

25G TSFP28 DWDM 48CH Tunable 15km Optical Transceiver Specification

Features

- ◆ SFP28 MSA compliant
- ◆ 25G electrical interface (OIF CEI-28G-VSR) 48 channels (191.3~196.0 THz)
- ◆ 100GHz channel spacing
- ◆ Maximum power consumption 2.5W LC duplex connector
- ◆ Supports 24.33024G、25.78125Gbps (with FEC) ; 9.8304G、10.1376G、10.3125Gbps
- ◆ Up to 15km transmission on single mode fiber
- ◆ Operating case temperature: 0 to 70°C (Commercial)
- ◆ Single 3.3V power supply RoHS-6 compliant

Applications

- ◆ CPRI/ eCPRI
- ◆ 10G/25G Ethernet switches and routers



General Description

Tunable DWDM greatly simplifies network construction and operation and maintenance and provides customers with cost-effective 5G fronthaul solutions. The product adopts 48-wave C-band tunable laser, which normalizes the optical module model, greatly reducing the types and quantity of spare parts; it can be connected to the multiplexer and demultiplexer arbitrarily, without matching one by one, and there is no problem of wavelength identification of the optical module; simple installation, Plug and play.

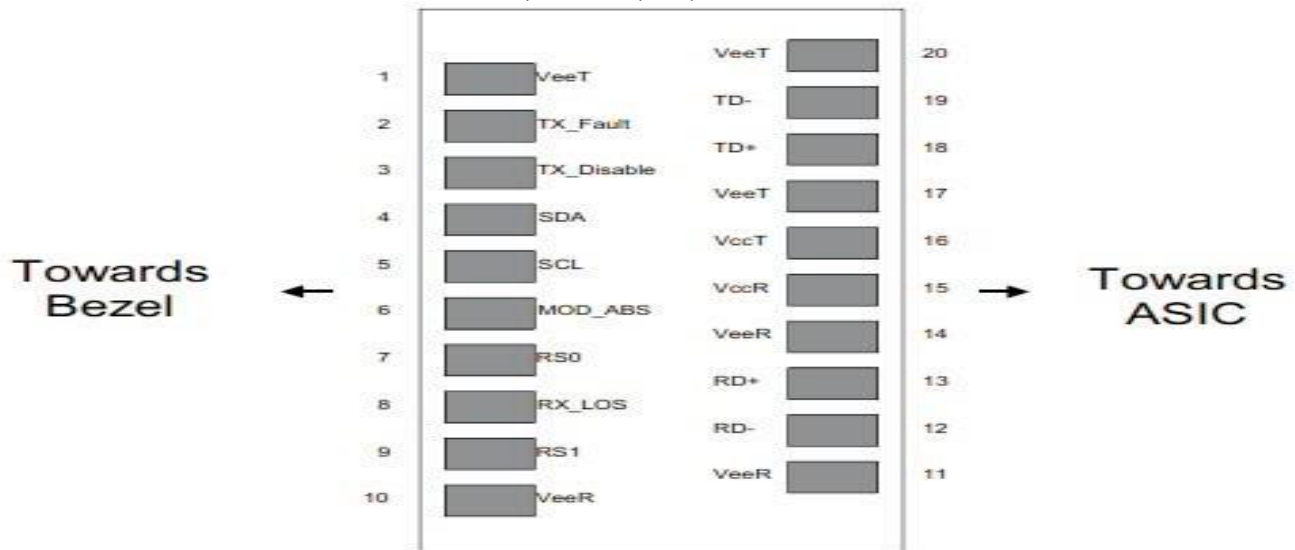
- ◆ ESD to the Electrical PINs: compatible with MIL-STD-883 Method 3015
- ◆ ESD to the Duplex LC Receptacle: compatible with EN 61000-4-2
- ◆ Immunity compatible with EN 61000-4-3
- ◆ EMI compatible with FCC Part 15 Class B
- ◆ Laser Eye Safety compatible with FDA 21CFR 1040.10 and 1040.11 IEC 60950, IEC60825-1,2

Pin Descriptions

PIN	Symbol	Name	Ref.
1	VeeT	Transmitter ground	1
2	TX Fault	Transmitter fault indication	
3	TX Disable	Disables the transmitter or laser output	2
4	SDA	Data line for an I2C series interface	2
5	SCL	Clock line for an I2C series interface	2
6	Mod_ABS	Indicates the module online state (this pin is connected to the VeeT or VeeR pin)	
7	RS0	Selects a rate for the module (this pin is connected to the 33 kilohm resistor)	
8	LOS	Indicates a loss of received signals	2
9	RS1	Selects a rate for the module (this pin is connected to the 33 kilohm resistor)	
10	VeeR	Receiver ground	1
11	VeeR	Receiver ground 1	1
12	RD-	Inverse received data output	
13	RD+	Received data output	
14	VeeR	Receiver ground	1
15	VccR	3.3 V receiver power	1
16	VccT	3.3 V transmitter power	1
17	VeeT	Transmitter ground	1
18	TD+	Transmit data input	
19	TD-	Inverse transmit data input	
20	VeeT	Transmitter ground	1

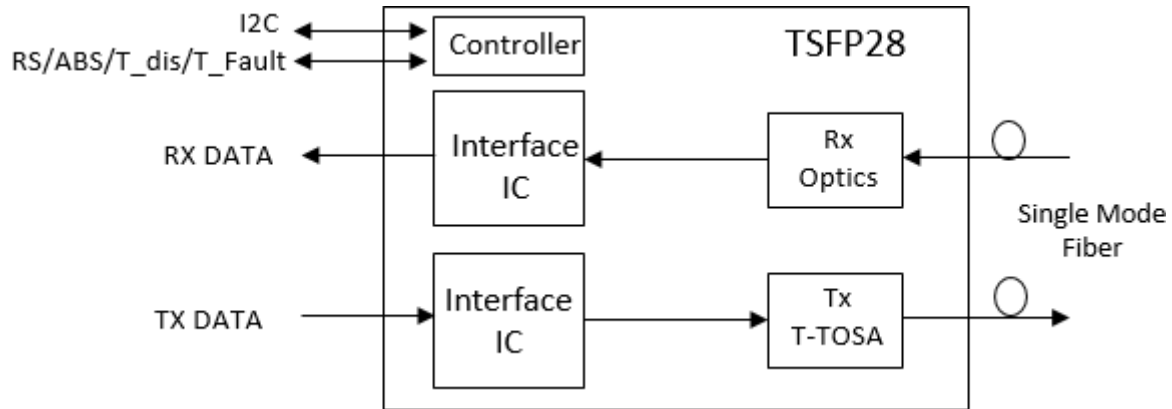
Note:

1. The ground of the module (operating module ground) and that of the module shell are separate from each other.
2. 4.7–10 kilohm resistor is used on the module to pull the output up to 3.15–3.45 V



Pin-out of Connector Block on Host Board

Transceiver Block Diagram



Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit	Ref
Maximum Supply Voltage	Vcc	0	3.3	3.6	V	
Storage Temperature	TS	-40		85	°C	
Operating Humidity	RH	0		85	%	

Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit	Ref
Power Supply Voltage	Vcc	0	3.14	3.3	V	
Data Rate		24.33024 9.8304		25.78125 10.3125	Gbps Gbps	
Case Operating Temperature	Tc TE	0 -20		70 85	°C °C	
Data Rate Accuracy		-100		100	ppm	
9/125um G.652 SMF	Lmax			15	km	

Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Ref
Power dissipation				2.5	W	1
Power Supply Current	Icc			0.7300	A	CDR Bypass
Transmitter						
Data Rate		24.3302 9.8304		25.78125 10.3125	Gbps	CDR Bypass
Differential Voltage pk-pk	Vpp	180		900	mV	
Tx Differential Input Impedence	Z _{IN}		100		Ω	

Transmitter Disable Voltage	V_D	2		Vee+ 0.3	V	
Transmitter Enable Voltage	V_{EN}	0		0.8	V	
Receiver						
Data Rate		24.33024 9.8304		25.78125 10.3125	Gbps	CDR Bypass
Differential Voltage pk-pk	V_{pp}	450	600	900	mV	
Rx Differential Output Impedence	Z_{out}		100		Ω	
LOS Assert Voltage	V_{LOSA}	2.4		Vcc	V	
LOS De-assert Voltage	V_{LOSD}	Vee		Vee+0.4	V	
Eye height	EH15	228			mV	
Eye width	EW15	0.57			UI	
Vertical Eye Closure	VEC			5.5	dB	

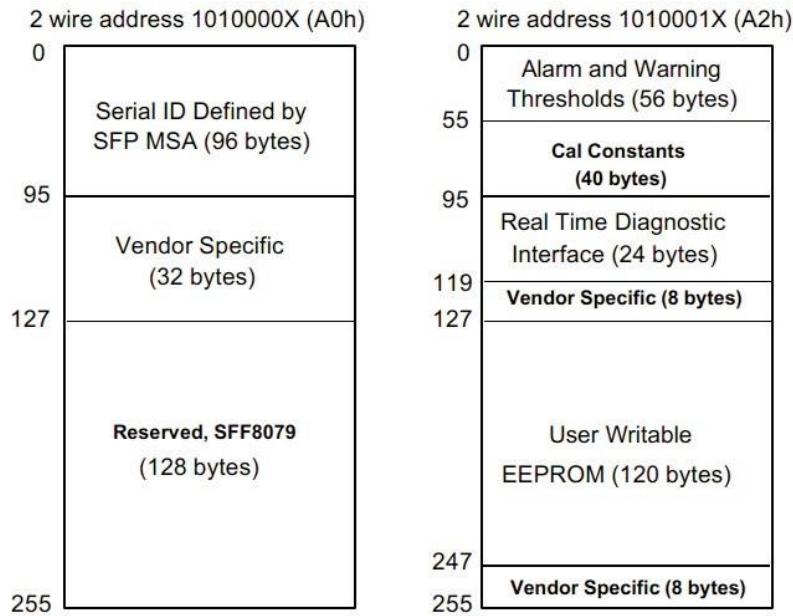
Notes: 1. Power dissipation is less than 2.5W when supply voltage is 3.3V.

Optical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Ref
Transmitter						
Output average power	PO	0		+4	dBm	
Data Rate		24.33024 9.8304		25.78125 10.3125	Gbps	
Data Rate Accuracy		-100		100	ppm	
Wavelength Range		191.3		196.0	THz	
Wavelength Accuracy		-12.5		12.5	GHz	
channel spacing			100		GHz	
Extinction Ratio (ER)	ER	3.5			dB	
Side-Mode Suppression Ratio	SMSR	30			dB	
Transmitter eye mask definition {X1, X2, X3, Y1, Y2, Y3}		"{0.31, 0.4, 0.45, 0.34, 0.38, 0.4} Hit ratio 5×10^{-5} hits per sample"				
Receiver						
Data Rate		24.33024 9.8304		25.78125 10.3125	Gbps	
Wavelength Range		191.3		196.0	THz	
Saturation Power		-2			dBm	
Receiver sensitivity				-14 (5e-5 FEC)	dBm	
Receiver sensitivity(after 15km)				-14(5e-5 FEC)	dBm	
LOS Assert		-30			dBm	
LOS Deassert				-16	dBm	
LOS Hysteresis		0.5			dB	
SRS eye mask definition {X1, X2, X3, Y1, Y2, Y3}		{0.31, 0.4, 0.45, 0.34, 0.38, 0.4}				

EPROM Information

- EEPROM memory map specific data field description is as below:



Digital Diagnostic Monitoring Interface

Five transceiver parameter values are monitored. The following table defines the monitored parameter's accuracy.

Parameter	Related Bytes(A2H memory)	Accurac	Notes
Temperature	96 to 97	±3°C	1,2
Voltage	98 to 99	<3%	2
Bias Current	100 to 101	<10%	2
TX Power	102 to 103	<3dB	2
RX Power	104 to 105	<3dB	2

Notes:

1. Actual temperature test point is fixed on module case around Laser.
2. Full operating temperature range.

Laser safety and Electromagnetic Compatibility

Laser safety

The transceiver uses a semiconductor laser system that is classified as Class 1 laser products per the Laser Safety requirements of FDA/CDRH, 21 CFR1040. These products have also been tested and certified as Class 1 laser products per IEC 60825-1:2014 and international standards.

Electromagnetic Compatibility

EMI (Emission)

The transceiver is designed to meet FCC 47 CFR FCC Part 15 Subpart B limits for emissions and noise immunity per EN 55032:2015 specifications.

RF Immunity

The transceiver has an immunity to operate when tested in accordance with IEC 61000-4-3 (80- 1000MHz, Test Level 3) and GR-1089.

Ordering Information

Part Number	Temperature Range	Distance	Channel	Power Consumption	O/E
TSFP28-DWDM	0 to 70°C	15km	191.3~196.0 THz	2.5W	PIN