



## FTH-S01T-SWDL-040D

QSFP28 100GBase-ER4, 4x LAN-WDM, EML+APD, single-mode, 40km



Picture 1 Transceiver QSFP28 100G 40km

### Description

FTH-S01T-SWDL-040D series QSFP28 transceiver can be used to setup a reliable, high speed (up to 100Gbps) serial data link over single-mode fibers. Maximum link span can reach up to 40km. This module is commonly used in today's datacenter interconnections and high-speed cores of computer networks over long distance. Transmission is established over pair of fibers, where four LAN-WDM channels (along with built-in multiplexer on TX side and demultiplexer on RX side) are used to carry the traffic (4x25Gbps lines combined together for 100Gbps throughput). Outstanding immunity to EMI interferences (thanks to case made from metal alloys) and great overall performance allows for deployment of high port density systems. Casing made fully from metal alloys ensures very good EMI immunity. Module is fully compliant with QSFP28 MSA and IEEE 802.3ba 100GBASE-ER4 specification. Host device can access module internal EEPROM memory and DDMI via I2C interface. Built-in digital diagnostic interface (DOM, DDMI) allows a network administrator to monitor each channel's parameters such as: transmitted and received optical power, temperature, supply voltage and laser current. Those information and data are very helpful e.g. in prediction and prevention of connection failures. A module is available in various dedicated versions, which can be compatible with devices from vendors such as Cisco, Juniper, Alcatel-Lucent and Huawei.

### Applications

- 100GBASE-ER4 & 100G Ethernet
- Telecom networking
- Infiniband QDR and DDR interconnects



## Key features

- LC Duplex connector
- Transmission distance up to 40km\*
- Supports 103.125Gb/s aggregate bit rate
- Throughput up to 4 x 25.78125Gb/s
- Fully compliant with QSFP28 MSA and SFF-8665, SFF-8636
- Hot-Pluggable
- RoHS-6 compliant
- Class 1 laser safety
- Low power consumption (4.5W)
- Metal case for low EMI
- Operating case temperature: 0~70°C

## Specification

### Supported transmission technology

Ethernet

### Speed supported for Ethernet technology

103.125Gbps

### Speed supported for Fibre Channel technology

-

### Transmission medium

Single-mode fiber 9/125µm

### Transmission distance\*

40km

### Receptacle type

LC Duplex

### Wavelength

TX: 1295.56nm, 1300.05nm, 1304.58nm, 1309.14nm

### Output power

-2.5~+4.5dBm (per line)

### Receiver sensitivity

-18dBm(per line)

### Power supply voltage

3.3V

### Power Consumption

4.5W

### Operating environment – temperature

0~70°C

### Operating environment - humidity

15~85% non-condensing

### Dimensions

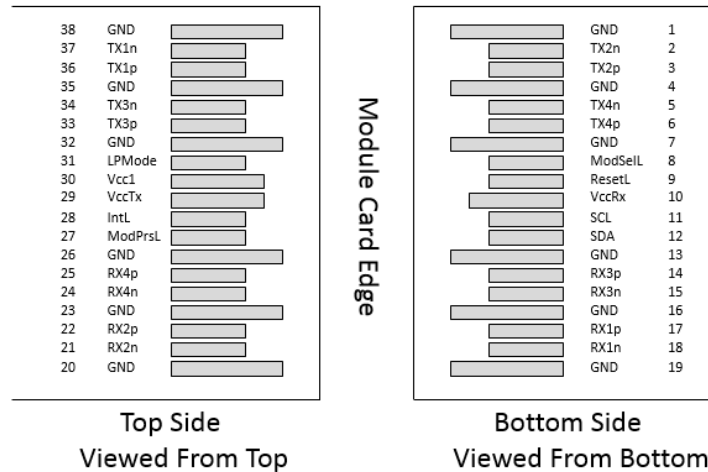
Compliant with QSFP28 Multi-Source Agreement

\* - transmission distance depends on optical link attenuation



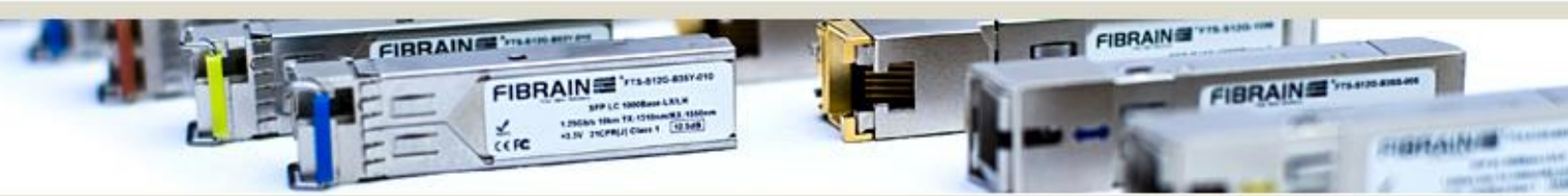
## Detailed technical specification

### Pin Description



Picture 2 MSA compliant Connector

Pin	Name	Function/Description	Notes
1	GND	Transmitter Ground (Common with Receiver Ground)	1
2	Tx2-	Transmitter Inverted Data Input	-
3	Tx2+	Transmitter Non-Inverted Data Input	-
4	GND	Transmitter Ground (Common with Receiver Ground)	1
5	Tx4-	Transmitter Inverted Data Input	-
6	Tx4+	Transmitter Non-Inverted Data Input	-
7	GND	Transmitter Ground (Common with Receiver Ground)	1
8	ModSelL	Module Select	-
9	ResetL	Module Reset	-
10	VccRx	3.3V Power Supply Receiver	-
11	SCL	2-Wire serial Interface Clock	-
12	SDA	2-Wire serial Interface Data	-
13	GND	Transmitter Ground (Common with Receiver Ground)	1
14	Rx3+	Receiver Non-Inverted Data Output	-
15	Rx3-	Receiver Inverted Data Output	-
16	GND	Transmitter Ground (Common with Receiver Ground)	1
17	Rx1+	Receiver Non-Inverted Data Output	-
18	Rx1-	Receiver Inverted Data Output	-
19	GND	Transmitter Ground (Common with Receiver Ground)	1
20	GND	Transmitter Ground (Common with Receiver Ground)	1
21	Rx2-	Receiver Inverted Data Output	-
22	Rx2+	Receiver Non-Inverted Data Output	-
23	GND	Transmitter Ground (Common with Receiver Ground)	1



24	Rx4-	Receiver Inverted Data Output	-
25	Rx4+	Receiver Non-Inverted Data Output	-
26	GND	Transmitter Ground (Common with Receiver Ground)	1
27	ModPrsl	Module Present	-
28	IntL	Interrupt	-
29	VccTx	3.3V power supply transmitter	-
30	Vcc1	3.3V power supply	-
31	LPMODE	Low Power Mode	-
32	GND	Transmitter Ground (Common with Receiver Ground)	1
33	Tx3+	Transmitter Non-Inverted Data Input	-
34	Tx3-	Transmitter Inverted Data Input	-
35	GND	Transmitter Ground (Common with Receiver Ground)	1
36	Tx1+	Transmitter Non-Inverted Data Input	-
37	Tx1-	Transmitter Inverted Data Input	-
38	GND	Transmitter Ground (Common with Receiver Ground)	1

**Notes:**

1. The module signal grounds are isolated from the module case.

**Electrical parameters**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Power Consumption				4.5	W	
Transceiver Power-on Initialization Time				2000	ms	
Supply Current	Icc			1.36	A	Steady state

**Transmitter parameters**

Parameter	Unit	min	type	max	Note
Signaling speed per line	Gbps	25,78125+/-100ppm			
Transmit wavelengths	nm	1294,53		1296,59	
		1299,02		1301,09	
		1303,54		1305,63	
		1308,09		1310,19	
SMSR	dB	30			
Total Average Launch Power	dBm			10.5	
Average Launch Power, each line	dBm	-2.5		4.5	
Extinction Ratio(ER)	dB	7			
RIN OMA	dB/Hz			-130	
Eye mask definition (X1, X2, X3, Y1, Y2, Y3)		(0.25, 0.4, 0.45, 0.25, 0.28, 0.4)			
Mask margin	%	5			



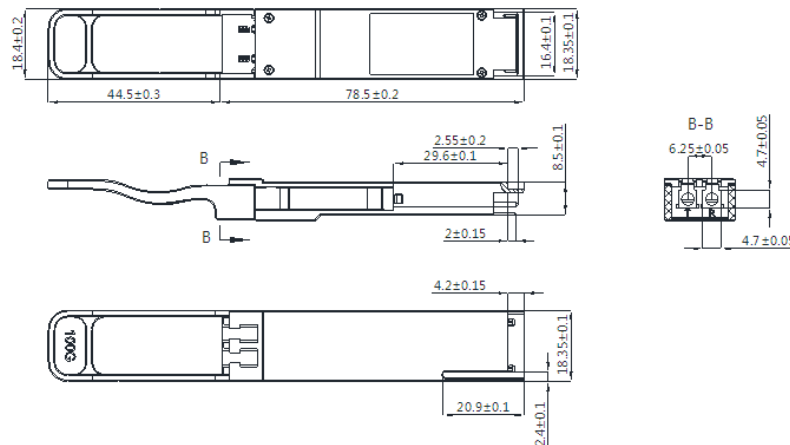
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Transmit wavelenghts	nm	1294,53		1296,59	
		1299,02		1301,09	
		1303,54		1305,63	
		1308,09		1310,19	
Total Avarage Receive Power	dBm			2.0	
Receiver sensitivity, each line	dB		-18	-21	SEN_25G (OMA) (1) SEN_27G (Ave) (2)
Damage treshhold , each line	dBm	-3.0			
LOS Assert	dBm	-26			
LOS Deassert	dBm			-24	
LOS Hysteresis	dB	0,5			

### Notes:

1. 25.78125Gb/s,ER=8dBm,NRZ,PRBS 2<sup>31</sup>-1,BER=1x10<sup>-12</sup>.
2. 27.95246Gb/s,ER=8dBm,NRZ,PRBS 2<sup>31</sup>-1,BER=5x10<sup>-5</sup>.

## Mechanical specification



Picture 3 Mechanical Dimensions



## Recommended environment conditions

Parameter	Symbol	Min	Typ	Max	Unit
Operating Temperature Range	T	0		70	°C
Supply Voltage	V <sub>CC</sub>	3.135	3.3	3.465	V
Relative Humidity	RH	15	-	85	%
Link Distance with				40	km

## Ordering information

FTH-S01T-SWDL-040D– QSFP28, 100G, 4xLAN WDM, 40km, single-mode, LC Duplex, **DDMI**, commercial temperature (0~70°C)

For further information regarding host device PCB layout recommendation, power supply requirements, EEPROM memory map, DDMI specification please check:

[SFF-8436 - Technical specification for QSFP transceiver](#) and [SFF-8665 - Technical specification for QSFP28 transceiver](#)

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