The GigaTech Products **QSFP-100G-ER4L-S-GT** is programmed to be fully compatible and functional with all intended CISCO switching devices. This QSFP28 optical transceiver is compliant with SFF-8665 and QSFP28 MSA standards. This module converts 4 input channels of 25Gb/s electrical data into 4 LAN-WDM optical signals and multiplexes them into a single channel for 100Gb/s optical transmission. On the receiver side, this module optically de-multiplexes a 100Gb/s input into 4 LAN-WDM channel signals and converts them to 4 channel output electrical data. This module is designed for single mode fiber using LC connection and operates at central wavelengths of 1295.56, 1300.05, 1304.59, 1309.14nm up to 30km over single mode fiber without FEC, and up to 40km over single mode fiber with FEC Enabled.

Features:

- Up to 103.1 Gb/s per wavelength
- 4 LAN-WDM lane MUX/DEMUX
- Hot-pluggable QSFP28 footprint
- Duplex LC connector
- Built-in digital diagnostic function
- Up to 30KM over SMF with FEC
- Up to 40KM over SMF without FEC
- Single power supply 3.3V
- Max power consumption 4W
- Operating temperature range

  C-Temp: 0℃ to 70℃

Compliance:

- QSFP28 MSA
- MSA SFF-8436
- IEEE 802.3ba
- RoHS Compliant

Applications:

- 100GB Ethernet
- Infiniband QDR, EDR

Warranty:

GigaTech Branded Optical Transceivers- Lifetime Warranty

RoHS 2002/95/EC

General Specifications - Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Storage Temperature	T_{STO}	-40		85	℃	Ambient Temperature
Power Supply Voltage	V_{CC}	-0.5		3.6	V	
Relative Humidity	*RH*	0		85	%	Non-condensing
Damage Threshold	TH_D	-3			dBm	Each Lane

Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Power Supply Voltage	*VCC*	3.135	3.3	3.465	V	
Power Consumption				4	W	
Data Rate	*DR*		25.78		Gbps	
Control Input Voltage High		2		V_{CC}	V	
Control Input Voltage Low		0		0.8	V	

Link Distances

Parameter	Fiber Type	Distance Range (Km)	Remarks
100 GBd	9/125um SMF	30	with FEC
100 GBd	9/125um SMF	40	without FEC

Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Power Consumption				4	W	
Supply Current	*Icc*			1.115	A	
Single-Ended Input Voltage Tolerance		-0.3		4.0	V	
AC Common Mode Input Voltage Tolerance		15			mV	RMS
Differential Input Voltage Swing Tolerance		50			mVpp	LOSA Threshold
Differential Input Voltage Swing	V_{IN_PP}	190		700	mVpp	
Differential Input Impedance	Z_{IN}	90	100	110	Ohm	
Single Ended Output Voltage		-0.3		4	V	
AC Common Mode Output Voltage				7.5	mV	RMS
Differential Output Voltage Swing	V_{OUT_PP}	300		850	mVpp	
Differential Input Impedance	Z_{OUT}	90	100	110	Ohm	

Optical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Optical Center Wavelength	λ_C	1294.53	1295.56	1296.59	nm	L0 Lane
		1299.02	1300.06	1301.09	nm	L1 Lane
		1303.54	1304.59	1305.63	nm	L2 Lane
		1308.09	1309.14	1310.19	nm	L3 Lane

Optical Characteristics - Transmitter

Total Output Optical Power	P_{OUT}		10.5	dBm	
Average Launch Power	P_{AVG}	-1.9	4.5	dBm	Each Lane
Optical Modulation Amp	*OMA*	0.1	4.5	dB	Each Lane
Difference in Launch Power	$P_{TX\text{-}DIFF}$		3.6	dB	
Transmit Dispersion Penalty	*TDP*		2.5	dB	
Extinction Ratio	*ER*	7		dB	
Side Mode Suppression Ratio	*SMSR*	30		dB	
Optical Return Loss Tolerance			20	dB	
Transmitter Eye Mask	Compliant to IEEE 802.3ba Standard				

Optical Characteristics - Receiver

Parameter	***Symbol***	***Min***	***Typ***	***Max***	***Unit***	***Remarks***
Optical Input Power (30KM)	P_{IN}	-14.7		-4.9	dBm	Average
Optical Input Power (40KM)	P_{IN}	17.7		-4.9	dBm	Average
Total Average Receive Power				3	dBm	
Receiver Sensitivity (Each Lane)	R_{X_SEN1}			-8.6	dBm	
Damage Threshold	TH_D	-3			dBm	Each Lane
Receive Power (OMA)				-1.9	dBm	
Receiver Sensitivity (OMA) Each Lane	*SEN*			-13.45	dBm	for BER = $1x10^{-12}$
Stressed Receiver Sensitivity (OMA) Each Lane				-11.45	dBm	for BER = $1x10^{-12}$
Receiver Reflectance	*RR*			-26	dB	
Difference in Receive Power	$P_{RX\text{-}DIFF}$			5.5	dB	
LOS Assert	LOS_A		-26		dBm	
LOS De-Assert	LOS_D		-24		dBm	
LOS Hysteresis		0.5			dB	

Digital Diagnostic Functions

Parameter	***Symbol***	***Min***	***Max***	***Unit***	***Remarks***
Temperature Monitor Absolute Error	*DMI_Temp*	-3	+3	C	Over Temp Range
Supply Voltage Monitor Absolute Error	*DMI_VCC*	-0.1	+0.1	V	Over Full Range
Channel RX Power Monitor Absolute Error	*DMI_RX_Ch*	-3	3	dB	
Channel Bias Current Monitor	*DMI_Ibias_Ch*	-10%	+10%	mA	
Channel TX Power Monitor Absolute Error	*DMI_TX_Ch*	-3	3	dB	

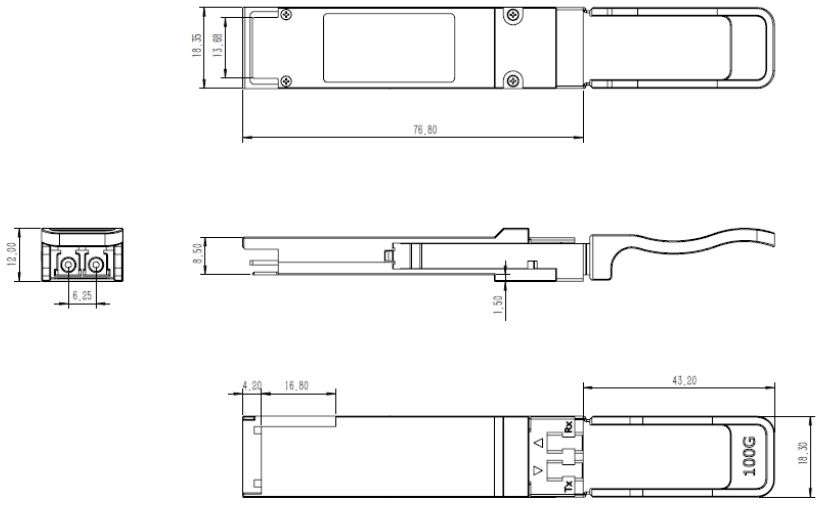
ESD

This transceiver is specified as ESD threshold 1kV for SFI pins and 2kV for all other electrical input pins, tested per MIL-STD-883, Method 3015.4 /JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module. This transceiver is shipped in ESD protective packaging. It should be removed from the packaging and handled only in an ESD protected environment.

Laser Safety

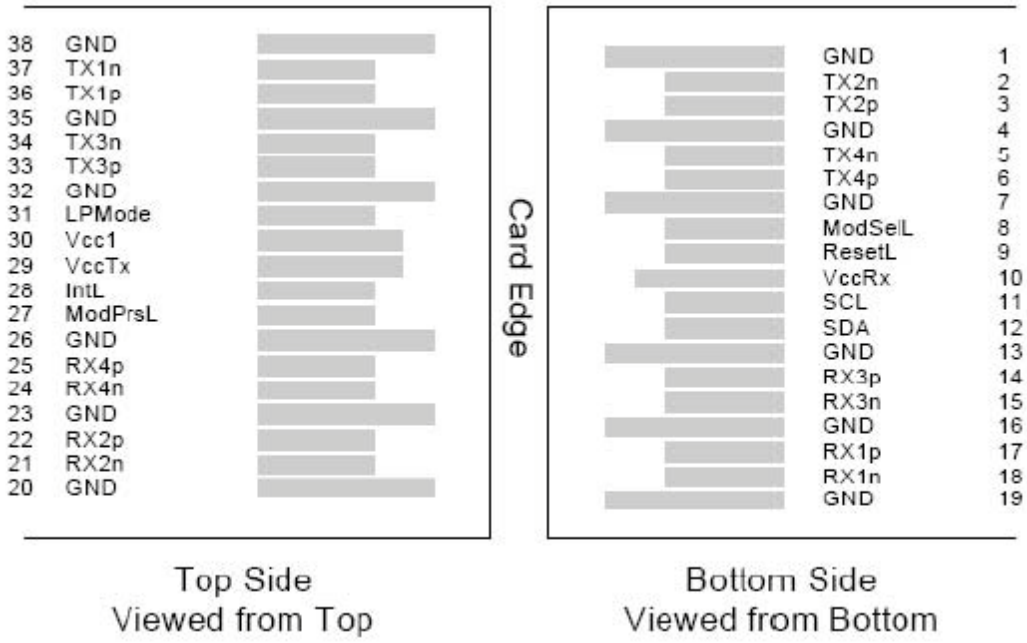
This is a Class 1 Laser Product according to IEC 60825-1:2007. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (June 24, 2007).

Dimensions



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

Electrical Pad Layout



Top Side
Viewed from Top

Bottom Side
Viewed from Bottom

Pin Assignment

PIN #	*Symbol*	*Description*	*Remarks*
1	GND	Ground	
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non-Inverted Data Input	
4	GND	Ground	
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non-Inverted Data Input	
7	GND	Ground	
8	ModSelL	Module Select	
9	ResetL	Module Reset	
10	Vcc RX	+3.3V Power Supply Receiver	
11	SCL	2-wire serial interface clock	
12	SDA	2-wire serial interface data	
13	GND	Ground	
14	Rx3p	Receiver Non-Inverted Data Output	
15	Rx3n	Receiver Inverted Data Output	
16	GND	Ground	
17	Rx1p	Receiver Non-Inverted Data Output	
18	Rx1n	Receiver Inverted Data Output	
19	GND	Ground	
20	GND	Ground	
21	Rx2n	Receiver Inverted Data Output	
22	Rx2p	Receiver Non-Inverted Data Output	
23	GND	Ground	
24	Rx4n	Receiver Inverted Data Output	
25	Rx4p	Receiver Non-Inverted Data Output	
26	GND	Ground	
27	ModPrsL	Module Present	
28	IntL	Interrupt	
29	Vcc TX	+3.3V Power Supply transmitter	
30	Vcc1	+3.3V Power Supply	
31	LPMode	Low Power Mode	
32	GND	Ground	
33	Tx3p	Transmitter Non-Inverted Data Input	
34	Tx3n	Transmiiter Inverted Data Input	
35	GND	Ground	
36	Tx1p	Transmitter Non-Inverted Data Input	
37	Tx1n	Transmiiter Inverted Data Input	
38	GND	Ground	

References

1. IEEE standard 802.3ba. IEEE Standard Department.
2. QSFP28 10Gbs 4X PLUGGABLE TRANSCEIVER – SFF-8665