

SPS-93120VW-DXXDYYG

(RoHS Compliant)

100GHz DWDM / 3Gb/s High Power Dual Optical SM Digital Diagnostic Transmitter

FEATURES

- SMPTE 297-2006 Compatible
- Designed for Dispersion Penalty 2400 ps/nm
- Speed from 50 Mbps to 3 Gbps
- Distance up to 120 km for 3G-SDI
- Support Video Pathological Patterns for SD-SDI, HD-SDI and 3G-SDI
- Dual Transmitter with Duplex LC
- Based on Industry Standard SFP
- SFF-8472 Digital Diagnostic Function
- Temperature-stabilized DWDM DML Transmitter
- 100 GHz ITU Grid, C Band
- Two Independent TTL Laser Disable Input
- Single +3.3 V Power Supply
- RoHS Compliant
- 0 to 70°C Operation
- 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 SPS-93120VW-DXXDYYG 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 I²C. This module is designed for single mode fiber and operates at a nominal wavelength of 100GHz ITU Grid, C Band DWDM wavelength. Each transmitter can transmit signal from 50 Mbps to 3 Gbps with up to 120 km of single-mode fiber when using SPS-9380VW-2RG as the receiver. A maximum distance of 120 km is achievable with 3Gbps pathological signals.

LASER SAFETY

This single mode transmitter is a Class 1 laser product. It complies with IEC-60825 and FDA 21 CFR 1040.10 and 1040.11. The transmitter 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.

ORDER INFORMATION

P/No.	Type	Bit Rate (Mb/s)	TX1		TX2		Package	Temp (°C)	RoHS Compliant
			λ (nm)	Power (dBm)	λ (nm)	Sen. (dBm)			
SPS-93120VW-DXXDYYG	2-TX	50 to 3000	XX*	7 to 3	YY*	7 to 3	LC SFP with DMI	0 to 70	Yes

*: XX is for Channel 1 and YY is for Channel 2 100GHz ITU Grid wavelength (Please see below)

Channel #	Product code	Frequency (THz)	Center Wavelength (nm)	Label**
20	SPS-93120VW-D20DYYG	192.0	1561.42	D20
21	SPS-93120VW-D21DYYG	192.1	1560.61	D21
22	SPS-93120VW-D22DYYG	192.2	1559.79	D22
23	SPS-93120VW-D23DYYG	192.3	1558.98	D23
24	SPS-93120VW-D24DYYG	192.4	1558.17	D24
25	SPS-93120VW-D25DYYG	192.5	1557.36	D25
26	SPS-93120VW-D26DYYG	192.6	1556.55	D26
27	SPS-93120VW-D27DYYG	192.7	1555.75	D27
28	SPS-93120VW-D28DYYG	192.8	1554.94	D28
29	SPS-93120VW-D29DYYG	192.9	1554.13	D29
30	SPS-93120VW-D30DYYG	193.0	1553.33	D30
31	SPS-93120VW-D31DYYG	193.1	1552.52	D31
32	SPS-93120VW-D32DYYG	193.2	1551.72	D32
33	SPS-93120VW-D33DYYG	193.3	1550.92	D33
34	SPS-93120VW-D34DYYG	193.4	1550.12	D34
35	SPS-93120VW-D35DYYG	193.5	1549.32	D35
36	SPS-93120VW-D36DYYG	193.6	1548.51	D36
37	SPS-93120VW-D37DYYG	193.7	1547.72	D37
38	SPS-93120VW-D38DYYG	193.8	1546.92	D38
39	SPS-93120VW-D39DYYG	193.9	1546.12	D39
40	SPS-93120VW-D40DYYG	194.0	1545.32	D40
41	SPS-93120VW-D41DYYG	194.1	1544.53	D41
42	SPS-93120VW-D42DYYG	194.2	1543.73	D42
43	SPS-93120VW-D43DYYG	194.3	1542.94	D43
44	SPS-93120VW-D44DYYG	194.4	1542.14	D44
45	SPS-93120VW-D45DYYG	194.5	1541.35	D45
46	SPS-93120VW-D46DYYG	194.6	1540.56	D46
47	SPS-93120VW-D47DYYG	194.7	1539.77	D47
48	SPS-93120VW-D48DYYG	194.8	1538.98	D48
49	SPS-93120VW-D49DYYG	194.9	1538.19	D49
50	SPS-93120VW-D50DYYG	195.0	1537.40	D50
51	SPS-93120VW-D51DYYG	195.1	1536.61	D51
52	SPS-93120VW-D52DYYG	195.2	1535.82	D52
53	SPS-93120VW-D53DYYG	195.3	1535.04	D53
54	SPS-93120VW-D54DYYG	195.4	1534.25	D54
55	SPS-93120VW-D55DYYG	195.5	1533.47	D55
56	SPS-93120VW-D56DYYG	195.6	1532.68	D56
57	SPS-93120VW-D57DYYG	195.7	1531.90	D57
58	SPS-93120VW-D58DYYG	195.8	1531.12	D58
59	SPS-93120VW-D59DYYG	195.9	1530.33	D59
60	SPS-93120VW-D60DYYG	196.0	1529.55	D60

** : Clasp Color Code is for Channel 1 100GHz ITU Grid wavelength

RELATED PRODUCTS

P/No.	Type	Bit Rate (Mb/s)	RX1		RX2		Package	Temp (°C)	RoHS Compliant
			λ (nm)	Sen. (dBm)	λ (nm)	Sen. (dBm)			
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	Topr	0	70	°C	
Power Supply Voltage	Vcc	0	4	V	
ESD Tolerance on all pins			1	KV	HBM
Relative Humidity	RH	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	Topr	0		70	°C
Data Rate		50		3000	Mb/s
Power Supply Current	I _{CC(TX+RX)}			860	mA

Transmitter Specifications (0°C < Tc < 70°C, 3.13V < Vcc < 3.47V)						
Parameter	Symbol	Min	Typ	Max	Units	Notes
Optical						
Average Launch Power	P _{O, AVG}	3	---	7	dBm	1
Center Wavelength Spacing			100		GHz	2
Transmitter Center Wavelength -- over life time	λ _c	X-100	X	X+100	pm	3
Output Spectrum Width	Δλ	---		1	nm	-20 dB width
Extinction Ratio	ER	5	7.5		dB	
Relative Intensity Noise	RIN			-120	dB/Hz	
Optical Rise Time / Fall Time	tr / tf			135	ps	4, SMPTE 424M
				270	ps	4, SMPTE 292M
				800	ps	4, SMPTE 344M
				1.5	ns	4, SMPTE 259M
Electrical						
Differential Input Voltage	V _{IH} - V _{IL}	200		800	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	

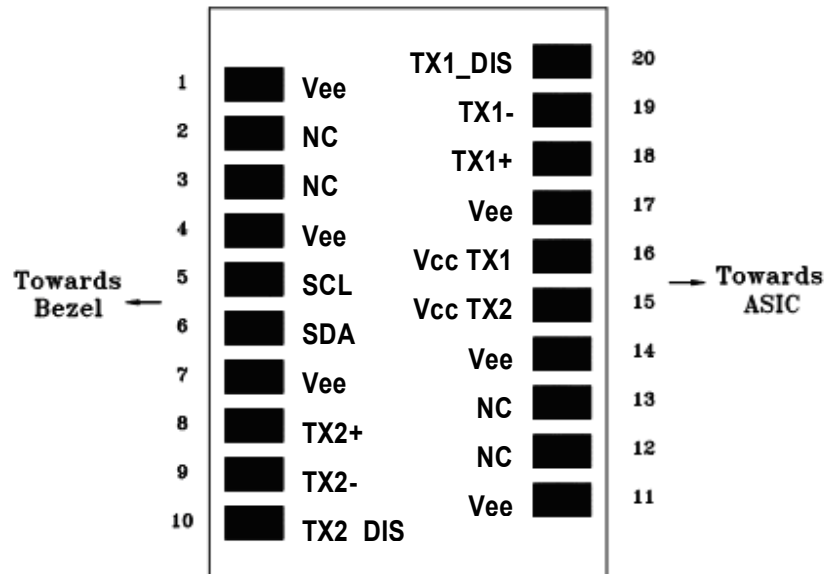
1. Output power is power coupled into a 9/125 μm single mode fiber.
2. Corresponds to approximately 0.8 nm.
3. X = specified ITU Grid wavelength
4. 20% to 80%, unfiltered.

MODULE DEFINITION

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

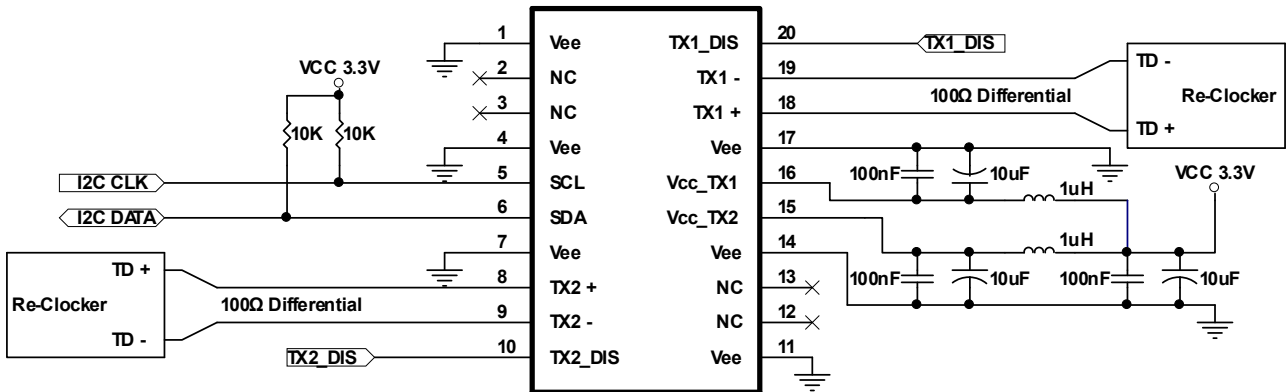
Module Definition 4 specifies a serial definition protocol. For this definition, upon power up, SCL and SDA appear as no connector (NC). When the host system detects this condition, it activates the serial protocol. The protocol uses the 2-wire serial CMOS E²PROM protocol of the ATMEL AT24C01A/02/04 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 ² C Clock	
6	SDA	Serial I ² 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.

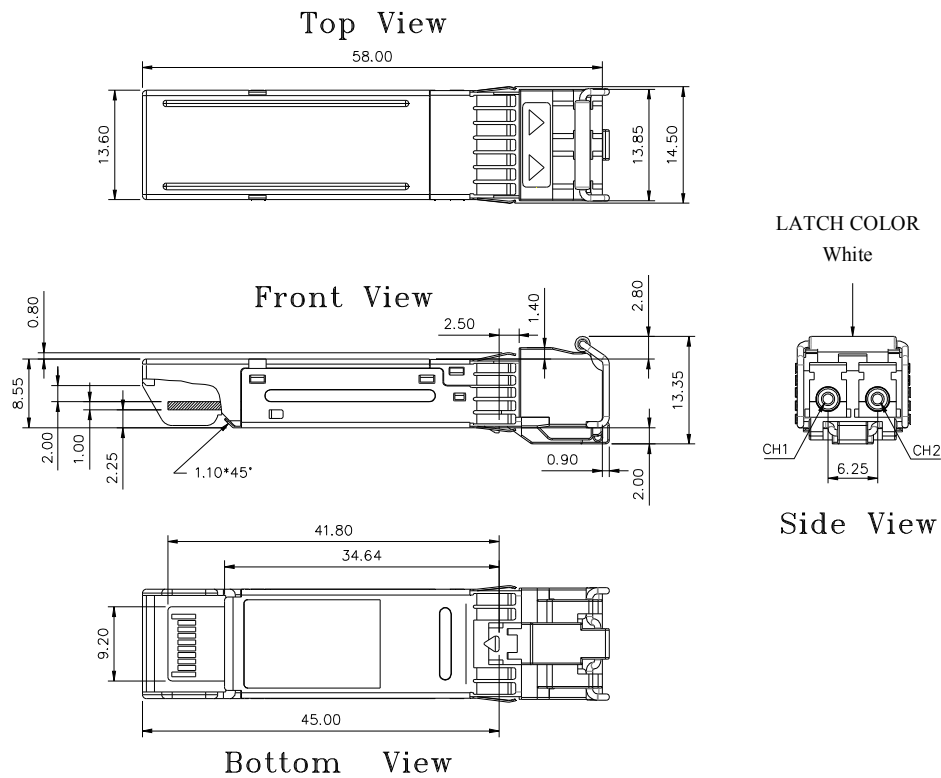
RECOMMENDED CIRCUIT SCHEMATIC



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.

REVISION HISTORY

Version	Subject	Release Date
1.0	Initial datasheet	2017/4/5
1.1	Update Package Diagram	2022/10/27
1.2	Update the Product code on page 2	2023/10/16