Approved Networks
A brand of legrand

QSFP28-LR4

100GBASE, QSFP28, LR4, SMF TRANSCEIVER
1295, 1300, 1304, 1309nm, 10km REACH, DUPLEX LC CONNECTOR

Features

- Hot pluggable QSFP28 MSA form factor
- Compliant to IEEE 802.3ba 100GBASE-LR4
- Up to 10km reach for G.652 SMF
- Single +3.3V power supply
- Operating case temperature: 0~70°C
- Maximum power consumption 4.0W
- Duplex LC receptacle
- Transmitter: cooled 4x25Gb/s LAN WDM EML TOSA (1295.56, 1300.05, 1304.58, 1309.14nm)
- Receiver: 4x25Gb/s PIN ROSA
- 4x28G Electrical Serial Interface (CEI-28G-VSR)
- RoHS-6 compliant

Applications

- 100GBASE-LR4 Ethernet Links
- Client-side 100G Telecom connections

1. Absolute Maximum Ratings

It has to be noted that the operation in excess of any individual absolute maximum ratings might cause permanent damage to this module.

Parameter	Symbol	Min	Max	Units	Notes
Storage Temperature	TS	-40	85	˚C	
Operating Case Temperature	TOP	0	70	˚C	
Power Supply Voltage	VCC	-0.5	3.6	V	
Relative Humidity (non-condensation)	RH	0	85	%	
Damage Threshold, each lane	THd	5.5		dBm	

2. Recommended Operating Conditions and Power Supply Requirements

Parameter	Symbol	Min	Typ	Max	Units
Operating Case Temperature	TOP	0		70	˚C
Power Supply Voltage	VCC	3.135	3.3	3.465	V
Data Rate, each Lane			25.78125		Gb/s
Control Input Voltage High		2		Vcc	V
Control Input Voltage Low		0		0.8	V
Link Distance with G.652	D	0.002		10	km

3. Electrical Characteristics

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

Parameter	Symbol	Min	Typ	Max	Units	Notes
Power Consumption				4.0	W	
Supply Current	Icc			1.21	A	
Transceiver Power-on Initialization Time				2000	ms	1
Transmitter (each Lane)						
Single-ended Input Voltage Tolerance (Note 2)		-0.3		4.0	V	Referred to TP1 signal common
AC Common Mode Input Voltage Tolerance		15		mV	RMS	
Differential Input Voltage		50		mVpp	LOSA	
Receiver (each Lane)						
Single-ended Output Voltage		-0.3		4.0	V	Referred to signal common
AC Common Mode Output Voltage				7.5	mV	RMS
Differential Output Voltage Swing	Vout,pp	300		850	mVpp	
Differential Output Impedance	Zout	90	100	110	Ohm	

Notes:

1. Power-on Initialization Time is the time from when the power supply voltages reach and remain above the minimum recommended operating supply voltages to the time when the module is fully functional.
2. The single ended input voltage tolerance is the allowable range of the instantaneous input signals.

4. Optical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Lane Wavelength	L0	1294.53	1295.56	1296.59	nm	
	L1	1299.02	1300.05	1301.09	nm	
	L2	1303.54	1304.58	1305.63	nm	
	L3	1308.09	1309.14	1310.19	nm	

Transmitter						
SMSR	SMSR	30			dB	
Total Average Launch Power	PT			10.5	dBm	
Average Launch Power, each Lane	PAVG	-4.3		4.5	dBm	
OMA, each Lane	POMA	-1.3		4.5	dBm	1
Difference in Launch Power between any Two Lanes (OMA)	Ptx,diff			5	dB	
Launch Power in OMA minus Transmitter and Dispersion Penalty (TDP), each Lane		-2.3			dBm	
TDP, each Lane	TDP			2.2	dB	
Extinction Ratio	ER	4			dB	
RIN20OMA	RIN			-130	dB/Hz	
Optical Return Loss Tolerance	TOL			20	dB	
Transmitter Reflectance	RT			-12	dB	
Eye Mask {X1, X2, X3, Y1, Y2, Y3}		{0.25, 0.4, 0.45, 0.25, 0.28, 0.4}				2
Average Launch Power OFF Transmitter, each Lane	Poff			-30	dBm	
Receiver						
Damage Threshold, each Lane	THd	5.5			dBm	3
Total Average Receive Power				10.5	dBm	
Average Receive Power, each Lane		-10.6		4.5	dBm	
Receive Power (OMA), each Lane				4.5	dBm	
Receiver Sensitivity (OMA), each Lane	SEN			-8.6	dBm	
Stressed Receiver Sensitivity (OMA), each Lane				-6.8	dBm	4
Difference in Receive Power between any Two Lanes (OMA)	Prx,diff			5.5	dB	
LOS Assert	LOSA		-18		dBm	
LOS Deassert	LOSD		-15		dBm	
LOS Hysteresis	LOSH	0.5			dB	
Receiver Electrical 3 dB upper Cutoff Frequency, each Lane	Fc			31	GHz	

Conditions of Stress Receiver Sensitivity Test (Note 5)						
Vertical Eye Closure Penalty, each Lane			1.8	dB		
Stressed Eye J2 Jitter, each Lane			0.3		UI	
Stressed Eye J9 Jitter, each Lane			0.47		UI	

Notes:

1. Even if the TDP < 1 dB, the OMA min must exceed the minimum value specified here.
2. See Figure 4 below.
3. The receiver shall be able to tolerate, without damage, continuous exposure to a modulated optical input signal having this power level on one lane. The receiver does not have to operate correctly at this input power.
4. Measured with conformance test signal at receiver input for BER = 1x10-12.
5. Vertical eye closure penalty and stressed eye jitter are test conditions for measuring stressed receiver sensitivity. They are not characteristics of the receiver.

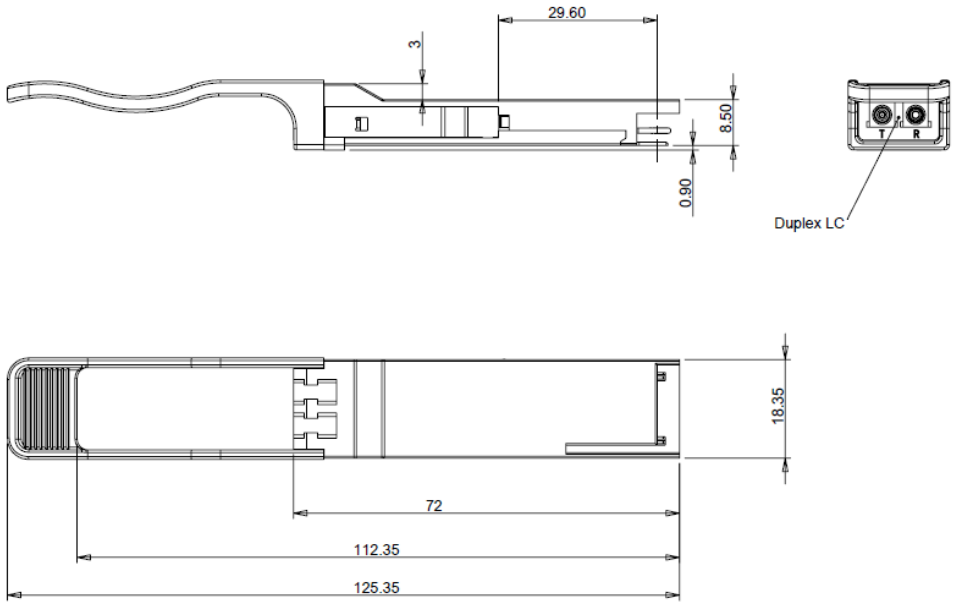
5. Digital Diagnostic Functions

The following digital diagnostic characteristics are defined over the normal operating conditions unless otherwise specified.

Parameter	Symbol	Min	Max	Units	Notes
Temperature monitor absolute error	DMI_Temp	-3	+3	°C	Over operating temperature range
Supply voltage monitor absolute error	DMI _VCC	-0.1	0.1	V	Over full operating range
Channel RX power monitor absolute error	DMI_RX_Ch	-2	2	dB	1
Channel Bias current monitor	DMI_Ibias_ Ch	-10%	10%	mA	
Channel TX power monitor absolute error	DMI_TX_Ch	-2	2	dB	1

Note: Due to measurement accuracy of different single mode fibers, there could be an additional +/-1 dB fluctuation, or a +/- 3 dB total accuracy.

6. Mechanical Diagram



Note: External physical characteristics are subject to variation. This may include, but is not limited to, external case designs, pull tab colors and/or shapes, removal latch styles or colors, and label sizes and placement. These variations do not affect the function or characteristics of the transceivers.

7. Ordering Information

OEM	Part Number	OEM	Part Number
Adtran	1445510F2C-A	HP	JL310A-A
Alcatel-Lucent	3HE11274AA-A	HP	JH683A-A
Allied Telesis	AT-QSFP28-LR4-A	HP	JL275A-A
Arista	QSFP-100G-LR4-A	HP	100GEQ-LR4-HPE
Arista	100GEQ-LR4-ARB	Huawei	QSFP28-100G-LR4-A
Brocade-Foundry	100G-QSFP28-LR4-10KM-A	Huawei	QSFP-100G-LR4-HT-A
Calix	100-04744-A	Infinera	TOM-100G-Q-LR4-A
Check Point	CPAC-TR-100LR-A	Infinera	TOM-100GMR-Q-LR4-A
Chelsio	SM100G-LR-A	Ixia	QSFP28-LR4-XCVR-A
Ciena	160-9401-900-A	Juniper	QSFP-100GBASE-LR4-A
Ciena	160-9401-900-C1	Juniper	QSFP-100GBASE-LR4-C1
Ciena	XCVR-Q10V31-C1	Juniper	QSFP-100G-LR4-T2-A
Cisco	100GEQ-LR4-CSC	Juniper	JNP-QSFP-100G-LR4-A
Cisco	QSFP-100G-LR4-S-A	Juniper	JNP-QSFP-100G-LR4-C1

Cisco	QSFP-100G-LR4-S-C1	Juniper	100GEQ-LR4S-JUN
Cisco	100GEQ-LR4S-CSC	Juniper/OnePort	QSFP-100G-LR4-T2-OP
Cisco	100GEQ-LR4-CSC	Lenovo	7G17A03540-A
Cisco/OnePort	QSFP-100G-LR4-S-OP	Mellanox	MMA1L10-CR-A
DELL	Q28-100G-LR4-A	Meraki	MA-QSFP-100G-LR4-A
Dell	407-BCDI-A	MRV	QSFP28-100GE-LR4-A
DELL	407-BCDH-A	MSA	AN-QSFP28-LR4
Dell	407-BBSL-A	MSA Champion ONE	100GQSFP28E-LR4
Edgecore	ET7402-LR4-A	MSA OnePort	OP-QSFP28-LR4
Extreme	AA1405001-E6-A	NOKIA	3HE10550AA-A
Extreme	10403-A	NOKIA	3HE10550AA-C1
F5 Networks	F5-UPG-QSFP28-LR4-A	NoviFlow	400000518-A
Finisar	FTLC1154RDPL-A	Oclaro	TRQ5E20ENF-LF000-A
Finisar	FTLC1151RDPL-A	Palo Alto	PAN-QSFP28-100GBASE-LR4-A
Fortinet	FG-TRAN-QSFP28-LR4-A	Plexxi	PX-CBL-QSFP28-LR4-10KM-A
Fujitsu	FIM37700-A	Ruckus Wireless	E100G-QSFP28-LR4-10KM-A
Fujitsu	HA74L-0001-0152-A	Source Photonics	SPQ-CE-LR-CDFB-A
Gigamon	Q28-503-A	Transition Networks	TN-QSFP-100G-LR4-A
H3C	QSFP-100G-LR4-WDM1300-A		

8. Contact Information

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