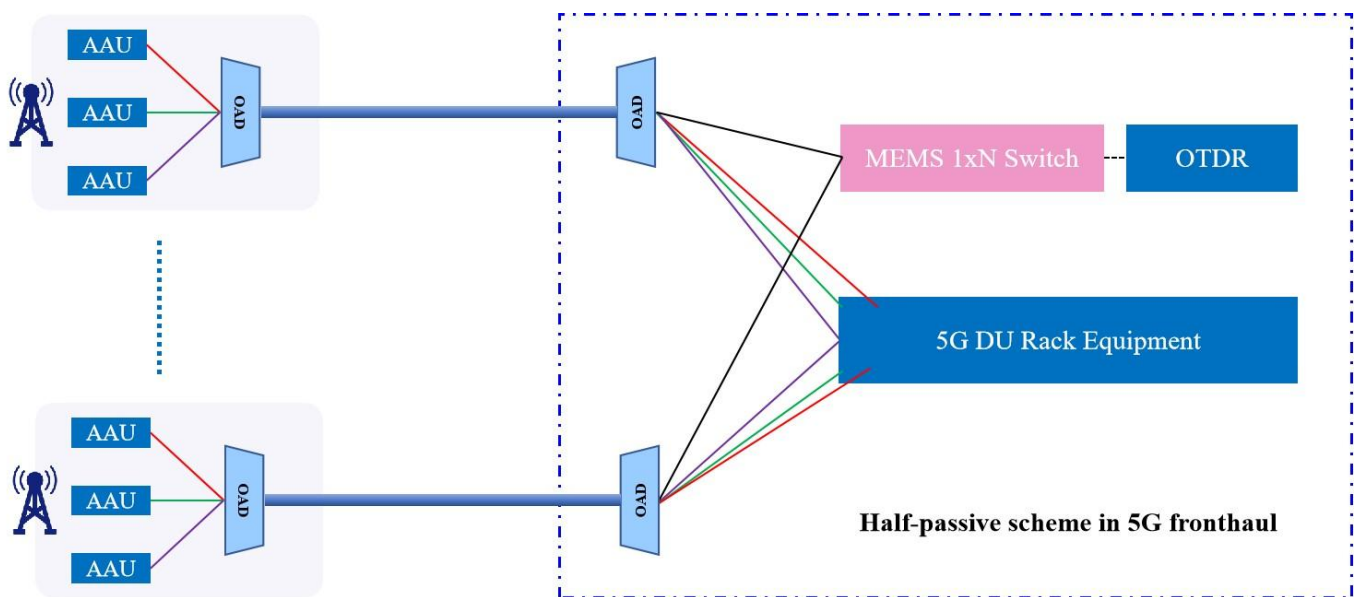
### **FEATURES**

- ✓ Proven MEMS durability and reliability
- ✓ Compact form factor
- ✓ Fast switching time
- ✓ Qualified to Telcordia GR-1073-CORE and RoHS requirements

## APPLICATIONS

- ✓ Fiber monitoring(working with OTDR or OCM)
- ✓ Optical network routing
- ✓ Fiber sensing
- ✓ Resource sharing
- ✓ Optical network protection and restoration

## APPLICATION - FIBER MONITORING



## DEVICE SERIES SPECIFICATIONS

<b>DEVICEE TYPE</b>	<b>CHANNEL</b>	<b>PIN NUM</b>	<b>DIMENSIONS (mm)</b>	<b>SUPPLY VOLTAGE (V)</b>
CM2	MINI 1 x 2	3	Φ 3.6 × 16	0 ~ 12
C2	1 x 2	3	Φ 5.5 × 26	0 ~ 60
C16	2 < N ≤ 16	3	Φ 5.5 × 43	0 ~ 60
C32	16 < N ≤ 32	5	Φ 6.3 × 47	0 ~ 60
C64	32 < N ≤ 64	5	Φ 6.3 × 52	0 ~ 60

## OPTICAL SPECIFICATIONS<sup>1</sup>

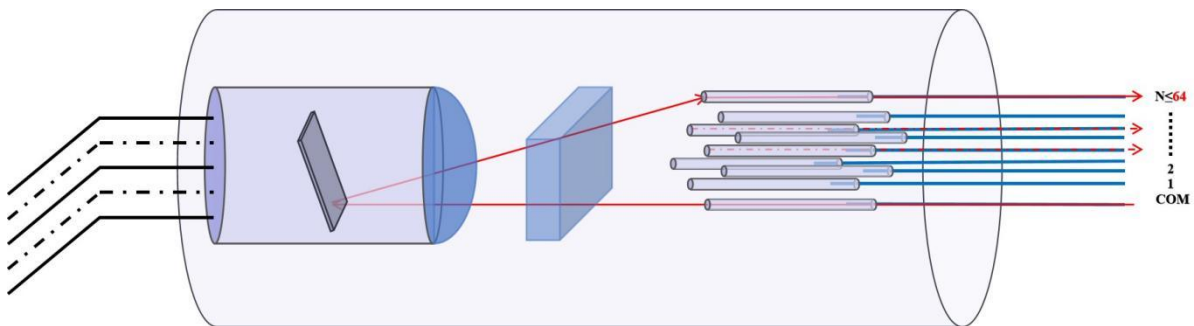
<b>PARAMETER</b>		<b>UNIT</b>	<b>VALUE</b>
Wavelength		nm	13:1290 ~ 1330 15:1525 ~ 1568 16:1600 ~ 1650
Test Wavelength		nm	1310 / 1550 / 1625 or 1650
Insertion Loss <sup>2</sup>	1 x 2	dB	≤ 0.6, typical 0.5
	1 x 4 / 8		≤ 0.8, typical 0.6
	1 x 12 / 16		≤ 1.0, typical 0.9
	1 x 24 / 32		≤ 1.3, typical 1.1
	1 x 48 / 64		≤ 1.5, typical 1.2
Return Loss		dB	≥ 45
Repeatability <sup>3</sup>		dB	≤ 0.1
Crosstalk		dB	≥ 40
PDL		dB	≤ 0.2
WDL <sup>4</sup>		dB	≤ 0.3
TDL	2 ≤ N ≤ 16	dB	≤ 0.3
	16 < N ≤ 64		≤ 0.4
Switch Time <sup>5</sup>	2 ≤ N ≤ 16	ms	≤ 5
	16 < N ≤ 64		≤ 10
Durability		cycle	≥ 1 x 10 <sup>9</sup>
Maximum Optical Power		mW	≤ 500
Latching Type			Non-latching

1. All specifications are without connectors.
2. IL is measured at CWL, 23°C. IL is for single-band. Dual-band adds 0.2dB.
3. Repeatability is defined after 100 cycles.
4. WDL is measured at CWL±20nm, 23°C.
5. When using optimized voltage ramp.

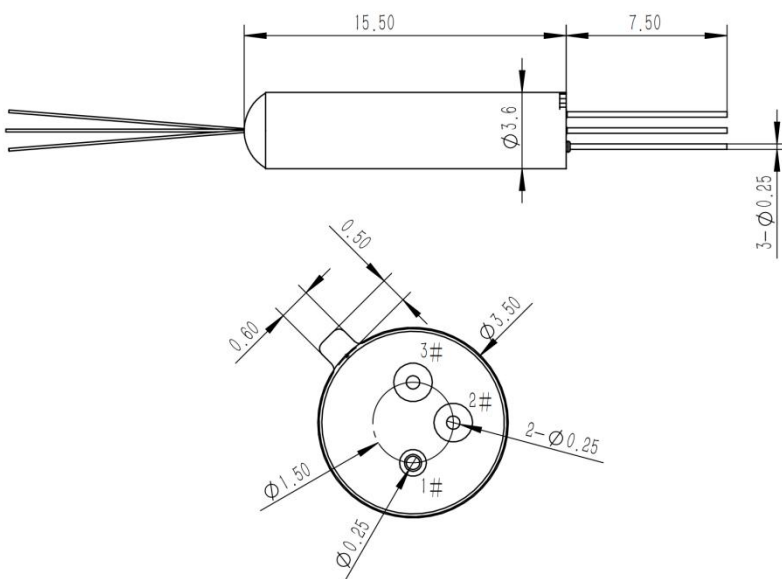
## ENVIRONMENTAL CONDITIONS

<b>PARAMETER</b>	<b>UNIT</b>	<b>VALUE</b>
Operation Temperature	°C	- 5 ~ 65
Storage Temperature	°C	- 40 ~ 85
Operation Humidity	%RH	5 ~ 95
Storage Humidity	%RH	5 ~ 95

## FUNCTIONAL BLOCK DIAGRAM

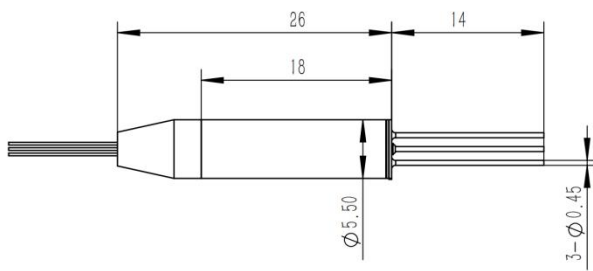


## CYLINDRIC MINI 1x2 - DIMENSIONS AND PINOUT

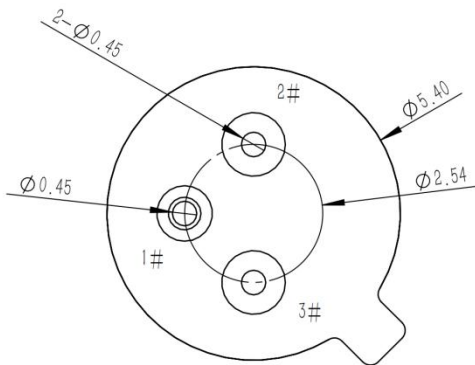


<b>Pin number</b>	<b>Description</b>
1	GND
2	Axis Y
3	Axis X

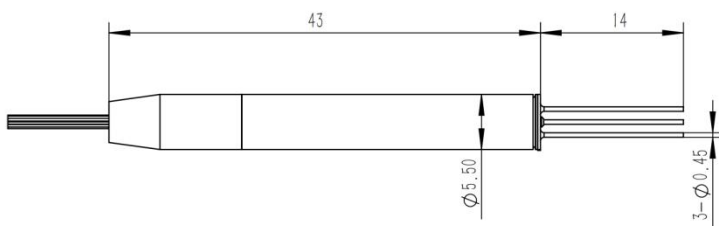
## CYLINDRIC 1x2 - DIMENSIONS AND PINOUT



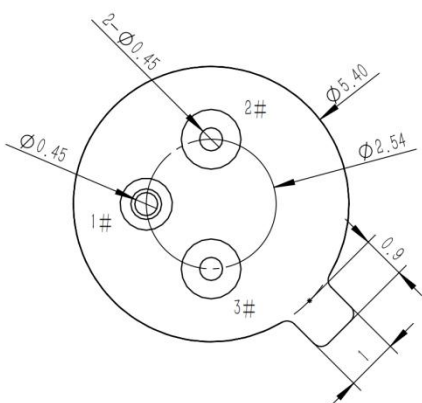
<b>Pin number</b>	<b>Description</b>
1	GND
2	Axis Y
3	Axis X



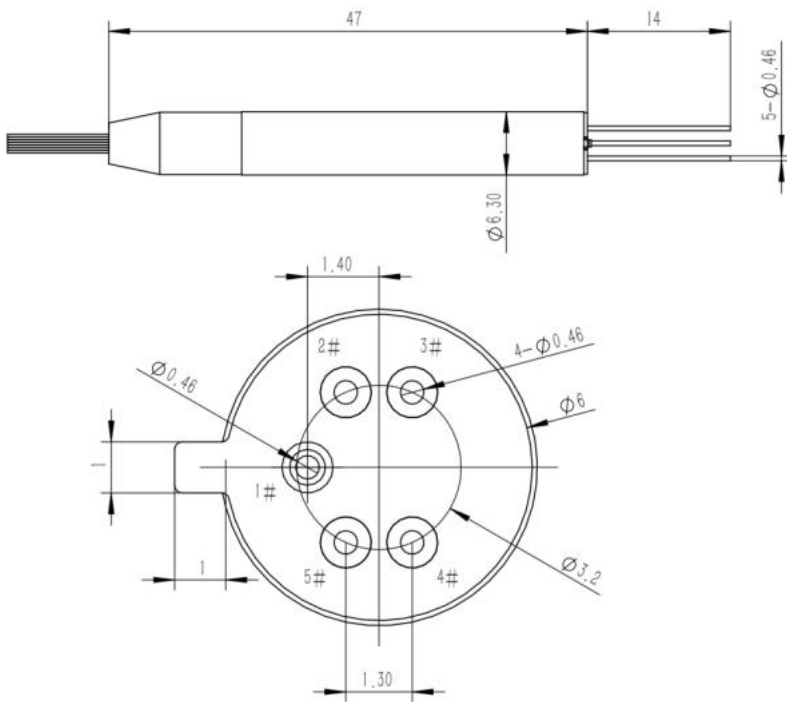
## CYLINDRIC 1xN ( $2 < N \leq 16$ ) - DIMENSIONS AND PINOUT



<b>Pin number</b>	<b>Description</b>
1	GND
2	Axis Y
3	Axis X

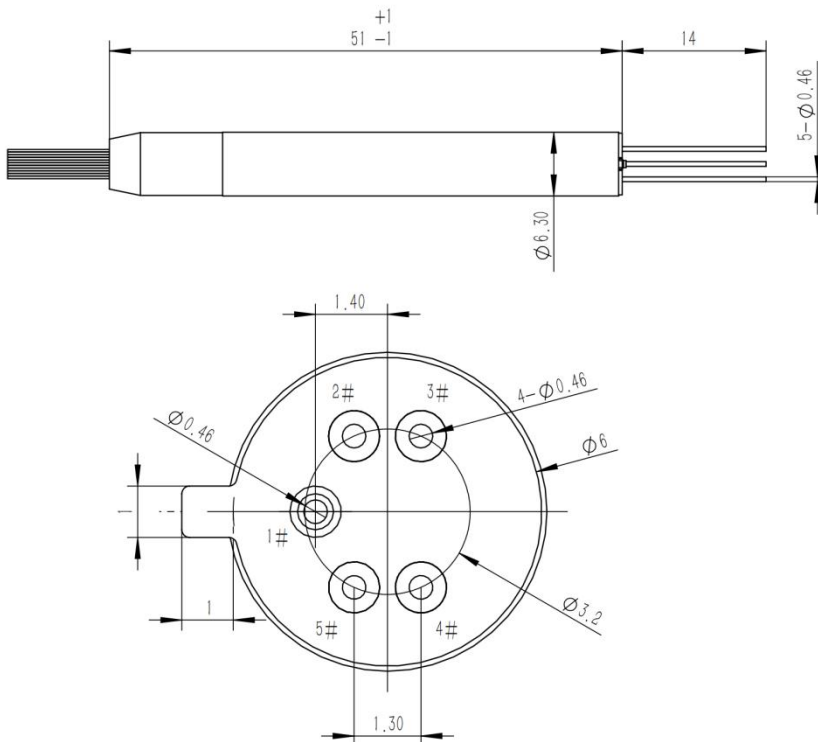


## CYLINDRIC 1xN (16 < N ≤ 32) - DIMENSIONS AND PINOUT



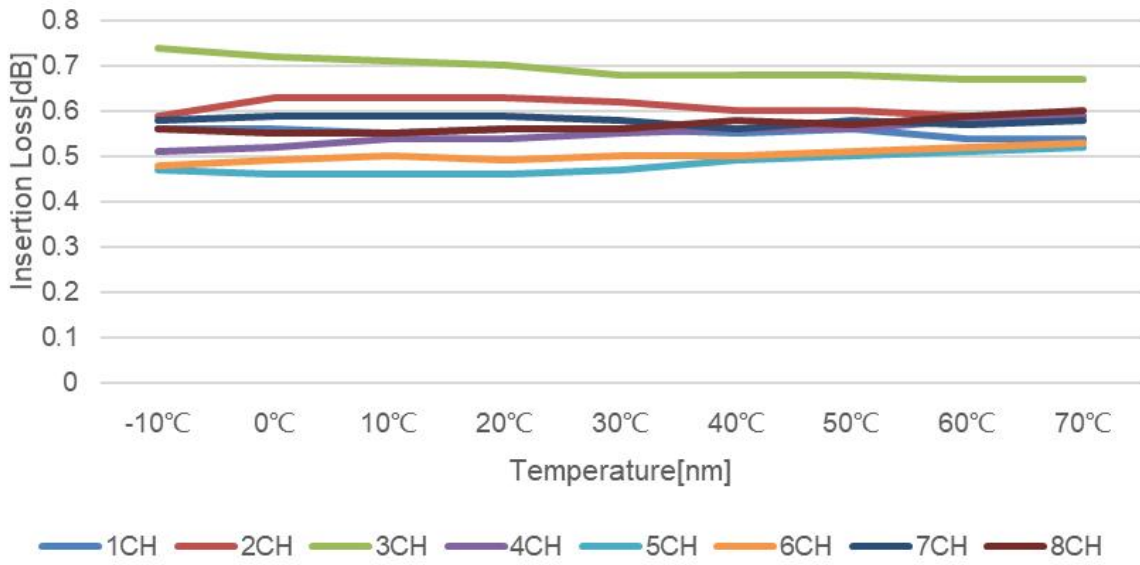
<i>Pin number</i>	<i>Description</i>
1	GND
2	Axis X+
3	Axis Y-
4	Axis X-
5	Axis Y+

## CYLINDRIC 1xN (32 < N ≤ 64) - DIMENSIONS AND PINOUT

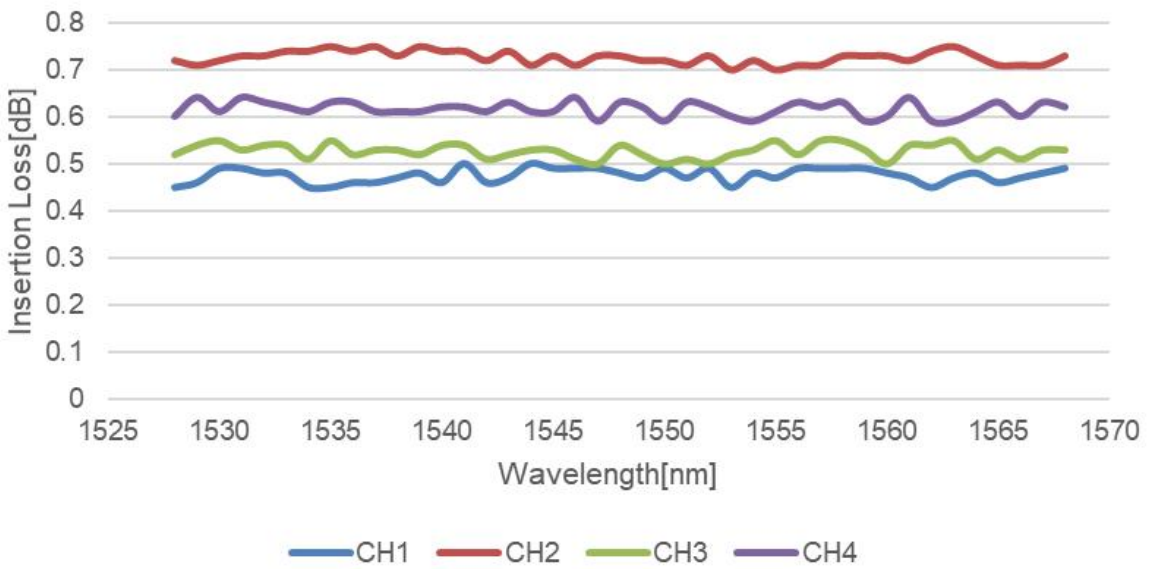


<i>Pin number</i>	<i>Description</i>
1	GND
2	Axis X+
3	Axis Y-
4	Axis X-
5	Axis Y+

## INSERTION LOSS vs. TEMPERATURE (1x8)



## WAVELENGTH DEPENDENT LOSS (1x4)





# ORDERING INFORMATION

MS -  -  -  -  -  -  -

## Product Code

**MS** MEMS Switch

## Switch Configuration

**1xN** 1xN Switch  
**1x16**  
**1x32**  
**1x64** (Specify  $1 \leq N \leq 64$ )

## Wavelength Range

**13** 1290 – 1330 nm  
**15** 1525 – 1568 nm  
**16** 1600 – 1650 nm  
**13/15** 1290 – 1330 & 1525 – 1568 nm  
**15/16** 1525 – 1568 & 1600 – 1650 nm  
Or customer specify

## Fiber Type

**S** Single Mode, G657A2

## Jacket Type

**025**  $\Phi$ 0.25 mm, bare fiber  
**09**  $\Phi$ 0.9 mm, loose tube

## Pigtail Length

**1** 1 meter  
Or customer specify

## Connector Type

**00** No connector  
Or customer specify

## Package

**C** Cylindric package  
**CM** Cylindric package MINI



# MEMS OPTIC 1xN SWITCH - SM *Module Type*

## MODULE SERIES SPECIFICATIONS

<b>MODULE TYPE</b>	<b>CHANNEL</b>	<b>CONTROL TYPE<sup>1</sup></b>	<b>DIMENSIONS (mm)</b>	<b>SUPPLY VOLTAGE (V)</b>
M1	$2 \leq N \leq 16$	①②	68 x 30 x 13	5
	$16 < N \leq 32$		75 x 30 x 13	
	$32 < N \leq 48$		75 x 30 x 16	
	$48 < N \leq 64$		80 x 34 x 18	
M2	$2 \leq N \leq 128$	①	140 x 90 x 15	5
M3	$2 \leq N \leq 16$	②③	68 x 40 x 13	5
M4	$2 < N \leq 64$	①②	80 x 60 x 16	5
	$64 < N \leq 128$		80 x 60 x 22	
M5	$2 \leq N \leq 16$	①② / ①③ / ①④ / ③④	65 x 24.7 x 13	5
MX1	$2 \leq N \leq 300$	①	150 x 150 x 20	5 ~ 12
MX3	$2 \leq N \leq 2048$	①	158 x 150 x 29	5 ~ 12

1. ① UART ② PARALLEL ③ IIC ④ RS232

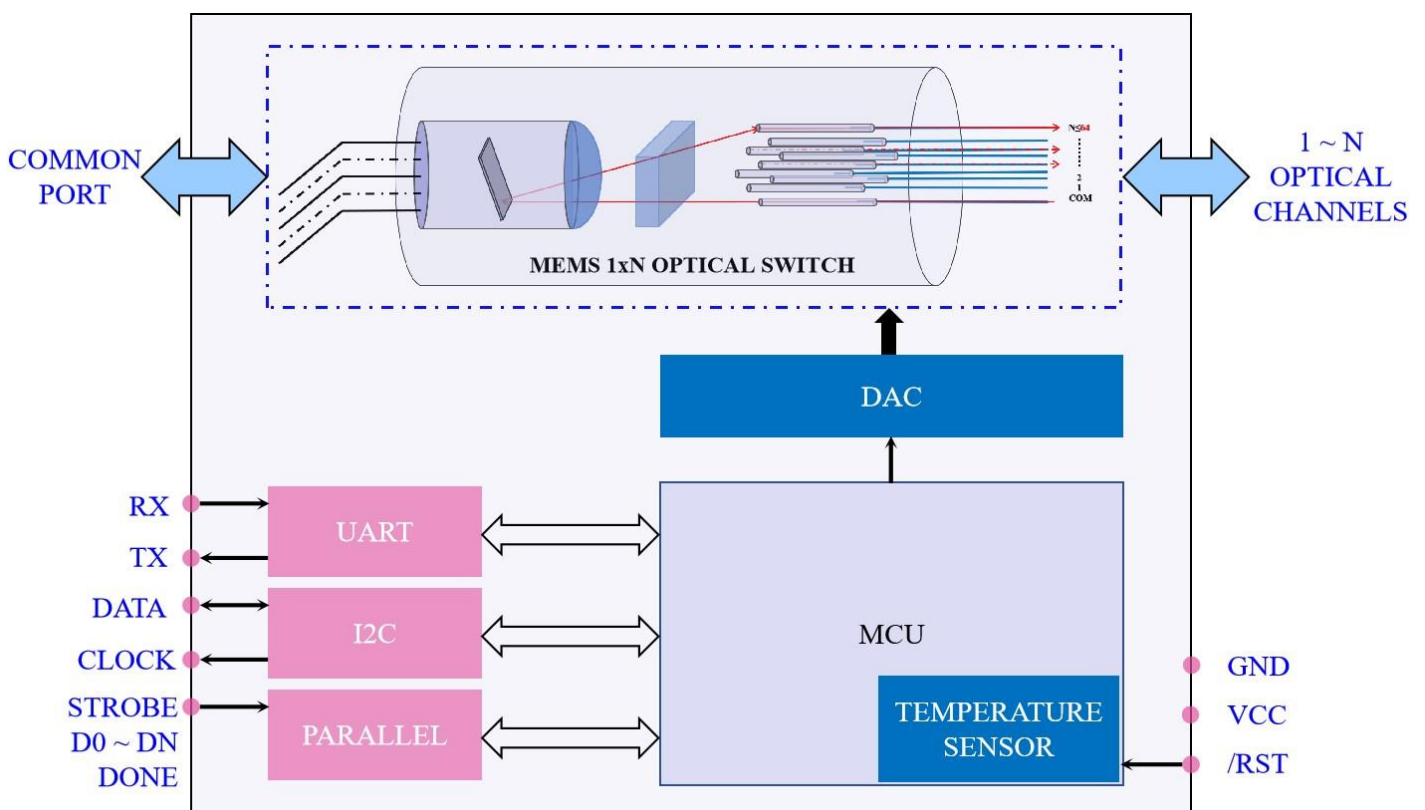
# OPTICAL SPECIFICATIONS<sup>1</sup>

<b>PARAMETER</b>		<b>UNIT</b>	<b>VALUE</b>
Wavelength		nm	13:1290 ~ 1330 15:1525 ~ 1568 16:1600 ~ 1650
Insertion Loss <sup>2</sup>	1 x 2	dB	≤ 0.6, typical 0.5
	1 x 4 / 8		≤ 0.8, typical 0.6
	1 x 12 / 16		≤ 1.0, typical 0.9
	1 x 24 / 32		≤ 1.3, typical 1.1
	1 x 48 / 64		≤ 1.5, typical 1.2
	1 x 96 / 128		≤ 2.0, typical 1.6
	1 x 256 / 512		≤ 2.3, typical 1.8
	1 x 1024 1 x 2048		≤ 2.5, typical 2.1 ≤ 2.8, typical 2.3
Return Loss		dB	≥ 45
Repeatability <sup>3</sup>		dB	≤ 0.1
Crosstalk		dB	≥ 40
PDL	2 < N ≤ 64	dB	≤ 0.2
	64 < N ≤ 2048		≤ 0.4
WDL <sup>4</sup>	2 < N ≤ 64	dB	≤ 0.3
	64 < N ≤ 2048		≤ 0.6
TDL	2 ≤ N ≤ 16	dB	≤ 0.3
	16 < N ≤ 64		≤ 0.4
	64 < N ≤ 1024		≤ 0.7
	1024 < N ≤ 2048		≤ 0.8
Switch Time <sup>5</sup>	2 ≤ N ≤ 16	ms	≤ 5
	16 < N ≤ 64		≤ 10
	64 < N ≤ 1024		≤ 15
	1024 < N ≤ 2048		≤ 20

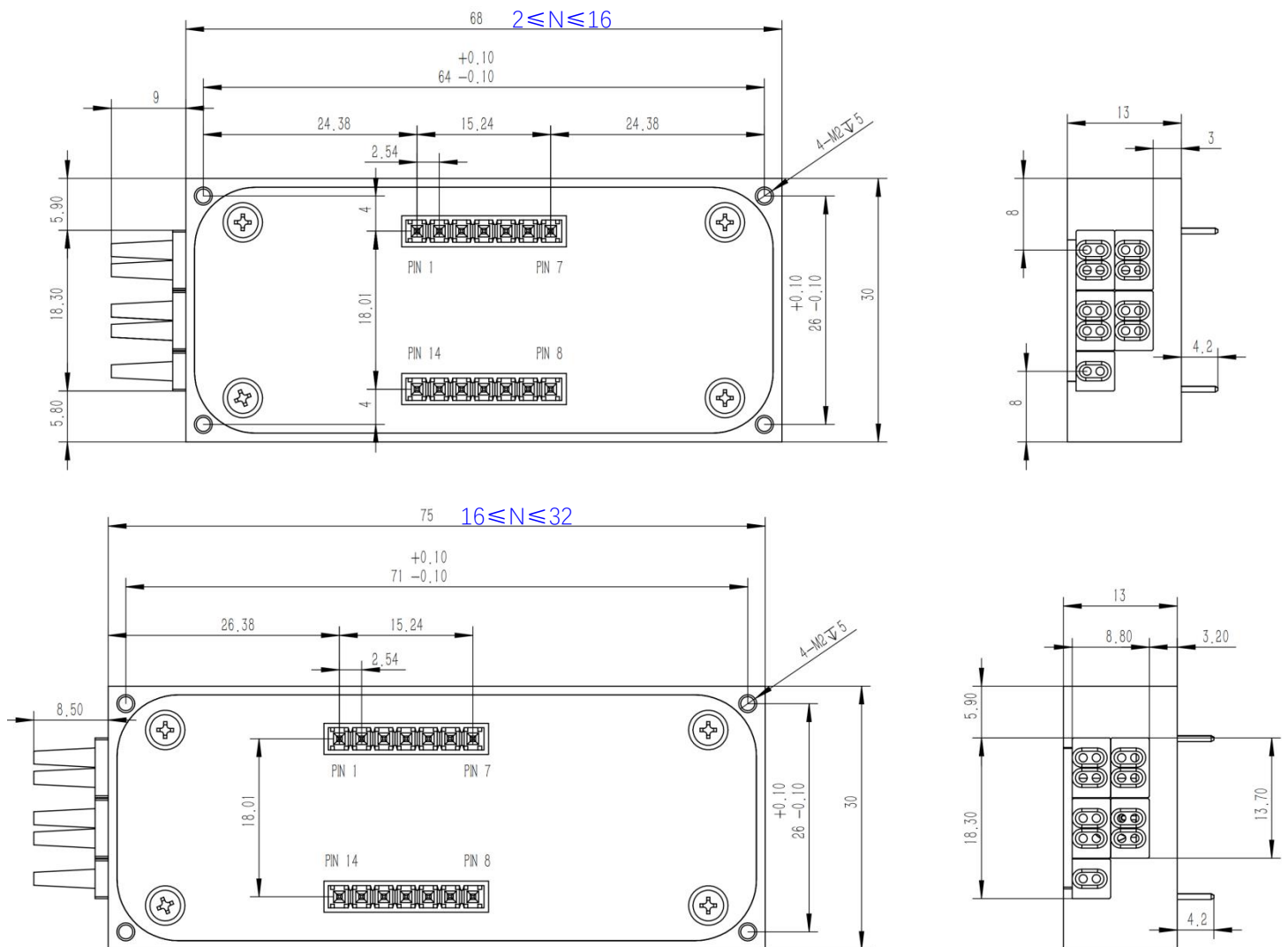
Durability	cycle	$\geq 1 \times 10^9$
Maximum Optical Power	mW	$\leq 500$
Latching Type		Non-latching

1. All specifications are without connectors.
2. IL is measured at CWL, 23°C. IL is for single-band. Dual-band adds 0.2dB.
3. Repeatability is defined after 100 cycles.
4. WDL is measured at  $CWL \pm 20nm$ , 23°C.
5. When using optimized voltage ramp.

## FUNCTIONAL BLOCK DIAGRAM



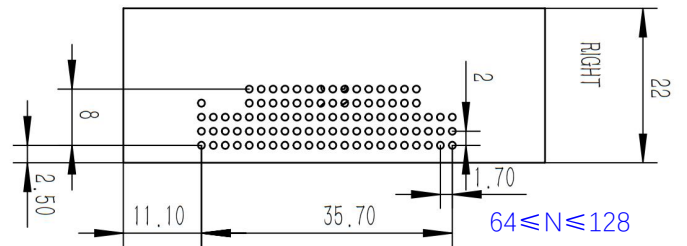
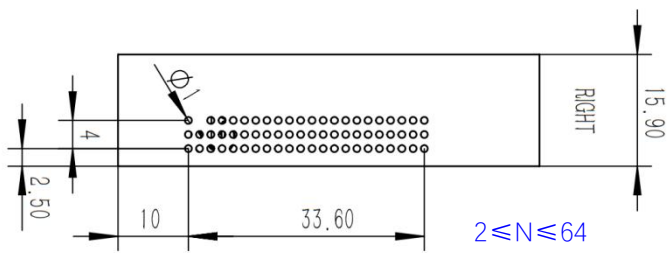
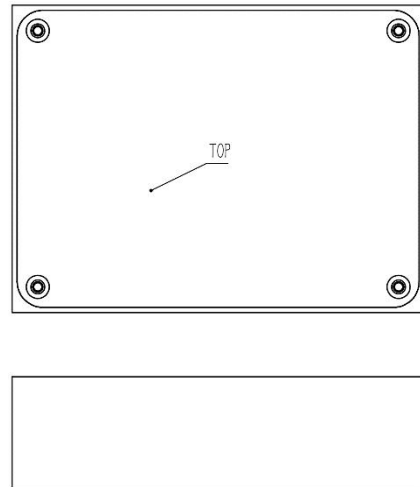
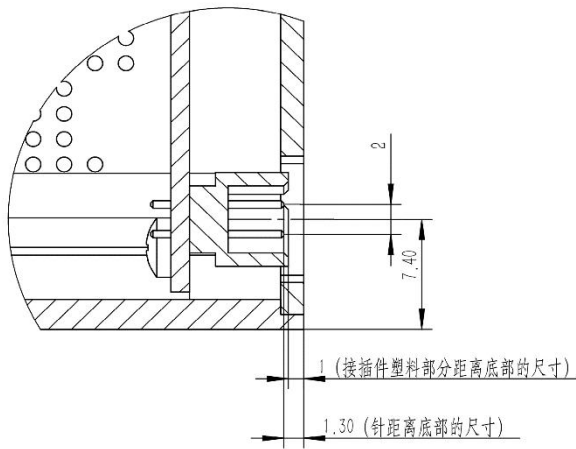
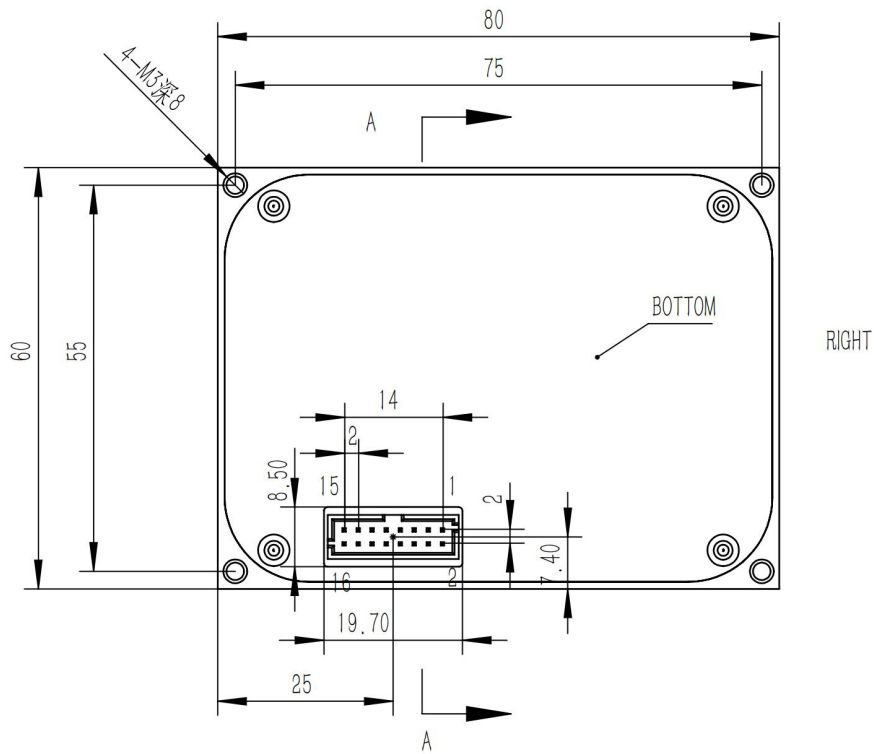
## MODULE TYPE 1 - DIMENSIONS AND PINOUT



## MODULE TYPE 1 - ELECTRONIC PIN DEFINITION

<b>PIN NO.</b>	<b>FUNCTION</b>	<b>PIN NO.</b>	<b>FUNCTION</b>
1	No Connect	8	Parallel D4 Input
2	5V(VCC)	9	Parallel D2 Input
3	Parallel STROBE/ENABLE	10	Done
4	Ground(GND)	11	Ground(GND)
5	Parallel D0 Input	12	Parallel D1 Input
6	UART RX Data	13	Parallel D3 Input
7	UART TX Data	14	Hardware Reset(/RESET)

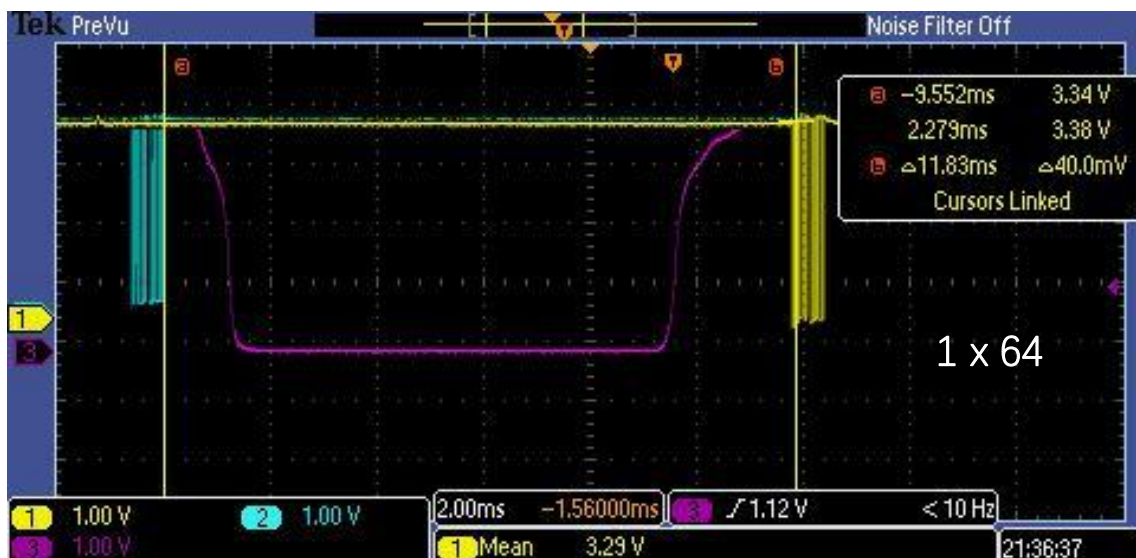
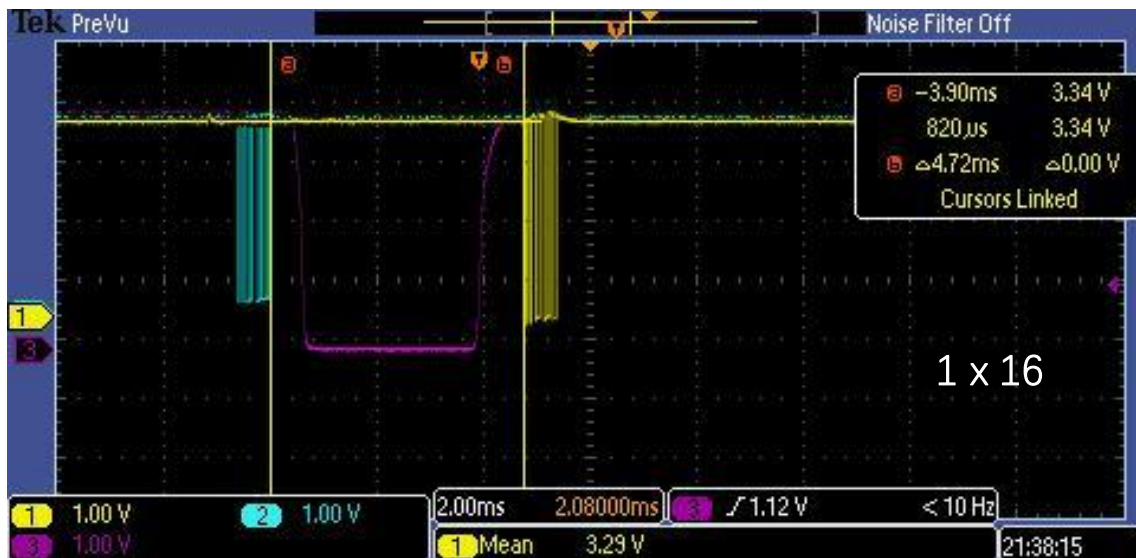
# MODULE TYPE 4 - DIMENSIONS AND PINOUT



## MODULE TYPE 4 - ELECTRONIC PIN DEFINITION

PIN NO.	FUNCTION	PIN NO.	FUNCTION
1	Parallel D6 Input	9	UART RX Data
2	Parallel D5 Input	10	UART TX Data
3	Hardware Reset(/RESET)	11	Parallel D4 Input
4	Reserved	12	Parallel D3 Input
5	Ground(GND)	13	Parallel D2 Input
6	Ground(GND)	14	Parallel D1 Input
7	5~12V(VCC)	15	Parallel D0 Input
8	5~12V(VCC)	16	Parallel STROBE/ENABLE

## SWITCHING TIME AND WAVEFORM



# ORDERING INFORMATION

MS -  -  -  -  -  -  -

<b>Product Code</b>	
MS	MEMS Switch
<b>Switch Configuration</b>	
1xN	1xN Switch
1x32	
1x128	
1x2048	(Specify $1 \leq N \leq 2048$ )
<b>Wavelength Range</b>	
13	1290 – 1330 nm
15	1525 – 1568 nm
16	1600 – 1650 nm
13/15	1290 – 1330 & 1525 – 1568 nm
15/16	1525 – 1568 & 1600 – 1650 nm
Or customer specify	
<b>Fiber Type</b>	
S	Single Mode, G657A2
<b>Jacket Type</b>	
09	Φ0.9 mm, loose tube
<b>Pigtail Length</b>	
1	1 meter
Or customer specify	
<b>Connector Type</b>	
LC/UPC	
FC/APC	
Or customer specify	
<b>Package</b>	
M1	Module, single stage, support 1 switch
M4	Module, single stage, support 1 switch
	Module, double stage, maximum 3 switches
MX1	Module, double stage, maximum 32 switches
MX3	Module, double stage, maximum 32 switches





# MEMS OPTIC 1xN SWITCH - SM *External PCB*

## MODULE SERIES SPECIFICATIONS

<b>MODULE TYPE</b>	<b>CHANNEL</b>	<b>CONTROL TYPE<sup>1</sup></b>	<b>DIMENSIONS (mm)</b>	<b>SUPPLY VOLTAGE (V)</b>
CP0	$2 \leq N \leq 128$	①②	69 x 32 x 8	5
CP1	$2 \leq N \leq 16$	①②	60 x 26 x 11	5
	$16 < N \leq 32$			
	$32 < N \leq 48$			
	$48 \leq N \leq 64$			
CP2	$2 \leq N \leq 128$	①	133 x 83 x 9	5
CP3	$2 \leq N \leq 16$	②③	63 x 36 x 8	5
CP4	$2 < N \leq 64$	①②	75 x 55 x 8	5
	$64 < N \leq 128$			
CP5	$2 \leq N \leq 64$	①② / ①③ / ①④ / ③④	60 x 21 x 8	5
CP6	$2 \leq N \leq 64$	②③	53 x 21 x 9	5
CP7	$2 \leq N \leq 64$	①	53 x 21 x 8	5
CP8	$2 \leq N \leq 64$	③	115 x 16 x 8	5

1. ① UART ② PARALLEL ③ IIC ④ RS232

# OPTICAL SPECIFICATIONS<sup>1</sup>

<b>PARAMETER</b>		<b>UNIT</b>	<b>VALUE</b>
Wavelength		nm	8:850 only 9:980 only 13:1290 ~ 1330 15:1525 ~ 1568
Test Wavelength		nm	1310 / 1550 / 1625 or 1650
Insertion Loss <sup>2</sup>	1 x 2	dB	≤ 0.6, typical 0.5
	1 x 4 / 8		≤ 0.8, typical 0.6
	1 x 12 / 16		≤ 1.0, typical 0.9
	1 x 24 / 32		≤ 1.3, typical 1.1
	1 x 48 / 64		≤ 1.5, typical 1.2
	1 x 96 / 128		≤ 2.0, typical 1.6
Return Loss		dB	≥ 45
Repeatability <sup>3</sup>		dB	≤ 0.1
Crosstalk		dB	≥ 40
PDL	2 < N ≤ 64	dB	≤ 0.2
	64 < N ≤ 128		≤ 0.4
WDL <sup>4</sup>	2 < N ≤ 64	dB	≤ 0.3
	64 < N ≤ 128		≤ 0.6
TDL	2 ≤ N ≤ 16	dB	≤ 0.3
	16 < N ≤ 64		≤ 0.4
	64 < N ≤ 128		≤ 0.7
Switch Time <sup>5</sup>	2 ≤ N ≤ 16	ms	≤ 5
	16 < N ≤ 64		≤ 10
	64 < N ≤ 128		≤ 15
Durability		cycle	≥ 1 x 10 <sup>9</sup>
Maximum Optical Power		mW	≤ 500
Latching Type			Non-latching

1. All specifications are without connectors.

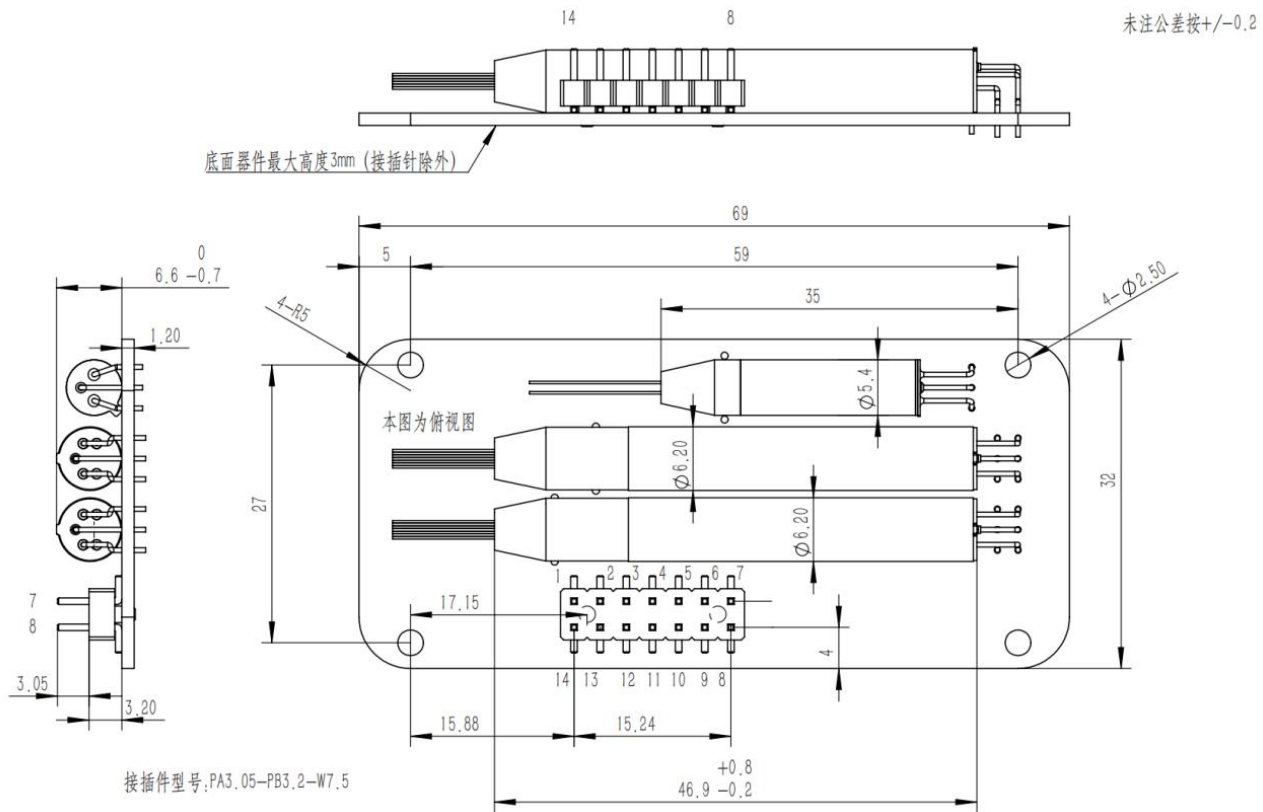
2. IL is measured at CWL, 23°C. IL is for single-band. Dual-band adds 0.2dB.

3. Repeatability is defined after 100 cycles.

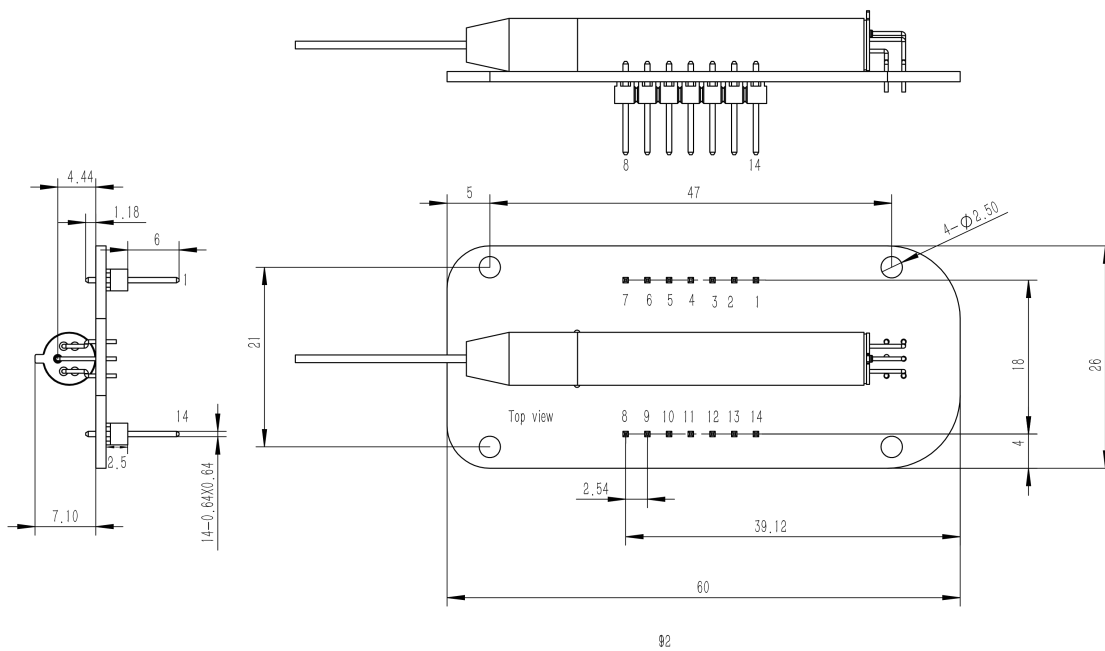
4. WDL is measured at CWL±20nm, 23°C.

5. When using optimized voltage ramp.

# EXTERNAL PCB 0 - DIMENSIONS AND PINOUT



# EXTERNAL PCB 1 - DIMENSIONS AND PINOUT



## EXTERNAL PCB 0&1 - ELECTRONIC PIN DEFINITION

<b><i>PIN NO.</i></b>	<b><i>FUNCTION</i></b>	<b><i>PIN NO.</i></b>	<b><i>FUNCTION</i></b>
1	No Connect	8	Parallel D4 Input
2	5V(VCC)	9	Parallel D2 Input
3	Parallel STROBE/ENABLE	10	Done
4	Ground(GND)	11	Ground(GND)
5	Parallel D0 Input	12	Parallel D1 Input
6	UART RX Data	13	Parallel D3 Input
7	UART TX Data	14	Hardware Reset(/RESET)

# ORDERING INFORMATION

MS -  -  -  -  -  -  -

## Product Code

**MS**      **MEMS Switch**

## Switch Configuration

**1xN**      **1xN Switch**  
**1x16**  
**1x64**  
**1x128**      (Specify  $1 \leq N \leq 128$ )

## Wavelength Range

**13**      **1290 – 1330 nm**  
**15**      **1525 – 1568 nm**  
**16**      **1600 – 1650 nm**  
**13/15**      **1290 – 1330 & 1525 – 1568 nm**  
**15/16**      **1525 – 1568 & 1600 – 1650 nm**  
 Or customer specify

## Fiber Type

**S**      **Single Mode, G657A2**

## Jacket Type

**025**      **Φ 0.25 mm, bare fiber**

## Pigtail Length

**1**      **1 meter**  
 Or customer specify

## Connector Type

**00**      **No connector**  
 Or customer specify

## Package

**CP0**      **With External PCB 0, support max 3 switches (Splicing switch)**  
**CP1**      **With External PCB 1, support 1 switch**



## **MEMS OPTIC 1xN SWITCH - MM** *cylindrical package*

### **DEVICE SERIES SPECIFICATIONS**

<b><i>DEVICEE TYPE</i></b>	<b><i>CHANNEL</i></b>	<b><i>PIN NUM</i></b>	<b><i>DIMENSIONS (mm)</i></b>	<b><i>SUPPLY VOLTAGE (V)</i></b>
MM C24	$2 < N \leq 24$	5	$\Phi 6.3 \times 47$	0 ~ 60

## OPTICAL SPECIFICATIONS<sup>1</sup>

<b>PARAMETER</b>		<b>UNIT</b>	<b>VALUE</b>
Wavelength		nm	8:850 only 9:980 only 13:1290 ~ 1330 15:1525 ~ 1568
Test Wavelength		nm	850 / 980 / 1310 / 1550
Insertion Loss <sup>2</sup>	1 x 2 / 4 / 8	dB	≤ 1.0, typical 0.6
	1 x 12 / 16		≤ 1.2, typical 0.8
	1 x 24		≤ 1.4, typical 1.0
Return Loss		dB	≥ 30
Repeatability <sup>3</sup>		dB	≤ 0.1
Crosstalk		dB	≥ 30
PDL		dB	≤ 0.2
WDL <sup>4</sup>		dB	≤ 0.4
TDL		dB	≤ 0.3
Switch Time <sup>5</sup>		ms	≤ 5
Durability		cycle	≥ 1 x 10 <sup>9</sup>
Maximum Optical Power		mW	≤ 500
Latching Type			Non-latching

1. All specifications are without connectors.

2. IL is measured at CWL, 23°C. IL is for single-band. Dual-band adds 0.2dB.

3. Repeatability is defined after 100 cycles.

4. WDL is measured at CWL±20nm, 23°C.

5. When using optimized voltage ramp.

# ORDERING INFORMATION

AZ - MS -  -  -  -  -  -  -

## Product Code

MS MEMS Switch

## Switch Configuration

1xN 1xN Switch  
 1x4  
 1x8  
 1x16  
 1x24 (Specify  $2 \leq N \leq 24$ )

## Wavelength Range

8 850 nm only  
 9 980 nm only  
 13 1290 – 1330 nm  
 15 1525 – 1568 nm  
 16 1600 – 1650 nm  
 Or customer specify

## Fiber Type

M Multimode  
 OM1 62.5um core  
 OM2 50um core  
 OM3 50um core  
 OM4 50um core

## Jacket Type

025  $\Phi$ 0.25 mm, bare fiber  
 09  $\Phi$ 0.9 mm, loose tube

## Pigtail Length

1 1 meter  
 Or customer specify

## Connector Type

00 No connector  
 Or customer specify

## Package

C Cylindric package





# MEMS OPTIC 1xN SWITCH - MM *Module Type*

## MODULE SERIES SPECIFICATIONS

<b>MODULE TYPE</b>	<b>CHANNEL</b>	<b>CONTROL TYPE<sup>1</sup></b>	<b>DIMENSIONS (mm)</b>	<b>SUPPLY VOLTAGE (V)</b>
M1	$2 \leq N \leq 16$	①②	75 x 30 x 13	5
	$16 < N \leq 24$		75 x 30 x 16	
M4	$2 < N \leq 48$	①②	80 x 60 x 16	5
MX3	$2 \leq N \leq 576$	①	158 x 150 x 29	5 ~ 12

1. ① UART ② PARALLEL ③ IIC ④ RS232

# OPTICAL SPECIFICATIONS<sup>1</sup>

<b>PARAMETER</b>		<b>UNIT</b>	<b>VALUE</b>
Wavelength		nm	8:850 only 9:980 only 13:1290 ~ 1330 15:1525 ~ 1568
Insertion Loss <sup>2</sup>	1 x 8	dB	≤ 1.0, typical 0.6
	1 x 16		≤ 1.2, typical 0.8
	1 x 24		≤ 1.4, typical 1.0
	1 x 32 / 48 / 64		≤ 2.2, typical 1.4
	1 x 128		≤ 2.4, typical 1.6
	1 x 256		≤ 2.6, typical 1.8
	1 x 576		≤ 2.8, typical 2.0
Return Loss		dB	≥ 30
Repeatability <sup>3</sup>		dB	≤ 0.1
Crosstalk		dB	≥ 30
PDL	2 ≤ N ≤ 24	dB	≤ 0.2
	24 < N ≤ 576		≤ 0.4
WDL <sup>4</sup>	2 ≤ N ≤ 24	dB	≤ 0.4
	24 < N ≤ 576		≤ 0.8
TDL	2 ≤ N ≤ 24	dB	≤ 0.3
	24 < N ≤ 576		≤ 0.6
Switch Time <sup>5</sup>	2 ≤ N ≤ 16	ms	≤ 5
	16 < N ≤ 24		≤ 10
	24 < N ≤ 576		≤ 20
Durability		cycle	≥ 1 x 10 <sup>9</sup>
Maximum Optical Power		mW	≤ 500
Latching Type			Non-latching

1. All specifications are without connectors.

2. IL is measured at CWL, 23°C. IL is for single-band. Dual-band adds 0.2dB.

3. Repeatability is defined after 100 cycles.

4. WDL is measured at CWL±20nm, 23°C.

5. When using optimized voltage ramp.

# ORDERING INFORMATION

MS -  -  -  -  -  -  -

## Product Code

MS MEMS Switch

## Switch Configuration

1xN 1xN Switch  
 1x16  
 1x48  
 1x576 (Specify  $1 \leq N \leq 576$ )

## Wavelength Range

8 850 nm only  
 9 980 nm only  
 13 1290 – 1330 nm  
 15 1525 – 1568 nm  
 16 1600 – 1650 nm  
 Or customer specify

## Fiber Type

M Multimode  
 OM1 62.5um core  
 OM2 50um core  
 OM3 50um core  
 OM4 50um core

## Jacket Type

09  $\Phi$ 0.9 mm, loose tube

## Pigtail Length

1 1 meter  
 Or customer specify

## Connector Type

LC/UPC  
 FC/APC  
 Or customer specify

## Package

M1 Module, single stage, support 1 switch  
 M4 Module, single stage, support 1 switch  
 Module, double stage, maximum 3 switches  
 MX3 Module, double stage, maximum 32 switches



## **MEMS OPTIC** **1xN SWITCH - PM** *cylindrical package*

### **DEVICE SERIES SPECIFICATIONS**

<b><i>DEVICE TYPE</i></b>	<b><i>CHANNEL</i></b>	<b><i>PIN NUM</i></b>	<b><i>DIMENSIONS (mm)</i></b>	<b><i>SUPPLY VOLTAGE (V)</i></b>
PM C8	$2 < N \leq 8$	5	$\Phi 6.3 \times 47$	0 ~ 60

## OPTICAL SPECIFICATIONS<sup>1</sup>

<b>PARAMETER</b>		<b>UNIT</b>	<b>VALUE</b>
Wavelength		nm	13:1290 ~ 1330 15:1525 ~ 1568 16:1600 ~ 1650
Insertion Loss <sup>2</sup>	1 x 2	dB	≤ 1.0, typical 0.8
	1 x 4		≤ 1.2, typical 0.9
	1 x 8		≤ 1.4, typical 1.1
Return Loss		dB	≥ 45
Repeatability <sup>3</sup>		dB	≤ 0.1
Crosstalk		dB	≥ 40
PDL		dB	≤ 0.2
WDL <sup>4</sup>		dB	≤ 0.3
TDL		dB	≤ 0.3
Extinction Ratio	N ≤ 4	dB	≥ 18
	4 < N ≤ 8		≥ 16
Switch Time <sup>5</sup>		ms	≤ 5
Durability		cycle	≥ 1 x 10 <sup>9</sup>
Maximum Optical Power		mW	≤ 500
Latching Type			Non-latching

1. All specifications are without connectors.
2. IL is measured at CWL, 23°C. IL is for single-band. Dual-band adds 0.2dB.
3. Repeatability is defined after 100 cycles.
4. WDL is measured at CWL±20nm, 23°C.
5. When using optimized voltage ramp.

# ORDERING INFORMATION

MS -  -  -  -  -  -  -

## Product Code

MS MEMS Switch

## Switch Configuration

1xN 1xN Switch  
 1x4  
 1x8 (Specify  $2 \leq N \leq 8$ )

## Wavelength Range

13 1290 – 1330 nm  
 15 1525 – 1568 nm  
 16 1600 – 1650 nm  
 13/15 1290 – 1330 & 1525 – 1568 nm  
 15/16 1525 – 1568 & 1600 – 1650 nm  
 Or customer specify

## Fiber Type

PM Panda fiber

## Jacket Type

025  $\Phi 0.25$  mm, bare fiber  
 09  $\Phi 0.9$  mm, loose tube

## Pigtail Length

1 1 meter  
 Or customer specify

## Connector Type

00 No connector  
 Or customer specify

## Package

C Cylindric package



# MEMS OPTIC 1xN SWITCH - PM *Module Type*

## MODULE SERIES SPECIFICATIONS

<b>MODULE TYPE</b>	<b>CHANNEL</b>	<b>CONTROL TYPE<sup>1</sup></b>	<b>DIMENSIONS (mm)</b>	<b>SUPPLY VOLTAGE (V)</b>
M1	$2 \leq N \leq 8$	①②	75 x 30 x 13	5
M4	$2 < N \leq 16$	①②	80 x 60 x 16	5
MX3	$2 \leq N \leq 64$	①	158 x 150 x 29	5 ~ 12

1. ① UART ② PARALLEL ③ IIC ④ RS232

## OPTICAL SPECIFICATIONS<sup>1</sup>

<b>PARAMETER</b>		<b>UNIT</b>	<b>VALUE</b>
Wavelength		nm	13:1290 ~ 1330 15:1525 ~ 1568 16:1600 ~ 1650
Insertion Loss <sup>2</sup>	1 x 2	dB	≤ 1.0, typical 0.8
	1 x 4		≤ 1.2, typical 0.9
	1 x 8		≤ 1.4, typical 1.1
	1 x 16		≤ 2.4, typical 1.9
	1 x 24 / 32		≤ 2.6, typical 2.0
	1 x 48 / 64		≤ 2.8, typical 2.2
Return Loss		dB	≥ 45
Repeatability <sup>3</sup>		dB	≤ 0.1
Crosstalk		dB	≥ 40
PDL	2 ≤ N ≤ 8	dB	≤ 0.2
	8 < N ≤ 64		≤ 0.4
WDL <sup>4</sup>	2 ≤ N ≤ 8	dB	≤ 0.3
	8 < N ≤ 64		≤ 0.6
TDL	2 ≤ N ≤ 8	dB	≤ 0.3
	8 < N ≤ 64		≤ 0.6
Extinction Ratio	N ≤ 4	dB	≥ 18
	4 < N ≤ 8		≥ 16
	8 < N ≤ 64		≥ 15
Switch Time <sup>5</sup>	2 ≤ N ≤ 8	ms	≤ 5
	8 < N ≤ 64		≤ 10
Durability		cycle	≥ 1 x 10 <sup>9</sup>
Maximum Optical Power		mW	≤ 500
Latching Type			Non-latching

1. All specifications are without connectors.

2. IL is measured at CWL, 23°C. IL is for single-band. Dual-band adds 0.2dB.

3. Repeatability is defined after 100 cycles.

4. WDL is measured at CWL±20nm, 23°C.

5. When using optimized voltage ramp.



# ORDERING INFORMATION

MS -  -  -  -  -  -  -

## Product Code

**MS**      **MEMS Switch**

## Switch Configuration

**1xN**      **1xN Switch**  
**1x16**  
**1x32**  
**1x64**      (Specify  $1 \leq N \leq 64$ )

## Wavelength Range

**13**      **1290 – 1330 nm**  
**15**      **1525 – 1568 nm**  
**16**      **1600 – 1650 nm**  
**13/15**    **1290 – 1330 & 1525 – 1568 nm**  
**15/16**    **1525 – 1568 & 1600 – 1650 nm**  
 Or customer specify

## Fiber Type

**PM**      **Panda fiber**

## Jacket Type

**09**      **Φ0.9 mm, loose tube**

## Pigtail Length

**1**      **1 meter**  
 Or customer specify

## Connector Type

**LC/UPC**  
**FC/APC**  
 Or customer specify

## Package

**M1**      **Module, single stage, support 1 switch**  
**M4**      **Module, single stage, support 1 switch**  
             **Module, double stage, maximum 3 switches**  
**MX3**    **Module, double stage, maximum 32 switches**