Rev.TF2.30_20190315

25G SFP28-BX-U Transceiver
Hot Pluggable, LC, Tx1270nm DFB/Rx1330nm, Single Fiber, 10KM, DDM

Part number: FSPP-N8-C27-10D

Overview:

FSPP-N8-C27-10D Small Form Factor Pluggable SFP28 transceivers are compliant with the current SFP28 Multi-Source Agreement (MSA) Specification. The high performance un-cooled 1270nm DFB transmitter and high sensitivity PIN receiver with built-in CDR provide superior performance for 24.33G CPRI and 25GBase Ethernet applications up to 10km optical links.

Applications:

- 25GBase Ethernet
- Wireless – CPRI Option 10 at 24.33024Gb/s
- High speed I/O for file server
- Mass storage system I/O
- Bus extension application

Features:

- Compatible with IEEE802.3cc 25GBase-LR Ethernet and CPRI option 10 24.33024Gb/s Standard
- Compliant with SFF8402 SFP28 MSA and SFF8472 diagnostic monitoring interface
- Up to 25.78125Gb/s bi-directional data links
- Built-in CDR on both transmitter and receiver
- Hot Pluggable
- 1270nm DFB laser transmitter
- Simplex LC connector
- 2-wire interface for management and diagnostic monitor
- Single +3.3V power supply
- Transmission distance of 10km over single mode fiber
- RoHS Compliant

Absolute Maximum Ratings :

Parameters	Symbol	Min.	Max.	Unit
Storage Temperature	T_{ST}	-40	+85	°C
Supply Voltage	V_{cc}	-0.5	+4.0	V
Storage Relative Humidity	RH	5	95	%

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Recommended Operating Conditions :

Parameters	Symbol	Min.	Typ.	Max.	Unit
Case Operating Temperature (FSPP-N8-C27-10D)	T_{OP}	0	-	+70	°C
Case Operating Temperature (FSPP-N8-C27-10Di)	T_{OP}	-40	-	+85	°C
Supply Voltage	V_{cc}	+3.1	+3.3	+3.5	V
Supply Current	I_{cc}			400	mA

Transmitter Electro-optical Characteristics :

V_{CC}= 3.1V to 3.5V, T_{OP} = 0 °C to 70 °C(FSPP-N8-C27-10D); **T_{OP} = -40 °C to 85 °C**(FSPP-N8-C27-10Di)

Parameters	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Date Rate	DR	24.3	25.78125		Gb/s	
Optical Launch Power	Po	-7		+2	dBm	1
Center Wavelength	λ	1260	1270	1280	nm	
Spectral Width (-20dB)	△λ			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Optical Extinction Ratio	ER	3.5			dB	
Transmitter Dispersion Penalty @25.78G	TDP			2.7	dB	
Average Launch power of OFF Transmitter	P_{OFF}			-30	dBm	
Optical Eye Mask		{ 0.31, 0.4, 0.45, 0.34, 0.38, 0.4 }				2
Relative Intensity Noise	RIN			-130	dB/Hz	
Optical Return Loss Tolerance	ORLT			20	dB	
Differential Data Input Swing	V_{IN}	180		850	mV	
Input Differential Impedance	Z_{IN}	90	100	110	Ω	
TX Disable Input Voltage-Low (TX ON)	$TDISV_L$	GND		0.8	V	
TX Disable Input Voltage-High (TX OFF)	$TDISV_H$	2.0		Vcc	V	
TX Fault Output Voltage-Low (TX Normal)	$TFLTV_L$	GND		0.8	V	
TX Fault Output Voltage-High (TX Fault)	$TFLTV_H$	2.0		Vcc	V	

Note1: The optical power is launched into a 9/125μm single mode fiber

Note2: Measured with a PRBS 2^{31}-1 test pattern @25.78125Gbps BER<$5x10^{-5}$

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Receiver Electro-optical Characteristics :

V_{CC}= 3.1V to 3.5V, T_{OP} = 0 °C to 70 °C(FSPP-N8-C27-10D); **T_{OP} = -40 °C to 85 °C**(FSPP-N8-C27-10Di)

Parameters	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Date Rate	DR	24.3	25.78125		Gb/s	
Receiver Sensitivity	P_{IN_min}			-13.3	dBm	1
Maximum Input Power	P_{IN_max}			+2	dBm	1
Optical Center Wavelength	λ_C	1320	1330	1340	nm	
Receiver Reflectance	RR			-12	dB	
LOS De-Assert	LOS_D			-15	dBm	
LOS Assert	LOS_A	-30			dBm	
LOS Hysteresis	LOS_{HY}	0.5			dB	
Differential Data Output Swing	V_{OUT}	300		900	mV	
Output Differential Impedance	Z_{OUT}	90	100	110	Ω	
Receiver LOS Signal Output Voltage-Low	$LOSV_L$	GND		0.8	V	
Receiver LOS Signal Output Voltage-High	$LOSV_H$	2.0		Vcc	V	

Note1: Measured with a PRBS 2^{31}-1 test pattern @25.78125Gbps BER<$5x10^{-5}$

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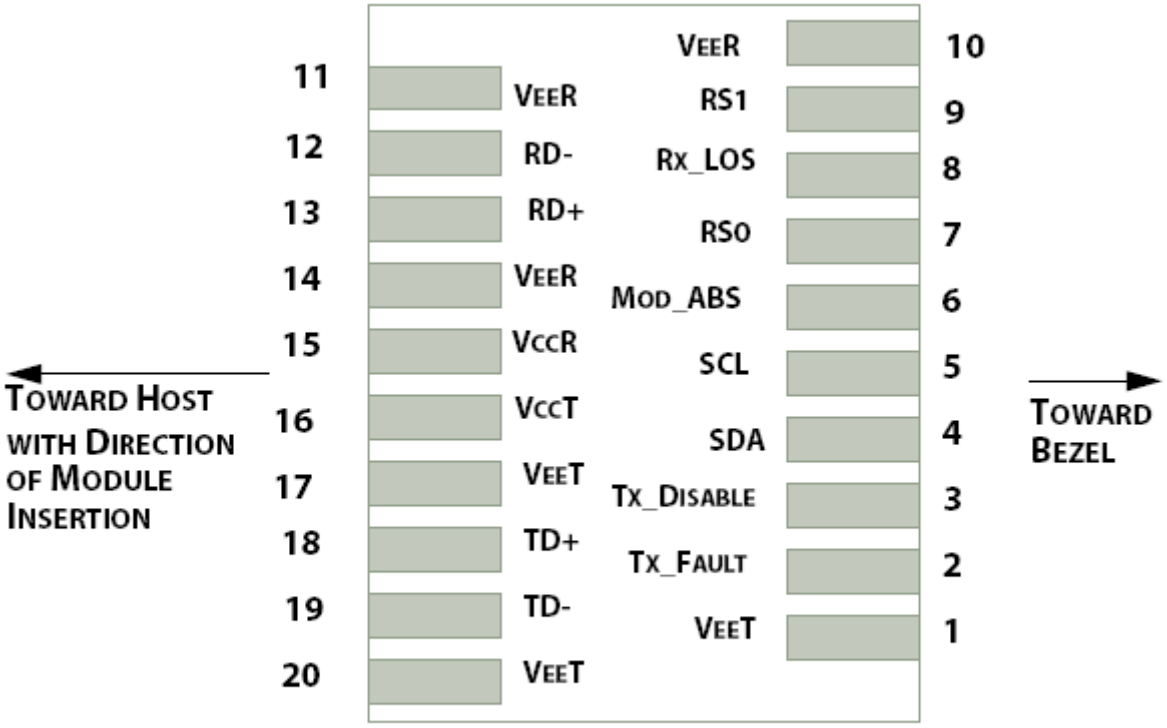
Pin Assignment :



Host PCB SFP28 pad assignment top view

Pin Description :

Pin	Name	Function / Description
1	VeeT	Transmitter Ground
2	TX_Fault	Transmitter Fault Indication (1)
3	TX_Disable	Transmitter Disable – Turns off transmitter laser output (2)
4	SDA	2-wire Serial Interface Data Line (SDA: Serial Data Signal) (3)
5	SCL	2-wire Serial Interface Clock (SCL: Serial Clock Signal) (3)
6	Mod_ABS	Module Absent, connected to VeeT or VeeR in the module (3)
7	RS0	Rate Select 0, optionally controls SFP+ module receiver (5)
8	Rx_LOS	Receiver Loss of Signal Indication (4)
9	RS1	Rate Select 1, optionally controls SFP+ module transmitter (5)
10	VeeR	Receiver Ground
11	VeeR	Receiver Ground

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12	RD-	Receiver Inverted Data output, Differential LVPECL, AC coupled
13	RD+	Receiver Non-Inverted Data output, Differential LVPECL, AC coupled
14	VeeR	Receiver Ground
15	VccR	Receiver 3.3V Power Supply
16	VccT	Transmitter 3.3V Power Supply
17	VeeT	Transmitter Ground
18	TD+	Transmitter Non-Inverted Data Input, Differential LVPECL, AC coupled
19	TD-	Transmitter Inverted Data Input, Differential LVPECL, AC coupled
20	VeeT	Transmitter Ground

Note1: TX Fault is open collector/drain output which should be pulled up externally with a 4.7K~10KΩ resistor on the host board to supply <VccT+0.3V or VccR+0.3V. When high, this output indicates a laser fault of some kind. Low indicates normal operation. In the low state, the output will be pulled to <0.8V.

Note2: TX Disable input is used to shut down the laser output per the state table below. It is pulled up within the module with a 4.7K~10KΩ resistor. 1)Low(0~0.8V): Transmitter on; 2)Between(0.8V and 2V): Undefined; 3)High (2.0~ VccT): Transmitter Disabled; 4)Open: Transmitter Disabled

Note3: These are the module definition pins. They should be pulled up with a 4.7K~10KΩ resistor on the host board to supply less than VccT+0.3V or VccR+0.3V. Mod-ABS is grounded by the module to indicate that the module is present.

Note4: LOS (Loss of signal) is an open collector/drain output which should be pulled up externally with a 4.7K~10KΩ resistor on the host board to supply <VccT+0.3V or VccR+0.3V. When high, this output indicates the received optical power is below the worst case receiver sensitivity (as defined by the standard in use). Low indicates normal operation. In the low state, the output will be pulled to <0.8V.

Note5: No connect on this module.

Digital Diagnostic Functions :

As defined by the SFP MSA (SFF-8472) Ficer's SFP28 transceivers provide digital diagnostic functions via a 2-wire serial interface, which allows real-time access to the following operating parameters:

- Transceiver temperature
- Laser bias current
- Transmitted optical power
- Received optical power
- Transceiver supply voltage

It also provides a sophisticated system of alarm and warning flags, which may be used to alert end-users when particular operating parameters are outside of a factory-set normal range.

The operating and diagnostics information is monitored and reported by a Digital Diagnostics Controller (DDC) inside the transceiver, which is accessed through the 2-wire serial interface. When the serial protocol is activated, the serial clock signal (SCL pin) is generated by the host. The positive edge clocks data into the SFP transceiver into those segments of its memory map that are not write-protected. The negative edge clocks data from the SFP transceiver. The serial data signal (SDA pin) is bi-directional for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial protocol activation. The memories are organized as a series of 8-bit data words that can be addressed individually or sequentially.
For more detailed information including memory map definitions, please see the SFP MSA (SFF-8472) Specification.

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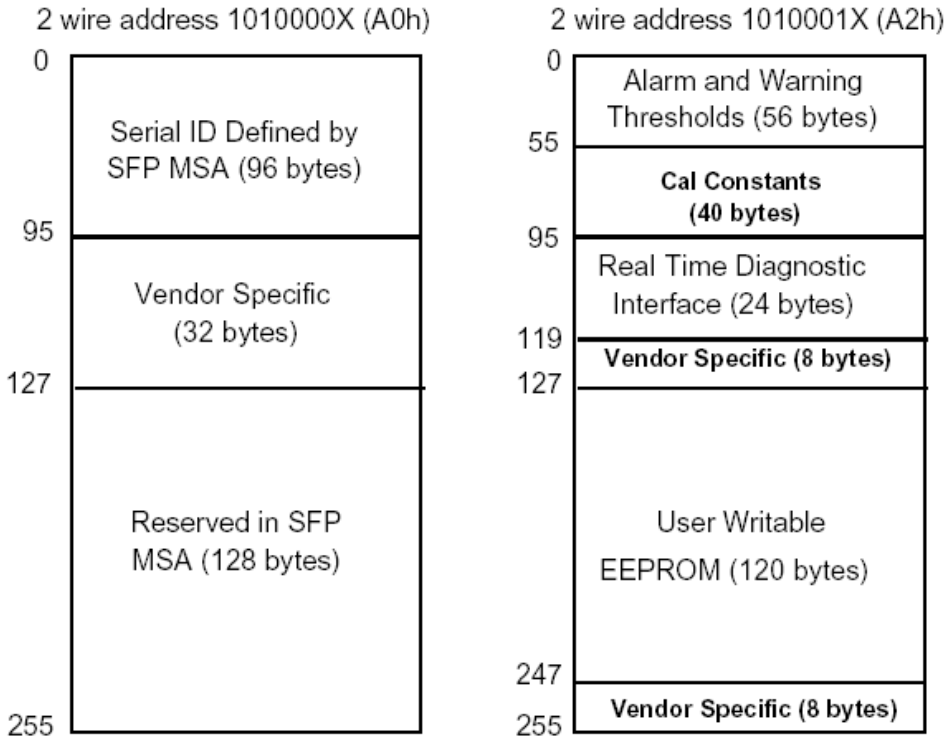
Digital Diagnostic Memory Map



Digital Diagnostic Monitoring Characteristics

Parameter	Accuracy	Unit	Note
Temperature	±3	°C	
Supply Voltage	±0.1	V	
TX Bias Current	±5	mA	
TX Output Power	±3	dB	
RX Received Optical Power	±3	dB	

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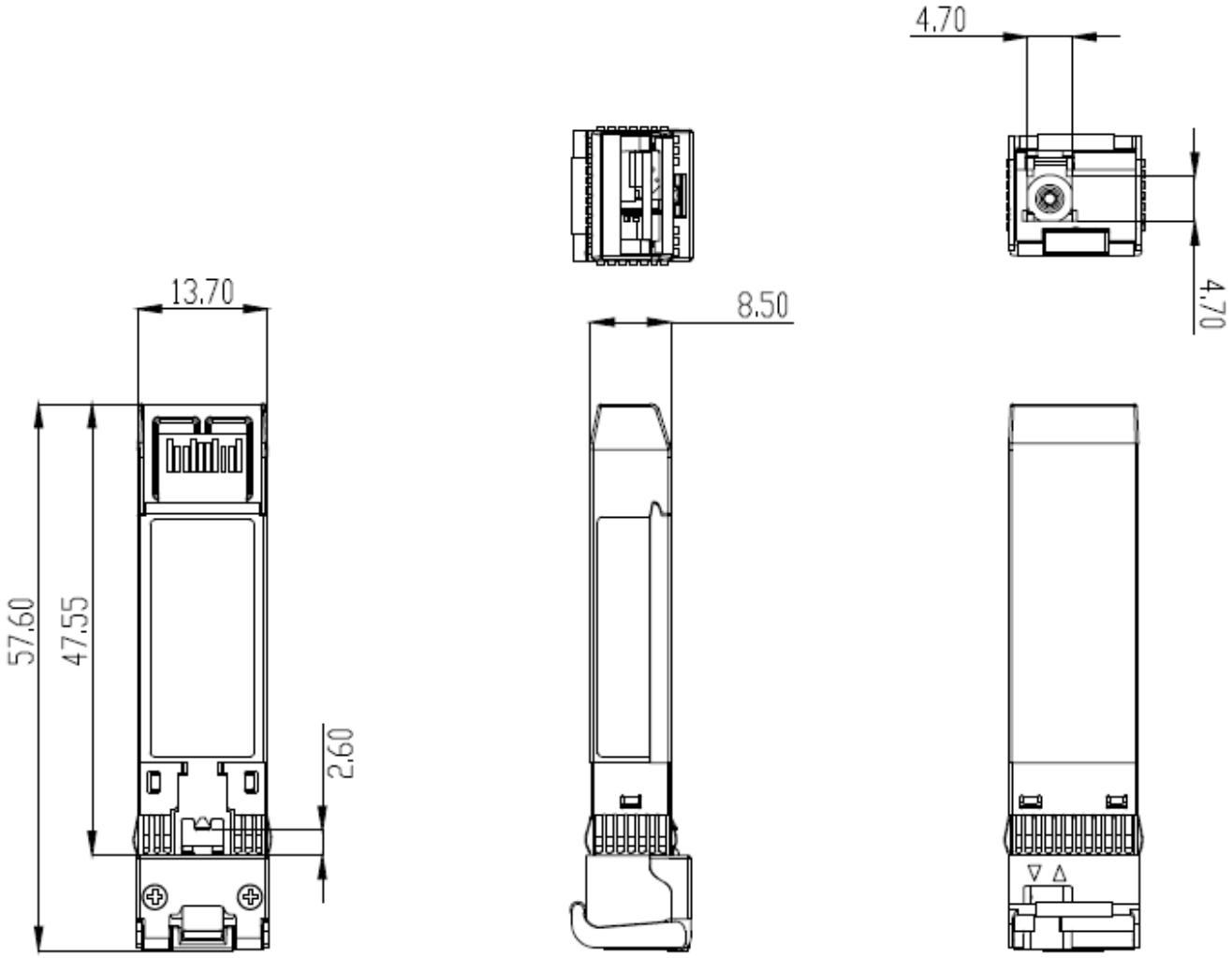
Mechanical Dimensions :



(All Dimensions are ±0.20mm Unless Otherwise Specified, Unit: mm)

Ordering Information :

Part No.	TX	RX	Link	DDM	Temp.
FSPP-N8-C27-10D	1270nm	1330nm	10km	Yes	0~70°C
FSPP-N8-C27-10Di	1270nm	1330nm	10km	Yes	-40~85°C

NOTE: Distances are indicative only. To calculate a more precise link budget based on specific conditions in your application, please refer to the optical characteristics.

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