

SPS-2312VMW-1TDXXG / SPS-2312AVMW-1TDXXG

(RoHS Compliant)

12 Gb/s / 10 km / DWDM Medium Power Single Optical SM Digital Diagnostic Transmitter

FEATURES

- SMPTE 2082, SMPTE 424M, SMPTE 292M, SMPTE 259M, and DVB-ASI Compatible
- Speed up to 12 Gb/s
- Distance up to 10 km for 12G-SDI
- Support Video Pathological Patterns for HD-SDI, 3G-SDI, 6G-SDI, and 12G-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: SPS-2312VMW-1TDXXG
- -40 to 85°C Operation: SPS-2312AVMW-1TDXXG
- Hot-Pluggable
- Class 1 Laser International Safety Standard IEC-60825 Compliant

APPLICATIONS

- SMPTE 2082 Compliant Electrical-to-Optical Interfaces
- High-density Video Routers

DESCRIPTION

The SPS-2312VMW-1TDXXG series is a single channel single mode transmitter module designed to transmit optical serial digital signals as defined in SMPTE 2082, SMPTE 424M, SMPTE 292M, SMPTE 259M, and DVB-ASI. It supports up to 12Gbps and is specifically designed to transmit the pathological patterns for HD-SDI, 3G-SDI, 6G-SDI, and 12G-SDI. It is with the SFP+ 20-pin connector to allow hot plug capability. Digital diagnostic functions are available via an I²C. It uses a C Band DWDM lasers and is class 1 laser compliant according to International Safety Standard IEC-60825. A maximum distance of 10 km is achievable with 12Gbps pathological signals.

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.

ORDER INFORMATION

P/No.	Type	Bit Rate (Gb/s)	TX1		TX2		Package	Temp (°C)	RoHS Compliant
			λ (nm)	Power (dBm)	λ (nm)	Power (dBm)			
SPS-2312VMW-1TDXXG	1-TX	Up to 12	XX*	5 to 0			LC SFP+ with DMI	0 to 70	Yes
SPS-2312AVMW-1TDXXG	1-TX	Up to 12	XX*	5 to 0			LC SFP+ with DMI	-40 to 85	Yes

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

Channel #	Product code	Frequency (THz)	Center Wavelength (nm)	Label**
20	SPS-2312VMW-1TD20G	192.0	1561.42	D20
21	SPS-2312VMW-1TD21G	192.1	1560.61	D21
22	SPS-2312VMW-1TD22G	192.2	1559.79	D22
23	SPS-2312VMW-1TD23G	192.3	1558.98	D23
24	SPS-2312VMW-1TD24G	192.4	1558.17	D24
25	SPS-2312VMW-1TD25G	192.5	1557.36	D25
26	SPS-2312VMW-1TD26G	192.6	1556.55	D26
27	SPS-2312VMW-1TD27G	192.7	1555.75	D27
28	SPS-2312VMW-1TD28G	192.8	1554.94	D28
29	SPS-2312VMW-1TD29G	192.9	1554.13	D29
30	SPS-2312VMW-1TD30G	193.0	1553.33	D30
31	SPS-2312VMW-1TD31G	193.1	1552.52	D31
32	SPS-2312VMW-1TD32G	193.2	1551.72	D32
33	SPS-2312VMW-1TD33G	193.3	1550.92	D33
34	SPS-2312VMW-1TD34G	193.4	1550.12	D34
35	SPS-2312VMW-1TD35G	193.5	1549.32	D35
36	SPS-2312VMW-1TD36G	193.6	1548.51	D36
37	SPS-2312VMW-1TD37G	193.7	1547.72	D37
38	SPS-2312VMW-1TD38G	193.8	1546.92	D38
39	SPS-2312VMW-1TD39G	193.9	1546.12	D39
40	SPS-2312VMW-1TD40G	194.0	1545.32	D40
41	SPS-2312VMW-1TD41G	194.1	1544.53	D41
42	SPS-2312VMW-1TD42G	194.2	1543.73	D42
43	SPS-2312VMW-1TD43G	194.3	1542.94	D43
44	SPS-2312VMW-1TD44G	194.4	1542.14	D44
45	SPS-2312VMW-1TD45G	194.5	1541.35	D45
46	SPS-2312VMW-1TD46G	194.6	1540.56	D46
47	SPS-2312VMW-1TD47G	194.7	1539.77	D47
48	SPS-2312VMW-1TD48G	194.8	1538.98	D48
49	SPS-2312VMW-1TD49G	194.9	1538.19	D49
50	SPS-2312VMW-1TD50G	195.0	1537.40	D50
51	SPS-2312VMW-1TD51G	195.1	1536.61	D51
52	SPS-2312VMW-1TD52G	195.2	1535.82	D52
53	SPS-2312VMW-1TD53G	195.3	1535.04	D53
54	SPS-2312VMW-1TD54G	195.4	1534.25	D54
55	SPS-2312VMW-1TD55G	195.5	1533.47	D55
56	SPS-2312VMW-1TD56G	195.6	1532.68	D56
57	SPS-2312VMW-1TD57G	195.7	1531.90	D57
58	SPS-2312VMW-1TD58G	195.8	1531.12	D58
59	SPS-2312VMW-1TD59G	195.9	1530.33	D59
60	SPS-2312VMW-1TD60G	196.0	1529.55	D60

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

RELATED PRODUCTS

P/No.	Type	Bit Rate (Gb/s)	RX1		RX2		Package	Temp (°C)	RoHS Compliant
			λ (nm)	Sen. (dBm)	λ (nm)	Sen. (dBm)			
SPS-2116VMW-1RG	1-RX	Up to 12	1260/1620	-1 to -11			LC SFP+ with DMI	0 to 70	Yes

Absolute Maximum Ratings					
Parameter	Symbol	Min	Max	Units	Notes
Storage Temperature	Tstg	-40	85	°C	
Operating Case Temperature	Topr	0 -40	70 85	°C	SPS-2312VMW-1TDXXG SPS-2312AVMW-1TDXXG
Power Supply Voltage	Vcc	-0.5	3.6	V	

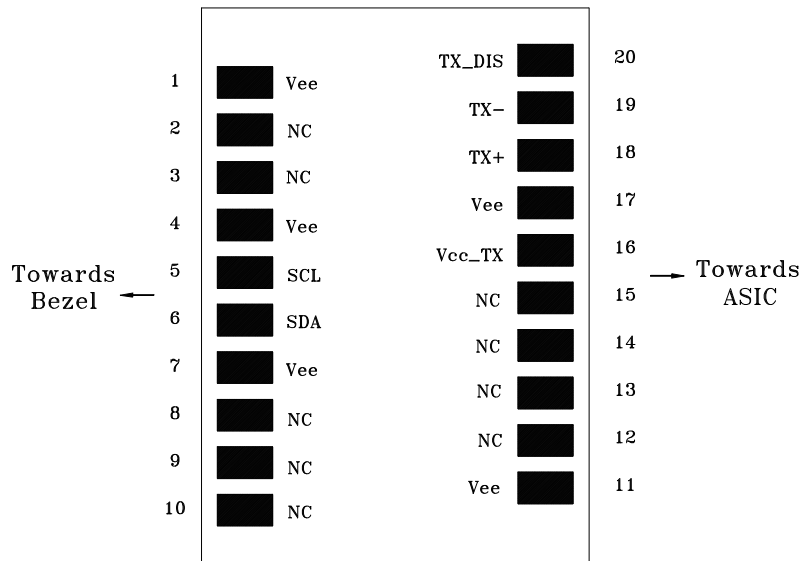
Recommended Operating Conditions					
Parameter	Symbol	Min	Typ	Max	Units / Notes
Power Supply Voltage	Vcc	3.13	3.3	3.47	V
Operating Case Temperature	Topr	0 -40		70 85	°C / SPS-2312VMW-1TDXXG °C / SPS-2312AVMW-1TDXXG
Power Supply Current	Icc		230 300	250 320	mA / SPS-2312VMW-1TDXXG mA / SPS-2312AVMW-1TDXXG
Data Rate			11.88		Gb/s

Transmitter Optical Specifications (3.13V < Vcc < 3.47V)						
Parameter	Symbol	Min	Typ	Max	Units	Notes
Average Launch Power	P _{O, Avg}	0		5	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	σ _λ			1	nm	-20 dB width
Side Mode Suppression Ratio	SMSR	30			dB	
Extinction Ratio	ER	3.5				
Relative Intensity Noise	RIN			-128	dB/Hz	
Average Launch Power of OFF Transmitter				-30	dBm	

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

Electrical Characteristics						
Parameter	Symbol	Min	Typ	Max	Units	Notes
High-Speed Signal (CML) Interface Specification						
Input Data Rate			11.88		Gb/s	
Differential Input Impedance	R _{in}		100		Ω	
Low-Speed Signal (LVTTTL) Interface Specification						
Input High Voltage		2.0		V _{cc} +0.3	V	
Input Low Voltage		GND		0.8	V	

CONNECTION DIAGRAM



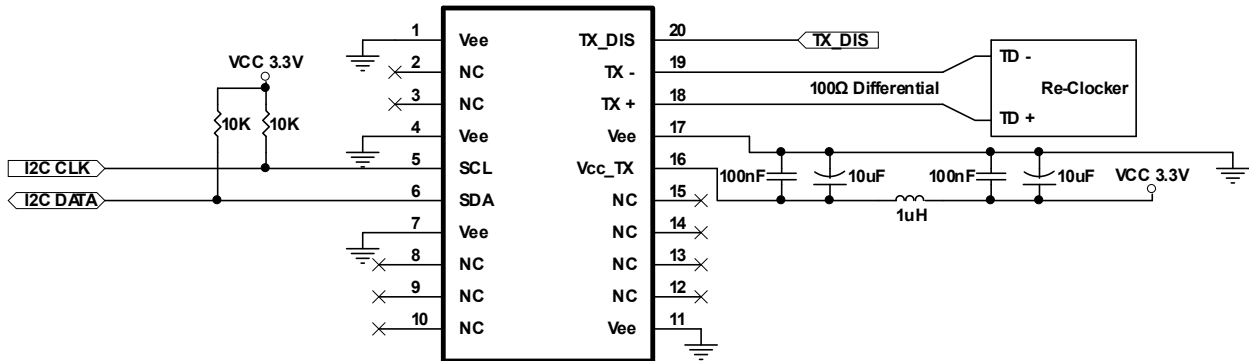
PIN	Name	Function	Notes
1	Vee	Signal Ground	
2	NC	No Connection	
3	NC	No Connection	
4	Vee	Signal Ground	
5	SCL	Serial I ² C Clock	
6	SDA	Serial I ² C Data	
7	Vee	Signal Ground	
8	NC	No Connection	
9	NC	No Connection	
10	NC	No Connection	
11	Vee	Signal Ground	
12	NC	No Connection	
13	NC	No Connection	
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.

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.

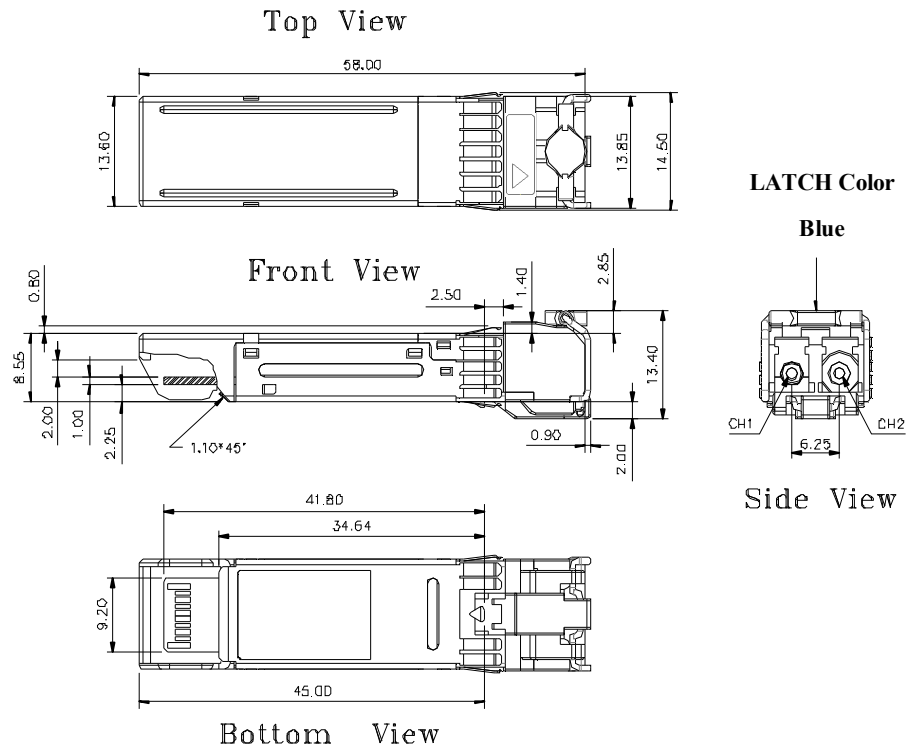
RECOMMENDED CIRCUIT SCHEMATIC



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	2023/9/14
1.1	Update the Product code on page 2	2023/10/16