3 Gb/s Optical Video Transceiver

SFP, LC Connector, 1310 nm FP Transceiver for Single Mode Fiber, RoHS Compliant

Digital Diagnostics Functions

Features

- 1310 nm FP LD
- Data Rate: 50 Mb/s to 3 Gb/s, NRZ
- Single +3.3 V Power Supply
- RoHS Compliant and Lead-free
- DC/AC Differential Electrical Interface
- Compliant with Multi-Source Agreement (MSA) Small Form Factor Pluggable (SFP)
- Supports video pathological patterns for SD-SDI, HD-SDI and 3G-SDI
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface
- Duplex LC Connector
- Eye Safety
  Designed to meet Laser Class 1 comply with EN60825-1

Applications

- SMPTE 297-2006 compatible optical-to-electrical interfaces
- High-density video routers

Description

The CT-2500TVP-MB4L-D series from Coretek Opto Corp. are high performance and cost-effective modules for serial optical data communication applications specified for data rates of up to 3 Gb/s. It operates with +3.3 V power supply. The module is intended for single mode fiber, operates at a nominal wavelength of 1310 nm and complies with Multi-Source Agreement (MSA) Small Form Factor Pluggable (SFP). Each module is integrated with digital diagnostics functions via an I^2C serial interface.

The module is a duplex LC connector transceiver designed for robust performance in the presence of SDI pathological patterns for SMPTE 259M, SMPTE 344M, SMPTE 292M and SMPTE 424M serial rates including SD-SDI compliant link at 270 Mb/s, HD-SDI compliant link at 1.485 Gb/s and 3G-SDI compliant link at 2.97 Gb/s. It provides extensive operational status monitoring through I^2C interface. For the transceiver, output optical power, bias current, received power, supply voltage and operating temperature are monitored. If a parameter monitored is outside the pre-defined range, the alarm flag associated with the parameter will be raised. The characterization is performed in accordance with Telcordia Specification GR-468-CORE.

EMC

Most equipment utilizing high-speed transceiver will be required to meet the following requirements:

1) FCC in the United States
2) CENELEC EN55022 (CISPR 22) in Europe

To assist the customer in managing the overall equipment EMC performance, the transceiver have been designed to satisfy FCC class B limits and provide good immunity to radio-frequency electromagnetic fields.

Eye Safety

This laser based single mode transceiver is a CLASS 1 LASER PRODUCT, Hazard level 1. It complies with IEC 60825-1 Ed.2: 2007-03 and FDA performance standards for laser products (21 CFR 1040.10 and 1040.11) except for deviations pursuant to Laser Notice 50, dated June 24, 2007.

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Product Information

Model Number	Operating Voltage & Interface	TX		RX	
		λ (nm)	*Power (dBm)*	λ (nm)	Sens. (dBm)
CT-2500TVP-MB4L-D	3.3 V DC/AC	1310 nm	-5 ~ 0 dBm	*1310*	*0 to -18 dBm*

Link Distance

SDI	Bit Rate		Max Link Distance
3G-SDI	*SMPTE 424M*	*2.97 Gb/s*	*10 km*
HD-SDI	*SMPTE 292M*	*1.485 Gb/s*	*21 km*
SD-SDI	*SMPTE 259M*	*270 Mb/s*	*30 km*

ABSOLUTE MAX RATINGS

PARAMETER	SYMBOL	MIN	MAX	UNIT	NOTE
Storage Temperature	T_S	-40	85	°C	
Supply Voltage	V_{CC}	-0.5	4.5	V	
Data Input Voltage	---	0	Vcc	V	
Supply Current	I_S		300	mA	

OPERATING CONDITIONS

PARAMETER	SYMBOL	MIN.	MAX.	UNIT	NOTE
Ambient Operating Temperature	T_A	0	70	°C	
Supply Voltage	V_{CC}	3.1	3.5	V	
Common-mode input compliant voltage	V_{INCM}	Vcc-1.5	V_{CC}- $V_{IN(DIFF)}$/4	V	TD+/-
Data Input Voltage Swing	V_{ID}	300	1860	mV	TD+/-

ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	MIN	MAX	UNIT	NOTE
Supply Current	I_{CC}		300	mA	
Tx_ Disable Input Voltage - Low	V_{IL}	0	0.8	V	
Tx_ Disable Input Voltage - High	V_{IH}	2.0	Vcc	V	
In-rush current ramp rate			50	mA/ms	
I^2C CLK , I^2C DATA - Low	V_{IL}	-0.6	Vcc × 0.3	V	
I^2C CLK , I^2C DATA - High	V_{IH}	Vcc × 0.7	Vcc + 0.5	V	

TRANSMITTER ELECTRO-OPTICAL CHARACTERISTICS

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNIT	NOTE
Optical Output Power	Po	-5		0	dBm	1
Extinction Ratio	ER	5	7.5		dB	
Center Wavelength	λ_c	1290	1310	1330	nm	
Spectral Width (RMS)	$\Delta\lambda$		1.5	3	nm	
Optical Rise time (20%-80%)	t_r			165	ps	2, 3
Optical Fall time (20%-80%)	t_f			180	ps	2, 3
Optical Signal Intrinsic Jitter				60	ps	3

Notes:

1. Measured average power coupled into 9/125 μm single mode fiber.
2. These are 20-80% values.
3. Measured at 2.97 Gb/s.

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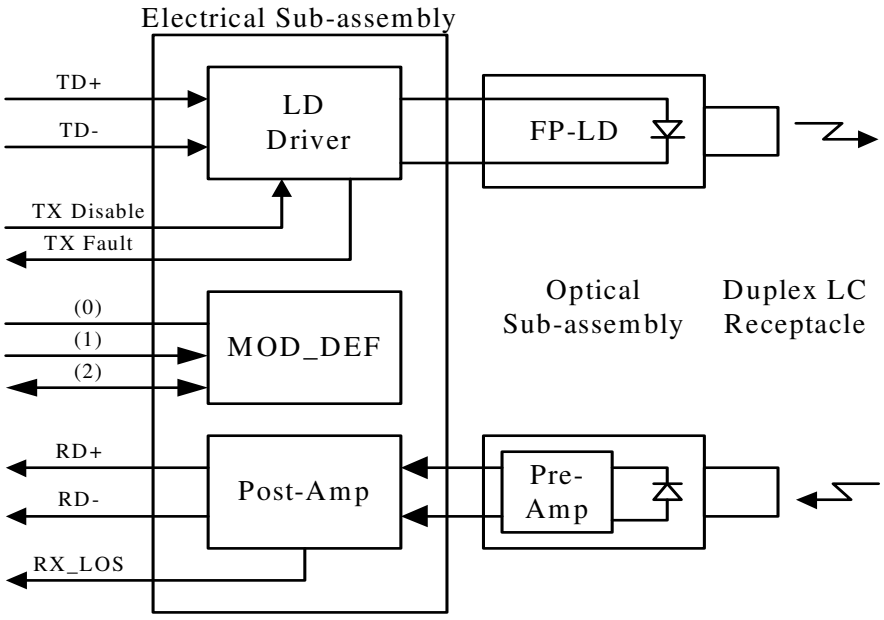
RECEIVER ELECTRO-OPTICAL CHARACTERISTICS

PARAMETER		SYMBOL	MIN	TYP.	MAX	UNIT	NOTE
Maximum Input Optical Power		P_{max}	0			dBm	PRBS23, BER=1e-12
Minimum Input Optical Power	2.97 Gb/s	P_{min}			-18	dBm	pathological
					-20	dBm	PRBS23, BER=1e-12
Minimum Input Optical Power	1.485 Gb/s	P_{min}			-20	dBm	pathological
					-21	dBm	PRBS23, BER=1e-12
Operating Wavelength		λ	1260		1620	nm	
LOS of Signal - Asserted		P_A	-35			dBm	
LOS of Signal - Deasserted		P_D			-21	dBm	
Loss of Signal -Hysterisis		P_D -P_A	0.5			dB	

TIMING CHARACTERISTICS

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNIT	NOTE
TX_DISABLE Assert Time	t_off			10	μs	
TX_DISABLE Negate Time	t_on			1	ms	
Time to initialize	t_init			300	ms	
TX_DISABLE time to start reset	t_reset	10			μs	

BLOCK DIAGRAM OF TRANSCEIVER



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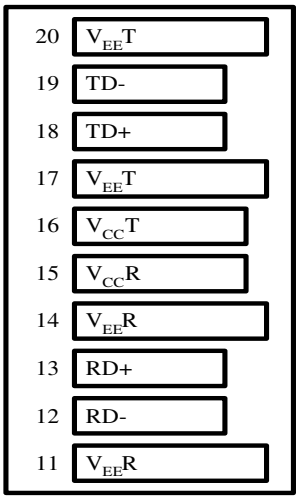
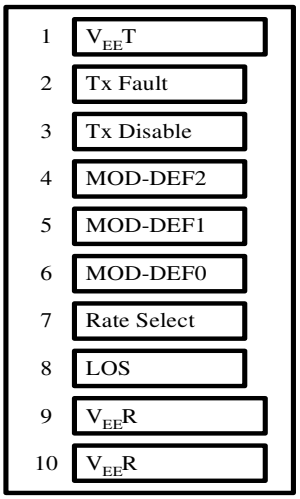
PIN OUT DIAGRAM OF TRANSCEIVER



Top of Board



Buttom of Board (As Viewed through Top of Board

PIN OUT TABLE

Pin	Symbol	Functional Description
1	VeeT	Transmitter Ground
2	TX Fault	Transmitter Fault Indication
3	TX Disable	Transmitter Disable – Module disables on high or open
4	MOD-DEF(2)	Module Definition 2 – Two wire serial ID interface
5	MOD-DEF(1)	Module Definition 1 – Two wire serial ID interface
6	MOD-DEF(0)	Module Definition 0 – Grounded in module
7	Rate Select	Not Connected
8	LOS	Loss of Signal
9	VeeR	Receiver Ground
10	VeeR	Receiver Ground
11	VeeR	Receiver Ground
12	RD-	Inverse Received Data Out
13	RD+	Received Data Out
14	VeeR	Receiver Ground
15	VccR	Receiver Power
16	VccT	Transmitter Power
17	VeeT	Transmitter Ground
18	TD+	Transmitter Data In
19	TD-	Inverse Transmitter Data In
20	VeeT	Transmitter Ground

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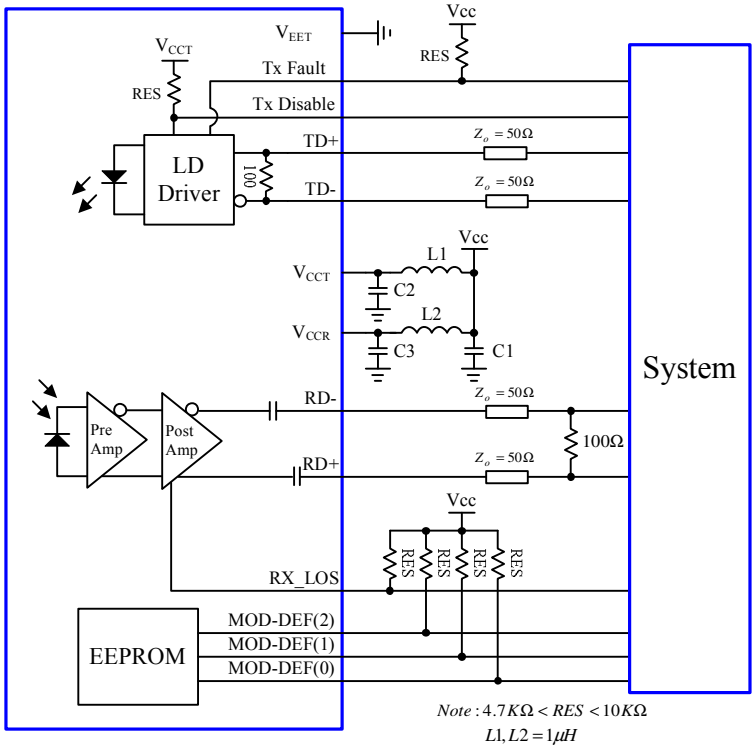
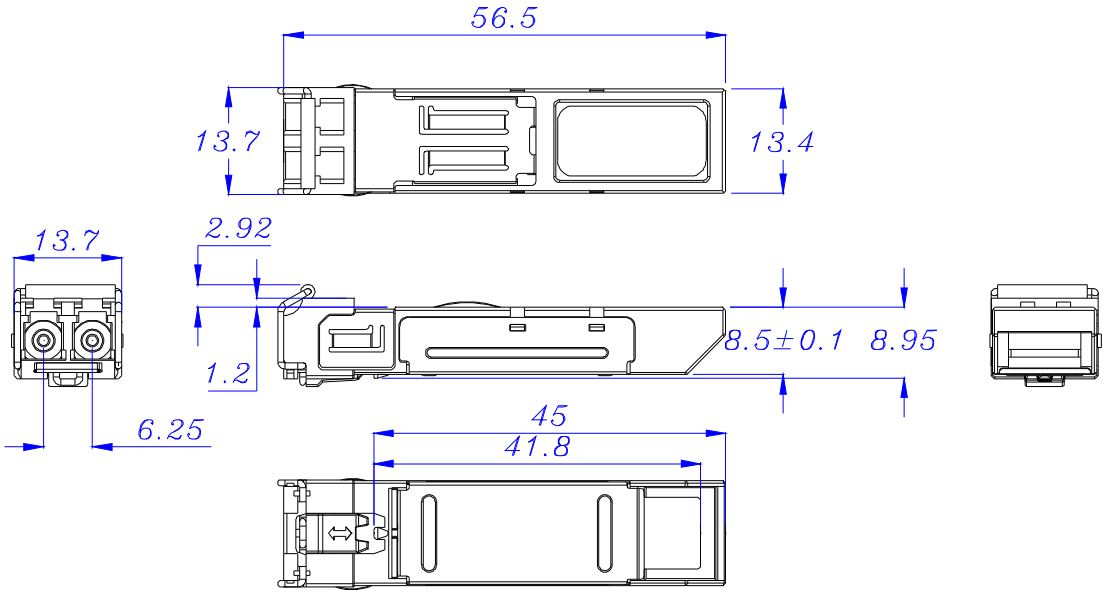
RECOMMENDED CIRCUIT SCHEMATIC



Note : $4.7K\Omega < RES < 10K\Omega$
$L1, L2 = 1\mu H$
$C1 = 10\mu F$
$C2, C3 = 0.1\mu F$

MECHANICAL DIMENSIONS

Units in mm



All dimensions are ±0.2mm unless otherwise specified.

Claim:

CORETEK Opto Corp. reserves the right to make changes in the specification described hereinafter without prior notice.

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