

## SPS-9310VW-CXXCYYG

(RoHS Compliant)

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

#### FEATURES

- I SMPTE 297-2006 Compatible
- I Speed from 50 Mbps to 3 Gbps
- I Support Video Pathological Patterns for SD-SDI, HD-SDI and 3G-SDI
- I Dual CWDM Transmitter: 1270 nm to 1610 nm
- I Based on Industry Standard SFP
- I SFF-8472 Digital Diagnostic Function
- I Two Independent TTL Laser Disable Input
- I Single +3.3 V Power Supply
- I RoHS-6 Compliant
- I 0 to 70°C Operation
- I Hot Pluggable
- I Class 1 Laser International Safety Standard IEC-60825 Compliant

#### DESCRIPTION

The SPS-9310VW-CXXCYYG is a dual channel optical single mode transmitter module designed to transmit 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<sup>2</sup>C. It is with two independent CWDM DFB laser transmitters. There are eighteen center wavelengths available from 1270 nm to 1610 nm, with each step 20 nm.

#### LASER SAFETY

This single mode transceiver is a Class 1 laser product. It complies with IEC-60825 and FDA 21 CFR 1040.10 and 1040.11. The transceiver must be operated within the specified temperature and voltage limits. The optical ports of the module shall be terminated with an optical connector or with a dust plug.

#### APPLICATIONS

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

#### ORDER INFORMATION

P/No.	Type	Bit Rate (Mb/s)	TX1		TX2		Package	Temp (°C)	RoHS Compliant
			λ (nm)	Power (dBm)	λ (nm)	Power (dBm)			
SPS-9310VW-CXXCYYG	2-TX	50 to 3000	XX*	-3 to -8	YY*	-3 to -8	LC SFP with DMI	0 to 70	Yes

\*: XX is for Channel 1 and YY is for Channel 2 CWDM Wavelength (0 to 70°C)

Central Wavelength	Min. (nm)	Typ. (nm)	Max. (nm)	Clasp Color Code	Central Wavelength	Min. (nm)	Typ. (nm)	Max. (nm)	Clasp Color Code
-C270	1264.5	1270	1277.5	Light Purple	-C450	1444.5	1450	1457.5	Yellow Orange
-C290	1284.5	1290	1297.5	Sky Blue	-C470	1464.5	1470	1477.5	Gray
-C310	1304.5	1310	1317.5	Yellow Green	-C490	1484.5	1490	1497.5	Violet
-C330	1324.5	1330	1337.5	Yellow Ocher	-C510	1504.5	1510	1517.5	Blue
-C350	1344.5	1350	1357.5	Pink	-C530	1524.5	1530	1537.5	Green
-C370	1364.5	1370	1377.5	Beige	-C550	1544.5	1550	1557.5	Yellow
-C390	1384.5	1390	1397.5	White	-C570	1564.5	1570	1577.5	Orange
-C410	1404.5	1410	1417.5	Silver	-C590	1584.5	1590	1597.5	Red
-C430	1424.5	1430	1437.5	Black	-C610	1604.5	1610	1617.5	Brown

CWDM\*: 18 Wavelengths from 1270 nm to 1610 nm, each step 20 nm.

Clasp Color Code\*: Clasp Color Code is for Channel 1 CWDM Wavelength

#### RELATED PRODUCTS

P/No.	Type	Bit Rate (Mb/s)	RX1		RX2		Package	Temp (°C)	RoHS Compliant
			λ (nm)	Power (dBm)	λ (nm)	Sen. (dBm)			
SPS-9110VW-2RG	2-RX	50 to 3000	1260/1620	0 to -20	1260/1620	0 to -20	LC SFP with DMI	0 to 70	Yes
SPS-9380VW-2RG	2-RX	50 to 3000	1260/1620	-9 to -28	1260/1620	-9 to -28	LC SFP with DMI	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	300	mA

Transmitter Specifications (0°C < Tc < 70°C, 3.13V < Vcc < 3.47V)						
Parameter	Symbol	Min	Typ	Max	Units	Notes
<b>Optical</b>						
Optical Transmit Power	Po	-8		-3	dBm	1
Output Center Wavelength	$\lambda$	$\lambda_c - 5.5$	$\lambda_c$	$\lambda_c + 7.5$	nm	2
Output Spectrum Width	$\Delta\lambda$	---		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
<b>Electrical</b>						
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	

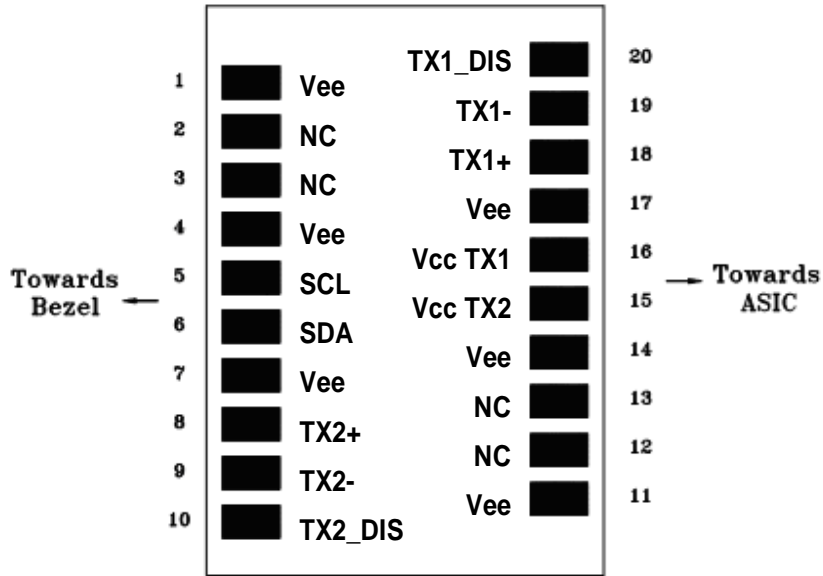
1. Output power is power coupled into a 9/125  $\mu$ m single mode fiber.
2. ITU-T G.694.2 CWDM wavelength from 1470 nm to 1610 nm, each step 20 nm.
3. 20% to 80%, unfiltered.

## MODULE DEFINITION

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

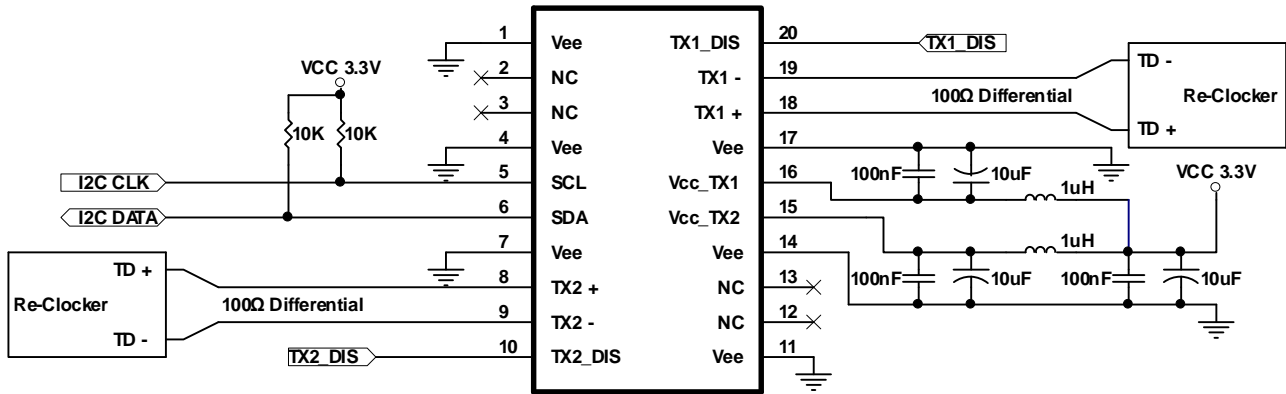
Module Definition 4 specifies a serial definition protocol. For this definition, upon power up, SCL and SDA appear as no connector (NC). When the host system detects this condition, it activates the serial protocol. The protocol uses the 2-wire serial CMOS E<sup>2</sup>PROM protocol of the ATMEL AT24C01A/02/04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

CONNECTION DIAGRAM



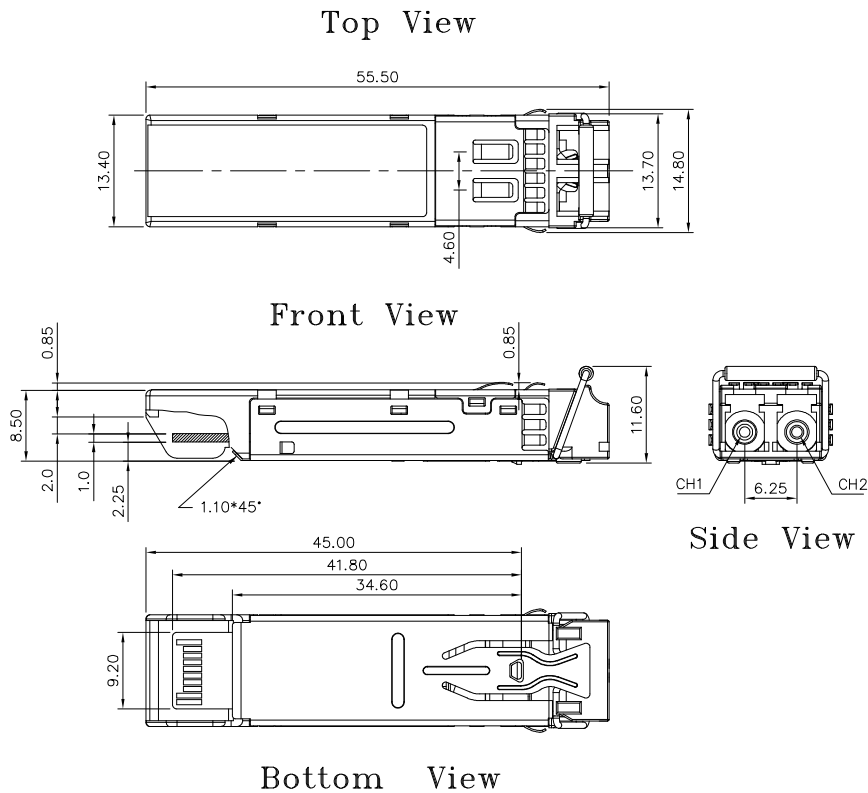
PIN	Name	Function	Notes
1	Vee	Signal Ground	
2	NC	No Connection	
3	NC	No Connection	
4	Vee	Signal Ground	
5	SCL	Serial I <sup>2</sup> C Clock	
6	SDA	Serial I <sup>2</sup> C Data	
7	Vee	Signal Ground	
8	TX2+	Positive Transmitter Data In (2)	AC coupled differential lines with 100 ohm differential termination inside the module
9	TX2-	Negative Transmitter Data In (2)	
10	TX2_DIS	Transmitter Disable (2)	Internal 4.7 kΩ pull-up. The bias current and modulation current are turned off if TX2_DIS = HIGH.
11	Vee	Signal Ground	
12	NC	No Connection	
13	NC	No Connection	
14	Vee	Signal Ground	
15	Vcc TX2	Power Supply (2)	+3.3V±5%
16	Vcc TX1	Power Supply (1)	+3.3V±5%
17	Vee	Signal Ground	
18	TX1+	Positive Transmitter Data In (1)	AC coupled differential lines with 100 ohm differential termination inside the module
19	TX1-	Negative Transmitter Data In (1)	
20	TX1_DIS	Transmitter Disable (1)	Internal 4.7 kΩ pull-up. The bias current and modulation current are turned off if TX1_DIS = HIGH.

## RECOMMENDED CIRCUIT SCHEMATIC



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.

## PACKAGE DIAGRAM (Units in mm)



Note: Specifications subject to change without notice.

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REVISION HISTORY

Version	Subject	Release Date
1.0	Initial datasheet	2009/3/1
2.0	Provide 18-CH CWDM	2009/8/1