

## NetLight® NLX-Type Optical Transceivers for 10 Gigabit Serial Applications



### Features

- Multiprotocol compliant:
  - IEEE®-802.3ae 10 Gigabit Ethernet (10GBASE-L) at 10.312 Gb/s inter- and intraoffice SONET/SDH
  - 10G Fibre Channel at 10.519 Gb/s
  - OC-192/STM-64 at 9.953 Gb/s
  - FEC/G.709 rates of 10.66 Gb/s/10.709 Gb/s
- Fully compliant with specifications for XFP MSA
- Supports all links up to 80 km
- Available with cooled or uncooled laser modules
- Diagnostics capability via 2-wire interface protocol
- Hot pluggable
- Industry-standard, duplex LC optical connector
- Less than 2.5 W power dissipation
- XFI electrical interface
- Operating case temperature range: 0 °C to 70 °C

### Applications

- Telecommunications:
  - Inter- and intraoffice SONET/SDH
  - Metropolitan area networks
  - Subscriber loop
- Datacom:
  - 10G Ethernet routers
  - 10G Ethernet switches
- Storage area networks:
  - Host bus adapter
  - SCSI router
  - Channel hubs
- High-speed data communications

Note: This document is provided to help in the evaluation of samples that are under development and undergoing reliability testing. The samples described should be used only for evaluation. TriQuint reserves the rights to change specifications, features, functions, capabilities, release schedule, and prices, and to discontinue development, manufacture, or delivery.

**Table 1. Product Offering, NLX-type Optical Transceiver**

Device Code	Device Description
NLX01-AAA	10 Gb/s transceiver, 600 m reach, 1310 nm FP laser
NLX02-AAA	10 Gb/s transceiver, 2 km reach, 1310 nm DFB laser
NLX10-AAA	10 Gb/s transceiver, 10 km reach, 1310 nm DFB laser
NLX20-AAA	10 Gb/s transceiver, 20 km reach, 1310 nm DFB laser
NLX40-AAA	10 Gb/s transceiver, 40 km reach, 1550 nm EML laser
NLX80-AAA	10 Gb/s transceiver, 80 km reach, 1550 nm EML laser

## **Description**

The NLX-type optical transceiver is a high-performance, cost-effective module for 10 Gb/s serial optical data communication. The module is compliant with a multitude of protocols and bit rates, including 10 Gb/s Ethernet (10GBASE-L), SONET/SDH (including FEC and G.709 rates), and 10 Gb/s Fibre Channel. The devices are designed to incorporate both uncooled and cooled optical engines, thereby enabling reaches of very short (<600 m) to long reach (80 km) to be supported with one common foot print. The module is a hot-pluggable, duplex-LC design, compatible with the 10 Gb/s Small Form-Factor Pluggable (XFP) multi-source agreement (MSA) specifications.

The module contains a 10 Gb/s optical transmitter and a 10 Gb/s optical receiver, along with the electronics necessary to ensure both input and output signal quality. The module also allows user access to the of transceiver monitoring and configuration data via the 2-wire XFP Management Interface. The module also supports 10 GbE Ethernet rate of 10.3 Gb/s, G.709 rate of 10.709 Gb/s and FEC rate of 10.6642 Gb/s, and 10G FC rate of 10.599 Gb/s.

Electrically, the module interfaces to the XFI, high-speed serial electrical interface with a nominal baud rate of 9.95 Gb/s to 11.1 Gb/s. The electrical interface is based on a high-speed, low-voltage, ac-coupled logic with a nominal differential impedance of 100  $\Omega$ . The module is hot pluggable into the 30-pin connector. The transceiver contains circuitry for signal conditioning, enabling host board traces on standard FR4 printed-wiring boards up to 200 mm.

In the transmitting direction, the transceiver module contains either a Fabry-Perot laser for transmissions less than 600 m, a DFB (distributed-feedback) laser for transmissions from 2 km to 20 km, or a cooled EML (electroabsorptive modulated laser) for transmission up to 80 km. All sources are capable of transmitting up to 11.1 Gb/s for launching into optical fiber.

In the receiving direction, the transceiver module contains either a PIN-based receiver for shorter distances, or an APD-based receiver for longer distances up to 80 km. The receiver operates over the wavelength range of 1.1  $\mu\text{m}$  to 1.6  $\mu\text{m}$ .

## Characteristics

**Table 2. NLX-Type Optical Transceiver: Transmitter and Receiver Optical Characteristics**

Parameter	Application	Device Code	Min	Max	Unit
Average Optical Output Power <sup>1</sup> (Po)	VSR-600	NLX-01 (600 m)	−6	−1	dBm
	VSR-2000	NLX-02 (2 km)	−6	−1	
	10GBASE-L/10GFC	NLX-10 (10 km)	−4	0.5	
	S-64.1/IR-1	NLX-20 (20 km)	1	5	
	10GBASE-E	NLX-4E (40 km)	−4.7	4	
	S-64.2b/IR-2	NLX-4S (40 km)	−1	2	
	L-64.2a	NLX-80 (80 km)	−2	2	
Optical Wavelength (λ)	VSR-600	NLX-01 (600 m)	1260	1360	nm
	VSR-2000	NLX-02 (2 km)	1290	1330	
	10GBASE-L/10GFC	NLX-10 (10 km)	1260	1355	
	S-64.1/IR-1	NLX-20 (20 km)	1290	1330	
	10GBASE-E	NLX-4E (40 km)	1530	1565	
	S-64.2b/IR-2	NLX-4S (40 km)	1530	1565	
	L-64.2a	NLX-80 (80 km)	1530	1565	
Extinction Ratio (ER)	VSR-600	NLX-01 (600 m)	6	—	dB
	VSR-2000	NLX-02 (2 km)	6	—	
	10GBASE-L/10GFC	NLX-10 (10 km)	3.5 <sup>2</sup>	—	
	S-64.1/IR-1	NLX-20 (20 km)	6	—	
	10GBASE-E	NLX-4E (40 km)	3.0 <sup>2</sup>	—	
	S-64.2b/IR-2	NLX-4S (40 km)	8.2	—	
	L-64.2a	NLX-80 (80 km)	TBD	—	
Optical Modulation Amplitude (OMA)	10GBASE-L/10GFC	NLX-10 (10 km)	−5.2	—	dBm
	10GBASE-E	NLX-4E (40 km)	−1.7	—	
Receiver Sensitivity <sup>3</sup> (PRMIN)	VSR-600	NLX-01 (600 m)	−11	—	dBm
	VSR-2000	NLX-02 (2 km)	−11	—	
	10GBASE-L/10GFC	NLX-10 (10 km)	−12.6	—	
	S-64.1/IR-1	NLX-20 (20 km)	−12.6	—	
	10GBASE-E	NLX-4E (40 km)	−14.1	—	
	S-64.2b/IR-2	NLX-4S (40 km)	−14.1	—	
	L-64.2a	NLX-80 (80 km)	−21	—	
Receiver Overload	VSR-600	NLX-01 (600 m)	−1	—	dBm
	VSR-2000	NLX-02 (2km)	−1	—	
	10GBASE-L/10GFC	NLX-10 (10km)	0.5	—	
	S-64.1/IR-1	NLX-20 (20km)	−1	—	
	10GBASE-E	NLX-4E (40km)	−1	—	
	S-64.2b/IR-2	NLX-4S (40km)	−1	—	
	L-64.2a	NLX-80 (80km)	−8	—	

1. Output power definitions and measurements per ITU-T Recommendation G.691.

2. Ratio of logic 1 output power to logic 0 output power under fully modulated conditions.

3. With 1550 nm transmitter at  $1 \times 10^{-12}$  BER, 8.2 dB extinction ratio,  $2^{23} - 1$  PRBS.

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### ***Additional Information***

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