

25Gb/s SFP28 Active Optical Cable

DESCRIPTION

25Gb/s SFP28 Active Optical cable transceiver consists of several key components, including the LD driver, limiting amplifier, digital diagnostic monitor, VCSEL laser, and PIN photo-detector. This module is designed to support data links up to 100m in 50/125um multimode optical fiber. Additionally, the SFP28 SR module meets SFI electrical specifications for the electrical interface. The transmitter input and receiver output impedance is 100 Ohms differential, with internally AC coupled data lines. Differential termination is provided to reduce common mode conversion and ensure quality signal termination for minimal electromagnetic interference. SFI operation typically requires improved FR4 material or standard FR4 with one connector. The transmitter within the module converts 25Gbit/s serial PECL or CML electrical data into optical data compliant with the 25GBASE-SR standard. Additionally, a Transmit Disable (Tx_Dis) feature is included for compatibility with open collector systems.

FEATURES

- Up to 25Gb/s data links
- 850nm VCSEL laser and PIN receiver
- Transmission distance up to 100m (OM3)
- Hot-pluggable SFP+ footprint
- RoHS-10 compliant and lead-free
- Cost effective SFP28 solution
- Support Digital Diagnostic Monitoring interface
- Compliant with SFF+MSA and SFF-8472
- Single +3.3V power supply
- Metal enclosure, for lower EMI
- Case operating temperature Commercial: 0 ~ +70°C



APPLICATIONS

- High-speed storage area networks
- Computer cluster cross-connect
- Custom high-speed data pipess

SPECIFICATIONS

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit
Storage Temperature	T _S	-40		+85	°C
Supply Voltage	V _{CC}	-0.5		3.6	V
Relative Humidity	RH	5		95	%
Damage Threshold	THd	3			dBm

Recommended Operating Environment:

Parameter	Symbol	Min.	Typical	Max.	Unit
Case operating Temperature(commercial)	T _{op}	0		70	°C
Power Supply Voltage	V _{CC}	3.135	3.3	3.465	V
Data Rate			25		Gb/s
Control Input Voltage High		2		V _{cc}	V
Control Input Voltage Low		0		0.8	V
Link Distance (OM3 50/125um)	D			100	m

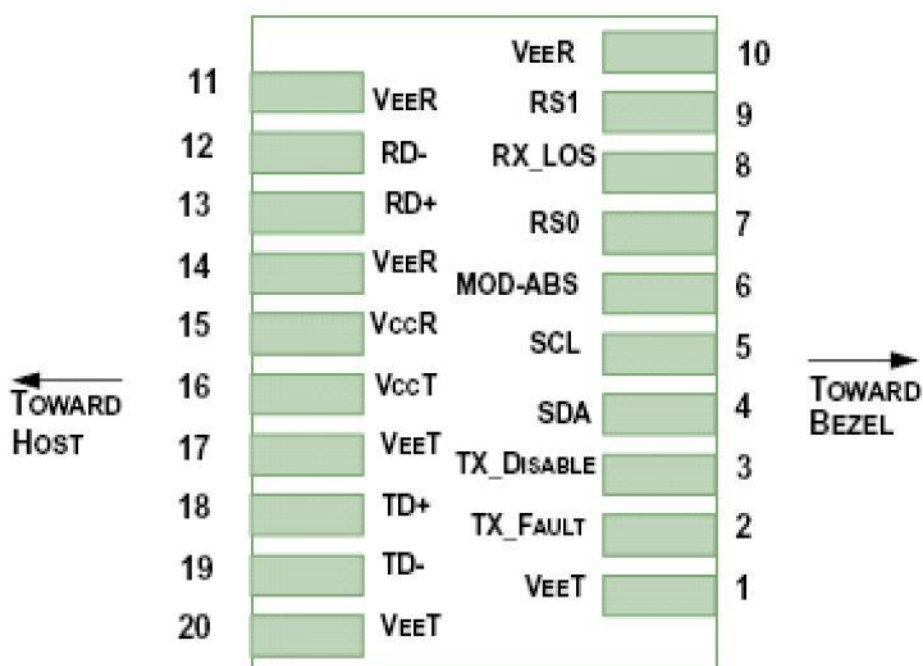
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25Gb/s SFP28 Active Optical Cable

Electrical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Power Consumption	P			1.0	W	
Supply Current	Icc			300	mA	
Transmitter Section:						
Single-ended Input Voltage Tolerance	Vcc	-0.3		4.0	V	
AC Common Mode Input Voltage Tolerance (RMS)		15			mV	
Differential Input Voltage Swing	Vin,pp	200		1000	mVpp	
Differential Input Impedance	Zin	90	100	110	Ohm	1
Transmit Disable Assert Time				10	us	
Receiver Section:						
Differential Output Voltage Swing	Vout,pp	200		1000	mVpp	
Differential Output Impedance	Zout	90	100	110	Ohm	3
Data output rise/fall time	Tr/Tf	28			ps	4
LOS Assert Voltage	VloSH	Vcc-1.3		Vcc	V	5
LOS De-assert Voltage	VloSL	Vee		Vee +0.8	V	5

Pin Assignment and Pin Description



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25Gb/s SFP28 Active Optical Cable

Pin	Symbol	Name/Description	Notes
1	V _{EET}	Transmitter Ground	1
2	T _{FAULT}	Transmitter Fault	
3	T _{DIS}	Transmitter Disable; Turns off transmitter laser output	
4	SDA	Two wire serial interface Data Line (LVCMOS-I/O) (MOD-DEF2)	2
5	SCL	Two wire serial interface Clock Line (LVCMOS-I/O) (MOD-DEF1)	2
6	MOD_ABS	Module Definition, Grounded in the module	
7	RS0	Rx Rate Select:	
8	LOS	Receiver Loss of Signal Indication Active LOW	
9	RS1	Transmitter Rate Select (not used)	
10	V _{EER}	Receiver Ground	1
11	V _{EER}	Receiver Ground	1
12	RD-	Receiver Inverted Data Output	
13	RD+	Receiver Data Output	
14	V _{EER}	Receiver Ground	1
15	V _{CCR}	Receiver Power - +3.3V	
16	V _{CCT}	Transmitter Power - +3.3 V	
17	V _{EET}	Transmitter Ground	1
18	TD+	Transmitter Non-Inverted Data Input	
19	TD-	Transmitter Inverted Data Input	
20	V _{EET}	Transmitter Ground	1

Notes:

1. Module ground pins GND are isolated from the module case.
2. Shall be pulled up with 4.7K-10Kohms to a voltage between 3.15V and 3.45V on the host board.

Optical Parameters ($T_{OP} = -40$ to 85°C , $VCC = 3.135$ to 3.465 Volts)

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Transmitter Section:						
Center Wavelength	λ_c	840	850	860	nm	
Optical Spectral Width	$\Delta\lambda$			0.6	nm	
Average Optical Power	PAVG	-8.4		2.4	dBm	1
Extinction Ratio	ER	2.0			dB	
Transmitter OFF Output Power	P _{off}			-30	dBm	
Relative Intensity Noise	RIN			-128	dB/Hz	
Transmitter and Dispersion Penalty	TDP			4.4	dB	
Optical Return Loss Tolerance	ORLT			12	dB	
Output Eye Mask	Compliant with IEEE802.3 z (class 1 laser safety)					

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Receiver Section:						
Center Wavelength	λ_c	770	850	860	nm	
Receiver Sensitivity (Average Power)	Sen			-10	dBm	2
Stressed Sensitivity (OMA)				-5.2	dBm	2
Input Saturation Power (overload)	Psat	0.5			dBm	
LOS Assert	LOSA	-20			dBm	
LOS De-assert	LOSD			-11	dBm	
LOS Hysteresis	LOSH	0.5			dB	

Notes:

1. Class 1 Laser Safety per FDA/CDRH and IEC-825-1 regulations.
2. Measured with Light source 850nm, ER=2.0dB; BER =10^{-12} @ PRBS=2³¹-1 NRZ.

Ordering Information

Description	DDM	Temperature	Reference