BROCADE

32G-IR-Dxxx-BR

SFP28, 8/16/32G FC, DWDM 100GHz, DDM, 7dB, 10km, D200-D600 (41ch)

OVERVIEW

The 32G-IR-Dxxx-BR is a versatile DWDM transceiver in SFP28 form-factor supporting a wide range of Fiber Channel (FC) services (8G to 32G). The transceiver is provided in versions covering all C-band channels in the 100GHz DWDM grid as specified in the ITU-T G.694.1 standard. The transceiver has been layer-1 tested and approved by Brocade.

The transceiver has an inbuilt 3-mode CDR (Clock Data Recovery) function;
- High data rate mode for 32G FC
- Low data rate mode for 16G FC
- Bypass mode for 8 GFC

The optical performance provides a bridgeable distance of up to 10km (without dispersion compensation) for 32G 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

Parameter	Value
Technology	DWDM 100GHz SFP28
Transmission media	SM (2x LC)
Typical reach	10km
Nominal wavelengths	192.00 - 196.00THz
Bit rate support	28.05Gbps
	14.025Gbps
	8.500Gbps
Protocol support	32GFC
	16GFC
	8GFC
Power budget	0 – 7.0dB
Dispersion tolerance	-170 to +170ps/nm
Power consumption	< 2.0W
Operating temperature	0°C to +70°C
Storage temperature	-40°C to +85°C

Parameter	Value
Transmitter data:	
Output power	Min: -3.0dBm [2]
	Max: +2.0dBm [2]
Transmit wavelengths	192.00 - 196.00THz
	100GHz (ITU-T G.694.1)
Receiver data:	
Minimum input power	-10.0dBm [1] [2]
Overload (max power)	+2.0dBm [1] [2]
Wavelength range	1480 - 1580nm
DDM	Yes
MSA compliance	SFP28 MSA
	SFF-8402

[1] @ 28.05 Gbps (32G FC) and BER < 10^{-6} using PRBS 2^{31}-1

[2] Average power

Safety/regulatory compliance:
TUV/UL/FDA (contact Smartoptics for latest certification information)
RoHS compliance

Note: Optical BER performance is specified at a BER 1E-6 implying that Reed Solomon RS-FEC encoding/decoding shall be used to provide sufficient BER performance.

Subject to change without notice.
For more information visit smartoptics.com.

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RATE SELECT OPERATION

The 32G-IR-DxxS--BR supports high data rates 25.78G/28.05G with CDR engaged and Low data rate 14.025G with CDR half-rate engaged, 8.5G with CDR bypassed.

RS0	RS1	Rx data rate	Tx data rate
High/1	High/1	28.05Gbps	28.05Gbps
Low/0	Low/0	14.025/8.5Gbps	14.025/8.5Gbps

LOOPBACK CONFIGURATION

E-wrap Loopback: User can configure e-wrap loopback by writing 0x01 to byte 111 of A2H. The default value of byte 111 of A2H is 0x00. Please note that the changed value will not be saved at power-off.

O-wrap Loopback: User can configure e-wrap loopback by writing 0x04 to byte 111 of A2H. The default value of byte 111 of A2H is 0x00. Please note that the changed value will not be saved at power-off.

ORDERING INFORMATION

Ordering number	Frequency THz	Wavelength nm
32G-IR-D200-BR	192.00	1561.42
32G-IR-D210-BR	192.10	1560.61
32G-IR-D220-BR	192.20	1559.79
32G-IR-D230-BR	192.30	1558.98
32G-IR-D240-BR	192.40	1558.17
32G-IR-D250-BR	192.50	1557.36
32G-IR-D260-BR	192.60	1556.55
32G-IR-D270-BR	192.70	1555.75
32G-IR-D280-BR	192.80	1554.94
32G-IR-D290-BR	192.90	1554.13
32G-IR-D300-BR	193.00	1553.33
32G-IR-D310-BR	193.10	1552.52
32G-IR-D320-BR	193.20	1551.72
32G-IR-D330-BR	193.30	1550.92
32G-IR-D340-BR	193.40	1550.12
32G-IR-D350-BR	193.50	1549.32
32G-IR-D360-BR	193.60	1548.51
32G-IR-D370-BR	193.70	1547.72
32G-IR-D380-BR	193.80	1546.92
32G-IR-D390-BR	193.90	1546.12
32G-IR-D400-BR	194.00	1545.32

Ordering number	Frequency THz	Wavelength nm
32G-IR-D410-BR	194.10	1544.53
32G-IR-D420-BR	194.20	1543.73
32G-IR-D430-BR	194.30	1542.94
32G-IR-D440-BR	194.40	1542.14
32G-IR-D450-BR	194.50	1541.35
32G-IR-D460-BR	194.60	1540.56
32G-IR-D470-BR	194.70	1539.77
32G-IR-D480-BR	194.80	1538.98
32G-IR-D490-BR	194.90	1538.19
32G-IR-D500-BR	195.00	1537.40
32G-IR-D510-BR	195.10	1536.61
32G-IR-D520-BR	195.20	1535.82
32G-IR-D530-BR	195.30	1535.04
32G-IR-D540-BR	195.40	1534.25
32G-IR-D550-BR	195.50	1533.47
32G-IR-D560-BR	195.60	1532.68
32G-IR-D570-BR	195.70	1531.90
32G-IR-D580-BR	195.80	1531.12
32G-IR-D590-BR	195.90	1530.33
32G-IR-D600-BR	196.00	1529.55

Network Optical Equipment

GENERAL DEFINITIONS

Parameter	Description
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. Electrical cable with attached connectors. AOC: Active Optical Cable. 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 typical fiber dispersion, fiber loss and power budget properties, i.e. w/o dispersion compensation and optical amplification. Actual distance is dependent on actual optical path loss and dispersion properties.
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(s) from transmitter.
Interface standards	Referenced interface standards or MSA's, e.g. IEEE 802.3 standard for 10GbE services or 100G 4WDM-10 etc.
Power budget	Min and max power budget between Transmitter and Receiver w/o optical path penalties.
Dispersion tolerance/penalty	Maximum amount of tolerated dispersion and required reduction of power budget to maintain stipulated Bit Error Rate (BER) and at a given bit rate.
Temperature range	Max operating case temperature range. Standard temperature range (C-temp): 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. Will vary over temperature.
Transmitter Output power	Average output power. Provided in min and max values.
Receiver minimum input power	Minimum average input power at specified BER, normally $1E^{-12}$. Note that some protocols require FEC to achieve sufficient BER.
Receiver max input power	Maximum average input power giving a BER, normally $1E^{-12}$.
DDM	Digital Diagnostic Monitoring functionality as defined in e.g. SFF-8472 MSA.

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