

# 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. Pin to pin distance of 24.96 mm 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 <sup>[1]</sup>	$I_{F,PK}$		90	mA
Transmitter Reverse Input Voltage	$V_R$		3	V
Rated impulse voltage <sup>[2]</sup>	$V_T$		12	kV
Lead Soldering Cycle <sup>[3, 4]</sup>	Temp	$T_{SOL}$	+260	°C
	Time		10	Sec
Nominal Voltage of the supply system <sup>[2]</sup>	$V_{eff}$		1000	V

Notes:

1. For  $I_{F,PK} > 60\text{mA}$ , the duty cycle factor must maintain  $I_{F,AV} \leq 60\text{mA}$  and pulse width  $\leq 1\mu\text{s}$
2. Overvoltage category 4; inhomogeneous field; pollution degree 3; material group 2; altitude up to 4000m 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 <sup>[1]</sup>	$V_{CC}$	4.75	5.25	V
Transmitter Average Forward Current	$I_{F,AV}$	40	60	mA

Note:

1. <100m<sub>p-p</sub> Noise

**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 <sup>[1]</sup>	V <sub>F</sub>	1.8	2.1	2.65	V
Forward Voltage Temperature Coefficient	$\Delta V_F / \Delta T$		-1.8		mV/°C
Reverse Input Breakdown Voltage <sup>[2]</sup>	V <sub>BR</sub>	3.0	13		V
Diode Capacitance <sup>[3]</sup>	C <sub>0</sub>		60		pF

Notes:

1. I<sub>F,dc</sub> = 60mA
2. I<sub>F,dc</sub> = -10μA
3. V<sub>F</sub> = 0V; f = 1MHz

## Electrical Output Signal Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units
Supply Current (without LED current)	I <sub>CC</sub>		27	45	mA
High Level Output Voltage	V <sub>OH</sub>	4.2	4.7		V
Low Level Output Voltage	V <sub>OL</sub>		0.22	0.4	V
Output Risetime (10-90%) <sup>[1, 2]</sup>	t <sub>r</sub>		10	20	ns
Output Falltime (90-10%) <sup>[1, 2]</sup>	t <sub>f</sub>		10	20	ns
Power Supply Noise Immunity	PSNI	0.1	0.4		V <sub>pp</sub>

Notes:

1. C<sub>L</sub> = 10pF
2. In the recommended drive circuit
3. Typical Value measured from junction to PC board solder joint for horizontal mount package

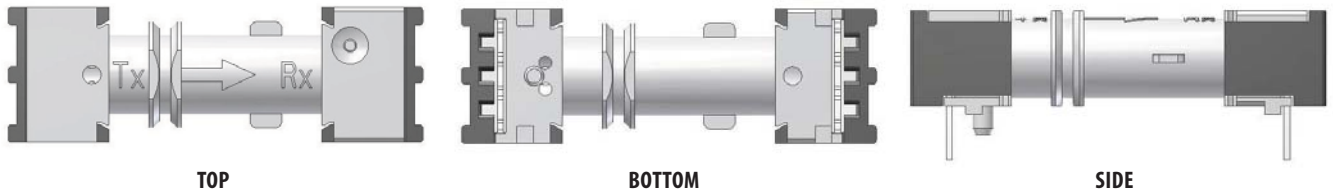
## Specified Link Performance, T<sub>A</sub> = -40° to +85°C, DC to 10MBaud, unless otherwise noted.

Parameter	Symbol	Min.	Typ	Max.	Unit	Condition
Signaling Rate	f <sub>S</sub>	DC		10	Mb/s	NRZ
Pulse Width Variation <sup>[1]</sup>	PWV	80		120	ns	10Mbaud
Propagation Delay Time <sup>[2]</sup>	t <sub>D</sub>		95		ns	Assuming a delay of 10ns from the application (already included)
Duty Cycle Distortion <sup>[3]</sup>	DCD	-10		+10	ns	10Mbaud

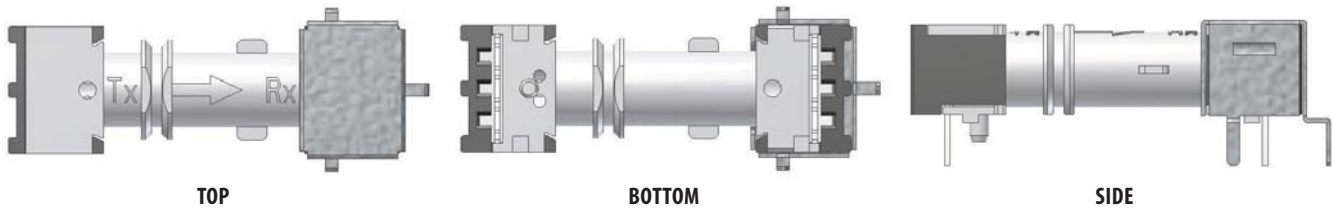
Notes:

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

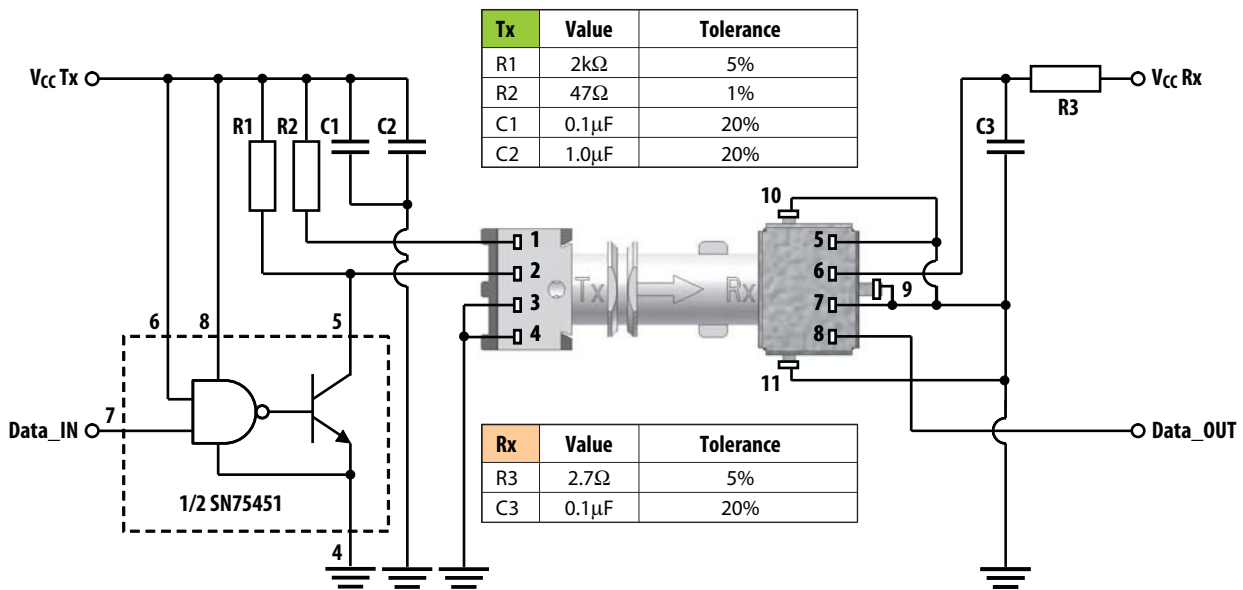
### HFBR-3810Z View



### HFBR-3810MSZ View



### Mandatory Drive circuit – Top view



### Pin description

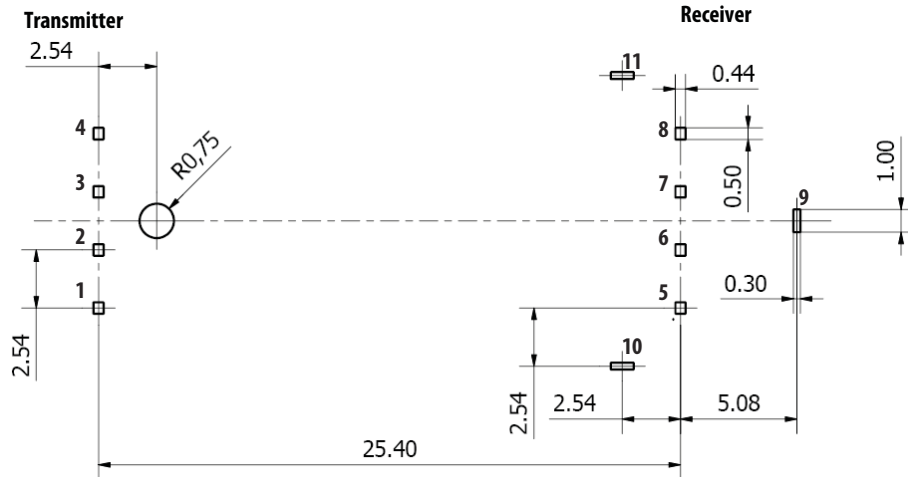
Pin No.	Transmitter
1	Anode
2	Cathode
3	GND
4	GND

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

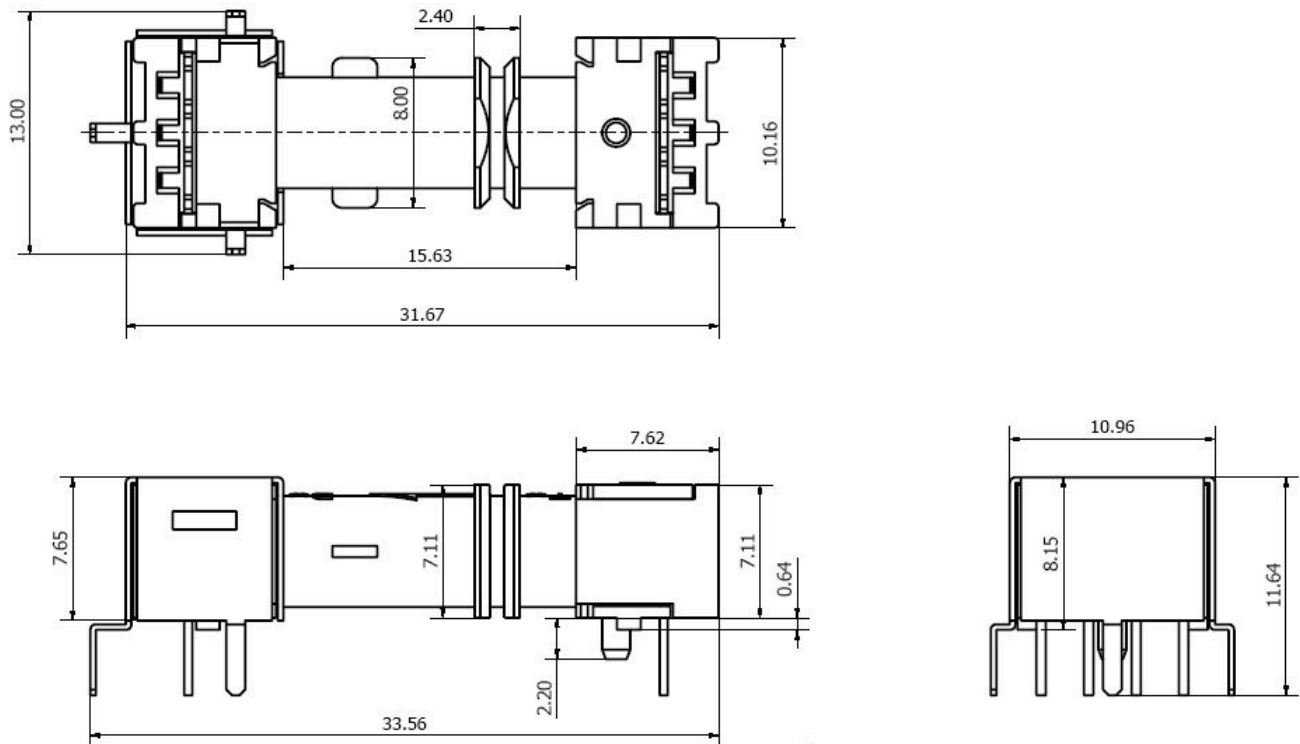
Note:

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

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



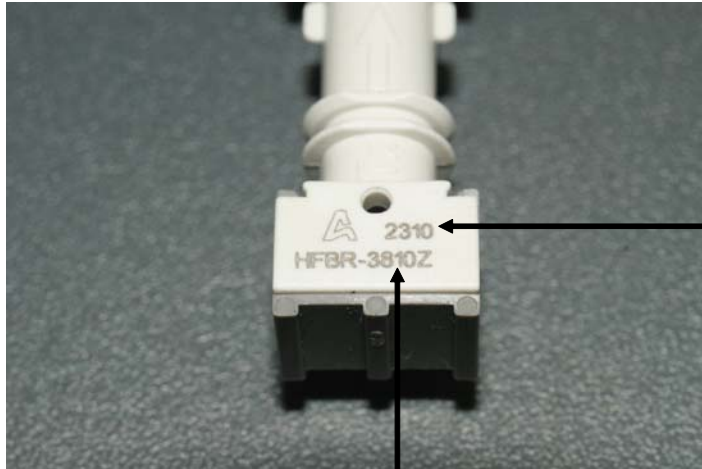
## HFBR-3810Z<sup>[1]</sup> and HFBR-3810MSZ – Mechanical Dimensions



Note:

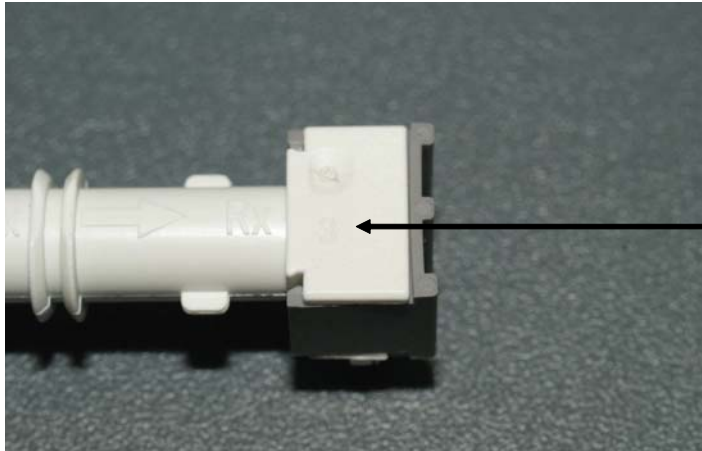
1. In case HFBR-3810Z is used: a) the dimensions of both ends are identical; b) the total length is reduced to 31.13mm

## HFBR-3810Z and HFBR-3810MSZ - Marking



Date code  
xxyy  
xx:week  
yy:year

Part number  
HFBR-3810Z or  
HFBR-3810MSZ



Cavity number  
1, 2, 3 or 4  
indicates in  
which cavity  
the housing  
has been  
produced

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