NU-33B54B-R / NU-33B54B-P / NU-33B54B-R / NU-33B54B-P
155 Mbps 1310 nm Burst Mode TX / 622 Mbps 1490 nm Continuous-Mode RX
3.3V, 2X5 SFF Package, Class B B-PON ONU Transceiver

FEATURES
- Optical Network Unit (ONU) for ITU-T G.983.3 Class B B-PON
- 1-Fiber Bi-directional WDM SM Transceiver
- 155 Mbps / 1310 nm Burst-Mode Transmitter
- 622 Mbps / 1490 nm Continuous-Mode Receiver with 2R Output
- 2x5 Package with SC Receptacle: NU-33B54B-R
- 2x5 Package with SC/PC Pigtail: NU-33B54B-P
- 0 to 70°C Operating Temperature: NU-33B54B-R
- -40 to 85°C Operating Temperature: NU-33B54B-R-A
- Single +3.3 V Power Supply
- LVPECL Differential Inputs and Outputs
- LVTTL TX Shutdown Input
- LVTTL RX Loss Signal Output
- Wave Solderable and Aqueous Washable
- Class 1 Laser International Safety Standard IEC 60825 Compliant

APPLICATIONS
- Fast Ethernet PON System
- Broadband PON System
- ATM PON System

DESCRIPTION
NU-33B54B series is optical network unit (ONU) for ITU-T G.983.3 B-PON with 622 Mbps in downstream and 155 Mbps in upstream. The NU-33B54B series is high performance module for Point-to-Multi-Point (M2MP) system by using 1310 nm burst-mode transmitter and 1490 nm continuous-mode receiver. The transmitter section uses a 1310 nm multiple quantum well laser and is a class 1 laser compliant according to International Safety Standard IEC 60825. The receiver section uses an integrated 1490 nm / 1550 nm detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC. LVPECL interface is used for differential inputs and outputs. A LVTTL logic interface simplifies interface to external circuitry.

LASER SAFETY
This single mode transceiver is a Class 1 laser product. It complies with IEC 60825 and FDA 21 CFR 1040.10 and 1040.11. The transceiver must be operated within the specified temperature and voltage limits. The optical ports of the module shall be terminated with an optical connector or with a dust plug.

ORDER INFORMATION

P/No.	TX				RX					Temp. (°C)	PIN	Package
	Type	Speed (Mb/s)	λ (nm)	Power (dBm)	Type	Speed (Mb/s)	λ (nm)	Sens. (dBm)	Sat. (dBm)			
NU-33B54B-R	BM	155	1310	2 to -4	CNT, 2R	622	1490/1550	-29	-5	0 to 70	2X5	SFF Rec.
NU-33B54B-R-A	BM	155	1310	2 to -4	CNT, 2R	622	1490/1550	-29	-5	-40 to 85	2X5	SFF Rec.
NU-33B54B-P	BM	155	1310	2 to -4	CNT, 2R	622	1490/1550	-29	-5	0 to 70	2X5	SFF Pig.
NU-33B54B-P-A	BM	155	1310	2 to -4	CNT, 2R	622	1490/1550	-29	-5	-40 to 85	2X5	SFF Pig.

NOTE: 1. XX-XXXXXX-K, K=R, SC RECEPTACLE, K=P, SC/PC PIGTAIL WITH FIBER LENGTH 50 CM.
3. BM: Burst Mode; CNT: Continuous Mode; SFF: Small Form Factor Package.

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Absolute Maximum Ratings					
Parameter	**Symbol**	**Min.**	**Max.**	**Unit**	**Notes**
Power Supply Voltage	Vcc	0	4	V	
Input Voltage		GND	Vcc	V	
Output Current	Iout	0	30	mA	
Operating Temperature	Topr	0	70	°C	With air flow 1m/sec
Storage Temperature	Tstg	-40	85	°C	
Soldering Temperature			260	°C	10 seconds on leads only
Bending Radius of Fiber		30		mm	For pigtail product

Stress in excess of the maximum absolute ratings can cause permanent damage to the module.

Recommended Operating Conditions					
Parameter	**Symbol**	**Min.**	**Max.**	**Unit**	**Notes**
Power Supply Voltage	Vcc	3.13	3.47	V	
Power Supply Current	Icc_{TX+RX}		250	mA	
Operating Temperature	Topr	0	70	°C	With air flow 1m/sec

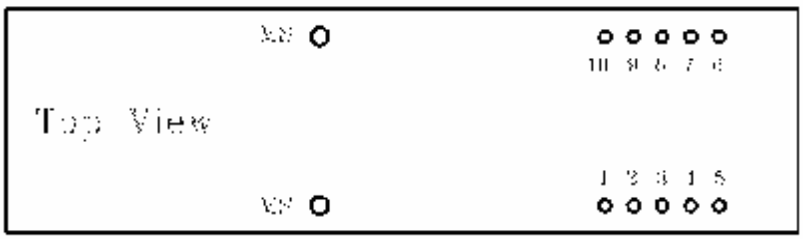
Transmitter Specifications ($0^oC < Topr < 70^oC$, 3.13V < Vcc < 3.47V)						
Parameter	**Symbol**	**Min.**	**Typ.**	**Max.**	**Units**	**Notes**
Optical						
Optical Transmit Power	Po	-4		2	dBm	1
Output Center Wavelength	λ	1260	1310	1360	nm	
Output Spectrum Width	$\Delta\lambda_{RMS}$			4	nm	RMS (σ)
Extinction Ratio	E_R	10			dB	
Background Light	BDL			-35	dBm	Without Input to Transmitter
Data Rate			155	170	Mb/s	
Optical Rise Time			1.0	2.0	ns	10% to 90% Values
Optical Fall Time			1.0	2.0	ns	10% to 90% Values
Relative Intensity Noise	RIN			-120	dB/Hz	
Total Jitter				1	ns	
Electrical						
Data Input Current – Low		-350			μA	
Data Input Current – High				350	μA	
Differential Input Voltage	$V_{IH} - V_{IL}$	300		1600	mV	
Data Input Voltage – Low	$V_{IL} - V_{CC}$	-2.0		-1.58	V	3
Data Input Voltage -- High	$V_{IH} - V_{CC}$	-1.1		-0.74	V	3
Shutdown Input Voltage -- Low	$V_{TSHDN,L}$	0		0.8	V	TX Output Disable
Shutdown Input Voltage -- High	$V_{TSHDN,H}$	2.0		Vcc	V	TX Output Enable
Shut Off Time for Tx Shutdown	t_{DIS}			30	μs	

1. Output power is power coupled into a 9/125 μm single mode fiber.
2. These inputs are compatible with 10K, 10KH and 100K ECL and LVPECL inputs.

Receiver Characteristics (0°C < Topr < 70°C, 3.13V < Vcc < 3.47V)						
Parameter	**Symbol**	**Min.**	**Typ.**	**Max.**	**Units**	**Notes**
Optical						
Sensitivity	Sen			-29	dBm	4
Saturation Optical Power	Sat	-5				4
Wavelength of Operation		1480		1500	nm	5,6
Signal Detect Assert Level	Pa			-29		
Signal Detect Deassert Level	Pd	-40				
Signal Detect Hysteresis		1.0		4.0	dB	
Data Rate			622	650	Mb/s	
Optical Return Loss		14			dB	
Electrical						
Data Output Voltage – Low	V_{OL} - V_{CC}	-2.0		-1.58	V	7
Data Output Voltage – High	V_{OH} - V_{CC}	-1.1		-0.74	V	7
SD Output Voltage -- Low	V_{OL} - V_{CC}			0.8	V	
SD Output Voltage -- High	V_{OH} - V_{CC}	2.0			V	
Signal Detect Assert Time	AS_{MAX}			100	µs	OFF to ON
Signal Detect Deassert Time	ANS_{MAX}			300	µs	ON to OFF

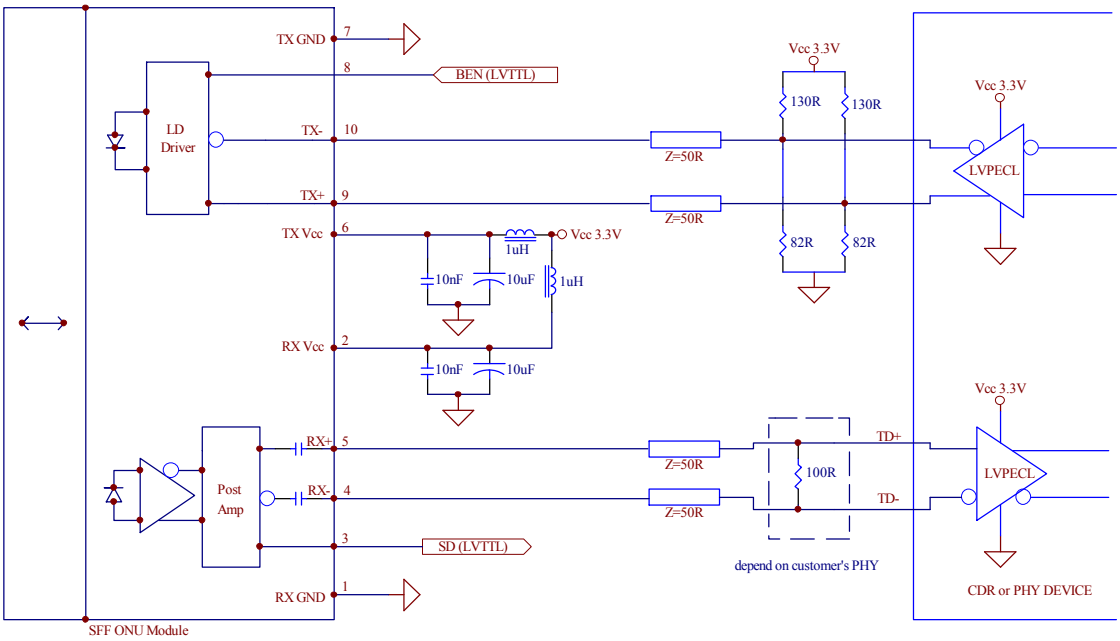
4. Sensitivity and saturation levels at BER 1E-10 for a 2^{23}-1 PRBS @ER=10.
5. At least 30 dB optical isolation for the wavelength 1260 to 1360 nm.
6.
7. These inputs are compatible with 10K, 10KH and 100K ECL and LVPECL outputs.

CONNECTION DIAGRAM



PIN	I/O	Symbol	Notes
1		RXGND	Directly connect this pin to the receiver ground plane
2		RXVCC	+3.3V dc power for the receiver section
3	O	LOS	Loss Signal Output. Active “Low” indicates a loss of receiving optical signal.
4	O	RD–	Receiver Dataout Bar. See recommended circuit schematic
5	O	RD+	Receiver Dataout. See recommended circuit schematic
6		TXVCC	+3.3V dc power for the transmitter section
7		TXGND	Directly connect this plan to the transmitter ground plane
8	I	TX SHUT	Transmitter Shutdown Input. Active Low. Connect this pin to +3.3V TTL logic “0” to disable TX. This pin is internally pulled to “High”.
9	I	TD+	Transmitter Data In. See recommended circuit schematic
10	I	TD-	Transmitter Data In Bar. See recommended circuit schematic
MS		MS	Mounting Studs. Connect to Chassis Ground

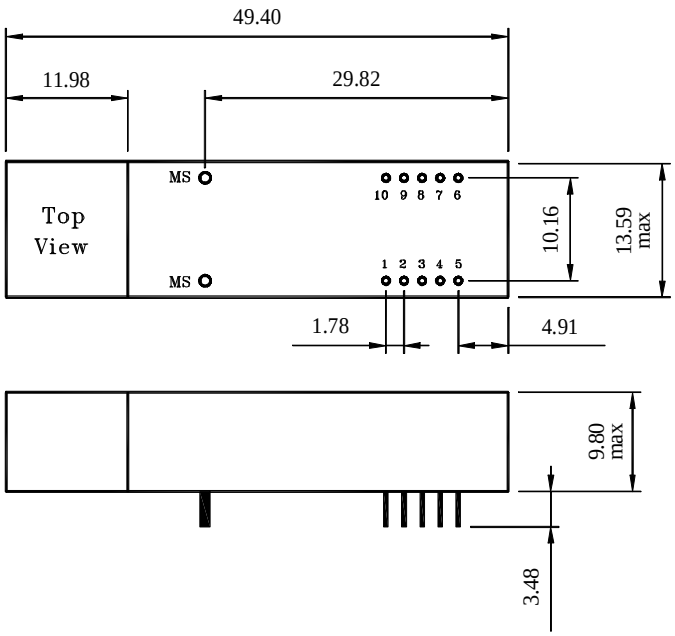
RECOMMENDED CIRCUIT SCHEMATIC



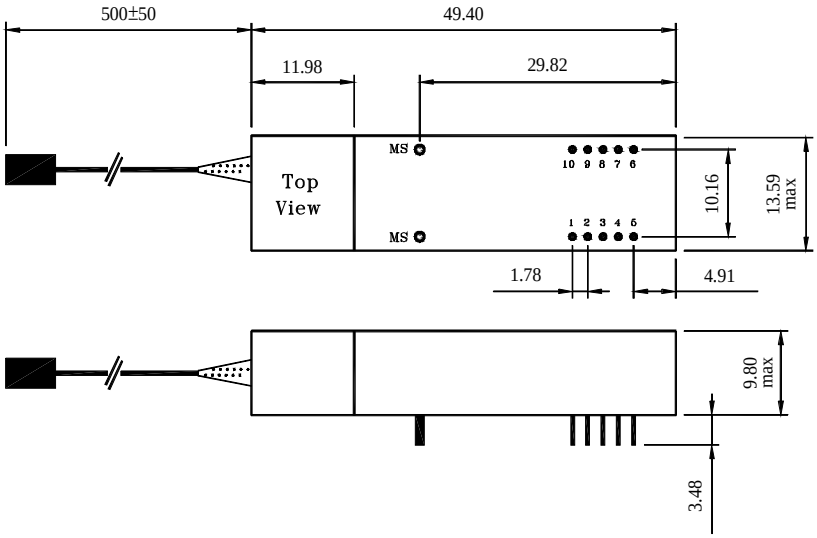
PACKAGE DIAGRAM

Units in mm

1) SC Receptacle



2) Pigtail



Note: Specifications subject to change without notice.