**850 nm / 3 Gb/s Single Optical Multi-Mode Digital Diagnostic Transmitter**

# FVD2-1T-SM10

## Features

- SMPTE 297-2006 Compatible
- Speed from 50 Mbps to 3Gbps with up to 1,000 km Multi-mode Fiber
- Distance up to 300m for 3G-SDI
- Support Video Pathological Patterns for SD-SDI, HD-SDI and 3G-SDI
- Single Transmitter with Simplex LC
- Based on Industry Standard SFP
- 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 FVD2-1T-SM10 is a single channel optical multi-mode transceiver designed to transmit optical serial digital signals as defined in SMPTE 297-2006. It supports from 50 kbps 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 850 nm VCSEL transmitters. The transmitter can transmit signal from 50Mbps to 3 Gbps with up to 1,000m of multi-mode fiber when using the SPS-9110VW-1RG/2RG as the receiver. A maximum distance of 300m 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 | 7 | °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 | | 130 | 180 | 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 | -7 | -2 | 0 | dBm | 1 |
| Output Center Wavelength | λ | 830 | 850 | 870 | nm | At 25oC |
| Output Spectrum Width | Δλ | | | 1 | nm | RMS (σ) |
| 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 mm single mode fiber.
2. 20% to 80%, unfiltered.

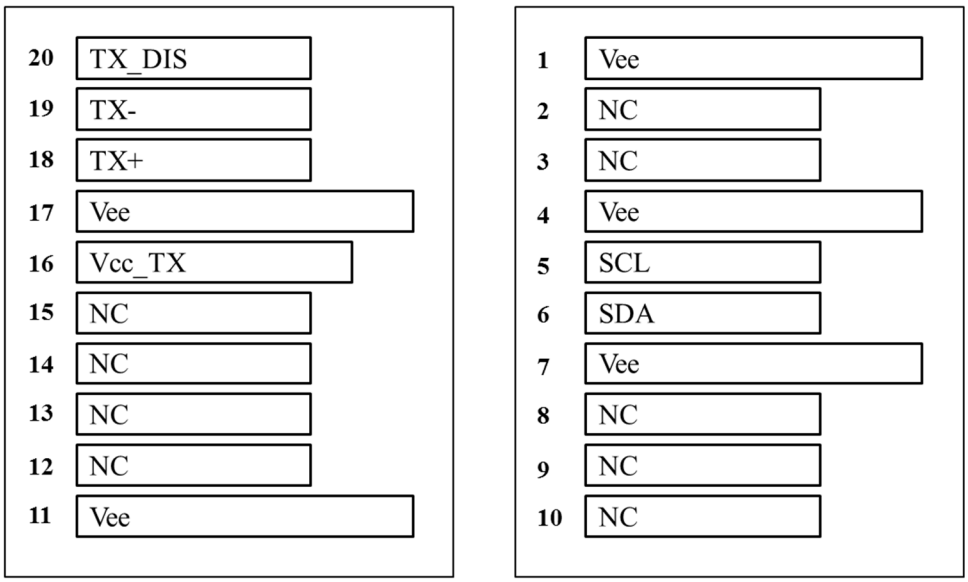
## Ⅳ. Module Definition

| 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 $E^2$PROM protocol of the ATMEL AT24C01A/02/04 family of components.

## Ⅴ. Pin Information

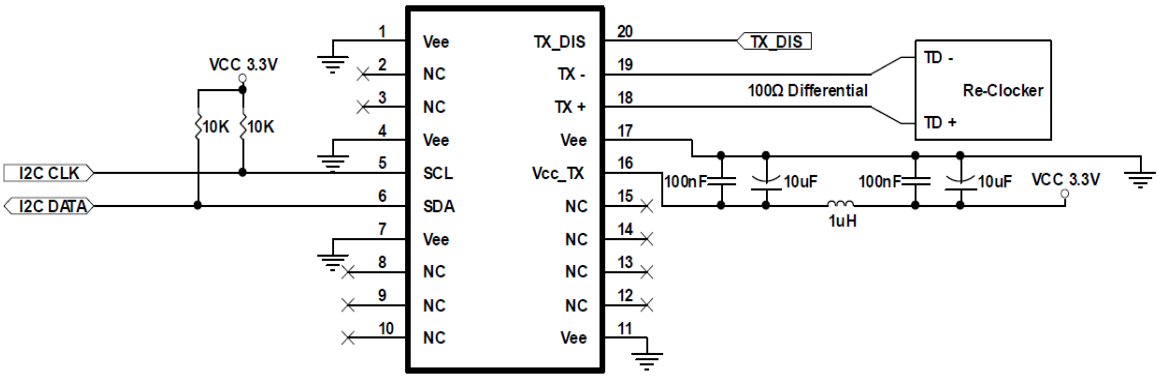



Top of Board

Bottom of Board
(as viewed thru top of board)

| Pin | Name | Function | NOTE |
|---|---|---|---|
| 1 | Vee | Signal Ground | |
| 2 | NC | No Connection | |
| 3 | NC | No Connection | |
| 4 | Vee | Signal Ground | |
| 5 | SCL | Serial I2C Clock | |
| 6 | SDA | Serial I2C Data | |
| 7 | Vee | Signal Ground | |
| 8 | NC | No Connection | |
| 9 | NC | No Connection | |
| 10 | NC | No Connection | |
| 11 | Vee | Signal Ground | |
| 12 | NC | No Connection | |
| 13 | NC | No Connection | |
| 14 | Vee | Signal Ground | |
| 15 | NC | No Connection | |
| 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



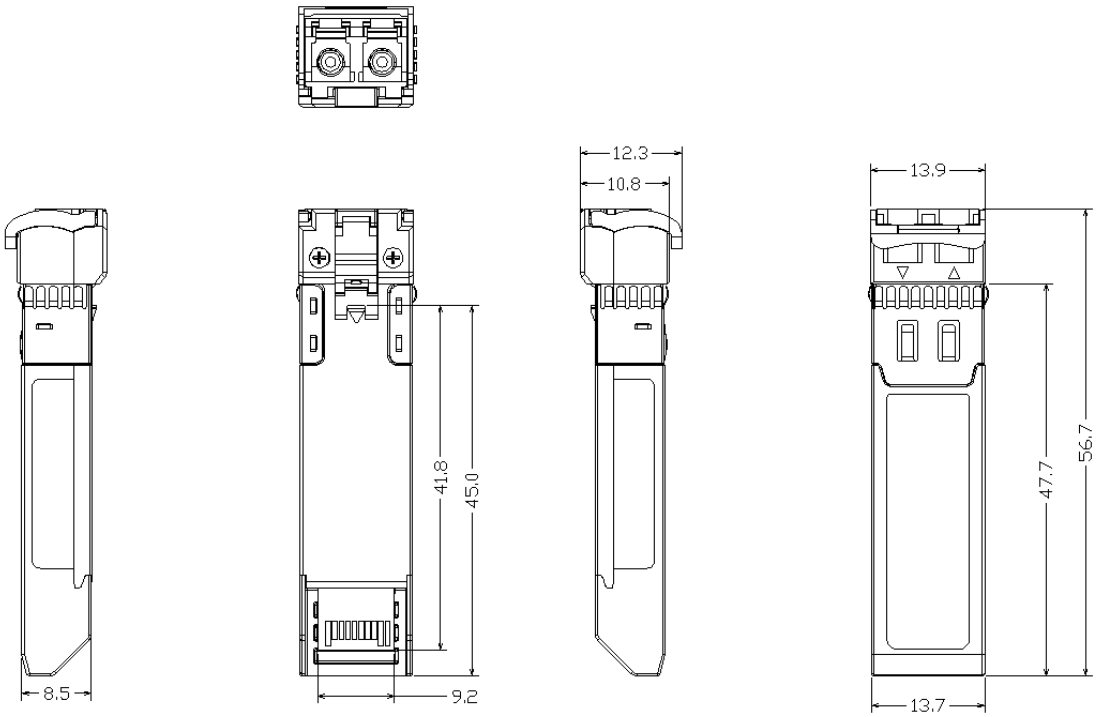

1. Consult the Chipset manufacturer's applications information for biasing required for TX outputs. Some chipset outputs are internally biased and may not need external bias resistor.

## 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 |
|---|---|---|---|---|---|---|
| FOTTU<br>Video SFP<br>For SDI | 2 : 2core<br>1: 1core | | 2T : 2Tx<br>1T : 1Tx<br>2R : 2Rx<br>1R : 1Rx<br>1TR:1Tx+1Rx<br>1B : 1BOSA<br>2B : 2BOSA | - | MM : Multimode<br>SM : Single mode | 03 : 300m<br>10 : 10km<br>30 : 30km<br>50 : 50km<br>80 : 80km |

## Ⅸ. More information

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