

Product Features

- Electrical interface specifications per SFF-8431
- Management interface specifications per SFF-8432 and SFF-8472
- SFP28 MSA package with Single LC receptacle
- DFB Laser, PIN photo-detector
- Up to 25.78G bi-directional data links
- Single +3.3V power supply
- Class 1 laser safety certified
- Operating temperature Options:
 - (Commercial) 0°C to +70°C
 - (Industrial) -40°C to +85°C
- Up to 10km on 9/125µm SMF
- RoHS6/6 Compliant



Applications

- 25GBASE-LR at 25.78Gbps
- 25GBASE-BX at 25.78Gbps
- CPRI and OBSAI

Descriptions

LX660xxDH are designed for Single Fiber Bidirectional serial optical data communications up to 25.78Gb/s. The electrical interface is compliant with SFI specifications of SFF-8431. The transceiver consists of 25.78Gbit/s DFB optical transmitter and PIN receiver, and transmission distance up to 10Km on single mode fiber.

Ordering Information

Table 1. Ordering Information

Part Number	Transmitter	Output Power	Receiver	OMA Sensitivity @25.78G	Reach	Temp	DDM	RoHS
LX6601CDH	1270nm DFB	-5 ~ +2dBm	1330nm PIN	< -12dBm	10km	0~70 °C	Available	Compliant
LX6601IDH	1270nm DFB	-5 ~ +2dBm	1330nm PIN	< -12dBm	10km	-40~85 °C	Available	Compliant
LX6602CDH	1330nm DFB	-5 ~ +2dBm	1270nm PIN	< -12dBm	10km	0~70 °C	Available	Compliant
LX6602IDH	1330nm DFB	-5 ~ +2dBm	1270nm PIN	< -12dBm	10km	-40~85 °C	Available	Compliant

Pin Description

Table 2. Pin Description

Pin	Name	Function/Description	Notes
1	VeeT	Transmitter Ground	1
2	TX_Fault	Transmitter Fault (LVTTTL-O) - High indicates a fault condition	2
3	TX_Disable	Transmitter Disable (LVTTTL-I) – High or open disables the transmitter	3
4	SDA	Two wire serial interface Data Line (LVCMOS-I/O) (MOD-DEF2)	4
5	SCL	Two wire serial interface Clock Line (LVCMOS-I/O) (MOD-DEF1)	4
6	MOD_ABS	Module Absent (Output), connected to VeeT or VeeR in the module	5
7	RS0	NA	6
8	RX_LOS	Receiver Loss of Signal (LVTTTL-O)	2
9	RS1	NA	6
10	VeeR	Receiver Ground	1
11	VeeR	Receiver Ground	1
12	RD-	Inverse Received Data out (CML-O)	
13	RD+	Received Data out (CML-O)	
14	VeeR	Receiver Ground	
15	VccR	Receiver Power - +3.3V	
16	VccT	Transmitter Power - +3.3 V	
17	VeeT	Transmitter Ground	1
18	TD+	Transmitter Data In (CML-I)	
19	TD-	Inverse Transmitter Data In (CML-I)	
20	VeeT	Transmitter Ground	1

Notes:

1. The module signal grounds are isolated from the module case.
2. This is an open collector/drain output that on the host board requires a 4.7KΩ to 10KΩ pull-up resistor to VccHost.
3. This input is internally biased high with a 4.7KΩ to 10KΩ pull-up resistor to VccT.
4. Two-Wire Serial interface clock and data lines require an external pull-up resistor dependent on the capacitance load.
5. This is a ground return that on the host board requires a 4.7KΩ to 10KΩ pull-up resistor to VccHost.
6. Rate select can also be set through the 2-wire bus in accordance with SFF-8472 v. 12.1, Rx Rate Select is set at Bit 3, Byte 110, Address A2h. Tx Rate Select is set at Bit 3, Byte 118, Address A2h.

Note: writing a “1” selects maximum bandwidth operation. Rate select is the logic OR of the input state of Rate Select Pin and 2-wire bus.

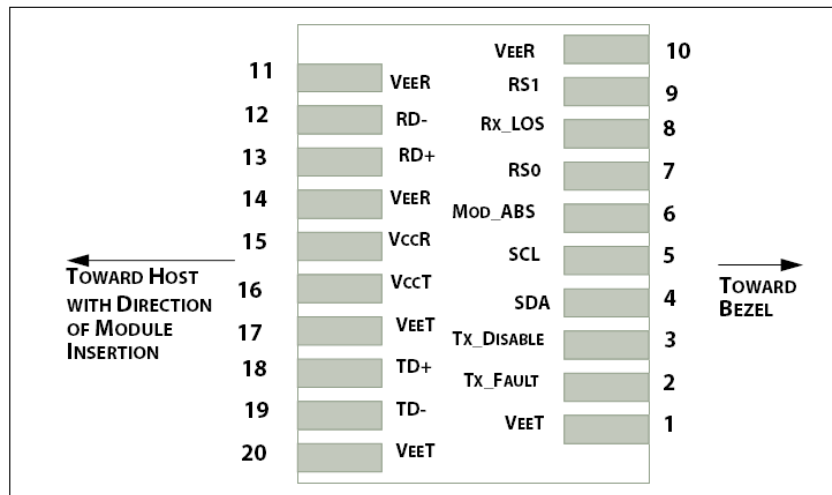


Figure 1. Host PCB SFP28 pad assignment top view

Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of the data sheet. Exposure to absolute maximum ratings for extended periods can adversely affect device reliability.

Table 3. Absolute Maximum Ratings

Parameter	Symbol	Minimum	Maximum	Unit
Storage Temperature	T _s	-40	85	°C
Relative Humidity	RH	5	95	%
Supply Voltage	V _{cc}	-0.3	4.0	V

Recommended Operating Conditions

Table 4. Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit	
Operating Case Temperature	Commercial	T _c	0	25	70	°C
	Industrial	T _c	-40	25	85	°C
Supply Voltage	V _{cc}	3.135	3.3	3.465	V	
Data Rate	-	-	24.33 25.78	-	Gb/s	

Transceiver Electrical Characteristics

Table 5. Transceiver Electrical Characteristics

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes	
Module Supply Current	I _{CC}	-	-	450	mA	-	
Power Dissipation	P _D	-	-	1500	mW	-	
Transmitter							
Input Differential Impedance	Z _{IN}	-	100	-	Ω	-	
Differential Data Input Swing	V _{IN, P-P}	180	-	700	mV _{P-P}	-	
TX_FAULT	Transmitter Fault	V _{OH}	2.0	-	V _{CCHOST}	V	-
	Normal Operation	V _{OL}	0	-	0.8	V	-
TX_DISABLE	Transmitter Disable	V _{IH}	2.0	-	V _{CCHOST}	V	-
	Transmitter Enable	V _{IL}	0	-	0.8	V	-
Receiver							
Output Differential Impedance	Z _O	-	100	-	Ω	-	
Differential Data Output Swing	V _{OUT, P-P}	300	-	850	mV _{P-P}	1	
Data Output Rise Time, Fall Time	t _r , t _f	-	-	15	ps	2	
RX_LOS	Loss of signal (LOS)	V _{OH}	2.0	-	V _{CCHOST}	V	3
	Normal Operation	V _{OL}	0	-	0.8	V	3

Notes:

1. Internally AC coupled, but requires a external 100Ω differential load termination.
2. 20–80%.
3. LOS is an open collector output. Should be pulled up with 4.7kΩ on the host board.

Transmitter Optical Characteristics

Table 6. Transmitter Optical Characteristics

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes	
Launch Optical Power	P _o	-5	-	+2	dBm	1	
Center Wavelength Range	LX6601xDH	λ _c	1260	1270	1280	nm	-
	LX6602xDH	λ _c	1320	1330	1340	nm	-
Extinction Ratio	EX	3.5	-	-	dB	2	
Spectral Width (-20dB)	Δλ	-	-	1	nm	-	
Side Mode Suppression Ratio	SMSR	30	-	-	dB	-	
Optical Rise/Fall Time @25.78Gb/s	t _r /t _f	15	-	-	ps	3	
Optical Return Loss Tolerance	ORLT	-	-	12	dB	-	
Pout @TX-Disable Asserted	P _{off}	-	-	-30	dBm	1	

Notes:

1. Class 1 Laser Safety per FDA/CDRH and EN (IEC) 60825 regulations.
2. 20dB spectral width.
3. Unfiltered, 20-80%.

Receiver Optical Characteristics

Table 7. Receiver Optical Characteristics

Parameter		Symbol	Minimum	Typical	Maximum	Unit	Notes
Center Wavelength	LX6601xDH	λ_c	1320	1330	1340	nm	-
	LX6602xDH	λ_c	1260	1270	1280	nm	-
Receiver OMA Sensitivity		RxSENS	-	-	-12	dBm	1
Receiver Overload (P_{avg})		P_{OL}	2	-	-	dBm	
Optical Return Loss		ORL	26	-	-	dB	-
LOS De-Assert		LOS_D	-	-	-14	dBm	-
LOS Assert		LOS_A	-35	-	-	dBm	-
LOS Hysteresis		-	0.5	-	-	dB	-

Notes:

1. Measured with PRBS $2^{31}-1$ at 5×10^{-5} BER.

General Specifications

Tale 8. General Specifications

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Data Rate	BR		25.78		Gb/s	
Bit Error Rate	BER			5×10^{-5}		1
Supported Link Length on 9/125um SMF, 25.78Gb/s	L	-	10		km	2

Notes:

1. Tested with a PRBS $2^{31}-1$ test pattern for 25.78Gb/s operation.
2. Distances are based on FC-PI-6 Rev. 3.1 and IEEE 802.3 standards, with FEC.

Recommended Host Board Power Supply Filter Network

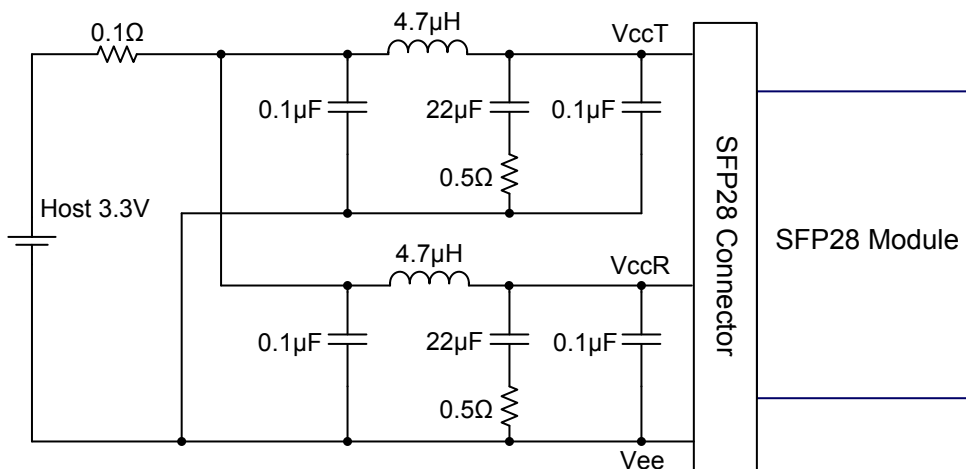


Figure 2. Recommended Host Board Power Supply Filter Network

Recommended Application Interface Block Diagram

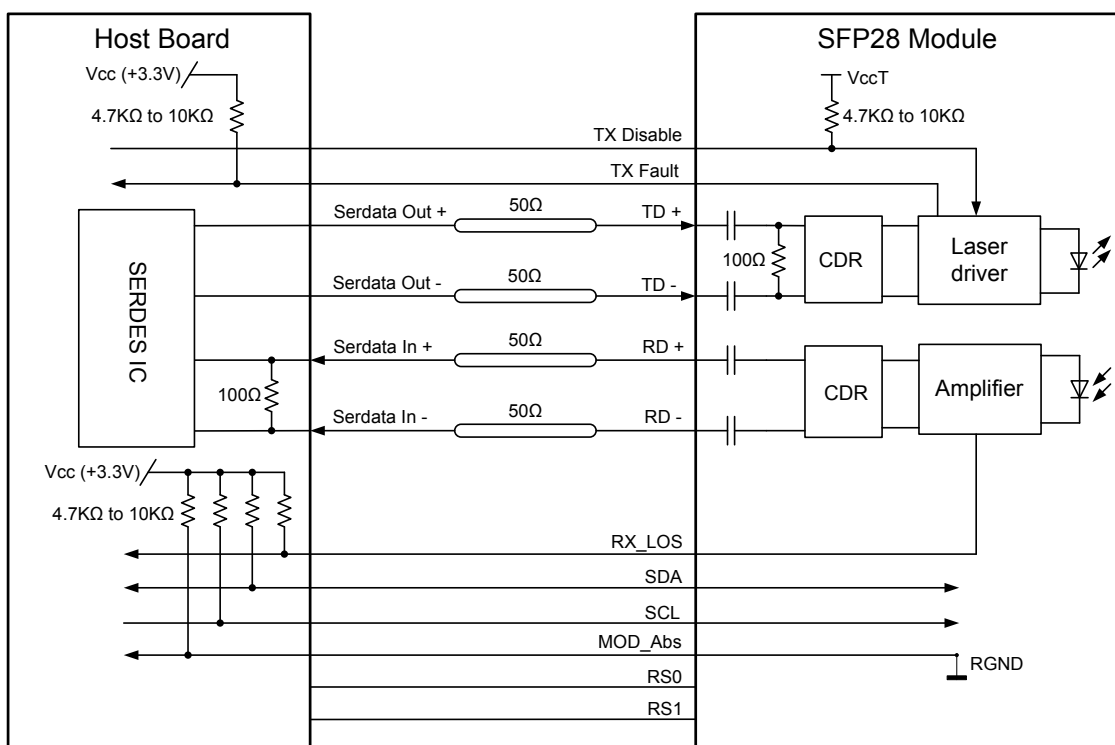


Figure 3. Recommended Application Interface Block Diagram

Mechanical specifications

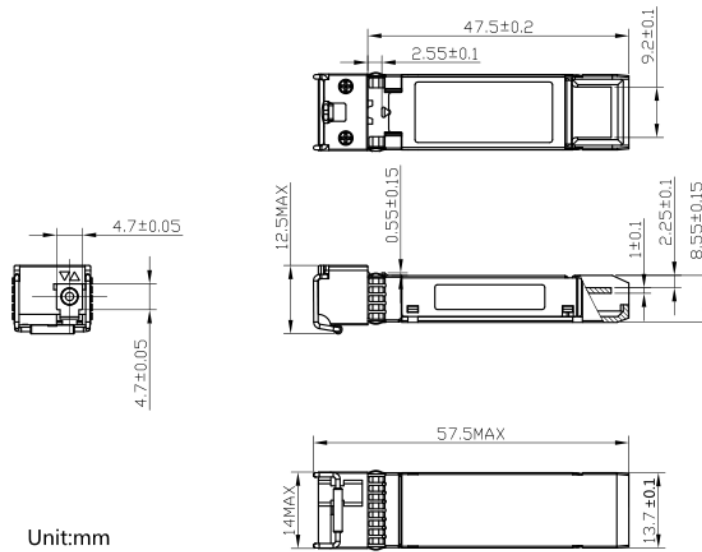
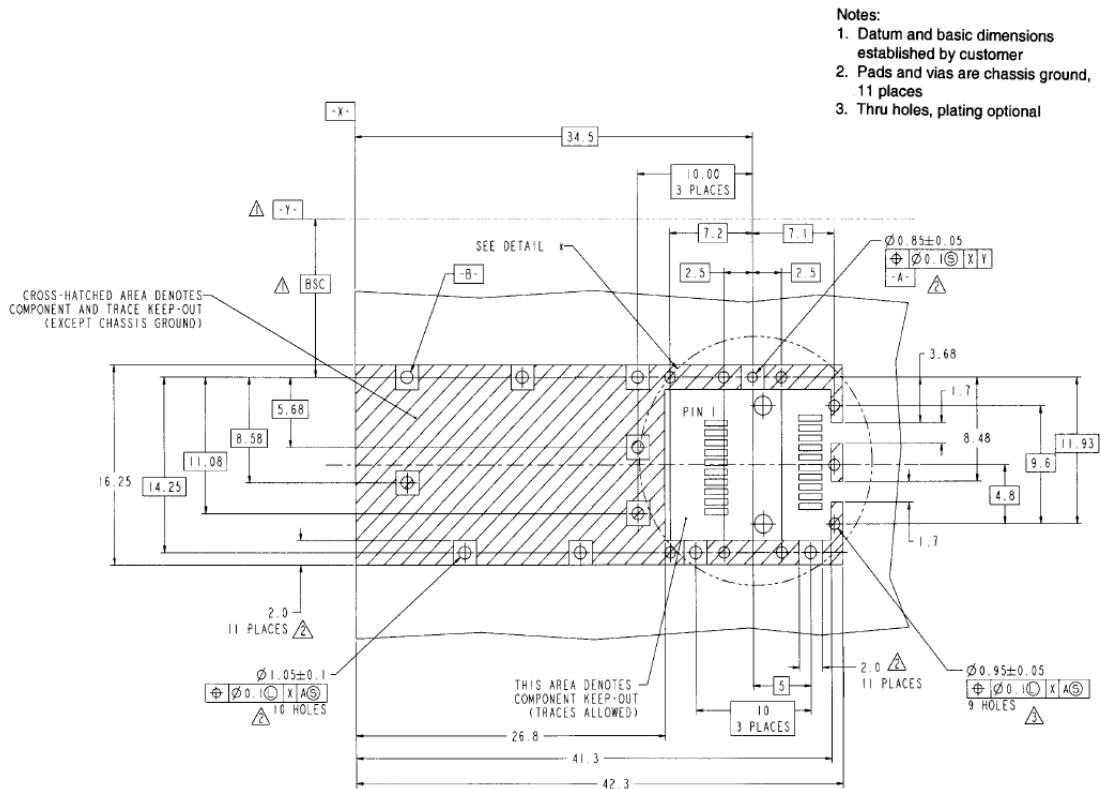


Figure 4. Outline Drawing

PCB layout recommendation



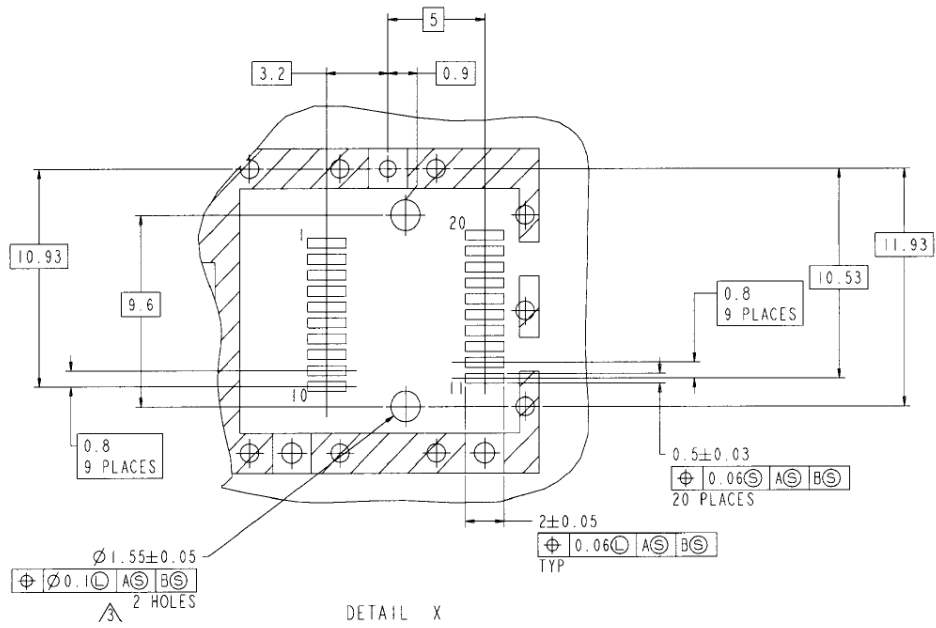


Figure 5. PCB layout recommendation

Revision History

Date	Rev	Description	Modified By
02/06/2020	V1.0	initial version	Guotao Huang

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