

100Gbps QSFP28 PSM4 Transceiver, Single Mode, 500m

This product is a parallel 100Gb/s Quad Small Form-factor Pluggable (QSFP28) optical module. It provides increased port density and total system cost savings.

The QSFP28 full duplex optical module offers 4 independent transmit and receive channels, each capable of 25Gb/s operation for an aggregate data rate of 100Gb/s on 2km of single mode fibre. An optical fibre ribbon cable with an MTP/MPO connector can be plugged into the QSFP28 module receptacle. Proper alignment is ensured by the guide pins inside the receptacle. The cable usually cannot be twisted for proper channel to channel alignment. Electrical connection is achieved through an MSA-compliant 38-pin edge type connector. The module operates with single +3.3V power supply. LVCMOS/LVTTL global control signals, such as Module Present, Reset, Interrupt and Low Power Mode, are available with the modules. A 2-wire serial interface is available to send and receive more complex control signals, and to receive digital diagnostic information. Individual channels can be addressed and unused channels can be shut down for maximum design flexibility. The product is designed with form factor, optical/electrical connection and digital diagnostic interface according to the QSFP28 Multi-Source Agreement (MSA). It has been designed to meet the harshest external operating conditions including temperature, humidity and EMI interference. The module can be managed through the I2C two-wire serial interface.

KEY FEATURES

- Independent full-duplex channels
- Up to 28Gb/s data rate per channel
- QSFP28 MSA compliant
- Compliant to IEEE 802.3bm 100GBASE PSM4
- Operating case temperature: 0 to 70°C
- RoHS-6 compliant

APPLICATIONS

- 100G Ethernet
- Infiniband QDR and DDR interconnects
- Data Centre and Enterprise networking

Specification

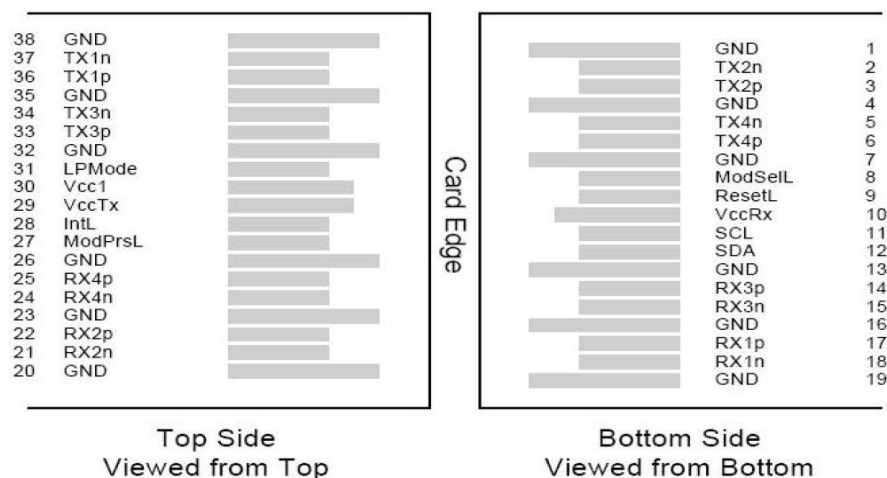
Digital Diagnostic Functions

The following digital diagnostic characteristics are defined over the normal operating conditions unless otherwise specified.

PARAMETER	SYMBOL	MIN	MAX	UNITS	NOTES
TEMPERATURE MONITOR ABSOLUTE ERROR	DMI_Temp	-3	3	degC	Over operating temperature range
SUPPLY VOLTAGE MONITOR ABSOLUTE ERROR	DMI VCC	-0.1	0.1	V	Over full operating range
CHANNEL RX POWER MONITOR ABSOLUTE ERROR	DMI_RX_Ch	-2	2	dB	1
CHANNEL BIAS CURRENT MONITOR	DMI_Ibias_Ch	-10%	10%	mA	
CHANNEL TX POWER MONITOR ABSOLUTE ERROR	DMI_TX_Ch	-2	2	dB	1

Notes 1: Due to measurement accuracy of different single mode fibres, there could be an additional +/-1 dB fluctuation, or a +/- 3 dB total accuracy.

Pin Assignment and Description



Electrical Characteristics

The following electrical characteristics are defined over the Recommended Operating Environment unless otherwise specified

PARAMETER	SYMBOL	MIN	TYPICAL	MAX	UNITS	NOTES
Power Consumption				3.5	W	
Supply Current	I _{cc}			1.1	A	
Transceiver Power-on Initialization Time				2000	ms	1
TRANSMITTER (EACH LANE)						
Single-ended Input Voltage Tolerance (Note 2)		-0.3		4.0	V	Referred to TP1 signal common
AC Common Mode Input Voltage Tolerance		15			mV	RMS
Differential Input Voltage Swing Threshold		50			mV _{pp}	LOSA Threshold
Differential Input Voltage Swing	V _{in,pp}	190		700	mV _{pp}	
Differential Input Impedance	Z _{in}	90	100	110	Ohm	
RECEIVER (EACH LANE)						
Single-ended Output Voltage		-0.3		4.0	V	Referred to signal common
AC Common Mode Output Voltage				7.5	mV	RMS
Differential Output Voltage Swing	V _{out,pp}	300		850	mV _{pp}	
Differential Output Impedance	Z _{out}	90	100	110	Ohm	

Notes:

1. Power-on Initialization Time is the time from when the power supply voltages reach and remain above the minimum recommended operating supply voltages to the time when the module is fully functional.
2. The single ended input voltage tolerance is the allowable range of the instantaneous input signals.

Optical Characteristics

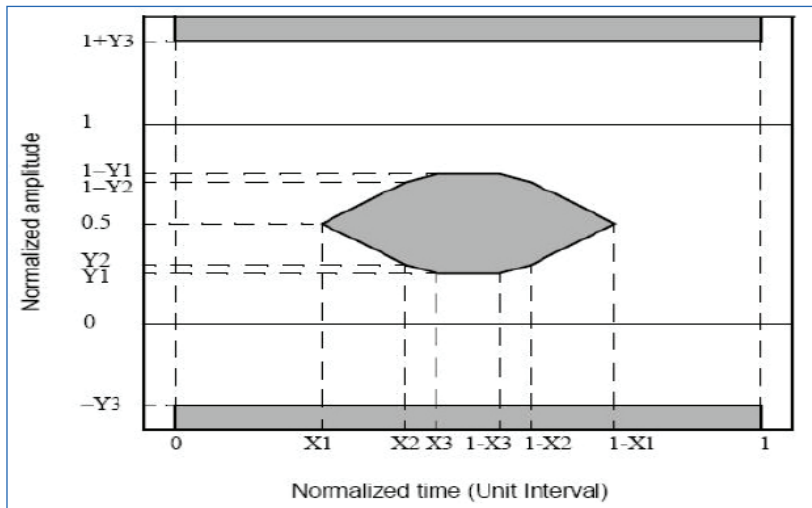
All parameters are specified under the recommended operating conditions with PRBS31 data pattern unless otherwise specified.

PARAMETER	SYMBOL	MIN	TYPICAL	MAX	UNITS	NOTES
TRANSMITTER						
Center Wavelength	λ_C	1295	1310	1325	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Total Average Launch Power	PT			8.0	dBm	
Average Launch Power, each Lane	PAVG	-5.5		2.0	dBm	
Optical Modulation Amplitude (OMA), each Lane	POMA	-3.5		2.2	dBm	
Difference in Launch Power between any Two Lanes (OMA)	Ptx,diff			5	dB	1
Launch Power in OMA minus Transmitter and Dispersion Penalty (TDP), each Lane		-4.3			dBm	
TDP, each Lane	TDP			2.9	dB	
Extinction Ratio	ER	3.5			dB	
Relative Intensity Noise	RIN			-128	dB/Hz	
Optical Return Loss Tolerance	TOL			20	dB	
Transmitter Reflectance	RT			-12	dB	
Average Launch Power OFF Transmitter, each Lane	Poff			-30	dBm	
Transmitter Eye Mask Definition {X1, X2, X3, Y1, Y2, Y3}		(0.31, 0.4, 0.45, 0.34, 0.38, 0.4)				2
RECEIVER						
Center Wavelength	λ_C	1295	1310	1325	nm	
Damage Threshold, each Lane	THd	4.5			dBm	3
Average Receive Power, each Lane		-10.2		2.0	dBm	
Receive Power (OMA), each Lane				2.2	dBm	
Receiver Sensitivity (OMA), each Lane	SEN1			-9.0	dBm	4
Receiver Sensitivity (OMA), each Lane	SEN2			-12.0	dBm	5
Receiver Reflectance	RR			-26	dB	
Difference in Receive Power between any Two Lanes (OMA)	Prx,diff			5.5	dB	
LOS Assert	LOSA		-20		dBm	
LOS Deassert	LOSD		-18		dBm	

PARAMETER	SYMBOL	MIN	TYPICAL	MAX	UNITS	NOTES
LOS Hysteresis	LOSH	0.5			dB	
Receiver Electrical 3 dB upper Cutoff Frequency, each Lane	Fc			31	GHz	

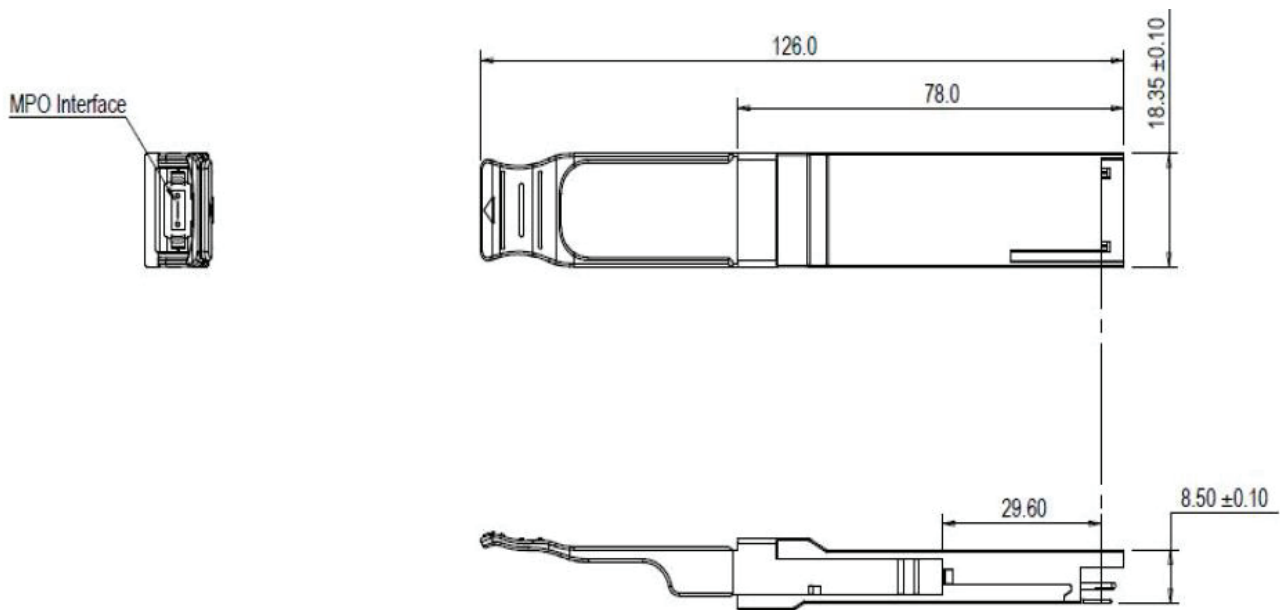
Notes:

1. Even if the TDP < 0.8 dB, the OMA min must exceed the minimum value specified here.
2. See the figure below.



3. The receiver shall be able to tolerate, without damage, continuous exposure to a modulated optical input signal having this power level on one lane. The receiver does not have to operate correctly at this input power.
4. Measured at receiver input for BER = 1×10^{-12} .
5. Measured at receiver input for BER = 5×10^{-5} .

Mechanical Dimensions



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 end-face should be used with this product as illustrated in Figure 6.

