

The GigaTech Products **QSF-503-GT** is programmed to be fully compatible and functional with all intended GIGAMON switching devices. This QSFP+ optical transceiver is compliant with SFF-8436 and QSFP+ MSA standards. This module converts 4 input channels of 10Gb/s electrical data into 4 CWDM optical signals and multiplexes them into a single channel for 40Gb/s optical transmission. On the receiver side, this module optically de-multiplexes a 40Gb/s input into 4 CWDM 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 1271, 1291, 1311, 1331nm up to 10km over single mode fiber.

Features:

- Up to 11.2 Gb/s per wavelength
- 4 CWDM lane MUX/DEMUX
- Hot-pluggable QSFP+ footprint
- Duplex LC connector
- Built-in digital diagnostic function
- Up to 10KM over SMF
- Single power supply 3.3V
- Operating temperature range
C-Temp: 0°C to 70°C



Compliance:

- QSFP+ MSA
- MSA SFF-8436
- IEEE 802.3ba
- RoHS Compliant

Applications:

- 40GB Ethernet
- Infiniband DDR and QDR

Warranty:

GigaTech Branded Optical Transceivers- Lifetime Warranty

General Specifications - Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Storage Temperature	T_{STO}	-20		85	°C	Ambient Temperature
Bit Error Rate	BER			10^{-12}		
Input Voltage	V_{CC}	3.14	3.3	3.47	V	
Maximum Voltage	V_{MAX}	-0.5		3.6	V	Electrical Power Interface

Link Distances

Parameter	Fiber Type	Distance Range (Km)
40 Gbd	9/125um SMF	10

Optical Characteristics - Transmitter

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Optical Center Wavelength	λ_c	1264.5	1271	1277.5	nm	L0 Lane
		1284.5	1291	1297.5	nm	L1 Lane
		1304.5	1311	1317.5	nm	L2 Lane
		1324.5	1331	1337.5	nm	L3 Lane
Total Output Optical Power	P_{OUT}			8.3	dBm	Average
Average Launch Power (Each Lane)	P	-7		2.3	dBm	
Optical Modulation Amp	OMA	-4		3.5	mW	Peak to Peak
Extinction Ratio	ER	3.5			dB	
Spectral Width (-20 dB)	$\Delta\lambda$			0.6	nm	EIA/TIA-455-127
Side Mode Suppression Ratio	$SMSR$	30			dB	
Relative Intensity Noise (OMA)	RIN			-128	dB/Hz	
Transmit Dispersion Penalty	TDP			2.3	dB	
Optical Return Loss Tolerance				20	dB	
Launch Power of OFF Transmit	P_{OUT_OFF}			-30	dBm	Average
Transmitter Eye Mask	Compliant to IEEE 802.3ba Standard					

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		1304.5	1311	1317.5	nm	L2 Lane
		1324.5	1331	1337.5	nm	L3 Lane
Optical Input Power (Each Lane)	P_{IN}	-13.7		2.3	dBm	Average
Damage Threshold	P	3.3			dBm	
Receiver Sensitivity (Each Lane)	RX_SEN1			-11.5	dBm	
Stressed Receiver Sensitivity				-9.9	dBm	In OMA Each Lane
Receiver Reflectance	TR_{RX}			-26	dB	
LOS Assert	LOS_A	-25			dBm	
LOS De-Assert	LOS_D			-16	dBm	
LOS Hysteresis		0.5			dB	

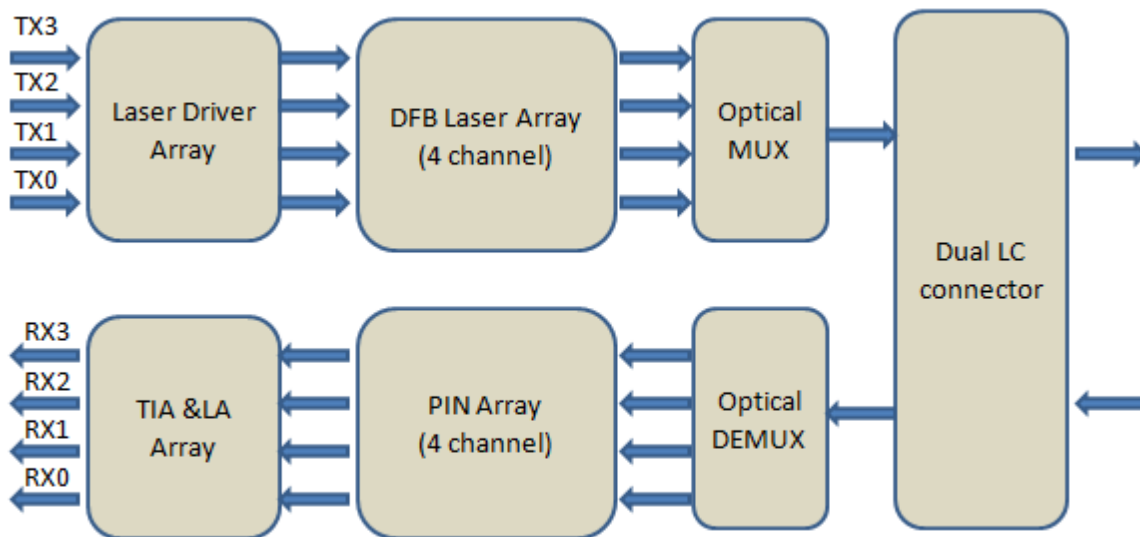
Electrical Characteristics – Transmitter

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Input Differential Impedance	R_{IN}		100		Ω	Non Condensing
Single Ended Data Input Swing	V_{IN_PP}	90		600	mV	
Transmit Disable Voltage	V_D	$V_{CC}-1.3$		V_{CC}	V	
Transmit Enable Voltage	V_{EN}	V_{EE}		$V_{EE}+0.8$	V	

Electrical Characteristics – Receiver

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Single Ended Data Output Swing	V_{OUT_PP}	150	300	425	mV	
Data Output Rise Time (20%-80%)	T_R		30		ps	
Data Output Fall Time (20%-80%)	T_F		30		ps	
LOS Fault	V_{LOS_F}	$V_{CC}-1.3$		V_{CC_HOST}	V	
LOS Normal	V_{LOS_N}	V_{EE}		$V_{EE}+0.5$	V	

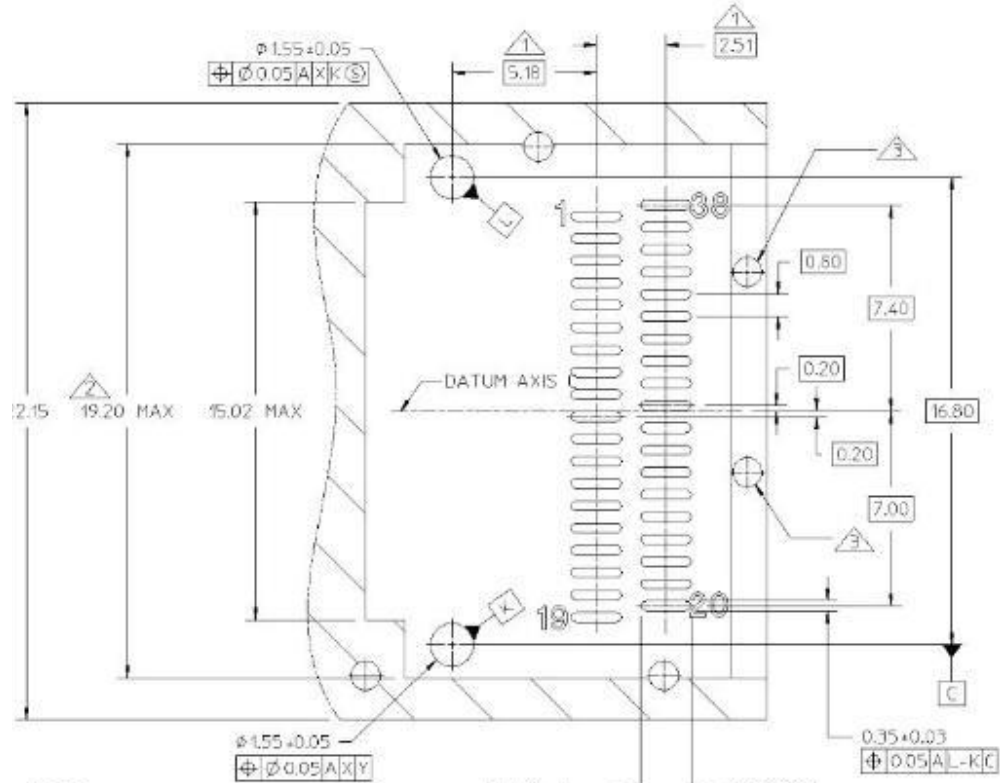
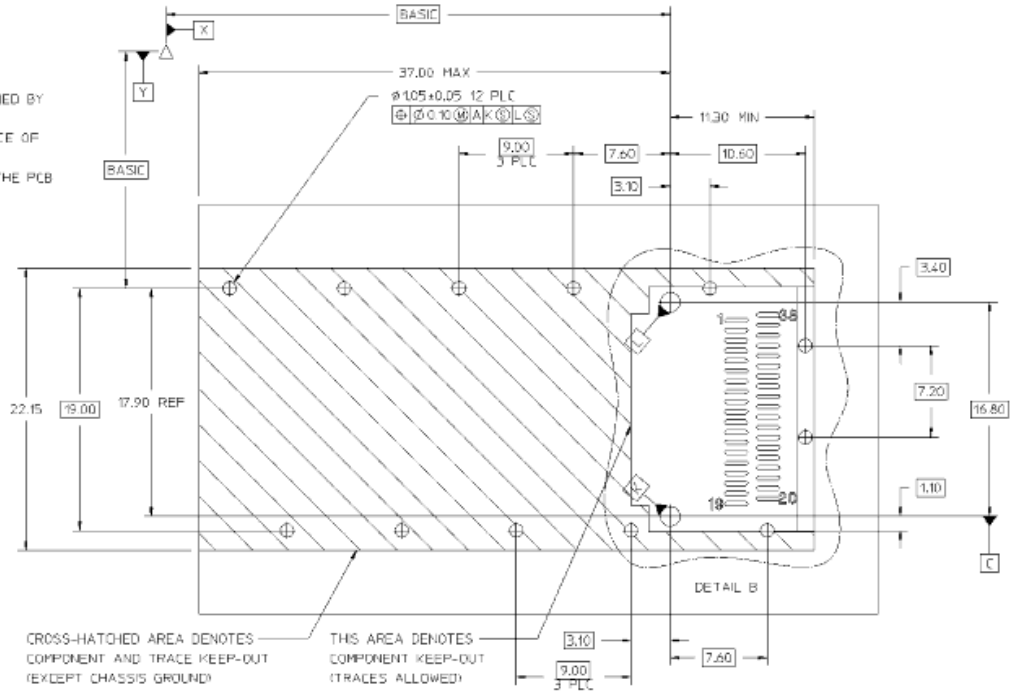
Block Diagram of Transceiver



This product converts the 4-channel 10Gb/s electrical input data into CWDM optical signals (light), by a driven 4-wavelength Distributed Feedback Laser (DFB) array. The light is combined by the MUX parts as a 40Gb/s data, propagating out of the transmitter module from the SMF. The receiver module accepts the 40Gb/s CWDM optical signals input, and de-multiplexes it into 4 individual 10Gb/s channels with different wavelength. Each wavelength light is collected by a discrete photo diode, and then outputted as electric data after amplified by a TIA.

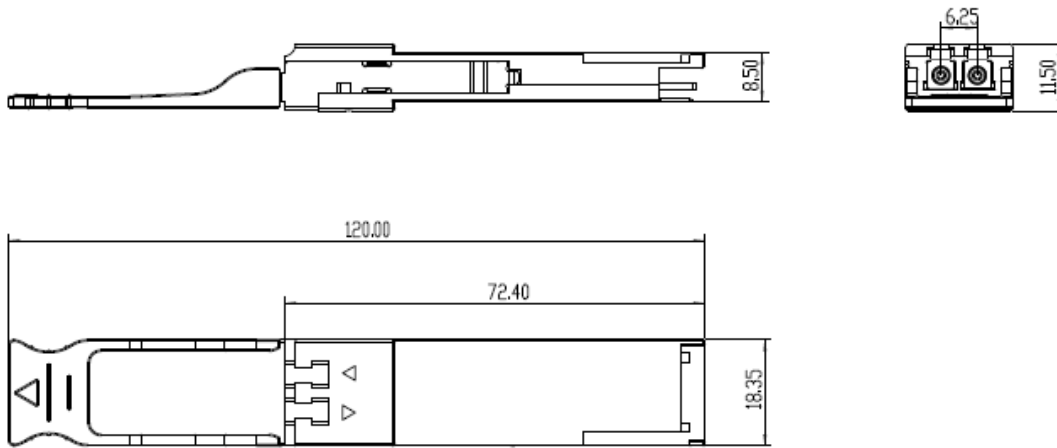
PCB Layout Recommendation

- NOTES
1. DATUM X & Y ARE ESTABLISHED BY THE CUSTOMER'S FIDUCIAL
 2. DATUM A IS THE TOP SURFACE OF THE HOST BOARD
 3. LOCATION OF THE EDGE OF THE PCB IS APPLICATION SPECIFIC
 4. FINISHED PTH HOLE SIZE



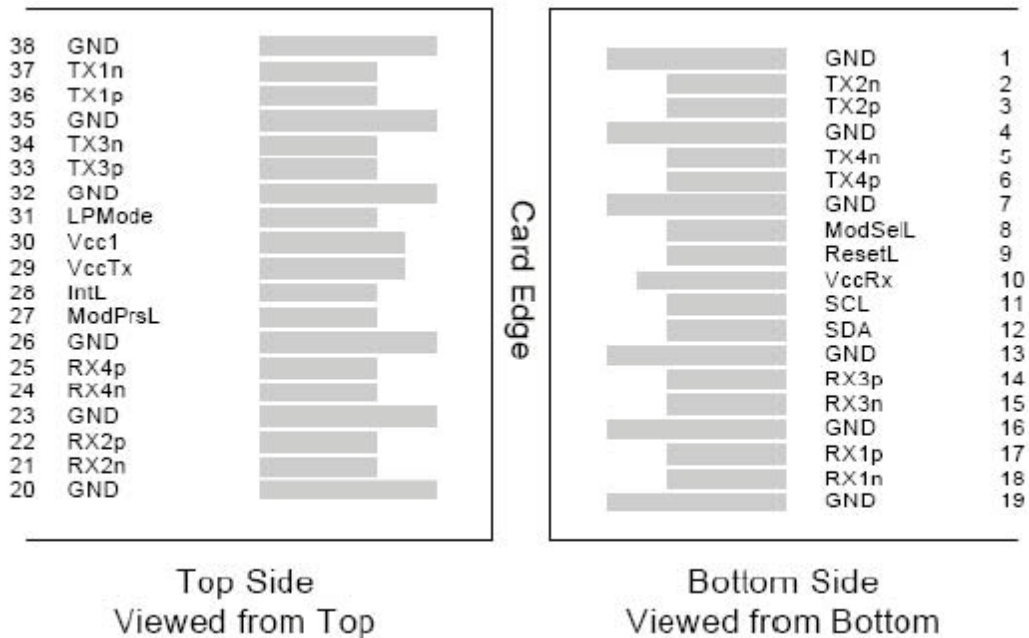
- NOTES
1. CENTERLINE OF PAD
 2. SURFACE TRACES PERMITTED WITHIN THIS LENGTH
 3. INDICATED HOLES ARE OPTIONAL

Dimensions



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

Electrical Pad Layout



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

References

1. IEEE standard 802.3ba. IEEE Standard Department, 2010.
2. QSFP+ 10Gbs 4X PLUGGABLE TRANSCEIVER – SFF-8436