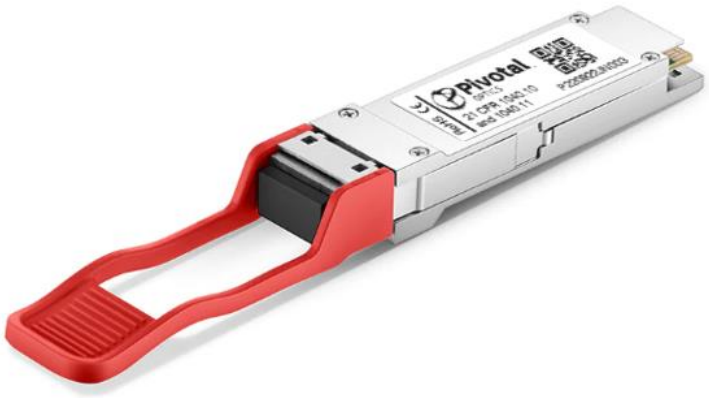
QSFP28-100G-ER4

Single-Rate 100GBase QSFP28 ER4 1295-1310nm 40km SMF Transceiver

Product Features

- Compliant to Ethernet 100GBASE-ER4
- Supports 103.125Gb/s aggregate bit rate
- Transmitter: cooled 4x25Gb/s LAN WDM
  - TOSA:

    (1295.56, 1300.05, 1304.58, 1309.14nm)
- Receiver: 4x25Gb/s APD ROSA
- Up to 40km reach for G.652 SMF
- Built-in 4-channel Clock and Data Recovery (CDR) in TX and RX
- Duplex LC optical receptacle
- 4x25G electrical interface (OIF CEI-28G-VSR)
- RoHS-10 compliant and lead-free
- Single +3.3V power supply
- Maximum power consumption 4.5W
- Case operating temperature
  - Commercial: 0 ~ 70°C
  - Industrial: -40 ~ +85°C



Product Applications

- 100GBASE-ER 100G Ethernet
- Infiniband QDR and DDR interconnects
- Client-side 100G Telecom connections

I. Maximum Ratings

Exceeding the limits below may damage the transceiver module permanently.

Parameter	Symbol	Min.	Typ.	Max.	Units
Storage Temperature	TS	-40		+85	°C
Power Supply Voltage	VCC	-0.3		4	V
Relative Humidity (non-condensation)	RH	0		85	%
Damage Threshold	THd	-3.0			dBm

II. Operating Specifications

Parameter	Symbol	Min.	Typ.	Max.	Units	Notes
Case Operating Temperature	TC	0		+70	°C	Commercial
		-40		+85		Industrial
Power Supply Voltage	Vcc	3.135	3.3	3.465	V	
Data Rate (each lane)			25.78125		Gb/s	
Control Input Voltage High		2		V_{CC}	V	
Control Input Voltage Low		0		0.8	V	
Link Distance	TD			40	km	

III. Optical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Transmitter						
Lane Wavelength (range)	L0	1294.53	1295.56	1296.59	nm	
	L1	1299.02	1300.05	1301.09	nm	
	L2	1303.54	1304.58	1305.63	nm	
	L3	1308.09	1309.14	1310.19	nm	
Signaling rate (each lane)			25.78125	28.05	Gb/s	
Side-Mode suppression ratio	SMSR	30				
Total Launch power	P_T			10.5	dBm	
Average Launch Power (each lane)	Pavg	-2.9		4.5	dBm	1
OMA (each lane)	P_{OMA}	0.1		4.5		2
Extinction Ratio	ER	8.0			dB	
Difference in Launch Power between any Two Lanes (OMA)	Ptx,diff			3.6	dB	
Transmitter and Dispersion Penalty (each lane)	TDP			2.5	dB	
OMA transmitter (each lane)	OMA-TDP	-0.65			dBm	
Average launch power of OFF transmitter (each lane)	Poff			-30	dBm	
Transmitter reflectance	R_T			-12	dB	
$RIN_{20}OMA$	RIN			-130	dB/Hz	
Optical Return Loss Tolerance	ORLT			20	dB	
Transmitter eye mask { X1, X2, X3, Y1, Y2, Y3 }		{ 0.25, 0.4, 0.45, 0.25, 0.28, 0.4 }				

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Receiver						
Signaling rate (each lane)			25.78125	28.05	Gb/s	
Average Receive Power (each lane)		-20		-4.9	dBm	40km link
Receive Power OMA (each lane)				-1.9	dBm	
Receiver Sensitivity OMA (each lane)	SEN1			-16.65	dBm	3
Receiver Sensitivity OMA (each lane)	SEN2			-20.5	dBm	
Receiver reflectance				-26	dB	4
Difference in Receive Power between any two lanes (Average & OMA)	Ptx,diff			3.6	dB	
LOS Assert	LOS A		-26		dBm	
LOS DeAssert	LOS D		-24		dBm	
LOS Hysteresis	LOS H	0.5			dB	
Receiver Electrical 3 dB (upper)	Fc			31	GHz	
Conditions of Stressed Receiver Sensitivity Test:						
Vertical Eye Closure Penalty (each lane)						
Stressed Eye J2 Jitter (each lane)						
Stressed Eye J9 Jitter (each lane)						

Notes:

1. The minimum average launch power spec is based on ER not exceeding 9.5dB and transmitter OMA higher than 0.1dBm.
2. Even if the TDP < 0.75 dB, the OMA min must exceed the minimum value specified here.
3. Measured with a PRBS 231-1 test pattern, @25.78Gb/s, BER<1E-12.
4. Measured with a PRBS 231-1 test pattern, @28.05Gb/s, BER<5E-5.
5. Vertical eye closure penalty, stressed eye J2 jitter, and stressed eye J9 jitter are test conditions for measuring stressed receiver sensitivity. They are not characteristics of the receiver.

IV. Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Power Consumption	p			4.5	W	
Supply Current	Icc			1360	mA	
Transmitter						
Overload Differential Voltage pk-pk	TP1a	900			mV	
Common Mode Voltage (Vcm)	TP1	-350		2850	mV	1
Differential Termination Resistance Mismatch	TP1				%	@ 1MHz
Differential Return Loss (SDD11)	TP1	See CEI-28G-VSR Equation 13-19			dB	
Common Mode to Differential conversion and Differential to Common Mode conversion (SDC11, SCD11)	TP1	See CEI-28G-VSR Equation 13-20			dB	
Stressed Input Test	TP1a	See CEI-28G-VSR Section 13.3.11.2.1				
Receiver						
Differential Voltage, pk-pk	TP4			900	mV	
Common Mode Voltage (Vcm)	TP4	-350		2850	mV	1
Common Mode Noise, RMS	TP4			10	%	@ 1MHz
Differential Return Loss (SDD22)	TP4	See CEI-28G-VSR Equation 13-19			dB	
Common Mode to Differential conversion and Differential to Common Mode conversion (SDC22, SCD22)	TP4	See CEI-28G-VSR Equation 13-21			dB	
Common Mode Return Loss (SCC22)	TP4			-2	dB	2
Transition Time, 20 to 80%	TP4	9.5			ps	
Vertical Eye Closure (VEC)	TP4			5.5	dB	
Eye Width at 10-15 probability (EW15)	TP4	0.57			UI	
Eye Height at 10-15 probability (EH15)	TP4	228			mV	

Notes:

1. Vcm is generated by the host. Specification includes effects of ground offset voltage.
2. From 250MHz to 30GHz.

Warranty

All transceivers feature a limited lifetime warranty.

Disclaimer

External physical characteristics are subject to variation. This may include, but is not limited to, external case designs, pull tab colors and/or shapes, removal latch styles or colors, and label sizes and placement. These variations do not affect the function or characteristics of the transceivers.