OSFP-DR4-400G-Flat Top

OSFP RHS, 400GBASE-DR4, 1310 nm, 500 m, MPO-12/APC

1. Product overview

400G DR4 single-mode transceiver with four 100G-PAM4 electrical channels and MPO-12/APC optical interface. OSFP RHS form factor supports links up to 500 m and multiple Ethernet and InfiniBand applications.

Simplified functional diagram



MPO-12/APC / SMF

2. Key features

IEEE 802.3-2022 DR4 optics; IEEE 802.3ck-2022 400GAUI-4/200GAUI-2/100GAUI-1 C2M; CMIS Rev. 5.2 and Rev. 4.0 stated; 9 W max; 3.3 V; RoHS-6; Class 1 laser.

3. Applications

Ethernet: 4x100G, 2x200G, 1x400G. InfiniBand: NDR, 2xNDR200.

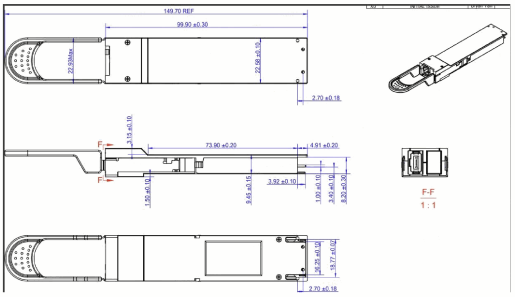
4. Technical data

Parameter	Specification	Parameter	Specification
Storage / humidity	-40 to +85°C / 5-95%	Absolute supply	-0.5 to 3.6 V
Absolute case Top_1 / Top_2	0-60°C / 0-70°C; DDMI at Top_1	Absolute differential input	1 V max
Control input / output current	-0.3 to Vcc+0.5 V / -20 to +20 mA	Electrical lane count	4 (source pin list has 8)

Electrical characteristics, per lane - TX input TP1/TP1a; RX output TP4.

TX input	Specification	RX output	Specification
Differential p-p tolerance	750 mV min	AC common-mode p-p LF/FB	32 / 80 mV typ
AC common-mode tolerance LF/FB	32 / 80 mV max	Differential p-p short/long	600 / 845 mV typ
Return loss	802.3ck Eq.120G-2, dB	Return loss	802.3ck Eq.120G-1, dB
Effective return loss	8.5 dB min	Effective return loss	8.5 dB min
Termination mismatch	10% max	Termination mismatch	10% max
Stressed input tolerance	802.3ck 120G.3.4.3	Eye height / VEC	15 mV min / 12 dB max
Single-ended tolerance	-0.4 to 3.3 V	DC common-mode	-0.35 to 2.85 V
DC common-mode	-0.35 to 2.85 V	Transition time	8.5 ps min

Mechanical drawing from source



5. Recommended operating conditions

Parameter	Specification	Parameter	Specification
Case temperature	0 to +70°C	Supply min/typ/max	3.135 / 3.3 / 3.465 V
Power / signaling / lanes	9 W max / 53.125 GBd typ / 4	Pre-FEC BER / distance	$2.4x10^{-4}$ max / 2-500 m
Serial clock / noise tolerance	400 kHz max / 25 mV max (10 Hz-10 MHz)	RX output load / FEC	100 ohm; PRBS13Q; host FEC

OSFP-DR4-400G-FL

6. Optical characteristics

Transmitter, each lane	Specification
Signaling rate / format	53.125 ±100 ppm GBd / PAM4
Wavelength	1304.5 / 1311 / 1317.5 nm (min/typ/max)
SMSR	30 dB min
Average launch power	-2.9 to +4 dBm [A]
OMAouter	-0.8 to +4.2 dBm
Launch OMAouter minus TDECQ	-2.2 dBm min
TDECQ	3.4 dB max
Average launch power, TX off	-15 dBm max
Extinction ratio	3.5 dB min
RIN21.4OMA	-136 dB/Hz max
Optical return loss tolerance	21.4 dB max
Transmitter reflectance	-26 dB max [B]

Receiver, each lane	Specification
Signaling rate / format	53.125 ±100 ppm GBd / PAM4
Wavelength	1304.5 / 1311 / 1317.5 nm (min/typ/max)
Damage threshold	5 dBm min [C]
Average receive power	-5.9 to +4 dBm [D]
Receive OMAouter	4.2 dBm max
Receiver reflectance	-26 dB max
Sensitivity OMAouter	-3.9 and SECQ - 5.3 dBm (max column; source gives no operator) [E]
Stressed sensitivity OMAouter	-1.9 max;
Stress test SECQ	3.4 dB typ
Stress test aggressor OMAouter	4.2 dBm typ

Source optical notes: [A] Table references note 2 (OMA minimum must be exceeded even for TDECQ<1.4 dB); note 1 describes minimum average TX power as informative. [B] Reflectance looking into TX. [C] Continuous exposure at damage threshold must not cause damage; operation is not required. [D] Minimum average RX power is informative; below it cannot comply, above it does not ensure compliance. [E] Sensitivity is informative, for transmitter SECQ 0.9 dB. [F] TP3 conformance signal, 124.8.9 and BER per 124.1.1. Stress conditions are test conditions, not RX characteristics.

7. Digital diagnostics and management

Parameter	Specification
Management / DDM	CMIS Rev.5.2 and Rev.4.0 in source. Range; accuracy; unit: temperature 0-75; ±3; °C. Voltage 0-Vcc; ±0.1; V. TX bias 15-125; ±10%; mA. TX power -4.9 to +5; ±3; dB. RX power -7.9 to +5; ±3; dB.
Control pins	SCL14 / SDA47: two-wire clock/data, bidirectional. LPWn/PRSn17: low-power/presence. INT/RSTn44: interrupt/reset, multilevel. Host pull-ups to3.3V; source circuit references10.5.3 and10.5.2.
60-contact pin map	TX p/n lanes 1-8: 59/58,2/3,56/55,5/6,53/52,8/9,50/49,11/12. RX p/n lanes 1-8: 29/28,32/33,26/25,35/36,23/22,38/39,20/19,41/42. Vcc:15,16,45,46 (+3.3 V). GND:1,4,7,10,13,18,21,24,27,30,31,34,37,40,43,48,51,54,57,60.
Plug sequence	GND 1; Vcc 2; other pins 3. Source exceptions: GND18/21/24 sequence3; RX20/23/25 sequence1.

8. Safety and regulatory

RoHS-6; Class 1 laser safety; IEEE802.3-2022 and IEEE802.3ck-2022 stated.

9. Ordering information

Ordering number	Description
OSFP-400G-DR4	OSFP RHS, 400GBASE-DR4 Flat Top 4x100Gbps 1310 nm, 500 m, MPO-12/APC