

100G QSFP28 30km ER4 Lite Transceiver Specification

HTQ28-L404-30BD

Feature

- ◆ Compliant with 100GBASE-ER4
- ◆ Support line rates from 103.125 Gbps to 111.81 Gbps
- ◆ Integrated LAN WDM TOSA / APD ROSA for up to 30 km reach over SMF without FEC ,up to 40 km reach over SMF with FEC
- ◆ Digital Diagnostics Monitoring Interface
- ◆ Duplex LC optical receptacle
- ◆ No external reference clock
- ◆ Electrically hot-pluggable
- ◆ Compliant with QSFP28 MSA with LC connector
- ◆ Case operating temperature range:0°C to 70°C

Applications

- ◆ IEEE 802.3ba 100GBASE ER4Links
- ◆ Client-side 100G interconnections
- ◆ OTN OTU4

Standards

- ◆ Compliant to IEEE 802.3ba ,IEEE 802.3bm and 100G ER4
- ◆ Compliant to SFF-8636 ,SFF-8665

Description

The Hirundo' s 100G QSFP28 ER4 Lite optical Transceiver integrates receiver and transmitter path on one module. In the transmit side, four lanes of serial data streams are recovered, retimed, and passed to four laser drivers. The laser drivers control 4- EML with center wavelength of 1296 nm, 1300nm, 1305nm and 1309 nm. The optical signals are multiplexed to a single –mode fiber through an industry standard LC connector. In the receive side, the four lanes of optical data streams are optically de-multiplexed by the integrated optical demultiplexer. Each data stream is recovered by a APD and trans-impedance amplifier, retimed. This module features a hot-pluggable electrical interface, low power consumption and MDIO management interface. The product is designed with form factor, optical/electrical connection and digital diagnostic interface according to the QSFP28 Multi-Source Agreement (MSA) and compliant to IEEE 802.3bm.

1. Ordering Information

Table 1.1 Ordering Information

Part No.	Specifications							
	Package	Date rate (Gbps)	Wavelength (nm)	Optical Power (dBm)	Sensitivity OMA(dBm)	Temp (°C)	Reach (km)	Connector
HTQ28-L404-30BD	QSFP28	4*25.78	LWDM4	-2.5~6.5	<-18.5	0~70	30	LC
PN	HTQ28-L404-30BD							
Description	4X25Gbps,SMF, 30Km, 0-70°C							
SAP No	-							
Customer PN	-							

2. Revision History

Table 2.1 Revision History

Version	Initiated	Reviewed	Revision	Date
V1.0	Leo	Virgil	LiuSJ	2020.12.16

3. Absolute Maximum Ratings and Recommended Operating Conditions

Table 3.1 Absolute Maximum Ratings

Parameter	Symbol	Unit	Min	Max
Storage Temperature Range	Ts	°C	-40	+85
Relative Humidity	RH	%	5	85
Power Supply Voltage	Vcc	V	-0.5	+4.0
Signal Input Voltage		V	-0.3	Vcc+0.3
Receiver Damage Threshold		dBm	-7	

Table 3.2 Recommended Operating Conditions

Parameter	Symbol	Unit	Min	Typ	Max
Operating Case Temperature	Tc	°C	0	/	70
Power Supply Voltage	Vcc	V	3.135	3.3	3.465
Bit Rate(Per channel)	BR	GB/S		25.78	
Bit Error Ratio	BER				10 ⁻¹²
Max Link Length(without FEC)	L	Km			30
Max Link Length(with FEC)	L	Km			40

4. Optical Specification

Table 4.1 Optical Specifications

Parameter	Symbol	Unit	Min	Typ	Max	Notes
Transmitter (per Lane)						
Signaling rate per lane		Gbps		25.78125± 100pm		
Center wavelength	λ_c	nm	1294.53 1299.02 1303.54 1308.09	1295.56 1300.05 1304.58 1309.14	1296.59 1301.09 1305.63 1310.19	
RMS Spectral Width	SW	nm			1	
Total Average Launch Power	Pout	dBm			10.5	
Transmit OMA per Lane	TxOMA	dBm	0.5		6.5	
Average Launch Power per Lane	TXPx	dBm	-2.5		6.5	
Optical Extinction Ratio	ER	dB	4.5			
Side-Mode Suppression Ratio	SMSR	dB	30			
Relative Intensity Noise	RIN	dB/Hz			-128	
Optical Return Loss Tolerance		dB			20	
Transmitter Reflectance		dB			-12	
Average launch power of OFF Transmitter, each lane		dBm			-30	
Transmitter Eye mask definition {X1,X2,X3, Y1,Y2,Y3}			{0.25,0.4,0.45,0.25,0.28,0.4}			Hit ratio 5x10 ⁻⁵
Receiver(per Lane)						
Signaling rate per lane		Gbps		25.7812± 100pm		
Center wavelength	λ_{IN}	nm	1294.53 1299.02 1303.54 1308.09	1295.56 1300.05 1304.58 1309.14	1296.59 1301.09 1305.63 1310.19	
Damage Threshold Per Lane	DT	dBm	-7			
Average receive Power per Lane	RXPx	dBm	-20.5		-7	
Receiver Sensitivity (OMA) per Lane	Rxsens	dBm			-15	BER=10 ⁻¹²
Receiver Sensitivity (OMA) per Lane	Rxsens	dBm			-18.5	BER=10 ⁻⁵
Receiver reflectance	Rfl	dB			-26	
LOS De-Assert	LOSD	dBm			-18	
LOS Assert	LOSA	dBm	-35			
LOS Hysteresis		dB	0.5		6	

5. Electrical Specification

Table 5.1 Electrical Specifications

Parameter	Symbol	Unit	Min	Typ	Max	Notes
Supply Voltage	VCC	V	3.135	3.3	3.465	
Supply Current	ICC				1.21	
Power Consumption	Pc	W			4	
Transmitter						
Signaling rate per lane		Gbps		25.7812± 100pm		
Input Differential Impedance	R _{IN}	Ω	90	100	110	
Differential data input swing	V _{IN}	mVp-p	350		900	
Receiver						
Signaling rate per lane		Gbps		25.7812± 100pm		
Output Differential Impedance	R _{OUT}	Ω	90	100	110	
Differential data output swing	V _{OUT}	mVp-p	300		800	
IIC communication						
IIC Clock frequency	-	KHZ	100		400	

6. Module Memory Map

The common memory map for managed external cable interfaces is utilized for serial ID, digital monitoring and control functions. The map is arranged into a single lower page address space of 128 bytes and multiple upper address pages.

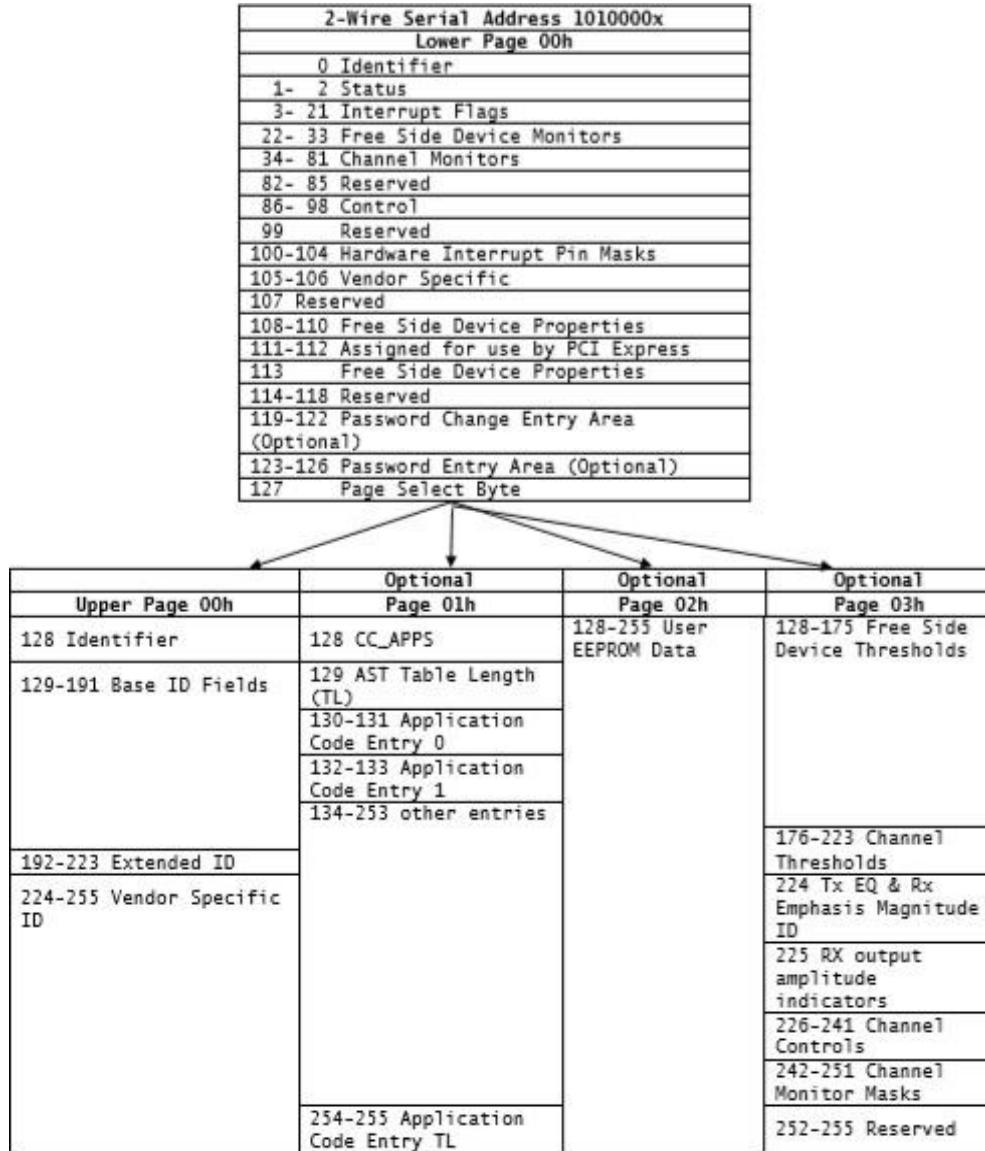


Figure 1 Digital Diagnostic Memory Map

7. Pin Assignment and Pin Description

7.1 Pin Assignment

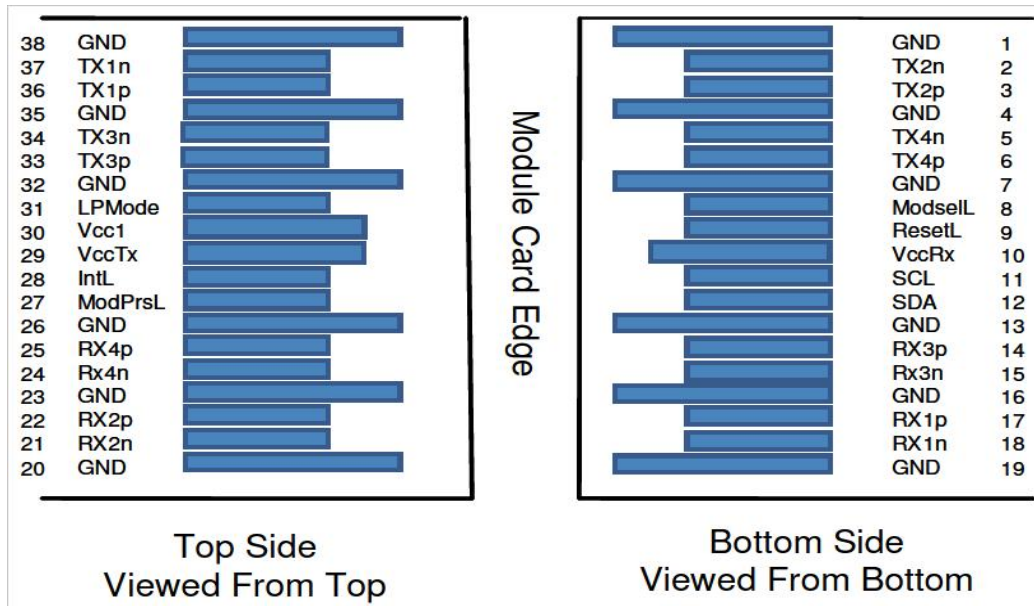


Figure 2 Electrical Pin-out Details

7.2 Pin Description

Table 7.1 Pin Description

Pin	Symbol	Name/Description	Note
1	GND	Ground	1
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non-Inverted Data Input	
4	GND	Ground	1
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non-Inverted Data Input	
7	GND	Ground	1
8	ModSe1L	Module Select	
9	ResetL	Module Reset	
10	Vcc Rx	+3.3V Power supply receiver	
11	SCL	2-wire serial interface clock	
12	SDA	2-wire serial interface data	
13	GND	Ground	1
14	Rx3p	Receiver Non-Inverted Data Output	
15	Rx3n	Receiver Inverted Data Output	
16	GND	Ground	1
17	Rx1p	Receiver Non-Inverted Data Output	
18	Rx1n	Receiver Inverted Data Output	
19	GND	Ground	1
20	GND	Ground	1
21	Rx2n	Receiver Inverted Data Output	
22	Rx2p	Receiver Non-Inverted Data Output	
23	GND	Ground	1
24	Rx4n	Receiver Inverted Data Output	
25	Rx4p	Receiver Non-Inverted Data Output	
26	GND	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	Ground	1
33	Tx3p	Transmitter Non-Inverted Data Input	
34	Tx3n	Transmitter Inverted Data Input	
35	GND	Ground	1
36	Tx1p	Transmitter Non-Inverted Data Input	
37	Tx1n	Transmitter Inverted Data Input	
38	GND	Ground	1

Notes:

1.GND is the symbol for signal and supply (power) common for the QSFP28 module. All are common within the module and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal common ground plane. Circuit ground is internally isolated from chassis ground.

8. Typical Application Circuit

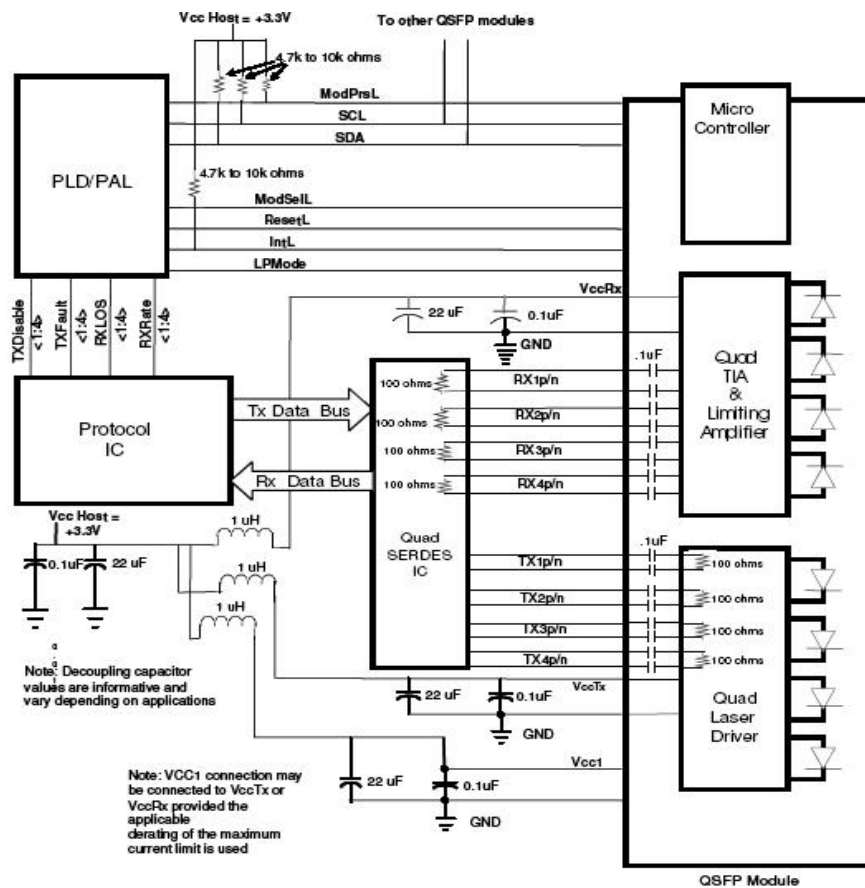


Figure 3 Typical application circuit

9. Package Dimensions

Figure 4 shows the package dimensions of the module. The module is designed to be compliant with QSFP28 MSA specification.

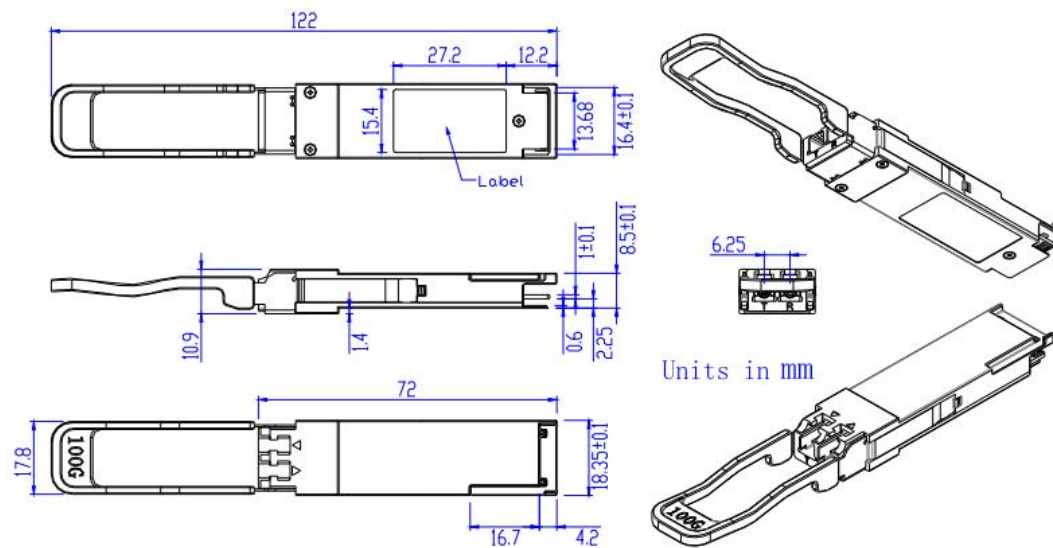


Figure 4 Package Dimensions

10. For More Information

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