100G QSFP28 BIDI SR Transceiver
CC-QKK11SL-SD

Features

- QSFP28 MSA Specification Compliant, including new functions per SFF-8636
- 100G and 40G Link Distances up to 70m over OM3, 100m over OM4
- Hot Pluggable
- Dual Wavelength VCSEL Bi-Directional Optical Interface, PAM4 2x50Gbps 850nm/908nm
- Interface with Digital monitoring and maskable Interrupts for Ex- panded functionality
- Case Operating Temperature:Range: 0 to 70ºC
- RoHS II Compliance
- Operating Mode

Applications

- Data Center
- High performance computing interconnect

Description

The CC-QKK11SL-SD is a QSFP28 Optical transceiver for 100Gbps and 40Gbps interconnects . It is compliant with the QSFP28 MSA specifications,operates from a 3.3V DC power supply. It is fabricated with a rugged die cast metal housing and cage assembly.

Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max
Storage Ambient Temperature	T_{stg}	-40	+85	ºC
Relative Humidity - Storage	RH_S	0	95	%
Relative Humidity - Operating	RH_O	0	85	%
Module Supply Voltage	V_{CC}	-0.5	3.6	V

Notes:

Exceeding the Absolute Maximum Ratings may cause irreversible damage to the device. The device is not intended to be operated under the condition of simulta- neous Absolute Maximum Ratings, a condition which may cause irreversible damage to the device.RH is Non-condensing condition.

Recommended Operating Conditions (T=25 ℃,unless noted)

Parameter	Symbol	Min.	Max.	Unit	
Case Operating Temperature	T_{case}	0	+25	+70	ºC
Module Supply Voltage	V_{CC}	3.135	3.3	3.465	V
Signaling Speed Per electricalchannel(4x25G NRZ)	S	-	25.78	-	Gb/s
Power Consumption	P	-	-	4	W

Notes

Exceeding the Absolute Maximum Ratings may cause irreversible damage to the device. The device is not intended to be operated under the condition of simultaneous Absolute Maximum Ratings, a condition which may cause irreversible damage to the device. RH is Non-condensing condition.

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Transmitter Electrical Interfaces

Parameter	Symbol	Min	Typ	Max	Units
Tx_Data Differential Input Voltage	V_{IN}	200	-	900	mV
Tx_Data Differential Input Impedance	Z_{IN}	-	100	-	Ω

Receiver Electrical Interfaces

Parameter	Symbol	Min	Typ	Max	Units
Rx_Data Differential Output Voltage	V_{OUT}	-	-	1200	mV
Rx_Data Differential Output Impedance	Z_{OUT}	-	100	--	Ω

Timing requirement of control and status I/O

Parameter	Symbol	Min	Typ	Max	Units
Tx Squelch Deassert Time	toff_T_{xsq}	-	-	1	s
Rx Squelch Deassert Time	toff_R_{xsq}	-	-	2	s

NON-Volatile Memory Specification

Parameter	Symbol	Min	Typ	Max	Units
Complete Single or Sequential Write	twr	-	-	80	ms

Soft Control and Status Timing Requirments

Parameter	Symbol	Min	Typ	Max	Units
Application or Rate Select Change Time	t_ratesel	-	-	600	ms

100G Transmitter Optical Characteristics

Parameter	Symbol	Test Point	Min	Typ	Max	Units	Notes
Average Launch Power ,each lane	P_{OUT}	TP2	-6.2	-	4	dBm	Average Optical Output
Optical modulation Amplitude , each lane	OMA	TP2	-4.2	-	3	dBm	
Extinction Ratio	ER	TP2	3	-	-	dB	
Launch power in OMAouter minus TDECQ, each lane	OMA TDECQ	TP2	-5.9	-	-	dB	
Optical Output with Tx OFF	P_{OFF}	TP2	-	-	-30	dBm	
Center Wavelength 1	λ	TP2	844	850	863	nm	
Center Wavelength 2	λ	TP2	900	908	918	nm	
RMS Spectral Width1	Δλ	TP2	-	-	0.6	nm	
RMS Spectral Width2	Δλ	TP2	-	-	0.65	nm	
Optical return loss tolerance	ORL	TP2	-	-	12	dB	
Transmitter and dispersion eye closure for PAM4 (TDECQ), each lane	TDECQ	TP2			4.9	dB	

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100G Receiver Optical Characteristics

Parameter	Symbol	Test Point	Min	Typ	Max	Units	Notes
Average power at receive input, each lane	PIN	TP3	-7.9	-	4	dBm	Note1
Receive power, each lane (OMAouter)	PIN(OMA)	TP3	-5.9	-	3	dBm	
Unstressed receiver sensitivity (OMAouter),each lane	Sen	TP3	-	-	max (-6.6,SECQ- 8)	dBm	Note2
Center Wavelength1	λ	TP3	844	850	863	nm	
Center Wavelength2	λ	TP3	900	908	918	nm	
Receiver Reflectance	RFL	TP3	-	-	-12	dB	
Rx_LOS of Signal - Assert	PA	TP3	-30	-	-	dBm	
Rx_LOS of Signal - Deassert	PD	TP3	-	-	-5.9	dBm	
Rx_LOS of Signal - Hysteresis	PHy	TP3	0.5	-	-	dB	

Note 1: A received power below this value cannot be compliant; however, a value above this does not ensure compliance.
Note 2:Sensitivity where the BER=2.4E-4 measured with a PRBS 31Q test pattern@26.56GBaud.

The mode Select description:

The firmware uses only rx2_rate_select and rx1_rate_select to switch 2 types of mode, and only byte 87. bit3~bit0 is used in another word. • The host can switch the module to 4*25G NRZ->2*53G PAM4 for default mode (with standard KP4 FEC) by setting rx2_rate_select to 00b and rx1_rate_select to 11b，byte87=03h in another word. • The host can switch the module to 4*10G NRZ->2*20G NRZ for 40G mode by setting rx2_rate_select to 00b and rx1_rate_select to 01b，byte87 to 01h in another word. • The mode select is volatile operation, after reset the module is back to default rate: 4*25G NRZ->2*53G PAM4 for normal work mode, rx2_rate_select=11b and rx1_rate_select=00b，byte87=03h in another word.

Type	Mode Description	Host Side	Media Side	Media side FEC	Page00 Byte 87
1	Delfault mode	4*25.78G NRZ	2*53.125G PAM4	With standard KP4	0x03
2	40G mode	4*10G NRZ	2*20G NRZ	No FEC	0x01

Notes:
In 40G mode, we only test the connectivity of 100m OM4 long fiber, and do not do other tests, nor do we guarantee other indicators in this mode.
The content of the customer's second-level password is:**0x9715 DA ED**
The range of open register information is as follows ：
page0:byte0
page0:byte105-110
page0:byte113-116
page0:byte128-255
page2:byte128-255
page3:byte128-229

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I2C Memory Map (Based on SFF8636 2.10a) Lower Page						
Address		Name	Bits Value	Byte Value	Read-Only /Read/Write	Support
Byte	Bit					
0	7-0	Identifier		11h	Read- Only	Yes
1	7-0	Revision Compliance		08h	Read- Only	Yes
2	7-4	Reserved		status		
	3	Reserved				
	2	Flat_mem	0b		Read- Only	Yes
	1	IntL			Read- Only	Yes
	0	Data_Not_Ready			Read- Only	Yes
3	7	L-Tx4 LOS	status	status	Read- Only	Yes
	6	L-Tx3 LOS	status		Read- Only	Yes
	5	L-Tx2 LOS	status		Read- Only	Yes
	4	L-Tx1 LOS	status		Read- Only	Yes
	3	L-Rx4 LOS	status		Read- Only	Yes
	2	L-Rx3 LOS	status		Read- Only	Yes
	1	L-Rx2 LOS	status		Read- Only	Yes
	0	L-Rx1 LOS	status		Read- Only	Yes
4	7	L-Tx4 Adapt EQ Fault	status	status	Read- Only	Yes
	6	L-Tx3 Adapt EQ Fault	status		Read- Only	Yes
	5	L-Tx2 Adapt EQ Fault	status		Read- Only	Yes
	4	L-Tx1 Adapt EQ Fault	status		Read- Only	Yes
	3	L-Tx4 Fault	status		Read- Only	Yes
	2	L-Tx3 Fault	status		Read- Only	Yes
	1	L-Tx2 Fault	status		Read- Only	Yes
	0	L-Tx1 Fault	status		Read- Only	Yes
5	7	L-Tx4 LOL	status	status	Read- Only	Yes
	6	L-Tx3 LOL	status		Read- Only	Yes
	5	L-Tx2 LOL	status		Read- Only	Yes
	4	L-Tx1 LOL	status		Read- Only	Yes
	3	L-Rx4 LOL	status		Read- Only	Yes
	2	L-Rx3 LOL	status		Read- Only	Yes
	1	L-Rx2 LOL	status		Read- Only	Yes
	0	L-Rx1 LOL	status		Read- Only	Yes

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Address		Name	Bits Value	Byte Value	Read-Only /Read/Write	Support
Byte	Bit					
6	7	L-Temp High Alarm	status	status	Read- Only	Yes
	6	L-Temp Low Alarm	status		Read- Only	Yes
	5	L-Temp High Warning	status		Read- Only	Yes
	4	L-Temp Low Warning	status		Read- Only	Yes
	3-2	Reserved	status			
	1	TC readiness flag	status		Read- Only	Yes
	0	Initialization complete flag	status		Read- Only	Yes
7	7	L-Vcc High Alarm	status	status	Read- Only	Yes
	6	L-Vcc Low Alarm	status		Read- Only	Yes
	5	L-Vcc High Warning	status		Read- Only	Yes
	4	L-Vcc Low Warning	status		Read- Only	Yes
	3-0	Reserved	status			
8	All	Vendor Specific			Read- Only	
9	7	L-Rx1 Power High Alarm	status	status	Read- Only	Yes
	6	L-Rx1 Power Low Alarm	status		Read- Only	Yes
	5	L-Rx1 Power High Warning	status		Read- Only	Yes
	4	L-Rx1 Power Low Warning	status		Read- Only	Yes
	3	L-Rx2 Power High Alarm	status		Read- Only	Yes
	2	L-Rx2 Power Low Alarm	status		Read- Only	Yes
	1	L-Rx2 Power High Warning	status		Read- Only	Yes
	0	L-Rx2 Power Low Warning	status		Read- Only	Yes
10	7	L-Rx3 Power High Alarm	status	status	Read- Only	Yes
	6	L-Rx3 Power Low Alarm	status		Read- Only	Yes
	5	L-Rx3 Power High Warning	status		Read- Only	Yes
	4	L-Rx3 Power Low Warning	status		Read- Only	Yes
	3	L-Rx4 Power High Alarm	status		Read- Only	Yes
	2	L-Rx4 Power Low Alarm	status		Read- Only	Yes
	1	L-Rx4 Power High Warning	status		Read- Only	Yes
	0	L-Rx4 Power Low Warning	status		Read- Only	Yes
11	7	L-Tx1 Bias High Alarm	status	status	Read- Only	Yes
	6	L-Tx1 Bias Low Alarm	status		Read- Only	Yes
	5	L-Tx1 Bias High Warning	status		Read- Only	Yes
	4	L-Tx1 Bias Low Warning	status		Read- Only	Yes
	3	L-Tx2 Bias High Alarm	status		Read- Only	Yes
	2	L-Tx2 Bias Low Alarm	status		Read- Only	Yes
	1	L-Tx2 Bias High Warning	status		Read- Only	Yes
	0	L-Tx2 Bias Low Warning	status		Read- Only	Yes

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Address		Name	Bits Value	Byte Value	Read-Only /Read/Write	Support
Byte	Bit					
12	7	L-Tx3 Bias High Alarm	status	status	Read- Only	Yes
	6	L-Tx3 Bias Low Alarm	status		Read- Only	Yes
	5	L-Tx3 Bias High Warning	status		Read- Only	Yes
	4	L-Tx3 Bias Low Warning	status		Read- Only	Yes
	3	L-Tx4 Bias High Alarm	status		Read- Only	Yes
	2	L-Tx4 Bias Low Alarm	status		Read- Only	Yes
	1	L-Tx4 Bias High Warning	status		Read- Only	Yes
	0	L-Tx4 Bias Low Warning	status		Read- Only	Yes
13	7	L-Tx1 Power High Alarm	status	status	Read- Only	Yes
	6	L-Tx1 Power Low Alarm	status		Read- Only	Yes
	5	L-Tx1 Power High Warning	status		Read- Only	Yes
	4	L-Tx1 Power Low Warning	status		Read- Only	Yes
	3	L-Tx2 Power High Alarm	status		Read- Only	Yes
	2	L-Tx2 Power Low Alarm	status		Read- Only	Yes
	1	L-Tx2 Power High Warning	status		Read- Only	Yes
	0	L-Tx2 Power Low Warning	status		Read- Only	Yes
14	7	L-Tx3 Power High Alarm	status	status	Read- Only	Yes
	6	L-Tx3 Power Low Alarm	status		Read- Only	Yes
	5	L-Tx3 Power High Warning	status		Read- Only	Yes
	4	L-Tx3 Power Low Warning	status		Read- Only	Yes
	3	L-Tx4 Power High Alarm	status		Read- Only	Yes
	2	L-Tx4 Power Low Alarm	status		Read- Only	Yes
	1	L-Tx4 Power High Warning	status		Read- Only	Yes
	0	L-Tx4 Power Low Warning	status		Read- Only	Yes
15-16	All	Reserved				
17-18	All	Reserved				
19-21	All	Vendor Specific				
22	7-0	Temperature MSB	status	status	Read- Only	Yes
23	7-0	Temperature LSB	status	status	Read- Only	Yes
24-25	All	Reserved				
26	7-0	Supply Voltage MSB	status	status	Read- Only	Yes
27	7-0	Supply Voltage LSB	status	status	Read- Only	Yes
28-29	All	Reserved				
30-33	All	Vendor Specific				
34	7-0	Rx1 Power MSB	status	status	Read- Only	Yes

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Address		Name	Bits Value	Byte Value	Read-Only /Read/Write	Support
Byte	Bit					
35	7-0	Rx1 Power LSB	status	status	Read- Only	Yes
36	7-0	Rx2 Power MSB	status	status	Read- Only	Yes
37	7-0	Rx2 Power LSB	status	status	Read- Only	Yes
38	7-0	Rx3 Power MSB	status	status	Read- Only	Yes
39	7-0	Rx3 Power LSB	status	status	Read- Only	Yes
40	7-0	Rx4 Power MSB	status	status	Read- Only	Yes
41	7-0	Rx4 Power LSB	status	status	Read- Only	Yes
42	7-0	Tx1 Bias MSB	status	status	Read- Only	Yes
43	7-0	Tx1 Bias LSB	status	status	Read- Only	Yes
44	7-0	Tx2 Bias MSB	status	status	Read- Only	Yes
45	7-0	Tx2 Bias LSB	status	status	Read- Only	Yes
46	7-0	Tx3 Bias MSB	status	status	Read- Only	Yes
47	7-0	Tx3 Bias LSB	status	status	Read- Only	Yes
48	7-0	Tx4 Bias MSB	status	status	Read- Only	Yes
49	7-0	Tx4 Bias LSB	status	status	Read- Only	Yes
50	7-0	Tx1 Power MSB	status	status	Read- Only	Yes
51	7-0	Tx1 Power LSB	status	status	Read- Only	Yes
52	7-0	Tx2 Power MSB	status	status	Read- Only	Yes
53	7-0	Tx2 Power LSB	status	status	Read- Only	Yes
54	7-0	Tx3 Power MSB	status	status	Read- Only	Yes
55	7-0	Tx3 Power LSB	status	status	Read- Only	Yes
56	7-0	Tx4 Power MSB	status	status	Read- Only	Yes
57	7-0	Tx4 Power LSB	status	status	Read- Only	Yes
58-65		Reserved channel monitor set 4				
66-73		Reserved channel monitor set 5				
74-81		Vendor Specific				
82-85		Reserved		00h		
86	7-4	Reserved		00h		
	3	Tx4 Disable	0b		Read/Write	Yes
	2	Tx3 Disable	0b		Read/Write	Yes
	1	Tx2 Disable	0b		Read/Write	Yes
	0	Tx1 Disable	0b		Read/Write	Yes

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Address		Name	Bits Value	Byte Value	Read-Only /Read/Write	Support
Byte	Bit					
87	7	Rx4_Rate_select	0b	03h	Read/Write	No
	6	Rx4_Rate_select	0b		Read/Write	No
	5	Rx3_Rate_select	0b		Read/Write	No
	4	Rx3_Rate_select	0b		Read/Write	No
	3	Rx2_Rate_select	0b		Read/Write	No
	2	Rx2_Rate_select	0b		Read/Write	No
	1	Rx1_Rate_select	1b		Read/Write	Yes
	0	Rx1_Rate_select	1b		Read/Write	Yes
88	7	Tx4_Rate_select	0b	00h	Read/Write	No
	6	Tx4_Rate_select	0b		Read/Write	No
	5	Tx3_Rate_select	0b		Read/Write	No
	4	Tx3_Rate_select	0b		Read/Write	No
	3	Tx2_Rate_select	0b		Read/Write	No
	2	Tx2_Rate_select	0b		Read/Write	No
	1	Tx1_Rate_select	0b		Read/Write	No
	0	Tx1_Rate_select	0b		Read/Write	No
89-92	All	Reserved		00h		
93	7	SW Reset	0b	00h	Read/Write	Yes
	6-4	Reserved				
	3	High Power Class Enable (Class 8)	0b		Read/Write	No
	2	High Power Class Enable (Class 5-7)	0b		Read/Write	No
	1	Power set	0b		Read/Write	Yes
	0	Power override	0b		Read/Write	Yes
94-97	All	Reserved		00h		
98	7	Tx4_CDR_control	1b	FFh	Read/Write	No
	6	Tx3_CDR_control	1b		Read/Write	No
	5	Tx2_CDR_control	1b		Read/Write	No
	4	Tx1_CDR_control	1b		Read/Write	No
	3	Rx4_CDR_control	1b		Read/Write	No
	2	Rx3_CDR_control	1b		Read/Write	No
	1	Rx2_CDR_control	1b		Read/Write	No
	0	Rx1_CDR_control	1b		Read/Write	No

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Address		Name	Bits Value	Byte Value	Read-Only /Read/Write	Support
Byte	Bit					
99	7-2	Reserved		00h		
	1	LP/TxDis ctrl	0b	00h	Read/Write	LP only
	0	IntL/LOSL ctrl	0b		Read/Write	IntL only
100	7	M -Tx4 LOS Mask	0b	00h	Read/Write	Yes
	6	M -Tx3 LOS Mask	0b		Read/Write	Yes
	5	M -Tx2 LOS Mask	0b		Read/Write	Yes
	4	M -Tx1 LOS Mask	0b		Read/Write	Yes
	3	M -Rx4 LOS Mask	0b		Read/Write	Yes
	2	M -Rx3 LOS Mask	0b		Read/Write	Yes
	1	M -Rx2 LOS Mask	0b		Read/Write	Yes
	0	M -Rx1 LOS Mask	0b		Read/Write	Yes
101	7	M-Tx4 Adapt EQ Fault Mask		00h	Read/Write	Yes
	6	M-Tx3 Adapt EQ Fault Mask			Read/Write	Yes
	5	M-Tx2 Adapt EQ Fault Mask			Read/Write	Yes
	4	M-Tx1 Adapt EQ Fault Mask			Read/Write	Yes
	3	M-Tx4 Transmitter Fault Mask			Read/Write	Yes
	2	M-Tx3 Transmitter Fault Mask			Read/Write	Yes
	1	M-Tx2 Transmitter Fault Mask			Read/Write	Yes
	0	M-Tx1 Transmitter Fault Mask			Read/Write	Yes
102	7	M-Tx4 CDR LOL Mask		00h	Read/Write	Yes
	6	M-Tx3 CDR LOL Mask			Read/Write	Yes
	5	M-Tx2 CDR LOL Mask			Read/Write	Yes
	4	M-Tx1 CDR LOL Mask			Read/Write	Yes
	3	M-Rx4 CDR LOL Mask			Read/Write	Yes
	2	M-Rx3 CDR LOL Mask			Read/Write	Yes
	1	M-Rx2 CDR LOL Mask			Read/Write	Yes
	0	M-Rx1 CDR LOL Mask			Read/Write	Yes
103	7	M-Temp High Alarm		00h	Read/Write	Yes
	6	M -Temp Low Alarm			Read/Write	Yes
	5	M-Temp High Warning			Read/Write	Yes
	4	M-Temp Low Warning			Read/Write	Yes
	3-2	Reserved				
	1	M-TC readiness flag			Read/Write	No
	0	Reserved				

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Address		Name	Bits Value	Byte Value	Read-Only /Read/Write	Support
Byte	Bit					
104	7	M-Vcc High Alarm		00h	Read/Write	Yes
	6	M-Vcc Low Alarm			Read/Write	Yes
	5	M-Vcc High Warning			Read/Write	Yes
	4	M-Vcc Low Warning			Read/Write	Yes
	3-0	Reserved				
105-106	All	Vendor Specific		00h	Read/Write	
107	7-0	Max Power Consumption		28h	Read/Write	Yes
108	7-0	Propagation Delay MSB		00h	Read/Write	Yes
109	7-0	Propagation Delay LSB		02h	Read/Write	Yes
110	7-4	Advanced Low Power Mode		30h	Read/Write	Yes
	3	Far Side Managed			Read/Write	Yes
	2-0	Min Operating Voltage			Read/Write	Yes
111-112	All	Assigned for use by PCI Express			Read/Write	No
113	7	Reserved		00h		
	6-4	Far-End Implementation			Read/Write	Yes
	3-0	Near -End Implementation			Read/Write	Yes
114	7-4	Tx_TurnOn MaxDuration		00h	Read/Write	Yes
	3-0	DatapathInit MaxDuration			Read/Write	Yes
115	7-5	ModeSelL wait time exponent		34h	Read/Write	Yes
	4-0	ModSelL wait time mantissa			Read/Write	Yes
116	7-0	Secondary Extended Spec Compliance		00h	Read/Write	Yes
117-118	All	Reserved		00h		
119-122	7-0	Password Change Entry Area		00001011h	Read/Write	Yes
123-126	7-0	Password Entry Area		00000000h	Read/Write	Yes
127	7-0	Page Select Byte		00h	Read/Write	Yes
128	7-0	Identifier	-	11h	Read- Only	Yes
129	7-0	Ext. Identifier	-	CCh	Read- Only	Yes
130	7-0	Connector Type	-	07h	Read- Only	Yes
131	7-0	Specification compliance	-	80h	Read- Only	Yes
132	7-0		-	00h	Read- Only	Yes
133	7-0		-	00h	Read- Only	Yes
134	7-0		-	00h	Read- Only	Yes
135	7-0		-	00h	Read- Only	Yes

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Address		Name	Bits Value	Byte Value	Read-Only /Read/Write	Support
Byte	Bit					
136	7-0	Specification compliance	-	00h	Read- Only	Yes
137	7-0		-	00h	Read- Only	Yes
138	7-0		-	00h	Read- Only	Yes
139	7-0	Encoding	-	05h	Read- Only	Yes
140	7-0	Singaling rate, nominal	-	FFh	Read- Only	Yes
141	7-0	Extended Rate Select Compliance	-	02h	Read- Only	Yes
142	7-0	Length (SMF)	-	00h	Read- Only	Yes
143	7-0	Length (OM3 50 um)	-	23h	Read- Only	Yes
144	7-0	Length (OM2 50 um)	-	00h	Read- Only	Yes
145	7-0	Length (OM1 62.5 um) or Copper Cable Attenuation	-	00h	Read- Only	Yes
146	7-0	Length (passive copper or active cable or OM4 50 um)	-	32h	Read- Only	Yes
147	7-0	Device technology	-	00h	Read- Only	Yes
148	7-0	Vendor name	C	43h	Read- Only	Yes
149	7-0		C	43h	Read- Only	Yes
150	7-0		L	4Ch	Read- Only	Yes
151	7-0		O	4Fh	Read- Only	Yes
152	7-0		U	4Fh	Read- Only	Yes
153	7-0		D	55h	Read- Only	Yes
154	7-0			44h	Read- Only	Yes
155	7-0			20h	Read- Only	Yes
156	7-0			20h	Read- Only	Yes
157	7-0			20h	Read- Only	Yes
158	7-0			20h	Read- Only	Yes
159	7-0			20h	Read- Only	Yes
160	7-0			20h	Read- Only	Yes
161	7-0			20h	Read- Only	Yes
162	7-0			20h	Read- Only	Yes
163	7-0			20h	Read- Only	Yes

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Address		Name	Bits Value	Byte Value	Read-Only /Read/Write	Support
Byte	Bit					
164	7-0	Extender Module	-	00h	Read-Only	Yes
165	7-0	Vendor OUI	-	00h	Read-Only	Yes
166	7-0		-	00h	Read-Only	Yes
167	7-0		-	00h	Read-Only	Yes
168	7-0	Vendor PN	C	43h	Read-Only	Yes
169	7-0		C	43h	Read-Only	Yes
170	7-0		-	2Dh	Read-Only	Yes
171	7-0		Q	51h	Read-Only	Yes
172	7-0		K	4Bh	Read-Only	Yes
173	7-0		K	4Bh	Read-Only	Yes
174	7-0		1	31h	Read-Only	Yes
175	7-0		1	31h	Read-Only	Yes
176	7-0		S	53h	Read-Only	Yes
177	7-0		C	43h	Read-Only	Yes
178	7-0		-	2Dh	Read-Only	Yes
179	7-0		S	53h	Read-Only	Yes
180	7-0		D	44h	Read-Only	Yes
181	7-0			20h	Read-Only	Yes
182	7-0			20h	Read-Only	Yes
183	7-0			20h	Read-Only	Yes
184	7-0	Vendor rev	1	31h	Read-Only	Yes
185	7-0		1	31h	Read-Only	Yes
186	7-0	Wavelength or Copper Cable Attenuation	-	42h	Read-Only	Yes
187	7-0		-	68h	Read-Only	Yes
188	7-0	Wavelength tolerance or Copper Cable Attenuation	-	0Ah	Read-Only	Yes
189	7-0		-	F0h	Read-Only	Yes
190	7-0	Max case temp.	-	46h	Read-Only	Yes
191	7-0	CC_BASE	-	Check Sum	Read-Only	Yes
192	7-0	Link codes	-	21h	Read-Only	Yes
193	7-0	Options	-	0Bh	Read-Only	Yes
194	7-0		-	35h	Read-Only	Yes
195	7-0		-	BAh	Read-Only	Yes
196-211	All	Vendor SN	-	20h	Read-Only	Yes
212-219	All	Date Code	-	20h	Read-Only	Yes
220	7-0	Diagnostic Monitoring Type	-	3Ch	Read-Only	Yes
221	7-0	Enhanced Options	-	19h	Read-Only	Yes
222	7-0	Baud Rate, nominal	-	67h	Read-Only	Yes
223	7-0	CC_EXT	-	Check	Read-Only	Yes
224-255	All	Vendor Specific	-	00h	Read-Only	

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I2C Memory Map (Based on SFF8636 2.10a) Page02						
Address		Name	Bits Value	Byte Value	Read-Only /Read/Write	Support
Byte	Bit					
128-255	7-0	User EEPROM	00000000b	00h	Read/Write	Yes

I2C Memory Map (Based on SFF8636 2.10a) Page03						
Address		Name	Bits Value	Byte Value	Read-Only /Read/Write	Support
Byte	Bit					
128-129	All	Temp High Alarm	-	50h 00h	Read-Only	Yes
130-131	All	Temp Low Alarm	-	F6h 00h	Read-Only	Yes
132-133	All	Temp High Warning	-	46h 00h	Read-Only	Yes
134-135	All	Temp Low Warning	-	00h 00h	Read-Only	Yes
136-143	All	Reserved	-		Read-Only	
144-145	All	Vcc High Alarm	-	8Dh CCh	Read-Only	Yes
146-147	All	Vcc Low Alarm	-	74h 04h	Read-Only	Yes
148-149	All	Vcc High Warning	-	87h 5Ah	Read-Only	Yes
150-151	All	Vcc LowWarning	-	7Ah 76h	Read-Only	Yes
152-159	All	Reserved	-		Read-Only	
160-175	All	Vendor Specific	-		Read-Only	
176-177	All	Rx Power High Alarm	-	C3h C7h	Read-Only	Yes
178-179	All	Rx Power Low Alarm	-	02h F7h	Read-Only	Yes
180-181	All	Rx Power High Warning	-	62h 1Fh	Read-Only	Yes
182-183	All	Rx Power Low Warning	-	05h EAh	Read-Only	Yes
184-185	All	Tx Bias High Alarm	-	17h 70h	Read-Only	Yes
186-187	All	Tx Bias Low Alarm	-	00h 00h	Read-Only	Yes
188-189	All	Tx Bias High Warning	-	13h 88h	Read-Only	Yes
190-191	All	Tx Bias Low Warning	-	00h 00h	Read-Only	Yes
192-193	All	Tx Power High Alarm	-	C3h C7h	Read-Only	Yes
194-195	All	Tx Power Low Alarm	-	07h 1Ch	Read-Only	Yes
196-197	All	Tx Power High Warning	-	62h 1Fh	Read-Only	Yes
198-199	All	Tx Power Low Warning	-	0Eh 2Fh	Read-Only	Yes
200-207	All	Reserved	-		Read-Only	
208-215	All	Reserved	-		Read-Only	
216-223	All	Vendor Specific	-		Read-Only	

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Address		Name	Bits Value	Byte Value	Read-Only /Read/Write	Support
Byte	Bit					
224	7-4	Max Tx Input equalization	0000b	0Fh	Read- Only	Yes
	3-0	Max Rx output emphasis	1111b		Read- Only	Yes
225	7-6	Reserved	0b	0Fh	Read- Only	Yes
	5-4	Rx output emphasis	0b		Read- Only	Yes
	3	Rx output amplitude support	1b		Read- Only	Yes
	2		1b		Read- Only	Yes
	1		1b		Read- Only	Yes
	0		1b		Read- Only	Yes
226	All	Reserved	-		Read- Only	
227	7	Controllable Host-Side FEC support	0b	08h	Read- Only	Yes
	6	Controllable Media-Side FEC support	0b		Read- Only	Yes
	5-4	Reserved	0b		Read- Only	Yes
	3	Tx Force Squelch Implemented	1b		Read- Only	Yes
	2	RXLOSL Fast Mode	0b		Read- Only	Yes
	1	TxDis Fast Mode Supported	0b		Read- Only	Yes
	0	Reserved	0b		Read- Only	Yes
228	All	Maximum TC stablization time	-	00h	Read- Only	Yes
229	All	Maximum CTLE settling time	-	00h	Read- Only	Yes
230	7	Host-Side FEC enable	0b	00h	Read/Write	No
	6	Media -Side FEC enable	0b		Read/Write	No
	5-0	Reserved				No
231	7-4	Reserved		00h		
	3	Tx4 Force Squelch	0b		Read/Write	Yes
	2	Tx3 Force Squelch	0b		Read/Write	Yes
	1	Tx2 Force Squelch	0b		Read/Write	Yes
	0	Tx1 Force Squelch	0b		Read/Write	Yes
232	7-0	Reserved				
233	7-4	Reserved		00h		No
	3	Tx1AEFreeze	0b		Read/Write	No
	2	Tx2AEFreeze	0b		Read/Write	No
	1	Tx3AEFreeze	0b		Read/Write	No
	0	Tx4AEFreeze	0b		Read/Write	No
234	7-4	Tx1 input equalizer control		00h	Read/Write	No
	3-0	Tx2 input equalizer control			Read/Write	No
235	7-6	Tx3 input equalizer control		00h	Read/Write	No
	5-4	Tx4 input equalizer control			Read/Write	No
236	7-4	Rx1 output emphasis control		00h	Read/Write	Yes
	3-0	Rx2 output emphasis control			Read/Write	Yes

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Address		Name	Bits Value	Byte Value	Read-Only /Read/Write	Support
Byte	Bit					
237	7-6	Rx3 output emphasis control		00h	Read/Write	Yes
	5-4	Rx4 output emphasis control			Read/Write	Yes
238	7-4	Rx1 output amplitude control		00h	Read/Write	Yes
	3-0	Rx2 output amplitude control			Read/Write	Yes
239	7-6	Rx3 output amplitude control		00h	Read/Write	Yes
	5-4	Rx4 output amplitude control			Read/Write	Yes
240	7	Rx4 SQ Disable (squelch disable)		00h	Read/Write	Yes
	6	Rx3 SQ Disable (squelch disable)			Read/Write	Yes
	5	Rx2 SQ Disable (squelch disable)			Read/Write	Yes
	4	Rx1 SQ Disable (squelch disable)			Read/Write	Yes
	3	Tx4 SQ Disable (squelch disable)			Read/Write	No
	2	Tx3 SQ Disable (squelch disable)			Read/Write	No
	1	Tx2 SQ Disable (squelch disable)			Read/Write	No
	0	Tx1 SQ Disable (squelch disable)			Read/Write	No
241	7	Rx4 Output Disable		0Fh	Read/Write	Yes
	6	Rx3 Output Disable			Read/Write	Yes
	5	Rx2 Output Disable			Read/Write	Yes
	4	Rx1 Output Disable			Read/Write	Yes
	3	Tx4 adaptive equalization control	1b		Read/Write	No
	2	Tx3 adaptive equalization control	1b		Read/Write	No
	1	Tx2 adaptive equalization control	1b		Read/Write	No
	0	Tx1 adaptive equalization control	1b		Read/Write	No
242	7	M-Rx1 Power High Alarm		00h	Read/Write	Yes
	6	M-Rx1 Power Low Alarm			Read/Write	Yes
	5	M-Rx1 Power High Warning			Read/Write	Yes
	4	M-Rx1 Power Low Warning			Read/Write	Yes
	3	M-Rx2 Power High Alarm			Read/Write	Yes
	2	M-Rx2 Power Low Alarm			Read/Write	Yes
	1	M-Rx2 Power High Warning			Read/Write	Yes
	0	M-Rx2 Power Low Warning			Read/Write	Yes
243	7	M-Rx3 Power High Alarm		00h	Read/Write	Yes
	6	M-Rx3 Power Low Alarm			Read/Write	Yes
	5	M-Rx3 Power High Warning			Read/Write	Yes
	4	M-Rx3 Power Low Warning			Read/Write	Yes
	3	M-Rx4 Power High Alarm			Read/Write	Yes
	2	M-Rx4 Power Low Alarm			Read/Write	Yes
	1	M-Rx4 Power High Warning			Read/Write	Yes
	0	M-Rx4 Power Low Warning			Read/Write	Yes

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Address		Name	Bits Value	Byte Value	Read-Only /Read/Write	Support
Byte	Bit					
244	7	M-Tx1 Bias High Alarm		00h	Read/Write	Yes
	6	M-Tx1 Bias Low Alarm			Read/Write	Yes
	5	M-Tx1 Bias High Warning			Read/Write	Yes
	4	M-Tx1 Bias Low Warning			Read/Write	Yes
	3	M-Tx2 Bias High Alarm			Read/Write	Yes
	2	M-Tx2 Bias Low Alarm			Read/Write	Yes
	1	M-Tx2 Bias High Warning			Read/Write	Yes
	0	M-Tx2 Bias Low Warning			Read/Write	Yes
245	7	M-Tx3 Bias High Alarm		00h	Read/Write	Yes
	6	M-Tx3 Bias Low Alarm			Read/Write	Yes
	5	M-Tx3 Bias High Warning			Read/Write	Yes
	4	M-Tx3 Bias Low Warning			Read/Write	Yes
	3	M-Tx4 Bias High Alarm			Read/Write	Yes
	2	M-Tx4 Bias Low Alarm			Read/Write	Yes
	1	M-Tx4 Bias High Warning			Read/Write	Yes
	0	M-Tx4 Bias Low Warning			Read/Write	Yes
246	7	M-Tx1 Power High Alarm		00h	Read/Write	Yes
	6	M-Tx1 Power Low Alarm			Read/Write	Yes
	5	M-Tx1 Power High Warning			Read/Write	Yes
	4	M-Tx1 Power Low Warning			Read/Write	Yes
	3	M-Tx2 Power High Alarm			Read/Write	Yes
	2	M-Tx2 Power Low Alarm			Read/Write	Yes
	1	M-Tx2 Power High Warning			Read/Write	Yes
	0	M-Tx2 Power Low Warning			Read/Write	Yes
247	7	M-Tx3 Power High Alarm		00h	Read/Write	Yes
	6	M-Tx3 Power Low Alarm			Read/Write	Yes
	5	M-Tx3 Power High Warning			Read/Write	Yes
	4	M-Tx3 Power Low Warning			Read/Write	Yes
	3	M-Tx4 Power High Alarm			Read/Write	Yes
	2	M-Tx4 Power Low Alarm			Read/Write	Yes
	1	M-Tx4 Power High Warning			Read/Write	Yes
	0	M-Tx4 Power Low Warning			Read/Write	Yes
248-249	All	Reserved				
250-251	All	Reserved				
252-255	All	Reserved				

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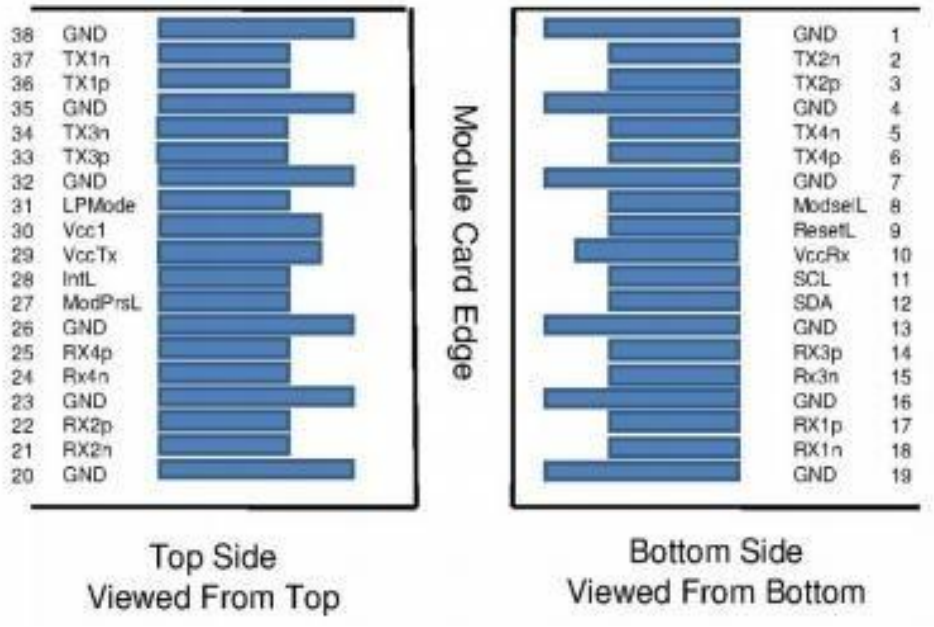
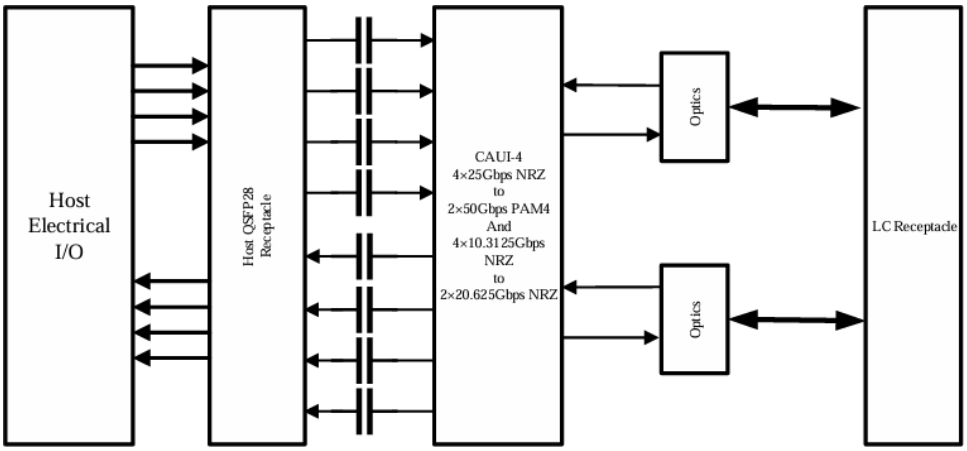
Pin As



Block Diagram



Optical interface instruction

λ1	844-863nm	T1,R1
λ2	900-918nm	T2,R2

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Pin Description

Pin	Symbol	Description	Notes
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	RetsetL	Module Reset	
10	V Rx	Receiver +3.3V DC Power Supply	
11	SCL	I2C Serial Clock	
12	SDA	I2C Serial Data	
13	GND	Ground	
14	Rx3p	Receiver Non Inverted Differential Output	
15	Rx3n	Receiver Inverted Differential Output	
16	GND	Ground	
17	Rx1p	Receiver Non Inverted Differential Output	
18	Rx1n	Receiver Inverted Differential Output	
19	GND	Ground	
20	GND	Ground	
21	Rx2n	Receiver Inverted Differential Output	
22	Rx2p	Receiver Non Inverted Differential Output	
23	GND	Ground	
24	Rx4n	Receiver Inverted Differential Output	
25	Rx4p	Receiver Non Inverted Differential Output	
26	GND	Ground	
27	ModPrsL	Module Present	
28	IntL	Interrupt	
29	VCC Tx	Transmitter +3.3V DC Power Supply	
30	VCC1	+3.3V DC Power Supply	
31	LPMod	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	

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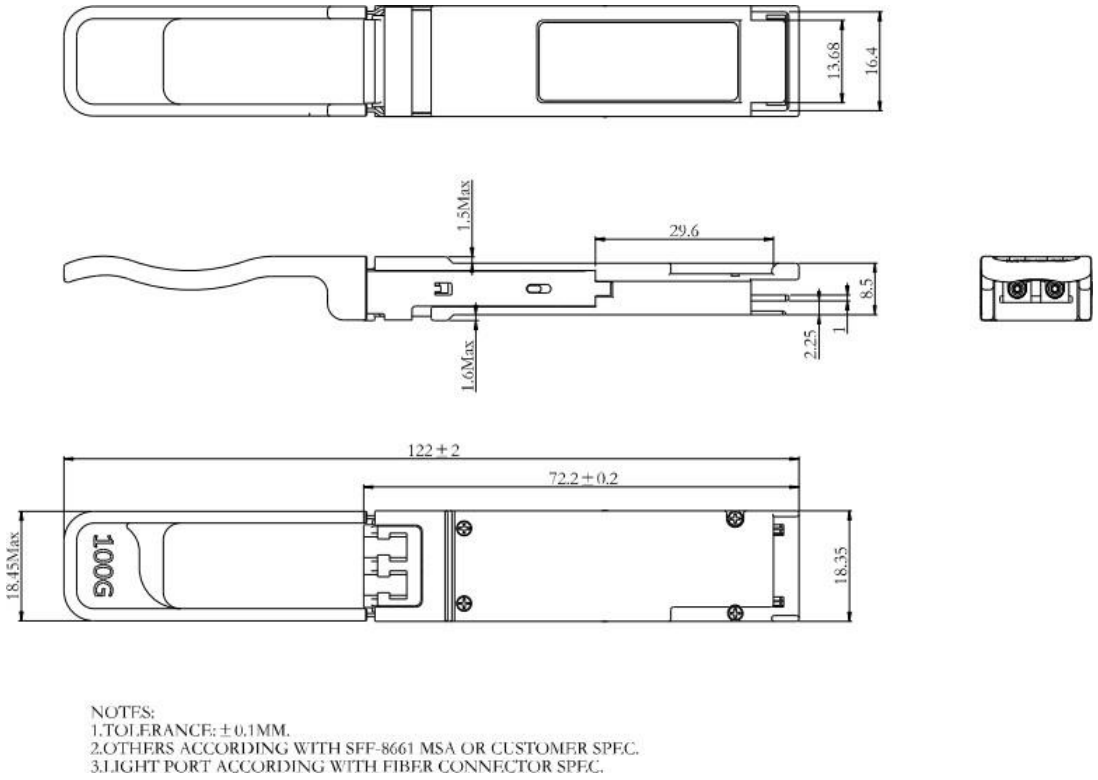
Outline Dimensions



NOTES:
1.TOLERANCE: ±0.1MM.
2.OTHERS ACCORDING WITH SFF-8661 MSA OR CUSTOMER SPEC.
3.LIGHT PORT ACCORDING WITH FIBER CONNECTOR SPEC.

Digital Diagnostic Monitor Accuracy

Parameter	Accuracy	Unit
Internally measured transceiver temperature	+/-3	deg.C
Internally measured transceiver supply voltage	+/-3	%
Measured Tx bias current	+/-10	%
Measured Tx output power	+/-3	dB
Measured Rx received average optical power	+/-3	dB

Appendix A Document Revision

Version No.	Date	Description
V1.0	2024-01-25	First released
V1.1	2024-02-21	Added ： The mode Select description （Page3-16）