Data Sheet

AFBR-1715TZ

DC to 50-Mbaud, 850-nm VCSEL Miniature Link Fiber-Optic Transmitter

Description

The Broadcom® AFBR-1715TZ is a high-performance optical transmitter designed for a fiber-optic communication link with a data rate from DC to 50 Mbaud. The optical transmitter uses an 850-nm VCSEL source with integrated optics and driver IC to realize a low-powered device suitable for industrial applications with link distances up to several kilometers.

The AFBR-1715TZ is compliant with popular “industry-standard” ST connectors, and it is designed for use with 62.5/125-µm and 105-µm multimode fiber (MMF).

Features

- RoHS compliant
- Data rate support from DC to 50 Mbaud
- Single 3.3V power supply
- Manufactured in an ISO 9001 certified facility
- 62.5/125-µm or 105-µm MMF
- Low current consumption and low power dissipation
- Class 1 FDA IEC 60825-1 laser safety compliant
- Operating temperature: –40°C to +85°C
- Excellent EMI and EMC behavior
- Incorporates an 850-nm VCSEL and driver IC with an LVTTL input logic transmitter
- Hermetically sealed package

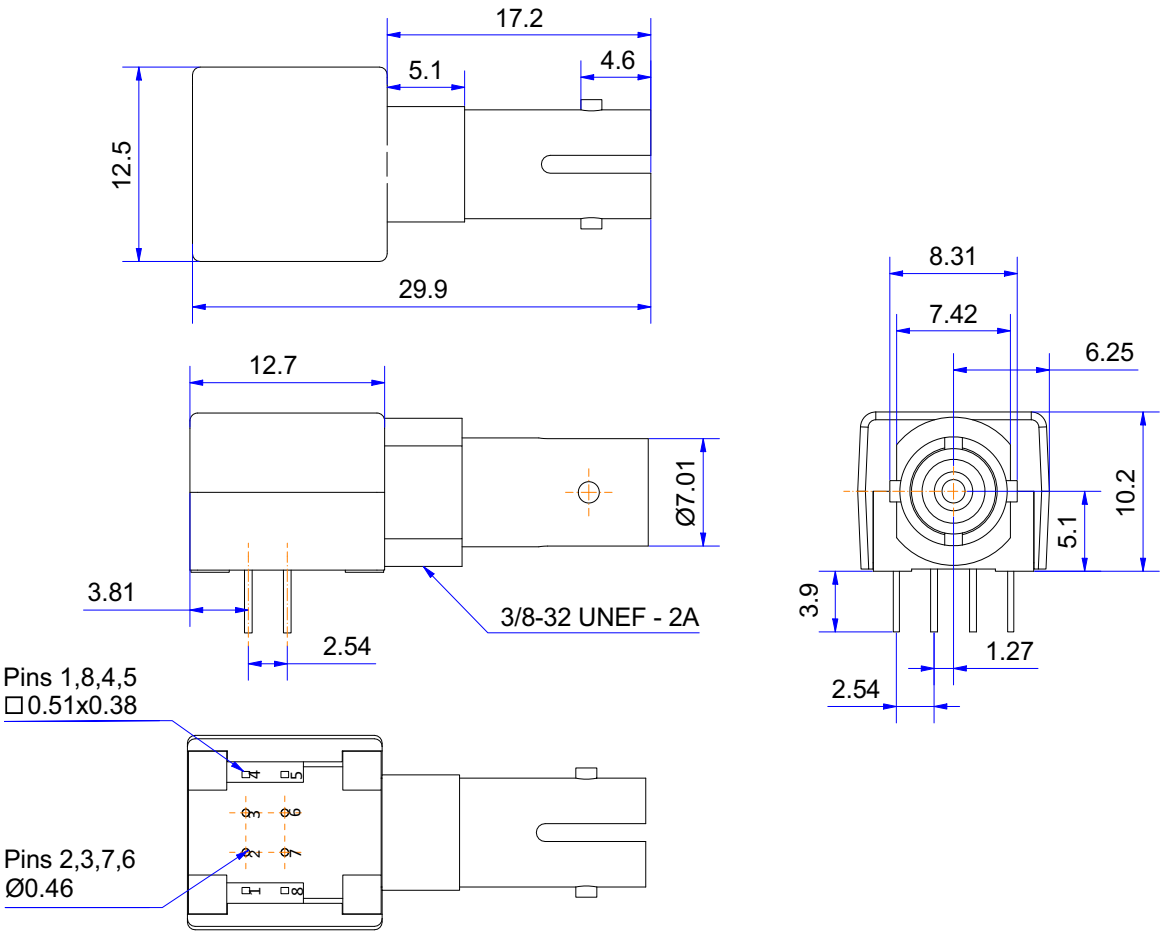
Applications

- Power substation automation
- HVDC
- Industrial networking over MMF

Regulatory Compliance

Feature	Test Method	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	JEDEC JESD22-A114	HBM Class 2 (2000V to <4000V)
Product Safety Laser Safety	EN62368-1 EN60825-1 EN60825-2 FDA/CDRH	Laser Class 1 Complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC 60825-1 Ed. 3., as described in Laser Notice No. 56, dated May 8, 2019
RoHS Compliance	—	Reference to RoHS Directive 2011/65EU Annex II and RoHS RL (EU) 2015-863
Moisture Sensitivity Level (MSL)	J-STD-020D	1 (Unlimited floor life time)

Mechanical Dimensions and Module Drawing

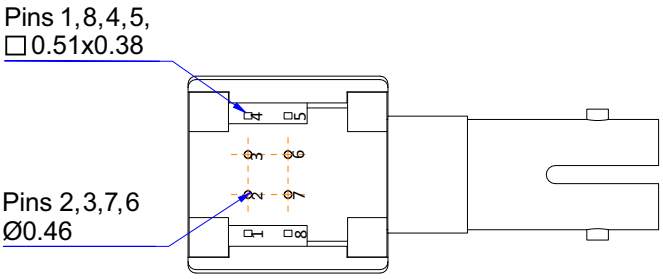


NOTE:

- Dimensions are in millimeters (mm).
- A finished hole diameter of at least 1.02 mm (0.04 in.) is recommended for all eight pins to ensure smooth mounting on the PCB.

Pin Description

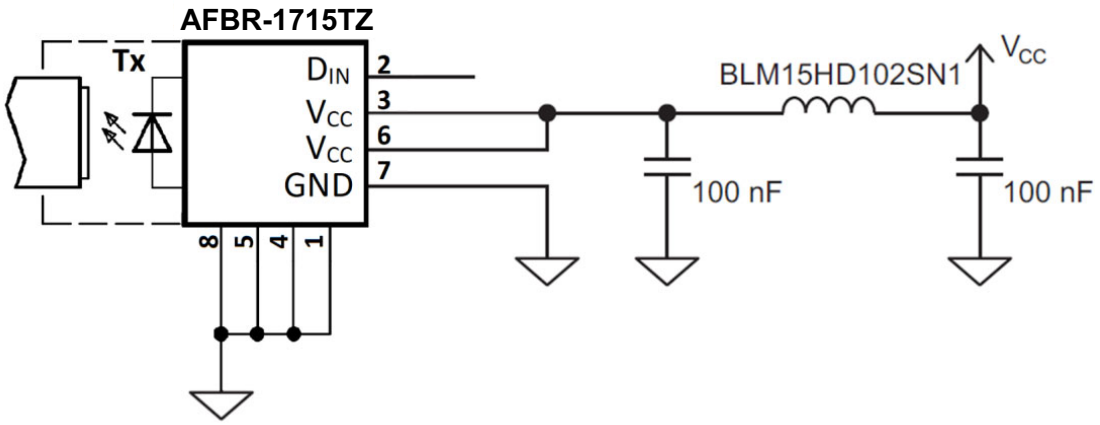
Bottom View



Pin	Name (Function)	Notes
1	N.C.	a
2	D_{IN} (TX Data In [LVTTL])	
3	V_{CC} (3.3V Supply Voltage)	
4	N.C.	a
5	N.C.	a
6	V_{CC} (3.3V Supply Voltage)	
7	GND (Ground)	
8	N.C.	a

a. Pins 1, 4, 5, and 8 are connected together internally.

Recommended Application Circuit



Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause catastrophic damage to the device. Limits apply to each parameter in isolation, all other parameters having values within the recommended operation conditions. It should not be assumed that limiting values of more than one parameter can be applied to the products at the same time. Exposure to the absolute maximum ratings for extended periods can adversely affect device reliability.

Parameter	Symbol	Min.	Max.	Units	Notes
Storage Temperature	T_S	–40	+85	°C	
Supply Voltage	V_{CC}	–0.3	3.6	V	
Data Input Voltage	V_{IN}	–0.5	V_{cc}	V	
Lead Soldering Temperature	T_{sold}	—	260	°C	MSL1
Lead Soldering Time	t_{sold}	—	10	s	

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Units	Notes
Ambient Operating Temperature	T_A	–40	—	+85	°C	a
Supply Voltage	V_{CC}	3.0	3.3	3.6	V	
Data Rate	DR	DC	—	50	Mbaud	b

a. Electrical and optical specifications of the product are guaranteed across the recommended ambient operating temperature range only.

b. Characterized with a 50-Mbaud PRBS 2^7-1 pattern.

Transmitter Electrical Characteristics

T_A = –40°C to +85°C, V_{CC} = 3.3V ± 0.3V

Parameter	Symbol	Min.	Typ.	Max.	Units	Notes
Supply Current	I_{CC}	—	6.5	10	mA	a
Power Dissipation	P_{DISS}	—	—	36	mW	
Data Input Voltage – Low	V_{INL}	0	—	0.8	V	
Data Input Voltage – High	V_{INH}	2	—	V_{CC}	V	
Data Input Capacitance	C_{IN}	—	5	—	pF	
Data Input Resistance	R_{IN}	—	80	—	kΩ	
Propagation Delay	t_{TD}	—	6	15	ns	

a. Typical value at 3.3V and 25°C.

Transmitter Optical Characteristics

T_A = –40°C to +85°C, V_{CC} = 3.3V ± 0.3V

Parameter	Symbol	Min.	Typ.	Max.	Units	Notes
Optical Output Power Peak (62.5/125 µm or 105 µm)	P_o	–8.2	–1.5	+2	dBm	a, b
Extinction Ratio	EXT	10	—	—	dB	c
Logic-Low Optical Output Power Peak	$P_{o\_Logic\_Low}$	—	—	–37	dBm	d
Central Wavelength	λ_C	805	845	865	nm	a
Spectral Width – FWHM	$\Delta\lambda$	—	0.5	5	nm	a
Optical Rise Time (20% to 80%)	t_r	—	2	4	ns	a, e
Optical Fall Time (80% to 20%)	t_f	—	1.7	3	ns	a, e
Pulse Width Distortion	t_{TPWD1}	–7	—	+2	ns	e, f
Pulse Width Distortion	t_{TPWD2}	–5	—	+2	ns	e, g

a. Typical values are for 3.3V and 25°C.

b. Valid for operations without a mechanical load that affects the fiber-port coupling. A mechanical load that affects the fiber-port coupling can lead to a significant decline in coupling efficiency especially when using 62.5-µm MMF. To keep this effect low, the installation of a fiber relief or the use of 105-µm MMF is recommended.

c. Characterized with a 01 pattern at 50 Mbaud.

d. DC to 2.5 MHz.

e. Measured with a 200-MHz optical/electrical converter.

f. Electrical input of 50 Mbaud, measured with a long input of low pulse followed by a high pulse.

g. Electrical input of 50 Mbaud, 0101 pattern, and 50% duty cycle. Pulse width is measured at a 50% threshold.