

# 16G-ER-DXXX-BR1

SFP+, 16/8/4 Gbps FC/FICON, DWDM 100GHz, DDM, 14dB, 40km, D200 - D600 (41ch)



## OVERVIEW

The 16G-ER-Dxxx-BR1 is a versatile DWDM transceiver in SFP+ form-factor supporting a wide range of Fiber Channel (FC) services (4G to 16G). The transceiver has been layer-1 tested and approved by Brocade.

The transceiver is provided in 41 channel versions at the 100GHz DWDM grid as specified in the ITU-T 694.1 standard. The transceiver can also be used in 1550/1530nm CWDM applications by selecting wavelength versions that match these.

The optical performance provides a bridgeable distance of up to 40km (without dispersion compensation) for 16G FC. This transceiver provides digital diagnostic functions via a 2-wire serial interface as defined by the SFF-8472 specification.

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

## TECHNICAL DATA

<b>Technology</b>	DWDM 100GHz SFP+
<b>Transmission media</b>	SM (2x LC)
<b>Typical reach</b>	40 km
<b>Nominal wavelength</b>	192.00 - 196.00 THz (41ch)
<b>Bit rate range</b>	4.25 – 14.025 Gbps
<b>Protocols</b> FC:	16G FC 8G FC 4G FC
<b>Power budget</b>	6 – 13 dB <sup>1)</sup> 6 – 14 dB <sup>2) 3)</sup>
<b>Dispersion tolerance</b>	800 ps/nm
<b>Dispersion penalty</b>	Max: 2dB
<b>Temperature range</b>	0°C to +70°C
<b>Power consumption</b>	< 2.2 W

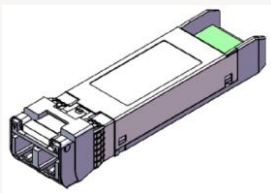
<b>Transmitter data</b>	<b>Output power (avg):</b>	Min: 0 dBm <sup>1)</sup> Max: +4 dBm <sup>1)</sup>
	<b>Tx wavelength:</b>	192.00 - 196.00 THz in 100GHz steps (G.694.1)
<b>Receiver data</b>	<b>Minimum input power:</b>	-13.0 dBm <sup>1) 4)</sup> -14.0 dBm <sup>2) 4)</sup> -14.0 dBm <sup>3) 4)</sup>
	<b>Max input power:</b>	-2.0 dBm
	<b>Wavelength range:</b>	1480 – 1580 nm
<b>DDM</b>		Yes
<b>MSA compliance</b>		SFP+ MSA

- <sup>1)</sup> @ 14.025 Gbps (16G FC)  
<sup>2)</sup> @ 8.5 Gbps (8G FC)  
<sup>3)</sup> @ 4.25 Gbps (4G FC)  
<sup>4)</sup> @ BER < 1E-12 using PRBS 2<sup>31</sup>-1

### Regulatory compliance

<b>RoHS</b>	RoHS 6
<b>Safety</b>	EN 60825-1 Class 1 laser product

<b>Storage temp.</b>	-40°C to 85°C
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For a 1550nm CWDM channel the DWDM channels D250 – D410 can be used.  
 For a 1530nm CWDM channel the DWDM channels D500 – D600 can be used.  
 (The ITU G.694.2 channel grid states 1551/1531nm ± 7nm)

For 1550nm single-channel applications, the ITU-T G.959 states 1500nm – 1565nm, which means any channel between D200 – D600.

Subject to change without notice.

For more information visit [smaroptics.com](http://smaroptics.com).

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## ORDERING INFORMATION

Part number	ITU channel	$\lambda$ nm	Part number	Freq. THz	$\lambda$ nm
16G-ER-D200-BR1	192.00	1561.42	16G-ER-D400-BR1	194.00	1545.32
16G-ER-D210-BR1	192.10	1560.61	16G-ER-D410-BR1	194.10	1544.53
16G-ER-D220-BR1	192.20	1559.79	16G-ER-D420-BR1	194.20	1543.73
16G-ER-D230-BR1	192.30	1558.98	16G-ER-D430-BR1	194.30	1542.94
16G-ER-D240-BR1	192.40	1558.17	16G-ER-D440-BR1	194.40	1542.14
16G-ER-D250-BR1	192.50	1557.36	16G-ER-D450-BR1	194.50	1541.35
16G-ER-D260-BR1	192.60	1556.55	16G-ER-D460-BR1	194.60	1540.56
16G-ER-D270-BR1	192.70	1555.75	16G-ER-D470-BR1	194.70	1539.77
16G-ER-D280-BR1	192.80	1554.94	16G-ER-D480-BR1	194.80	1538.98
16G-ER-D290-BR1	192.90	1554.13	16G-ER-D490-BR1	194.90	1538.18
16G-ER-D300-BR1	193.00	1553.33	16G-ER-D500-BR1	195.00	1537.40
16G-ER-D310-BR1	193.10	1552.52	16G-ER-D510-BR1	195.10	1536.61
16G-ER-D320-BR1	193.20	1551.72	16G-ER-D520-BR1	195.20	1535.82
16G-ER-D330-BR1	193.30	1550.92	16G-ER-D530-BR1	195.30	1535.04
16G-ER-D340-BR1	193.40	1550.12	16G-ER-D540-BR1	195.40	1534.25
16G-ER-D350-BR1	193.50	1549.32	16G-ER-D550-BR1	195.50	1533.47
16G-ER-D360-BR1	193.60	1548.51	16G-ER-D560-BR1	195.60	1532.68
16G-ER-D370-BR1	193.70	1547.72	16G-ER-D570-BR1	195.70	1531.90
16G-ER-D380-BR1	193.80	1546.92	16G-ER-D580-BR1	195.80	1531.12
16G-ER-D390-BR1	193.90	1546.12	16G-ER-D590-BR1	195.90	1530.33
			16G-ER-D600-BR1	196.00	1529.55

## DEFINITIONS

Technology:	CWDM; Transceiver type for CWDM applications using G.694.2 channel grid. DWDM; Transceiver type for DWDM applications using G.694.1 channel grid.
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 at specified BER, normally $1E^{-12}$ .
DDM:	Digital Diagnostic Monitoring functionality as defined in SFF-8472 MSA.