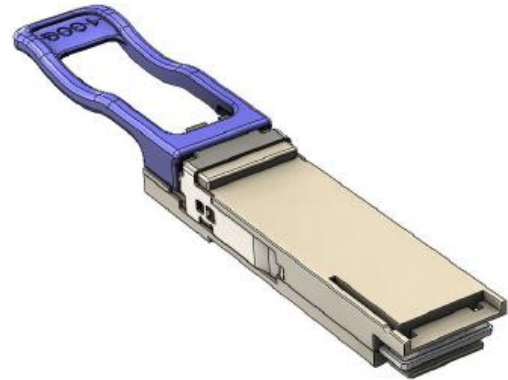


Product Features

- Compliant with IEEE Std 802.3ba, 100G Ethernet
- Compliant with QSFP28 MSA
- CWDM DML Lasers
- 4 channels PIN photo detector
- Single +3.3V power supply
- Class 1 laser safety certified
- Operating temperature: -40°C to +85°C
- Up to 10km on SMF
- RoHS Compliant



Applications

- 100G CWDM4 Ethernet links
- Data center

Descriptions

HS026TICW4-10 QSFP28 transceiver modules are designed for 100 Gigabit Ethernet over 10km single mode fiber. They are compliant with the QSFP28 100G and IEEE 802.3ba. Each transceiver incorporates four direct modulated lasers with driver ICs, four PIN diodes with TIAs, and two Mux/De-Mux blocks in a highly integrated CWDM configuration for operation over duplex LC connectors. Mechanical dimensions, connectors and the footprint of this product is QSFP28 specifications compliant.

Ordering Information

Table 1. Ordering Information

Part Number	Transmitter	Output Power	Receiver	Sensitivity	Reach	Temp	DDM	RoHS
HS026TICW4-10	DFB	-6.5~ +4.5dBm	PIN	< -11.5dBm	10km	-40~ 85 °C	Available	Compliant



Pin Description

Table 2. Pin Description

Pin	Name	Function/Description	Notes
1	GND	Transmitter Ground (Common with Receiver Ground)	1
2	Tx2-	Transmitter Inverted Data Input	
3	Tx2+	Transmitter Non-Inverted Data output	
4	GND	Transmitter Ground (Common with Receiver Ground)	1
5	Tx4-	Transmitter Inverted Data Input	
6	Tx4+	Transmitter Non-Inverted Data output	
7	GND	Transmitter Ground (Common with Receiver Ground)	1
8	ModSelL	Module Select	2
9	ResetL	Module Reset	2
10	VccRx	3.3V Power Supply Receiver	
11	SCL	2-Wire serial Interface Clock	2
12	SDA	2-Wire serial Interface Data	2
13	GND	Transmitter Ground (Common with Receiver Ground)	1
14	Rx3+	Receiver Non-Inverted Data Output	
15	Rx3-	Receiver Inverted Data Output	
16	GND	Transmitter Ground (Common with Receiver Ground)	1
17	Rx1+	Receiver Non-Inverted Data Output	
18	Rx1-	Receiver Inverted Data Output	
19	GND	Transmitter Ground (Common with Receiver Ground)	1
20	GND	Transmitter Ground (Common with Receiver Ground)	1
21	Rx2-	Receiver Inverted Data Output	
22	Rx2+	Receiver Non-Inverted Data Output	
23	GND	Transmitter Ground (Common with Receiver Ground)	1
24	Rx4-	Receiver Inverted Data Output	1
25	Rx4+	Receiver Non-Inverted Data Output	
26	GND	Transmitter Ground (Common with Receiver Ground)	1
27	ModPrsl	Module Present	
28	IntL	Interrupt	2
29	VccTx	3.3V power supply transmitter	
30	Vcc1	3.3V power supply	
31	LPMode	Low Power Mode	2
32	GND	Transmitter Ground (Common with Receiver Ground)	1
33	Tx3+	Transmitter Non-Inverted Data Input	

34	Tx3-	Transmitter Inverted Data Output	
35	GND	Transmitter Ground (Common with Receiver Ground)	1
36	Tx1+	Transmitter Non-Inverted Data Input	
37	Tx1-	Transmitter Inverted Data Output	
38	GND	Transmitter Ground (Common with Receiver 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.

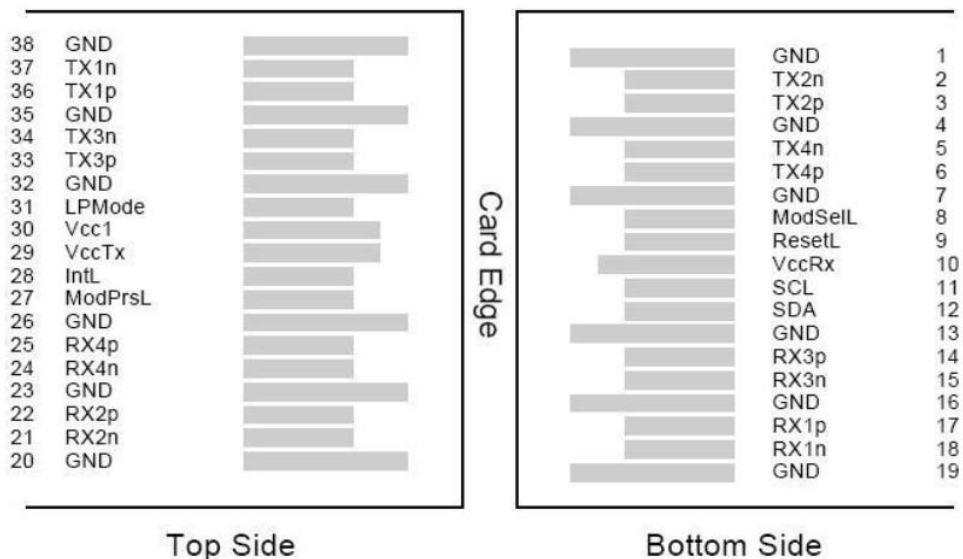


Figure 1. Host PCB QSFP28 pad assignment top view



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	-50	90	°C
Relative Humidity	RH	5	95	%
Supply Voltage	V _{cc}	-0.5	3.6	V

Recommended Operating Conditions

Table 4. Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Operating Case Temperature	T _c	-40	25	85	°C
Supply Voltage	V _{cc}	3.135	3.3	3.465	V
Data Rate PER Channel	-	-	25.78125 ± 100ppm		Gb/s

Transceiver Electrical Characteristics

Table 5. Transceiver Electrical Characteristics

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Module Supply Current	I _{cc}	-	950		mA	-
Power Dissipation	P _D	-	3200		mW	-
Transmitter						
-Single-ended Input Voltage Tolerance	-	-0.3	-	3.6	V	-
Input Differential Impedance	Z _{IN}	-	100	-	Ω	-
Differential Data Input Swing	V _{IN, P-P}	190	-	900	mV _{P-P}	-
AC Common Mode Input Voltage Tolerance	-	15	-	-	mV	-
Differential Input Voltage Swing Threshold	-	50	-	-	mV _{P-P}	-
Receiver						
Single-ended Output Voltage	-	-0.3	-	3.6	V	
Output Differential Impedance	Z _O	90	100	110	Ω	-



Differential Data Output Swing	$V_{OUT, P-P}$	300	-	900	mV _{P-P}	-
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Transmitter Optical Characteristics

Table 6. Transmitter Optical Characteristics

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Launch Optical Power per lane	P _o	-6.5	-	+4.5	dBm	1
Total Launch Optical Power	P _o	-	-	+10.5	dBm	1
Optical Modulation Amplitude (OMA), each lane	P(OMA)	-4		+2.5	dBm	
Difference in launch power between any two lanes (Average and OMA)				+6	dB	
Center Wavelength Range	L1	1264.5	-	1277.5	nm	-
	L2	1284.5	-	1297.5	nm	-
	L3	1304.5	-	1317.5	nm	-
	L4	1324.5	-	1337.5	nm	-
Extinction Ratio	EX	3.5	-	-	dB	1
Spectral width(-20dB)	$\Delta\lambda$	-	-	1	nm	-
Side Mode Suppression Ratio	SMSR	30	-	-	dB	-
Optical Return Loss Tolerance	ORLT	-	-	20	dB	-
Transmitter reflectance				-12	dB	2
P _{out} @TX-Disable Asserted	P _{off}	-	-	-30	dBm	3
Transmitter eye mask definition {X1, X2, X3, Y1, Y2, Y3}			{0.31, 0.4, 0.45, 0.34, 0.38, 0.4}			4

Notes:

1. Measured with a PRBS 2³¹-1 test pattern @25.78125Gbps.
2. Transmitter reflectance is defined looking into the transmitter.
3. The optical power is launched into SMF.
4. Eye mask hit ratio is 5E-5

Receiver Optical Characteristics

Table 7. Receiver Optical Characteristics

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Center Wavelength	L1	1264.5	-	1277.5	nm	-
	L2	1284.5	-	1297.5	nm	-
	L3	1304.5	-	1317.5	nm	-
	L4	1324.5	-	1337.5	nm	-
Receiver sensitivity (OMA), each lane	S	-	-	-11.5	dBm	1

Damage Threshold(each channel)	POL	+3.5	-	-	dBm	2
Average receive power, each lane		-13		+2.5	dBm	3
Receiver reflectance	ORL	-	-	-26	dB	-
LOS De-Assert	LOSD	-	-	-16	dBm	-
LOS Assert	LOSA	-26	-	-	dBm	-
LOS Hysteresis	-	0.5	-	-	dB	-

Notes:

1. Measured with PRBS 2³¹-1 test pattern, 25.78125Gb/s, BER 5.0E-5;
2. The receiver shall be able to tolerate, without damage, continuous exposure to an optical signal having this average power level;
3. Average receive power, each lane(min) is informative and not the principal indicator of signal strength. A received power below this value cannot be compliant; however, a value above this does not ensure compliance.

Recommended Host Board Power Supply Filter Network

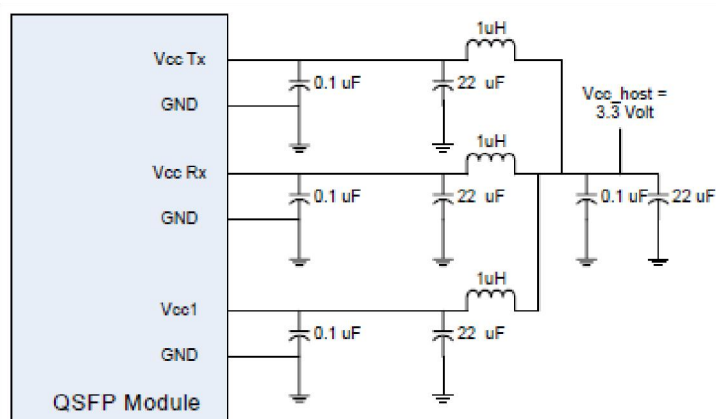


Figure 2. Recommended Host Board Power Supply Filter Network



Mechanical specifications

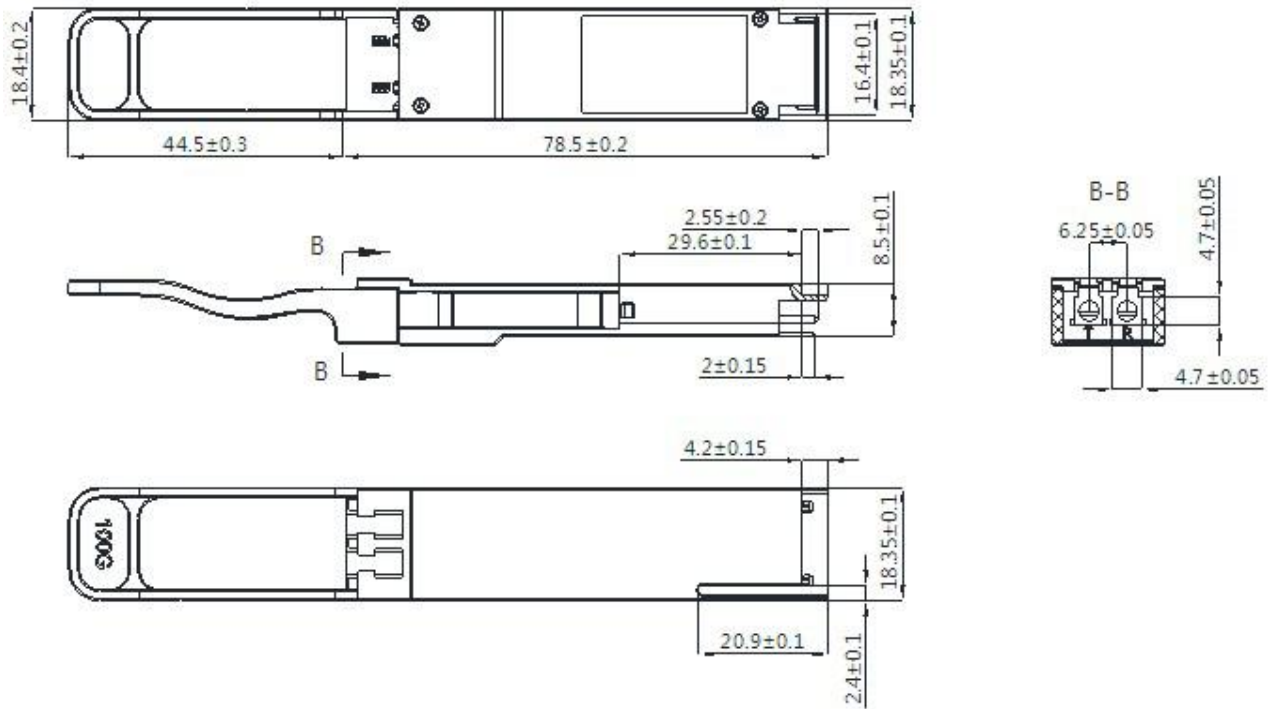


Figure 5. Outline Drawing