# 40G QSFP+ Direct Attach Cable

# (DAC)

# Datasheet



## General Description

QSFP+ Direct Attach Cables are compliant with the SFF-8436 specifications. Various choices of wire gauge are available from 30 to 24 AWG with various choices of cable length (up to 7m).

## Features

* Compliant with SFF- 8436.
* Up to 10.3125Gbps data rate per channel
* Up to 7m transmission
* Operating temperature: 0~70℃
* Single 3.3V power supply
* RoHS compliant

## Benefits

* Cost-effective copper solution
* Lowest total system power solution
* Lowest total system EMI solution
* Optimized design for Signal Integrity

## Applications

* 40G Ethernet

## Pin Function Definition

|  |  |  |  |
| --- | --- | --- | --- |
| **Pin** | **Logic** | **Symbol** | **Description** |
| 1 |  | GND | Ground |
| 2 | CML-I | Tx2n | Transmitter Inverted Data Input |
| 3 | CML-I | Tx2p | Transmitter Non-Inverted Data Input |
| 4 |  | GND | Ground |
| 5 | CML-I | Tx4n | Transmitter Inverted Data Input |
| 6 | CML-I | Tx4p | Transmitter Non-Inverted Data Input |
| 7 |  | GND | Ground |
| 8 | LVTTL-I | ModSelL | Module Select |
| 9 | LVTTL-I | ResetL | Module Reset |
| 10 |  | Vcc Rx | +3.3V Power Supply Receiver |
| 11 | LVCMOS-I/O | SCL | 2-wire serial interface clock |
| 12 | LVCMOS-I/O | SDA | 2-wire serial interface data |
| 13 |  | GND | Ground |
| 14 | CML-O | Rx3p | Receiver Non-Inverted Data Output |
| 15 | CML-O | Rx3n | Receiver Inverted Data Output |
| 16 |  | GND | Ground |
| 17 | CML-O | Rx1p | Receiver Non-Inverted Data Output |
| 18 | CML-O | Rx1n | Receiver Inverted Data Output |
| 19 |  | GND | Ground |
| 20 |  | GND | Ground |
| 21 | CML-O | Rx2n | Receiver Inverted Data Output |
| 22 | CML-O | Rx2p | Receiver Non-Inverted Data Output |
| 23 |  | GND | Ground |
| 24 | CML-O | Rx4n | Receiver Inverted Data Output |
| 25 | CML-O | Rx4p | Receiver Non-Inverted Data Output |
| 26 |  | GND | Ground |
| 27 | LVTTL-O | ModPrsL | Module Present |
| 28 | LVTTL-O | IntL | Interrupt |
| 29 |  | Vcc Tx | +3.3V Power supply transmitter |
| 30 |  | Vcc1 | +3.3V Power supply |
| 31 | LVTTL-I | LPMode | Low Power Mode |
| 32 |  | GND | Ground |
| 33 | CML-I | Tx3p | Transmitter Non-Inverted Data Input |
| 34 | CML-I | Tx3n | Transmitter Inverted Data Input |
| 35 |  | GND | Ground |
| 36 | CML-I | Tx1p | Transmitter Non-Inverted Data Input |
| 37 | CML-I | Tx1n | Transmitter Inverted Data Input |
| 38 |  | GND | Ground |



**General Product Characteristics**

|  |  |
| --- | --- |
| **QSFP+ DAC Specifications** |  |
| Number of Lanes | Tx & Rx |
| Channel Data Rate | 10.3125 Gbps |
| Operating Temperature | 0 to + 70°C |
| Storage Temperature | -40 to + 85°C |
| Supply Voltage | 3.3 V nominal |
| Electrical Interface | 38 pins edge connector |
| Management Interface | Serial, I2C |

**High Speed Characteristics**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | **Symbol** | **Min** | **Typ** | **Max** | **Units** | **Notes** |
| Differential Impedance | Zd | 90 | 100 | 110 | Ω |  |
| Differential Input Return Loss | SDDXX | <-12+2\* SQRT (f) with f in GHz | dB | 0.01~4.1GHz |
| <-6.3+13\*Log10/(f/5.5) with f in GHz | dB | 4.1~11.1GHz |
| Common Mode Output Return Loss | SCCXX | < -7+1.6\*f with f in GHz | dB | 0.01~2.5GHz |
|  |  | -3 | dB | 2.5~11.1GHz |
| Difference Waveform Distortion Penalty | dWDPc |  |  | 6.75 | dB |  |
| VMA Loss | L |  |  | 4.4 | dB |  |
| VMA Loss to Crosstalk Ratio | VCR | 32.5 |  |  | dB |  |

**Mechanical Specifications**

The connector is compatible with the SFF-8436 specification.



|  |  |
| --- | --- |
| Length (m) | Cable AWG |
| 1 |  30 |
| 2 | 30/26 |
| 3 | 30/26 |
| 4 | 26 |
| 5 | 26/24 |
| 6 | 24 |
| 7 | 24 |

## Regulatory Compliance

|  |  |  |
| --- | --- | --- |
| **Feature** | **Test Method** | **Performance** |
| Electrostatic Discharge (ESD) to the Electrical Pins | MIL-STD-883C Method 3015.7 | Class 1(>2000 Volts) |
| Electromagnetic Interference(EMI) | FCC Class B | Compliant with Standards |
| CENELEC EN55022 Class B |
| CISPR22 ITE Class B |
| RF Immunity(RFI) | IEC61000-4-3 | Typically Show no Measurable Effect from a 10V/m Field Swept from 80 to 1000MHz |
| RoHS Compliance | RoHS Directive 2011/65/EU and it's Amendment Directives 6/6 | RoHS 6/6 compliant |