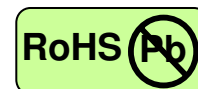


3 Gb/s Optical Video Transceiver



SFP, LC Connector, CWDM Transceiver for Single Mode Fiber, RoHS Compliant

Digital Diagnostics Functions



Features



- 18 CWDM Wavelengths
- 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-CB6L-D XX 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 nominal CWDM wavelengths and complies with Multi-Source Agreement (MSA) Small Form Factor Pluggable (SFP). Each module is integrated with digital diagnostics functions via an I²C 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 I²C interface. For the transceiver, output optical power, bias current, RX 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 characteristics are 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.

3 Gb/s Optical Video Transceiver



Product Information

Model Number	Operating Voltage & Interface	TX		RX	
		λ (nm)	Power (dBm)	λ (nm)	Sens. (dBm)
CT-2500TVP-CB6L-D XX	3.3 V DC/AC	XX nm	0 ~ +5 dBm	1310	0 to -18 dBm

Wavelength Mapping

XX Code	Wavelength	Latch Color	XX Code	Wavelength	Latch Color
27	1270 nm	Light Purple	45	1450 nm	Yellow Orange
29	1290 nm	Sky Blue	47	1470 nm	Gray
31	1310 nm	Yellow Green	49	1490 nm	Violet
33	1330 nm	Yellow Ocher	51	1510 nm	Blue
35	1350 nm	Pink	53	1530 nm	Green
37	1370 nm	Beige	55	1550 nm	Yellow
39	1390 nm	White	57	1570 nm	Orange
41	1410 nm	Silver	59	1590 nm	Red
43	1430 nm	Black	61	1610 nm	Brown

Link Distance

SDI	Bit Rate	Max Link Distance
3G-SDI	SMPTE 424M	2.97 Gbps
HD-SDI	SMPTE 292M	1.485 Gbps
SD-SDI	SMPTE 259M	270 Mbps

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	V_{CC}	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}	$V_{CC}-1.5$	$V_{CC}-V_{IN(DIFF)}/4$	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	V_{CC}	V	
In-rush current ramp rate			50	mA/ms	
I^2C CLK , I^2C DATA - Low	V_{IL}	-0.6	$V_{CC} \times 0.3$	V	
I^2C CLK , I^2C DATA - High	V_{IH}	$V_{CC} \times 0.7$	$V_{CC} + 0.5$	V	

3 Gb/s Optical Video Transceiver



TRANSMITTER ELECTRO-OPTICAL CHARACTERISTICS

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNIT	NOTE
Optical Output Power	P_o	0		+5	dBm	1
Extinction Ratio	ER	5	7.5		dB	
Center Wavelength	λ_c	$\lambda_c - 5.5$	λ_c	$\lambda_c + 7.5$	nm	
Spectral Width (RMS)	$\Delta \lambda$			1	nm	
Optical Rise time (20%-80%)	t_r			165	ps	2
Optical Fall time (20%-80%)	t_f			180	ps	2
Optical Signal Intrinsic Jitter				60	ps	

Notes:

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

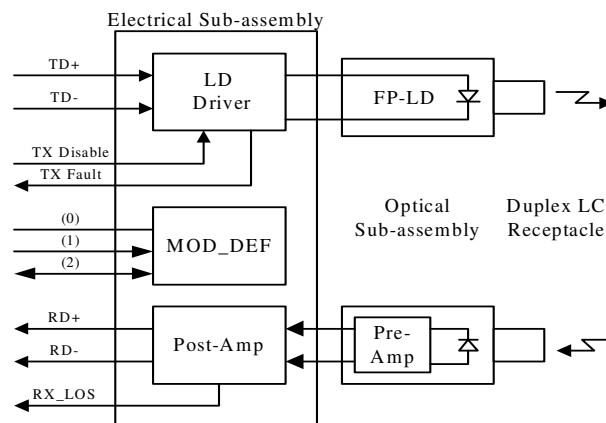
RECEIVER ELECTRO-OPTICAL CHARACTERISTICS

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNIT	NOTE
Maximum Input Optical Power	P_{max}	0			dBm	PRBS23, BER=1e-12
Minimum Input Optical Power	P_{min}			-18	dBm	pathological
				-20	dBm	PRBS23, BER=1e-12
Minimum Input Optical Power	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	

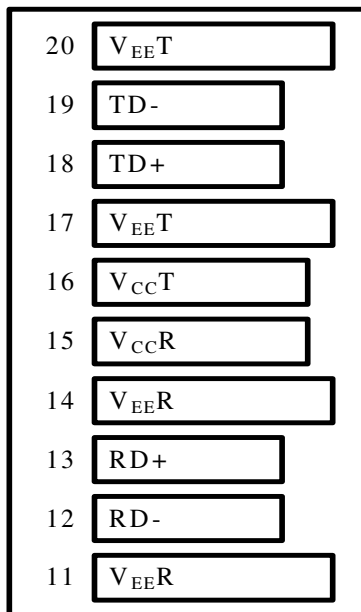
BLOCK DIAGRAM OF TRANSCEIVER



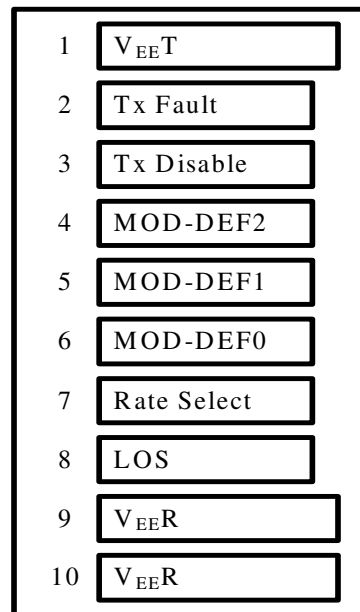
3 Gb/s Optical Video Transceiver



PIN OUT DIAGRAM OF TRANSCEIVER



Top of Board



Bottom 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

3 Gb/s Optical Video Transceiver



EEPROM Serial ID Memory Contents

Table 1 - EEPROM Serial ID A0h Memory Contents

Addr.	Field Size (Bytes)	Name of Field	Hex	Description
00	1	Identifier	03	SFP
01	1	Ext. Identifier	04	MOD4
02	1	Connector	07	LC
03 ~ 10	8	Transceiver Codes	00 00 00 00 00 00 00 00	
11	1	Encoding	03	
12	1	BR, Nominal	1E	
13	1	Reserved	00	
14	1	Length (SMF)-km	28	40 km
15	1	Length (SMF)-100m	FF	
16	1	Length (50µm,OM2)	00	
17	1	Length (62.5µm,OM1)	00	
18	1	Length (copper)	00	
19	1	Length (50µm, OM3)	00	
20 ~ 35	16	Vendor Name	43 4F 52 45 54 45 4B 20 20 20 20 20 20 20 20 20	CORETEK
36	1	Unallocated	00	
37 ~ 39	3	OUI Code	00 00 00	
40 ~ 55	16	Vendor PN	43 54 2D 32 35 30 30 54 56 50 2D 43 42 36 4C 44	CT-2500TVP-CB6LD
56 ~ 59	4	Vendor Rev	30 30 30 30	0000
60 ~ 61	2	Wavelength	04 F6 05 0A 05 1E 05 32 05 46 05 5A 05 6E 05 82	1270nm 1290nm 1310nm 1330nm 1350nm 1370nm 1390nm 1410nm

3 Gb/s Optical Video Transceiver



			05 96	1430nm
			05 AA	1450nm
			05 BE	1470nm
			05 D2	1490nm
			05 E6	1510nm
			05 FA	1530nm
			06 0E	1550nm
			06 22	1570nm
			06 36	1590nm
			06 4A	1610nm
62	1	Reserved	00	
63	1	CC BASE	XX	Check sum
64 ~ 65	2	Options	00 1A	LOS, TX_FAULT and TX_DISABLE
66	1	BR max	00	
67	1	BR min	00	
68 ~ 83	16	Vendor SN	4B 52 xxxxxxxxxxxxxx	KR xxxxxxxxxxxxxx
84 ~ 91	8	Date code		
92	1	Diagnostic Monitoring Type	68	
93	1	Enhanced Options	90	
94	1	SFF-8472	01	Rev 9.3 of SFF-8472 Compliance
95	1	CC BASE	XX	Check sum
96 ~ 127	32	Vendor Specific		

Table 2 - EEPROM Serial ID A2h Memory Contents

Addr.	Field Size (Bytes)	Name of Field	Hex	Description
00 ~ 07	8	Temperature Alarm/Warning (°C)	64 00 FB 00 50 00 5A 00	Alarm_H/L : 100/-5 Warning_H/L : 90/0
08 ~ 15	8	Voltage Alarm/Warning (V)	8C A0 75 30 88 B8 79 18	Alarm_H/L : 3.6/3 Warning_H/L : 3.5/3.1
16 ~ 23	8	Bias Current Alarm/Warning (mA)	9C 40 03 E8 88 B8 07 D0	Alarm_H/L : 80/2 Warning_H/L : 70/4

3 Gb/s Optical Video Transceiver

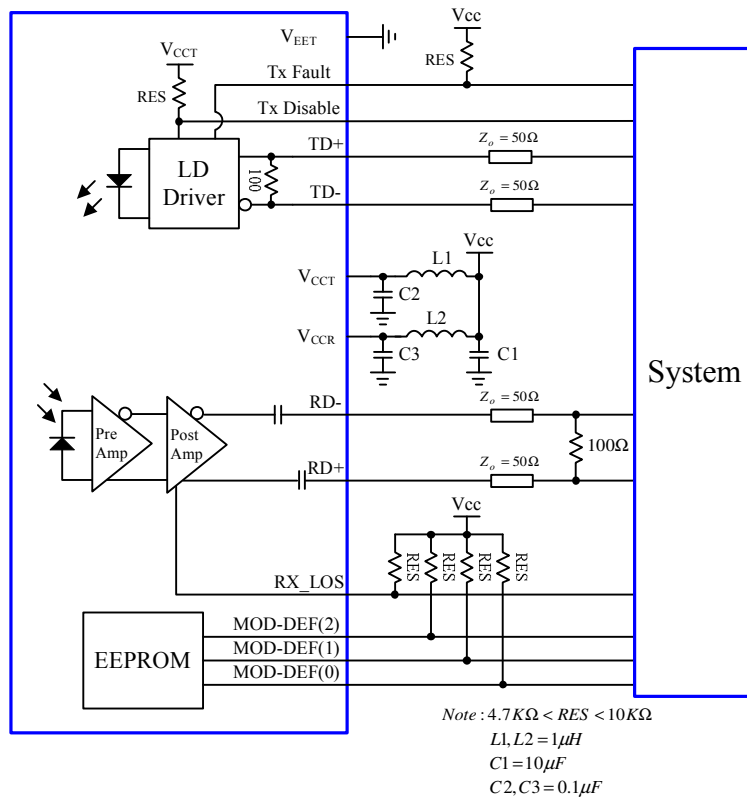


24 ~ 31	8	Tx Power Alarm/Warning (dBm)	9B 83 1F 07 7B 86 27 10	Alarm_H/L : 6 /-1 Warning_H/L : 5 /0
32 ~ 39	8	Rx Power Alarm/Warning (dBm)	27 10 00 4F 1F 07 00 64	Alarm_H/L : 0 /-21 Warning_H/L : -1 /-20
128 ~ 143	16	Vendor Specific		

Table 3 - Monitoring Specification

Parameter	Range	Accuracy	Calibration
Temperature	0°C to 70°C	±3°C	Internal
Voltage	3.0 to 3.6 V	±3%	Internal
Bias Current	0 to 80 mA	±10%	Internal
TX Power	0 to +5 dBm	±3 dB	Internal
RX Power	-21 to 0 dBm	±3 dB	Internal

RECOMMENDED CIRCUIT SCHEMATIC

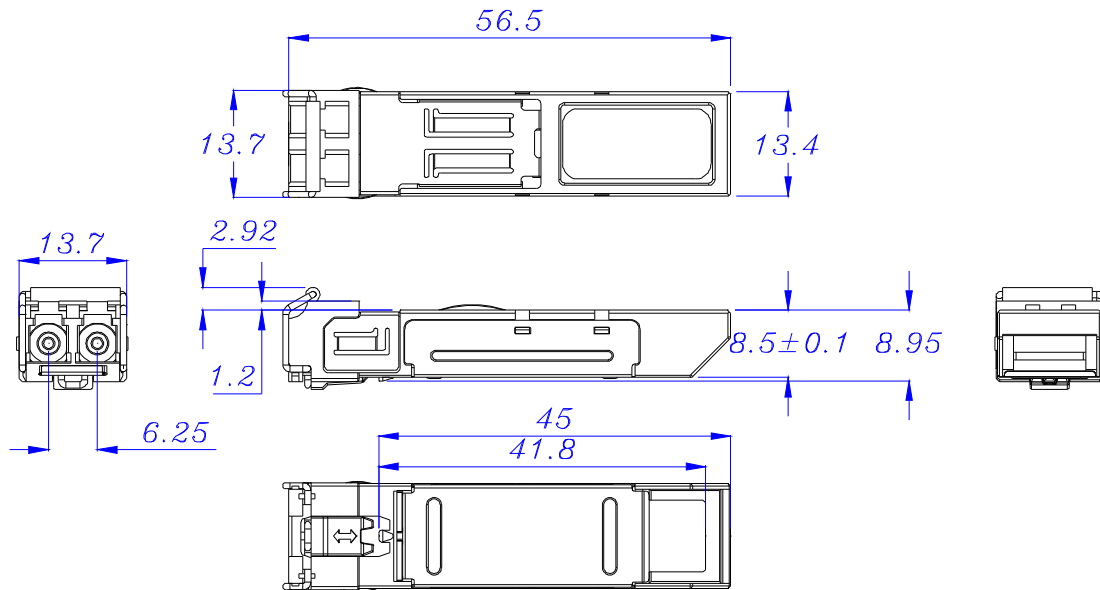


3 Gb/s Optical Video Transceiver



MECHANICAL DIMENSIONS

Units in mm



All dimensions are ± 0.2 mm unless otherwise specified.

Claim:

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