1310 nm / 3 Gb/s Medium Power Single Optical SM Digital Diagnostic Transmitter

FVD2-1TR-SM30-M

Features

- SMPTE 297-2006 Compatible
- Hot-Pluggable SFP Footprint LC Optical Transceiver
- Small Form-Factor Pluggable (SFP) MSA compatible
- Speed from 50 Mbps to 3Gbps with up to 30 km
- Distance up to 30 km for 3G-SDI
- Support Video Pathological Patterns for SD-SDI, HD-SDI and 3G-SDI
- SFF-8472 Digital Diagnostic Function
- Single 3.3V power supply
- Operating case temperature : 0°C to 70°C
- 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-M is an optical single mode transmitter/receiver module designed to transmit/receive optical serial digital signals as defined in SMPTE 297-2006.It supports from 50 Mbps to 3 Gbps and is specifically designed for transmitted the SMPTE 259M, SMPTE 344M,SMPTE 292M and SMPTE 424M SDI pathological patterns. It is with the SFP 20-pin connector to allow hot plug capability. Digital diagnostic functions are available via an I^2C. It is with 1310 nm DFB laser transmitters. The transmitter can transmit signal from 50 Mbps to 3 Gbps with up to 30 km of single-mode fiber. A maximum distance of 30 km is achievable with 3Gbps pathological signals..

Ⅰ. Absolute Maximum Ratings

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	Note
Storage Temperature	T_{stg}	-40	85	°C	
Operating Case Temperature	T_c	0	70	°C	
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	Mb/s
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	-5	-2	0	dBm	1
Output Center Wavelength	λ	1260	1310	1360	nm	
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	2, SMPTE 424M
				270	ps	2, SMPTE 292M
				800	ps	2, SMPTE 344M
				1.5	ns	2, SMPTE 259M

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 μm single mode fiber.
2. 20% to 80%, unfiltered.

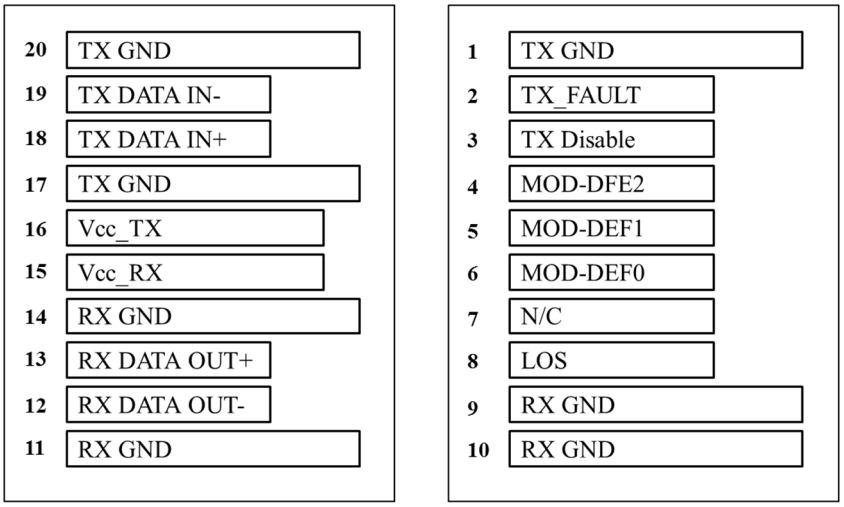
Receiver Specifications (0oC < Tc < 70oC, 3.13V < Vcc < 3.47V)

Parameter	Symbol	Min	Typ	Max	Unit	Notes
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	
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Unit**	**Notes**
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 292M
				800	ps	1, SMPTE 344M
				1.5	ps	1, SMPTE 259M
Output LOS Voltage -- Low	V_{OL}	0	-	0.5	V	IOL=-1.6mA, 1 TTL unit load
Output LOS Voltage -- High	V_{OH}	2.5		Vcc+0.3	V	IOL=-1.6μA, 1 TTL unit load
SCL, SDA	V_{OH}	2.5	-	Vcc+0.3	V	
	V_{OL}	0		0.5	V	

Notes

1.20% to 80%, unfiltered..

Ⅳ. Pin Information



Top of Board

Bottom of Board
(as viewed thru top of board)

Pin	Name	Description	Pin	Name	Description
1	TX GND	Transmitter Ground	11	RX GND	Receiver Ground
2	TX Fault[1]	Transmitter Fault Indication	12	RX DATA OUT-	Inverse Received Data Out
3	TX Disable	Transmitter Disable (Module disables on high or open)	13	RX DATA OUT+	Received Data Out
4	MOD-DFE2	Modulation Definition 2 – Two wires serial ID Interface	14	RX GND	Receiver Ground
5	MOD-DEF1	Modulation Definition 1 – Two wires serial ID Interface	15	Vcc RX	Receiver Power – 3.3V±5%
6	MOD-DEF0	Modulation Definition 0 – Ground in Module	16	Vcc TX	Transmitter Power – 3.3V±5%
7	N/C	Not Connected	17	TX GND	Transmitter Ground
8	LOS	Loss of Signal.	18	TX DATA IN+	Transmitter Data In
9	RX GND	Receiver Ground	19	TX DATA IN-	Inverse Transmitter Data In
10	RX GND	Receiver Ground	20	TX GND	Transmitter Ground

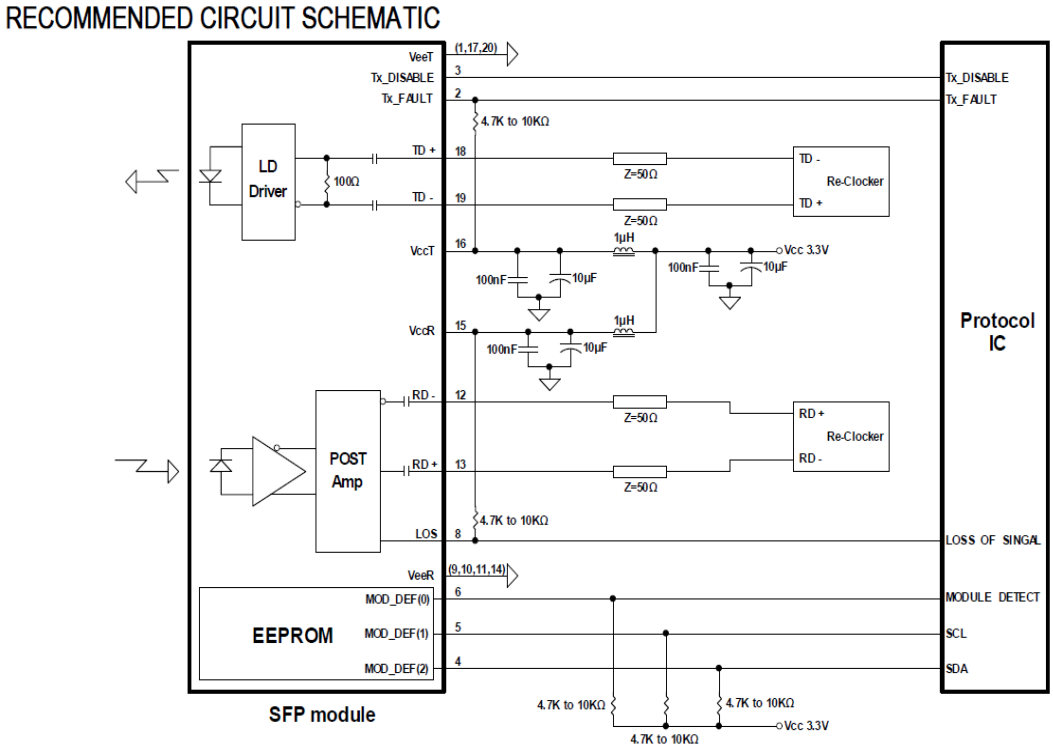
Ⅴ. Module Definition

Module Definition	MOD-DEF2 PIN 4	MOD-DEF1 PIN 5	MOD-DEF0 PIN 6	Interpretation by Host
4	SDA	SCL	LV-TTL Low	Serial module definition protocol

Module Definition 4 specifies a serial definition protocol. For this definition, upon power up,MOD-DEF(1:2) appear as no connector(NC) and MOD-DEF(0) is TTL LOW.

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.

Ⅵ. Application Schematics

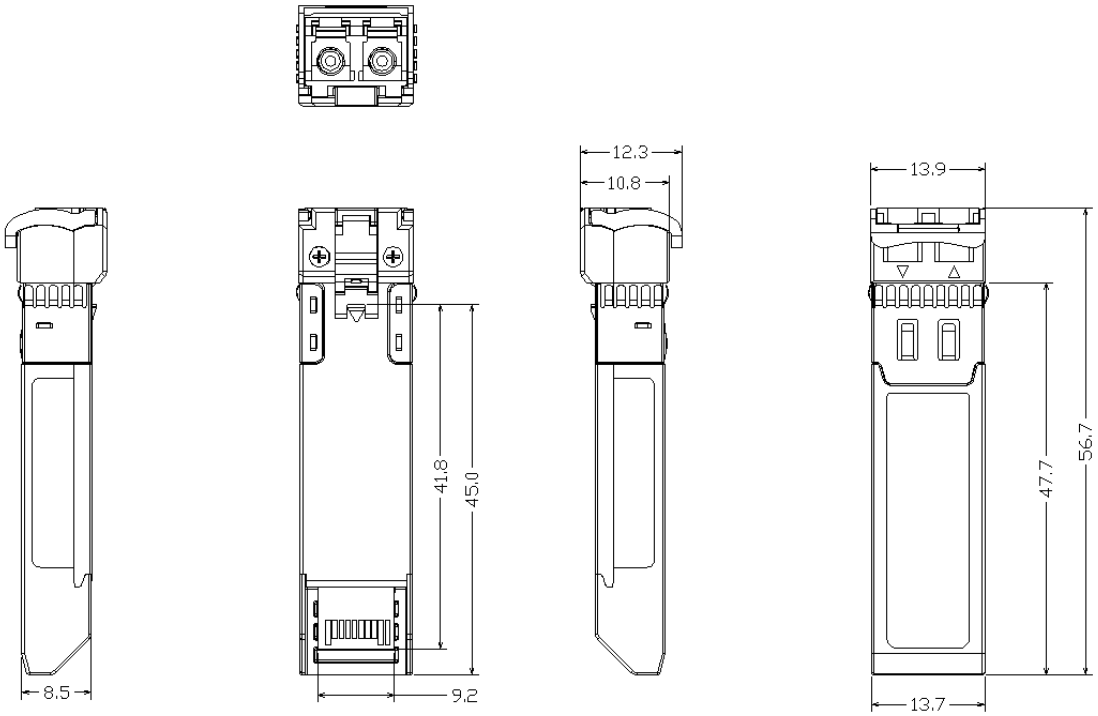


Ⅶ. Outline Diagrams

Package Outline

Dimensions are in millimeters

Tolerances are ±0.2mm, unless otherwise specified



Ⅷ. Ordering Information

FVD	Core	-	Tx/Rx	-	Mode	Distance	-	MSA
FOTTU Video SFP For SDI	2: 2core 1: 1core		2T : 2Tx 1T : 1Tx 2R : 2Rx 1R : 1Rx 1TR:1Tx+1Rx 1B : 1BOSA 2B : 2BOSA	-	MM: Multimode SM: Single mode	03 : 300m 10 : 10km 30 : 30km 50 : 50km 80 : 80km		M: MSA

IX. More information

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