

TSQL4-F22LE4C Optical Transceiver

Single-mode 200G BASE LR4 Transceiver, With Diagnostic Monitoring
Duplex QSFP56 10km Transceiver

Features

- Hot-pluggable QSFP56 form factor
- LC connector
- 200GBASE-LR4 compliant– 4x 26.5625 GBd PAM4
- 200GAUI-4 compliant– 4x 26.5625 GBd PAM4
- Maximum link length of 10km via SMF fiber
- Digital diagnostics functions are available via the I2C interface
- Single 3.3V Power Supply
- Power Dissipation: <8.0W
- CMIS 4.0 management interface
- Operating Case Temperature: 0°C~+70°C
- RoHS compliant 

Applications

- 5G backhaul
- Switch&Router Connections
- Data Centers 200GE 10Km SMF links

Production Description

TSQL4-F22LE4C, 200GBASE-LR4, hot pluggable optical transceiver is a high-performance solution for 200GE links for up to 10km over single mode fiber (SMF).

It combines 4x26.5625 GBd PAM4 electrical lanes into four 26.5625 GBd PAM4 optical channels in compliance with IEEE 200GBASE-LR4. Superior performance and reliability is achieved through advanced transmitter and receiver design using cooled EA-DFB-LDs each at a LAN- WDM 1.3 μm wavelength and 4x PIN PDs with low-power TIAs. The 4 optical transmit and receive lanes are WDM' ed on to a single fiber pair through an LC connector.

Absolute Maximum Rating

These values represent the damage threshold of the module. Stress in excess of any of the individual Absolute Maximum Ratings can cause immediate catastrophic damage to the module even if all other parameters are within Recommended Operating Conditions.

Parameters	Symbol	Min.	Max.	Unit
Power Supply Voltage	VCC	-0.5	+3.6	V
Storage Temperature	T _c	-40	+85	°C
Relative Humidity	RH	5	85	%

Recommended Operating Environment

Recommended Operating Environment specifies parameters for which the electrical and optical characteristics hold unless otherwise noted.

Parameter	Symbol	Min.	Typical	Max	Unit
Power Supply Voltage	VCC	3.135	3.30	3.465	V
Operating Case Temperature	T _{ca}	0		70	°C

Electrical Characteristics

The following electrical characteristics are defined over the Recommended Operating Environment unless otherwise specified.

Parameter	Symbol	Min.	Typical	Max	Unit	Notes
Signaling Rate per lane		-100ppm	26.5625	+100ppm	Gbd	
Transmitter						
Differential Input Impedance	Z _{in}	90	100	110	ohm	
Differential Input Voltage Amplitude	ΔV _{in}	-	-	900	mVp-p	
Receiver						
Differential Output Impedance	Z _{out}	90	100	110	ohm	
Differential Output Voltage Amplitude	ΔV _{out}	900	-	-	mVp-p	AtTP1a

Optical Characteristics

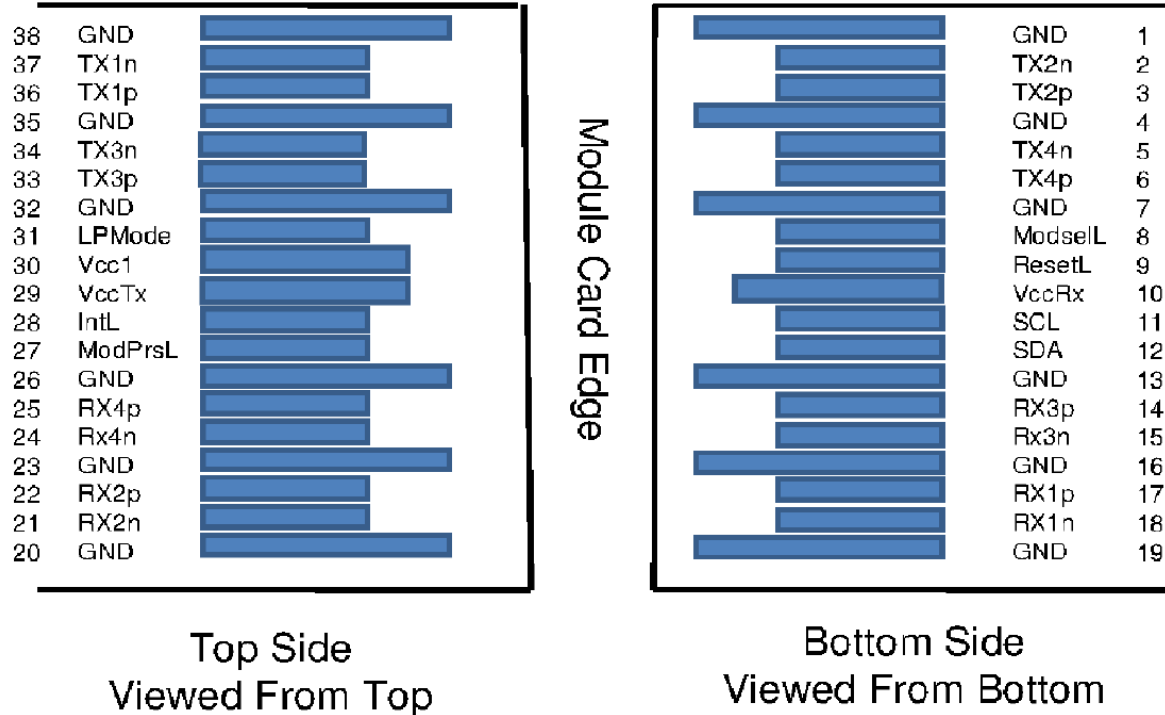
The following optical characteristics are defined over the Recommended Operating Environment unless otherwise specified.

Parameter	Symbol	Min.	Typical	Max	Unit	Notes
Transmitter						
Center Wavelength	Ch0	λ_0	1294.53		1296.59	nm
	Ch1	λ_1	1299.02		1301.09	
	Ch2	λ_2	1303.54		1305.63	
	Ch3	λ_3	1308.09		1310.19	
Side-mode suppression ratio	SMSR	30			dB	
Average Optical Power, each lane	Po	-3.4	-	5.3	dBm	
Outer Optical Modulation Amplitude (each lane)	OMAout	-0.4		5.1	dBm	
Launch power in OMA _{outer} minus TDECQ	Ptdecq	-1.8			dBm	
Extinction Ratio	ER	3.5	-	-	dBm	
Transmitter and Dispersion Eye Closure for PAM4 per lane	TDECQ			3.4	dB	
Average launch power of off transmitter(each lane)	Poff			-30	dBm	
Optical Return Loss Tolerance	ORL	-	-	15.1	dB	
Receiver						
Center Wavelength	Ch0	λ_0	1294.53		1296.59	nm
	Ch1	λ_1	1299.02		1301.09	
	Ch2	λ_2	1303.54		1305.63	
	Ch3	λ_3	1308.09		1310.19	
Damage Threshold	DT	6.3			dBm	
Average Receive power, each lane		-9.7		5.3	dBm	
Receiver reflectance	Rfl			-26	dB	
Receiver Power (OMA _{outer}) , each lane	OMAout			5.1	dBm	
Stressed Receiver Sensitivity (OMA _{outer}), each lane	Sens			-5.2	dBm	
Receiver Sensitivity (OMA _{outer}) , each lane	Sen			-7.7	dBm	1

Note:

[1] Measured with conformance test signal at TP3 for the BER specified in IEEE 802.3bs

Qsfp56 Transceiver Electrical Pad Layout



Pin Definition

Pin	Symbol	Name/Description
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	+3.3 V 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	+3.3 V Power supply transmitter
30	VCC1	+3.3 V 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

Ordering Information

Part Number	Product Description
TSQL4-F22LE4C	200G QSFP56 LR4, 10Km, 0°C ~ +70°C

Important Notice

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