

ESHKLB31-K10C(I)

SFP + 10Gb/s 1310nm 10km DDMI

PRODUCT FEATURES

- Up to 10.3125Gbps Data Links
- 1310nm DFB laser transmitter and PIN/TIA receiver
- Maximum link length of 10km on 9/125um SMF
- Hot-pluggable SFP footprint
- Duplex LC receptacles
- Low power dissipation < 1.5W
- RoHS compliant and lead-free
- Support Digital Diagnostic Monitor interface
- Single +3.3V power supply
- Compliant with SFF-8472
- Case operating temperature
Commercial:0°C to +70°C
Industrial:-40°C to +85°C



APPLICATIONS

- 10GBASE-LR/LW Ethernet
- 1Gb/s,2Gb/s,4Gb/s,8Gb/s and 10Gbs Fibre Channel
- CPRI Rates 10.138 Gb/s, 9.830 Gb/s
7.373 Gb/s, 6.144 Gb/s, 4.915 Gb/s
2.458 Gb/s, 1.229 Gb/s, 0.614 Gb/s
- SONET OC-192, SDH STM-64

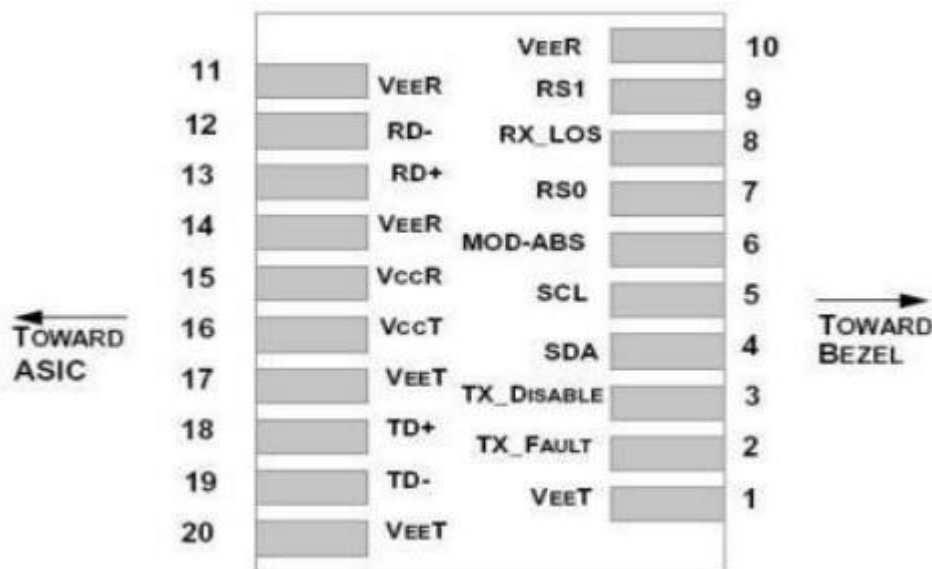
Compliance

- SFP MSA
- SFF-8472
- IEEE802.3ae
- ROHS

Ordering information

Part No.	Bit Rate (Gbps)	Laser (nm)	Distance (km)	Fiber Type	DDMI	Connector	Temp
ESHKLB31-K10C	10.3125	1310	10	SMF	YES	LC	0°C ~70°C
ESHKLB31-K10I	10.3125	1310	10	SMF	YES	LC	-40°C ~85°C

Pin Diagram



Pinout of Connector Block on Host Board

Pin Descriptions

Pin	Symbol	Name/Description	Ref.
1	VEET	Transmitter Ground (Common with Receiver Ground)	1
2	TFAULT	Transmitter Fault.	2
3	TDIS	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	No connection required	
8	LOS	Loss of Signal indication. Logic "0" indicates normal	5
9	RS1	No connection required	
10	VEER	Receiver Ground (Common with Transmitter Ground)	1
11	VEER	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	VEER	Receiver Ground (Common with Transmitter Ground)	1
15	VCCR	Receiver Power Supply	
16	VCCT	Transmitter Power Supply	
17	VEET	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	VEET	Transmitter Ground (Common with Receiver Ground)	1

Notes:

1. Circuit ground is internally isolated from chassis ground.
2. TFAULT is an open collector/drain output, which is pulled up with a 4.7k Ω - 10k Ω resistor on the host board, but is grounded inside the SFP cable plug.
3. Laser output disabled on TDIS > 2.0V or open, enabled on TDIS < 0.8V.
4. Should be pulled up with 4.7K - 10K Ω on the host board to a voltage between 2.0V and 3.6V. MOD_ABS pull line low to indicate module is plugged in.
5. LOS is open collector output. 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.

Absolute Maximum Ratings

Parameter	Symbol	Min	Type	Max	Unit	Ref.
Maximum Supply Voltage	Vcc	-0.5		3.6	V	
Storage Temperature	TS	-40		85	°C	
Case Operating Temperature	TOP	0		70	°C	Commercial
		-40		85		Industrial
Relative Humidity	RH	0		85	%	1

Notes:

1. Non-condensing.

Optical Characteristics (TOP = 0°C to 70°C, VCC = 3.3 $\pm$ 5% Volts)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Transmitter						
Center Wavelength	λ_c	1290	1310	1330	nm	
Spectral Width(-20dB)	Pm			1	nm	
Side-mode Suppression Ratio	SMSR	30			dB	
Average Output Power	Pavg	-4		+0.5	dBm	
Extinction Ratio	ER	9			dB	
Return Loss		12			dB	
Transmitter OFF Output	POff			-30	dBm	
Receiver						
Center Wavelength	λ_c	1260		1600	nm	
Receiver Sensitivity, Average Power				-15	dBm	1
Receiver Saturation	Psat			0	dBm	
Loss of Signal Assert	PA	-25			dBm	
Loss of Signal De-assert	PD			-16	dBm	
LOS Hysteresis	PD- PA	0.5			Db	

Notes:

1. Measured with a PRBS2³¹⁻¹ test pattern, @10.3125Gbps, BER < 1E-12.

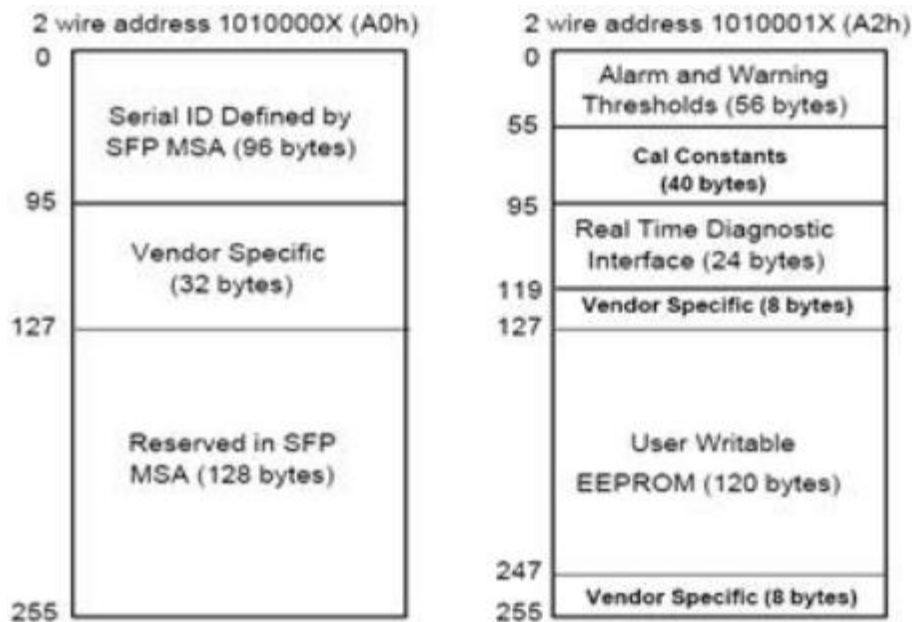
Electrical Characteristics (TOP = 0°C to 70°C, VCC = 3.3 ± 5% Volts)

Parameter	Symbol	Min	Type	Max	Unit	Ref.
Supply Voltage	Vcc	3.135	3.3	3.465	V	
Supply Current	Icc			300	Ma	
Transmitter						
Input differential impedance	Rin		100			1
Differential data input swing	Vin, pp	200		1000	Mv	
Transmit Disable Voltage	VD	2		VCC	V	
Transmit Enable Voltage	VEN	Vee		Vee+0.8	V	
Receiver						
Differential data output swing	Vout, pp	200		1000	Mv	2
LOS Fault	VLOS_fault	2		Vcc	V	3
LOS Normal	VLOS_nor	Vee		Vee+0.8	V	3
Power Supply Noise	VCCT/VCC	Per SFP	mVpp			

Notes:

1. Connected directly to TX data input pins. AC coupling from pins into laser driver IC.
2. Into 100Ω differential termination.
3. LossOfSignal is LVTTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.

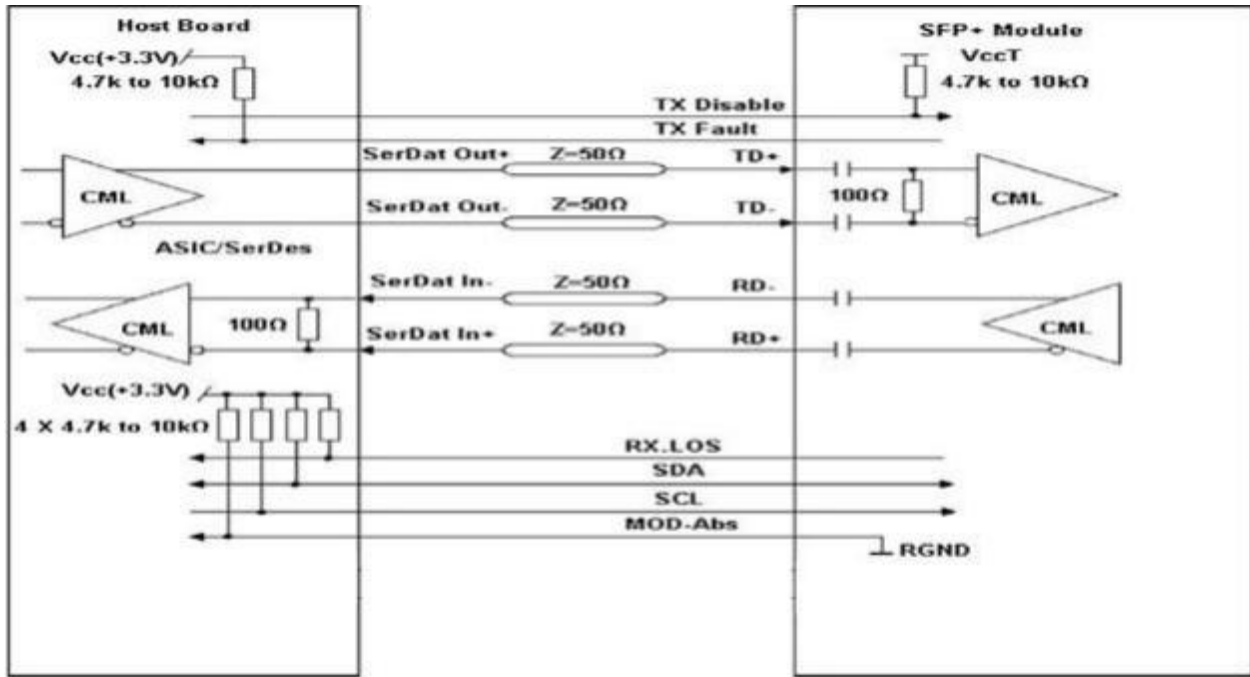
Digital Diagnostic Memory Map



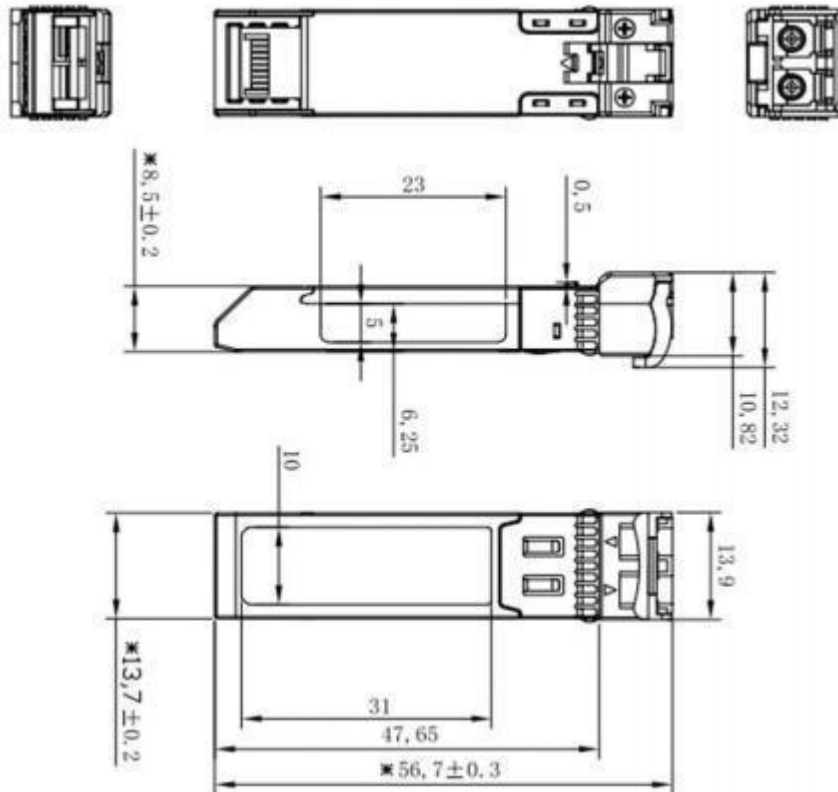
Digital Diagnostic Monitoring Information

Parameter	Unit	Accuracy
Case Temperature	°C	±3
Supply Voltage	V	±3%
Tx Bias Current	mA	±10%
Tx Optical Power	Db	±3
Rx Optical Power	Db	±3

Recommended Interface Circuit



Mechanical Dimensions



SFPwiremechanical drawing (Unit:mm)

Appendix A. Document Revision

Version	Initiated	Reviewed	Revision	Release Date
A0	Lynn	Luke	New Release	2019-7-31

Contact Information

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