

Features

- Hot-pluggable SFP28 Form Factor
- Supports 25.78Gbps Data Rate
- 850nm VCSEL laser and PIN photo-detector
- Maximum link length of 70m on OM3 MMF and 100m on OM4 MMF
- Internal CDR on both Transmitter and Receiver channel
- Single 3.3V power supply
- Power dissipation < 1W
- Digital Diagnostics Functions are available via the I2C interface
- RoHS6 compliant
- Operating case temperature: 0°C ~70°C



Applications

- 25GBASE-SR Ethernet
- Other optical links

Description

This is a single-channel, Pluggable, Fiber-Optical SFP28 for 25Gigabit Ethernet and Infiniband EDR Applications. It is a high performance module for short-range data communication and interconnect applications which operate at 25.78125 Gbps up to 70m using OM3 fiber or 100m using OM4 fiber. This module is designed to operate over multimode fiber systems using a nominal wavelength of 850nm. The electrical interface uses a 20 contact edge type connector. The optical interface uses duplex LC receptacle.

Absolute Maximum Ratings

<i>Parameter</i>	<i>Symbol</i>	<i>Min.</i>	<i>Typ.</i>	<i>Max.</i>	<i>Units</i>	<i>Note</i>
Storage Temperature	T_c	-40		85	°C	
Power Supply Voltage	V_{CC}	0		3.6	V	
Relative Humidity(Non-Condensation)	RH	0		85	%	

Recommended Operating Conditions

<i>Parameter</i>	<i>Symbol</i>	<i>Min.</i>	<i>Typ.</i>	<i>Max.</i>	<i>Units</i>	<i>Note</i>
Operating Case Temperature	T_c	0		70	°C	
Power Supply Voltage	V_{CC}	3.13	3.3	3.47	V	
Power Supply Current	I_{CC}			300	mA	
Bit Rate		10.3	25.78125		Gbps	
Fiber Length on OM3 MMF				70	m	
Fiber Length on OM4 MMF				100	m	

Digital Diagnostic Functions

<i>Parameter</i>	<i>Symbol</i>	<i>Accuracy</i>	<i>Units</i>	<i>Note</i>
Temperature Monitor Absolute Error	DMI_Temp	± 3	°C	
Supply Voltage Monitor Absolute Error	DMI_VCC	±0.1	V	
TX Power	DMI_TX	± 3 dB	dB	
RX Power	DMI_RX	± 3 dB	dB	
Bias Current Monitor	DMI_Ibias	± 10%	mA	

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units	Note
Transmitter						
Bit Rate		10.3	25.78125		Gbps	
Center Wavelength	λ_t	840	850	860	nm	
Spectral Width(-20dB)				0.6	nm	
Average Optical Power	P_{avg}	-8.4		2.4	dBm	
Optical Return Loss Tolerance	T_{ORL}			12	dB	
Extinction Ratio	ER	2			dB	
Jitter	J			0.3	UI	
Optical Eye Mask		5			%	
Receiver						
Bit Rate		10.3	25.78125		Gbps	
Center Wavelength	λ_r	840	850	860	nm	
Receiver Sensitivity	P_{sens}			-10.3	dBm	1
Damage Threshold	DT	3.4			dBm	
Receive Sensitivity (OMA)	S_{OMA}			-9.5	dBm	2
Receiver Reflectance	R_{REFL}			-12	dB	
Jitter	J			0.2	UI	
LOS De-Assert	$LOSD$			-13	dBm	
LOS Assert	$LOSA$	-30	-		dBm	
LOS Hysteresis	$LOSH$	0.5			dB	

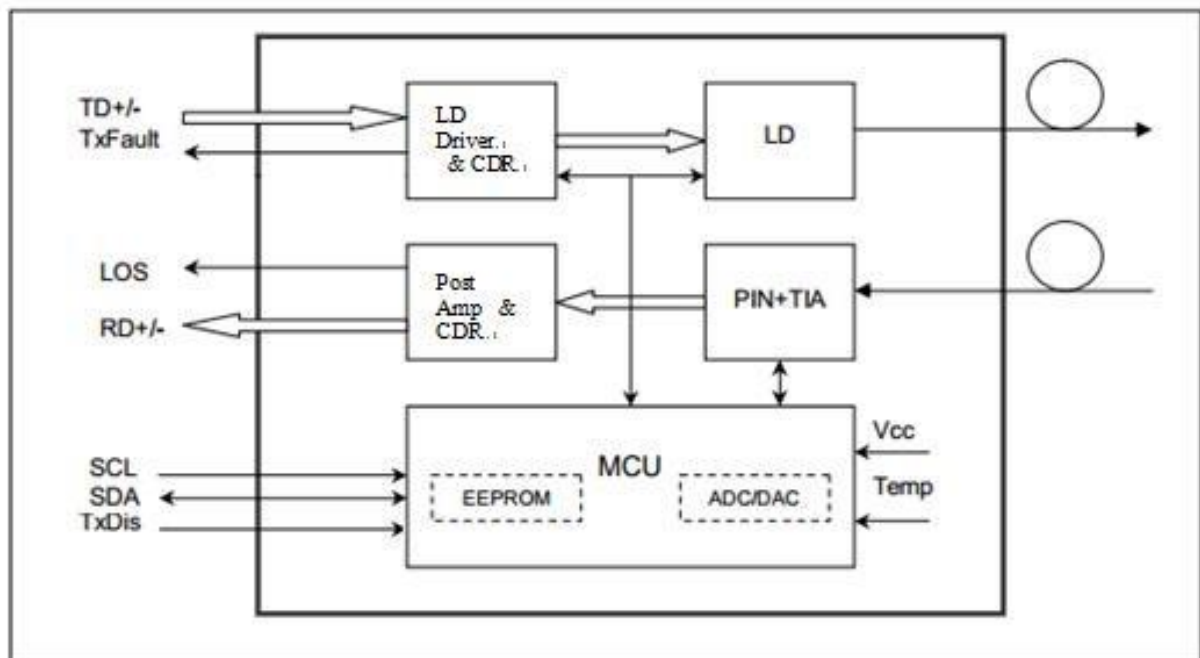
Notes:

1. BER=5x10⁻⁵; PRBS 2³¹-1 @25.78125Gbps.
2. The stressed sensitivity value in the table are for system level BER measurements which include the effects of CDR circuit.

Electro Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units	Note
Transmitter						
Differential Data Input Swing	$V_{in,pp}$	200		1000	mV	
Input Differential Impedance	Z_{IN}	90	100	110	Ω	
TX Disable	Disable	V_{IL}	2.0	V_{cc}	V	
	Enable	V_{IHL}	0	0.8	V	
TX Fault	Fault	V_{OH}	2.0	V_{cc}	V	
	Normal	V_{OL}	0	0.8	V	
Receiver						
Differential Data Output Swing	$V_{out,pp}$	300	-	800	mV	
Output Differential Impedance	Z_D	90	100	110	Ω	
LOS	High	2.0		V_{cc}	V	
	Low			0.8	V	

Block Diagram of Transceiver



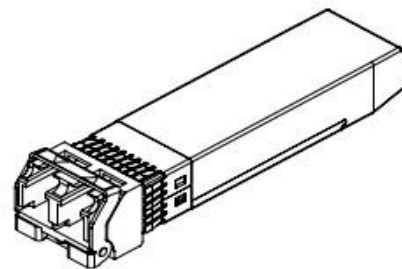
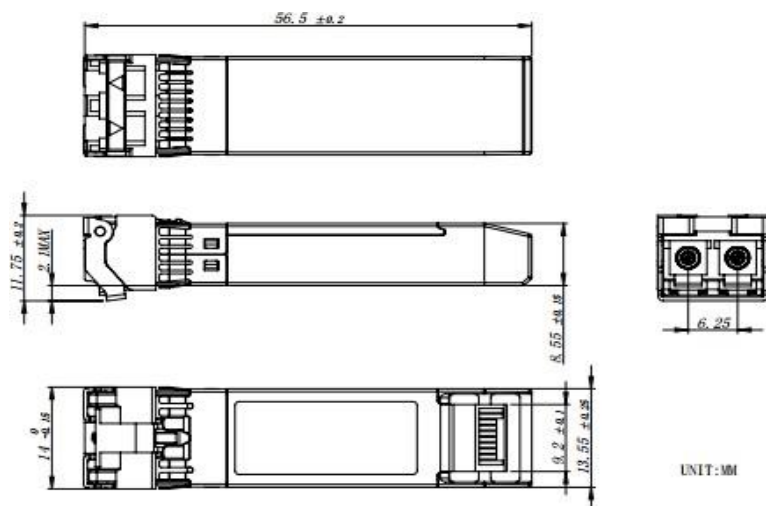
Pin Assignment

<i>Pin</i>	<i>Symbol</i>	<i>Function/Description</i>	<i>Note</i>
1	VEET	Transmitter Ground	1
2	Tx_FAULT	Transmitter Fault	2
3	Tx_DIS	Transmitter Disable. Laser output	
4	SDA	2-wire Serial Interface Data Line	2
5	SCL	2-wire Serial Interface Clock Line	2
6	MOD_ABS	Module Definition. Grounded within the module	
7	RS0	Receiver Rate Select	
8	RX_LOS	Receiver Loss of Signal Indication Active LOW	
9	RS1	Transmitter Rate Select (not used)	
10	VEER	Receiver Ground	1
11	VEER	Receiver Ground	1
12	RD-	Receiver Inverted Data Output	
13	RD+	Receiver Date Output	
14	VEER	Receiver Ground	1
15	VCCR	Receiver 3.3V Supply	
16	VCCT	Transmitter 3.3V Supply	
17	VEET	Transmitter Ground	1
18	TD+	Transmitter Non-Inverted Data Input	
19	TD-	Transmitter Inverted Data Input	
20	VEET	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.

Dimensions



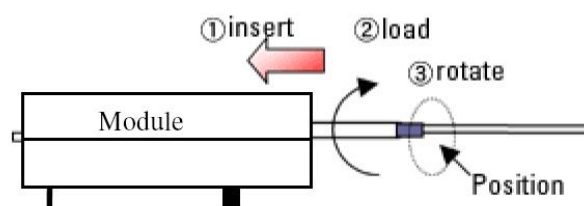
Optical Receptacle Cleaning Recommendations :

All fiber stubs inside the receptacle portions were cleaned before shipment. In the event of contamination of the optical ports, the recommended cleaning process is the use of forced nitrogen. If contamination is thought to have remained, the optical ports can be cleaned using a NTT international Cletop® stick type and HFE7100 cleaning fluid. Before the mating of patch-cord, the fiber end should be cleaned up by using Cletop® cleaning cassette.

Cleaning of patch-cord



Cleaning of fiber stub



1. Insert
Ensure that stick is held straight when inserting into sleeve.
2. Load
Apply sufficient pressure (approx 600-700g) to ensure ferrule a little depressed in sleeve.
3. Rotate
Rotate stick clockwise 4-5 times, while ensuring direct contact with ferrule end-face is maintained.

*Notice: Number of possible wipes:
Maintenance (repair) ~1 use / piece
Equipment construction: 4 uses / piece (max.)*

Note: The pictures were extracted from NTT-ME website. And the Cletop® is a trademark registered by NTT-ME

Ordering Information

<i>Model Number</i>	<i>Part Number</i>	<i>Wavelength</i>	<i>Temperature</i>
SFP28-25G-SR	OPAX-MX1-85-CH	850nm	0 to 70 °C

Modification History

<i>Revision</i>	<i>Date</i>	<i>Description</i>
A1	Nov. 2016	Initial Release

Note: All information contained in this document is subject to change without notice.