



# Product specification

## BiDi Transceiver-SFP+ SM LC 10KM Indus

### 1330nm(Tx)/1270nm(Rx)



## 15-SFPBXSMLC002-I

### Description

The 15-SFPBXSMLC002-I are 10Gbps enhanced small form factor pluggable (SFP+) transceivers compatible with 10GBASE Ethernet and 10G Fibre Channel. It is suitable for single-mode fibre (SMF) communications in 10Gbps Ethernet and 10G Fibre.

Hughes transceivers are Class 1 Laser Products compliant with FDA regulations and meet Class 1 eye safety requirements of EN 60825 and the electrical safety requirements of EN 60950.

## Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Supply Voltage	V <sub>cc</sub>	-0.5	4	V
Storage Temperature	T <sub>s</sub>	-40	85	°C
Operating Temperature	T <sub>c</sub>	-40	85	°C

## Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit
Power Supply Voltage	V <sub>cc</sub>	3.15	3.3	3.45	V
Power Supply Current	I <sub>cc</sub>			300	mA
Data Rate			10		GBps
Max Link Length on 9/125µm SMF	L <sub>max</sub>		10		km

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## Optical Specifications

Parameter	Symbol	Min.	Typical	Max.	Unit
<b>Transmitter</b>					
Centre Wavelength	$\lambda_c$	1310	1330	1340	nm
Spectral Width (-20dB)	$\sigma$			1	nm
Average Output Power	P <sub>out</sub>	-5		5	dBm
Extinction Ratio	ER	3.5			dB
Avg Launch Power Off Transmitter	P <sub>off</sub>			-30	dBm
<b>Receiver</b>					
Centre Wavelength	$\lambda_c$	1260	1270	1280	nm
Receiver Sensitivity	P <sub>IN</sub>			-14	dBm
Receiver Overload	P <sub>max</sub>	3			dBm
LOS De-Assert	LOS <sub>D</sub>			-19	dBm
LOS Assert	LOS <sub>A</sub>	-24			dBm
LOS Hysteresis		0.5		4.5	dB

## Electrical Specifications

Parameter	Symbol	Min.	Typical	Max.	Unit
<b>Transmitter</b>					
Input Differential Impedance	Z <sub>in</sub>	90	100	110	$\Omega$
Data Input Swing Differential	V <sub>in</sub>	250		1200	mV
Tx-Dis Disable	V <sub>d</sub>	2.0		V <sub>cc</sub>	V
Tx-Dis Enable	V <sub>en</sub>	0		0.8	V
TX-Fault (Fault)		2.0		V <sub>cc</sub> +0.3	V
TX-Fault (Normal)		0		0.8	V
<b>Receiver</b>					
Data Output Swing Differential	V <sub>out</sub>	250		800	mV
Rx-Los Fault	V <sub>lf</sub>	2.0		V <sub>CCHOST</sub>	V
Rx-Los Normal	V <sub>ln</sub>	0		0+0.8	V
Output rise and fall time	Tr, Tf	30		V <sub>CCHOST</sub>	ps





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## Pin Descriptions

Pin	Symbol	Description	Ref.
1	VEET	Transmitter Ground (Common with Receiver Ground)	6.1
2	TFAULT	Transmitter Fault.	
3	TDIS	Transmitter Disable. Laser output disabled on high or open.	6.2
4	MOD_DEF(2)	Module Definition 2. Data line for Serial ID.	6.3
5	MOD_DEF(1)	Module Definition 1. Clock line for Serial ID.	6.3
6	MOD_DEF(0)	Module Definition 0. Grounded within the module.	6.3
7	RS0	Rate Select0, optionally controls SFP+ module receiver.	
8	LOS	Loss of Signal indication. Logic 0 indicates normal	6.4
9	RS1	Rate Select1, optionally controls SFP+ module receiver	6.1
10	VEER	Receiver Ground (Common with Transmitter Ground)	6.1
11	VEER	Receiver Ground (Common with Transmitter Ground)	6.1
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)	6.1
15	VCCR	Receiver Power Supply	
16	VCCT	Transmitter Power Supply	
17	VEET	Transmitter Ground (Common with Receiver Ground)	6.1
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)	6.1

### Notes:

- 6.1 Circuit ground is internally isolated from chassis ground.
- 6.2 Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.
- 6.3 Should be pulled up with 4.7k - 10kohms on host board to a voltage between 2.0V and 3.6V. MOD\_DEF(0) pulls line low to indicate module is plugged in.
- 6.4 LOS is open collector output. Should be pulled up with 4.7k -10kohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.





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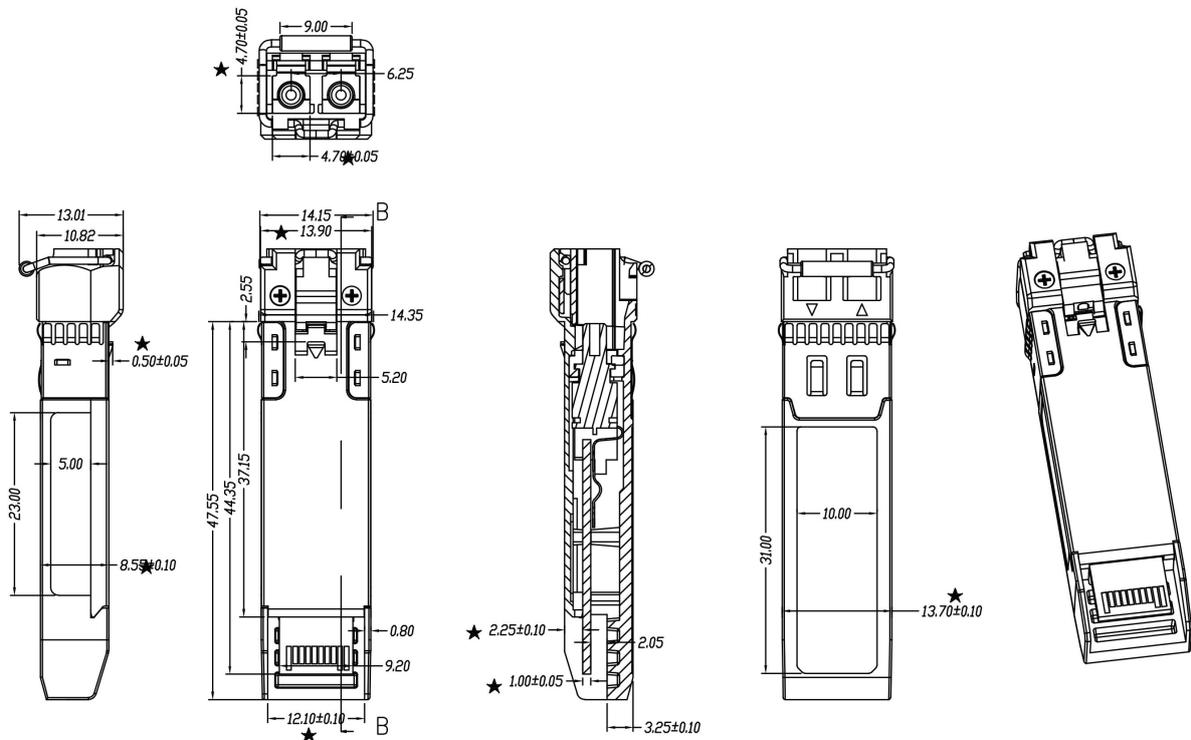
### 1330nm(Tx)/1270nm(Rx)

### EEPROM & DDM threshold

2 Wire Address 1010000X (A0h)	
0~95	Serial ID Defined by SFP MSA (96 bytes)
96~127	Vendor Specific (32 bytes)
128~255	Reserved (128 bytes)

	Low Alarm	Low Warn	High Warn	High Alarm
Temperature	-45°C	-40°C	85°C	90°C
Voltage	3V	3.1V	3.6V	3.7V
TX Bias	15mA	20mA	75mA	85mA
Tx Power	-8dBm	-7dBm	5dBm	6dBm
Rx Power	-20dBm	-18dBm	0.5dBm	1.5dBm

### Mechanical Drawing



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