

### **E1MG-LHB-DW3347-NT-C**

Brocade® E1MG-LHB-DW3347 Compatible TAA 1000Base-DWDM 100GHz SFP Transceiver (SMF, 1533.47nm, 120km, LC, DOM)

#### **Features:**

- INF-8074 and SFF-8472 Compliance
- Duplex LC Connector
- Commercial Temperature 0 to 70 Celsius
- Single-mode Fiber
- Hot Pluggable
- Excellent ESD Protection
- Metal with Lower EMI
- RoHS Compliant and Lead Free



#### **Applications:**

- Gigabit Ethernet over DWDM
- 1x Fibre Channel
- Access, Metro and Enterprise

#### **Product Description**

This Brocade® (Formerly) E1MG-LHB-DW3347 compatible SFP transceiver provides 1000Base-DWDM throughput up to 120km over single-mode fiber (SMF) using a wavelength of 1533.47nm via an LC connector. It is guaranteed to be 100% compatible with the equivalent Brocade® (Formerly) transceiver. This easy to install, hot swappable transceiver has been programmed, uniquely serialized and data-traffic and application tested to ensure that it will initialize and perform identically. Digital optical monitoring (DOM) support is also present to allow access to real-time operating parameters. This transceiver is Trade Agreements Act (TAA) compliant. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

ProLabs's transceivers are RoHS compliant and lead-free.

TAA refers to the Trade Agreements Act (19 U.S.C. & 2501-2581), which is intended to foster fair and open international trade. TAA requires that the U.S. Government may acquire only "U.S. – made or designated country end products."



## Regulatory Compliance

- ESD to the Electrical PINs: compatible with MIL-STD-883E Method 3015.4
- ESD to the LC Receptacle: compatible with IEC 61000-4-3
- EMI/EMC compatible with FCC Part 15 Subpart B Rules, EN55022:2010
- Laser Eye Safety compatible with FDA 21CFR, EN60950-1& EN (IEC) 60825-1,2
- RoHS compliant with EU RoHS 2.0 directive 2015/863/EU

## Absolute Maximum Ratings

| Parameter                               | Symbol | Min. | Typ. | Max. | Unit | Notes |
|---|--------|------|------|------|------|-------|
| Maximum Supply Voltage                  | Vcc    | 0    |      | 3.6  | V    |       |
| Storage Temperature                     | TS     | -40  |      | +85  | °C   |       |
| Operating Case Temperature              | Tc     | 0    |      | +70  | °C   |       |
| Relative Humidity                       | RH     | 5    |      | 85   | %    | 1     |
| Electrical static discharge (HBM Model) | ESD    | 500  |      | 1000 | V    | 2     |
| Receiver Optical Damage Threshold       | RXDmg  |      |      | +3.5 | dBm  | 3     |

### Notes:

1. Non-condensing
2. ESD, per JEDEC JESD22-A114-B
3. This must not be exceeded

## Electrical Characteristics

| Parameter               | Symbol | Min. | Typ. | Max. | Unit | Notes |
|-------------------------|--------|------|------|------|------|-------|
| Power Supply Voltage    | Vcc    | 3.14 | 3.3  | 3.46 | V    |       |
| Power supply current    | Icc    |      |      | 550  | mA   |       |
| Total power dissipation | PD     |      |      | 1.8  | W    |       |

## Optical Characteristics

| Parameter  | Symbol         | Min.               | Typ. | Max.             | Unit     |
|--|----------------|--------------------|------|------------------|----------|
| <b>Transmitter</b>                                 |                |                    |      |                  |          |
| Signaling Rate                                     |                |                    |      | 1.25             | Gbps     |
| Optical Output Power                               | P <sub>o</sub> | -1                 |      | +5               | dBm      |
| Transmission Distance                              |                | 0                  |      | 120              | km       |
| Transmitter Dispersion Penalty                     | TDP            |                    |      | 2                | dB       |
| Extinction Ratio                                   | ER             | 8.2                |      |                  | dB       |
| Optical Eye Shape & Mask                           |                | IEEE 802.3ab       |      |                  |          |
| Eye Mask Margin                                    |                | 10                 |      |                  | %        |
| Spectral Width                                     |                |                    |      | 1                | nm       |
| Optical Frequency Tuning Range (5 bands)           |                | 192.00 (1561.42)   |      | 195.90 (1530.33) | THz (nm) |
| SMSR   |                | 30                 | 35   |                  | dB       |
| Optical Frequency Minimum Tuning Grid              |                | 100                |      |                  | GHz      |
| Optical Centre Wavelength                          | $\lambda_c$    | As per ITU-T 694.1 |      |                  | nm       |
| Optical Frequency Accuracy (deviation from centre) |                | -12.5              |      | +12.5            | GHz      |
| Time to Initialize Cooled Operation                |                |                    | 10   | 90               | Sec      |
| Tuning Speed (Channel to Channel)                  |                |                    |      | 10               | Sec      |
| <b>Receiver</b>                                    |                |                    |      |                  |          |
| Receiver Wavelength Range                          |                | 191.00 (1569.59)   |      | 197.00 (1521.79) | THz (nm) |
| Receiver Overload                                  |                | -12                |      |                  | dBm      |
| Receiver Sensitivity (BER 1E-12, PRBS 231-1)       |                |                    |      | -30              | dBm      |
| Receiver Optical Reflectance                       |                |                    |      | -27              | dB       |
| LOS assert   |                | -35                |      | -30              | dBm      |
| LOS assert/de-assert hysteresis                    |                | 0.5                |      | 2.0              | dB       |

## Block Diagram



## Pin Descriptions

| Pin | Logic     | Symbol     | Name/Descriptions                                    | Notes |
|-----|-----------|------------|--|-------|
| 1   |           | VeeT       | Module Transmitter Ground                            | 1     |
| 2   | LVTTL-O   | TX Fault   | Module Transmitter Fault                             | 2     |
| 3   | LVTTL-I   | TX Disable | Transmitter Disable. Turns off laser output          | 3     |
| 4   | LVTTL-I/O | SDA        | 2-wire Serial interface Data line                    |       |
| 5   | LVTTL-I/O | SCL        | 2-wire Serial Interface Clock                        |       |
| 6   |           | Mod ABS    | Module absent, connect to VeeT or VeeR in the module |       |
| 7   | LVTTL-I   | RS0        | Unused   |       |
| 8   | LVTTL-O   | Rx LOS     | Receiver Loss of Signal Indication                   | 2     |
| 9   | LVTTL-I   | RSI        | Unused   |       |
| 10  |           | VeeR       | Module Receiver Ground                               | 1     |
| 11  |           | VeeR       | Module Receiver Ground                               | 1     |
| 12  | CML-O     | RD-        | Receiver Inverted Data Output                        |       |
| 13  | CML-O     | RD+        | Receiver Non-Inverted Data Output                    | 1     |
| 14  |           | VeeR       | Module Receiver Ground                               |       |
| 15  |           | VccR       | Module Receiver 3.3V Supply                          |       |
| 16  |           | VccT       | Module Transmitter 3.3V Supply                       |       |
| 17  |           | VeeT       | Module Transmitter Ground                            | 1     |
| 18  | CML-I     | TD+        | Transmitter Non-Inverted Data Input                  |       |
| 19  | CML-I     | TD-        | Transmitter Inverted Data Input                      |       |
| 20  |           | VeeT       | Module Transmitter Ground                            | 1     |

## Notes:

1. The module signal ground pins, VeeR and VeeT, are isolated from the module chassis ground.

2. This pin is an open collector/drain output pin and shall be pulled up with 4.7-10 kohms to power supply voltage between 3.3V and 3.5V on the host board.
3. TX\_Disable is an input contact with a 4.7-10 kohm pull-up to VccT inside the module.

### Electrical Pin-out Details



### Mechanical Specifications

Small Form Factor Pluggable (SFP) transceivers are compatible with the dimensions defined by the SFP Multi-Sourcing Agreement (MSA).

W 13.9mm x L 56.5mm x H 11.85mm



## **About ProLabs**

Our experience comes as standard; for over 15 years ProLabs has delivered optical connectivity solutions that give our customers freedom and choice through our ability to provide seamless interoperability. At the heart of our company is the ability to provide state-of-the-art optical transport and connectivity solutions that are compatible with over 90 optical switching and transport platforms.

## **Complete Portfolio of Network Solutions**

ProLabs is focused on innovations in optical transport and connectivity. The combination of our knowledge of optics and networking equipment enables ProLabs to be your single source for optical transport and connectivity solutions from 100Mb to 400G while providing innovative solutions that increase network efficiency. We provide the optical connectivity expertise that is compatible with and enhances your switching and transport equipment.

## **Trusted Partner**

Customer service is our number one value. ProLabs has invested in people, labs and manufacturing capacity to ensure that you get immediate answers to your questions and compatible product when needed. With Engineering and Manufacturing offices in the U.K. and U.S. augmented by field offices throughout the U.S., U.K. and Asia, ProLabs is able to be our customers best advocate 24 hours a day.

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