

OSICS – 8-Channel Modular Platform

The OSICS platform offers the highest flexibility and largest choice of plug-ins required in fiberoptic system testing, particularly for Dense Wavelength Division Multiplexing (DWDM). Up to 8 plug-in modules can be mixed and matched in a single OSICS mainframe, thus fulfilling all needs for applications requiring multi-wavelength sources. OSICS features a complete line of modular solutions including:

- **OSICS-ECL**, Tunable external cavity lasers (step mode).
- **OSICS-FBL**, Full Band tunable laser from 1270 to 1650 nm.
- **OSICS-TLS-50**, high power tunable lasers locked on ITU 50GHz grid.
- **OSICS-TLS-AG**, high power tunable lasers with low linewidth.
- **OSICS-DFB**, High power distributed feedback laser diodes
- **OSICS-SLD**, SLED broadband light source.
- **OSICS-SWT**, optical switches and shutter.
- **OSICS-ATN**, high power optical attenuator.
- **OSICS-BKR**, Back Reflector.



Osics Key features:

- **Affordable price** – even if the customer starts with a single module.
- **Ease of use** : simultaneous reading of all relevant information of the 8 modules on the front panel.
- **24/7 use** for manufacturing.
- **Largest choice of laser sources.**
- **Full band telecom laser**: 380 nm in one single compact instrument (ECL Full Band).



OSICS mainframe	Dimensions (W x H x D)		448 x 133 x 370 mm3
	Power supply		100 to 240 V, 50 to 60 Hz
	Interfaces		Instrument front panel RS-232 C IEEE-488.2*1
	Weight (without any module)		8.1 kg
OSICS laser modules	Optical interface		FC-APC connector on single mode SMF-28 fiber or Polarization Maintaining fiber (SM13/SM15)
	Output isolation		35 dB
	Return loss		60 dB
	Analog modulation	ECL, DFB	150 Hz - 200 MHz (external modulation)
	Digital modulation	ECL	500 Hz - 1 MHz (internal or external)
		DFB	1 Hz - 1 MHz (internal or external)
	Dimensions (W x H x D)		35 x 130 x 250 mm3 (single slot)
	Weight		1 kg (0.7 kg for OSICS-DFB)
	Environment	Operating temperature range*2	
Warm up time (room temperature)		2 hours max (1 hour typ.)	

*1 : Tested and validated with National Instruments GPIB board.

*2 : ECL module operates from +15 to +30°C (+59 to 86°F) .

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OSICS ECL– External Cavity Tunable Laser Source Module

The ECL modules are high-performance External Cavity Lasers using Tunics technology which leads to a high output power over the whole tuning range:

- >80 nm tunability
- Large choice of modules from 1270 to 1660 nm.
- Ase-noise free output thanks to patented technology available for O and C&L band models: >90dB/0.1nm SSER.
- More than +6dBm output power on standard telecom band.
- 150kHz narrow linewidth thanks to External Cavity Laser design.
- Intuitive control from Osics mainframe front panel or remote operation.
- Full suite of internal and external modulation capabilities.
- Osics SWT with automatic Power Control allows to combine up to 4 Osics ECL modules to build a larger wavelength range tunable laser.



		T100-1300	1400	1480	1560/P6	T100-1560/P6	T100-1600/P6
Wavelength range	P = 0 dBm	1270-1340 nm	1340-1430 nm	1440-1520 nm	1520-1600 nm		1560-1640 nm
	P = +6 dBm	1300-1330 nm			1530-1580 nm		1570-1620 nm
Signal to Source spontaneous Emission Ratio (SSSER) * ¹		>80 dB/0.1nm	>45 dB/0.1nm			>90 dB/0.1nm	
Wavelength accuracy * ²		±0.2 nm					
Wavelength stability * ² , * ³		±0.01 nm / h ±0.01 nm / 24 h (typ.)					
Wavelength setting resolution		0.01 nm (0.001 nm optional)					
Tuning repeatability		±0.01 nm (typ.)					
Tuning speed * ⁵		10 nm/s (typ.)					
Power stability * ² , * ³		±0.01 dB / h; ±0.01 dB / 24 h (typ.)					
Spectral width (FWHM)		150 kHz (typ.) (coherence control OFF) >100 MHz (coherence control ON)					
Side mode suppression ratio (SMSR)		>45 dB (typ.)					
Relative intensity noise * ² , * ⁵		>145 dB/Hz (typ.)					

*1 : Spontaneous Emission measured on a 0.1nm bandwidth at ±1 nm from the signal

*2 : After warm-up, for 0 dBm output power..

*3 : At a constant temperature.

*4 : With High Resolution option (R) the tuning speed changes to 3 nm/s..

*5 : Measured at an electrical frequency of 100 MHz.

Options

M : Polarization maintaining output fiber (orientation TE in slow axis, in line with connector key); SM13 fiber for T100-1300, SM15 otherwise

R : High resolution (1 pm). Tuning speed changes to 3 nm/s.

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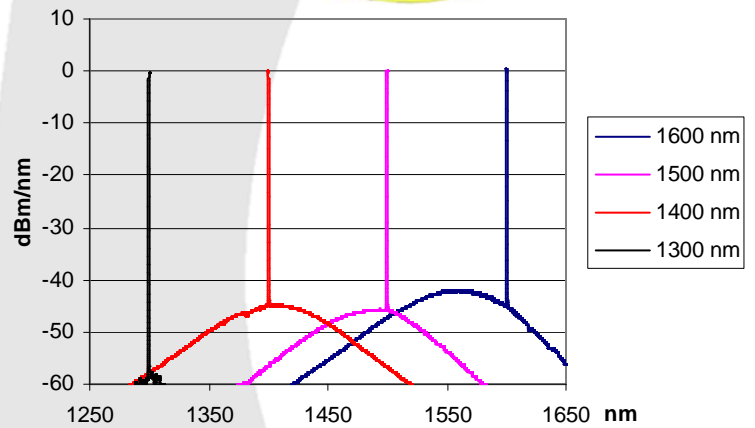
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OSICS ECL-FBL – Full-Band Tunable Laser Source

From 1270 nm to 1650 nm, the ECL-FBL provides full telecom band coverage for the O, E, S, C, L and U bands from a single output in a compact unit.

With 0 dBm guaranteed power over the entire tuning range, the ECL-FBL is the ideal tool for testing CWDM and WDM passive and active components.

The full-band laser is made of four ECL modules and one optical switch featuring Automatic Power Control. The ECL modules are high-performance External Cavity based on Yenista's Tunics technology which leads to excellent optical power and wavelength stability. With a modular approach, users buy only the wavelength range they need today and keep the ability to extend it at a later stage. The ECL-FBL fits inside the classical 8 slot modular OSICS platform, a compact 3U format ideal for Research & Development and production testing. The remaining free slots could be utilized for any of the other OSICS modules, such as DFBs, TLS modules or additional ECL modules.



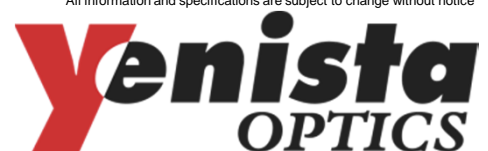
Osics ECL-FBL Optical Spectrum at various wavelengths

		ECL-1300	ECL-1400 Extended	ECL-1480 Extended	ECL-1600 Extended
Laser Specifications	Wavelength range *1	1270-1340 nm	1340-1430 nm	1430-1540 nm	1540-1650 nm
	Output Power *1, *2	+0dBm over all wavelength range			
	Automatic Power Control Accuracy	±0.2 dB			
	Wavelength Accuracy	±0.2 nm			
	Wavelength Stability	± 0.01nm / h (± 0.01nm / 24h typ.)			
	Wavelength Setting Resolution	0.01 nm			
	Tuning Repeatability	± 0.01nm (typ.)			
	Tuning Speed	10 nm/s			
	Side Mose Duppression Ratio	>45 dB			
Mainframe Specifications	Dimensions (WxHxD)	448 x 133 x 370 mm3			
	Power Supply	100 to 240 V, 50 to 60 Hz			
	Control	Instrument front pannel, RS-232C, IEEE-488.2-			
	Weight (with all five modules)	13,1 kg			

*1 : After warm-up.
*2 : At a constant temperature.

Ordering information
Osics ECL-FBL : package made of one Osics mainframe + four Osics ECL module + one Osics SWT 1x4 and relevant patchcord.

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OSICS TLS-50 WDM Tunable Laser Source

The Missing Link Between a Tunable Laser and a Fixed DFB.

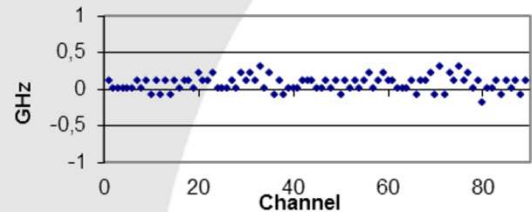
The OSICS TLS-50 modules are tunable laser sources with high output power and very good wavelength accuracy based on the ITU-T grid. The wavelength can be tuned over about 90 channels of the ITU-T grid by 50 GHz steps, covering around 35 nm in C or L band. With +13 dBm (20 mW) output power as well as high power and wavelength stability, this is the ideal laser for WDM testing, with performance better or equal to fixed wavelength DFB.



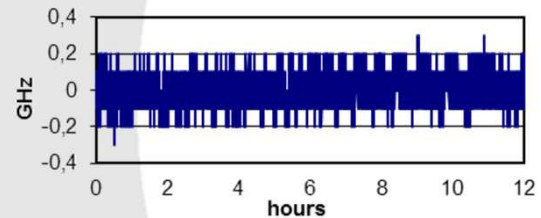
Key Parameters

- **High power : More than +13 dBm in C band**
Ideal for optical amplifier testing or WDM channel emulation.
- **Ultra-fast tuning: down to 20 ms.**
- **Wavelength locked on 50GHz ITU-T grid.**
- **Polarization Maintaining output for use with external modulator.**
- **SBS suppression.**
- **Internal AM and FM modulation.**
- **Real Time & Easy Operation.**

The platform user-friendly interface allows real time adjustment of the laser; as well as simultaneous display of all power and wavelength values on the Osics front panel.



Absolute frequency accuracy over C band



Frequency stability over 12 hours

	Band C	Band L
Number of ITU channels	89 (50 GHz spacing)	93 (50 GHz spacing)
Wavelength range	196.1 to 191.7 THz (1528.77 to 1563.86 nm)	191.1 to 186.5 THz (1568.77 to 1607.47 nm)
Output power	20 mW (+13 dBm)	10 mW (+10 dBm)
Power range (typ.)	+8 to +14 dBm	+5 to +11 dBm
Wavelength accuracy ¹	± 1.8 GHz	
Wavelength setting resolution	50 GHz	
Switching speed (typ. between two channels)	< 20 ms	
Power stability ^{1,2}	±0.05 dB	
Absolute output power deviation across tuning range	0.5 dB	
Linewidth (FWHM)	<5 MHz (1 MHz typ.)	
Stimulated Brillouin scattering (SBS) Suppression ⁴	Yes	
Frequency Modulation ⁵	10 kHz to 100kHz	
Trace Tone (Amplitude Modulation) ^{5,-}	10 kHz to 500 kHz	
Side Mode Suppression Ratio ¹	> 40 dB (45 dB typ.)	
Relative Intensity Noise ^{1,2,3} (RIN)	-145 dB/Hz	
Operating temperature range	+15 to +35°C (+59 to +95°F)	
Interfaces	Optical interface	FC/APC connector on polarization maintaining fiber. PER >20dB
	Dimensions (W x H x D) and Weight	35 x 130 x 250 mm ³ (single slot), 1 kg
Osics Platform Specifications	Dimensions (W x H x D) and Weight	448 x 133 x 370 mm ³ , 8.1 kg
	Power supply	100 to 240 V, 50 to 60 Hz
	Control	Instrument front panel, RS-232 C, and IEEE-488.2

1 After warm-up of 60 s.

2 Over two hours at a constant temperature

3 Average RIN on 1-100GHz. -110 dB/Hz on 10MHz-1GHz

4 Enable : on/off. Linewidth from 250 to 1000MHz depending on Frequency Modulation selected.

5 Waveshape Selection: Sinusoidal or Triangular.

6 Tone depth : up to 10%

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OSICS TLS-AG

Low Linewidth WDM Tunable Laser Source

The Ideal Source for WDM coherent transmission.

The OSICS-TLS AG modules are tunable laser sources with high output power and low linewidth thanks to External Cavity Design. **The wavelength can be tuned to any wavelength** in C or L band. With more than +13 dBm (20 mW) output power, plus high power and wavelength stability this is the ideal laser for WDM coherent transmission testing.

As part of the Osics family, this module has been designed to be used in all testing setups: high specs and low cost laser for every day lab applications to intensive field testing with multiple channels emulation. You can have as many as 8 OSICS TLS module in an OSICS mainframe and each module can be controlled from the front panel of the mainframe through an intuitive interface, or through the remote RS-232 C and IEEE-488.2 interfaces.



Key Parameters

▪ High power : More than +13dBm

Ideal for optical amplifier testing or WDM channel emulation.

▪ Selection of pre-configured channel or any wavelength in the covered wavelength range.

A must for de-tuning over ITU grid.

▪ Low linewidth : <100kHz

Ideal for use as local oscillator in Coherent transmission.

▪ Polarization Maintaining output for use with external modulator.

▪ SBS suppression.

▪ Turn on and off the laser with one click.

▪ Handy Operation.

The platform user-friendly interface allows direct adjustment of the laser from front panel; as well as simultaneous display of all power and wavelength values.

		Band C	Band L
Grid Selection		Adjustable to any wavelength grid (ITU-T 100 GHz, 50 GHz, and arbitrary grid)	
Wavelength range		196.25 to 191.5 THz (1527.60 to 1565.5 nm)	190.95 to 186.35 THz (1570.01 to 1608.76 nm)
Output power		20 mW (+13 dBm)	
Power range (typ.)		+7 to +14 dBm	
Relative Frequency (wavelength) accuracy (typ.)		± 0.5 GHz (± 4 pm)	
Absolute Frequency (wavelength) accuracy (typ.) ¹		± 1.5 GHz (± 12 pm)	
Frequency setting resolution		Down to 1 MHz	
Switching speed (typ. between two channels) ²		20 s	
Power stability ³		±0.03 dB	
Absolute output power deviation across tuning range		±0.2 dB	
Instantaneous Linewidth (FWHM)		< 100 kHz	
Stimulated Brillouin scattering (SBS) Suppression ability ⁴		Yes	
Side Mode Suppression Ratio (typ.)		50 dB	
Signal to Spontaneous Emission Ratio (typ.) ⁵		60 dB	
Relative Intensity Noise (RIN) ⁶		-145 dB/Hz	
Operating temperature range		+15 to +35°C (+59 to +95°F)	
Modules Interfaces	Optical interface	FC/APC connector on polarization maintaining fiber. PER >20dB	
	Control	Status LED, laser on/off button	
	Dimensions (W x H x D) and Weight	35 x 130 x 250 mm ³ (single slot), 1 kg	
Osics Platform Specifications	Dimensions (W x H x D) and Weight	448 x 133 x 370 mm ³ , 8.1 kg	
	Power supply	100 to 240 V, 50 to 60 Hz	
	Control	Instrument front panel, RS-232 C, and IEEE-488.2	

1: ± 2,5 GHz (± 22 pm) end of life.

2: 30 s max, including power stabilisation.

3: At a constant temperature.

4: At a dither frequency of 20.8 kHz and a FM p-p modulation width from 0 to 1000 MHz.

5: integrated over a 0.1 nm band.

6: At +13dBm, average RIN on 10MHz-40 GHz.

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OSICS DFB

High Power Distributed Feed Back Laser



The DFB modules are high-performance Distributed Feed Back laser diodes.

- OSICS-DFB offers more than +13 dBm of optical power coupled in a polarization maintaining fiber with a remarkable 5 pm wavelength stability over one hour. The internal wavelength calibration yields a 30 pm accuracy and the wavelength can be finely tuned over 1.8 nm (typ.) with the internal temperature control.
- OSICS-DFB is also available at 1310 nm.
- Other wavelengths are available on request.
- Each module can be controlled from the front panel of the mainframe, or through the remote interface. The modules and the mainframe offer a full suite of internal and external modulation capabilities, and also feature a Brillouin effect suppression function.

	Osics DFB C- and L-band	Osics DFB 1310	Osics DFB SP
ITU-T wavelength	1529.55-1610.05 nm * ¹	1310 nm ±10 nm	Other wavelengths: please consult for availability and detailed specifications
Output power	+13 dBm		
Wavelength tuning range	1.6 nm (1.8 nm typ.)		
Wavelength accuracy * ²	±0.03 nm		
Wavelength stability * ^{2, *3, *4}	±0.005 nm / h (±0.005 nm / 24 h typ.)		
Power stability * ^{2, *3, *4}	±0.01 dB / h (±0.01 dB / 24 h typ.)		
Spectral width (FWHM)	<10 MHz		
Side mode suppression ratio * ²	>35 dB (45dB typ.)		
Relative intensity noise * ^{2, *5}	>140 dB/Hz (typ.)		
Optical interface	FC/APC connector on PMF. PER >17dB		

*1 : The ITU-T wavelength is user-selected at time of order on the ITU-T grid, using the following format: OSICS-DFB-XXX.XX where XXX.XX is the frequency in THz.*2 : At a constant temperature.

*2 : After warm-up, for Pmax output power.

*3 : At a constant temperature.

*4 : Measured with an APC connector on the powermeter side.

*5 : Measured at an electrical frequency of 100 MHz.



Osics DFBs Typical Application: WDM grid Simulation

Ordering Information

C&L band : Osics DFB-XXX.XX where XXX.XX is the frequency in THz
1310 : Osics DFB 1310

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OSICS ATN-HP

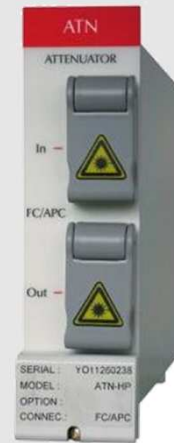
Variable Optical Attenuator

Up to 2W input power

The ATN module integrates industry standard attenuator components. It combines a 60 dB attenuation range and operates throughout a large wavelength range.

As part of a test set ATN modules can be used to equalize channels and to reach low power levels without modifying sources' signal-to-noise ratio. This is especially useful for optical amplifier characterization.

The ability to receive up to 2 W input power allows to use this on large counts DWDM test bench.



Key Parameters

▪ **High input power for optical amplifier testing or multi-wavelengths attenuation.**

▪ **60 dB attenuation range with 0.1 dB resolution.**

The large attenuation range capability allows to adapt to any set-up with a single instrument.

▪ **Real Time & Easy Operation.**

The platform user-friendly interface allows real time adjustment of the attenuation.

Each module attenuation could be read at any time on the Osics front panel.

▪ **Low Return Loss.**

There is no more need to use additional optical isolator before the attenuator to avoid perturbations to your lasers stability thanks to the low return loss of Osics ATN.

▪ **single slot module inside the Osics platform.**

User will benefit of all Osics platform capabilities: remote commands, ability to host up to 8 modules including DFBs, high performances tunable laser sources, optical switches...etc

	Osics ATN-HP	Osics ATN-HP / M
Wavelength Range	1250 -1650 nm	1400 -1650 nm
Attenuation Range	Up to 60 dB	
Calibrated Range	Up to 40 dB @ 1300 and 1550 nm	Up to 40 dB @1550 and 1625 nm
Attenuation accuracy (typ.) *1	±0.3 dB	
Insertion Loss	< 2 dB (1 dB typ.)	
Attenuation Setting Resolution	0.1 dB	
Polarisation Dependent Loss *2	< 0.1 dB	
Return Loss	> 60 dB	
Maximum Input Power	2 W (+33 dBm)	
Optical connectors *3	FC-APC on SMF-28	FC-APC on PMF SM15

*1 : inside calibrated range.

*2 : Total PDL including both FC-APC connectors.

*3 : For PM version, PER is 20 dB

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OSICS BKR - Variable Reflector

The BKR module integrates a variable reflector that could be set from 2.5 to 60 dB and operates throughout a large wavelength range.

The Osics BKR emulates reflectance that normally occurs from all optical interfaces within fiber optic systems. It will be the perfect tool in R&D to test prototypes and see how its operation is affected by undesired backreflection. It could also be used in large PON/WDM test-bed to stress the system.



Key Parameters

- **55 dB reflection range with 0.1 dB resolution.**

The large reflection range capability allows to adapt to any set-up with a single instrument.

- **Real Time & Easy Operation.**

The platform user-friendly interface allows real time adjustment of the reflectance.

Each module reflectance could be read at any time on the Osics front panel.

- **single slot module inside the Osics platform.**

User will benefit of all Osics platform capabilities: remote commands, ability to host up to 8 modules including DFBs, high performances tunable laser sources, optical switches...etc

Applications

- **Simulation of cumulated fiber reflection (PON, WDM systems).**

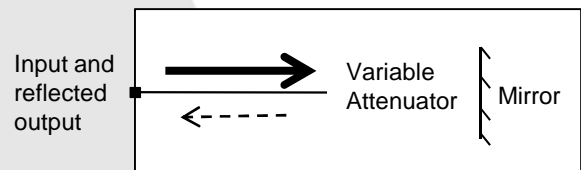
The large reflection range capability allows to adapt to any set-up with a single instrument.

- **Component testing (transmitters, receivers, laser diode, isolator...)**

Used with a Bit Error Rate Tester, it allows testing return loss sensitivity of individual components.

- **Laser development and production.**

- **OTDR testing.**



Osics BKR Module Principle

	Osics BKR
Wavelength Range	1250-1650 nm
Reflectance Range	Up to to 55 dB
Calibrated Range	Up to 40 dB @ 1300 and 1550 nm
Reflectance Accuracy (typ.)*¹	± 0.3 dB
Insertion Loss	< 4 dB (3 dB typ.)
Attenuation Setting Resolution*²	0.02 dB
Polarisation Dependent Loss	0.2 dB
Speed	0.1 second / 3 dB (typ.)
Maximum Input Power	0.2 W (+23 dBm)
Optical connectors	FC-APC on SMF-28

All specifications are tested at 23°C +/- 2°C; optic al connector included.

*1 : inside calibrated range and up to 35 dB.

*2 : from 1 to 10 dB, 0,1 dB for 10 to 40dB.

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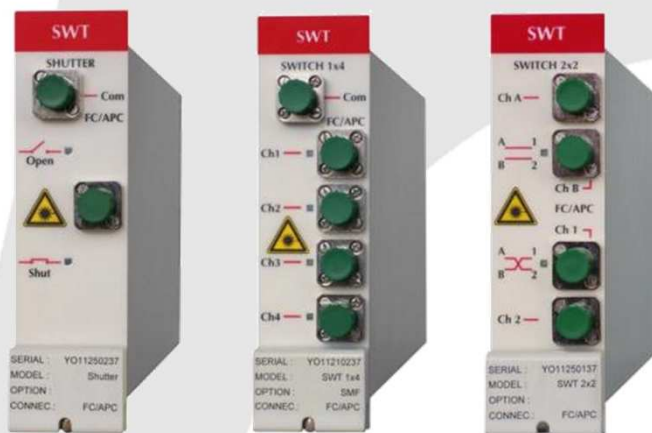
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OSICS SWT– Optical Switch and Shutter

OSICS SWT is a full suite of fiber optic switch and shutter modules based on optical prism technology. These modules are perfect modules for use in laboratory or manufacturing environment to automate test set-ups and reduce measurement uncertainties due to optical connections.

Key Parameters

- **Low Insertion and Polarization Dependent Loss.**
- **Excellent Reproducibility.**
- **High optical isolation.**
- **Ultra low back reflection: down to 65 dB.**
- **Broad Spectral range.**
- **Short switch time : <30 ms.**
- **Single slot module inside the Osics platform.**



	Single Mode Fiber	Polarization Maintaining
Available Configuration	1x1 1x2 1x4 2x2	1x1 1x2 1x4
Spectral range (nm)	1260-1630	1480-1630
Insertion loss *1, *2	< 1 dB	< 1.5 dB
Polarization dependence loss *1	PDL < 0.1 dB	PER > 20 dB
Repeatability *2	≤ 0.005 dB	≤ 0.01 dB
Return loss *1	> 65 dB	> 55 dB
On/off ratio (1x1 Shutter Only)	> 80 dB	
Crosstalk *2	> 55 dB	
Switching time	30 ms typ.	
Guaranteed lifetime (number of cycle)	> 10 ⁸	
Input/output fiber type	SMF-28 fiber	PMF, SM15
Connection type	FC/APC Narrow key	
Remote communications port IEEE-488.2	Yes (on back panel of mainframe)	
Remote communications port RS-232 C	Yes (on back panel of mainframe)	
Dimensions W x H x D	35 x 128 x 230 mm ³ (1.4x5.0x9.0 in ³)	
Weight	1 kg (2.21 lb)	
Temperature operating range	15 - 35°C	

*1 : Typical values including connectors. Maximum insertion loss is 1,4 dB for SMF and 2,0 dB for PMF.

*2 : On the whole wavelength range.

Ordering Information

Single Mode Fiber:

- Osics SWT-1x1 : Optical Shutter
- Osics SWT- 1x2 : Optical Switch 1x2
- Osics SWT- 1x4 : Optical Switch 1x4
- Osics SWT- 2x2 : Optical Swithc 2x2

Polarisation Maintening Fiber :

- Osics SWT-1x1-PM: Optical Shutter, PM option
- Osics SWT-1x2-PM : Optical Switch 1x2, PM option
- Osics SWT-1x4-PM : Optical Switch 1x4, PM option



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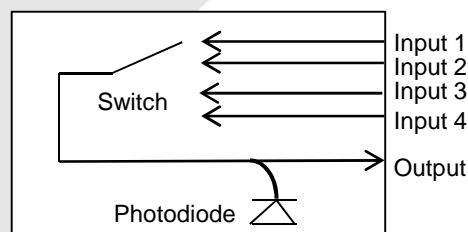
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OSICS SWT APC– Optical Switch with Automatic Power Control

OSICS SWT is a convenient sequential optical switch module that comes in a 1x2 or 1x4 configuration (1 common input/output channel and 2 or 4 output/input channels to choose from).

This module is fully bi-directional. It may be used in various setup types, for instance:

- **In a common configuration**, it allows you to direct a laser signal from the common input to either output channels.
- **In a reverse configuration**, you can direct one of the input channels to the common output channel.
- **In an Osics ECL driver configuration**, you can pilot from 1 to 4 ECL with the Osics SWT GUI. The Automatic Power Control automatically adjusts the output power of the input laser so you can get out of the switch the exact selected power by compensating any loss due to connection between laser and switch.



Osics SWT- APC Module Principle

Spectral range (nm)	1250-1650 nm
Insertion loss *1, *2	< 1.5 dB
Polarization dependence loss (PDL) *1, *3	< 0.1 dB
Repeatability *2, *4	± 0.02 dB
Return loss *1	54 dB
Crosstalk *2	- 50 dB
Optical input/output connectors (module front panel)	FC/APC
Automatic Power Control	Yes (with Osics ECL)
Input/output fiber type	Corguide™ SMF-28 fiber
Connection type	FC/APC wide key
Synchronization	BNC connector N2: 50 ms TTL pulses
Remote communications port IEEE-488.2	Yes (on back panel of mainframe)
Remote communications port RS-232 C	Yes (on back panel of mainframe)
Dimensions W x H x D	35 x 128 x 230 mm3 (1.4x5.0x9.0 in3)
Weight	1 kg (2.21 lb)
Temperature operating range	15 - 35°C

*1 : Including connectors.

*2 : On the whole wavelength range.

*3 : At 1550 nm.

*4 : At constant temperature, over 100 successive cycles.

Ordering Information

Osics SWT 1x2 : 1 per 2 Optical Switch with Automatic Power control
Osics SWT 1x4 : 1 per 4 Optical Switch with Automatic Power control

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