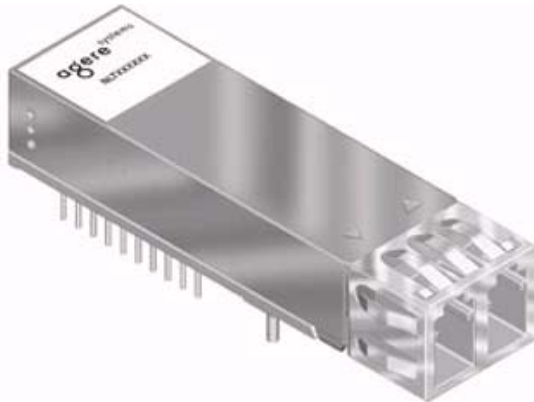


NetLight[®] SFF Transceiver NLT Series



Features

- Compliant with SONET standard GR-253-CORE and ITU standard G.957 and G.958
- Multisourced footprint:
 - 0.5 in. small form factor
 - 10-pin and 20-pin package
- 3.3 V for low power consumption
- Duplex LC receptacle
- 0.16 in. (4.05 mm) pin length
- Laser with automatic output power control
- PECL/CML data inputs/outputs
- PECL/CML clock inputs/outputs
- LVTTTL transmitter disable input
- PECL/LVTTTL signal-detect output
- –40 °C to +85 °C operating temperature range
- Telecom reliability (GR-468-CORE RT)
- Human body model ESD:
 - MIL-STD-883C Method 3012.4 >1000 V
 - IEC[®] 100-4-2 (EN61000-4-2) >15 kV
- EMC/EMI:
 - Exceeds FCC Class B and CENELEC EN 55022 Class B
 - Meets IEC 1000-4-3 (EN6111-4-3)
- Meets UL[®] 94V-0 flammability
- Wave solderable and aqueous wash compatible

Applications

Products are being developed for use in the application areas listed in Table 1.

Table 1. NLT-Series SFF Transceiver Application Overview

Parameter		Applications				
		Intraoffice	Interoffice			
			Short Haul		Long Haul	
Source Nominal Wavelength (nm)		1310	1310	1550	1310	1550
Distance (km)*		<2 (SR)	15 (IR)		40 (LR1)	80 (LR2)
STM/OC Level	STM-1/OC-3	X	X	—	X	X
	STM-4/OC-12	X	X	—	X	X
	STM-16/OC-48	X	X	—	X	X
Distance (km)*		10				
1000BASE-LX	1.25 Gbits/s	X				

* These are target distances to be used for classification and not for specification.

Description

The NLT series of *NetLight* small form-factor, pin through-hole (SFF) transceivers are the next generation of the 1417/2417 *NetLight* transceiver product line. This NLT will offer versions for single-mode fiber applications such as SDH, SONET, ATM, and Gigabit Ethernet data rate and application reaches.

The modules contain an optical transmitter and receiver and the electronics necessary to meet the

specification required for SONET/SDH/Gigabit Ethernet applications. The optical transmitter uses an uncooled, field-proven 1310 nm FP, 1310 nm DFB, or 1550 nm DFB laser and supports applications up to 80 km on single-mode fiber.

The optical receiver uses either a PIN or APD photodetector. The receivers have clock and data recovery functionality as an option.

Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operations sections of the data sheet. Exposure to absolute maximum ratings for extended periods can adversely affect device reliability.

Parameter	Symbol	Min	Max	Unit
Supply Voltage	V _{CC}	0	5	V
Operating Temperature Range	T _C	−40	85	°C
Storage Temperature Range	T _{stg}	−40	85	°C
Lead Soldering Temperature/Time	—	—	260/10	°C/s
Operating Wavelength Range	λ	1.2	1.6	μm

Transceiver Pin Information

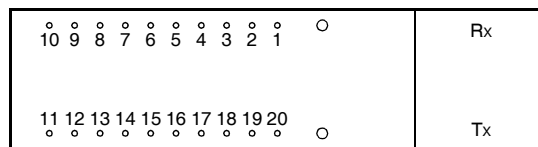


Figure 1. Transceiver 10-Pin and 20-Pin Configurations (top view)

Transceiver Optical/Electrical Characteristics, 10-pin and 20-pin Versions

Applicable standards:

- SONET GR-253-CORE/ITU G.957
- OC-3/STM-1: IR, LR1, LR2
- OC-12/STM-4: IR, LR1, LR2
- OC-48/STM-16: SR, IR, LR1, LR2
- 1000BASE-LX

Transceiver Optical/Electrical Characteristics, 10-Pin and 20-Pin Versions

(continued)

Table 2. Transmitter Optical and Electrical Characteristics (T_c = –40 °C to +85 °C, V_{CC} = 3.135 V—3.465 V)

Parameter ¹	Symbol	Min	Max	Unit
Average Optical Output Power:	P _O			
OC-3/STM-1/OC-12/STM-4 (IR)		–15	–8	dBm
OC-3/STM-1 (LR1)		–5	0	dBm
OC-12/STM-4 (LR1)		–3	2	dBm
OC-3/STM-1 (LR2)		–5	0	dBm
OC-12/STM-4 (LR2)		–3	2	dBm
OC-48/STM-16 (SR)		–10	–3	dBm
OC-48/STM-16 (IR)		–5	0	dBm
OC-48/STM-16 (LR1/LR2)		–2	3	dBm
1000BASE-LX		–9.5	–3	dBm
Optical Wavelength:	λ _C			
OC-3/STM-1 (IR)		1261	1360	nm
OC-3/STM-1/OC-12/STM-4 (LR1)		1280	1335	nm
OC-3/STM-1/OC-12/STM-4 (LR2)		1480	1580	nm
OC-12/STM-4 (IR)		1274	1356	nm
OC-48/STM-16 (SR)		1266	1360	nm
OC-48/STM-16 (IR)		1260	1360	nm
OC-48/STM-16 (LR1)		1280	1335	nm
OC-48/STM-16 (LR2)		1500	1580	nm
1000BASE-LX		1285	1343	nm
Spectral Width (FP versions):	Δλ _{RMS}			
OC-3/STM-1 (IR) OC-48/STM-16 (SR)		—	4	nm
OC-12/STM-4 (IR)		—	2.5	nm
1000BASE-LX		—	2.8	nm
Spectral Width (DFB Versions)	Δλ ₂₀	—	1	nm
Side-mode Suppression Ratio (DFB versions)	SMSR	—	30	dB
Dynamic Extinction Ratio:	EXT			
OC-3/STM-1/OC-12/STM-4 (LR1/LR2)		10	—	dB
1000BASE-LX		9.0	—	dB
All Others		8.2	—	dB
Power Supply Current	I _{CC} T	—	150	mA
Input Data Voltage: ²	V _{IN}	PECL Compatible dc-Coupled CML/PECL Compatible ac-Coupled Input Data		
OC-3/STM-1/OC-12/STM-4, 1000BASE-LX OC-48/STM-16				
Transmit Disable Voltage ³	V _D	V _{CC} – 0.9	V _{CC}	V
Transmit Enable Voltage ³	V _{EN}	V _{EE}	V _{EE} + 0.8	V
Transmitter Enable Time	T _{EN}	—	1	ms
Transmitter Disable Time	T _{DIS}	—	10	μs
Laser Bias Voltage (20-pin versions only)	V _{BIAS}	0.0	0.7	V
Laser Back-facet Monitor Voltage (20-pin versions only)	V _{BF}	0.01	0.2	V

1. All parameters must meet the specifications presented in the table over entire lifetime of the product.

2. 50 Ω load, measured single ended. Differential operation is necessary for optimum performance.

3. TTL compatible interface.

Transceiver Optical/Electrical Characteristics, 10-Pin and 20-Pin Versions

(continued)

Table 3. Receiver Optical and Electrical Characteristics (T_C = -40 °C to +85 °C, V_{CC} = 3.135 V – 3.465 V)

Parameter ¹	Symbol	Min	Max	Unit
Average Sensitivity: ²	P _I			
OC-3/STM-1 (IR)		—	-28	dBm
OC-3/STM-1 (LR1/LR2)		—	-34	dBm
OC-12/STM-4 (IR/LR1/LR2)		—	-28	dBm
OC-48/STM-16 (SR/IR)		—	-18	dBm
OC-48/STM-16 (LR1)		—	-27	dBm
OC-48/STM-16 (LR2)		—	-28	dBm
1000BASE-LX		—	-20	dBm
Maximum Input Power: ²	P _{MAX}			
OC-3/STM-1 (IR)		-8	—	dBm
OC-3/STM-1 (LR1/LR2)		-10	—	dBm
OC-12/STM-4 (IR/LR1/LR2)		-8	—	dBm
OC-48/STM-16 (SR)		-3	—	dBm
OC-48/STM-16 (IR)		0	—	dBm
OC-48/STM-16 (LR1/LR2)		-9	—	dBm
1000BASE-LX		-3	—	dBm
Power Supply Current:	I _{CCR}			
With CDR		—	200	mA
Without CDR		—	150	mA
Output Data Voltage: ³	V _{IN}	PECL Compatible dc-Coupled CML/PECL Compatible ac-Coupled		
OC-3/STM-1/OC-12/STM-4 (IR/LR1/LR2), 1000BASE-LX OC-48/STM-16 (SR/IR/LR1/LR2)				
Signal Detect Switching Threshold:				
1000BASE-LX:				
Assert	LSTD	-45	-21	dBm
Deassert	LSTI	-45	-20.5	dBm
OC-3/STM1/OC-12/STM-4 (IR):				
Assert	LSTD	-45	-29	dBm
Deassert	LSTI	-45	-28.5	dBm
OC-3/STM-1 (LR1/LR2):				
Assert	LSTD	-45	-35	dBm
Deassert	LSTI	-45	-34.5	dBm
OC-12/STM-4 (LR1/LR2):				
Assert	LSTD	-45	-29	dBm
Deassert	LSTI	-45	-28.5	dBm
OC-48/STM-16 (SR/IR):				
Assert	LSTD	-45	-19	dBm
Deassert	LSTI	-45	-8.5	dBm
OC-48/STM-16 (LR1/LR2):				
Assert	LSTD	-45	-28	dBm
Deassert	LSTI	-45	-27.5	dBm
Signal-detect Hysteresis	HYS	0.5	6	dB
Signal-detect Voltage	V _{SD}	TTL Compatible, PECL compatible (OC-3/STM-1 without CDR)		
Signal-detect Response Time	SDRT		100	μs

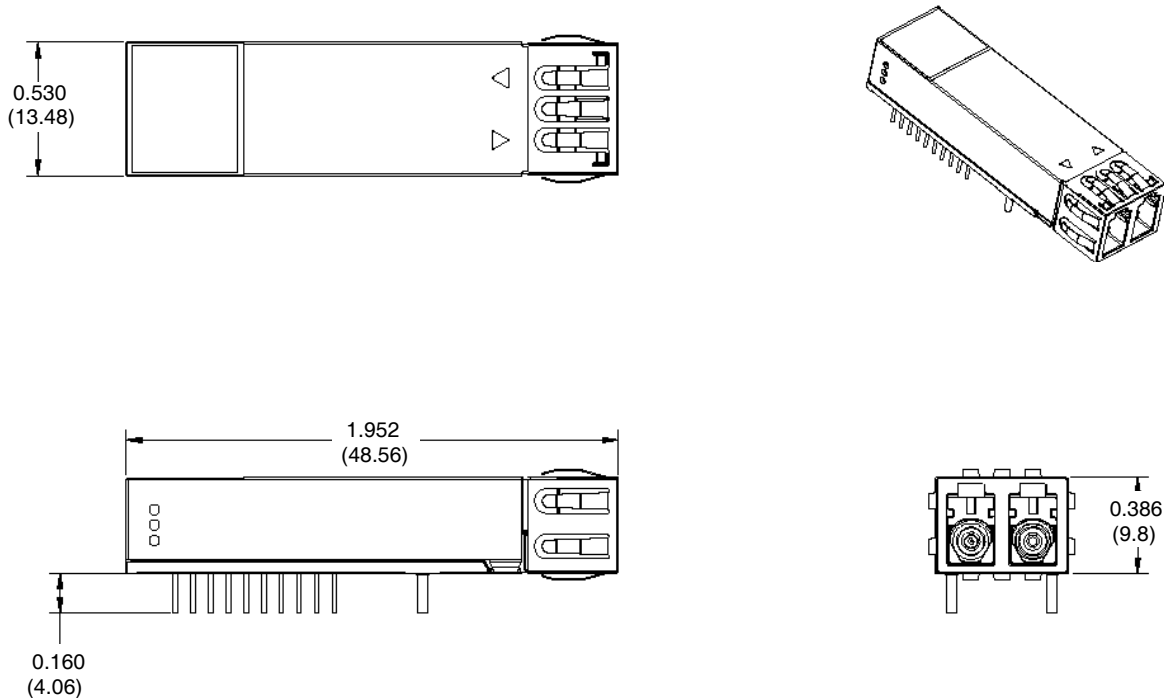
1. All parameters must meet the specifications presented in the table over entire lifetime of the product.

2. 2²³ – 1 PRBS with a BER of 10⁻¹⁰ and 8.2 dB extinction ratio, transmitter on and modulated at proper bit rate and maximum input level.

3. 50 Ω load, measured single ended. Differential operation is necessary for optimum performance.

Outline Diagram

Dimensions are in inches and (millimeters).



Coding Information

Agere Systems' SFF product family will be described by the coding scheme in the table below.

Table 4. Coding Information

Family	Connector	Style	Data Rate	Distance	Features
N = <i>NetLight</i>	L = LC	P = Pluggable T = Through-hole Pins	02 = 155 Mbits/s 06 = 622 Mbits/s 12 = 1.2 Gbits/s 25 = 2.5 Gbits/s	02 = 2 km 10 = 10 km 15 = 15 km 40 = 40 km 80 = 80 km Etc.	NA = 2 x 5 std PA= 2 x 10 std RA = 2 x 10 std with CDR (-40 °C to 85 °C)

For example, the NLT25-02-NA is a *NetLight* transceiver with an LC connector and through-hole pins. It operates at 2.5 Gbits/s over the short-reach range of 2 km. It is a 10-pin standard part and operates over the temperature range of -40 °C to 85 °C.

Product Availability

The availability dates presented here are in advance of actual product availability and are estimates presented for budgetary planning purposes.

Table 5. Product Availability

Code	Description	Data Sheet	Samples	Production
NLT02-15-NA	OC-3 IR (10-pin)	March 2002	April 2002	July 2002
NLT02-15-PA	OC-3 IR (20-pin)	March 2002	April 2002	July 2002
NLT06-15-NA	OC-12 IR (10-pin)	March 2002	April 2002	July 2002
NLT06-15-PA	OC12 IR (20-pin)	March 2002	April 2002	July 2002
NLT25-02-NA	OC-48 SR (10-pin)	March 2002	May 2002	July 2002
NLT25-02-PA	OC-48 SR (20-pin)	March 2002	May 2002	July 2002
NLT02-15-RA	OC-3 IR (20-pin w/CDR)	March 2002	June 2002	July 2002
NLT06-15-RA	OC12 IR (20-pin w/CDR)	March 2002	June 2002	July 2002
NLT25-02-RA	OC-48SR (20-pin w/CDR)	March 2002	June 2002	July 2002
NLT02-40-PA	OC-3 LR1 (20-pin)	April 2002	May 2002	July 2002
NLT02-40-RA	OC-3 LR1 (20-pin w/CDR)	April 2002	June 2002	July 2002
NLT06-40-PA	OC-12 LR1 (20-pin)	April 2002	May 2002	July 2002
NLT06-40-RA	OC-12 LR1 (20-pin w/CDR)	April 2002	June 2002	July 2002
NLT25-15-PA	OC-48 IR (20-pin)	February 2002	April 2002	August 2002
NLT25-15-RA	OC-48 IR (20-pin w/CDR)	February 2002	March 2002	August 2002
NLT02-80-PA	OC-3 LR2 (20-pin)	March 2002	June 2002	October 2002
NLT02-80-RA	OC-3 LR2 (20-pin w/CDR)	March 2002	April 2002	September 2002
NLT06-80-PA	OC-12 LR2 (20-pin)	March 2002	July 2002	December 2002
NLT06-80-RA	OC-12 LR2 (20-pin w/CDR)	March 2002	April 2002	September 2002
NLT25-40-PA	OC-48 LR1 (20-pin)	June 2002	August 2002	December 2002
NLT25-40-RA	OC-48 LR1 (20-pin w/CDR)	June 2002	July 2002	November 2002
NLT25-80-BA	OC-48 LR2 (20-pin) 0 °C to 70 °C	May 2002	June 2002	October 2002
NLT25-80-CA	OC-48 LR2 (20-pin w/CDR) (0 °C to 70 °C)	May 2002	July 2002	November 2002
NLT12-10-NA	1000BASE-LX (10-pin)	March 2002	May 2002	July 2002

Supporting Documentation

Data Sheets for the Agere Systems' *NetLight* SFF Transceivers will be issued starting March 2002. Additional performance, qualification, and reliability data will follow in the second half of 2002.

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