HFBR-3810Z & HFBR-3810MSZ

650 nm Fiber Optics Link for DC to 10Mbaud

Data Sheet

Description

HFBR-3810Z consists of an optic transmitter and receiver operating at 650nm wavelength. The pin to pin air gap distance of 25.1mm provides transient voltage suppression of 12kV.

Applications

- Drives/Inverters
- Galvanic isolation on one single PCB

Features

- Data transmission at signal rates of DC to 10MBaud
- DC coupled receiver with CMOS/TTL output for easy designs: no data encoding or digitizing circuitry required
- High noise immunity
- RoHS compliant
- Transient voltage suppression of up to 12kV according IEC 60664-1
- Laser class 1 according to IEC-60825: Amendment 2001

HFBR-3810Z & HFBR-3810MSZ DC to 10MBaud Data Link

Absolute Maximum Ratings

Parameter		Symbol	Min.	Max.	Units
Signaling Rate		f_s	DC	10	Mbd
Storage and Operating Temperature		$T_{S,O}$	-40	+85	°C
Receiver supply voltage		V_{CC}	-0.5	+5.5	V
Receiver Average Output Current		$I_{O,AVG}$	-16	16	mA
Receiver Output Power Dissipation		P_{OD}		80	mW
Transmitter Peak Forward Input Current [1]		$I_{F,PK}$		90	mA
Transmitter Reverse Input Voltage		V_R		3	V
Rated impulse voltage [2]		V_T		12	kV
Lead Soldering Cycle [3, 4]	Temp	T_{SOL}		+260	°C
	Time			10	Sec
Nominal Voltage of the supply system [2]		Veff		1000	V

Notes:
1. For $I_{F,Pk}$ > 60mA, the duty cycle factor must maintain $I_{F,AV}$ ≤ 60mA and pulse width ≤ 1µs
2. [IEC 60664-1] Overvoltage category 4; inhomogeneous field; pollution degree 3; material group 2; altitude up to 2000m for HFBR-3810MSZ and up to 3000m for HFBR-3810Z above sea level
3. 1.6mm below seating plane; wave soldering only
4. MSL class 3

Recommended Operating Conditions

Parameter	Symbol	Min.	Max.	Units
Ambient Temperature	T_A	-40	85	°C
Power Supply Voltage [1]	V_{CC}	4.75	5.25	V
Transmitter Peak Forward Current [2]	$I_{F,P}$	54	90	mA
Transmitter Average Forward Current [2]	$I_{F,AV}$		60	mA

Note:
1. <100m_{p-p} Noise
2. Current applied at the transmitter must not exceed 50µA in order to guarantee a logical "1" at the RX output

Mechanical Dimensions

Parameter	Symbol	HFBR 3810Z	HFBR 3810MSZ	Unit
Clearance	d_C	25.1	20.1	mm
Creepage	d_{CP}	28.7	23.1	mm
Clearance Internal [1]	d_{CI}	21.1	21.1	mm
Creepage Internal [1]	d_{CPI}	25.1	25.1	mm

Notes:
1. Only air gap with non conductive mold the distance is 24.6mm.
2. CTI value of the housing material is 600.

All the data in this specification refers to the operating conditions above and over lifetime unless otherwise stated.

ATTENTION: *Stresses above those listed here may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.*

Electrical Input Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units
Forward Voltage [1]	V_F	1.8	2.1	2.65	V
Forward Voltage Temperature Coefficient	$\Delta V_F / \Delta T$		-1.8		mV/°C
Reverse Input Breakdown Voltage [2]	V_{BR}	3.0	13		V
Diode Capacitance [3]	C_0		60		pF

Notes:
1. $I_{F,dc}$ = 60mA
2. $I_{F,dc}$ = -10µA
3. V_F = 0V; f = 1MHz

Electrical Output Signal Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units	Condition
Supply Current (without LED current)	I_{CC}		27	45	mA	
High Level Output Voltage	V_{OH}	4.2	4.7		V	
Low Level Output Voltage	V_{OL}		0.22	0.4	V	
Output Risetime (10-90%) [1, 2]	t_r		10	20	ns	
Output Falltime (90-10%) [1, 2]	t_f		10	20	ns	
Power Supply Noise Immunity	PSNI	0.1	0.4		V_{pp}	Sine Wave DC - 10MHz

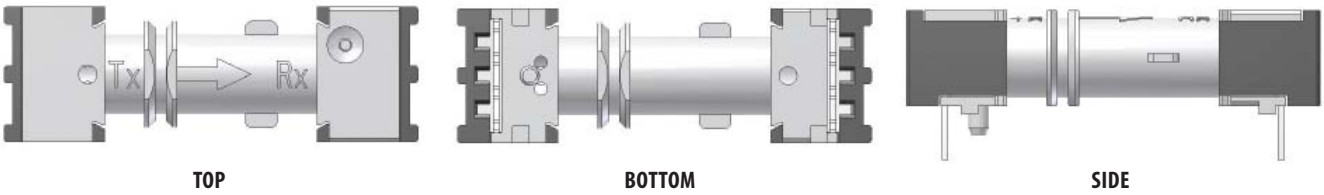
Notes:
1. C_L = 10pF
2. In the recommended drive circuit
3. Typical Value measured from junction to PC board solder joint for horizontal mount package

Specified Link Performance, T_A = -40° to +85°C, DC to 10MBaud, unless otherwise noted.

Parameter	Symbol	Min.	Typ	Max.	Unit	Condition
Signaling Rate	f_S	DC		10	Mbaud	NRZ
Pulse Width Variation [1]	PWV	80		120	ns	10Mbaud
Propagation Delay Time [2]	t_D		95		ns	Assuming a delay of 10ns from the application (already included)
Duty Cycle Distortion [3]	DCD	-10		+10	ns	10Mbaud

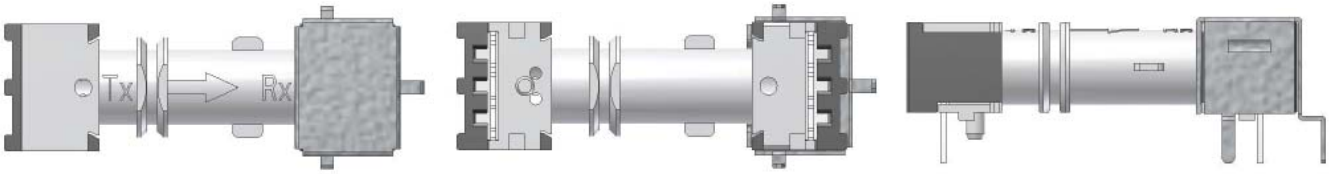
Notes:
1. Minimum/maximum duty cycle distortion +/-10ns
2. Determined from 50% of the rising edge of data_in to 50% of the consecutive falling egde of data_out
3. +/-10% of the nominal pulse width

Package views - HFBR-3810Z



TOP BOTTOM SIDE

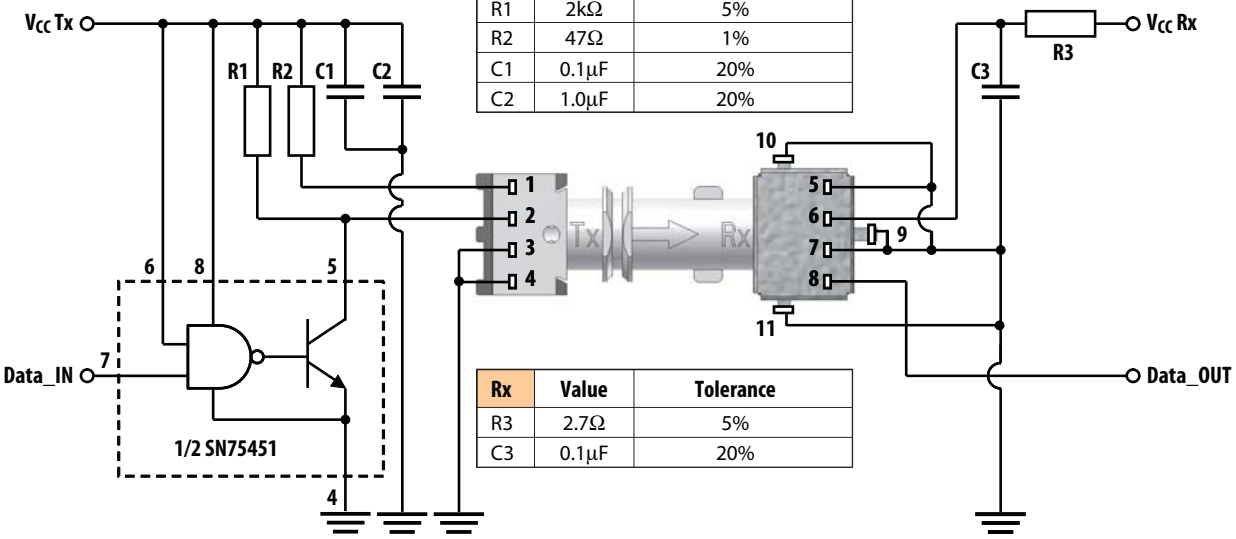
Package views - HFBR-3810MSZ



TOP BOTTOM SIDE

Mandatory Drive circuit – Top view

Tx	Value	Tolerance
R1	2kΩ	5%
R2	47Ω	1%
C1	0.1µF	20%
C2	1.0µF	20%



Rx	Value	Tolerance
R3	2.7Ω	5%
C3	0.1µF	20%

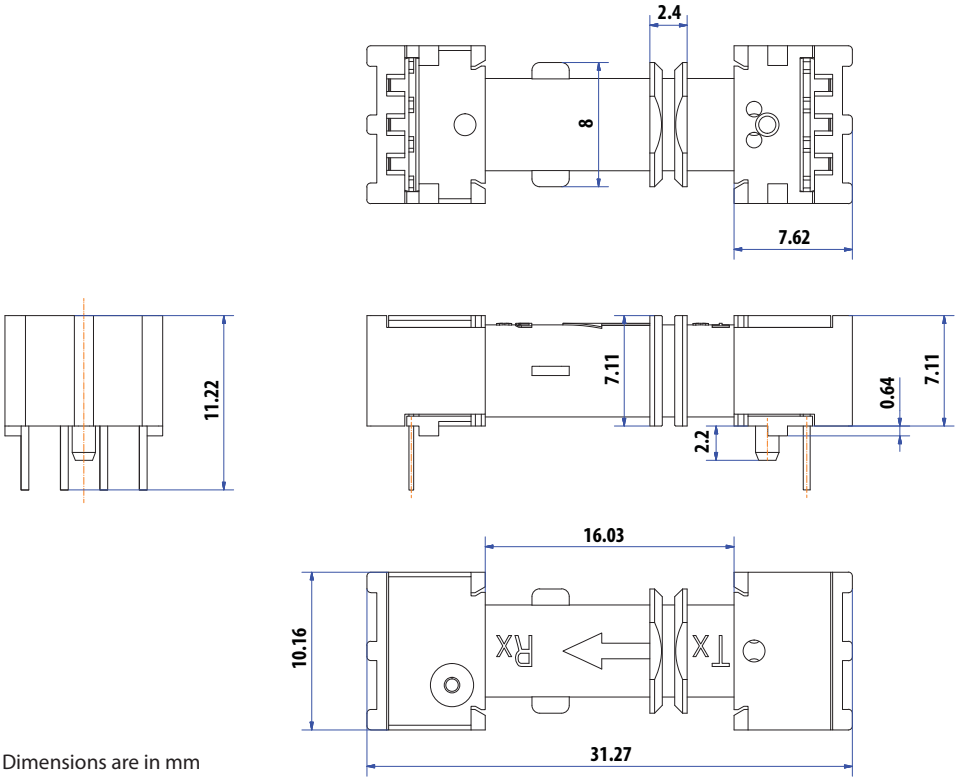
Pin description

Pin No.	Transmitter
1	Anode
2	Cathode
3	GND
4	GND

Pin No.	Receiver
5	GND
6	VCC(5V)
7	GND
8	Data_OUT
9, 10, 11	GND (shield option [1])

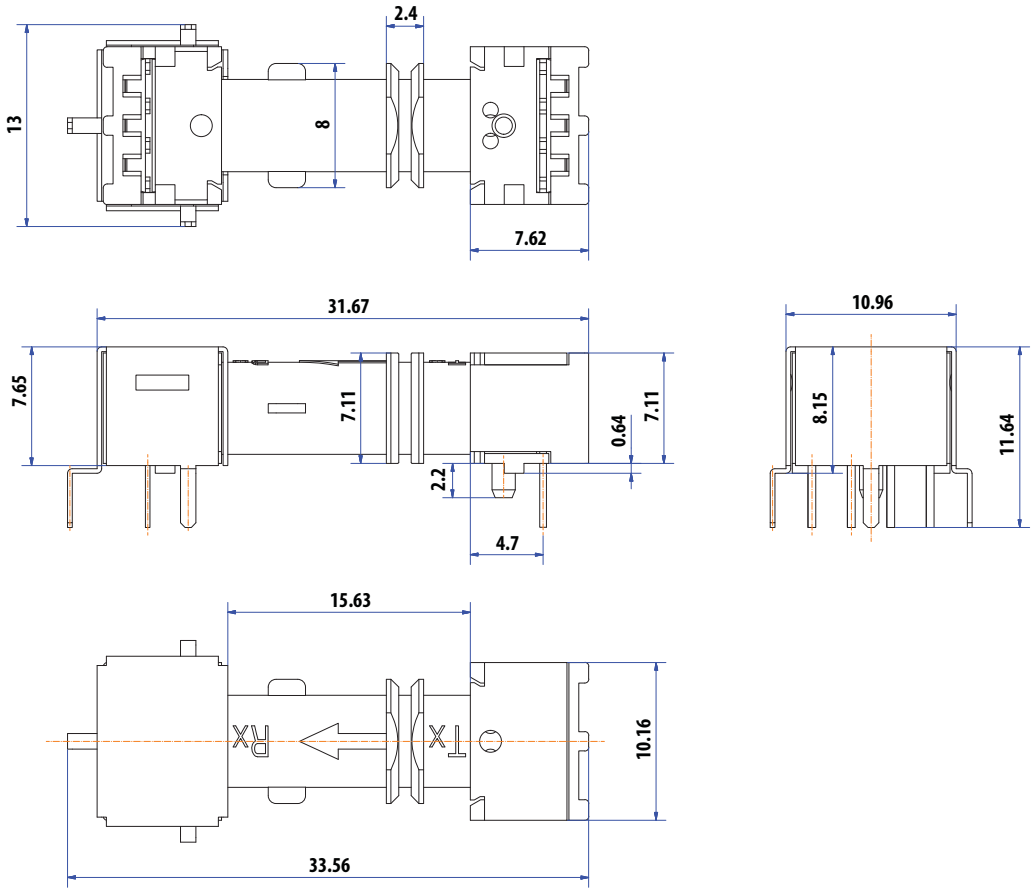
Note:
1. Pin 9,10 and 11 are not available if HFBR-3810Z is used and therefore do not need to be considered.

Mechanical Dimensions - HFBR-3810Z



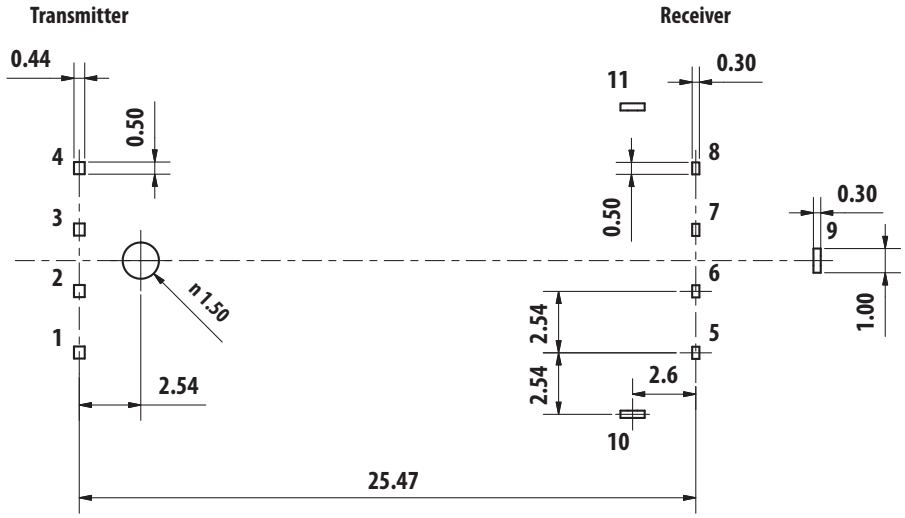
Dimensions are in mm

Mechanical Dimensions - HFBR-3810MSZ



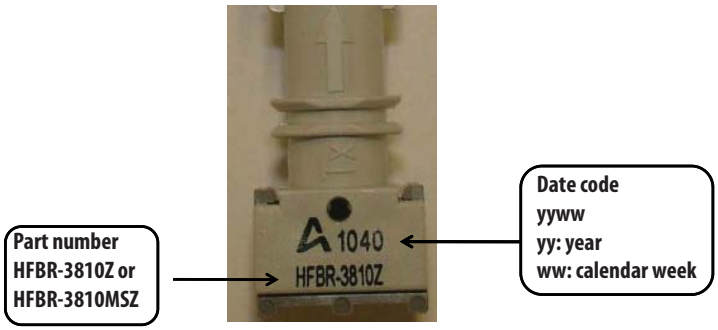
Dimensions are in mm

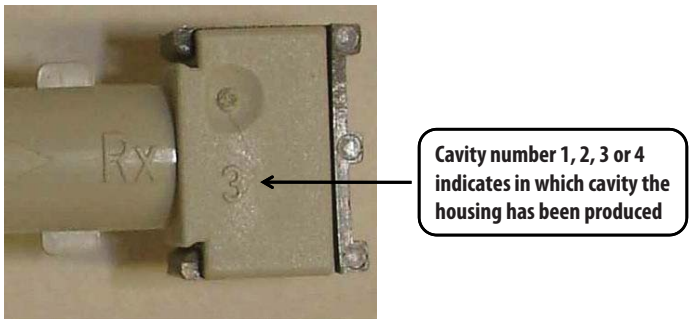
Footprint bottom view - HFBR-3810Z and HFBR-3810MSZ



Dimensions are in mm

Marking - HFBR-3810Z and HFBR-3810MSZ





For product information and a complete list of distributors, please go to our web site: **www.avagotech.com**

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