



25G-SFP28-ER

SFP28 25Gb/s 40km ER Transceiver

PRODUCT FEATURES

- Up to 25.78Gbps Data Links
- Hot-pluggable SFP28 footprint
- DML Laser and APD receiver
- Duplex LC connector
- Up to 40km transmission on SMF
- Metal enclosure, for lower EMI
- 2-wire interface with integrated Digital Diagnostic monitoring
- Single 3.3V power supply
- Power dissipation < 2.0W
- Case operating temperature

Commercial: 0°C to +70°C

Industrial: -40°C to +85°C

APPLICATIONS

- 25GBASE-ER
- eCPRI and CPRI

STANDARD

- Compliant with SFF-8472 & 8431
- RoHS Compliant.



Ordering information

Product part Number	Data Rate (Gbps)	Media	Wavelength (nm)	Transmission Distance(km)	Temperature Range (Tcase) (°C)	
25G-SFP28-ER	25.78	Single mode fiber	1310	40	0~70	Commercial
25G-SFP28-ER-I	25.78	Single mode fiber	1310	40	-40~85	Industrial

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Storage Temperature	T _s	-40	-	85	°C	
Relative Humidity	R _H	0	-	85	%	
Power Supply Voltage	V _{CC}	-0.3	-	4	V	
Signal Input Voltage	V _{SI}	V _{CC} -0.3	-	V _{CC} +0.3	V	

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Case Operating Temperature	T _{case}	0	-	70	°C	Commercial
		-40		85	°C	Industrial
Power Supply Voltage	V _{CC}	3.14	3.3	3.47	V	
Power Supply Current	I _{CC}	-		550	mA	Commercial
				600	mA	Industrial
Data Rate	BR		25.78		Gbps	TX Rate/RX Rate
Transmission Distance	TD		40		km	
Coupled fiber	Single mode fiber					9/125um SMF

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Transmitter						
Lane Wavelengths(Range)	λ	1295		1325	nm	
Side-mode suppression ratio (SMSR)	SMSR	30	-	-	dB	
Average Launched Power	P ₀	0		+6.0	dBm	

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Average Launched Power(Laser Off)	P_{off}	-	-	-30	dBm	
Extinction Ratio	ER	4		-	dB	
Spectrum Bandwidth(-20dB)		-	-	1	nm	
RIN ₂₀ OMA	RIN ₂₀ OMA			-130	dB/Hz	
Optical return loss tolerance				20	dB	
Transmitter reflectance				-12	dB	
Transmitter eye mask definition {X1, X2, X3, Y1, Y2, Y3}	{0.31, 0.4, 0.45, 0.34, 0.38, 0.4}					Note (1)
Receiver						
Input Optical Wavelength	λ	1295	-	1325	nm	
Damage threshold		-3			dBm	
Input Saturation Power (Overload)	P_{ast}	-6			dBm	
Receiver sensitivity (OMA)	$P_{Sens-OMA}$			-19	dBm	Note(2)
Los Of Signal Assert	P_A	-35	-	-	dBm	
Los Of Signal De-assert	P_D	-	-	-20	dBm	
LOS -Hysteresis	P_{Hys}	0.5			dB	

Note:

Note (1): Measured with a PRBS 231-1 test pattern, @25.78Gb/s.

Note (2): Measured with Light source 1310nm; BER = $<5 \times 10^{-5}$ @PRBS=2³¹-1 NRZ.

Electrical Interface Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Transmitter						
Input differential impedance	R _{in}		100		Ω	1
Single ended data input swing	V _{in,pp}	180		700	mV	
Transmitter Fault Output-High	V _{FaultH}	2	-	V _{cc} +0.3	V	
Transmitter Fault Output-Low	V _{FaultL}	0	-	0.8	V	
Transmitter Disable Voltage- High	V _{DisH}	2	-	V _{cc} +0.3	V	
Transmitter Disable Voltage- low	V _{DisL}	0	-	0.8	V	
Receiver						
Differential data output swing	V _{out,pp}	300		850	mV	2
LOS Output Voltage-High	V _{LOSH}	2	-	V _{cc} +0.3	V	
LOS Output Voltage-Low	V _{LOSL}	0	-	0.8	V	

Notes:

1. Connected directly to TX data input pins. AC coupled thereafter.
2. Into 100 ohms differential termination.

Pin Description

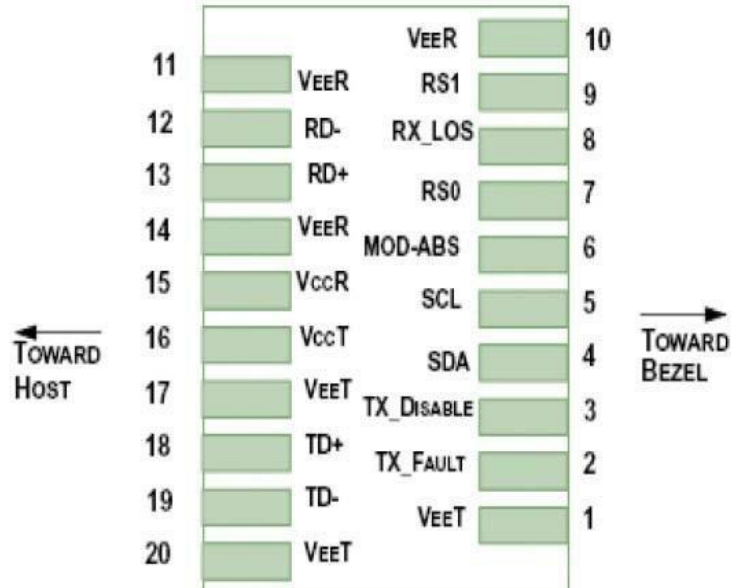


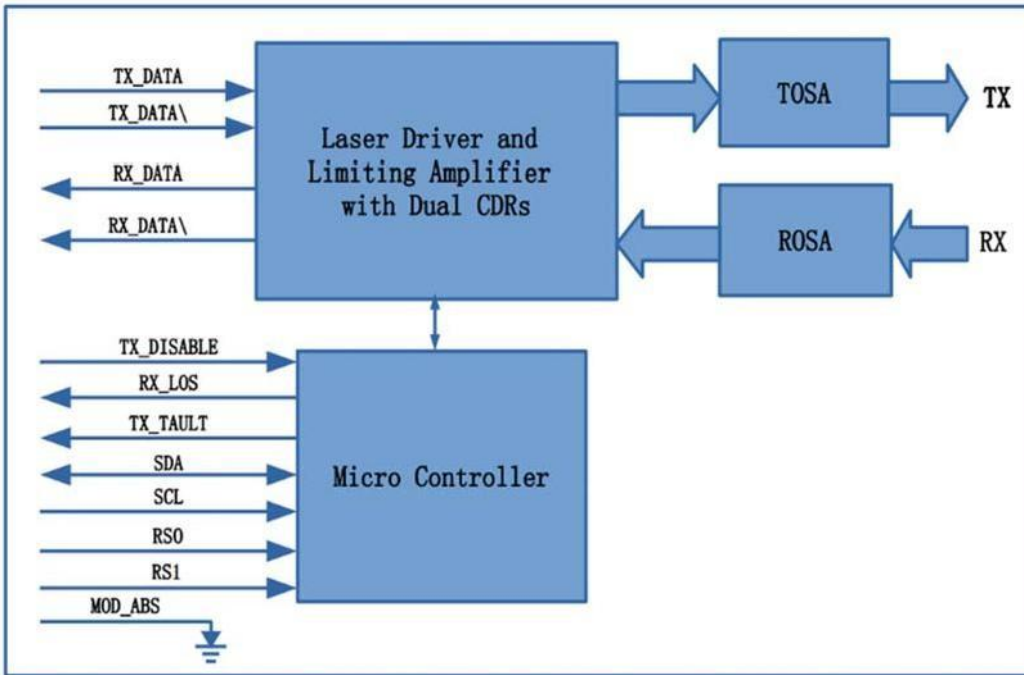
Diagram of Host Board Connector Block Pin Numbers and Name

Pin	Symbol	Name/Description	NOTE
1	V_{EET}	Transmitter Ground (Common with Receiver Ground)	1
2	T_{FAULT}	Transmitter Fault.	2
3	T_{DIS}	Transmitter Disable. Laser output disabled on high or open.	3
4	SDA	2-wire Serial Interface Data Line	4
5	SCL	2-wire Serial Interface Clock Line	4
6	MOD_ABS	Module Absent. Grounded within the module	4
7	RS0	Rate Select 0, internal pull down	5
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	6
9	RS1	Rate Select 1, internal pull down	5
10	V_{EER}	Receiver Ground (Common with Transmitter Ground)	1
11	V_{EER}	Receiver Ground (Common with Transmitter Ground)	1
12	RD-	Receiver Inverted DATA out. AC Coupled	
13	RD+	Receiver Non-inverted DATA out. AC Coupled	
14	V_{EER}	Receiver Ground (Common with Transmitter Ground)	1
15	V_{CCR}	Receiver Power Supply	
16	V_{CCT}	Transmitter Power Supply	
17	V_{EET}	Transmitter Ground (Common with Receiver Ground)	1
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled.	
19	TD-	Transmitter Inverted DATA in. AC Coupled.	
20	V_{EET}	Transmitter Ground (Common with Receiver Ground)	1

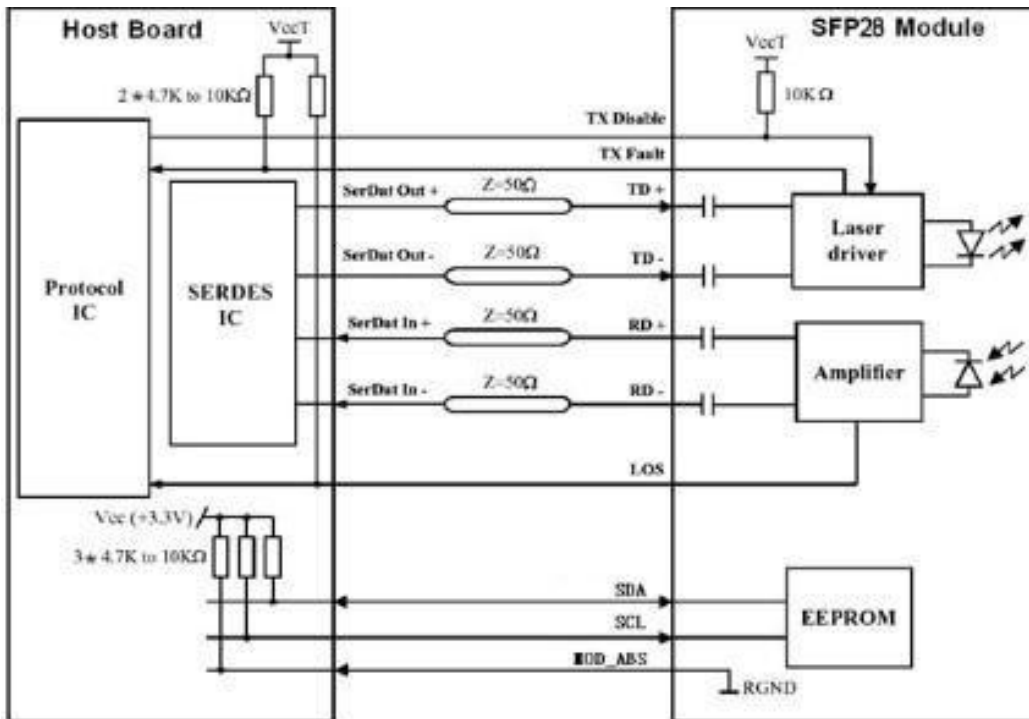
Notes:

1. Circuit ground is internally isolated from chassis ground.
2. T_{FAULT} is an open collector/drain output, which should be pulled up with a 4.7k – 10k Ohms resistor on the host board if intended for use. Pull up voltage should be between 2.0V to $V_{cc} + 0.3V$. A high output indicates a transmitter fault caused by either the TX bias current or the TX output power exceeding the preset alarm thresholds. A low output indicates normal operation. In the low state, the output is pulled to <0.8V.
3. Laser output disabled on $T_{DIS} > 2.0V$ or open, enabled on $T_{DIS} < 0.8V$.
4. Should be pulled up with 4.7k Ω - 10k Ω host board to a voltage between 2.0V and 3.6V. MOD_ABS pulls line low to indicate module is plugged in.
5. Internally pulled down per SFF-8431 Rev 4.1.
6. LOS is open collector output. It should be pulled up with 4.7k Ω – 10k Ω on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

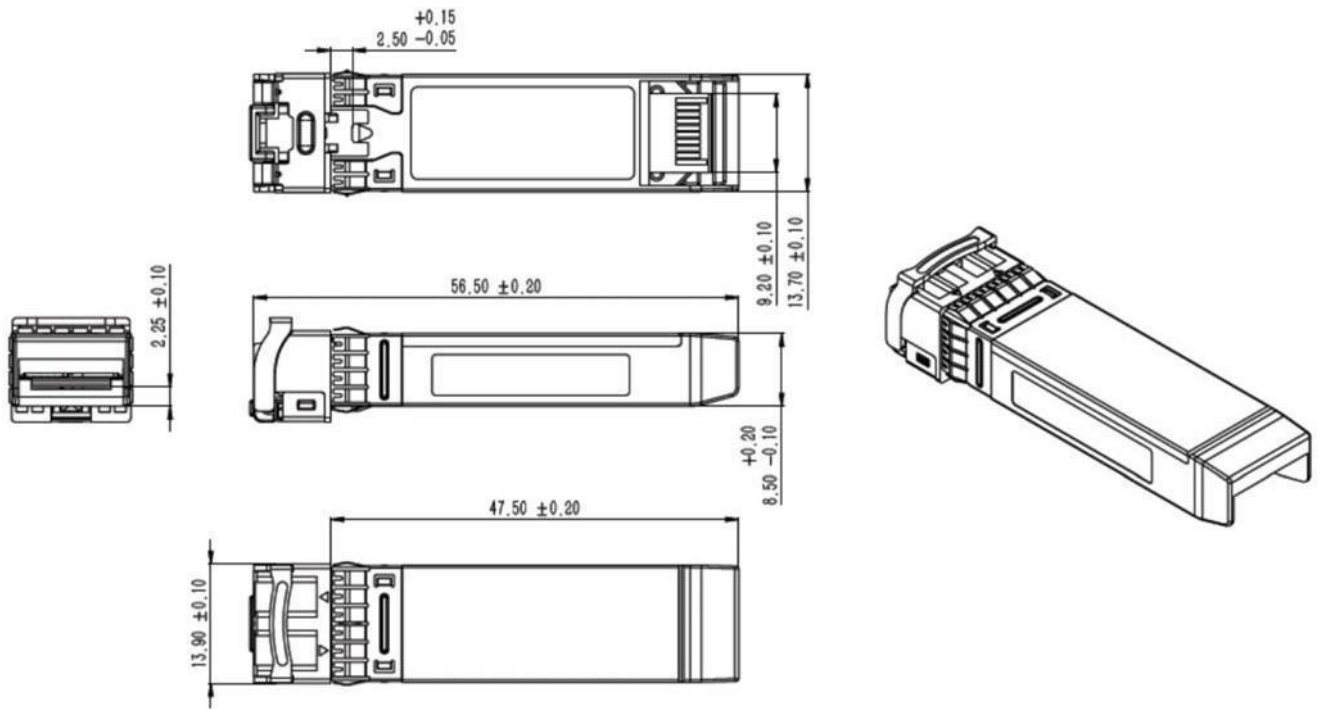
Block Diagram of Transceiver



Recommended Interface Circuit



Outline Dimensions



Document Revision

Version No.	Date	Description
1.00	2019-01-16	Initial released datasheet
1.10	2019-07-02	Update Lane Wavelengths(Range)
1.20	2020-05-26	Update outline dimensions
1.30	2020-08-10	Update Lane Wavelengths(Range): 1295~1310nm change to 1295~1325nm Update Input Saturation Power(Overload): -4dBm change to -6dBm