

SPS-93120VW-1TDXXG

(RoHS Compliant)

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

FEATURES

- SMPTE 297-2006 Compatible
- **Designed for Dispersion Penalty 2400 ps/nm**
- Speed from 50 Mbps to 3Gbps
- Distance up to 120 km 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
- **Temperature-stabilized DWDM DML Transmitter**
- **100 GHz ITU Grid, C Band**
- 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-1TDXXG is a single 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. The transmitter can transmit signal from 50 Mbps to 3 Gbps with up to 120 km of single-mode fiber when using SPS-9380VW-1RG/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)	TX		RX		Package	Temp (°C)	RoHS Compliant
			λ (nm)	Power (dBm)	λ (nm)	Sen. (dBm)			
SPS-93120VW-1TDXXG	1-TX	50 to 3000	DWDM*	7 to 3			LC SFP with DMI	0 to 70	Yes

*XX: 100GHz ITU Grid wavelength (Please see below)

Channel #	Product code	Frequency (THz)	Center Wavelength (nm)	Label
20	SPS-93120VW-1TD20G	192.0	1561.42	D20
21	SPS-93120VW-1TD21G	192.1	1560.61	D21
22	SPS-93120VW-1TD22G	192.2	1559.79	D22
23	SPS-93120VW-1TD23G	192.3	1558.98	D23
24	SPS-93120VW-1TD24G	192.4	1558.17	D24
25	SPS-93120VW-1TD25G	192.5	1557.36	D25
26	SPS-93120VW-1TD26G	192.6	1556.55	D26
27	SPS-93120VW-1TD27G	192.7	1555.75	D27
28	SPS-93120VW-1TD28G	192.8	1554.94	D28
29	SPS-93120VW-1TD29G	192.9	1554.13	D29
30	SPS-93120VW-1TD30G	193.0	1553.33	D30
31	SPS-93120VW-1TD31G	193.1	1552.52	D31
32	SPS-93120VW-1TD32G	193.2	1551.72	D32
33	SPS-93120VW-1TD33G	193.3	1550.92	D33
34	SPS-93120VW-1TD34G	193.4	1550.12	D34
35	SPS-93120VW-1TD35G	193.5	1549.32	D35
36	SPS-93120VW-1TD36G	193.6	1548.51	D36
37	SPS-93120VW-1TD37G	193.7	1547.72	D37
38	SPS-93120VW-1TD38G	193.8	1546.92	D38
39	SPS-93120VW-1TD39G	193.9	1546.12	D39
40	SPS-93120VW-1TD40G	194.0	1545.32	D40
41	SPS-93120VW-1TD41G	194.1	1544.53	D41
42	SPS-93120VW-1TD42G	194.2	1543.73	D42
43	SPS-93120VW-1TD43G	194.3	1542.94	D43
44	SPS-93120VW-1TD44G	194.4	1542.14	D44
45	SPS-93120VW-1TD45G	194.5	1541.35	D45
46	SPS-93120VW-1TD46G	194.6	1540.56	D46
47	SPS-93120VW-1TD47G	194.7	1539.77	D47
48	SPS-93120VW-1TD48G	194.8	1538.98	D48
49	SPS-93120VW-1TD49G	194.9	1538.19	D49
50	SPS-93120VW-1TD50G	195.0	1537.40	D50
51	SPS-93120VW-1TD51G	195.1	1536.61	D51
52	SPS-93120VW-1TD52G	195.2	1535.82	D52
53	SPS-93120VW-1TD53G	195.3	1535.04	D53
54	SPS-93120VW-1TD54G	195.4	1534.25	D54
55	SPS-93120VW-1TD55G	195.5	1533.47	D55
56	SPS-93120VW-1TD56G	195.6	1532.68	D56
57	SPS-93120VW-1TD57G	195.7	1531.90	D57
58	SPS-93120VW-1TD58G	195.8	1531.12	D58
59	SPS-93120VW-1TD59G	195.9	1530.33	D59
60	SPS-93120VW-1TD60G	196.0	1529.55	D60

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-1RG	1-RX	50 to 3000	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)}			430	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	

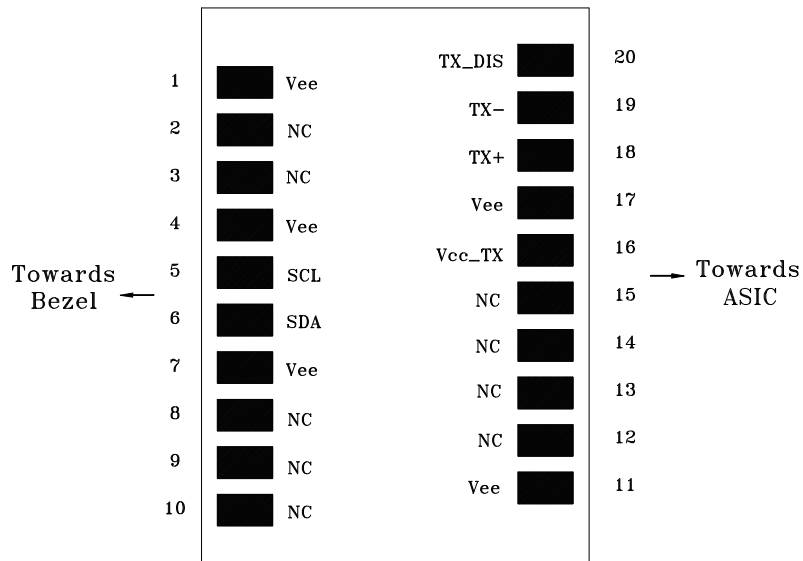
- Output power is power coupled into a 9/125 μm single mode fiber.
- Corresponds to approximately 0.8 nm.
- X = specified ITU Grid wavelength
- 20% to 80%, unfiltered.

MODULE DEFINITION

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

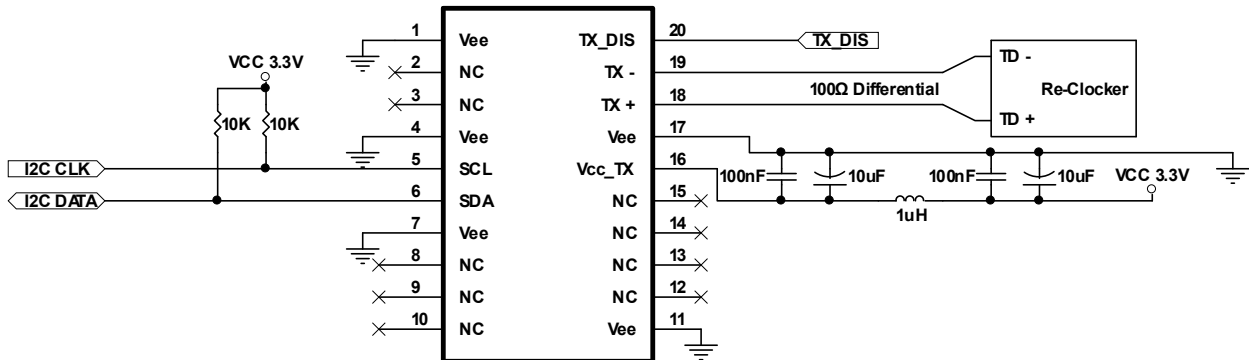
Module Definition 4 specifies a serial definition protocol. For this definition, upon power up, SCL and SDA appear as no connector (NC). When the host system detects this condition, it activates the serial protocol. The protocol uses the 2-wire serial CMOS E²PROM protocol of the ATMEL AT24C01A/02/04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

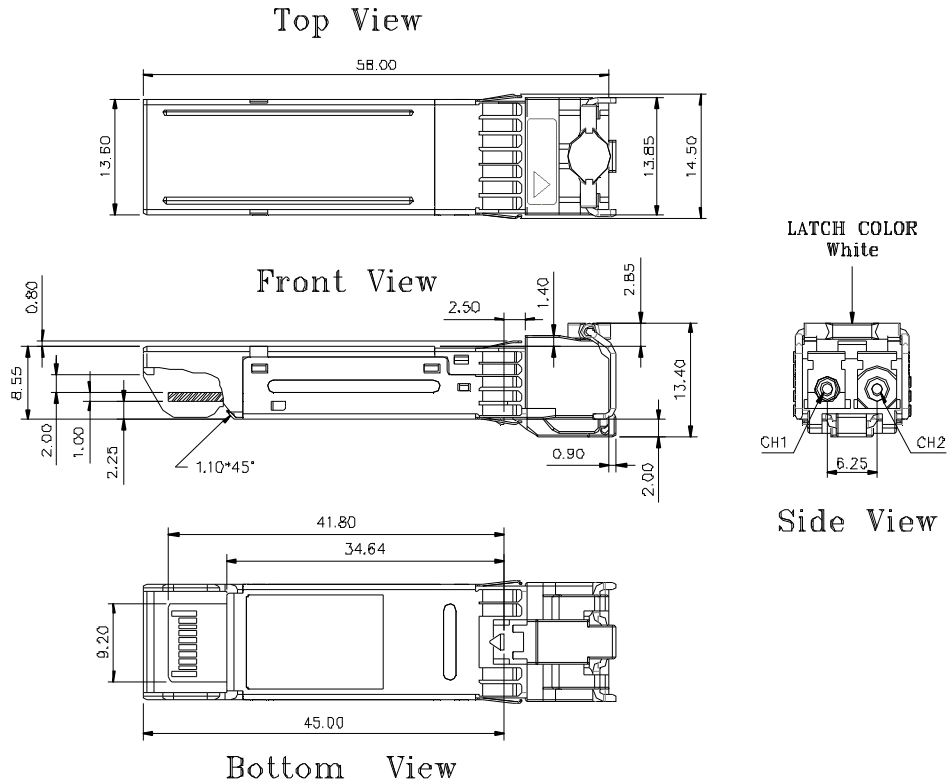
RECOMMENDED CIRCUIT SCHEMATIC



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