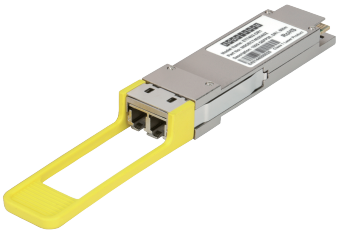
100G QSFP28 DR1 Transceiver

ET7402-DR1



Edgecore's QSFP28 DR1 transceiver module is designed for use in 100 Gigabit Ethernet links over 500 m single mode fiber. The module incorporates a single channel optical signal with a 1311 nm center wavelength, operating at 50 Gbaud data rate. The electrical interface of the module is compliant with the OIF CEI-28G-VSR and compliant with QSFP28 MSA.

Product Features

- IEEE802.3cd 100GBASE-DR specification compliant
- Single 3.3 V power supply
- Power dissipation < 4.5 W
- Up to 500 m over SMF fiber with FEC
- QSFP28 MSA compliant
- SFF-8636 Rev 2.10a compliant
- 4x25G electrical interface
- LC duplex connector
- Commercial case temperature range of 0°C to 70°C
- I2C interface with integrated Digital Diagnostic Monitoring
- RoHS compliant

Applications

- 100G Ethernet
- Data center

Ordering Information

Part Number	Data Rate	Fiber	Distance	Interface	Temp.	DDMI
ET7402-DR1	100 Gbps	SMF	500 m	LC	0~+70°C	Yes

Transmitter Optical Characteristics

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Signaling Speed			53.125		Gbaud
Modulation Format			PAM4		
Center Wavelength	λC	1304.5	1311	1317.5	nm
Side-Mode Suppression Ratio	SMSR	30			dB
Extinction Ratio	ER	3.5			dB
Transmit OMA	TxOMA	-0.8		4.2	dBm
Transmit Average*(note 1)	TxAVG	-2.9		4	dBm
Launch Power in OMA_{outer} Minus TDECQ (Extinction Ratio ≥ 5 dB)		-2.2			dBm
Launch Power in OMA_{outer} Minus TDECQ (Extinction Ratio < 5dB)		-1.9			dBm
Transmitter and Dispersion Eye Closure	TDECQ			3.4	dB
Optical Return Loss Tolerance*(note 2)				15.5	dB

Receiver Optical Characteristics

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Signaling Speed			53.125		Gbaud
Center Wavelength	λC	1304.5	1311	1317.5	nm
Damage Threshold		5			dBm
Receive Power (OMA_{outer})	RxOMA			4.2	dBm
Average Receive Power	RxAVG	-5.9		4	dBm
Receiver Sensitivity (OMA_{outer}),*(note 3)	SenOMA			Max (-3.9, SECQ-5.3)	dBm
Receiver Reflectance				-26	dB
LOS Assert	LOSA	-15			dBm
LOS De-Assert	LOSD			-12	dBm
LOS Hysteresis		0.5			dB

*Note 1: Average launch power (min) is informative and not the principal indicator of signal strength. A transmitter with launch power below this value cannot be compliant; however, a value above this does not ensure compliance.

*Note 2: Transmitter reflectance is defined looking into the transmitter.

*Note 3: Sensitivity is specified at 2.4x10-4 BER.

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	Ts	-40	+85	°C
Supply Voltage	Vcc	-0.5	3.6	V
Damage Threshold	Rxdmg	5		dBm
*Exceeding any one of these values may damage the device permanently.				

Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Case Temperature	Tc	0		70	°C
Power Supply Voltage	Vcc	3.135	3.3	3.465	V
Operating Relative Humidity	RH	5		85	%
Power Dissipation	PD			4.5	W

*Power supply specifications, instantaneous, sustained and steady state current are compliant with QSFP28 MSA Power Classification.

Transmitter Electrical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Differential Data Input Swing per Lane		900			mV_{p-p}	
Differential Input Impedance	Zin	90	100	110	ohm	
DC Common Mode Voltage (Vcm)		-350		2850	mV	1

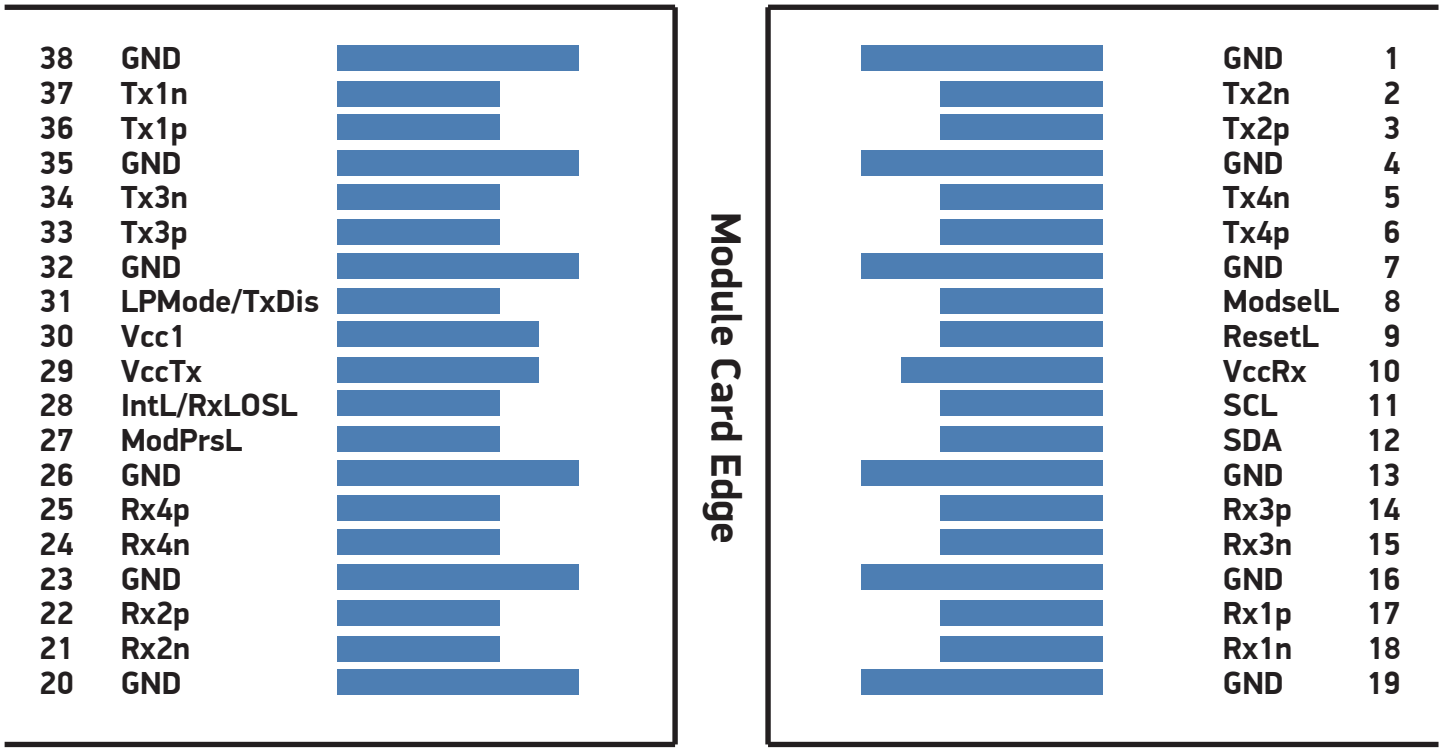
*Note 1: Vcm is generated by the host. Specification includes effects of ground offset voltage.

Receiver Electrical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Differential Output Amplitude				900	mV_{p-p}	
Differential Output Impedance	Zout	90	100	110	ohm	
Output Rise/Fall Time	t_r/t_f	12			ps	20%~80%
Eye Width		0.57			UI	
Eye Height Differential		228			mV	@TP4, 1E-15
DC Common Mode Voltage (Vcm)		-350		2850	mV	1

*Note 1: Vcm is generated by the host. Specification includes effects of ground offset voltage.

QSFP28 Transceiver Electrical Pad Layout



Top Side
Viewed From Top

Bottom Side
Viewed From Bottom

Pin Descriptions

Pin	Logic	Symbol	Description	Notes
1		GND	Ground	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	
3	CML-I	Tx2p	Transmitter Non-Inverted Data Input	
4		GND	Ground	1
5	CML-I	Tx4n	Transmitter Inverted Data Input	
6	CML-I	Tx4p	Transmitter Non-Inverted Data Input	
7		GND	Ground	1
8	LVTTL-I	ModSelL	Module Select	
9	LVTTL-I	ResetL	Module Reset	
10		VccRx	+3.3 V Power Supply Receiver	2
11	LVCMOS- I/O	SCL	2-wire Serial Interface Clock	
12	LVCMOS- I/O	SDA	2-wire Serial Interface Data	
13		GND	Ground	
14	CML-O	Rx3p	Receiver Non-Inverted Data Output	
15	CML-O	Rx3n	Receiver Inverted Data Output	
16		GND	Ground	1
17	CML-O	Rx1p	Receiver Non-Inverted Data Output	
18	CML-O	Rx1n	Receiver Inverted Data Output	
19		GND	Ground	1
20		GND	Ground	1
21	CML-O	Rx2n	Receiver Inverted Data Output	
22	CML-O	Rx2p	Receiver Non-Inverted Data Output	
23		GND	Ground	1
24	CML-O	Rx4n	Receiver Inverted Data Output	1
25	CML-O	Rx4p	Receiver Non-Inverted Data Output	
26		GND	Ground	1
27	LVTTL-O	ModPrsL	Module Present	
28	LVTTL-O	IntL/RxLOSL	Interrupt. Optionally Configurable As RxLOSL Via The Management Interface (SFF-8636).	
29		VccTx	+3.3 V Power supply transmitter	2
30		Vcc1	+3.3 V Power supply	2
31	LVTTL-I	LPMode/TxDis	Low Power Mode. Optionally Configurable As TxDis Via The Management Interface (SFF-8636).	
32		GND	Ground	1
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input	
34	CML-I	Tx3n	Transmitter Inverted Data Input	
35		GND	Ground	1
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	
37	CML-I	Tx1n	Transmitter Inverted Data Input	
38		GND	Ground	1
*Note 1:	GND is the symbol for signal and supply (power) common for QSFP28 modules. All are common within the QSFP28 module and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal common ground plane.			
*Note 2:	VccRx, Vcc1 and VccTx are the receiving and transmission power suppliers and shall be applied concurrently. Vcc Rx, Vcc1 and Vcc Tx may be internally connected within the QSFP28 transceiver module in any combination.			

Warranty
Please check www.edge-core.com for the warranty terms in your country.

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