

## 40G Base SR4 100m QSFP+ Optical Transceiver Module TVDQSFPPSR4-1

### Features

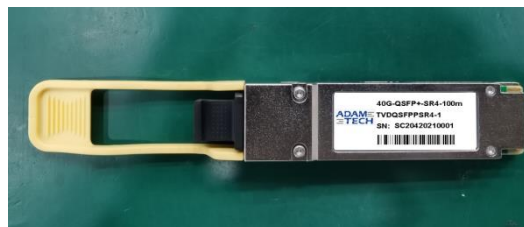
- Compliant to the industry standard SFF-8436 QSFP+ Transceiver Specification
- 4\* 10.3Gbps per module, bi-directional operation
- 4 channels 850nm VCSEL array
- 4 channels PIN photo detector array
- DDM function implemented
- Up to 100m on OM3 MMF and 150m on OM4 MMF
- Hot Pluggable QSFP+ form factor
- Single +3.3V power supply
- Operating case temperature: 0~+70°C
- RoHS-6 compliant (lead-free)

### Applications

- 40GBASE-SR4 Ethernet
- InfiniBand QDR (4 x 10G) interconnects
- Datacom/Telecom Switch & Router connections
- High speed multi-channel parallel data connections

### Compliance

- IEEE802.3ba 40GBASE-SR4
- SFF-8436 QSFP+ Specification
- Compliant with QSFP+ MSA



### Description

TVDQSFPPSR4-1 transceiver is a Parallel 40Gbps Quad Small Form-factor, Hot-Pluggable optical module.

The module integrates 4 independent transmitters and 4 independent receivers inside. Four-channel 850nm VCSEL array, PIN array, amplifier and Driver are used in the module for compact size, low power consumption and low cost. Each channel can operate at 10Gbps up to 100m using OM3 fiber.

The transceiver is compliant to the industry standard SFF-8436 QSFP Transceiver Specification. Digital diagnostic function is provided to monitor the working state of the module. The electrical interface uses a 38 contact edge type connector. The optical interface uses an 8 or 12 fiber MTP (MPO) connector. TVDQSFPPSR4-1 transceiver features small size, parallel multi-channel, hot-pluggable, low power and high speed operation. It's very suitable for high speed short-distance density data connections such as 40GBASE-SR4, InfiniBand QDR, Switch & Route interconnects etc.

### Ordering Information

Part No	Specification								
	Pack	Rate	Tx	Pout	Rx	S	Top	Reach	Others
TVDQSFPPSR4-1	QSFP+	40G	850nm VCSEL	-7.6~2.4 dBm	PIN	<-9.5dBm	0~70°C	100 m OM3	DDM/RoHS

## Specification

Absolute Maximum Ratings				
Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	T <sub>S</sub>	-40	+85	°C
Supply Voltage	V <sub>CC3</sub>	0	3.6	V
Relative Humidity	RH	5	95	%

Recommended Operating Conditions						
Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Operating Case Temperature	T <sub>C</sub>	0	-	70	°C	C
Power Supply Voltage	V <sub>CC3</sub>	3.135	3.3	3.465	V	
	I <sub>CC3</sub>	-	-	600	mA	
Power Dissipation	P <sub>D</sub>	-	-	2	W	
Data Rate	-	-	40	-	Gbps	
Transmission Distance	-	-	-	100	m	OM3
	-	-	-	150	m	OM4

Transmitter Optical Characteristic						
Parameter	Symbol	Min.	Typical	Max.	Unit	Not e
Center Wavelength	λ <sub>C</sub>	840	850	860	nm	
RMS Spectral width	-	-	-	0.65	nm	
Optical Power for TX DISABLE	-	-	-	-30	dBm	
Average launch power, each lane	P	-7.6	-	2.4	dBm	
Optical Modulation Amplitude (OMA), each lane	OMA	-5.6	-	3	dBm	
TDP per Lane	TDP	-	-	3.5	dB	
Bit Error Rate	BER	-	-	1E-12	ES	
Extinction Ratio	ER	3	-	-		
Signaling rate, each lane	-		10.3	-	Gbps	
Optical eye mask	-	Compliant with IEEE802.3ba			-	Hit ratio = 1 × 10E-12
Optical Return Loss Tolerance	-	-	-	12	dB	
Encircled flux	-	≥ 86% at 19 μm, ≤ 30% at 4.5 μm			-	
Eye mask margin	-	Compliant with IEEE802.3ba			-	Hit ratio = 1 × 5E-5
Average launch power of OFF transmitter, each lane	MAX		-30		dBm	

Receiver Optical Characteristic						
Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Center Wavelength	$\lambda_r$	840	850	860	nm	
Stressed Receiver Sensitivity(OA、EOL)	-		-	-10	dBm	
Saturation power (EOL)	-	2.4	-	-	dBm	
Damage threshold	-	3.4	-	-	dBm	
Max Input power	-	3.4	-	-	dBm	
LOS Assert	LOS_A	-30	-	-	dBm	
LOS Dessert	LOS_D	-	-	-12	dBm	
LOS Hysteresis	-	0.5	-	-	dB	
Receiver Reflectance	-	-	-	-12	dB	
Signaling rate, each lane	-	-	25.78	-	Gbps	

Electrical Characteristic						
Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Input differential impedance	-	-	100	-	$\Omega$	
Differential data input swing	-	180	-	700	mV	
Differential data output swing	-	-	-	900	mV	

Control and Status I/O Timing Characteristics						
Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Initialization time	t_init	-	-	2000	ms	
Reset Init Assert Time	t_reset_init	-	-	2	us	
Serial Bus Hardware Ready Time	t_serial	-	-	2000	ms	
Reset Assert Time	t_reset	-	-	2000	ms	
LPMode Assert Time	ton_LPMode	-	-	100	us	
LPMode Deassert Time	Toff_LPMode	-	-	300	ms	
IntL Assert Time	ton_IntL	-	-	200	ms	
IntL Deassert Time	toff_IntL	-	-	500	us	
Rx LOS Assert Time	ton_los	-	-	100	ms	
Tx Fault Assert Time	ton_Txfault	-	-	200	ms	
Flag Assert Time	ton_flag	-	-	200	ms	
Mask Assert Time	ton_mask	-	-	100	ms	
Mask Deassert Time	toff_mask	-	-	100	ms	
Power_override or Power_set Assert Time	ton_Pdown	-	-	100	ms	
Power_override or Power_set Deassert Time	toff_Pdown	-	-	300	ms	

### Pin-Out Definition

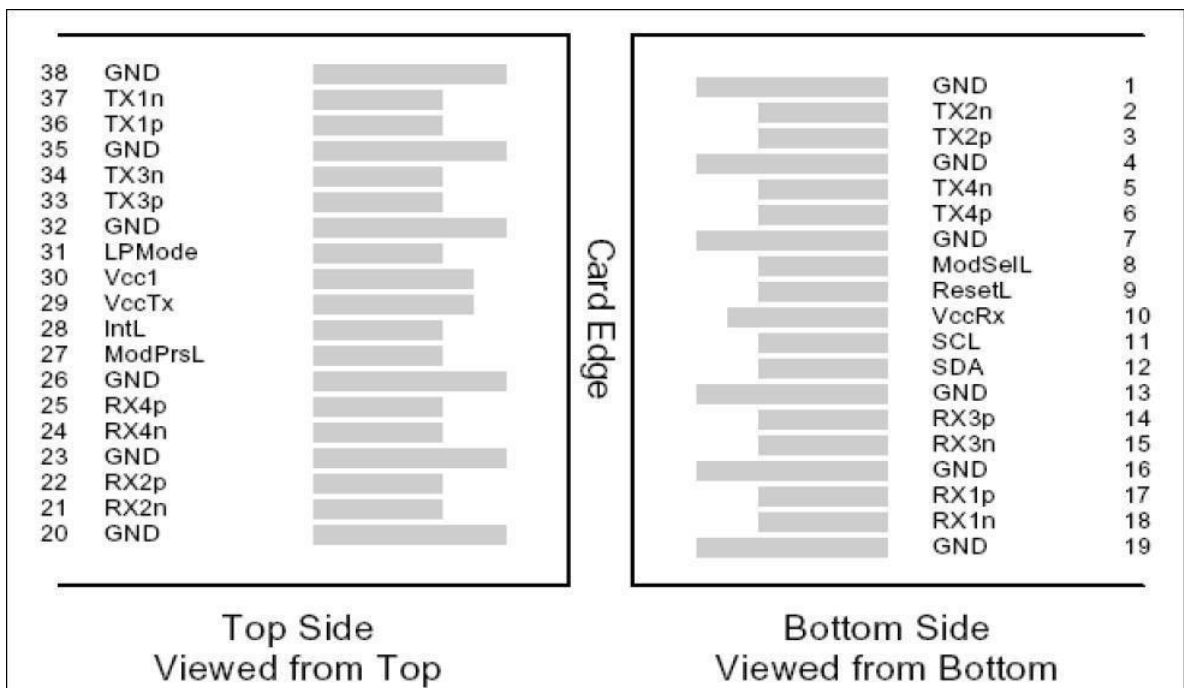


Figure1

### Pin Assignment

Pin	Name	Description	Notes
1	GND	Ground	Note1
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non-Inverted Data Input	
4	GND	Ground	Note1
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	Note2
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	

Pin	Name	Description	Notes
16	GND	Ground	Note1
17	Rx1p	Receiver Non-Inverted Data Output	
18	Rx1n	Receiver Inverted Data Output	Note1
19	GND	Ground	Note1
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	Note1
27	ModPrsL	Module Present	
28	IntL	Interrupt	
29	VccTx	+3.3V Power supply transmitter	Note2
30	Vcc1	+3.3V Power supply	Note2
31	LPMODE	Low Power Mode	
32	GND	Ground	Note1
33	Tx3p	Transmitter Non-Inverted Data Input	
34	Tx3n	Transmitter Inverted Data Input	
35	GND	Ground	Note1
36	Tx1p	Transmitter Non-Inverted Data Input	
37	Tx1n	Transmitter Inverted Data Input	
38	GND	Ground	Note1

Notes:

[1] GND is the symbol for signal and supply (power) common for the QSFP+ module. All are common within the QSFP+ module and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal-common ground plane.

[2] Vcc Rx, Vcc1 and VccTx are the receiver and transmitter power supplies and shall be applied concurrently. Recommended host board power supply filtering is shown in Figure 7. VccRx, Vcc1 and VccTx may be internally connected within the QSFP+ Module in any combination. The connector pins are each rated for a maximum current of 500 mA

### Optical Interface Lanes and Assignment

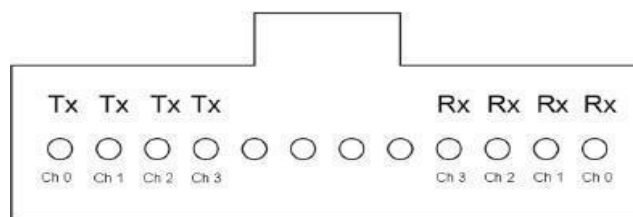
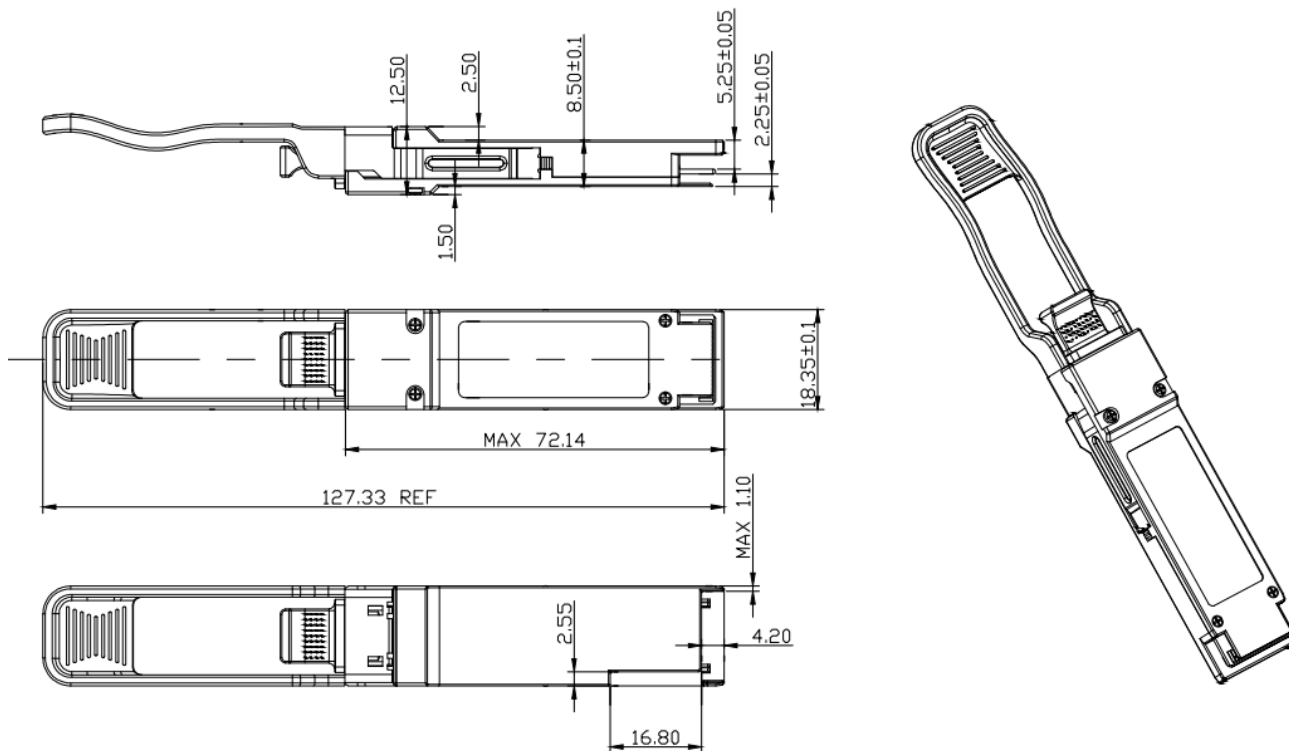


Figure 2 Optical Lane Assignment (front view of MPO receptacle)

**Mechanical Dimensions**

Unit is millimeter. All dimensions are  $\pm 0.1$ mm unless otherwise specified.



**Figure3 Mechanical Package Outline**