

DATA SHEET

MODULETEK:QSFP28-PSM4-2KM-C10

100Gb/s QSFP28 PSM4 2km Optical Transceiver

QSFP28-PSM4-2KM-C10 Overview

ModuleTek's QSFP28-PSM4-2KM-C10 QSFP28 100Gbps PSM4 optical transceiver offers 4 independent transmit and receive channels, each capable of 25.78125Gbps operation for an aggregate data rate of 103.1Gbps 2km of single mode fiber. An optical fiber ribbon cable with an MPO/MTP connector can be plugged into the QSFP28 module receptacle.

Product Features

- Supports 103.1Gb/s bit rate
- Compliant with 100G PSM4 Specification 2.0
- Compliant with 100G Ethernet IEEE 802.3bm
- Compliant with SFF-8665 (QSFP28 Solution) Revision 1.8
- MPO optical connector
- Built-in digital diagnostic functions
- Up to 2km transmission on SMF
- RoHS Compliant
- Operating temperature range: 0°C to70°C

Applications

- 100G Ethernet
- InfiniBand QDR and DDR interconnects

Ordering Information

Part Number	Description	Color on Clasp
QSFP28-PSM4-2KM-C10	100G QSFP28 PSM4 MPO Connectors, up to 2km on SMF, with DOM function	Yellow
For More Information: ModuleTek Limited Web: www.moduletek.com Email: sales@moduletek.com		

General Specifications

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Signaling Rate(Each Lane)			25.78125		Gb/s	
Data speed tolerance		-100		100	ppm	
Operating Temperature	T _C	0		70	°C	1
Storage Temperature	T _{STO}	-40		85	°C	2
Supply Current	I _{cc}			1200	mA	
Input Voltage	V _{CC}	3.14	3.3	3.46	V	
Power Consumption	P			3.5	V	

Notes:

1. Case temperature
2. Ambient temperature

Link Distances

Data Rate	Fiber Type	Distance Range (km)
100 Gb/s	9/125um SMF	2

Optical – Characteristics – Transmitter

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Average Launch Power(Each Lane)	P_{TX}	-9.4		2	dBm	
Optical Center Wavelength(Each Lane)	λ_C	1295	1310	1325	nm	
Optical Modulation Amplitude(Each Lane)	OMA	-5.15		2.2	dB	
Extinction Ratio	ER	3.5			dB	
Optical Return Loss Tolerance	TOL			20	dB	
Average Launch Power of OFF Transmitter(Each lane)	P_{OUT_OFF}			-30	dBm	
Transmitter Eye Mask Margin	EMM	5			%	

Optical – Characteristics – Receiver

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Optical Center Wavelength	λ_C	1295	1310	1325	nm	
Optical Input Power(each lane)	P_{RX}	-12.66		2	dBm	1
Damage Threshold	P	3			dBm	
Receiver Sensitivity (OMA)(Each Lane)	R_{X_SEN1}			-11.35	dBm	2
LOS Assert	LOS_A		TBD		dBm	
LOS De-Assert	LOS_D		TBD		dBm	
LOS Hysteresis	LOS_H		TBD		dB	

Notes:

1. Average, Informative
2. BER= 5×10^{-5}

Electrical – Characteristics – Transmitter

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Input differential impedance	R_{IN}	90	100	110	Ω	
Differential data input swing	V_{IN_PP}	200		900	mV	
TP1/TP1a Interface	Compliant to IEEE802.3ba XLPP1					

Electrical – Characteristics – Receiver

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Differential Output Impedance	R_{OUT}	90	100	110	Ω	
Differential data output swing	V_{OUT_PP}	200		900	mV	
TP4 Interface	Compliant to IEEE802.3ba XLPP1					

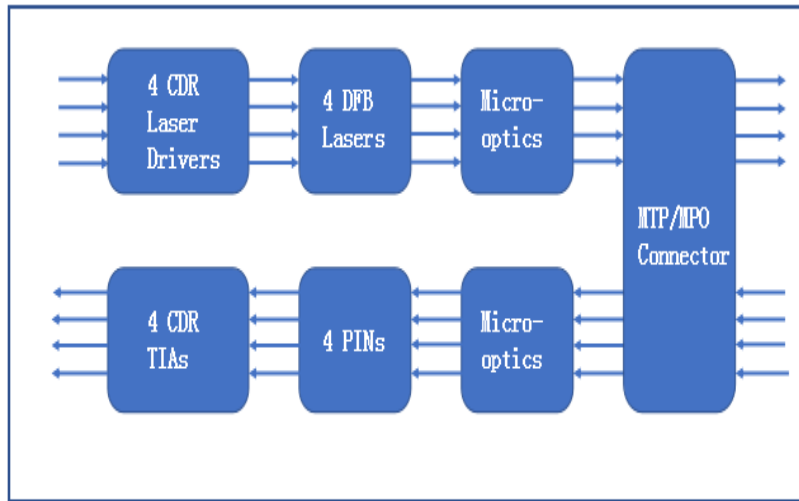
Digital Diagnostic Monitor Functions

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Temperature monitor absolute error	DMI_Temp	-3		3	$^{\circ}C$	1
Supply voltage monitor absolute error	DMI_VCC	-0.15		0.15	V	2
Channel RX power monitor absolute error	DMI_RX_Ch	-3		3	dB	3
Channel Bias current monitor	DMI_Ibias_Ch	-10%		10%	mA	3
Channel TX power monitor absolute error	DMI_TX_Ch	-3		3	dB	3

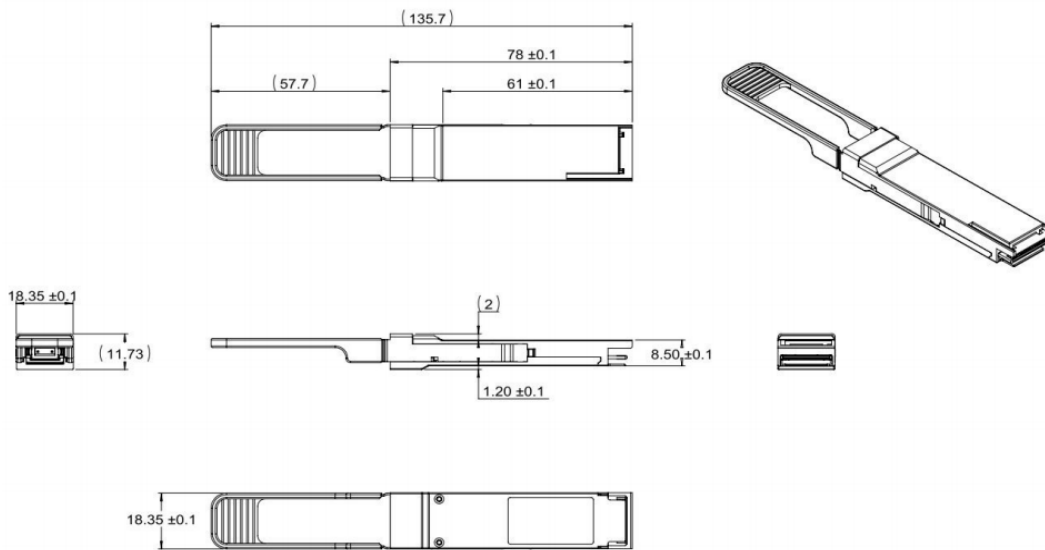
Notes:

1. Over operating temp
2. Full operating range
3. Ch1-Ch4

Block-Diagram-of-Transceiver



Dimensions

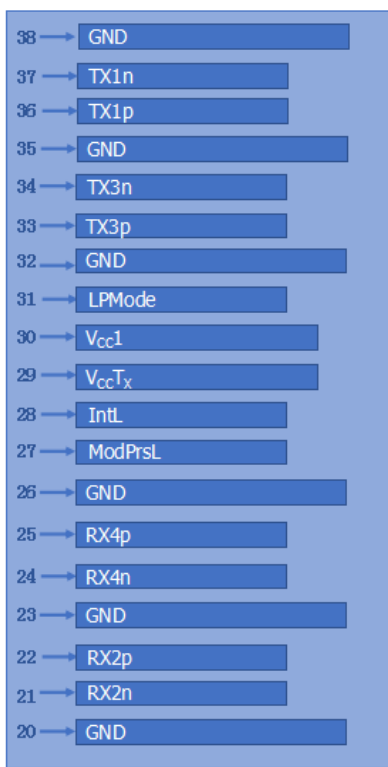


ALL DIMENSIONS ARE ± 0.2 mm UNLESS OTHERWISE SPECIFIED
UNIT: mm

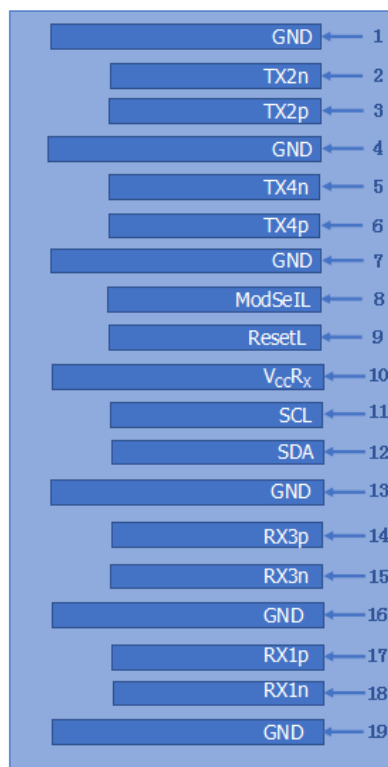
Attention:

To minimize MPO connection induced reflections, an MPO receptacle with 8-degree angled end-face is utilized for this product. A female MPO connector with 8-degree endface should be used with this product.

Electrical Pad Layout



Top Board



Bottom Board

Pin Assignment

PIN #	Symbol	Description	Remarks
1	GND	Ground	5
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non-Inverted Data Input	
4	GND	Ground	5
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non-Inverted Data Input	
7	GND	Ground	5
8	ModSelL	Module Insertion Indicator Pin	1
9	ResetL	Module Reset	2
10	V _{cc} R _X	+3.3V Power Supply Receiver	
11	SCL	2-wire serial interface clock	
12	SDA	2-wire serial interface data	
13	GND	Ground	5
14	Rx3p	Receiver Non-Inverted Data Output	
15	Rx3n	Receiver Inverted Data Output	
16	GND	Ground	5
17	Rx1p	Receiver Non-Inverted Data Output	
18	Rx1n	Receiver Inverted Data Output	
19	GND	Ground	5
20	GND	Ground	5
21	Rx2n	Receiver Inverted Data Output	
22	Rx2p	Receiver Non-Inverted Data Output	
23	GND	Ground	5
24	Rx4n	Receiver Inverted Data Output	
25	Rx4p	Receiver Non-Inverted Data Output	
26	GND	Ground	5
27	ModPrsL	Module Present	3
28	IntL	Interrupt	4
29	V _{cc} T _X	+3.3V Power Supply transmitter	
30	V _{cc} 1	+3.3V Power Supply	
31	LPMMode	Low Power Mode	5
32	GND	Ground	5
33	Tx3p	Transmitter Non-Inverted Data Input	

34	Tx3n	Transmitter Inverted Data Input	
35	GND	Ground	5
36	Tx1p	Transmitter Non-Inverted Data Input	
37	Tx1n	Transmitter Inverted Data Input	
38	GND	Ground	5

Notes:

1. ModSelL is the input pin. The module responds to 2-wire serial communication commands when it is held low by the host. ModSelL allows multiple QSFP modules to be used on a single 2-wire interface bus. If ModSelL is High, the module will not respond to any 2-wire interface communication from the host. ModSelL has internal pull-up resistors in the module
2. The module restart pin, when the low level on the ResetL pin lasts longer than the minimum pulse length, resets the module and restores all user modules to their default state. When performing reset device, the host should ignore all status bits. Until the module reset interrupt is completed, please note that during hot plugging, the module will issue this information to complete the reset interrupt without resetting
3. This pin is active high, indicating that the module is running under a low power module.
4. IntL is the output pin, which is the open collector output and must be pulled up to Vcc on the motherboard. When it is low, it indicates that the module may malfunction. The host uses a 2-wire serial interface to identify the interrupt source
5. Circuit ground is internally isolated from chassis ground.

References

1. 100G Ethernet IEEE 802.3bm.
2. 100G PSM4 Specification 2.0