

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 ^[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]	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 ^[1]	V_{CC}	4.75	5.25	V
Transmitter Average Forward Current	$I_{F,AV}$	40	60	mA

Note:

1. <100m_{p-p} 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 ^[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
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}

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

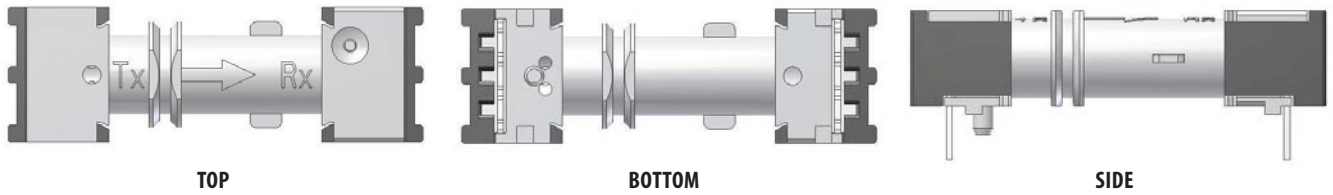
Specified Link Performance, T_A = -40° to +85°C, DC to 10MBaud, unless otherwise noted.

Parameter	Symbol	Min.	Typ	Max.	Unit	Condition
Signaling Rate	f _S	DC		10	Mb/s	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

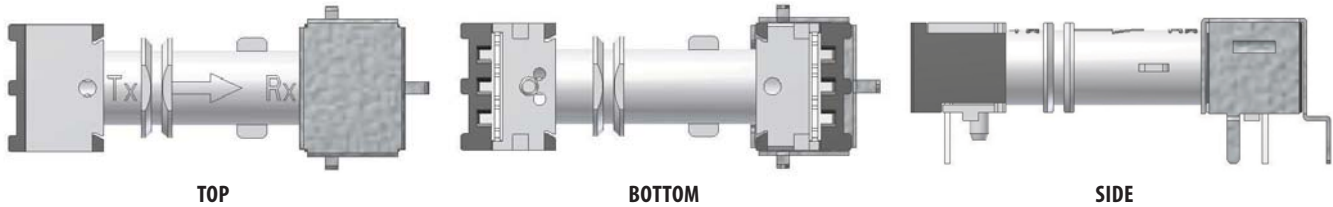
Notes:

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

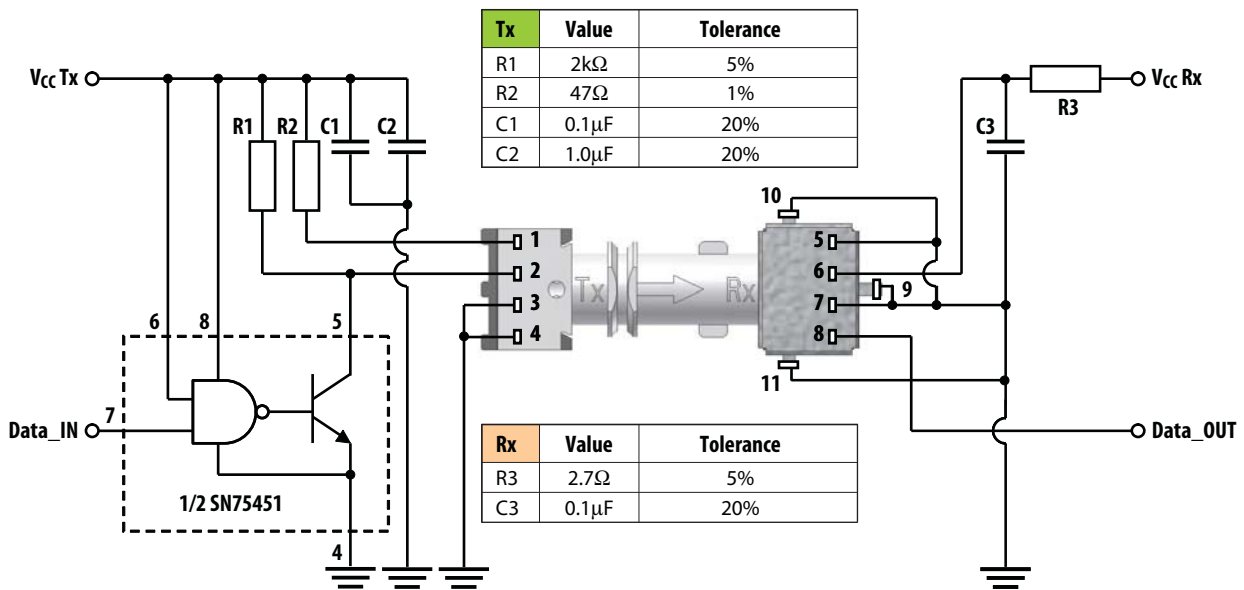
HFBR-3810Z View



HFBR-3810MSZ View



Mandatory Drive circuit – Top view



Pin description

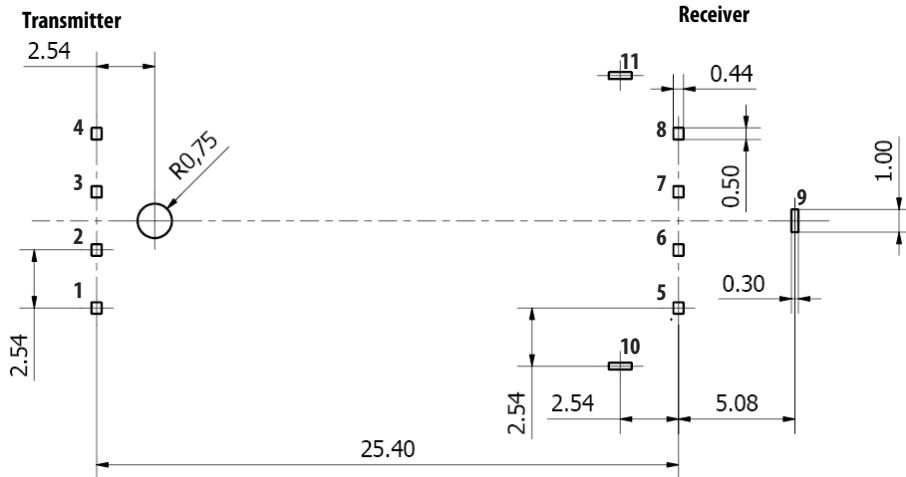
Pin No.	Transmitter
1	Anode
2	Cathode
3	GND
4	GND

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

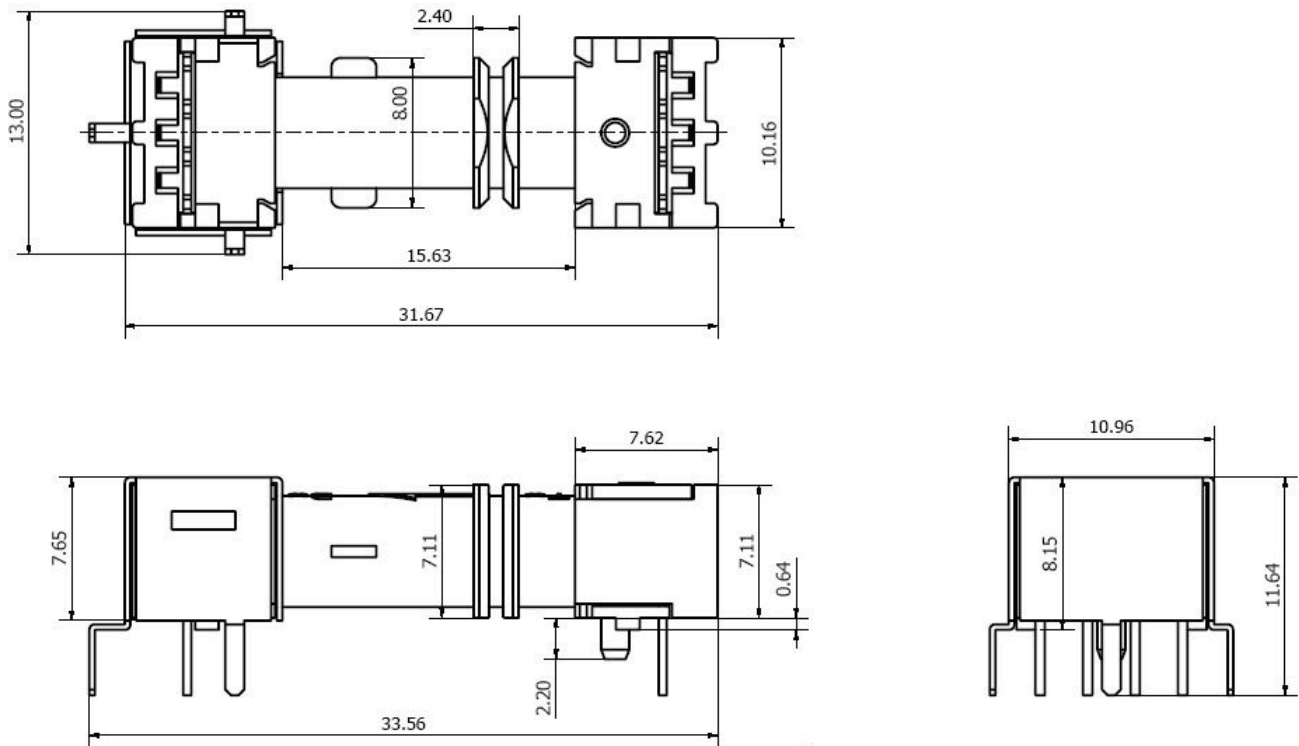
Note:

1. 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



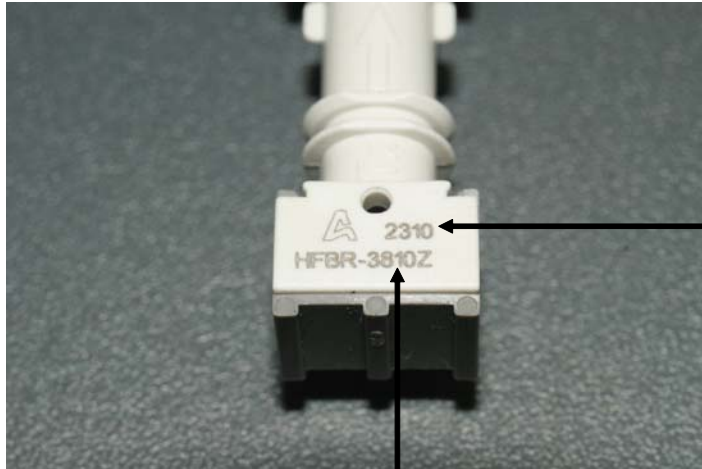
HFBR-3810Z^[1] and HFBR-3810MSZ – Mechanical Dimensions



Note:

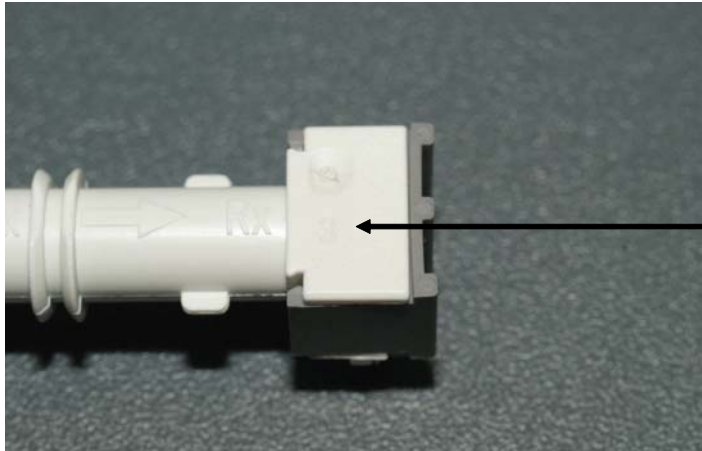
1. In case HFBR-3810Z is used: a) the dimensions of both ends are identical; b) the total length is reduced to 31.13mm

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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