

# 100GBASE-DR QSFP28

## Optical Transceiver

### Product Features

- Supports 100GBASE-DR
- Up to 500m over SMF
- DFB Transmitter and PIN Receiver
- Supports 4x25Gbps NRZ Host Interface
- Supports 53.125Gbd PAM4 optical Interface
- QSFP28 MSA Package with Duplex LC Connector
- I2C management interface with Digital Diagnostic Monitoring
- Compliant to SFF-8636
- Single 3.3V power supply
- Operating case temperature: 0~70°C
- Maximum power dissipation 3.5W
- RoHS-6 compliance

### Application

- 100GBASE-DR Ethernet Links

### Absolute Maximum Ratings

Parameter	Unit	Min.	Typical	Max.
Storage Temperature	°C	-40		85
Operating Case Temperature	°C	0		70
Operating Relative Humidity	%	5		85
Power Supply not Damaged Voltage	V	0		3.6

### Recommended Operating Conditions

Parameter	Unit	Min.	Typical	Max.
Operating Case Temperature	°C	0		70
Operating Relative Humidity	%	5		85
Power Supply Working Voltage	V	3.135	3.3	3.465
Power Consumption	W			3.5
Link Distance	m			500

**Characteristics**

All performance is specified at whole working temperature and conditions

Parameter	Unit	Min.	Typical	Max.	Note
<b>Transmitter</b>					
Signaling Rate	GBd	53.125±100ppm			
Module Format		PAM4			
TX Central Wavelength	nm	1304.5		1317.5	
Side-Mode Suppression Ratio	dB	30			
Average launch power	dBm	-2.9		4.0	
Launch Power in OMA minus TDECQ	dBm	-2.2 -1.9			Note1
Outer Optical Modulation Amplitude ( $OMA_{outer}$ )	dBm			4.2	
TDECQ	dB			3.4	
Average launch power of OFF transmitter	dB			-15	
Extinction ratio	dB	3.5			
RIN <sub>15.5</sub> OMA	dB/Hz			-136	
Optical return loss tolerance	dB			15.5	
Transmitter reflectance	dB			-26	
<b>Receiver</b>					
Signaling Rate	GBd	53.125±100ppm			
Module Format		PAM4			
RX Central Wavelength	nm	1304.5		1317.5	
Damage threshold	dBm	5			
Average receive power	dBm	-5.9		4	
Receive power OMA	dBm			4.2	
Receiver reflectance	dB			-26	
Receiver sensitivity OMA	dBm			max{-3.9,SECQ -5.3}	
Stress Sensitivity OMA	dBm			-1.9	
Stressed eye closure for PAM4 (SECQ)	dB		3.4		

Note1: -2.2dBm@for extinction ratio ≥ 5 dB,-1.9dBm@for extinction ratio < 5 dB

**PIN Function Definitions**

Pin No.	Symbol	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	+3.3V 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	VccTx	+3.3V Power supply transmitter
30	Vcc1	+3.3V 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

**Typical Interface Circuit**

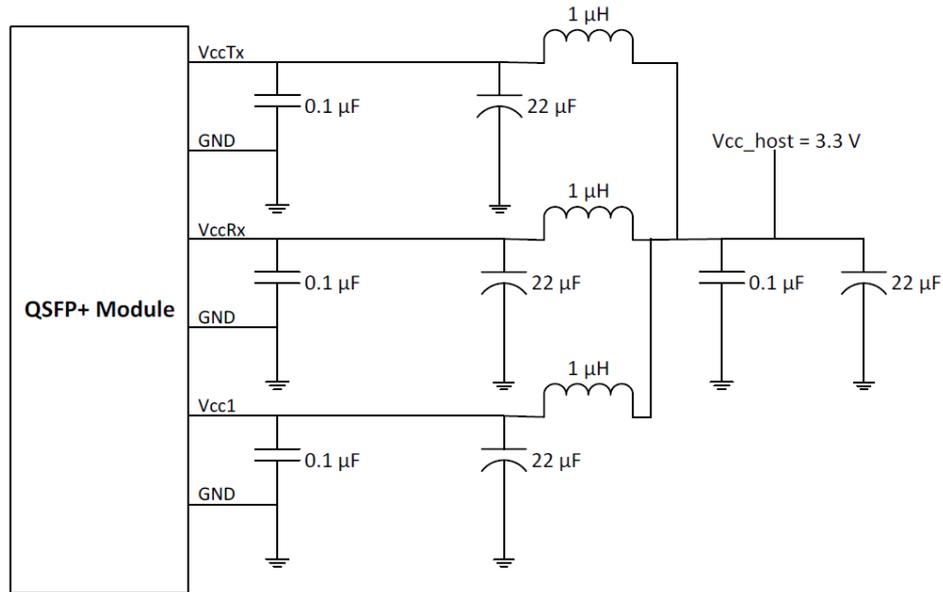


Figure 1 Recommended Interface Circuit

**QSPF28 Transceiver Electrical Pad Layout**

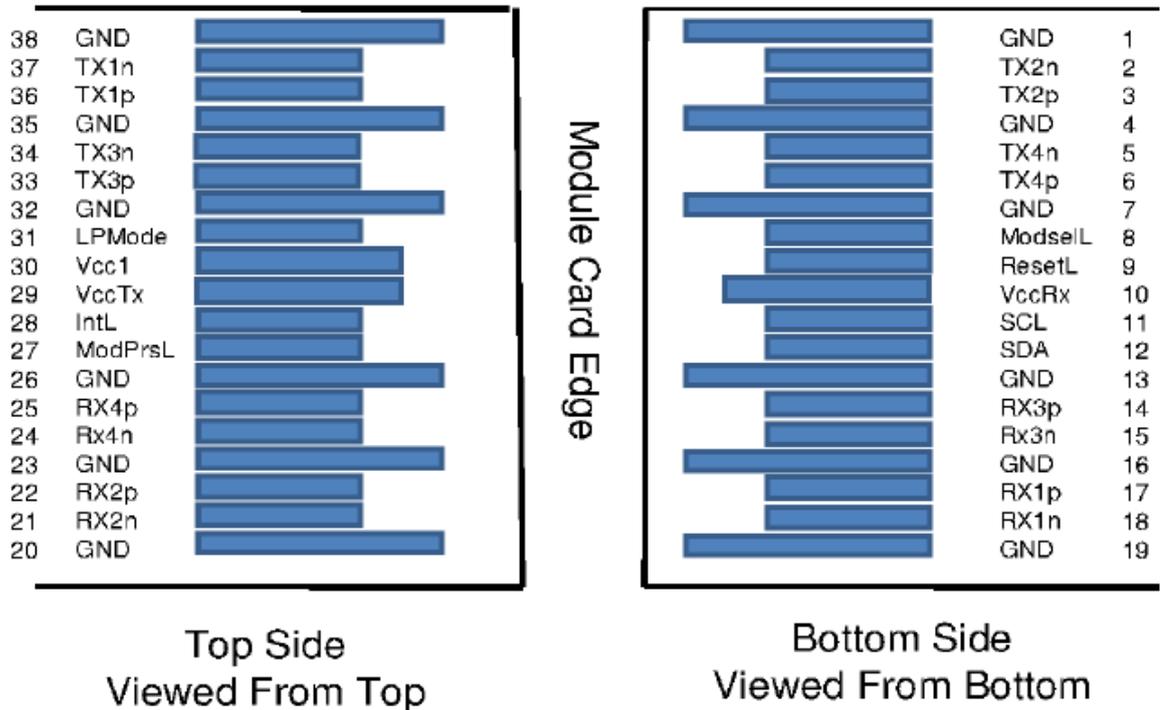


Figure 2 PIN MAP

**Mechanical Specifications**

For detail mechanical information, please refer to the related document of SFF-8661.

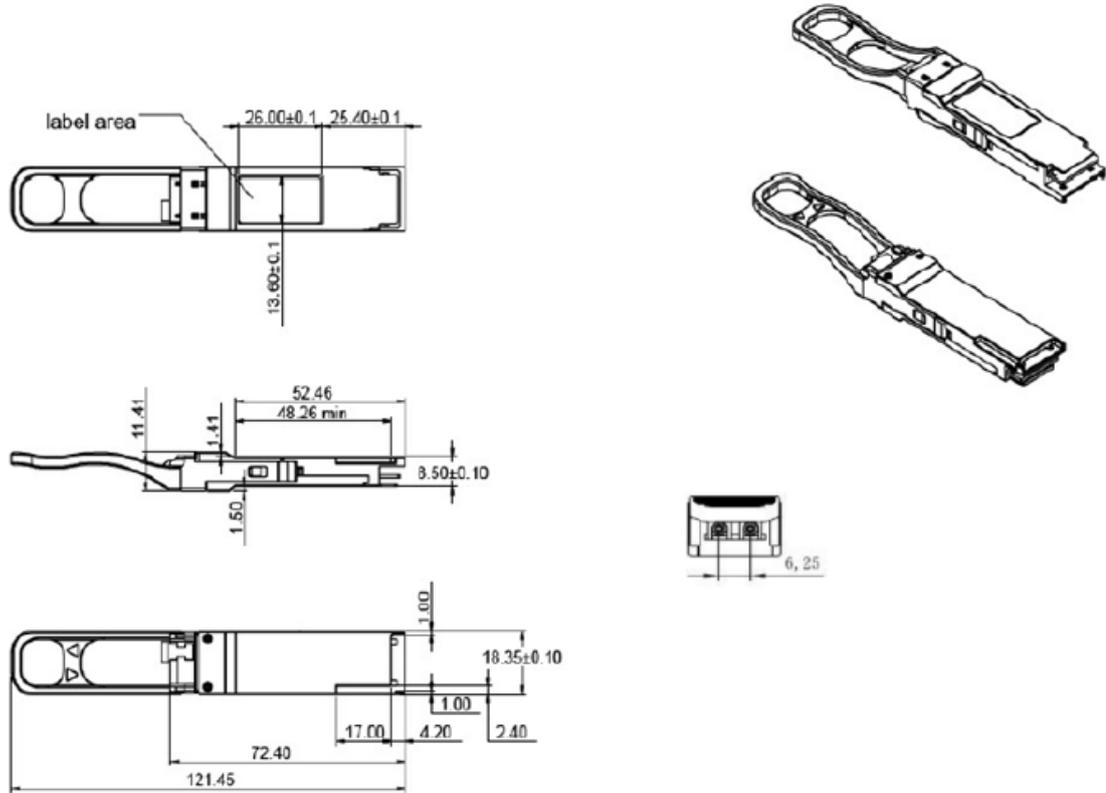


Figure 3 Mechanical

### EEPROM Information

The digital diagnostic memory map specific data field defined as following. For detail EEPROM information, please refer to the related document of SFF 8636.

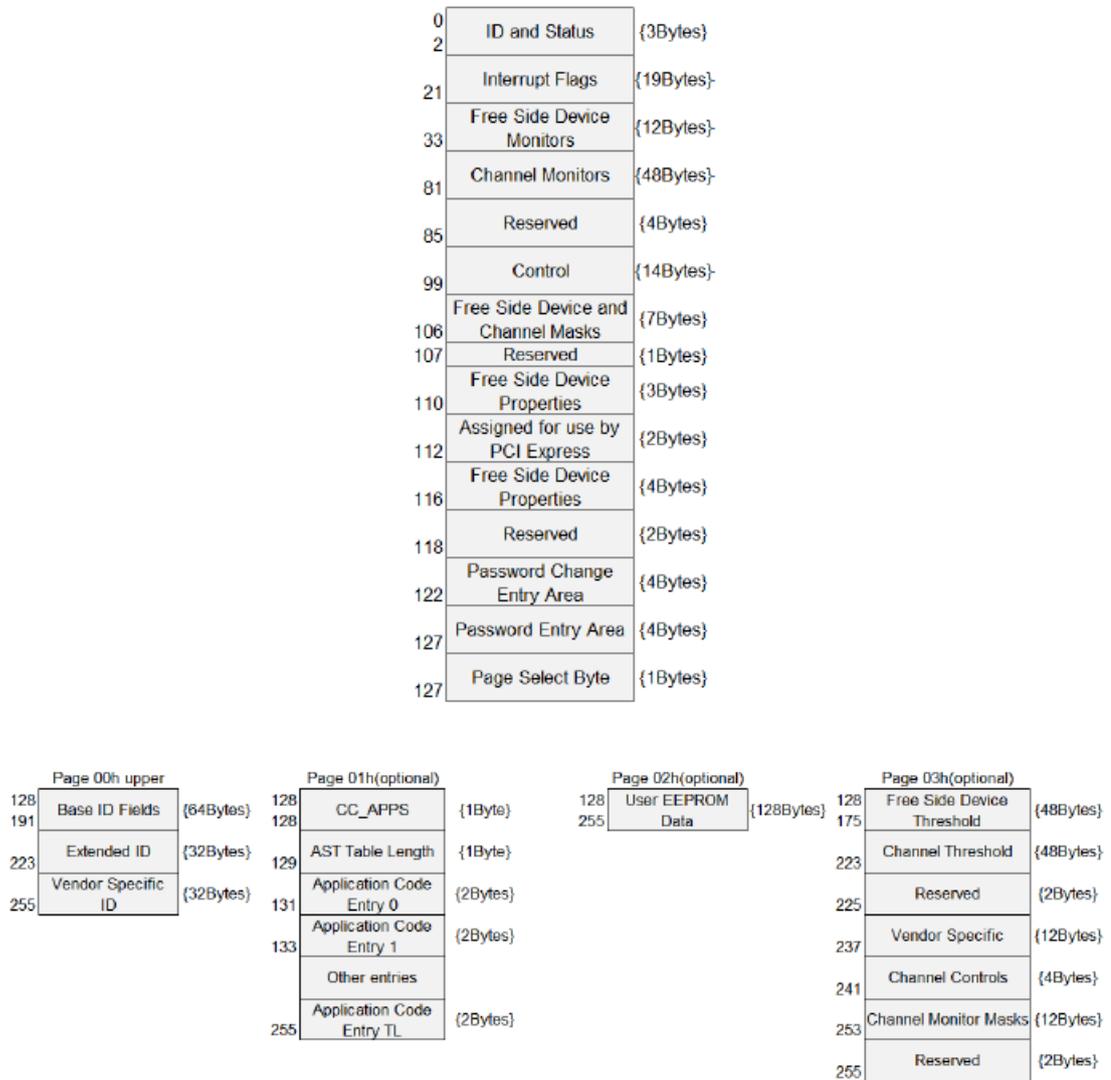


Figure 4 QSFP28 Memory Map

**ESD**

The QSFP28 module and host SFI contacts (High Speed Contacts) shall withstand 1000 V electrostatic discharge based on Human Body Model and all host contacts with exception of the SFI contacts (High Speed Contacts) shall withstand 2 kV electrostatic discharge based on Human Body Model. The QSFP28 module shall meet ESD requirements given in EN61000-4-2, criterion B test specification such that units are subjected to 15 kV air discharges during operation and 8 kV direct contact discharges to the case according section 5.3 in SFF-8679 REV1.5.

**Laser Safety**

This is a Class 1 Laser Product according to IEC 60825-1:2007. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (June 24, 2007).

**Ordering Information**

Ordering P/Ns	Description
DK33ii-QLCA	500m, 1310nm, 4*25G NRZ electrical interface, 1*100G PAM4 at LC/UPC optical interface, SiPh based, QSFP28, commercial temperature

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