

PRODUCT FEATURES

- LC BiDi optical interface
- Up to 10km transmission distance
- 24.33Gb/s to 25.78Gb/s data links
- Single 3.3 V power supply
- Low DC power consumption
- Hot-Pluggable SFP28 footprint
- High performance 1270/1330nm DML laser
- High sensitivity PIN/TIA optical receiver
- Single Mode operation
- BER < 5X10⁻⁵
- Built-in CDR
- Case Operating temperature ranges:
Industrial : -40 to 85°C
Commercial: 0 to 70°C
- RoHS2.0 compliance

APPLICATIONS

- 25GBASE-LR Ethernet
- CPRI 25G

COMPLIANCE

- SFF-8472
- SFF-8432
- SFF-8431

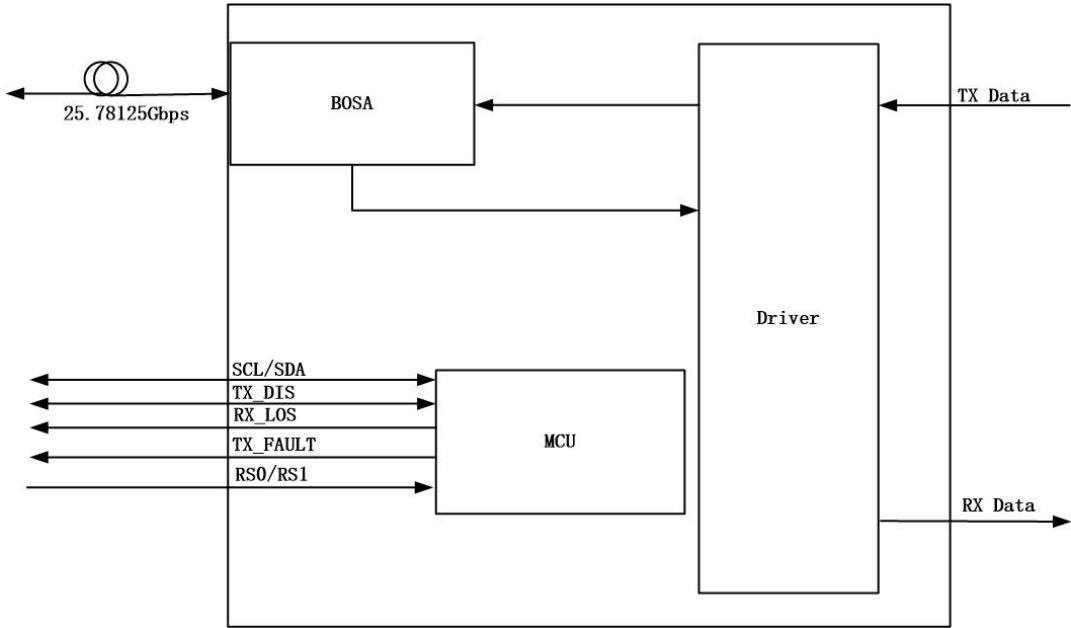
Ordering information

Part Number	Data Rate (Gb/s)	Media	Wavelength(nm)	Operating distance(km)	Temperature(°C)
IP-FFLK10B23C	25.78125	SMF	1270/1330	10	0~70
IP-FFLK10B32C	25.78125	SMF	1330/1270	10	0~70
IP-FFLK10B23I	25.78125	SMF	1270/1330	10	-40~85
IP-FFLK10B32I	25.78125	SMF	1330/1270	10	-40~85

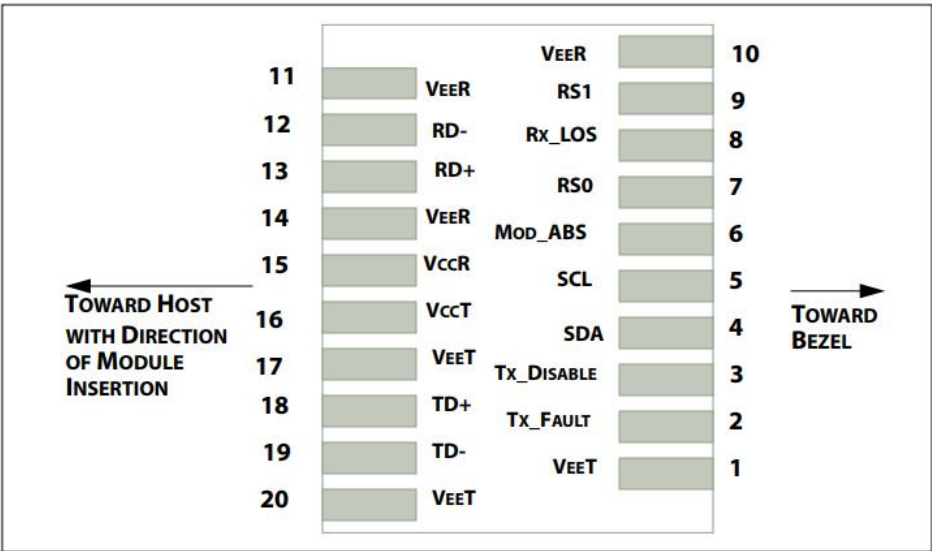
Product Description

The transceiver is intended for 10km reach service from 24.33Gb/s to 25.78Gb/s single mode high-speed communications equipment where low-cost, extraordinary performance and reliability are essential. It utilizes internal clock and data recovery (CDR) units on transmitter and the receiver chains for low jitter compliance. The differential AC coupled Tx and Rx data interfaces are CML compatible. The device is Class I laser safety compliant.

1. Block Diagram



2. Pin Diagram



SFP28 pad assignment top view

3. Pin Descriptions

Pin	Name	Function/Description	Notes
1	V _{EET}	Transmitter Ground	
2	T _{FAULT}	Transmitter Fault Indication	1
3	T _{DIS}	Transmitter Disable-Module disables on high or open	
4	SDA	2-wire Serial Interface Data Line (MOD-DEF2)	
5	SCL	2-wire Serial Interface Clock (MOD-DEF1)	
6	MOD_ABS	Module Absent, connected to V _{EET}	
7	RS0	Rx Rate Select	2
8	Rx_LOS	Loss of Signal indication. Logic 0 indicates normal operation.	1
9	RS1	Tx Rate Select	2
10	V _{EER}	Receiver Ground	
11	V _{EER}	Receiver Ground	
12	RD-	Receiver Inverted DATA out	3
13	RD+	Receiver Non-inverted DATA out	3
14	V _{EER}	Receiver Ground	
15	V _{CCR}	Receiver Power Supply	
16	V _{CCT}	Transmitter Power Supply	
17	V _{EET}	Transmitter Ground	
18	TD+	Transmitter Non-Inverted DATA in	4
19	TD-	Transmitter Inverted DATA in	4
20	V _{EET}	Transmitter Ground	

Notes:

1. Shall be pulled up with 4.7k-10k ohms to a voltage between 3.1V and 3.5V on the host board.
2. The pins are pulled low to V_{EET} with a >30k resistor in the module.
3. The 100Ohms differential Rx Data output is internally AC coupled and terminated.
4. The 100Ohms differential Tx Data input is internally AC coupled and terminated.

4. Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Units
Storage Temperature	T _{stg}	-40	+85	°C
Case Operating Temperature (Industrial)	T _O	-40	85	°C
Case Operating Temperature (Commercial)	T _O	0	70	°C
Relative Humidity - Storage	RH _s	0	95	%
Relative Humidity - Operating	RH _O	0	85	%
DC Supply Voltage	V _{CC}	0	3.6	V

5. Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit	Note
Power Supply Voltage	V _{CC}	3.135	3.3	3.465	V	
Power Consumption				1.2	W	C-temp

				1.5	W	I-temp
Power Supply Current @ 3.3V	I _{cc}			360	mA	C-temp
				450	mA	I-temp

6. Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Units	Notes
Transmitter						
Differential Data input Swing	V _{IN}	200		800	mV	
Tx Differential Input Impedence	Z _{IN}		100		Ω	
Transmitter Disable Voltage	V _D	2.0		V _{cc} +0.3	V	
Transmitter Enable Voltage	V _{EN}	0		0.8	V	
Receiver						
Differential Data Output Swing	V _{OUT}	200		800	mV	
Rx Differential Output Impedence	Z _{OUT}		100		Ω	
LOS Assert Voltage	V _{LOSA}	2.4		V _{cc}	V	
LOS De-assert Voltage	V _{LOSD}	V _{ee}		V _{ee} +0.4	V	

7. Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Transmitter						
Transmitter Laser Type		1270/1330nm DML				
Average Output Power	P _{out}	-4		6	dBm	
Extinction ratio	ER	3			dB	
Wavelength	λ	1260	1270	1280	nm	
		1320	1330	1340		
Spectral Line RMS Width @ -20dB	Δλ			1	nm	
Side Mode Suppression Mode	SMSR	30			dB	
Average Output Power (Laser Off)	P _{OFF}			-30	dBm	
Receiver						
Receiver Type		PIN/TIA				
Wavelength	λ	1320	1330	1340	nm	
		1260	1270	1280		
Received Sensitivity (OMA)	PIN(OMA)			-12	dBm	1
Optical Power Overload	PIN(SAT)	2			dBm	
Rx_LOS of Signal Assert	LOSA	-30			dBm	
Rx_LOS of Signal De-assert	LOSD			-14	dBm	
Rx_LOS of Signal Hysteresis	LOSH	0.5		5	dB	

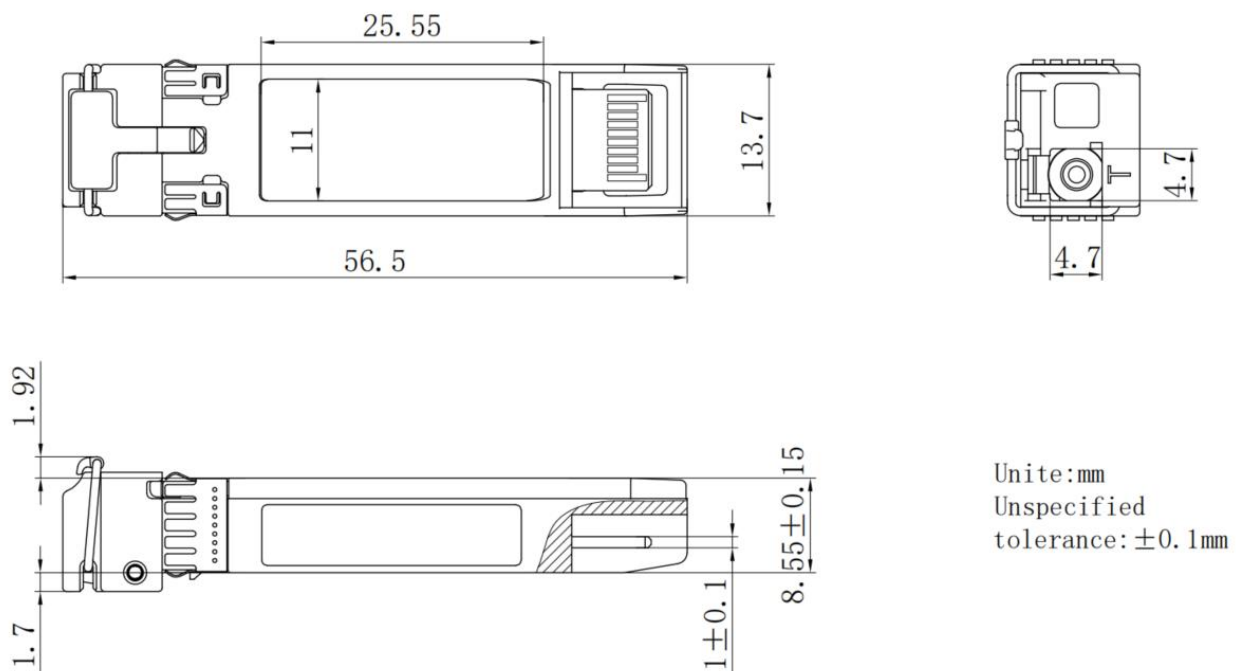
Note:

1.Measured at 25.78Gb/s with PRBS 2³¹⁻¹ NRZ test pattern for BER < 5x10⁻⁵.

8. Monitoring Interface

Parameter	Symbol	Spec	Units	Conditions / Notes
Temperature		+/-3℃	℃	
Voltage		+/-3%	V	
IBias		+/-10%	mA	
Rx power		+/-3	dBm	
Tx power		+/-3	dBm	

9. Mechanical Specifications



10. Regulatory Compliance

Feature	Test Method	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883C Method 3015.7	Class 1 (> 1500 Volts)
Electrostatic Discharge (ESD) Immunity	Variation of IEC 61000-4-2	LV4(Air discharge :15KV;Contact discharge:8 KV) Performance criterion:B
Electromagnetic Interference (EMI)	CISPR22 ITE Class B EN55022 Class B FCC Class B	Compliant with standards
Immunity	IEC61000-4-3 Class 2 EN55024	Typically show no measurable effect from a 3V/m field swept from 80 to 1000MHz applied to the transceiver without a chassis enclosure.

11. Contact Information

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12. Revision History

Version No.	Date	Description
1.0	Mar. 15, 2020	Preliminary datasheet
1.1	Apr.15, 2024	Updata the specifications of power consumption , and the optical characteristics
1.2	Jun.30, 2024	Update contact information.