

QSFP28 100G 1310nm ER4C Transceiver 40km LC Duplex DDM Arista Compatible

QSFP28100G1340LCDA

QSFP28 transceiver modules are designed for use in 100 Gigabit Ethernet links over single mode fibre. They are compliant with SFF-8665, INF-8438i, IEEE 802.3bm, 100G 4WDM-40 MSA. Digital diagnostics functions are available via an I2C interface, as specified by the QSFP28 MSA.

KEY FEATURES

- Up to 30km reach for G.652 SMF without FEC
- Up to 40km reach for G.652 SMF with FEC
- Cooled 4x25Gb/s LAN WDM EML TOSA with optical MUX
- 4 x 25G Electrical Interface
- Single +3.3V power supply
- DDM function implemented
- 2 Wire Serial Interface for module management
- Maximum power dissipation < 5W
- Operating temperature range: 0 ~ 70
- Compliant with RoHS6

APPLICATIONS

- Compliant with QSFP28 Standard: SFF-8665, SFF-8636
- Compliant with 100G 4WDM-40 MSA technical specification rev 1.0
- High speed I/O electrical interface (CAUI-4) compliant with IEEE 802.3bm

PART NO.	SPECIFICATIONS									APPLICATION
	Package	Data Rate	Laser	Optical Power	Detector	Sensitivity	Temp	Reach	Other	
FLSA1C340S	QSFP28	112G	EML	-2.5 ~ 6.5dBm (each lane)	APD	-18.5dBm	0~70°C	40km	DDM	100GBASE-ER4 Lite

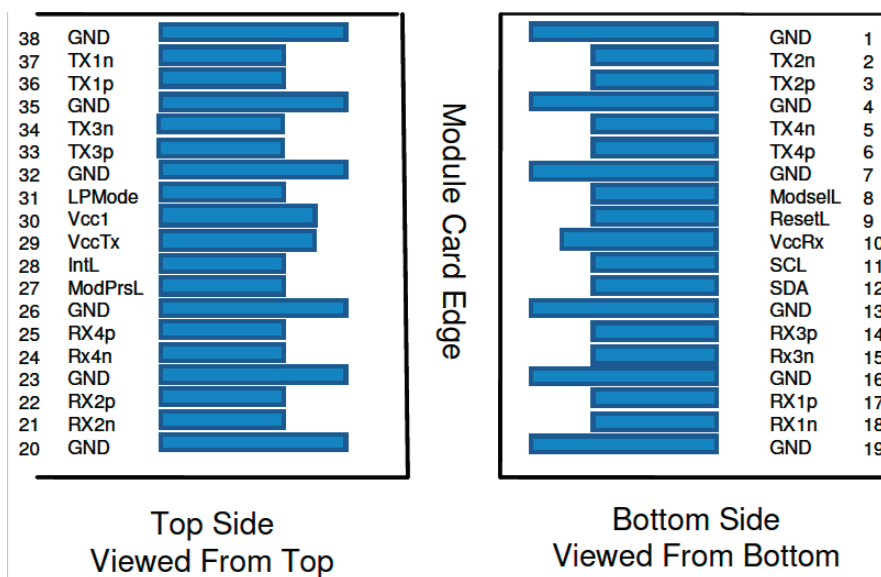


Figure 1. Pin Function Definitions

Pin Definitions

PIN	NAME	DESCRIPTION	PLUG SEQUENCE	NOTES
1	GND	Ground	1	1
2	Tx2n	Transmitter Inverted Data Input	3	
3	Tx2p	Transmitter Non-Inverted Data Input	3	
4	GND	Ground	1	1
5	Tx4n	Transmitter Inverted Data Input	3	
6	Tx4p	Transmitter Non-Inverted Data Input	3	
7	GND	Ground	1	1
8	ModSelL	Module Select	3	
9	ResetL	Module Reset	3	
10	Vcc Rx	+3.3 V Power supply receiver	2	2
11	SCL	2-wire serial interface clock	3	
12	SDA	2-wire serial interface data	3	
13	GND	Ground	1	1
14	Rx3p	Receiver Non-Inverted Data Output	3	
15	Rx3n	Receiver Inverted Data Output	3	
16	GND	Ground	1	1
17	Rx1p	Receiver Non-Inverted Data Output	3	
18	Rx1n	Receiver Inverted Data Output	3	

PIN	NAME	DESCRIPTION	PLUG SEQUENCE	NOTES
19	GND	Ground	1	1
20	GND	Ground	1	1
21	Rx2n	Receiver Inverted Data Output	3	
22	Rx2p	Receiver Non-Inverted Data Output	3	
23	GND	Ground	1	1
24	Rx4n	Receiver Inverted Data Output	3	
25	Rx4p	Receiver Non-Inverted Data Output	3	
26	GND	Ground	1	1
27	ModPrsL	Module Present	3	
28	IntL	Interrupt	3	
29	Vcc Tx	+3.3 V Power supply transmitter	2	2
30	Vcc1	+3.3 V Power Supply	2	2
31	LPMode	Low Power Mode	3	
32	GND	Ground	1	1
33	Tx3p	Transmitter Non-Inverted Data Input	3	
34	Tx3n	Transmitter Inverted Data Input	3	
35	GND	Ground	1	1
36	Tx1p	Transmitter Non-Inverted Data Input	3	
37	Tx1n	Transmitter Inverted Data Input	3	
38	GND	Ground	1	1

Notes:

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.

Absolute Maximum Ratings

PARAMETER	SYMBOL	UNIT	MIN	MAX
STORAGE TEMPERATURE RANGE	Ts	°C	-40	85
RELATIVE HUMIDITY	RH	%	5	85
MAXIMUM SUPPLY VOLTAGE	Vcc3	V	0	3.6

Recommended Operating Conditions

PARAMETER	SYMBOL	UNIT	MIN	TYP	MAX	NOTES
OPERATING CASE TEMPERATURE RANGE	T _c	°C	0	70		
POWER SUPPLY VOLTAGE	V _{cc}	V	3.135	3.3	3.465	
BIT RATE	BR	Gb/s	103.1	111.8		
OPERATING DISTANCE	L	Km			30	1
	L	Km			40	2

Notes:

1. Up to 30km reach for G.652 SMF without FEC

2. Up to 40km reach for G.652 SMF with FEC

Electric Ports Definition

PARAMETER	SYMBOL	UNIT	MIN	TYP	MAX
Supply Voltage	V _{cc}	V	3.135	3.3	3.465
Module Power		mW			5000
TRANSMITTER					
Input Differential Impedance	R _{IN}	Ω	80	100	120
Differential Data Input	V _{IN}	mVp-p	150	900	
LPMode, Reset and ModSelL	V _{IL}	V	-0.3	0.8	
	V _{IH}	V	0.2	V _{CC} +0.3	
RECEIVER					
Differential Data Output	V _{OD}	mVp-p			900
Differential Termination Mismatch		%		10	
Output Rise/Fall Time, 20%~80%	T _r	ps	9.5		
ModPrsL and IntL	V _{OL}	V	0	0.4	
	V _{OH}	V	V _{CC} -0.5	V _{CC} +0.3	

Optical Characteristics

(Tc=0 oC to 70 oC and Vcc= 3.14 to 3.46)

PARAMETER	SYMBOL	UNIT	MIN	TYP	MAX	NOTES
TRANSMITTER (PER LANE)						
Signaling Speed per Lane		GBd	25.78125 ± 100 ppm			
Lane Wavelength (range)	L0	nm	1294.53	1295.56	1296.59	
	L1		1299.02	1300.05	1301.09	
	L2		1303.54	1304.58	1305.63	
	L3		1308.09	1309.14	1310.19	
Total Average Launch Power	Pout	dBm			12.5	
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)	SMSR	dB	30			
Average launch power of OFF transmitter, per lane		dBm			-30	
Relative Intensity Noise	RIN	dB/Hz			-130	
Optical Return Loss Tolerance		dB			20	
Transmitter Reflectance		dB			-26	
Transmitter Eye mask definition {X1, X2,X3, Y1,Y2,Y3}			{0.25,0.4,0.45,0.25,0.28,0.4}			
RECEIVER (PER LANE)						
Signalling Speed per Lane		GBd	25.78125 ± 100 ppm			
Lane Wavelength (range)	L0	nm	1294.53	1295.56	1296.59	
	L1		1299.02	1300.05	1301.09	
	L2		1303.54	1304.58	1305.63	
	L3		1308.09	1309.14	1310.19	
Receiver sensitivity (OMA), each lane at 5E-5 BER	Rxsens	dBm			-18.5	1
Receiver sensitivity (OMA), each lane at 1E-12 BER	Rxsens	dBm			-16	2
Average Received Power per Lane	RXPx	dBm	-20.5		-3.5	
Return Loss	RL				-26	
LOS De-Assert	LOSD	dBm			-22	
LOS Assert	LOSA	dBm	-30			
LOS Hysteresis		dB	0.5		5	

Notes:

1. Measured with a PRBS 2³¹-1 test pattern, @25.78Gb/s, BER=5E-5
2. Measured with a PRBS 2³¹-1 test pattern, @25.78Gb/s, BER=1E-12

Digital Diagnostics

PARAMETER	RANGE	UNIT	ACCURACY	CALIBRATION
TEMPERATURE	0 to 70	°C	±3	Internal
VOLTAGE	0 to VCC	V	0.1	Internal
TX BIAS CURRENT (EACH LANE)	0 to 100	mA	10%	Internal
TX OUTPUT POWER (EACH LANE)	-2.5 to 6.5	dBm	±3	Internal
RX POWER (EACH LANE)	-20.5 to -3.5	dBm	±3	Internal

Typical Application Circuit

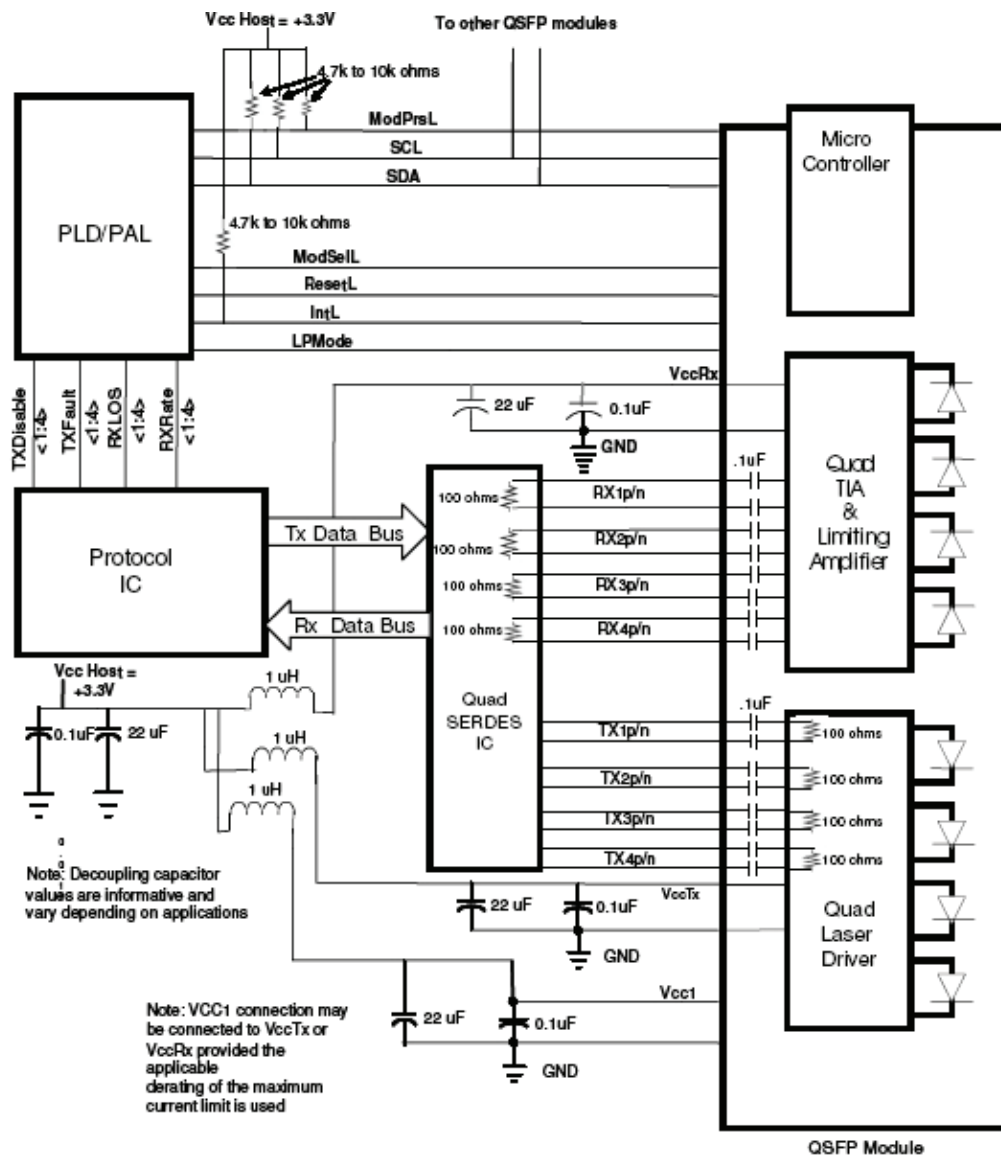
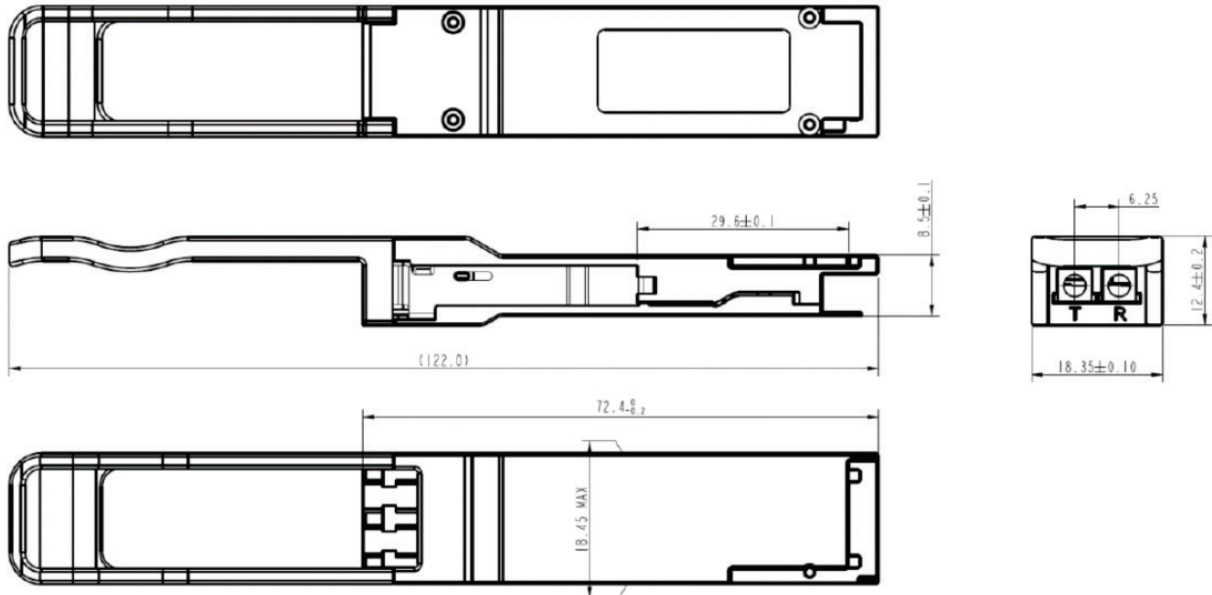


Figure 2. Typical Application Circuit

Mechanical Dimensions



Digital Diagnostics Functions

As defined by the SFF-8665–Specification for QSFP28 Copper and Optical Transceiver, Our QSFP28 transceivers provide digital diagnostic functions via a 2-wire serial interface, which allows real-time access to the following operating parameters:

- Transceiver temperature
- Laser bias current
- Transmitted optical power
- Received optical power
- Transceiver supply voltage

It also provides a sophisticated system of alarm and warning flags, which may be used to alert end-users when operating parameters are outside of a factory-set normal range. The operating and diagnostics information is monitored and reported by a Digital Diagnostics Transceiver Controller (DDTC) inside the transceiver, which is accessed through the 2-wire serial interface. When the serial protocol is activated, the serial clock signal (SCL pin) is generated by the host.