

MEMS MxN

OPTICAL CROSS-CONNECT SWITCH



SM 16x16/64x64

**MM
24x24**

**PM
8x8**



MEMS OPTIC MxN SWITCH - SM *Module Type*

DESCRIPTION

MEMS optical cross-connect switch is MxN switch matrix that allows the simultaneous connection of multiple input to output fibers in a fully non-blocking, all-optical, cross-connect configuration.

OXC is based on industry proven, long-life, reliable MEMS 1xN optical switch components. An MxN OXC is built by cascading M 1xN switches and N 1xM switches. Every input has a 1xN switch, while every output has a Mx1 switch. The output fibers of each 1xN are spliced to the N side of each Mx1 to allow any input to connect to any output.

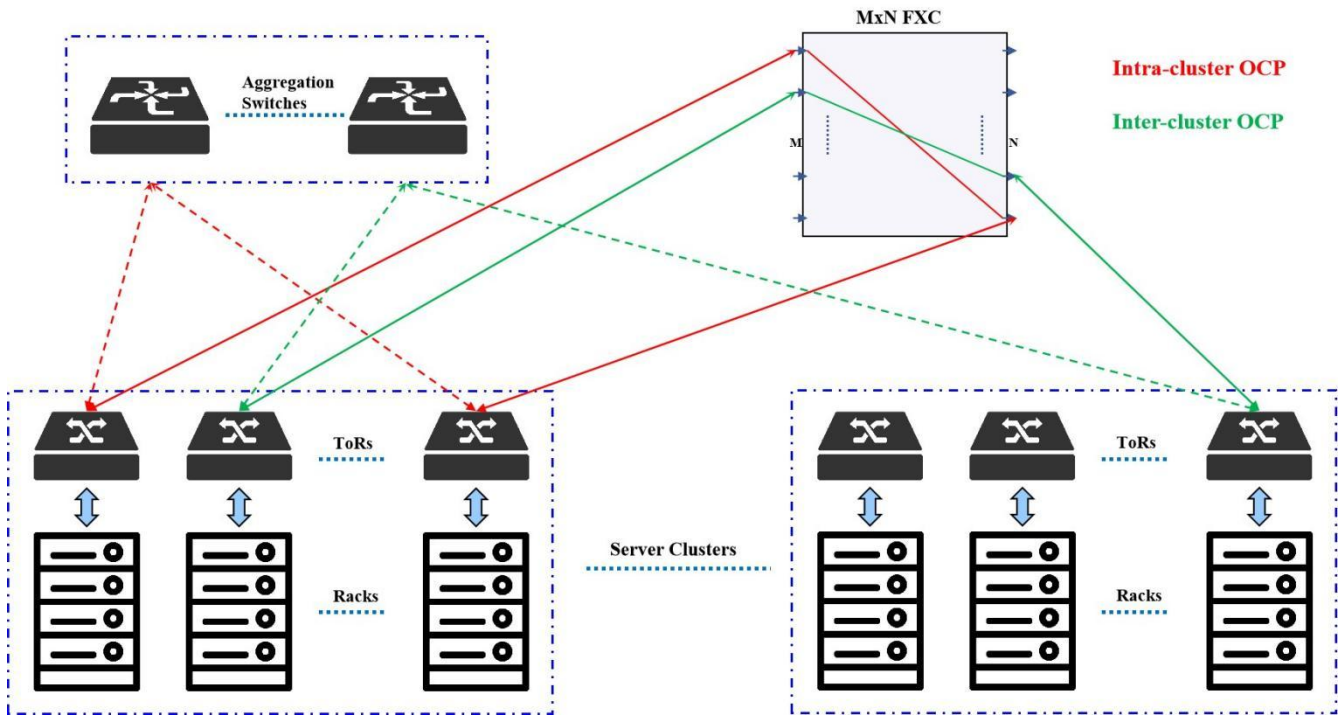
FEATURES

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

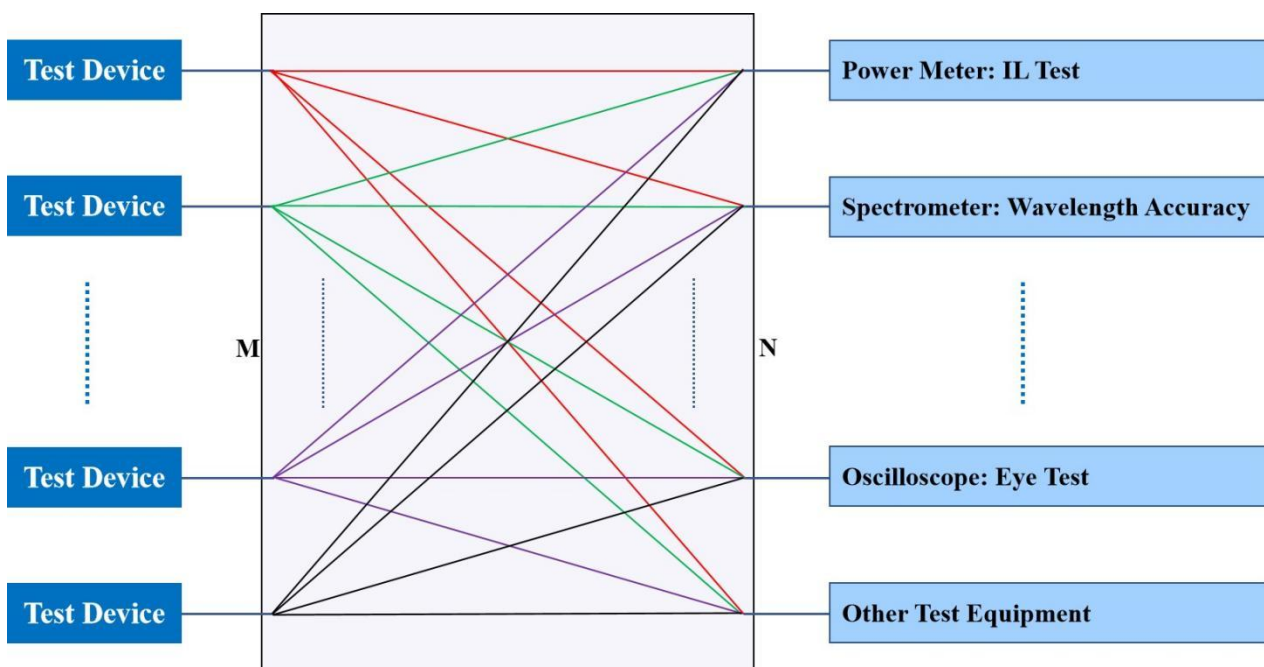
APPLICATIONS

- ✓ Optical network routing
- ✓ Resource sharing in test & measurement applications
- ✓ Optical network protection and restoration

APPLICATION - OPTICAL NETWORK ROUTING



APPLICATION - AUTOMATION TESTING



MODULE SERIES SPECIFICATIONS

MODULE TYPE	CHANNEL	CONTROL TYPE¹	DIMENSIONS (mm)	SUPPLY VOLTAGE (V)
M1	8 x 8 M + N ≤ 16 2 ≤ M, N ≤ 20	①	150 × 150 × 20	5 ~ 12
M2	16 x 16 M + N ≤ 32 2 ≤ M, N ≤ 20	①	128 x 261 x 25	5 ~ 12
M3	16 x 16 M + N ≤ 32 2 ≤ M, N ≤ 20	①	158 x 150 x 29	5 ~ 12
MX	64 x 64 M + N ≤ 128 2 ≤ M, N ≤ 96	①	Customized	Customized

1. ① UART ② IIC ③ RS232

OPTICAL SPECIFICATIONS¹

PARAMETER		UNIT	VALUE
Wavelength		nm	13:1290 ~ 1330 15:1525 ~ 1568 16:1600 ~ 1650
MxN			16 x 16 / 32 x 32 / 64 x 64
Insertion Loss ²	4 x 4	dB	≤ 1.6, typical 1.4
	8 x 8		≤ 1.8, typical 1.6
	16 x 16		≤ 2.2, typical 2.0
	24 x 24		≤ 2.4, typical 2.2
	32 x 32		≤ 2.6, typical 2.4
	48 x 48		≤ 2.8, typical 2.6
	64 x 64		≤ 3.0, typical 2.6
Return Loss		dB	≥ 45
Repeatability ³		dB	≤ 0.1
Crosstalk		dB	≥ 50
PDL		dB	≤ 0.35
WDL ⁴	16 x 16	dB	≤ 0.6
	64 x 64		≤ 0.8
TDL		dB	≤ 0.6
Switch Time ^{5,6}	16 x 16	ms	≤ 5
	64 x 64		≤ 10
Durability		cycle	≥ 1 x 10 ⁹
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.

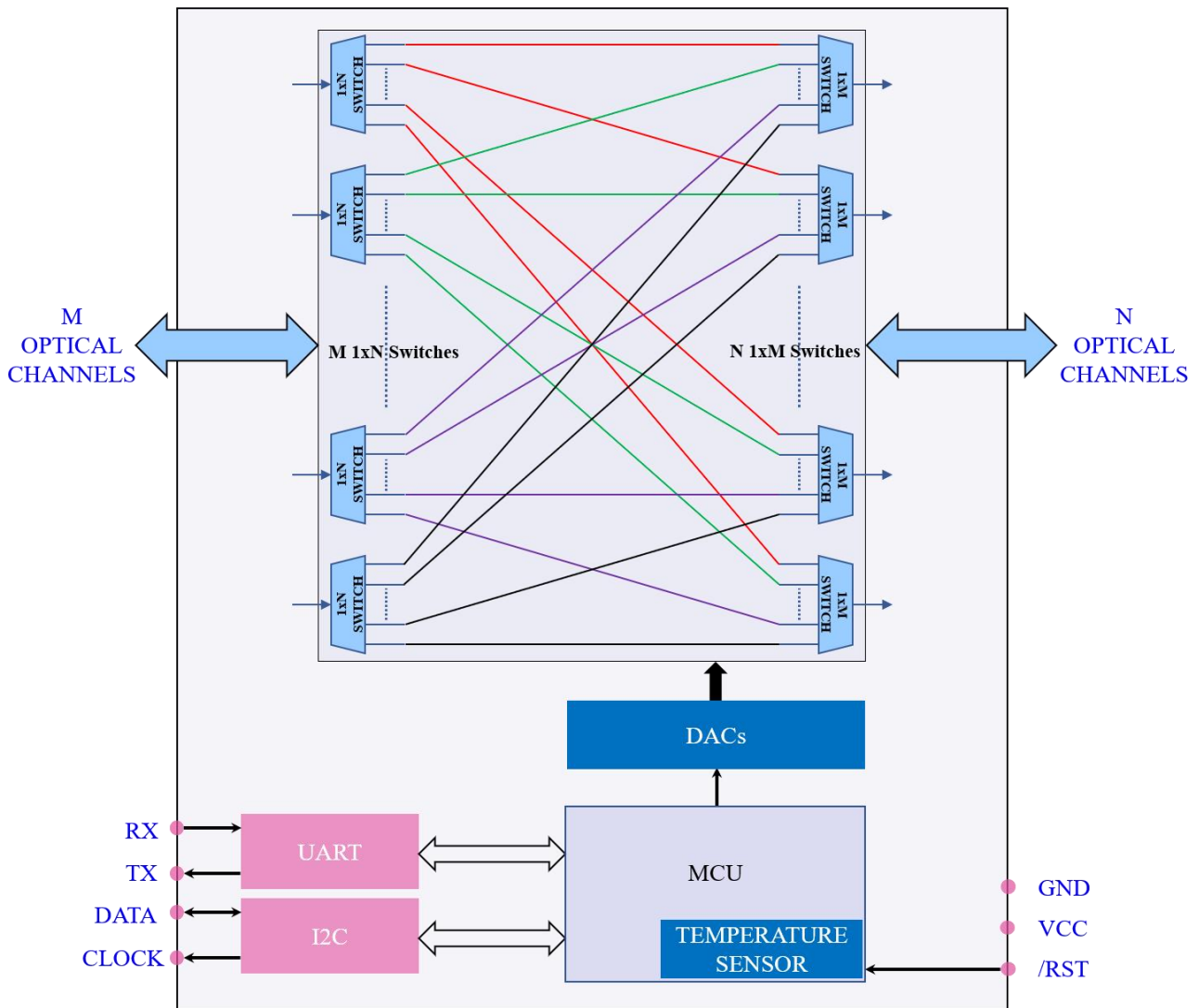
5. When using optimized voltage ramp.

6. One set of connection configurations.

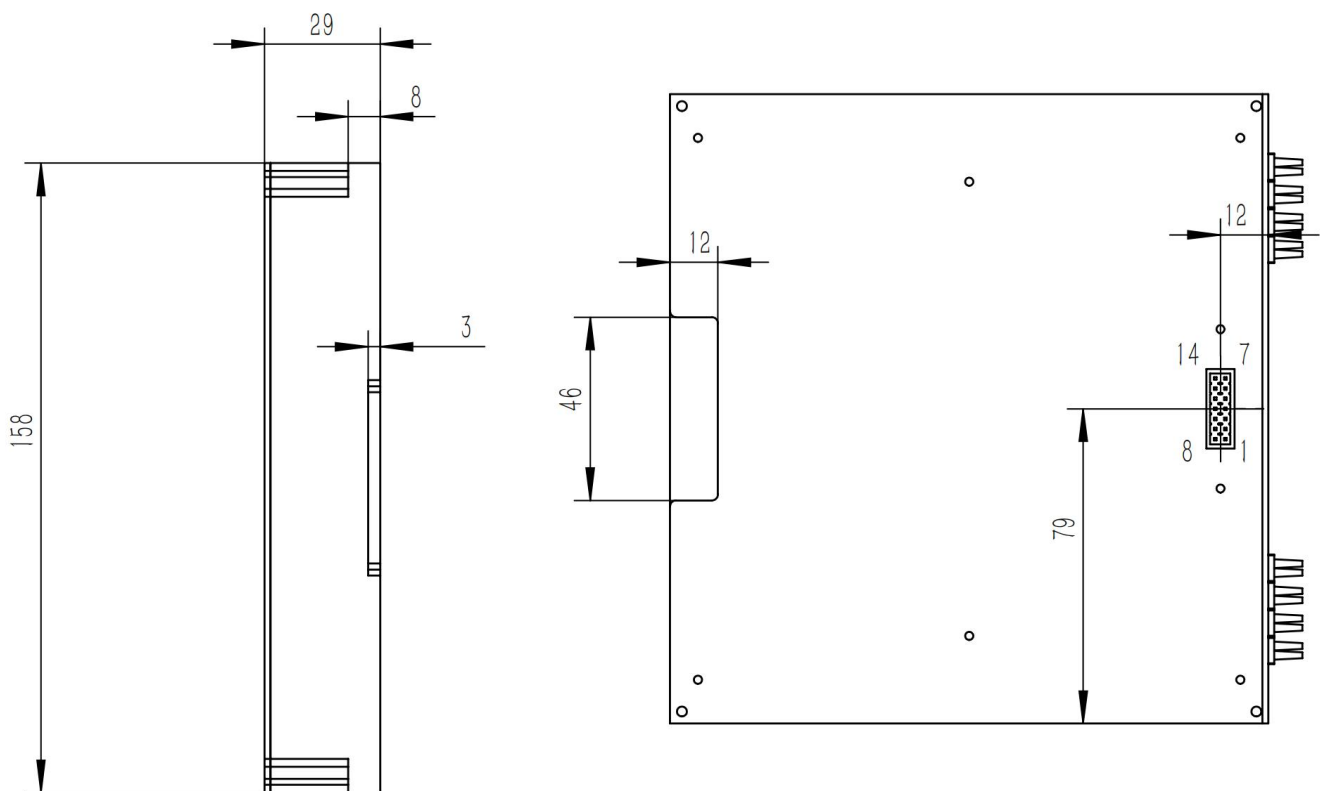
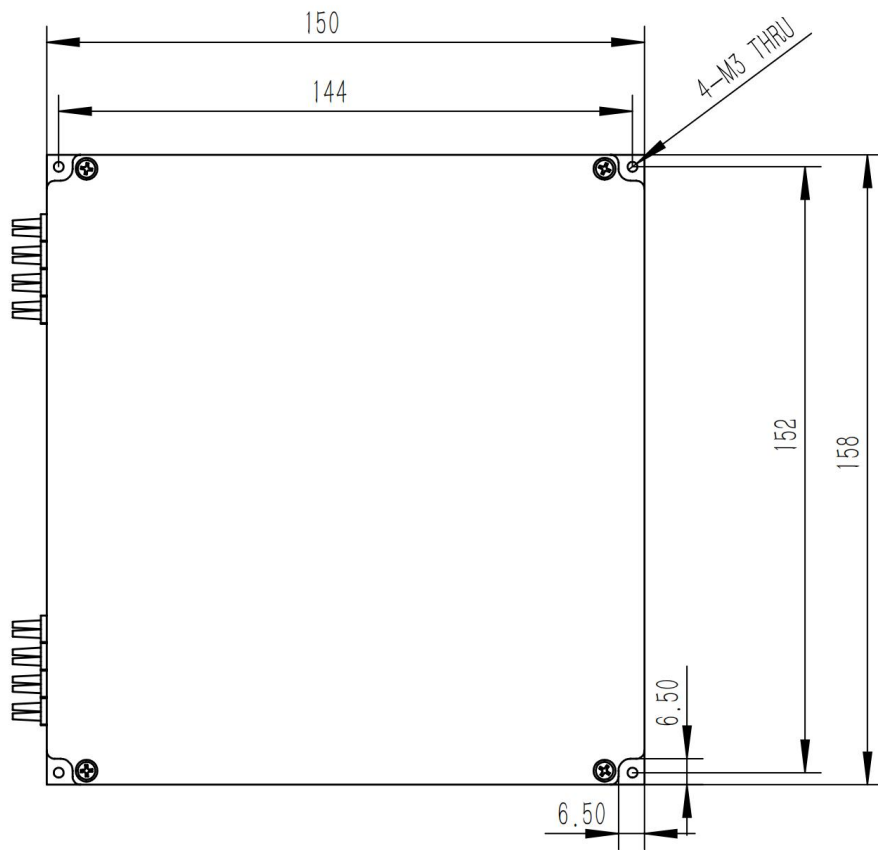
ENVIRONMENTAL CONDITIONS

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

FUNCTIONAL BLOCK DIAGRAM



MODULE TYPE 3 - DIMENSIONS AND PINOUT



MODULE TYPE 1&3 - ELECTRONIC PIN DEFINITION

<i>PIN NO.</i>	<i>FUNCTION</i>	<i>PIN NO.</i>	<i>FUNCTION</i>
1	No Connect	8	Reserved
2	5V(VCC)	9	Reserved
3	Reserved	10	Reserved
4	Ground(GND)	11	Ground(GND)
5	Reserved	12	Reserved
6	UART RX Data	13	Reserved
7	UART TX Data	14	Hardware Reset(/RESET)

ORDERING INFORMATION

MSX - - - - - - -

Product Code

MSX **MEMS Switch
Cross-Connect**

Switch Configuration

MxN **M+N≤128 & M,N≥2**
 8x8
 16x16
 32x32
 64x64

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

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, double stage, maximum support 16 switches**
M3 **Module, double stage, maximum support 32 switches**
MX **Module, double stage, maximum support 128 switches**



MEMS OPTIC MxN SWITCH - MM *Module Type*

MODULE SERIES SPECIFICATIONS

MODULE TYPE	CHANNEL	CONTROL TYPE¹	DIMENSIONS (mm)	SUPPLY VOLTAGE (V)
M3	16 x 16 M + N ≤ 32 2 ≤ M, N ≤ 20	①	158 x 150 x 29	5
MX	24 x 24 M + N ≤ 48 2 ≤ M, N ≤ 24	①	Customized	Customized

1. ① UART ② IIC ③ RS232

OPTICAL SPECIFICATIONS¹

PARAMETER		UNIT	VALUE
Wavelength		nm	8:850 only 9:980 only 13:1290 ~ 1330 15:1525 ~ 1568
Test Wavelength		nm	850 / 980 / 1310 / 1550
MxN			4 x 4 / 8 x 8 / 16 x 16
Insertion Loss ²	4 x 4	dB	≤ 1.4, typical 1.2
	4 x 8		≤ 1.5, typical 1.3
	8 x 8		≤ 1.6, typical 1.4
	12 x 12 / 16 x 16		≤ 2.2, typical 1.8
	24 x 24		≤ 2.8, typical 2.0
Return Loss		dB	≥ 30
Repeatability ³		dB	≤ 0.1
Crosstalk		dB	≥ 45
PDL		dB	≤ 0.35
WDL ⁴		dB	≤ 0.8
TDL		dB	≤ 0.6
Switch Time ^{5,6}		ms	≤ 10
Durability		cycle	≥ 1 x 10 ⁹
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.
6. One set of connection configurations.

ORDERING INFORMATION

MSX - - - - - - -

Product Code	
MSX	MEMS Switch Cross-Connect
Switch Configuration	
MxN	M+N≤48 & 24≥M,N≥2
8x8	
16x16	
24x24	
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	Φ0.9 mm, loose tube
Pigtail Length	
1	1 meter
Or customer specify	
Connector Type	
LC/UPC	
FC/APC	
Or customer specify	
Package	
M3	Module, double stage, maximum support 32 switches
MX	Module, double stage, maximum support 48 switches



MEMS OPTIC MxN SWITCH - PM *Module Type*

MODULE SERIES SPECIFICATIONS

MODULE TYPE	CHANNEL	CONTROL TYPE¹	DIMENSIONS (mm)	SUPPLY VOLTAGE (V)
M3	8 x 8 M + N ≤ 16 2 ≤ M,N ≤ 8	①	158 x 150 x 29	5

1. ① UART ② IIC ③ RS232

OPTICAL SPECIFICATIONS¹

PARAMETER		UNIT	VALUE
Wavelength		nm	13:1290 ~ 1330 15:1525 ~ 1568 16:1600 ~ 1650
Test Wavelength		nm	1310 / 1550 / 1625 or 1650
MxN			4 x 4 / 8 x 8
Insertion Loss ²	4 x 4	dB	≤ 2.4
	4 x 8		≤ 2.6
	8 x 8		≤ 2.8
Return Loss		dB	≥ 45
Repeatability ³		dB	≤ 0.1
Crosstalk		dB	≥ 50
PDL		dB	≤ 0.35
WDL ⁴		dB	≤ 0.6
TDL		dB	≤ 0.6
Switch Time ^{5,6}		ms	≤ 10
Durability		cycle	≥ 1 x 10 ⁹
Maximum Optical Power		mW	≤ 500
Extinction ratio		dB	≥ 16
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.

6. One set of connection configurations.

ORDERING INFORMATION

MSX - - - - - - -

Product Code

MSX **MEMS Switch
Cross-Connect**

Switch Configuration

MxN **$M+N \leq 16$ & $2 \leq M, N \leq 8$**
 4x4
 4x8
 8x8

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

M3 **Module, double stage, maximum support 32 switches**