**SPS-9380V-2RG** **(RoHS Compliant)**

**1260 to 1620 nm / 3 Gb/s Dual Optical SM Receiver**

## FEATURES

- SMPTE 297-2006 Compliant
- Speed from 50 Mbps to 3Gbps
- Support Video Pathological Patterns for SD-SDI, HD-SDI and 3G-SDI
- Dual High Sensitivity APD Receiver with Duplex LC
- Based on Industry Standard SFP
- Single +3.3 V Power Supply
- RoHS Compliant
- 0 to 70°C Operation
- Hot Pluggable

## DESCRIPTION

The SPS-9380V-2RG is a dual channel optical single mode receiver module designed to receive optical serial digital signals as defined in SMPTE 297-2006. It supports from 50 Mbps to 3 Gbps and is specifically designed for received 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. Each receiver can receive signal from 50 Mbps to 3 Gbps with up to 30 km of single-mode fiber when using the SPS-9380V-2TG as the transmitter. A maximum distance of 80 km is achievable with 3Gbps pathological signals.

## APPLICATIONS

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

## ORDER INFORMATION

| P/No. | Type | Bit Rate (Mb/s) | RX1 | | RX2 | | Package | Temp (°C) | RoHS Compliant |
|---|---|---|---|---|---|---|---|---|---|
| | | | λ (nm) | Sen. (dBm) | λ (nm) | Sen. (dBm) | | | |
| SPS-9380V-2RG | 2-RX | 50 to 3000 | 1260/1620 | -9 to -28 | 1260/1620 | -9 to -28 | LC SFP | 0 to 70 | Yes |

## ABSOLUTE MAXIMUM RATINGS

Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

| Absolute Maximum Ratings | | | | | |
|---|---|---|---|---|---|
| **Parameter** | **Symbol** | **Min** | **Max** | **Units** | **Notes** |
| Storage Temperature | Tstg | -40 | 85 | °C | |
| Operating Case Temperature | Tc | 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 |

| Recommended Operating Conditions | | | | | |
|---|---|---|---|---|---|
| **Parameter** | **Symbol** | **Min** | **Typ** | **Max** | **Units / Notes** |
| Power Supply Voltage | Vcc | 3.13 | 3.3 | 3.47 | V |
| Operating Case Temperature | Tc | 0 | | 70 | °C |
| Baud Rate | | 50 | | 3000 | Mb/s |
| Power Supply Current | Icc | | 200 | 250 | mA |

| Receiver Specifications ($0^oC < Tc < 70^oC$, 3.13V < Vcc < 3.47V) | | | | | | |
|---|---|---|---|---|---|---|
| **Parameter** | **Symbol** | **Min** | **Typ** | **Max** | **Units** | **Notes** |
| **Optical** | | | | | | |
| Wavelength of Operation | | 1260 | --- | 1620 | nm | |
| Sensitivity for SMPTE 424M 2.97 Gb/s | Sen | -9 | --- | -28 | dBm | Pathological |
| | | -9 | --- | -28 | dBm | PRBS $2^{23}$-1, BER=1E-12 |
| Sensitivity for SMPTE 292M 1.485 Gb/s | Sen | -9 | --- | -28 | dBm | Pathological |
| | | -9 | --- | -28 | dBm | PRBS $2^{23}$-1, BER=1E-12 |
| Signal Detect -- Asserted | Pa | --- | --- | -28 | dBm | Transition: low to high |
| Signal Detect -- Deasserted | Pd | -36 | --- | --- | dBm | Transition: high to low |
| 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 292M |
| | | | | 800 | ps | 1, SMPTE 344M |
| | | | | 1.5 | ns | 1, SMPTE 259M |
| 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 | $I_{OH}$=40μA, 1 TTL unit load |
| SCL, SDA | $V_{OH}$ | 2.5 | | Vcc+0.3 | V | |
| | $V_{OL}$ | 0 | | 0.5 | V | |

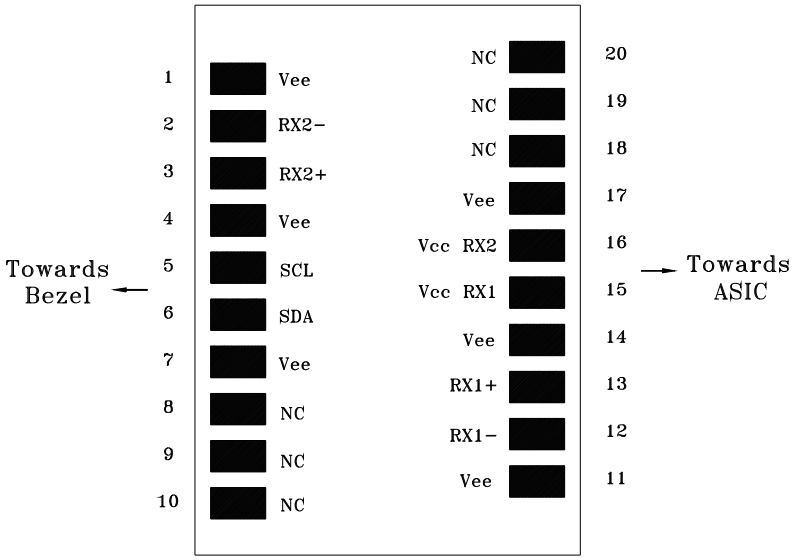
1. 20% to 80%, unfiltered.

## MODULE DEFINITION

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

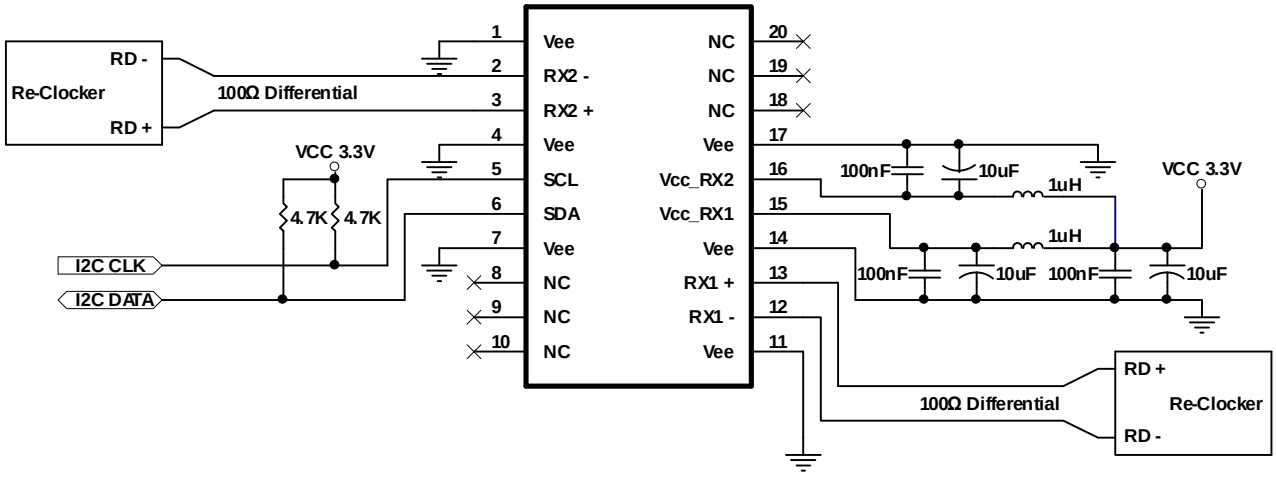
Module Definition 4 specifies a serial definition protocol. For this definition, upon power up, SCL and SDA appear as no connector (NC). When the host system detects this condition, it activates the serial protocol. The protocol uses the 2-wire serial CMOS $E^2$PROM protocol of the ATMEL AT24C01A/02/04 family of components.

CONNECTION DIAGRAM



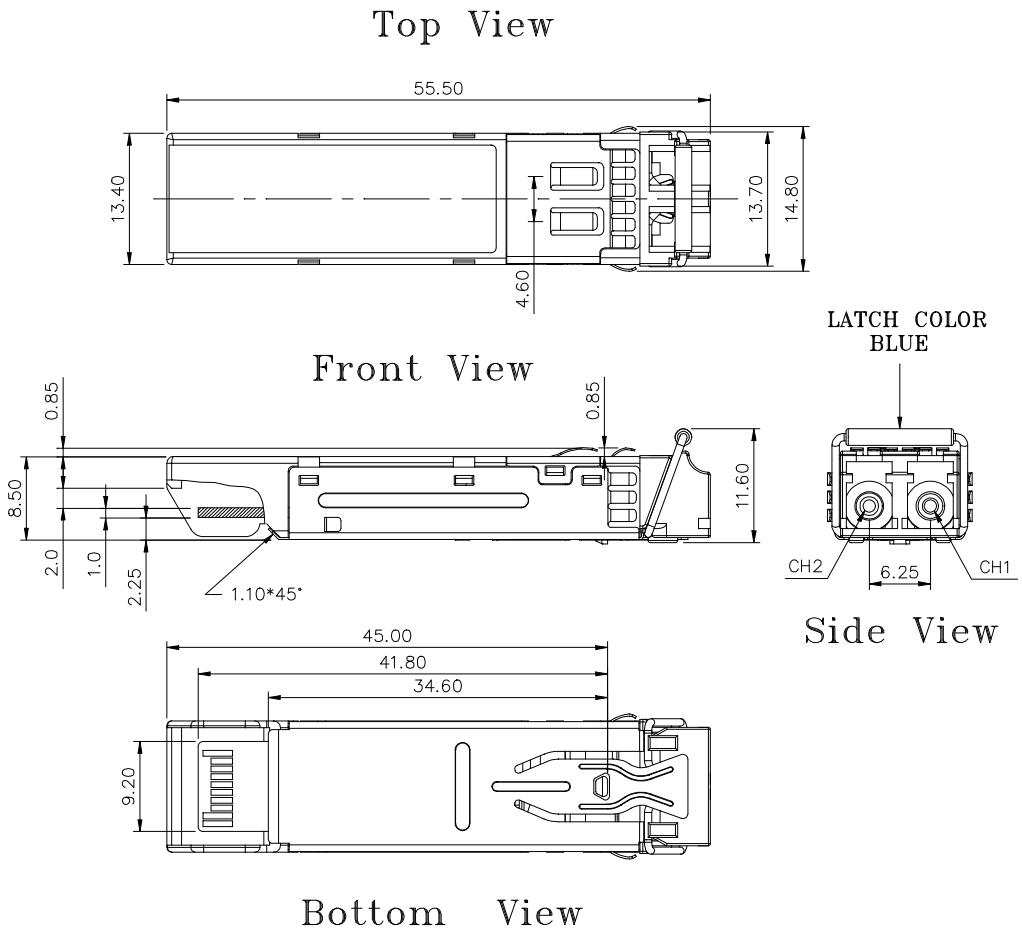

| PIN | Name | Function | Notes |
|---|---|---|---|
| 1 | Vee | Signal Ground | |
| 2 | RX2- | Negative Differential Output (2) | |
| 3 | RX2+ | Positive Differential Output (2) | |
| 4 | Vee | Signal Ground | |
| 5 | SCL | Serial $I^2C$ Clock | |
| 6 | SDA | Serial $I^2C$ Data | |
| 7 | Vee | Signal Ground | |
| 8 | NC | No Connection | |
| 9 | NC | No Connection | |
| 10 | NC | No Connection | |
| 11 | Vee | Signal Ground | |
| 12 | RX1- | Negative Differential Output (1) | |
| 13 | RX1+ | Positive Differential Output (1) | |
| 14 | Vee | Signal Ground | |
| 15 | Vcc RX1 | Power Supply (1) | +3.3V±5% |
| 16 | Vcc RX2 | Power Supply (2) | +3.3V±5% |
| 17 | Vee | Signal Ground | |
| 18 | NC | No Connection | |
| 19 | NC | No Connection | |
| 20 | NC | No Connection | |

## RECOMMENDED CIRCUIT SCHEMATIC




1. Consult Chipset manufacturer's data sheet and application data for appropriate receiver input biasing network.

## PACKAGE DIAGRAM (Units in mm)



REVISION HISTORY

| Version | Subject | Release Date |
|---|---|---|
| 1.0 | Initial datasheet | 2009/3/1 |
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