Optical Engines

opnext

WE *light* IT UP

Opnext Lights It Up

Opnext (NASDAQ: OPXT) is paving the way to a future of exciting laser developments and groundbreaking applications. Our industry heritage, future-focused thinking and deep commitment to research and development help us anticipate and meet the needs of a diverse range of markets, from telecomm and datacomm to medical, and information and industry applications, to defense and security.

Established in 2000, Opnext was created from the resources of the Fiber Optic Components Business Unit at Hitachi. We have continued to build on three decades of advanced Hitachi technology, establishing our own broad portfolio of solutions.

Technology

Opnext technologies represent the leading edge of product development in the marketplace today. Our optical engines are the core of an extensive portfolio of solutions for use throughout the network, including active optical components, lasers, transceivers, transponders and subsystems. Our solutions are backed by a strong and dedicated R&D program and the confidence that comes with proven experience and application success.

Research and Development

Opnext technology leads the industry and is well regarded in our many markets because we anticipate and meet our customer's needs for best-quality components and innovative applications at economical prices. We continue to expand our existing product line with the full support of Hitachi's R&D efforts, including the Central Research Laboratory (CRL), Mechanical Engineering Research Laboratory (MERL), and Production Engineering Research Laboratory (PERL).

Service

The high capacity networks of today and tomorrow call for significant cost and power reduction and increased performance and reliability. Opnext combines our laser technology with the optical packaging platforms needed to meet industry MSA standards, and add comprehensive engineering resources, for solutions that exceed expectations.

Our dedication and talent has earned us a reputation for excellence in all we do. Opnext engineers work hand-in-hand with customers, tailoring our solutions to every applications' specifications. Our focus on service extends from the first meeting through to final delivery — we are truly committed.

The dedication of Opnext professionals has helped us earn several accolades including being selected as "Cisco Technology Supplier of the Year," as the Top Optical Component Supplier by Ovum-RHK, and being selected for multiple annual Supplier Performance Awards by CIENA. Lightwave Magazine, the only publication serving the fiber optic communication industry worldwide, named Opnext one of its Top Five component suppliers for two consecutive years.

Opnext was established with a commitment to quality. Today, and into the future, you'll find evidence of that commitment in our relationships with our customers, communities and peers and in every solution we deliver.

Let Opnext bring new light to your applications. Visit www.opnext.com or contact us by calling 732-544-3400.

Featured Products

Extending our high speed portfolio is the **40G Duo-Binary and Differential Phase Shift Keying 300-pin LR Transponder** for Regional and Long Haul applications.
Available.

Used in metro and long haul DWDM applications, the Opnext **Widely Tunable, standard and dispersion robust LFF 300-pin Transponders** offer customers ease of configuration during installation and improves inventory management. Coming soon are the SFF and XFP-E full tunable modules.

System flexibility and configurability are additionally enhanced by the Opnext X-module family of products which leverages the XMD common TOSA platform for **300-pin**, **XENPAK**, **X2**, **XPAK**, **XFP, and SFP+** modules in support of 1.3µm and 1.5µm applications. Available.

For cost effective 10GbE applications, Opnext has the full suite of **LRM** modules. These 1.3um based modules are offered in all form factors including X2, XENPAK, and SFP+.

Leveraging our proven EA-DFB laser technology, Opnext has developed low power and wide temperature operation **1.5µm XFP** with demonstrated performance and quality.

Utilizing our extensive experience with laser and transceiver design we've enhanced **850nm** based modules such as our **10GBASE-SR XENPAK, X2, XFP,** and **SFP+** modules providing reliable solution for mission critical data center applications.

Proliferating the advantages of pluggable modules in metro applications, the **Opnext Long Reach TDM and DWDM modules** are available in both the XENPAK, X2, and XFP form factors. These modules utilize the MSA standard XMD TOSA following the common platform theme.

Accelerating the shift from discrete solution to integrated transceivers is enabled by Opnext's Multi-ratio (1G-2.7G) **DWDM SFP** modules available with <1W power consumption in 120km and 200km reach.

40G, 300-pin Form Factor

Package	Data Rate	Function	Part Number	Reach	Availability
300-Pin	40 Gbit/s	16 ch MUX/DEMUX with Jitter Filter	TRV7B10xN 1.55 µm ILM / PIN-PD	< 2 km VSR2000-3R2 (ITU-T G.693)	Available
			TRV7B11xN 1.55 µm ILM / PIN-PD	< 2km VSR2000-3R2 (ITU-T G.693)	Available
			TRV7BA0xN 1.55 µm Tunable LD+MZ / PIN-PD	DWDM, 50 GHz Wide dispersion tolerance +/-150 ps/nm	Sampling
			TRV7BB0xN 1.55 µm Tunable LD+MZ / DLI-BPD	DWDM, 50 GHz DPSK Modulation	Under Development

Features

- Laser Class 1
- Transmission length: 2 km (VSR2000-3R2)
- Wide Dispersion Tolerance with Full-C band Tunable Type Available (TRV7BA0 type)
- Operation Case Temperature: 0 to 70°C
- Low Power Consumption
- OIF SFI-5 Electrical Interface
- MSA I2C Edition 4 Management Interface
- 300-pin MSA Package: 5″ x 7″ x 0.7″

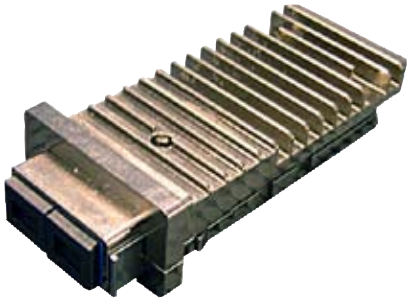
Applications

- OC-768 and STM-256 short reach / DWDM
- Metropolitan area network
- IP router and ATM core switch
- OADM
- High-speed data communications

Part Number	Data Rate (Gbit/s)	Wavelength (nm)	Operating Temp. (°C)	Output Power (dBm)	Extinction Ratio (dB)	Received Power (dBm)	Electrical I/F	Power Supply (v)	Power Consumption Typcial (W)	Reach	Dimensions	Remarks
TRV7B10xN	40 43	1,550	0 to 70	0 to +3	>8.2	-6 to +3	CML (SFI-5)	+5, +1.8 +3.3 -5.2	16	<2km VSR2000-3R2 (ITU-T G693)	127 x 177 x 17.8 mm 5 x 7 x 0.7″ (w/Fin) 5 x 7 x 0.54″ (flat top)	I2C, Jitter Filter
TRV7B11xN	40 43	1,550	0 to 70	0 to +3	>8.2	-6 to +3	CML (SFI-5)	+5, +1.8 +3.3 -5.2	16	<2km VSR2000-3R2 (ITU-T G693)	127 x 152 x 15.4 mm 5 x 6 x 0.61″ (flat top)	I2C, Jitter Filter
TRV7BA0xN	43	1,550	0 to 70	+1 min. +4 typ.	>9	0 to +7	CML (SFI-5)	+5, +1.8 +3.3 -5.2	18	DWDM with full C-band Tunable, 50 GHz, Wide Dispersion Tolerance +/- 150 ps/nm	127 x 177 x 17.8 mm 5 x 7 x 0.7″ (flat top)	I2C, Jitter Filter
TRV7BB0xN	43	1,550	0 to 70	+4 to +7	TBD	TBD	CML (SFI-5)	+5, +1.8 +3.3 -5.2	21	DWDM with full C-Band Tunable, 50GHz, DPSK Modulation	127 x 177 x 17.8 mm 5 x 7 x 0.7″ (flat top)	I2C, Jitter Filter

X2 Form Factor

Package	Data Rate	Interface	Part Number	Reach	Availability
X2	10 Gbit/s	XAUI	TRTC010EN Electrical	≤20 m CX4 10 GbE	Available
			TRT5001EN 1.3 µm uncooled DM/PIN-PD	≤220m*1, LRM, 10GbE	Available
			TRT5041EN 4 x 1.3 µm uncooled DFB/PIN-PD	≤300 m*1, LX4, 10 GbE	Available
			TRT200xEN 0.85 µm uncooled VCSEL/PIN-PD	≤300 m*2, SR, 10 GbE	Available
			TRT502xEN 1.3 µm uncooled DFB/PIN-PD	≤10 km, LR, 10 GbE	Available
			TRT705xEN 1.55 µm cooled EA-DFB/PIN-PD	≤40 km, ER, 10 GbE	Available
			TRT7063EN 1.55 µm cooled EA-DFB/APD	≤80 km, ZR, 10 GbE	Sampling



Features

- Laser Class 1
- MSA compliant
- VCSEL, DFB or EA-DFB transmitter
- PIN-PD or APD with CDR
- IEEE 802.3ae,aq compliant electrical interface
- Alarms, controls and performance monitoring functions

Applications

- Metropolitan area network
- Building vertical riser
- Inter and Intra Campus
- Data Centers

Part Number	Data Rate (Gbit/s)	Wavelength (nm)	Operating Temperature (°C)	Output Power (dBm)	Extinction Ratio (dB)	Received Power (dBm)	Electrical I/F	Power Supply (v)	Power Consumption (W)	Reach	Dimensions
TRTC010EN	10.3	-	-5 to 70	-	-	-	XAUI	+5 +3.3 APS	<3.0	≤20 m CX4 10GbE	91 x36 x 13.46 mm 3.58 x 1.42 x 0.53"
TRT5001EN	10.3	1,310	0 to 70	>-4.5*3	>3.5	-6.5*4	XAUI	+5 +3.3 APS	<4.0	≤220m*1, LRM, 10GbE	91 x36 x 13.46 mm 3.58 x 1.42 x 0.53"
TRT5041EN	10.3	1,275 1,300 1,325 1,349	0 to 70	>-6.75*3	>3.5	-14.25*4	XAUI	+5 +3.3 APS	<4.0	≤300 m*1 LX4 10GbE	91 x36 x 13.46 mm 3.58 x 1.42 x 0.53"
TRT200xEN	10.3	850	0 to 70	>-4.3*3	>3	-7.5*4	XAUI	+3.3 APS	<4.0	≤300 m*2 SR 10GbE	91 x36 x 13.46 mm 3.58 x 1.42 x 0.53"
TRT502xEN	10.3	1,310	0 to 70	>-5.2*3	>3.5	-10.3*4	XAUI	+3.3 APS	<4.0	≤10 km LR 10GbE	91 x36 x 13.46 mm 3.58 x 1.42 x 0.53"
TRT705xEN	10.3	1,550	0 to 70	>-1.7*3	>3	-11.3*4	XAUI	+5 +3.3 APS	<4.0	≤40 km ER 10GbE	91 x36 x 13.46 mm 3.58 x 1.42 x 0.53"
TRT7063EN	10.3	1,550	0 to 70	>0	>8.2	-24	XAUI	+5 +3.3 APS	<4.0	≤80 km ZR 10GbE	91 x36 x 13.46 mm 3.58 x 1.42 x 0.53"

1This solution applies to FDDI grade 62.5 µm multimode fiber with a worst case modal bandwidth-distance product of 500 MHz·km
2This solution applies to high bandwidth 50 µm multimode fiber with a minimum modal bandwidth of 2,000 MHz·km
3This value is in Optical Modulation Amplitude (OMA)
4Stressed sensitivity value is in Optical Modulation Amplitude (OMA)

XENPAK Form Factor

Package	Data Rate	Interface	Part Number	Reach	Availability
XENPAK	10 Gbit/s	XAUI	TREC010EN Electrical	≤20 m CX4 10 GbE	Available
			TRE5001EN 1.3 µm uncooled DM/PIN-PD	≤220m*1, LRM, 10GbE	Available
			TRE5041EN 4 x 1.3 µm uncooled DFB/PIN-PD	≤300 m*1, LX4, 10 GbE	Available
			TRE200xEN 0.85 µm uncooled VCSEL/PIN-PD	≤300 m*2, SR, 10 GbE	Available
			TRE502xEN 1.3 µm uncooled DFB/PIN-PD	≤10 km, LR, 10 GbE	Available
			TRE705xEN 1.55 µm cooled EA-DFB/PIN-PD	≤40 km, ER, 10 GbE	Available
			TRE7062EN 1.55 µm cooled EA-DFB/APD	≤80 km, ZR, 10 GbE	Available
			TRE7062ENxxx 1.55 µm cooled EA-DFB/APD	≤80 km DWDM 10 GbE	Available

Features

- Laser Class 1
- MSA compliant
- VCSEL, DFB or EA-DFB transmitter
- PIN-PD or APD with CDR
- IEEE 802.3ae,aq compliant electrical interface
- Alarms, controls and performance monitoring functions

Applications

- 10 Gbit/s Ethernet
- OADM
- Metropolitan area network
- Building vertical riser
- Inter and Intra Campus
- Data Centers

Part Number	Data Rate (Gbit/s)	Wavelength (nm)	Operating Temperature (°C)	Output Power (dBm)	Extinction Ratio (dB)	Received Power (dBm)	Electrical I/F	Power Supply (v)	Power Consumption (W)	Reach	Dimensions
TREC010EN	10.3	-	-5 to 70	-	-	-	XAUI	+5 +3.3 APS	<3.0	≤20 m CX4 10GbE	121 x36 x 17.4 mm 4.76 x 1.42 x 0.68″
TRE5001EN	10.3	1,310	0 to 70	>-4.5*3	>3.5	-6.5*4	XAUI	+5 +3.3 APS	<4.0	≤220m*1, LRM, 10GbE	121 x36 x 17.4 mm 4.76 x 1.42 x 0.68″3
TRE5041EN	10.3	1,275 1,300 1,325 1,349	0 to 70	>-6.75*3	>3.5	-14.25*4	XAUI	+5 +3.3 APS	<6.0	≤300 m*1 LX4 10 GbE	121 x36 x 17.4 mm 4.76 x 1.42 x 0.68″
TRE200xEN	10.3	850	0 to 70	>-4.3*3	>3	-7.5*4	XAUI	+3.3 APS	<4.0	≤300 m*2 SR 10 GbE	121 x36 x 17.4 mm 4.76 x 1.42 x 0.68″
TRE502xEN	10.3	1,310	0 to 70	>-5.2*3	>3.5	-10.3*4	XAUI	+3.3 APS	<4.0	≤10 km LR 10 GbE	121 x36 x 17.4 mm 4.76 x 1.42 x 0.68″
TRE705xEN	10.3	1,550	0 to 70	>-1.7*3	>3	-11.3*4	XAUI	+5 +3.3 APS	<9.0	≤40 km ER 10 GbE	121 x36 x 17.4 mm 4.76 x 1.42 x 0.68″
TRE7062EN	10.3	1,550	0 to 70	>0	>8.2	-24	XAUI	+5 +3.3 APS	<9.0	≤80 km ZR 10 GbE	121 x36 x 17.4 mm 4.76 x 1.42 x 0.68″
TRE7062ENxxx	10.3	1,530 to 1,560	0 to 70	>-1	>8.2	-24	XAUI	+5 +3.3 APS	<9.0	≤80km DWDM 100GHz	121 x36 x 17.4 mm 4.76 x 1.42 x 0.68″

1This solution applies to FDDI grade 62.5 µm multimode fiber with a worst case modal bandwidth-distance product of 500 MHz•km
2This solution applies to high bandwidth 50 µm multimode fiber with a minimum modal bandwidth of 2,000 MHz•km
3This value is in Optical Modulation Amplitude (OMA)
4Stressed Sensitivity value is in Optical Modulation Amplitude (OMA)

XFP Form Factor

Package	Data Rate / Application	Part Number	Reach	Availability
XFP	10 Gbit/s	TRF2001xN-GA000 0.85 µm uncooled VCSEL/PIN-PD	≤300 m*1 10GBASE-S (10GbE) 1200-MX-SN-I (10GFC)	Available
		TRF5013xN-GA000 TRF5012xH-LA000 1.3 µm uncooled DFB/PIN-PD	≤2 km / 7 km I64.1/SR-1 ≤10 km 10GBASE-L (10GbE) 1200-SM-LL-L (10GFC)	Available
		TRF5022ES-LA000 TRF5023EN-GA000† TRF5022EH-LA000 1.3 µm uncooled DFB/PIN-PD	≤10 km 10GBASE-L (10GbE) 1200-SM-LL-L (10GFC)	†Sampling Available
		TRF7052xN-GA000 TRF7052xE-GA000 1.55 µm ILM/PIN-PD	≤40 km S64.2b/IR-2 10GBASE-E (10GbE)	Available
		TRF7061xN-LF00x 1.55 µm ILM/APD	≤80 km G959.1/P1L1-2D2	Sampling

Features

- Laser Class 1
- XFP MSA compliant
- 1310nm DFB-LD or 1550nm ILM TOSA
- PIN-PD or APD ROSA
- 10G Serial Electrical I/F (XFI)
- I2C Management Interface

Applications

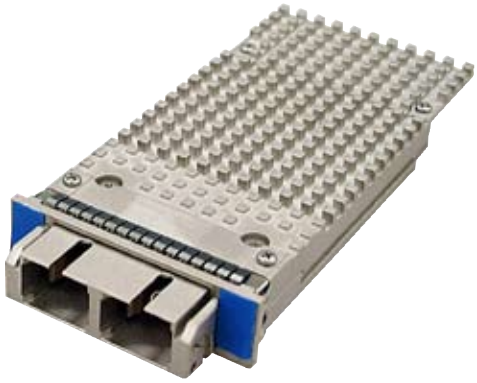
- OC-192 and STM-64 add/drop multiplexers
- Storage Area Network
- High-speed data Communications
- IP router ATM core switch
- Metropolitan transmission

Part Number	Data Rate (Gbit/s)	Wavelength (nm)	Operating Temperature (°C)	Output Power (dBm)	Extinction Ratio (dB)	Received Power (dBm)	Electrical I/F	Power Supply (v)	Power Consumption (W)	Reach	Dimensions
TRF2001xN-GA000	10.3, 10.5 11.1(*5) 11.3(*5)	850	0 to 70	>-4.3*2	>3	-7.5*3	XFI	+3.3	<1.5	≤300m*1 10GBASE-S(10GbE) 1200-MX-SN-I (10GFC)	18.35 x 78.0 x 8.5 mm3
TRF5013xN-GA000	10, 10.3 10.5,10.7 11.1, 11.3	1,310	-5 to 75	-6 to -1	>6	-11 or -10.3*3 to 0.5	XFI	+3.3	<2.0	≤2 km / 7 km I64.1/SR-1 <10 km 10GBASE-L(10 GbE) 1200-SM-LL-L(10 GFC)	18.35 x 78.0 x 8.5 mm3
TRF5012xH-LA000 (*4)	10, 10.3 10.5, 10.7 11.1	1,310	-5 to 85	-6 to -1	>6	-11 or -10.3*3 to 0.5	XFI	+3.3	<2.0	≤2 km / 7 km I64.1/SR-1 <10 km 10GBASE-L(10 GbE) 1200-SM-LL-L(10 GFC)	18.35 x 78.0 x 8.5 mm3
TRF5022ES-LA000 TRF5023EN-GA0000	10.3, 10.5 11.1	1,310	-5 to 75	-5.2*2 to 0.5	>3.5	-10.3*3 to 0.5	XFI	+3.3	<2.0	≤10 km 10GBASE-L(10GbE) 1200-SM-LL-L(10GFC)	18.35 x 78.0 x 8.5 mm3
TRF5022EH-LA000	10.3, 10.5 11.1	1,310	-5 to 85	-5.2*2 to 0.5	>3.5	-10.3*3 to 0.5	XFI	+3.3	<2.0	≤10 km 10GBASE-L(10GbE) 1200-SM-LL-L(10GFC)	18.35 x 78.0 x 8.5 mm3
TRF7052xN-GA000(*4)	10, 10.3 10.7, 11.1 11.3(*6)	1,550	-5 to 70	-1 to 2	>8.2	-14 or -11.3*3 to -1	XFI	+3.3 +5	<3.5	≤40 km S64.2b/IR-2 10GBASE-E(10GbE)	18.35 x 78.0 x 8.5 mm3
TRF7052xE-GA000	10, 10.3, 10.7, 11.1, 11.3 (*6)	1,550	-5 to 85	-1 to 2	>8.2	-14 or -11.3*3 to -1	XFI	+3.3 +5	<3.5	≤40 km S64.2b/IR-2 10GBASE-E(10GbE)	18.35 x 78.0 x 8.5 mm3
TRF7061xN-LF00x(*4)	10, 10.3 10.7, 11.1	1,550	-5 to 70	0 to +4	>9.0	-24 to -7	XFI	+3.3 +5	<3.5	≤80 km G959.1/P1L1-2D2	18.35 x 78.0 x 8.5 mm3

*1: This solution applies to high bandwidth 50µm multimode fiber with a minimum modal bandwidth of 2,000 MHz km
*2: OMA: Optical Modulation Amplitude
*3: Stressed receiver sensitivity in OMA
*4: x: B: Does not support 10.7 Gbit/s, F: Supports 10.7 Gbit/s
*5: E: Does not support 11.1 Gbit/s and 11.3 Gbit/s, F: Supports 11.1 Gbit/s and 11.3 Gbit/s
*6: 11.3 Gbit/s data rate is only supported by TRF7052, TRF7051 supports up to 11.1 Gbit/s

XPAK Form Factor

Package	Data Rate	Interface	Part Number	Reach	Availability
XPAK	10 Gbit/s	XAUI	TRP2004EN-LL	≤300 m (*1) 10GBASE-SR	Available
			TRP5024EN-SL	≤10 km 10GBASE-LR	Available



Features

- Laser Class 1
- MSA compliant
- VCSEL, DFB or EA-DFB transmitter
- PIN-PD or APD with CDR
- IEEE 802.3ae compliant electrical interface
- Alarms, controls and performance monitoring functions

Applications

- 10 Gbit/s Ethernet
- Building vertical riser
- Inter and Intra Campus
- Data Centers
- Storage Network

Part Number	Data Rate (Gbit/s)	Wavelength (nm)	Operating Temperature (°C)	Output Power (dBm)	Extinction Ratio (dB)	Received Power (dBm)	Electrical I/F	Power Supply (v)	Power Consumption (W)	Reach	Dimensions
TRP2004EN-LL	10.3	850	0 to 70	>-4.3 (*2)	>3	-7.5 (*3)	XAUI	+3.3 APS	<4.0	≤300 m (*1) 10GBASE-SR	86 x 36 x 9.8 mm 3.39 x 1.42 x 0.39″
TRP5024EN-SL	10.3	1,310	0 to 70	>-5.2 (*2)	>3.5	-10.3 (*3)	XAUI	+3.3 APS	<4.0	≤10 km 10GBASE-LR	86 x 36 x 9.8 mm 3.39 x 1.42 x 0.39″

*1: This solution applies to high bandwidth 50 µm multimode fiber with a minimum model bandwidth of 2,000 MHz•km
*2: This value is in optical modulation amplitude (OMA)
*3: Stressed sensitivity value is Optical modulation amplitude (OMA)

SFP+ Form Factor

Package	Data Rate	Interface	Part Number	Reach	Availability
SFP+	8 Gbit/s	SFI	TRS2200SW 850nm VCSEL PIN-PD	≤150 m (*1) SW	Available
		SFI	TRS5220SM 1310nm DFB PIN-PD	≤10 km LW	Available
	10 Gbit/s	SFI	TRS20A0EN 850nm VCSEL PIN-PD	≤100 m (*2) 10GbE USR*	Available
			TRS200xEN 850nm VCSEL PIN-PD	≤300 m (*2) 10GBASE-SR	Available
			TRS5001EN 1310nm DFB PIN-PD	≤220 m (*3) 10GBASE-LRM	Sampling
			TRS502xEN 1310nm DFB PIN-PD	≤10 km 10GBASE-LR	Available
			TRS705xEN 1550nm uncooled EA-DFB/PIN-PD	≤40 km 10GBASE-ER	Under Development

Features

- Laser Class 1
- SFP+ MSA compliant
- 10G Serial Framer I/F (SFI)
- I2C Management Interface
- <1W Power Consumption

Applications

- Rack to rack
- Data Centers
- Premise
- Metro
- Switches and Routers

Part Number	Data Rate (Gbit/s)	Wavelength (nm)	Operating Temperature (°C)	Output Power (dBm)	Extinction Ratio (dB)	Received Power (dBm)	Electrical I/F	Power Supply (v)	Power Consumption (W)	Reach	Dimensions
TRS2200SM	8.5	850	-5 to 85	>-5.2 (*4)	-	>-8.2 (*5)	SFI	+3.3	1.0	≤50 m (*1) SW	56.5 x 13.9 x 11.85 mm 2.22 x 0.55 x 0.47″
TRS5220SM	8.5	1310	-5 to 85	> -5.4 (*4)	3.5	-13.8 (*6)	SFI	+3.3	1.0	≤10 km	56.5 x 13.9 x 11.85 mm 2.22 x 0.55 x 0.47″
TRS20A0EN	10.3	850	0 to 70	>-5.2 (*4)	>3	>-6.6 (*5)	SFI	+3.3	1.0	≤100 m (*2) 10GbE USR	56.5 x 13.9 x 11.85 mm 2.22 x 0.55 x 0.47″
TRS200xEN	10.3	850	0 to 70	>-4.3 (*4)	>3	>-7.5 (*5)	SFI	+3.3	1.0	≤300 m (*2) 10GBASE-SR	56.5 x 13.9 x 11.85 mm 2.22 x 0.55 x 0.47″
TRS5001EN	10.3	1,310	0 to 70	>-4.5 (*4)	>3.5	>-6.5 (*5)	SFI	+3.3	1.0	≤220 m (*3) 10GBASE-LRM	56.5 x 13.9 x 11.85 mm 2.22 x 0.55 x 0.47″
TRS502xEN	10.3	1,310	0 to 70	>-5.2 (*4)	>3.5	>-10.3 (*5)	SFI	+3.3	1.0	≤10 km 10GBASE-LR	56.5 x 13.9 x 11.85 mm 2.22 x 0.55 x 0.47″
TRS705xEN	10.3	1,550	0 to 70	>-1.7 (*4)	>3	>-11.3 (*5)	SFI	+3.3	1.5	≤40 km 10GBASE-ER	56.5 x 13.9 x 11.85 mm 2.22 x 0.55 x 0.47″

* 10GbE USR is not an IEEE standard. Specification is subject to change.
*1: This distance applies to OM2 multimode fiber
*2: This solution applies to high bandwidth 50µm multimode fiber with a minimum modal bandwidth of 2000MHz • km
*3: This solution applies to FDDI grade 62.5µm multimode fiber with a worst case modal bandwidth-distance product of 500MHz • km
*4: This value is in Optical Modulation Amplitude (OMA)
*5: Stressed sensitivity value is in OMA
*6 Unstressed Sensitivity value is in OMA

10G, 300-pin Form Factor

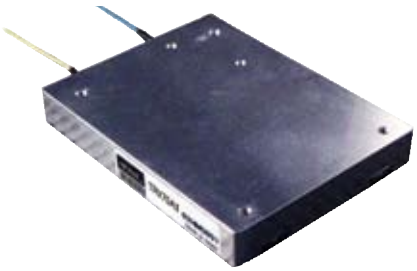
Package / Data Rate	Function	Size	Part Number	Reach	Availability
300-Pin 10 Gbit/s	16 ch MUX/DEMUX	55.9 x 76.2 x 13.5 mm 2.2 x 3.0 x 0.53"	TRV5019BS* 1.3 µm uncooled DFB/PIN-PD	< 2 km / 7 km I64.1/ SR-1 (GR-253)	Available
			TRV5029BS*/ZS* 1.3 µm uncooled DFB/PIN-PD	<12 km SR-1(GR-1377)	Available
			TRV5029EN* 1.3 µm uncooled DFB/PIN-PD	10 km 10GBASE-LR (10GbE)	Available
			TRV5029EZ* 1.3 µm uncooled DFB/PIN-PD	< 2 km / 7 km, 10 km I64.1 / SR-1 (GR-253) 10GBASE-LR (10GbE)	Available
			TRV5039BS* 1.3 µm uncooled DFB/PIN-PD	< 20 km S64.1 / IR-1	Available
			TRV5018BS 1.3 µm uncooled DFB/PIN-PD	< 2 km / 7 km, 10 km I64.1 / SR-1 (GR-253) 10GBASE-LR (10GbE)	Available
			TRV5028BS 1.3 µm uncooled DFB/PIN-PD	<12 km SR-1 (GR-1377)	Available
			TRV5038BS 1.3 µm uncooled DFB/PIN-PD	<20 km S64.1 / IR-1	Available
			TRV7058BN/ 7059BN*/EN* 1.55 µm ILM/PIN-PD	≤ 40 km IR-2/S-64.2b 10GbE	Available
			TRV7063xN*/7064BN 1.55 um ILM/APD	≤ 80 km LR-2/P1L1-2D2 10GbE	Available
		88.9 x 114.3 x 13.5 mm 3.5 x 4.5 x 0.53"	TRV7089xN/7080BN 1.55 µm C/L-band CW-LD+MZ/APD	DWDM, 100 GHz 1600 ps/nm	Available
			TRV708ExN*/708FBN 1.55 µm full C/L-band Tunable LD+MZ/APD	DWDM, 50 GHz 1600 ps/nm	Available
			TRV709ExN*/709FBN 1.55 µm full C/L-band Tunable LD+MZ/APD	DWDM, 50 GHz +/- 800 ps/nm	Available
			TRV709GxN*/709HBN 1.55 µm full C/L-band Tunable LD+MZ/PIN-PD	DWDM, 50 GHz +/- 800 ps/nm	Available
			TRV70A1xN*/70A2xN 1.55 µm full C/L-band Tunable LD+MZ/APD	DWDM, 50 GHz +/- 3000 ps/nm	Available

Features

- Laser Class 1
- SONET and ITU SDH compatible at OC-192 and STM-64 rates
- MSA compliant
- Short-reach, Intermediate reach, long-reach, and DWDM applications
- Available with C-band and L-band (TRV708x / TRV709x type)
- Increased dispersion tolerance (TRV70A1/A2 type)
- DFB, ILM or MZ + CW-LD transmitter
- PIN-PD or APD receiver with CDR
- Electrical interface with 16ch 622/644 Mbit/s MUX/DEMUX
- 622/644 Mbit/s LVDS data interface
- OIF, SFI4 compliant electrical interface
- Compact package with 300-pin (10x30 pin) electrical connector

Applications

- OC-192 and STM-64 short-reach and long-reach terrestrial DWDM transmission
- Metropolitan area network
- IP router and ATM core switch
- OADM
- High-speed data communications
- FEC (10.7 Gbit/s, G.709)
- 10 Gbit/s Ethernet



*: Built in Jitter Filter
**Built in VOA (Variable Optical Attenuator)
*1: OMA: Optical Modulation Amplitude
*2: Stressed receiver sensitivity in OMA
*3: +3.3V Single voltage supply is available with power consumption of 4.8W typ

Short-Reach

Part Number	Data Rate (Gbit/s)	Wavelength (nm)	Operating Temp. (°C)	Output Power (dBm)	Extinction Ratio (dB)	Received Power (dBm)	Electrical I/F	Power Supply (v)	Power Consumption (W)	Reach	Dimensions	Remarks
TRV5019BS	10 10.7	1,310	-5 to 70	-6 to -1	>6	-11 to -1	LVDS	+3.3, +1.8*3	4.3	<2 km / 7 km I64.1/SR-1 (GR-253)	55.9 x 76.2 x 13.5 mm 2.2 x 3.0 x 0.53"	I2C, Jitter Filter
TRV5029BS/ZS	10 10.7	1,310	-5 to 70	-4 to 0	>6	-12 to 0	LVDS	+3.3, +1.8*3	4.3	<12 km SR-1 (GR-1377)	55.9 x 76.2 x 13.5 mm 2.2 x 3.0 x 0.53"	I2C, Jitter Filter
TRV5029EN	10.3	1,310	-5 to 70	-5.2*1 to 0.5	>3.5	-10.3*2 to 0.5	LVDS	+3.3, +1.8*3	4.3	10 km 10GBASE-LR (10GbE)	55.9 x 76.2 x 13.5 mm 2.2 x 3.0 x 0.53"	I2C, Jitter Filter
TRV5029EZ	10 10.3	1,310	-5 to 70	-5.2*1 to -1	>6	-10.3*2 to 0.5	LVDS	+3.3, +1.8*3	4.3	<2 km / 7 km, 10 km I64.1/SR-1 (GR253) 10GBASE-LR (10GbE)	55.9 x 76.2 x 13.5 mm 2.2 x 3.0 x 0.53"	I2C, Jitter Filter
TRV5039BS	10	1,310	-5 to 70	1 to 5	>6	-12 to 0	LVDS	+3.3, +1.8*3	4.3	<20 km S64.1 / IR-1	55.9 x 76.2 x 13.5 mm 2.2 x 3.0 x 0.53"	I2C, Jitter Filter
TRV501BS	10 10.3 10.7	1,310	-5 to 70	-5.2*1 to -1	>6	-10.3*2 to 0.5	LVDS	+3.3, +1.8*3	4.3	10 km 10GBASE-LR (10GbE)	55.9 x 76.2 x 13.5 mm 2.2 x 3.0 x 0.53"	I2C
TRV5028BS	10 10.3 10.7	1,310	-5 to 70	-4 to 0	>6	-10.3*2 to 0.5	LVDS	+3.3, +1.8*3	4.3	<12 km SR-1 (GR-1377) 10GBASE-LR(10GbE)	55.9 x 76.2 x 13.5 mm 2.2 x 3.0 x 0.53"	I2C
TRV5038BS	10 10.3 10.7	1,310	-5 to 70	1 to 5	>6	-12 to 0	LVDS	+3.3, +1.8*3	4.3	<20 km S64.1 / IR-1	55.9 x 76.2 x 13.5 mm 2.2 x 3.0 x 0.53"	I2C

*1: OMA: Optical Modulation Amplitude
*2: Stressed receiver sensitivity in OMA
*3: +3.3V Single voltage supply is available with power consumption of 4.8W typ

Intermediate and Long Reach

Part Number	Data Rate (Gbit/s)	Wavelength (nm)	Operating Temperature (°C)	Output Power (dBm)	Extinction Ratio (dB)	Received Power (dBm)	Electrical I/F	Power Supply (v)	Power Consumption (W)	Reach	Dimensions
TRV7058BN TRV7059BN*/EN*	10 10.3 10.7	1,530 to 1,562	0 to 70	-1 to +2	>8.2	-14 to -1	LVDS	+3.3, -5.2	5.0	≤40 km IR-2/S-64.2b 10GbE	55.9 x 76.2 x 13.5 mm 2.2 x 3.0 x 0.53"
TRV7063xN* TRV7064BN	10 to 11.3	1,530 to 1,565	0 to 70	0 to +4	>9.0	-24 to -7	LVDS	+3.3, -5.2	5.0	≤80 km P1L1-2D2, 10GbE	55.9 x 76.2 x 13.5 mm 2.2 x 3.0 x 0.53"
TRV7089xN* TRV7080BN	10 to 11.3	1,530 to 1,565	0 to 70	+3 to +6	>10	-24 to -7	LVDS	+3.3, -5.2	typ. 6.0	1600 ps/nm DWDM, 100GHz	88.9 x 114.3 x 13.5 mm 3.5 x 4.5 x 0.53
TRV708ExN* TRV708FBN	10 to 11.3	1,528.8 to 1,563.9	0 to 70	+4 to +7	>10	-24 to -7	LVDS	+3.3, -5.2 +5.0	typ. 8.0	DWDM with full C/L-band Tunable, 50GHz, 1600 ps/nm	88.9 x 114.3 x 13.5 mm 3.5 x 4.5 x 0.53"
TRV709ExN* TRV709FBN	10 to 11.3	1,528.8 to 1,563.9	0 to 70	+4 to +7	>12	-24 to -7	LVDS	+3.3, -5.2 +5.0	typ. 8.0	DWDM with full C/L-band Tunable, 50GHz, ±800 ps/nm	88.9 x 114.3 x 13.5 mm 3.5 x 4.5 x 0.53"
TRV709GxN* TRV709HBN	10 to 11.3	1,528.8 to 1,563.9	0 to 70	+4 to +7	>12	-14 to -1	LVDS	+3.3, -5.2 +5.0	typ. 8.0	DWDM with full C/L-band Tunable, 50GHz, ±800 ps/nm	88.9 x 114.3 x 13.5 mm 3.5 x 4.5 x 0.53"
TRV70A1xN* TRV70A2xN	10 to 11.3	1,528.8 to 1,563.9	0 to 70	+4 to +7	> 7	-22 to +5**	LVDS	+3.3, -5.2 +5.0	typ. 11.0	DWDM with full C/L-band tunable 50 GHz, +/- 3000 ps/nm @ BER=1E-3	88.9 x 114.3 x 13.5 mm 3.5 x 4.5 x 0.53"

*Built-in jitter filter **Built in VOA (Variable Optical Attenuator)

SFP Form Factor

Features

- Laser Class 1
- Compliant with Small Form Factor Pluggable MSA Specification
- Compact size (13.3 x 49.8 x 9.8 mm / 0.52 x 1.95 x 0.39")
- Compliant with Industry Standard RFT Electrical Connector and Cage
- Available with either button release or bail release latching mechanism
- High-Performance and Cost-Effective
- Single +3.3V Power Supply and TTL Logic Interface
- Low Power Consumption
- Metal Package for Superior EMI Performance
- EEPROM with Serial ID Functionality
- Enhanced Monitoring Functionality
- Digital Diagnostics per SFF-8472 available
- Standard and Wide Operating Temperature Ranges

Applications

- SONET / SDH from 155 Mbit/s to 2.7 Gbit/s (OC-48, OC-12, OC-3, and STM-16, STM-4, STM-1)
- Gigabit Ethernet (GbE-SX, GbE-LX, and GbE-ZX)
- Fibre Channel (1.062/2.125/4.25 Gbit/s FC)
- Transmission distances from 150 m to 100 km
- Metropolitan and access systems
- IP routers and ATM core switches
- DWDM for Metro Area Networks

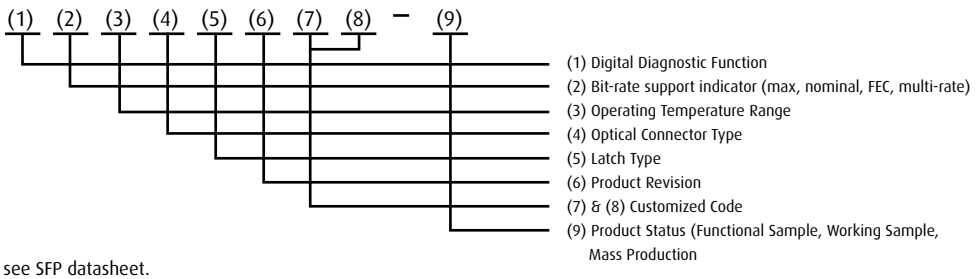
Package	Data Rate / Application	Part Number	Reach	Availability
SFP	DWDM ≤ 2.7 Gbit/s	TRF79A6 C-Band ITU Grid DFB APD	DWDM, 100 GHz 2400 ps/nm	Available
		TRF79B6 C-Band ITU Grid DFB APD	DWDM, 100 GHz 4000 ps/nm	Available
	OC-48 / STM-16	TRF591x 1310nm FP PIN-PD	<2 km SR / I-16	Available
		TRF592x 1310nm DFB PIN-PD	<15 km IR-1 / S-16.1	Available
		TRF595x 1310nm DFB APD	<40 km LR-1 / S-16.1	Available
		TRF796x 1550nm DFB APD	<80 km LR-2 / L-16.2	Available
	OC-12 / STM-4	TRF552x 1310nm FP PIN-PD	<15 km IR-1 / S-4.1	Available
		TRF555x 1310nm DFB PIN-PD	<40 km LR-1 / L-4.1	Available
		TRF756x 1550nm DFB PIN-PD	<80 km LR-2 / L-4.2	Available
		TRF758x 1550nm DFB PIN-PD	<100 km LR-2/L-4.2 Extended	Available
	OC-3 / STM-1	TRF542x 1310nm FP PIN-PD	<15 km IR-1 / S-1.1	Available
		TRF545x 1310nm FP PIN-PD	<40 km LR-2 / L-1.2	Available
		TRF746x 1550nm DFB PIN-PD	<80 km LR-2 / L-1.2	Available
		TRF748x 1550nm DFB PIN-PD	<100 km LR-2/L-4.2 Extended	Available
	GbE	TRF271x 850nm VCSEL PIN-PD	<550m SX	Available
		TRF573x 1310nm FP PIN-PD	<10 km LX	Available
		TRF776x 1550nm DFB PIN-PD	<80 km ZX	Available

x = 5: Without digital diagnostic function
x = 6: With digital diagnostic function

SFP Form Factor Cont.

Part Number	Data Rate (Gbit/s)	Wavelength (nm)	Maximum Operating Temperature (°C)	Output Power (dBm)	Reach	Extinction Ration (dB)	Received Power (dBm)	TOSA Isolator	TOSA Stub	ROSA Stub
TRF79A6	DWDM ≤2.7 Gbit/s	1,530 to 1,562	-5 to 70	0 to +4	DWDM, 100 GHz 2400 ps/nm	>8.2	-28 to -8	✓	✓	✓
TRF79B6		1,530 to 1,562	-5 to 70	0 to +4	DWDM, 100 GHz 4000 ps/nm	>8.2	-28 to -8	✓	✓	✓
TRF591x	OC-48 / STM-16	1,310	-40 to 85	-10 to -3	≤ 2 km SR / I-16	>8.2	-18 to -3		✓	✓
TRF592x		1,310	-40 to 85	-5 to 0	≤ 15 km IR-1 / S-16.1	>8.2	-18 to 0	available	✓	✓
TRF595x		1,310	-40 to 85	-2 to +3	≤ 40 km LR-1 / L-16.1	>8.2	-27 to -9	✓	✓	✓
TRF796x		1,550	-40 to 85	-2 to +3	≤ 80 km LR-2 / L-16.2	>8.2	-28 to -9	✓	✓	✓
TRF552x	OC-12 / STM-4	1,310	-40 to 85	-15 to -8	≤ 15 km IR-1 / S-1.1	>8.2	-28 to -8		✓	
TRF555x		1,310	-40 to 85	-5 to 0	≤ 40 km LR-1 / L-4.1	>10	-28 to -8		✓	
TRF756x		1,550	-40 to 85	-5 to 0	≤ 80 km LR-2 / L-4.2	>10	-28 to -8	✓	✓	✓
TRF758x		1,550	-40 to 85	-3 to +2	≤ 100 km LR-2 / L-4.2 Extended	>10	-30 to -8	✓	✓	✓
TRF542x	OC-3 / STM-1	1,310	-40 to 85	-15 to -8	≤ 15 km IR-1 / S-1.1	>8.2	-28 to -8		✓	
TRF545x		1,310	-40 to 85	-5 to 0	≤ 40 km LR-1 / L-1.1	>10	-34 to -10		✓	
TRF746x		1,550	-40 to 85	-5 to 0	≤ 80 km LR-2 / L-1.2	>10	-34 to -10	✓	✓	✓
TRF748x		1,550	-40 to 85	-3 to +2	≤ 100 km LR-2 / L-4.2 Extended	>10	-34 to -10	✓	✓	✓
TRF271x	GbE	770 to 860	-20 to 85	-9.5 to -3	≤ 550 m SX	>9	-17 to 0			
TRF573x		1,270 to 1,355	-40 to 85	-9.5 to -3	≤ 10 km LX	>9	-19 to -3			
TRF776x		1,550	-40 to 85	0 to +5	≤ 80 km ZX	>9	-24 to 0	✓	✓	✓

Product Nomenclature



For details of product nomenclature, please see SFP datasheet.

TOSA/ROSA Form Factor

Function	Data Rate	Package	Part Number	Reach	Availability
Laser Diode Modules	10 Gbit/s	LC Receptical Coax (MSA-TOSA)	LD5033 1.3μm DFB	≤10 km	Available
			LD5037 1.3μm DFB	≤10 km	Sampling
Photo Diode Modules	10 Gbit/s	MSA-ROSA	PD7056 APD-TIA	-26 dBm	Sampling

Features

Laser Diode Modules
- Uncooled operation at 1310 nm: LD5033
- MSA compliant XMD (10 Gbit/s Miniature Device): LD5033, LD5037
- -5~85 ºC Operation (LD5037)

Photo Diode Modules
- Integrated TIA (Trans Impedance Amplifier)
- High gain and high sensitivity
- MSA compliant XMD (10 Gbit/s Miniature Device): PD7006, PD7056

Applications

- Small form Transponders and Transceivers

Part Number	Data Rate (Gbit/s)	Wavelength (nm)	Operating Temperature (ºC)	Modulated Output Power (dBm)	Extinction Ration (dB)	Dispersion (ps/nm)	Penalty (dB)	Reach	Dimensions	Remarks
LD5033	10	1,290 to 1,330	0 to 75	-3 typ	>5	-	-	≤10 km	Φ5.6,L=15 mm	DM-DFB XMD-MSA
LD5037	10	1,290 to 1,330	-5 to 80	-3 typ	>5	-	-	≤10 km	Φ5.6,L=15 mm	DM-DFB (Without Thermistor)

Part Number	Data Rate (Gbit/s)	Wavelength (nm)	Operating Temperature (ºC)	Received Power (dBm)	Power Supply (v) Typical	Dimensions	Remarks
PD7056	10	1,310 to 1,550	0 to 80	-26 to -4	3.3 / 30	Φ5.35,L=14 mm	APD-TIA XMD-MSA

NOTE:
1. All specifications described herein are subject to change without prior notice.
2. To ensure safety and normal operation, be sure to read the instruction manual carefully before using the products.
3. Safety Considerations: Invisible laser radiation is emitted from the end of the fiber pigtail or optical connector of laser products and will be harmful to the human eye. Avoid looking directly into the beam during operation.

About this catalog

The Optical Engines Brochure is meant to showcase the Opnext line of modules, laser diodes and photodiodes. For more detailed information on our line of Optodevices or Subsystems, please visit the Opnext website at http://www.opnext.com or contact your nearest Opnext location or sales representative.

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