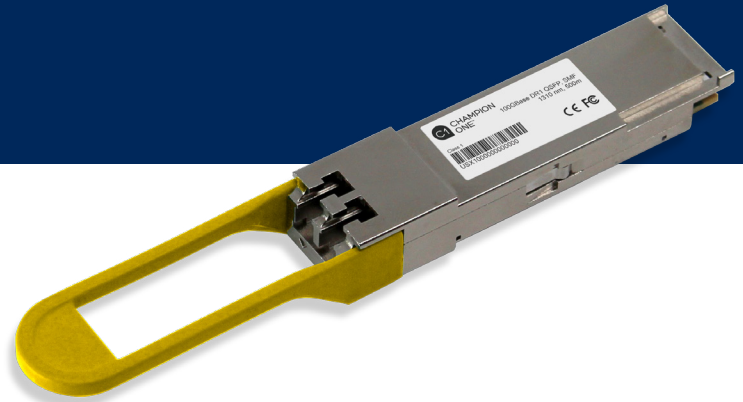


JNP-QSFP-100G-DR

100GBASE, QSFP28, DR1, SMF TRANCEIVER
1310nm, 500m REACH, DUPLEX LC CONNECTOR



Features

- Compliant with QSFP28 Standard SFF-8636 Rev 2.9
- Compliant with IEEE 802.3cd 100GBASE-DR
- High speed I/O electrical interface (CAUI-4)
- Single 3.3V Supply Voltage
- Maximum power consumption 4.3W
- 0-70 °C Case Operating Temperature
- 1310nm EML laser and PIN Receiver Array
- QSFP28 MSA package with duplex LC connector
- Two Wire Serial Interface with Digital Diagnostic Monitoring
- Complies with EU Directive 2011/65/EU (RoHS compliant)
- Class 1 Laser Product

1. Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit
Storage Temperature	TS	-40	-	+85	°C
Supply Voltage	VCC	-0.3	-	3.6	V
Relative Humidity (non-condensing)	RH	5	-	95	%
Data Input Voltage – Differential	IVDIP-VDINI	-	-	1.0	V
Control Input Voltage	VI	-0.3	-	Vcc+0.5	V
Control Output Current	IO	-20	-	20	mA

2. Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Operating Case Temperature	TOPR	0	-	70	°C	
Power Supply Voltage	VCC	3.135	3.3	3.465	V	
Instantaneous peak current at hot plug	ICC_IP	-	-	1800	mA	
Sustained peak current at hot plug	ICC_SP	-	-	1485	mA	
Maximum Power Dissipation	PD	-	-	4.3	W	

JNP-QSFP-100G-DR

100GBASE, QSFP28, DR1, SMF TRANCEIVER
1310nm, 500m REACH, DUPLEX LC CONNECTOR

Maximum Power Dissipation, Low Power Mode	PDLP	-	-	1.5	W	
Signalling Rate	SR	-	53.125	-	GBd	
Control Input Voltage High	VIH	VCC*0.7	-	VCC+0.3	V	
Control Input Voltage Low	VIL	-0.3	-	VCC*0.3	V	
Two Wire Serial Interface Clock Rate	-	-	-	400	kHz	
Power Supply Noise	-	-	-	66	mVpp	10Hz -10MHz
Rx Differential Data Output Load	-	-	100	-	ohms	
Operating Distance	-	2	-	500	m	

3. Transmitter Optical Specifications

Parameter	Symbol	Min.	Typical	Max.	Unit
Wavelength	λC	1304.5	1311	1317.5	nm
Side mode suppression ratio	SMSR	30	-	-	dB
Average Optical Launch Power	POUT	-2.9	-	4	dBm
Average Launch Power Tx_Off	POUT_OFF	-	-	-15	dBm
Extinction Ratio	ER	3.5	-	-	dB
Outer Optical Modulation Amplitude	OMAouter	-0.8	-	4.2	dBm
Launch Power in OMAouter minus TDECQ for ER \geq 5dB	OMAouter-TDECQ	-2.2	-	-	dBm
Launch Power in OMAouter minus TDECQ for ER < 5dB	OMAouter-TDECQ	-1.9	-	-	dBm
Transmitter and dispersion eye closure	TDECQ	-	-	3.4	dB
TDECQ-10log10(Ceq)		-	-	3.4	dB
Transmitter transition time	TTx	-	-	17	ps
RIN15.5OMA	RIN	-	-	-136	dB/Hz
Optical return loss tolerance	ORLT	-	-	15.5	dB
Transmitter reflectance	TR	-	-	-26	dB

JNP-QSFP-100G-DR

100GBASE, QSFP28, DR1, SMF TRANCEIVER
1310nm, 500m REACH, DUPLEX LC CONNECTOR

4. Receiver Optical Specifications

Parameter	Symbol	Min.	Typical	Max.	Unit
Wavelength	λ_C	1304.5	1311	1317.5	nm
Damage Threshold		5	-	-	dBm
Average receive power		-5.9	-	4	dBm
Receive power (OMA _{outer})	RP	-	-	4.2	dBm
Receiver reflectance	RR	-	-	-26	dB
Receiver sensitivity (OMA _{outer})	RS	max (-3.9, SECQ-5.3)			dBm
Stressed receiver sensitivity	SRS	-	-	-1.9	dBm
Stressed Receiver Sensitivity Test Conditions:					
Stressed eye closure for PAM4 (SECQ)	SECQ	-	-	3.4	dB
SECQ-10log ₁₀ (C _{eq})	-	-	-	3.4	dB

5. Electrical Specifications

Low-Speed Signal: Compliant to SFF-8679

High-Speed Signal: Compliant to CAUI-4 (IEEE 802.3-2018)

Transmitter (Module Input)						
Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Differential Data Input Amplitude	V _{IN,P-P}	95	-	900	mVpp	Note 1
Differential Termination Mismatch		-	-	10	%	
LPMode, Reset and ModSelL	V _{IL}	-0.3	-	V _{CC} *0.3	V	
	V _{IH}	V _{CC} *0.7	-	V _{CC} +0.3	V	
Receiver (Module Output)						
Differential Data Output Amplitude	V _{OUT,P-P}	250	-	900	mVpp	Note 1
Differential Termination Mismatch		-	-	10	%	
Output Rise/Fall Time, 20%~80%	T _R	9.5	-	-	ps	
ModPrsL and IntL	V _{OL}	0	-	0.4	V	IOL=4mA
	V _{OH}	V _{CC} -0.5	-	V _{CC} +0.3	V	IOL=-4mA

Note 1: Amplitude customization beyond these specs is dependent on validation in customer system

JNP-QSFP-100G-DR

100GBASE, QSFP28, DR1, SMF TRANCEIVER
1310nm, 500m REACH, DUPLEX LC CONNECTOR

6. Timing for QSFP28 Soft Control and Status Functions

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Initialization Time	t_init	-	-	10	s	Note 1
Reset Init Assert Time	t_reset_init	-	-	2	µs	
Serial Bus Hardware Ready Time	t_serial	-	-	2000	ms	
Monitor Data Ready Time	t_data	-	-	2000	ms	
Reset Assert Time	t_reset	-	-	10	s	Note 1
LPMODE Assert Time	ton_LP-Mode	-	-	100	µs	
LPMODE De-assert Time	toff_LP-Mode	-	-	10	s	Note 1
IntL Assert Time	ton_IntL	-	-	200	ms	
IntL Deassert Time	toff_IntL	-	-	500	µs	
Rx LOS Assert Time	ton_lol	-	-	100	ms	
Tx Fault Assert Time	ton_Txfault	-	-	200	ms	
Flag Assert Time	ton_flag	-	-	200	ms	
Mask Assert Time	ton_mask	-	-	100	ms	
Mask Deassert Time	toff_mask	-	-	100	ms	
Application or Rate Select Change Time	t_ratesel	-	-	N/A	ms	Note 2
Power_override or Power-set Assert Time	ton_Pdown	-	-	100	ms	
Power_override or Power-set De-assert Time	toff_Pdown	-	-	10	s	Note 1

Note 1: DSP limitation.

Note 2: This feature is unsupported.

7. I/O Timing for Squelch & Disable

Parameter	Symbol	Min.	Typical	Max.	Unit
Rx Squelch Assert Time	ton_Rxsq			100	ms
Rx Squelch Deassert Time	toff_Rxsq			1500	ms
Tx Squelch Assert Time	ton_Txsq			400	ms
Tx Squelch Deassert Time	toff_Txsq			400	ms
Tx Disable Assert Time	ton_txdis			100	ms

JNP-QSFP-100G-DR

100GBASE, QSFP28, DR1, SMF TRANCEIVER
1310nm, 500m REACH, DUPLEX LC CONNECTOR

Tx Disable Deassert Time	toff_txdis			400	ms
Rx Output Disable Assert Time	ton_rxdis			100	ms
Rx Output Disable Deassert Time	toff_rxdis			100	ms
Squelch Disable Assert Time	ton_sqdis			100	ms
Squelch Disable Deassert Time	toff_sqdis			100	ms

8. Digital Diagnostics

Parameter	Range	Accuracy	Unit	Calibration
Temperature	0 to 70	±3	°C	Internal
Voltage	0 to VCC	3%	V	Internal
Tx Bias Current (Each Lane)	0 to 100	10%	mA	Internal
Tx Output Power (Each Lane)	-2.9 to 4.0	±3	dB	Internal
Rx Power (Each Lane)	-5.9 to 4.0	±3	dB	Internal

9. Pin Definitions

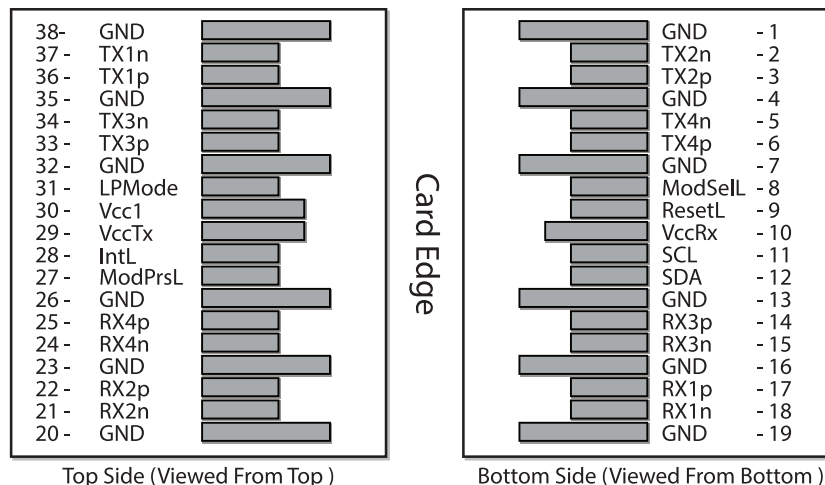
Pin	Logic	Symbol	Description	Plug Seq.	Notes
1		GND	Ground	1	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	3	
3	CML-I	Tx2p	Transmitter Non-Inverted Data Input	3	
4		GND	Ground	1	1
5	CML-I	Tx4n	Transmitter Inverted Data Input	3	
6	CML-I	Tx4p	Transmitter Non-Inverted Data Input	3	
7		GND	Ground	1	1
8	LVTTL-I	ModselL	Module Select	3	
9	LVTTL-I	ResetL	Module Reset	3	
10		Vcc Rx	+3.3V Power Supply Receiver	2	2
11	LVC MOS-I/O	SCL	2-wire serial interface clock	3	
12	LVC MOS-I/O	SDA	2-wire serial interface data	3	
13		GND	Ground	1	1
14	CML-O	Rx3p	Receiver Non-Inverted Data Output	3	
15	CML-O	Rx3n	Receiver Inverted Data Output	3	
16		GND	Ground	1	1
17	CML-O	Rx1p	Receiver Non-Inverted Data Output	3	

JNP-QSFP-100G-DR

100GBASE, QSFP28, DR1, SMF TRANCEIVER
1310nm, 500m REACH, DUPLEX LC CONNECTOR

18	CML-O	Rx1n	Receiver Inverted Data Output	3	
19		GND	Ground	1	1
20		GND	Ground	1	1
21	CML-O	Rx2n	Receiver Inverted Data Output	3	
22	CML-O	Rx2p	Receiver Non-Inverted Data Output	3	
23		GND	Ground	1	1
24	CML-O	Rx4n	Receiver Inverted Data Output	3	
25	CML-O	Rx4p	Receiver Non-Inverted Data Output	3	
26		GND	Ground	1	1
27	LVTTL-O	ModPrsL	Module Present	3	
28	LVTTL-O	IntL	Interrupt	3	
29		Vcc Tx	+3.3V Power supply transmitter	2	2
30		Vcc1	+3.3V Power supply	2	2
31	LVTTL-I	LPMODE	Low Power Mode	3	
32		GND	Ground	1	1
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input	3	
34	CML-I	Tx3n	Transmitter Inverted Data Input	3	
35		GND	Ground	1	1
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	3	
37	CML-I	Tx1n	Transmitter Inverted Data Input	3	
38		GND	Ground	1	1

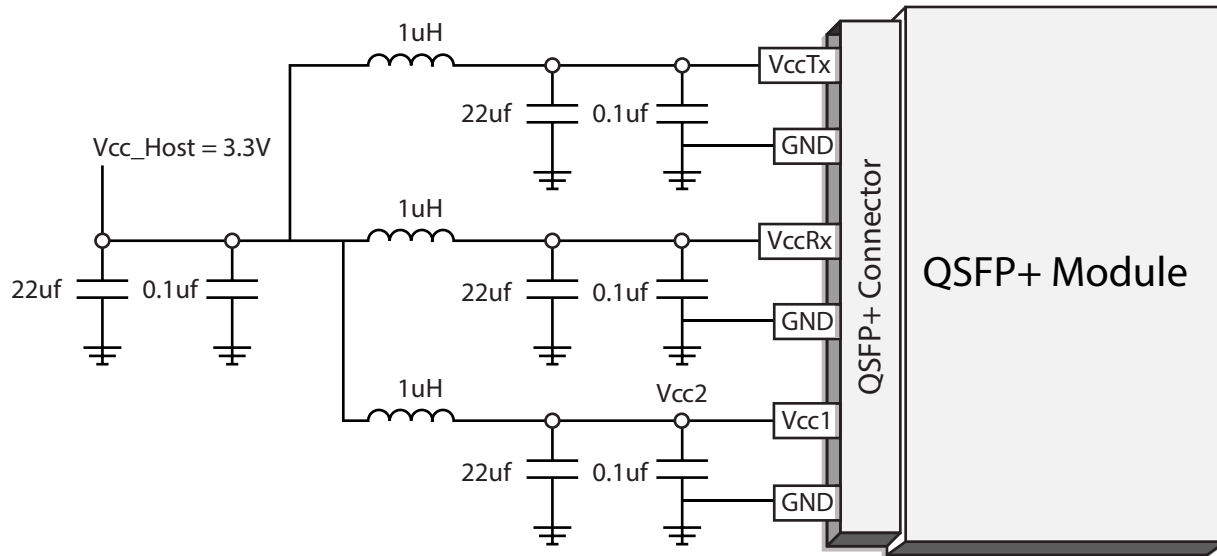
1. GND is the symbol for signal and supply (power) common for the QSFP+ module. All are common within the QSFP+ module and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal-common ground plane.
2. Vcc Rx, Vcc1 and Vcc Tx are the receiver and transmitter power supplies and shall be applied concurrently.



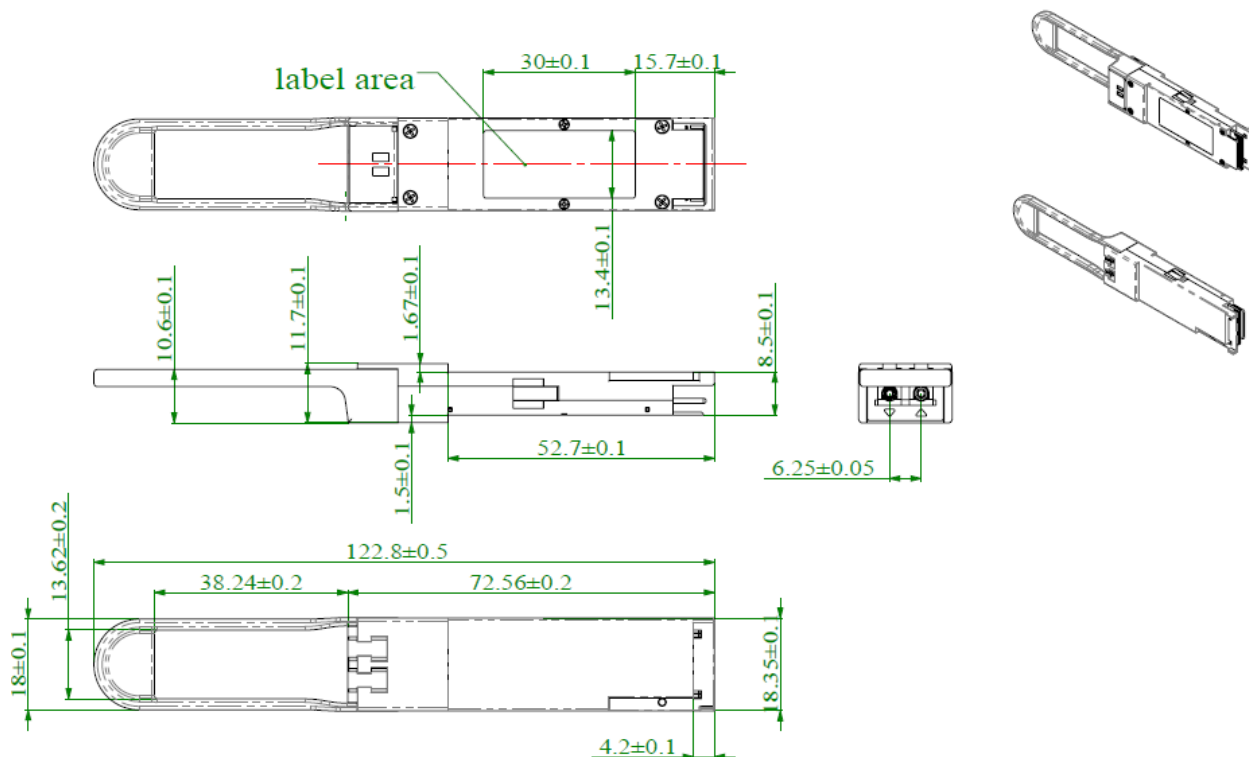
JNP-QSFP-100G-DR

100GBASE, QSFP28, DR1, SMF TRANCEIVER
1310nm, 500m REACH, DUPLEX LC CONNECTOR

10. Recommended Host Board Power Supply Filtering



11. Mechanical Diagram



JNP-QSFP-100G-DR

100GBASE, QSFP28, DR1, SMF TRANCEIVER
1310nm, 500m REACH, DUPLEX LC CONNECTOR

3. Contact Information

Cleveland

7575 East Pleasant Valley Road
Cleveland, OH 44131

Lake Forest

6 Orchard Road
Lake Forest, CA 92630

Silicon Valley

1900 Camden Avenue
San Jose, CA 95124

Champion ONE Global Headquarters

 info@championone.com

 +1.216.868.4143

 +1.216.831.2541