

Product Bulletin



2.5 Gb/s Transponder with Mux/Demux (1310 and 1550 nm) 54TR Series

The JDS Uniphase 54TR series transponder integrates optics and electronics in an OC-48 (2.5 Gb/s) time division multiplexing (TDM) transponder module. Multisource agreement (MSA) compatible and designed for operation at 1310 and 1550 nm, it can be used across a variety of optical fiber systems.

The bidirectional modules provide a SONET or SDH compliant interface between the SONET/SDH photonic physical layer and the electrical layer. Major components include an uncooled Fabry-Perot (FP) or distributed feedback (DFB) based optical transmitter; an Avalanche photodiode (APD) or PIN photodiode optical receiver with transimpedance amplifier (TIA); a microcontroller; a laser driver; and an integrated 16 signal mux/demux with clock and data recovery (CDR) circuitry.

The transponder provides either 1310 or 1550 nm wavelengths and is available in a PIN or APD receiver configuration. It receives a 2488.32 Mb/s optical signal, converts it to an electrical signal, recovers the clock, and demultiplexes the data into sixteen 155 Mb/s differential low voltage positive emitter coupled logic (LVPECL) data signals. The transponder is available in SR-1, LR-1, or LR-2 configurations.

Key Features

- MSA compatible
- Modular size for plug-and-play, allowing faster time-to-market for SR-1, LR-1, and LR-2 applications
- Outstanding optical and electrical performance over both commercial and industrial temperatures
- Expandable options, such as coarse wavelength division multiplexing (CWDM) and IR-1

Applications

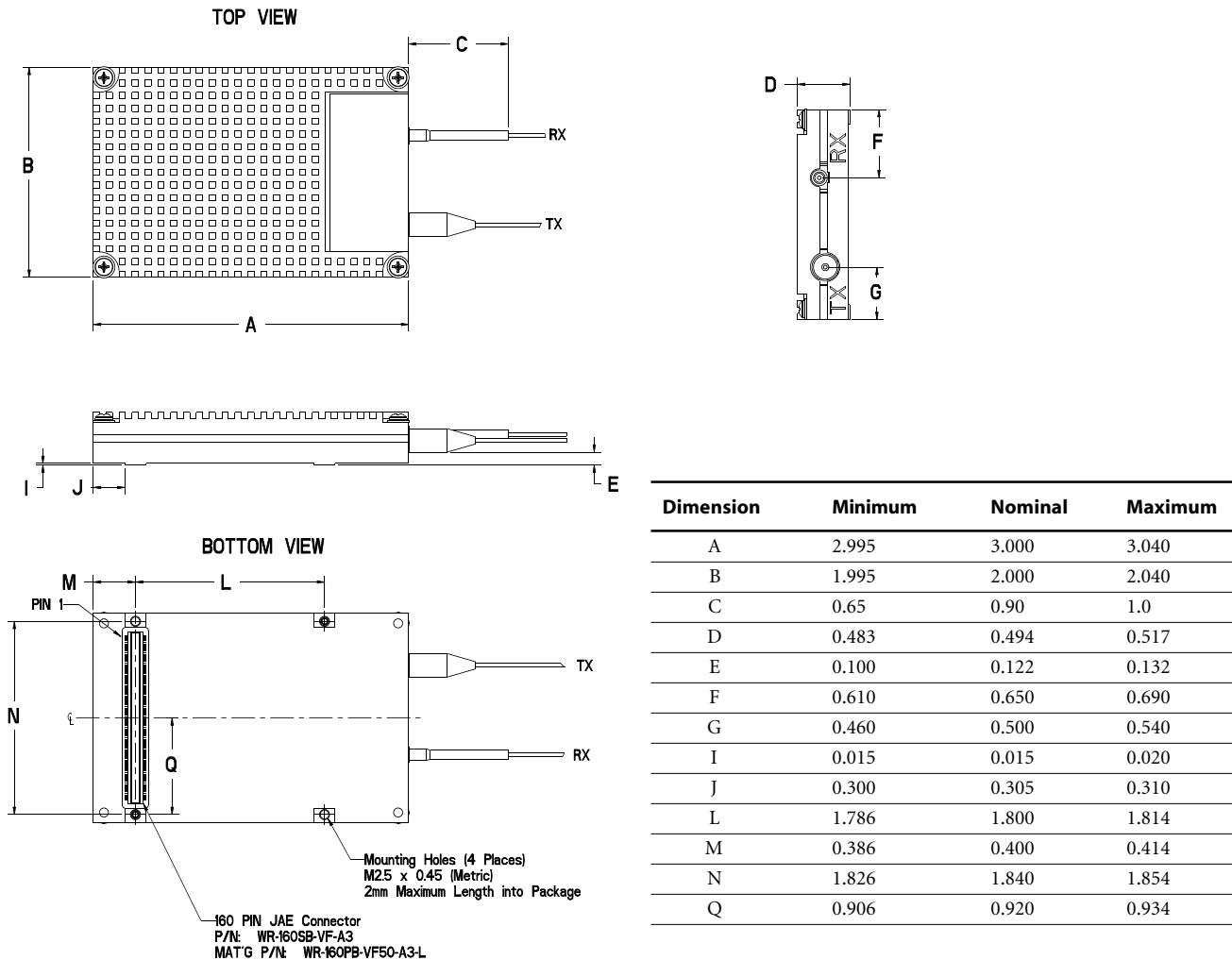
- Short, intermediate, and long reach applications
- Metro core
- Wide area networks
- Optical crossconnects
- Fiber backbone

Compliance

- Telcordia GR-253-CORE
- ITU-T G.783, ITU-T G.957, and ITU-T G.958

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Dimensions Diagram (Specifications in inches unless otherwise noted.)



Absolute Maximum Ratings¹

Parameter	Minimum	Maximum
Standard operating case temperature range	-5°C	70°C
Extended operating case temperature range	-40°C	80°C
Storage case temperature range	-40°C	85°C
Supply voltage	-0.5 V	4.0 V
Operating relative humidity (non-condensing)	5%	85%
Operating short-term relative humidity ^{2,3}	5%	90%
Receiver optical input power for APD	-	-3 dBm
Receiver optical input power for PIN photodiode	-	2 dBm

1. Limiting values apply to the 54TR within entire operating range unless otherwise specified.

2. Short-term refers to a period of not more than 72 consecutive hours and a total of not more than 15 days in one year. (This refers to a total of 360 hours in any given year, but no more than 15 occurrences during that one-year period.)

3. Not to exceed 0.024 lbs. of water/lb. of dry air.

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Optical Specifications ^(note¹) - short reach/intraoffice (Fabry Perot laser, PIN photodiode receiver) 1310 nm

Parameter	Minimum	Typical	Maximum
Average output power (note ²) (BOL)	-8 dBm	-5 dBm	-4 dBm
Average output power (note ²) (EOL)	-10 dBm	-5 dBm	-3 dBm
Operating wavelength	1266 nm	1310 nm	1360 nm
Extinction ratio (note ³) (BOL)	9.5 dB	10.0 dB	10.5 dB
Extinction ratio (note ³) (EOL)	8.2 dB	-	-
Optical rise and fall times	-	-	200 ps
Eye mask of optical output (note ^{4,5})	Compliant with GR-253 and ITU-T G.957		
Jitter generation (peak to peak)	-	-	85 mUI
Jitter generation (rms)	-	-	8 mUI
Average receiver sensitivity (note ^{6,7}) (BOL, BER=1 x 10 ⁻¹²)	-19 dBm	-20 dBm	-
Average receiver sensitivity (note ^{6,7}) (EOL, BER=1 x 10 ⁻¹²)	-18 dBm	-	-
Maximum received optical power	-3 dBm	-	-
Optical path penalty (at 2 km)	-	-	1 dB
Jitter tolerance and jitter transfer	Compliant with GR-253 and ITU-T G.958		
BER floor	-	-	10 ⁻¹⁵

Optical Specifications ^(note¹) - long reach/long haul (DFB laser, APD receiver) 1310 nm

Parameter	Minimum	Typical	Maximum
Average output power (note ²) (BOL)	0 dBm	1 dBm	2 dBm
Average output power (note ²) (EOL)	-2 dBm	0 dBm	3 dBm
Operating wavelength	1280 nm	1310 nm	1335 nm
Extinction ratio (note ³) (BOL)	9.5 dB	10.0 dB	10.5 dB
Extinction ratio (note ³) (EOL)	8.2 dB	-	-
Optical rise and fall times	-	200 ps	-
Eye mask of optical output (note ^{4,5})	Compliant with GR-253 and ITU-T G.957		
Jitter generation (peak-to-peak)	-	-	85 mUI
Jitter generation (rms)	-	-	8 mUI
Average receiver sensitivity (note ^{6,7}) (BOL, BER = 1 x 10 ⁻¹²)	-30 dBm	-31 dBm	-
Average receiver sensitivity (note ^{6,7}) (EOL, BER = 1 x 10 ⁻¹²)	-29 dBm	-	-
Maximum received optical power	-8 dBm	-	-
Dispersion	-	-	250 ps/nm
Optical path penalty	-	0.2 dB	1.0 dB
Jitter tolerance and jitter transfer	Compliant with GR-253 and ITU-T G.958		
BER floor	-	-	10 ⁻¹⁵

1. The following optical values apply to the 54TR within entire operating range unless otherwise specified.
2. Output power definitions and measurements per ITU-T recommendation G.957.
3. Ratio of logic 1 output power to logic 0 output power under fully modulated conditions.
4. GR-253-CORE, synchronous optical network (SONET) transport systems: common generic criteria.
5. ITU-T recommendation G.957, optical interfaces for equipment and systems relating to the synchronous digital hierarchy.
6. At 1x10⁻¹² BER, 2²³⁻¹ pseudo-random data input, and an extinction ratio of 10 dB.
7. For the extended temperature version, the BOL and EOL receiver sensitivity is reduced by 1 dB from -5 to -40 °C.

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Optical Specifications (note¹) - long reach/long haul 1550 nm (DFB laser, APD receiver)

Parameter	Minimum	Typical	Maximum
Average output power (note ²) (BOL)	-0.5 dBm	1 dBm	2 dBm
Average output power (note ²) (EOL)	-2 dBm	1 dBm	3 dBm
Operating wavelength	1500 nm	1550 nm	1580 nm
Extinction ratio (note ³) (BOL)	9.0 dB	9.7 dB	10.5 dB
Extinction ratio (note ³) (EOL)	8.2 dB	-	-
Eye mask of optical output (note ^{4,5})	Compliant with GR-253 and ITU-T G.957		
Jitter generation (peak-to-peak)	-	-	85 mUI
Jitter generation (rms)	-	-	8 mUI
Average receiver sensitivity (note ^{6,7}) (BOL, BER = 1x10 ⁻¹²)	-30 dBm	-31 dBm	-
Average receiver sensitivity (note ^{6,7}) (EOL, BER = 1x10 ⁻¹²)	-29 dBm	-	-
Maximum received optical power	-8 dBm	-	-
Dispersion	-	-	1600 ps/nm
Optical path penalty	-	1.3 dB	2.0 dB
Jitter tolerance and jitter transfer	Compliant with GR-253 and ITU-T G.783		
BER floor	-	-	10 ⁻¹⁵

- The following optical values apply to the 54TR within entire operating range unless otherwise specified.
- Output power definitions and measurements per ITU-T recommendation G.957.
- Ratio of logic 1 output power to logic 0 output power under fully modulated conditions.
- GR-253-CORE, synchronous optical network (SONET) transport systems; common generic criteria.
- ITU-T recommendation G.957, optical interfaces for equipment and systems relating to the synchronous digital hierarchy.
- At 1x10⁻¹² BER, 2³¹-1 pseudo-random data input, and an extinction ratio of 10 dB.
- For the extended temperature version, the BOL and EOL receiver sensitivity is reduced by 1 dB from -5 to -40 °C.

Electrical Specifications

Parameter	Minimum	Typical	Maximum
Supply voltage	3.135 V	3.3 V	3.465 V
DC power supply current drain	-	-	1500 mA
Power dissipation	-	4 W	5.2 W

Ordering Information

For more information on this or other products and their availability, please contact your local JDS Uniphase account manager or JDS Uniphase directly at 800-871-8537 in North America and 800-8735-5378 worldwide or via e-mail at jdsu.sales@jdsu.com.

Sample: 54TR-21114

54TR-□		□		□		□		□	
Code	Wavelength Option	Code	Connector Type	Code	Temperature Range	Code	Optical Reach	Code	IPDMON Maximum Current Output
2	1310 nm	1	SC/SPC	1	Standard, -5 to 70 °C	1	Long reach	0	Not required
3	1550 nm	2	ST/SPC	2	Extended, -40 to 80 °C	2	Intermediate reach	1	1 mA
		3	LC/SPC	3	Intermediate, -5 to 75 °C	3	Short reach	2	2 mA
		4	FC/SPC					3	3 mA
		5	MU/SPC					4	4 mA

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