

SO-SFP-10GE-ER-Dxxxx & Dxxxx-I

SFP+, 10G Multirate, DWDM 100GHz, DDM, 14dB, 40km, D9210-D9600 (40ch)

OVERVIEW

The SO-SFP-10GE-ER-Dxxxx is a versatile DWDM transceiver supporting a wide range of traffic formats ranging from 600 Mbps to 11.3 Gbps. The transceiver is provided in 40 channel versions at the 100GHz DWDM grid as specified in the ITU-T 694.1 standard.

The distance performance is in accordance with the IEEE 802.3ae ER/EW-standard, providing a bridgeable distance of up to 40km (without dispersion compensation) for 10GbE-LAN (10GBASE-ER) and 10GbE-WAN (10GBASE-EW) services.

This transceiver provides digital diagnostic functions via a 2-wire serial interface as defined by the SFF-8472 specification. The transceiver is available in two temperature range options, one being the Industrial temperature range (I-temp): -40°C to 85°C (-40°F to 185°F).

The transceiver module is compliant to RoHS-6/6.

TECHNICAL DATA

Technology	DWDM 100GHz SFP+
Transmission media	SM (2x LC)
Typical reach	40 km
Nominal wavelength	192.10 - 196.00 THz (40ch)
Interface standards	10GBASE-ER 10GBASE-EW
Bit rate range	0.6 - 11.3 Gbps
Protocols	Eth: 10GbE-LAN 10GbE-WAN GbE
	OTN: OTU2e OTU2 OTU1
	SDH/SONET: STM-64/OC-192 STM-16/OC-48 STM-4/OC-12
	FC: 10G FC 8G FC 4G FC 1G FC
	CPRI: Opt 1 (0.6144 Gbps) Opt 2 (1.2288 Gbps) Opt 3 (2.4576 Gbps) Opt 4 (3.0720 Gbps) Opt 5 (4.9152 Gbps) Opt 6 (6.1440 Gbps) Opt 7 (9.8304 Gbps) Opt 7A (8.11008 Gbps) Opt 8 (10.1376 Gbps)
	OBSAI: 1x (0.768 Gbps) 2x (1.536 Gbps) 4x (3.0720 Gbps) 8x (6.1440 Gbps)
Power budget	5.0 - 14.0 dB
Dispersion tolerance	-300 to +800 ps/nm ¹⁾
Dispersion penalty	2.0 dB @ 800 ps/nm ¹⁾
Temperature range	0°C to +70°C (Dxxxx) -40°C to +85°C (Dxxxx-I)
Power consumption	< 2W

Transmitter data	Output power:	Min: -1.0 dBm Max: +4.0 dBm
	Tx wavelength:	192.10 - 196.00 THz in 100GHz steps (G.694.1)
Receiver data	Minimum input power:	-15.0 dBm ¹⁾
	Max input power:	-1.0 dBm
	Wavelength range:	1480 – 1580 nm
DDM		Yes
MSA compliance		SFF-8431 SFF-8432 SFF-8472

¹⁾ @ 10.3Gbps

Regulatory compliance

EMC CE	EN 55022:2010 EN 55024:2010
UL/Safety	UL 60950-1
FCC	47 CFR PART 15 OCT, 2013
RoHS	RoHS 6
TUV	EN 60950-1:2006+A11+A1+A12+A2 EN 60825-1:2014 EN 60825-2:2004+A1+A2

Storage temp. -40°C to 85°C

Note! See "Definitions" below.

Note: IEEE 802.3ae 10GBASE-ER/EW is defined only at 1550 nm. The standard is referred to from bridgeable distance perspective for the other wavelengths within the DWDM band.

Subject to change without notice.

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ORDERING INFORMATION

Part number	Freq. THz	λ nm	Part number	Freq. THz	λ nm
SO-SFP-10GE-ER-D9210	192.10	1560.61	SO-SFP-10GE-ER-D9410	194.10	1544.53
SO-SFP-10GE-ER-D9220	192.20	1559.79	SO-SFP-10GE-ER-D9420	194.20	1543.73
SO-SFP-10GE-ER-D9230	192.30	1558.98	SO-SFP-10GE-ER-D9430	194.30	1542.94
SO-SFP-10GE-ER-D9240	192.40	1558.17	SO-SFP-10GE-ER-D9440	194.40	1542.14
SO-SFP-10GE-ER-D9250	192.50	1557.36	SO-SFP-10GE-ER-D9450	194.50	1541.35
SO-SFP-10GE-ER-D9260	192.60	1556.55	SO-SFP-10GE-ER-D9460	194.60	1540.56
SO-SFP-10GE-ER-D9270	192.70	1555.75	SO-SFP-10GE-ER-D9470	194.70	1539.77
SO-SFP-10GE-ER-D9280	192.80	1554.94	SO-SFP-10GE-ER-D9480	194.80	1538.98
SO-SFP-10GE-ER-D9290	192.90	1554.13	SO-SFP-10GE-ER-D9490	194.90	1538.19
SO-SFP-10GE-ER-D9300	193.00	1553.33	SO-SFP-10GE-ER-D9500	195.00	1537.40
SO-SFP-10GE-ER-D9310	193.10	1552.52	SO-SFP-10GE-ER-D9510	195.10	1536.61
SO-SFP-10GE-ER-D9320	193.20	1551.72	SO-SFP-10GE-ER-D9520	195.20	1535.82
SO-SFP-10GE-ER-D9330	193.30	1550.92	SO-SFP-10GE-ER-D9530	195.30	1535.04
SO-SFP-10GE-ER-D9340	193.40	1550.12	SO-SFP-10GE-ER-D9540	195.40	1534.25
SO-SFP-10GE-ER-D9350	193.50	1549.32	SO-SFP-10GE-ER-D9550	195.50	1533.47
SO-SFP-10GE-ER-D9360	193.60	1548.51	SO-SFP-10GE-ER-D9560	195.60	1532.68
SO-SFP-10GE-ER-D9370	193.70	1547.72	SO-SFP-10GE-ER-D9570	195.70	1531.90
SO-SFP-10GE-ER-D9380	193.80	1546.92	SO-SFP-10GE-ER-D9580	195.80	1531.12
SO-SFP-10GE-ER-D9390	193.90	1546.12	SO-SFP-10GE-ER-D9590	195.90	1530.33
SO-SFP-10GE-ER-D9400	194.00	1545.32	SO-SFP-10GE-ER-D9600	196.00	1529.55

The transceiver version supporting the extended temperature range -40°C to 85°C (-40°F to 185°F) has the suffix “-I” in the part number, e.g. SO-SFP-10GE-ER-D9210-I.

DEFINITIONS

Technology:	Grey; Transceiver type for non-WDM applications. Electrical or optical. CWDM; Transceiver type for CWDM applications using G.694.2 channel grid. DWDM; Transceiver type for DWDM applications using G.694.1 channel grid. BiDi; Transceiver pair using two different wavelength channels operating on a single-fiber. DAC: Direct Attach Cable (DAC). Electrical or optical cable with attached connectors.
Transmission Media:	Type of fiber, e.g. Multimode (MM) or Singlemode (SM). Number of and connector type within brackets (e.g. 2x LC, 1x MPO).
Typical reach:	Nominal distance performance based on dispersion and power budget properties, i.e. w/o dispersion compensation and optical amplification.
Bit rate range:	Supported bit rate range in Gigabit or Megabit per second (Gbps or Mbps).
Protocols:	Protocols within supported bit rate range.
Nominal wavelength:	Typical wavelength from transmitter.
Interface standards:	Referenced interface standards e.g. IEEE 802.3 standard for 10GbE services.
Power budget:	Min and max power budget between Transmitter and Receiver. Excluding any dispersion penalty.
Dispersion tolerance/penalty:	Maximum amount of tolerated dispersion and required reduction of power budget to maintain BER better than $1E^{-12}$. Defined at a specific bit rate.
Temperature range:	Max operating case temperature range. Standard temperature range: typically 0°C to +70°C (32°F to +158°F) Extended temperature range (E-temp): typically -20°C to +75°C (-4°F to +167°F) Industrial temperature range (I-temp): -40°C to +85°C (-40°F to +185°F)
Power consumption:	Worst case power consumption.
Transmitter Output power:	Average output power. Provided in min and max values.
Receiver minimum input power:	Minimum average input power at specified BER, normally $1E^{-12}$.
Receiver max input power:	Maximum average input power giving a BER, normally $1E^{-12}$.
DDM:	Digital Diagnostic Monitoring functionality as defined in SFF-8472 MSA.