

# Product Specification

400G OSFP to 2x 200G QSFP56 Passive Direct Attach Copper Breakout Cable

PN:O400-2Q200-C



## Features

- Hot Pluggable QSFP28 form factor
- Wire AWG:30AWG,28AWG,26AWG
- Available length range 0.5m~3m
- Operating data rate 212.5Gbps
- Power supply: +3.3V
- Max power dissipation <0.1W
- 4-Channel Full-Duplex Passive Copper Cable
- Commercial temperature range 0°C to 70°C
- Supports Device Programming by MCU with I2C

## Compliance

- QSFP28 MSA
- Compliant with QSFP Electrical MSA SFF-8636
- IEEE 802.3bj
- RoHS

## Applications

- 200 Gigabit Ethernet
- Fiber Channel over Ethernet
- Switches, servers,routers and HBA
- Data center cabling infrastructure
- High density connections between networking equipment

## Description

The O400-2Q200-C is a high-performance cable assembly designed to provide seamless connectivity from a 400G OSFP port to two 100G QSFP56 ports. This cable is engineered for high-density applications and supports 400G transmission standards, delivering reliable, high-bandwidth interconnect solutions. The OSFP interface features 8 transmitting and 8 receiving channels, providing an efficient solution for large-scale data center and telecom deployments. The assembly is RoHS-compliant, ensuring that all materials used meet strict environmental standards. This cable assembly offers a cost-effective and high-performance option for interconnecting systems with 400G data rate capabilities, supporting various high-speed applications in modern network infrastructures.

## Product performance Specifications

### 1、 Basic Product Characteristics

Parameter	Symbol	Min	Typ.	Max	Unit
Storage Temperature	T <sub>s</sub>	-40	-	+85	°C
Supply Voltage	V <sub>CC</sub>	-0.5	3.3	4.0	V
Relative Humidity	RH	5	-	85	%
Operating Case Temperature	T <sub>c</sub>	0	-	70	°C
Power Supply Voltage	V <sub>CC</sub>	3.135	3.3	3.465	V
Power Dissipation	PD	-	-	0.1	W
Data Rate	DR	-	425	-	Gbps

## 2、Product Optical and Electrical Characteristics

Test Type	Test Item	24AWG	26AWG	28AWG	30AWG
Electrical Characteristics	Differential impedance	100±5Ω at TDR	100±5Ω	100±5Ω	100±5Ω at TDR
	Mutual capacitance	14pF/ft nominal	14pF/ft nominal	14pF/ft nominal	14pF/ft nominal
	Time delay	1.31ns/ft nominal, (4.3ns/m) nominal	1.35ns/ft nominal	1.35ns/ft nominal	1.35ns/ft nominal, (4.3ns/m) nominal
	Time delay skew (within pairs)	80ps/10m maximum	120ps/8.5m maximum	120ps/7m maximum	50ps/5.5m maximum
	Time delay skew (between pairs)	350ps/10m maximum	500ps/8.5m maximum	500ps/7m maximum	350ps/5.5m maximum
	Attenuation	10dB/10m maximum at 1.25Ghz	10dB/8.5m maximum at 1.25Ghz	10dB/7m maximum at 1.25Ghz	8.4dB/5.5m maximum at 1.25Ghz
	Conductor DC Resistance	0.026Ω /ft maximum at 20°C	0.04Ω /ft maximum at 20°C	0.06Ω/ft maximum at 20°C	0.01Ω/ft maximum at 20°C
Physical Characteristics	Conductors (two pair)	24AWG Solid, Silver plated copper	26AWG Solid, Silver plated copper	28AWG Solid, Silver plated copper	30AWG Solid, Silver plated copper
	Insulation	Foam polyolefin	Foam polyolefin	Foam polyolefin	Foam polyolefin
	Pair drain wire	26AWG Solid, Silver plated copper	28AWG Solid, Silver plated copper	30AWG Solid, Silver plated copper	30AWG Solid, Silver plated copper
	Overall cable shield	Aluminum/polyester tape, 125% coverage, Tin plated copper braid, 38AWG, 85% coverage	Aluminum/polyester tape, 125% coverage, Tin plated copper braid, 38AWG, 85% coverage	Aluminum/polyester tape, 125% coverage, Tin plated copper braid, 38AWG, 85% coverage	Aluminum/polyester tape, 125% coverage, Tin plated copper braid, 38AWG, 85% coverage
	Outer diameter	6.0mm	5.2mm	4.7mm	4.2mm

### Recommended Host Board Power Supply Circuit

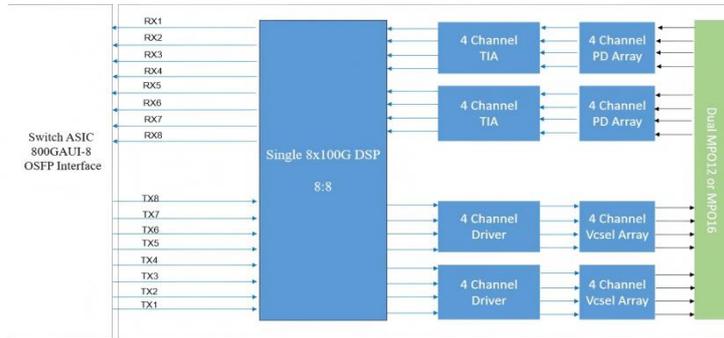


Figure 1: Module Block Diagram

### Recommended Interface Circuit

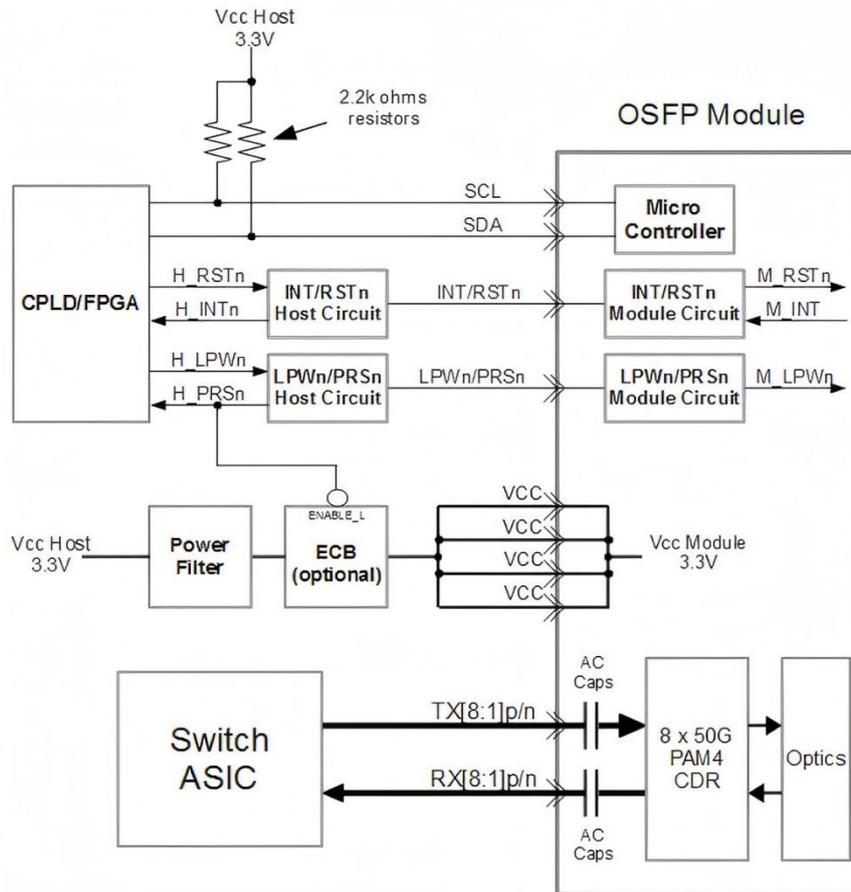


Figure2: Recommended Interface Circuit

### OSFP Pin-out Definition

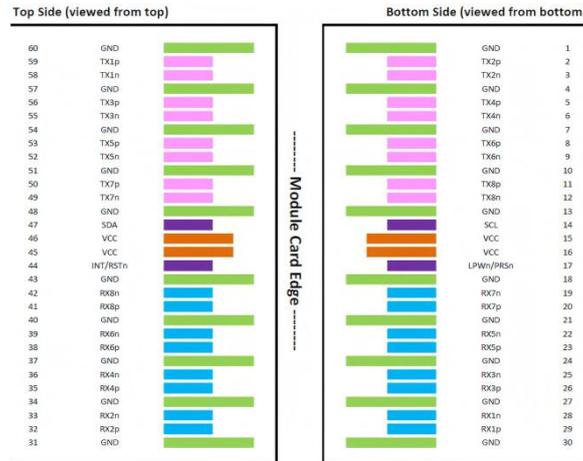


Figure3:OSFP Pin view

### OSFP Pin Function Definitions

Pin	Logic	Symbol	Description	Note
1		GND	Ground	
2	CML-I	TX2p	Transmitter Data Non-Inverted	
3	CML-I	TX2n	Transmitter Data Inverted	
4		GND	Ground	
5	CML-I	TX4p	Transmitter Data Non-Inverted	
6	CML-I	TX4n	Transmitter Data Inverted	
7		GND	Ground	
8	CML-I	TX6p	Transmitter Data Non-Inverted	
9	CML-I	TX6n	Transmitter Data Inverted	
10		GND	Ground	
11	CML-I	TX8p	Transmitter Data Non-Inverted	
12	CML-I	TX8n	Transmitter Data Inverted	
13		GND	Ground	
14	LVC MOS-I/O	SCL	2-wire Serial interface clock	1
15		VCC	+3.3V Power	
16		VCC	+3.3V Power	
17	Multi-Level	LPWn/PRSn	Low-Power Mode / Module Present	2
18		GND	Ground	
19	CML-O	RX7n	Receiver Data Inverted	
20	CML-O	RX7p	Receiver Data Non-Inverted	

21		GND	Ground	
22	CML-O	RX5n	Receiver Data Inverted	
23	CML-O	RX5p	Receiver Data Non-Inverted	
24		GND	Ground	
25	CML-O	RX3n	Receiver Data Inverted	
26	CML-O	RX3p	Receiver Data Non-Inverted	
27		GND	Ground	
28	CML-O	RX1n	Receiver Data Inverted	
29	CML-O	RX1p	Receiver Data Non-Inverted	
30		GND	Ground	
31		GND	Ground	
32	CML-O	RX2p	Receiver Data Non-Inverted	
33	CML-O	RX2n	Receiver Data Inverted	
34		GND	Ground	
35	CML-O	RX4p	Receiver Data Non-Inverted	
36	CML-O	RX4n	Receiver Data Inverted	
37		GND	Ground	
38	CML-O	RX6p	Receiver Data Non-Inverted	
39	CML-O	RX6n	Receiver Data Inverted	
40		GND	Ground	
41	CML-O	RX8p	Receiver Data Non-Inverted	
42	CML-O	RX8n	Receiver Data Inverted	
43		GND	Ground	
44	Multi-Level	INT/RSTn	Module Interrupt / Module Reset	2
45		VCC	+3.3V Power	
46		VCC	+3.3V Power	
47	LVC MOS-I/O	SDA	2-wire Serial interface data	1
48		GND	Ground	
49	CML-I	TX7n	Transmitter Data Inverted	
50	CML-I	TX7p	Transmitter Data Non-Inverted	
51		GND	Ground	
52	CML-I	TX5n	Transmitter Data Inverted	
53	CML-I	TX5p	Transmitter Data Non-Inverted	
54		GND	Ground	
55	CML-I	TX3n	Transmitter Data Inverted	
56	CML-I	TX3p	Transmitter Data Non-Inverted	
57		GND	Ground	
58	CML-I	TX1n	Transmitter Data Inverted	

59	CML-I	TX1p	Transmitter Data Non-Inverted	
60		GND	Ground	

**Note1:**Open-Drain with pull up resistor on Host.

**Note2:**See pin description for required circuit.

### QSFP112 Pin-out Definition

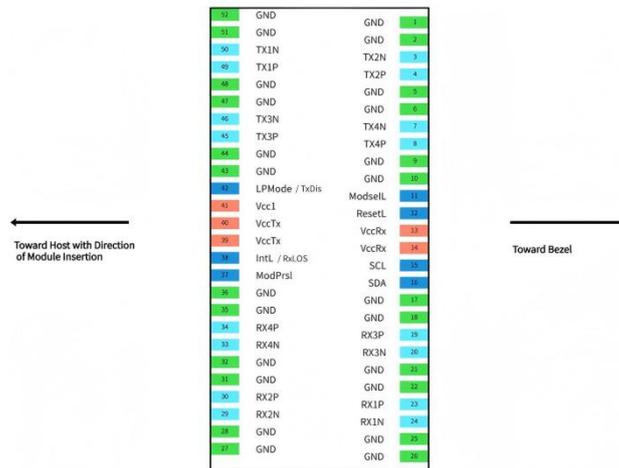


Figure4:QSFP112 Pin view

### QSFP112 Pin Function Definitions

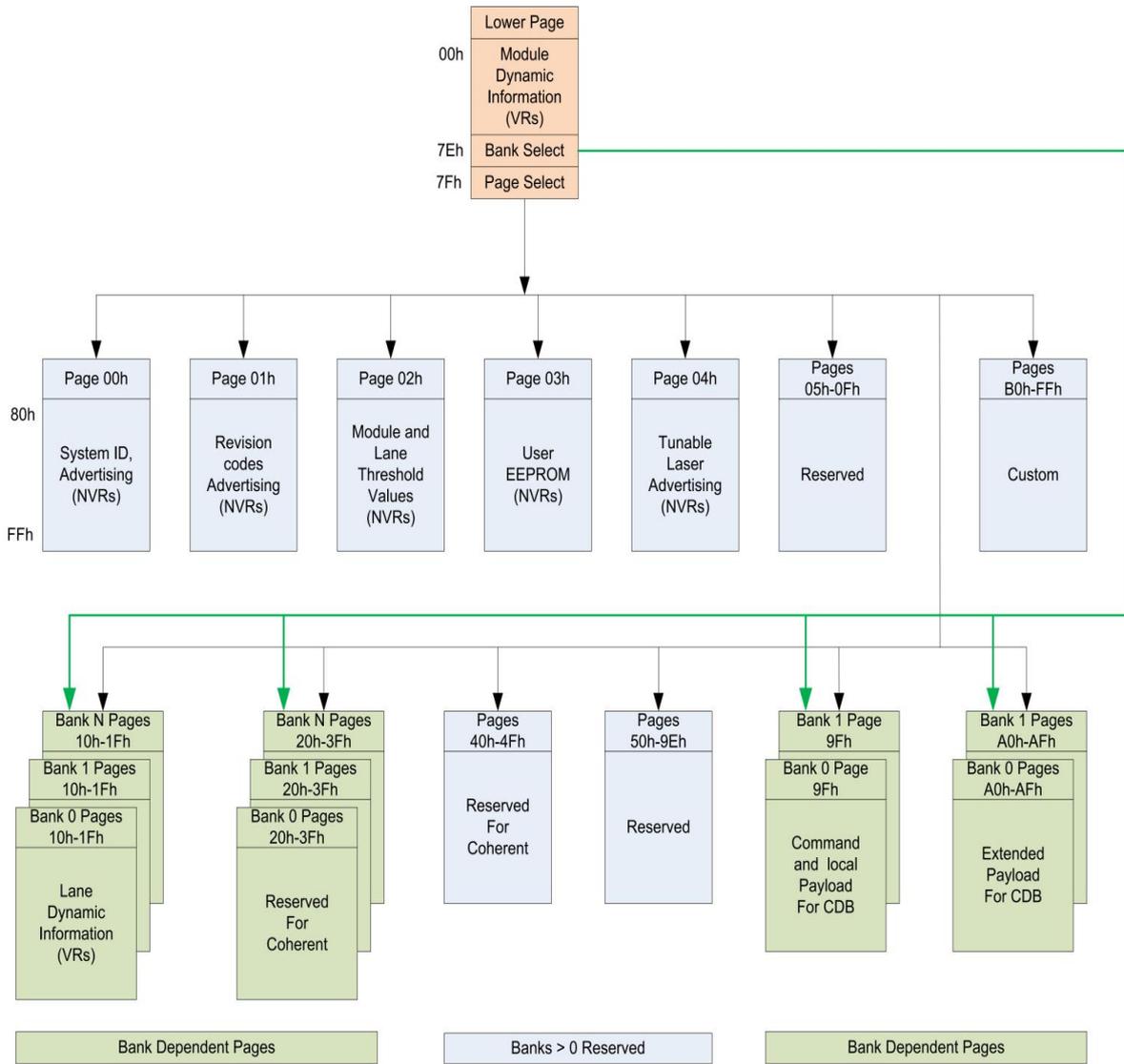
PIN	Module contact	Logic	Symbol	Description	Note
1	1		GND	Ground	1
2			GND	Ground	1
3	2	CML-I	Tx2n	Transmitter Inverted Data Input	
4	3	CML-I	Tx2p	Transmitter Non-Inverted Data Input	
5	4		GND	Ground	1
6			GND	Ground	1
7	5	CML-I	Tx4n	Transmitter Inverted Data Input	
8	6	CML-I	Tx4p	Transmitter Non-Inverted Data Input	
9	7		GND	Ground	1
10			GND	Ground	1
11	8	LVTTL-I	ModSelL	Select	
12	9	LVTTL-1	ResetL	Reset	
13	10		Vcc Rx	+3.3V Power supply receiver	2
14			Vcc Rx	+3.3V Power supply receiver	2
15	11	LVC MOS-I/O	SCL	2-wire serial interface clock	
16	12	LVC MOS-I/O	SDA	2-wire serial interface data	

17	13		GND	Ground	1
18			GND	Ground	1
19	14	CML-O	Rx3p	Receiver Non-Inverted Data Output	
20	15	CML-O	Rx3n	Receiver Inverted Data Output	
21	16		GND	Ground	1
22			GND	Ground	1
23	17	CML-O	Rx1p	Receiver Non-Inverted Data Output	
24	18	CML-O	Rx1n	Receiver Inverted Data Output	
25	19		GND	Ground	1
26			GND	Ground	1
27	20		GND	Ground	1
28			GND	Ground	1
29	21	CML-O	Rx2n	Receiver Inverted Data Output	
30	22	CML-O	Rx2p	Receiver Non-Inverted Data Output	
31	23		GND	Ground	1
32			GND	Ground	1
33	24	CML-O	Rx4n	Receiver Inverted Data Output	
34	25	CML-O	Rx4p	Receiver Non-Inverted Data Output	
35	26		GND	Ground	1
36			GND	Ground	1
37	27	LVTTTL-O	ModPrsL	Present	
38	28	LVTTTL-O	IntL/RxLOS	Interrupt/optional RxLOS	
39	29		Vcc Tx	+3.3V Power supply transmitter	2
40			Vcc Tx	+3.3V Power supply transmitter	2
41	30		Vcc1 <sub>2</sub>	+3.3V Power Supply	2
42	31	LVTTTL-I	LPMoDe/TxD is	Low Power Mode/optional TX Disable	
43	32		GND	Ground	1
44			GND	Ground	1
45	33	CML-I	Tx3p	Transmitter Non-Inverted Data Input	
46	34	CML-I	Tx3n	Transmitter Inverted Data Input	
47	35		GND	Ground	1
48			GND	Ground	1
49	36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	
50	37	CML-I	Tx1n	Transmitter Inverted Data Input	
51	38		GND	Ground	1
52			GND	Ground	1

**Note1:** GND is the symbol for signal and supply(power)common for the QSFP112module.Allare common within the QSFP112 module and all voltages are referenced to this potential unless otherwise noted.Connect these directly to the host board signal-common ground plane.

**Note2:** Vcc Rx, Vcc1 and Vcc Tx are the receiver and transmitter power supplies and shall be applied concurrently. Requirements, defined for the host side of the Host Edge Card Connector, are listed in Table 4. Recommended host board power supply filtering is shown in Figure 4. Vcc Rx, Vcc1 and Vcc Tx may be internally connected within the QSFP12 module in any combination. The connector pins are each rated for a maximum current of 1.5A (max. current of 2.0 A is required for high module power of 15-20W).

### Monitoring Specification



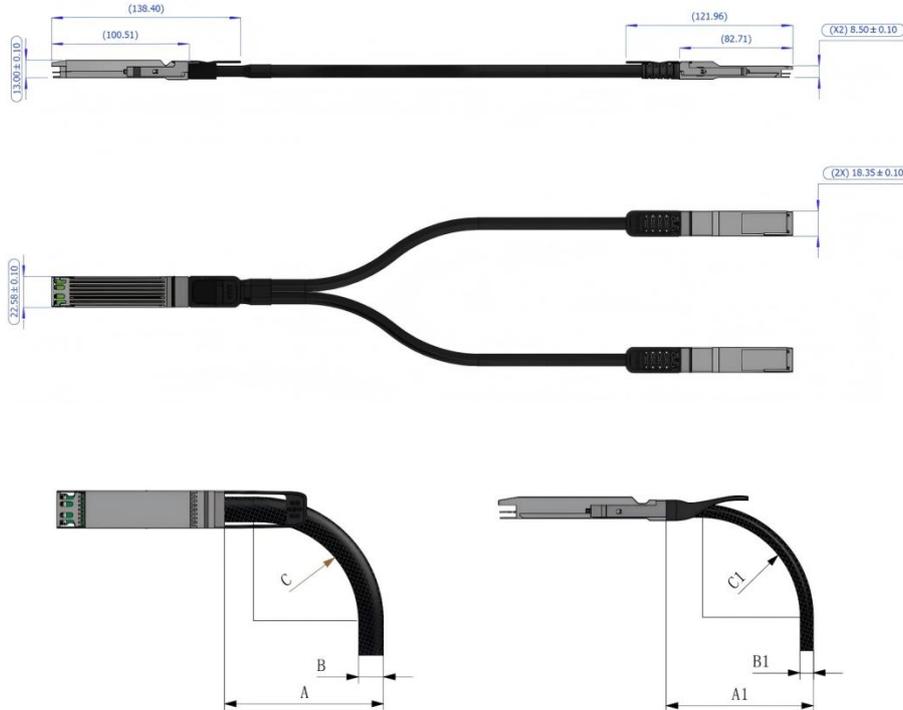
**Figure5:** Memory map

## Memory map Table

Byte	Unit	Name	Description
<b>Lower Page 00h</b>			
0	1	Identifier	Identifier - Type of Serial Module - See SFF-8024.
1	1	Revision Compliance	Identifier – CMIS revision; the upper nibble is the whole number part and the lower nibble is the decimal part. Example: 01h indicates version 0.1, 21h indicates version 2.1.
2-3	2	ID and Status Area	Flat mem indication, CLEI present indicator, Maximum TWI speed, Current state of Module, Current state of the Interrupt signal.
4-7	4	Lane Flag Summary	Flag summary of all lane flags on pages 10h-1Fh.
8-13	6	Module-Level Flags	All flags that are not lane or data path specific.
14-25	12	Module-Level Monitors	Monitors that are not lane or data path specific.
26-30	5	Module Global Controls	Controls applicable to the module as a whole
31-36	6	Module-Level Flag Masks	Masking bits for the Module-Level flags
37-38	2	CDB Status Area	Status of most recent CDB command
39-40	2	Module Firmware Version	Module Firmware Version.
41-63	23	Reserved Area	Reserved for future standardization
64-82	19	Custom Area	Vendor or module type specific use
83-84	2	Inactive Firmware Version	Version Number of Inactive Firmware. Values of 00h indicates module supports only a single image.
85-117	33	Application Advertising	Combinations of host and media interfaces that are supported by module data path(s)
118-125	8	Password Entry and Change	Password Entry and Change
126	1	Bank Select Byte	Bank address of currently visible Page
127	1	Page Select Byte	Page address of currently visible Page
<b>Upper Page 00h</b>			
128	1	Identifier	Identifier - Type of Serial Module - See SFF-8024.
129-144	16	Vendor name	Vendor name (ASCII)
145-147	2	Vendor OUI	Vendor IEEE company ID
148-163	16	Vendor PN	Part number provided by vendor (ASCII)
164-165	8	Vendor rev	Revision level for part number provided by vendor (ASCII)
166-181	10	Vendor SN	Vendor Serial Number (ASCII)
182-183	2	Date code year	ASCII code, two low order digits of year (00=2000)
184-185	2	Date code month	ASCII code digits of month (01=Jan through 12=Dec)
186-187	2	Date code day of month	ASCII code day of month (01-31)
188-189	2	Lot code	ASCII code, custom lot code, may be blank
190-199	10	CLEI code	Common Language Equipment Identification code

200-201	2	Module power characteristics	Module power characteristics
202	1	Cable assembly length	Cable assembly length
203	1	Media Connector Type	Media Connector Type
204	1	5 GHz attenuation	Passive copper cable attenuation at 5 GHz in 1 dB increments
205	1	7 GHz attenuation	Passive copper cable attenuation at 7 GHz in 1 dB increments
206	1	12.9 GHz attenuation	Passive copper cable attenuation at 12.9 GHz in 1 dB increments
207	1	25.8 GHz attenuation	Passive copper cable attenuation at 25.8 GHz in 1 dB increments
208-209	2	Reserved	Reserved
210-211	2	Cable Assembly Lane Information	Cable Assembly Lane Information
212	1	Media Interface Technology	Media Interface Technology
213-220	8	Reserved	Reserved
221	1	Custom	Custom
222	1	Checksum	Includes bytes 128-221
223-255	33	Custom Info NV	Custom Info NV

**Mechanical Dimension**



**Note:**

- Unit: mm
- Tolerance:  $\varphi 0.1\text{mm}$  if not shown
- Latch color: black
- When  $L < 2\text{m}$ , the tolerance is  $\pm 25\text{mm}$ , when  $L \geq 2\text{m}$ , the tolerance is  $\pm 50\text{mm}$

**Waring:**

- The transceiver optics is supplied with a dust cover. This plug protects the transceiver optics during standard manufacturing processes by preventing contamination from air borne particles. It is recommended that the dust cover remain in the transceiver whenever an optical fiber connector is not inserted.
- Handling Precautions: This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.
- Laser Safety: Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.