QDD-400GB-DCO-ZRP-1DBM-C-OPC

Cisco® Compatible TAA 400GBase-Open ZR+ Coherent QSFP-DD Transceiver (SMF, 1528.77nm to 1567.13nm, 120km, LC, DOM, 1dBm)

Features

- Hot Pluggable QSFP-DD Footprint (Type 2A)
- Supports 400/300/200/100Gbps
- Duplex LC Connector
- Tunable C-Band Transmitter
- Coherent Receivers
- Power Dissipation is 26.1W
- Single +3.3V Power Supply
- Operating Case Temperature: 15 to 75 Celsius
- Tunable Output Power: -9dBm to +1dBm
- Supports both CFEC and oFEC
- RoHS Compliant and Lead Free

Applications:

- 400GBase Ethernet
- Open ZR+
- IP-over-DWDM

Product Description

This Cisco® compatible QSFP-DD transceiver provides 400GBase-Open ZR+ throughput up to 120km over single-mode fiber (SMF) using a wavelength of 1528.77nm to 1567.13nm via an LC connector. It can operate at temperatures between 0 and 70C. Our transceiver is built to meet or exceed OEM specifications and is guaranteed to be 100% compatible with Cisco®. It has been programmed, uniquely serialized, and tested for data-traffic and application to ensure that it will initialize and perform identically. All of our transceivers comply with Multi-Source Agreement (MSA) standards to provide seamless network integration. Additional product features include Digital Optical Monitoring (DOM) support which allows access to real-time operating parameters. This transceiver is Trade Agreements Act (TAA) compliant. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

OptioConnect's transceivers are RoHS compliant and lead-free.

Application Codes

Application Code	Host Format	Payload Rate	Media Format	FEC	Modulation	Description	Media Lane Interface	Default: Enhanced Mode (S= Standard, E=Enhanced)
1	1 x 400GAUI-8	400G	ZR	CFEC	16QAM	OIF 400ZR app codes 0x01, 0x03	400G-400ZR-CFEC-16QAM-1-S	S
2	1 x 400GAUI-8	400G	ZR	CFEC	16QAM	OIF 400ZR app code 0x02	400G-400ER-CFEC-16QAM-1-S	S
3	1 x 400GAUI-8	400G	OpenZR+	oFEC	16QAM	OpenZR+ MSA	400G-400ZR-oFEC-16QAM-1-S	S
4	2 x 200GAUI-4	400G	OpenZR+	oFEC	16QAM	OpenZR+ MSA	200G-400ZR-oFEC-16QAM-1-S	S
5	4 x 100GAUI-2	400G	OpenZR+	oFEC	16QAM	OpenZR+ MSA	100G-400ZR-oFEC-16QAM-1-S	S
6	1 x 400GAUI-8	400G	OpenZR+	oFEC	16QAM	OpenZR+ MSA	400G-400ZR-oFEC-16QAM-1-E	E
7	2 x 200GAUI-4	400G	OpenZR+	oFEC	16QAM	OpenZR+ MSA	200G-400ZR-oFEC-16QAM-1-E	E
8	4 x 100GAUI-2	400G	OpenZR+	oFEC	16QAM	OpenZR+ MSA	400G-400ZR-oFEC-16QAM-1-E	E
9	3 x 100GAUI-2	300G	OpenZR+	oFEC	8QAM	OpenZR+ MSA	100G-300ZR-oFEC-8QAM-1-SE	S
10	1 x 200GAUI-2	200G	OpenZR+	oFEC	QPSK	OpenZR+ MSA	200G-200ZR-oFEC-QPSK-1-S	S
11	2 x 100GAUI-2	200G	OpenZR+	oFEC	QPSK	OpenZR+ MSA	100G-200ZR-oFEC-QPSK-1-S	S
12	1 x 100GAUI-2	100G	OpenZR+	oFEC	QPSK	OpenZR+ MSA	100G-100ZR-oFEC-QPSK-1-S	S

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage	Vcc	3.135	3.3	3.465	V	1
Storage Temperature	Tstg	-40		85	°C	
Operating Case Temperature	Tc	15		75	°C	
Relative Humidity (Non-Condensing)	RH			85	%	
Optical Receiver Overload				1	dBm	2

Notes:

1. 3.3V ±5% measured at the electrical connector.
2. The optical input to the receiver should not exceed this value. Transmitters must never be directly connected to receivers before ensuring that proper optical attenuation is used.

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage	Vcc	3.135	3.3	3.465	V	1
Power Supply Current	Icc			8	A	2
Peak Sustained Current	Icc,sp			8.7	A	3
Inrush Current	Icc,ip			10.5	A	4
Power Dissipation	P_{DISS}			26.1	W	5
Power Consumption				2.75	W	6

Notes:

1. 3.3V ±5% measured at the electrical connector.
2. Steady state current.
3. Sustained peak current at high power enable.
4. Instantaneous peak current at high power enable.
5. At nominal power supply voltage.
6. Low-power mode.

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Average Output Power	Po	-9		+1	dBm	1, 2, 3
Laser Linewidth				300	kHz	4
Output Power Stability		-0.5		+0.5	dB	5
Output Power Stability		-1		+1	dB	6
In-Band OSNR		38			dB/0.1nm	7
Out-of-Band OSNR – Narrowband		42			dB/0.1nm	8
Out-of-Band OSNR – Wideband		42			dB/0.1nm	9
Frequency Range		191.275		196.125	THz	10
Center Frequency		v_T -1.5	v_T	v_T +1.5	GHz	11
Channel Spacing		6.25			GHz	12
Centre Wavelength Range	Tλ	1528.58		1567.34	nm	
Centre Wavelength	Tλ	λT -15	λT	λT +15	pm	
Receiver						
Maximum Rx Power				13	dBm	
Receiver Operating Wavelength	Rλ	1528.58		1567.34	nm	
Receiver Sensitivity	S	-12		-21	dBm	13
	S	-15		-23	dBm	14
	S	-18		-29	dBm	15
	S	-20		-32	dBm	16
Receiver Overload	P_{OL}			1	dBm	17
Receiver Input Power Range		-12		1	dBm	18, 19
		-15		1	dBm	18, 20
		-18		1	dBm	18, 21
		-20		1	dBm	18, 22
Extended Receiver Input Power Range		-16		1	dBm	23
Acquisition Range		-3.6		3.6	GHz	24
Upstream Tx Linewidth		-300		300	kHz	
Transmitter VOA Dynamic Range		10			dB	25
OSNR Tolerance				22.5	dB	19
				19.5	dB	20
				14.8	dB	21
				11.5	dB	22
Crosstalk Tolerance				7	dB	26

Chromatic Dispersion Tolerance		-52,000	±13,000	+52,000	ps/nm	19, 27
		-100,000	±50,000	+100,000	ps/nm	20, 27
		-100,000	±50,000	+100,000	ps/nm	21, 27
		-160,000	±80,000	+160,000	ps/nm	22, 27

Notes:

1. Output power is coupled into a 9/125µm single-mode fibre.
2. The output power is settable in steps of 0.1dB within the specified wavelength range.
3. +1dBm tunable down to -9dBm.
4. Frequency stability relative to flex grid channel setting.
5. Provisioned power greater than the maximum available Tx power. Output power change over temperature and over time, measured over 10ms intervals.
6. Provisioned power less than the maximum available Tx power. Output power change over temperature and over time, measured over 10ms intervals.
7. The 0.1nm bandwidth for the IB OSNR refers to 12.5GHz optical bandwidth. Measured using the linear interpolation method with ±100GHz offset noise marker. For ZR application codes 0x01-0x03, IB OSNR is defined within the bandwidth of the Tx spectral excursion.
8. Measured in frequency range 191.275THz .... fs - 75GHz and fs + 75GHz ... 196.125THz. Noise power is measured in 12.5GHz RBW and referenced to 12.5GHz noise bandwidth.
9. Measured in frequency range 191.275THz .... fs - 150GHz and fs + 150GHz ... 196.125THz. Noise power is measured in 62.5GHz RBW and referenced to 12.5GHz noise bandwidth.
10. Per ITU-T G.694.1 DWDM grid definition.
11. Applies also to LO.
12. Supports 100, 75, 50, 12.5, and 6.25GHz frequency grids.
13. Minimum input power needed to achieve post-FEC BER≤10^{-15}, ZR400-OFEC-16QAM, OSNR>36dB.
14. Minimum input power needed to achieve post-FEC BER≤10^{-15}, ZR300-OFEC-8QAM, OSNR>36dB.
15. Minimum input power needed to achieve post-FEC BER≤10^{-15}, ZR200-OFEC-QPSK, OSNR>36dB.
16. Minimum input power needed to achieve post-FEC BER≤10^{-15}, ZR100-OFEC-QPSK, OSNR>36dB.
17. The optical input to the receiver should not exceed this value. Transmitters must never be directly connected to receivers before ensuring that proper optical attenuation is used. Aggregate power of all channels.
18. An input power in this range guarantees optimum OSNR performance.
19. ZR400-OFEC-16QAM.
20. ZR300-OFEC-8QAM.
21. ZR200-OFEC-QPSK.
22. ZR100-OFEC-QPSK.
23. With ≤1dB OSNR tolerance degradation.
24. Frequency offset between received carrier and LO.
25. With Tx VOA attenuation set to minimum.
26. Ratio of accumulated crosstalk channels to signal power.
27. Less than 0.5dB receiver sensitivity penalty compared to OSNR>36dB.

Pin Descriptions

Pin	Logic	Symbol	Name/Description	Notes
1		GND	Module Ground (Logic and Power Return Path).	1
2	CML-I	Tx2-	Transmit Differential Pairs from Host to Module.	
3	CML-I	Tx2+	Transmit Differential Pairs from Host to Module.	
4		GND	Module Ground (Logic and Power Return Path).	1
5	CML-I	Tx4-	Transmit Differential Pairs from Host to Module.	
6	CML-I	Tx4+	Transmit Differential Pairs from Host to Module.	
7		GND	Module Ground (Logic and Power Return Path).	1
8	LVTTL-I	ModSelL	Module Select.	
9	LVTTL-I	ResetL	Module Reset.	
10		VccRx	+3.3V Receiver Power Supply.	2
11	LVCMOS-I/O	SCL	2-Wire Serial Interface Clock.	3
12	LVCMOS-I/O	SDA	2-Wire Serial Interface Data.	3
13		GND	Module Ground (Logic and Power Return Path).	1
14	CML-O	Rx3+	Receive Differential Pairs from Module to Host.	
15	CML-O	Rx3-	Receive Differential Pairs from Module to Host.	
16		GND	Module Ground (Logic and Power Return Path).	1
17	CML-O	Rx1+	Receive Differential Pairs from Module to Host.	
18	CML-O	Rx1-	Receive Differential Pairs from Module to Host.	
19		GND	Module Ground (Logic and Power Return Path).	1
20		GND	Module Ground (Logic and Power Return Path).	1
21	CML-O	Rx2-	Receive Differential Pairs from Module to Host.	
22	CML-O	Rx2+	Receive Differential Pairs from Module to Host.	
23		GND	Module Ground (Logic and Power Return Path).	1
24	CML-O	Rx4-	Receive Differential Pairs from Module to Host.	
25	CML-O	Rx4+	Receive Differential Pairs from Module to Host.	
26		GND	Module Ground (Logic and Power Return Path).	1
27	LVTTL-O	ModPrsL	Module Present.	4
28		IntL	Interrupt.	5
29		VccTx	+3.3V Transmitter Power Supply.	2
30		Vcc1	+3.3V Power Supply.	2
31	LVTTL-I	LPMode	Low-Power Mode.	
32		GND	Module Ground (Logic and Power Return Path).	1
33	CML-I	Tx3+	Transmit Differential Pairs from Host to Module.	
34	CML-I	Tx3-	Transmit Differential Pairs from Host to Module.	

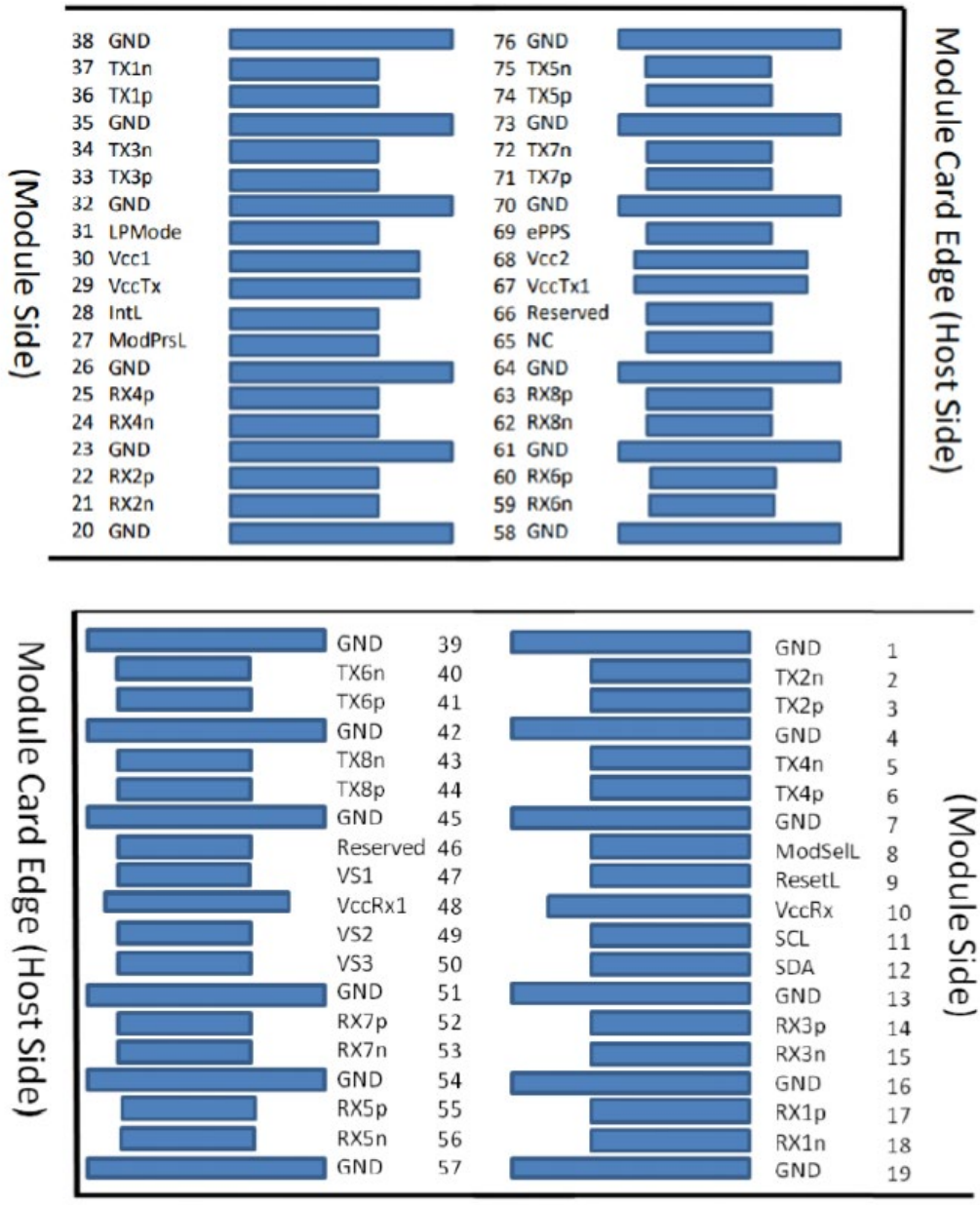
35		GND	Module Ground (Logic and Power Return Path).	1
36	CML-I	Tx1+	Transmit Differential Pairs from Host to Module.	
37	CML-I	Tx1-	Transmit Differential Pairs from Host to Module.	
38		GND	Module Ground (Logic and Power Return Path).	1
39		GND	Module Ground (Logic and Power Return Path).	1
40	CML-I	Tx6-	Transmit Differential Pairs from Host to Module.	
41	CML-I	Tx6+	Transmit Differential Pairs from Host to Module.	
42		GND	Module Ground (Logic and Power Return Path).	1
43	CML-I	Tx8-	Transmit Differential Pairs from Host to Module.	
44	CML-I	Tx8+	Transmit Differential Pairs from Host to Module.	
45		GND	Module Ground (Logic and Power Return Path).	1
46		Reserved	For Future Use. Not Connected.	6
47	LVCMOS-O	VS1	Module Vendor-Specific 1.	6
48		VccRx1	+3.3V Receiver Power Supply.	2
49	LVCMOS-I	VS2	Module Vendor-Specific 2.	6
50	LVCMOS-I/O	VS3	Module Vendor-Specific 3.	6
51		GND	Module Ground (Logic and Power Return Path).	1
52	CML-O	Rx7+	Receive Differential Pairs from Module to Host.	
53	CML-O	Rx7-	Receive Differential Pairs from Module to Host.	
54		GND	Module Ground (Logic and Power Return Path).	1
55	CML-O	Rx5+	Receive Differential Pairs from Module to Host.	
56	CML-O	Rx5-	Receive Differential Pairs from Module to Host.	
57		GND	Module Ground (Logic and Power Return Path).	1
58		GND	Module Ground (Logic and Power Return Path).	1
59	CML-O	Rx6-	Receive Differential Pairs from Module to Host.	
60	CML-O	Rx6+	Receive Differential Pairs from Module to Host.	
61		GND	Module Ground (Logic and Power Return Path).	1
62	CML-O	Rx8-	Receive Differential Pairs from Module to Host.	
63	CML-O	Rx8+	Receive Differential Pairs from Module to Host.	
64		GND	Module Ground (Logic and Power Return Path).	1
65		NC	Not Connected.	6
66		Reserved	For Future Use. Not Connected.	6
67		VccTx1	+3.3V Transmitter Power Supply.	2
68		Vcc2	+3.3V Power Supply.	2
69	LVTTL-I	ePPS	Precision Time Protocol (PTP) Reference Clock Input.	
70		GND	Module Ground (Logic and Power Return Path).	1

71	CML-I	Tx7+	Transmit Differential Pairs from Host to Module.	
72	CML-I	Tx7-	Transmit Differential Pairs from Host to Module.	
73		GND	Module Ground (Logic and Power Return Path).	1
74	CML-I	Tx5+	Transmit Differential Pairs from Host to Module.	
75	CML-I	Tx5-	Transmit Differential Pairs from Host to Module.	
76		GND	Module Ground (Logic and Power Return Path).	1

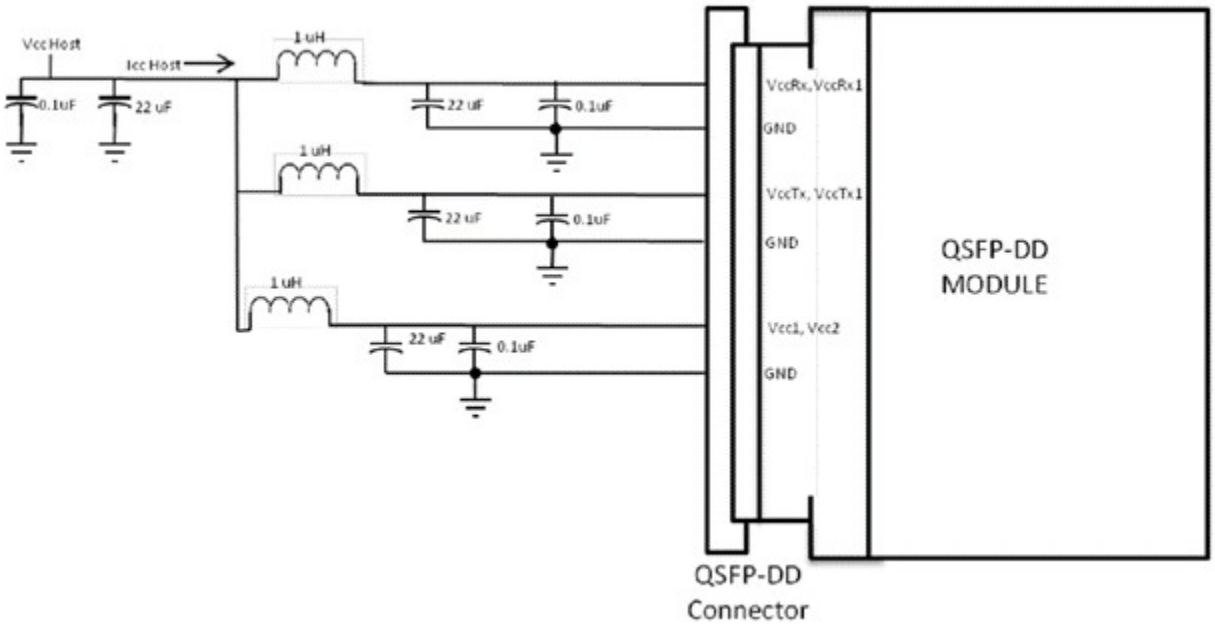
Notes:

1. QSFP-DD uses common ground (GND) for all signals and supply (power). All are common with the QSFP-DD 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. VccRx, VccRx1, Vcc1, Vcc2, VccTx, and VccTx1 shall be applied concurrently. VccRx, VccRx1, Vcc1, Vcc2, VccTx, and VccTx1 are internally connected within the module. The connector Vcc pins are each rated for a maximum current of 1.0A.
3. Open drain. Requires 1.0k to 3.3k pull-up resistor to 3.3V on the host.
4. Indication from module to host. Requires 4.7k to 10k pull-up resistor to 3.3V on the host.
5. Open collector. Interrupt request from module to host. Requires 4.7k pull-up resistor to 3.3V on the host.
6. Reserved and NC pins may be terminated with 50Ω to ground on the host. Vendor-Specific and Reserved pads shall have an impedance to the GND that is greater than 10kΩ and is less than 100pF.

Electrical Pad Layout



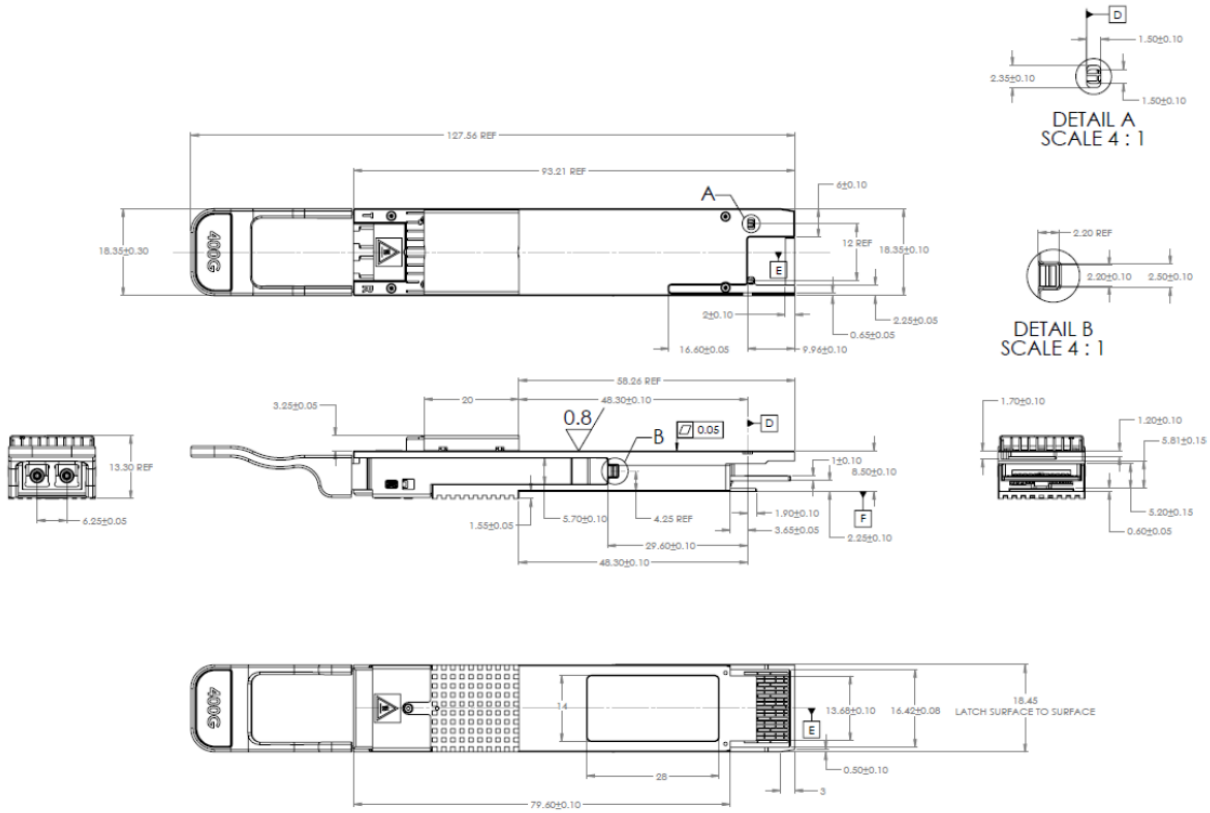
Recommended Power Supply Filter



Notes:

1. Filter capacitor values are informative vary depending on applications. Vcc1 and/or Vcc2 may be connected to the VccTx, VccTx1 or VccRx, VccRx1 provided the applicable derating of the maximum current limit is used.

Mechanical Specifications



OptioConnect
Innovation for the Future of High-Speed Networking

Who We Are
OptioConnect is reshaping the landscape of communication and high-speed networking through intelligent technology. With a core focus on cutting edge technology, we deliver smarter fiber optic solutions for enterprise networks, data centers, and next-gen telecom infrastructures.

What We Do
At OptioConnect, we fuse advanced engineering with intelligent automation to drive the future of networking. Our AI-integrated solutions are designed to optimize performance and streamline operations with:

- Superior Performance
- Network and traffic optimization
- Intelligent energy management
- Seamless OEM compatibility
- Scalable cost-efficiency

Smarter Networks by Design
Innovation isn't just a goal—it's our process. We embed AI and machine learning across our R&D and product lines, enabling adaptive performance, automated tuning, and faster deployment cycles. The result? Networks that don't just work—they learn, evolve, and outperform.

Our Team
Our engineers, data scientists, and network architects bring decades of experience and a future-focused mindset. We provide hands-on support with intelligent insights that turn complex challenges into simple solutions.

Our Mission
To deliver AI-enhanced connectivity that reduces cost, increases speed, and maximizes efficiency—empowering our partners to operate at the forefront of a rapidly evolving digital world.

Let's Connect
Discover how OptioConnect's intelligent infrastructure solutions can power your network's next leap forward.
www.optioconnect.com | info@optioconnect.com