CWDM / 3 Gb/s Medium Power Optical SM Digital Diagnostic Transmitter/Receiver

FVD2-1TR-SM30-XX

Features

- SMPTE 297-2006 Compatible
- Speed from 50kbps to 3Gbps
- Power Budget > 20 dB
- Support Video Pathological Patterns for SD-SDI, HD-SDI and 3G-SDI
- 16-CH CWDM : 1270 nm to 1610 nm
- Single Receiver with Simplex LC
- Based on Industry Standard SFP
- SFF-8472 Digital Diagnostic Function
- TTL Laser Disable Input
- TTL TX_Fault Output
- TTL RX_LOS Output
- Single 3.3V power supply
- Operating case temperature : 0℃ to 70℃
- ROHS Compliant
- Hot Pluggable
- Class 1 Laser International Safety Standard IEC-60825 Compliant

Applications

- SMPTE 297-2006 Compliant Electrical-to-Optical Interfaces
- High-density Video Routers

Description

The FVD2-1TR-SM30-XX is a single mode transceiver designed to transmit and receive optical signals as defined in SMPTE 297-2006. It supports from 100 kbps to 3 Gbps and is specifically designed for transmitted the SMPTE 259M, SMPTE 344M, SMPTE 292M and SMPTE 424M SDI pathological patterns. It completely complies with Multi-Source Agreement (MSA) SFP+. Each OSA is integrated with a digital diagnostic function via an I^2C serial interface. This module is designed for single mode fiber and operates at a nominal wavelength of CWDM wavelength. There are sixteen center wavelengths available from 1270 nm to 1610 nm with each step 20 nm, except 1370nm, 1390nm (water peak).

Ⅰ. Absolute Maximum Ratings

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	Note
Storage Temperature	T_{stg}	-40	85	℃	
Operating Case Temperature	T_c	0	70	℃	
Power Supply Voltage	Vcc	0	4	V	
ESD Tolerance on all pins			1	KV HBM	
Relative Humidity		5	95	% RH	non-condensing

Ⅱ. Recommended Operating Conditions

Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Power Supply Voltage	V_{CC}	3.13	3.3	3.47	V
Operating Case Temperature	T_c	0		70	°C
Baud Rate		50		3000	Mbps
Power Supply Current	Icc		200	300	mA

Ⅲ. Optical and Electrical Characteristics

Transmitter Specifications (0°C < Tc < 70°C, 3.13V < Vcc < 3.47V)

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Optical						
Optical Transmit Power	Po	0		4	dBm	1
Output Center Wavelength	λ	λc –5.5	λc	λc +7.5	nm	2
Output Spectrum Width	Δλ			1	nm	-20 dB width
Side Mode Suppression Ratio	SMSR	30			dB	
Extinction Ratio	ER	5	7.5		dB	
Relative Intensity Noise	RIN			-120	dB/Hz	
Optical Rise Time / Fall Time	tr / tf			135	ps	3,SMPTE 424M
				270	ps	3, SMPTE 292M
				800	ps	3, SMPTE 344M
				1.5	ns	3, SMPTE 259M
Remark :						

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Electrical						
Differential Input Voltage	V_{IH} - V_{IL}	200	-	1200	mVp-p	AC coupled input
Disable Input Voltage -- Low	$V_{TDIS,L}$	0	-	0.8	V	TX Output Enabled
Disable Input Voltage -- High	$V_{TDIS,H}$	2.0	-	Vcc+0.3	V	TX Output Disabled
SCL, SDA	V_{OH}	2.5	-	Vcc+0.3	V	
	V_{OL}	0		0.5	V	

Notes

1. Output power is power coupled into a 9/125 mm single mode fiber.
2. ITU-T G.694.2 CWDM wavelength from 1270nm to 1610nm, (except 1370nm, 1390nm)
3. 20% to 80%, unfiltered.

Receiver Specifications (0°C < Tc < 70°C, 3.13V < Vcc < 3.47V)

Parameter	Symbol	Min	Typ	Max	Unit	Note
Optical						
Wavelength of Operation		1260	-	1620	nm	
Sensitivity for SMPTE 424M 2.97 Gb/s	Sen	0	-	-18	dBm	Pathological
		0	-	-20	dBm	PRBS 2^{23}-1, ER=1E-12
Sensitivity for SMPTE 292M 1.485 Gb/s	Sen	0	-	-20	dBm	Pathological
		0	-	-21	dBm	PRBS 2^{23}-1, ER=1E-12
Signal Detect -- Asserted	Pa			-20	dBm	Transition: low to high
Signal Detect -- Deasserted	Pd	-29			dBm	Transition: low to high
Signal detect -- Hysteresis		1		6	dB	
Optical Return Loss			-27		dB	
Electrical						
CML Output (Differential)		550	660	850	mVp-p	AC coupled output
Optical Rise Time / Fall Time	tr / tf			135	ps	1, SMPTE 424M
				270	ps	1, SMPTE 424M
				800	ps	1, SMPTE 424M
				1.5	ns	1, SMPTE 424M
Output LOS Voltage -- Low	V_{OL}	0		0.5	V	I_{OL}=-1.6mA, 1 TTL unit load
Output LOS Voltage -- High	V_{OH}	2.5		Vcc+0.3	V	I_{OL}=-1.6μA, 1 TTL unit load
SCL, SDA	V_{OH}	2.5		Vcc+0.3	V	
	V_{OH}	0		0.5	V	

Notes

1. 20% to 80%, unfiltered.

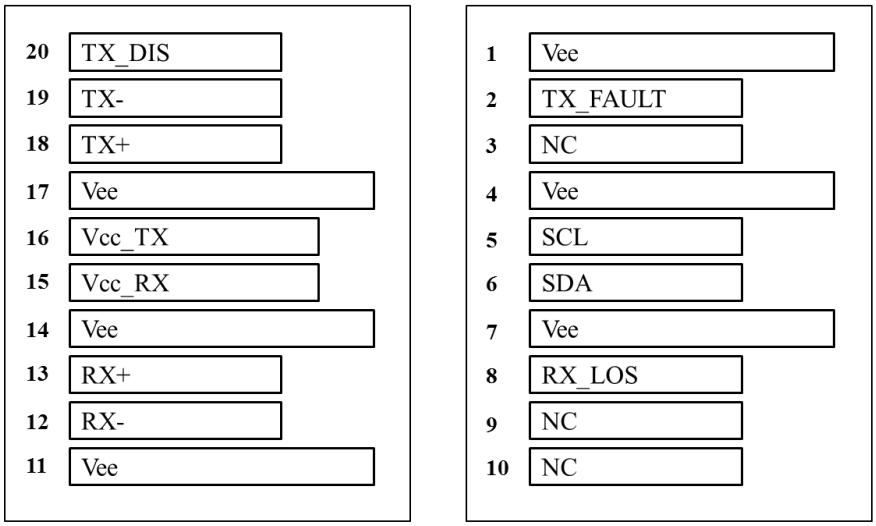
Ⅳ. Module Definition

Module Definition	PIN 5	PIN 6	Interpretation by Host
4	SCL	SDA	Serial module definition protocol

Module Definition 4 specifies a serial definition protocol. For this definition, upon power up, SCL and SDA appear as no connector(NC).

When the host system detects this condition, it activates the serial protocol. The protocol uses the 2-wire serial CMOS E^2PROM protocol of the ATMEL AT24C01A/02/04 family of components.

Ⅴ. Pin Information

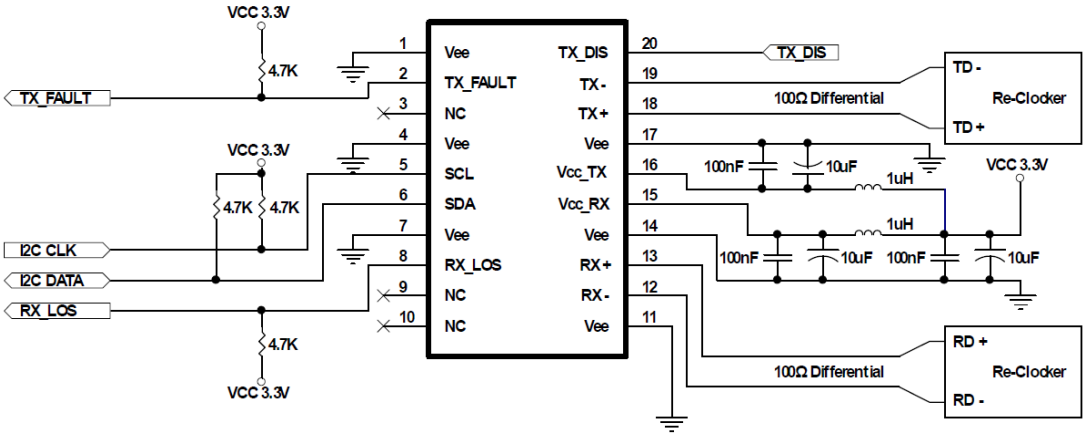


Top of Board

Bottom of Board
(as viewed thru top of board)

Pin	Name	Function	NOTE
1	Vee	Signal Ground	
2	TX_Fault	Transmitter Fault Indicator (Active high, open-drain)	
3	NC	No Connection	
4	Vee	Signal Ground	
5	SCL	Serial I^2C Clock	
6	SDA	Serial I^2C Data	
7	Vee	Signal Ground	
8	RX_LOS	Receiver Loss of Signal Indicator (Active high, open-drain)	
9	NC	No Connection	
10	NC	No Connection	
11	Vee	Signal Ground	
12	RX-	Negative Differential Output	
13	RX+	Positive Differential Output	
14	Vee	Signal Ground	
15	Vcc RX	Power Supply	
16	Vcc TX	Power Supply	+3.3V±5%
17	Vee	Signal Ground	
18	TX+	Positive Transmitter Data In	AC coupled differential lines with 100 ohm differential termination inside the module
19	TX-	Negative Transmitter Data In	
20	TX_DIS	Transmitter Disable	Internal 4.7 kΩ pull-up. The bias current and modulation current are turned off if TX1_DIS =HIGH

VI. Application Schematics



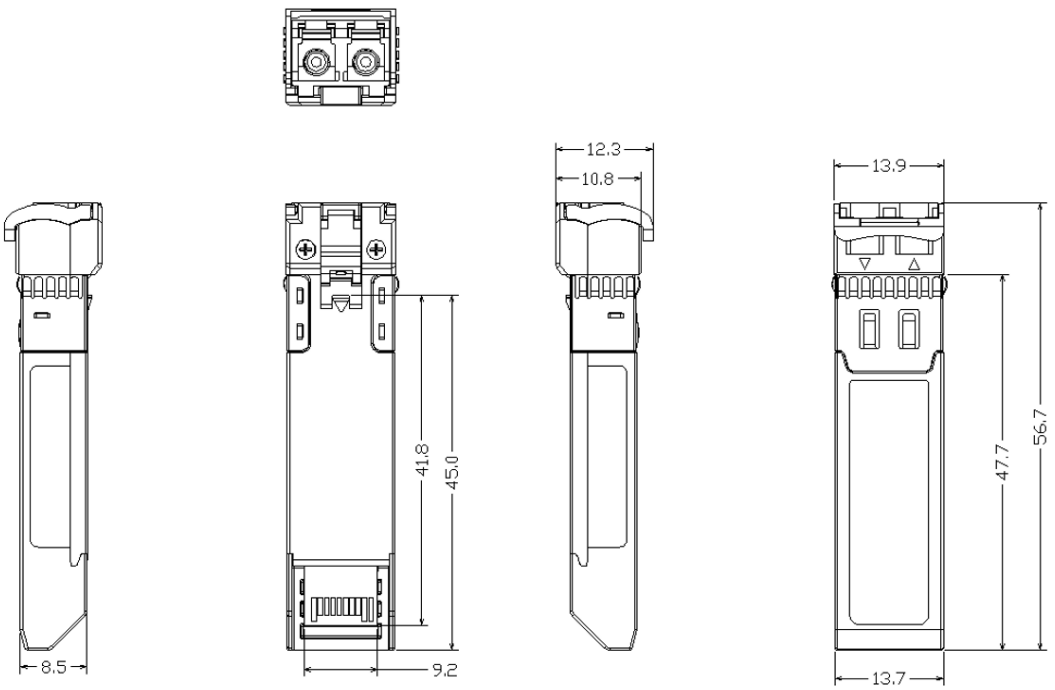
1. Consult the Chipset manufacturer's applications information for biasing required for TX outputs. Some chipset outputs are internally biased and may not need external bias resistor.

VI. Outline Diagrams

Package Outline

Dimensions are in millimeters

Tolerances are ±0.2mm, unless otherwise specified



Ⅷ. Ordering Information

FVD	Core	-	Tx/Rx	-	Mode	Distance	CWDM wavelength
FOTTU Video SFP For SDI	2 : 2core 1: 1core		2T : 2Tx 1T : 1Tx 2R : 2Rx 1R : 1Rx 1T1R : 1TR 1B : 1BOSA 2B : 2BOSA	-	MM : Multimode SM : Single mode	03 : 300m 10 : 10km 30 : 30km 50 : 50km 80 : 80km	27 : 1270 ~ 61 : 1610 See below Table

CWDM Wavelength (0 ~ 70'C)

Code	Min (nm)	Typical (nm)	Max (nm)	Latch Color	Code	Min (nm)	Typical (nm)	Max (nm)	Latch Color
27	1264.5	1270	1277.5	Light purple	47	1464.5	1470	1477.5	Gray
29	1284.5	1290	1297.5	Sky blue	49	1484.5	1490	1497.5	Violet
31	1304.5	1310	1317.5	Yellow Green	51	1504.5	1510	1517.5	Blue
33	1324.5	1330	1337.5	Yellow Ocher	53	1524.5	1530	1537.5	Green
35	1344.5	1350	1357.5	Pink	55	1545.5	1550	1557.5	Yellow
41	1404.5	1410	1417.5	Silver	57	1564.5	1570	1577.5	Orange
43	1424.5	1430	1437.5	Black	59	1584.5	1590	1597.5	Red
45	1444.5	1450	1457.5	Yellow Orange	61	1604.5	1610	1617.5	Brown

CWDM : 16 Wavelengths from 1270 nm to 1610 nm, each step 20 nm, except 1370nm, 1390nm,

Ⅸ. More information

FOTTU CO., LTD
23Floor, A-tower, Gunpo IT Vally ,
17, Gosan-ro 148 Beongil, Gunpo-si,
Gyeonggi-do, Korea 15850
Tel: 82-31-8068-1250
Fax: 82-31-8068-1264
Sales@fottu.com
www.fottu.com