HEWLETT PACKARD

5 MBd Low Cost Fiber Optic Receiver

Technical Data

HFBR-24X2 Series

Description

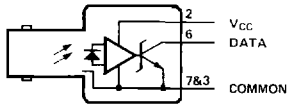
The HFBR-24X2 fiber optic receiver is designed to operate with the Hewlett-Packard HFBR-14XX fiber optic transmitter and 50/125 µm, 62.5/125 µm, and 100/140 µm fiber optic cable. Consistent coupling into the receiver is assured by the lensed optical system (Figure 1). Response does not vary with fiber size.

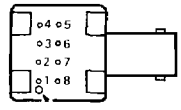
The HFBR-24X2 receiver incorporates an integrated photo IC containing a photodetector and dc amplifier driving an open-collector Schottky output transistor. The HFBR-24X2 is designed for direct interfacing to popular logic families. The absence of an internal pull-up resistor allows the open-collector output to be used with logic families such as CMOS requiring voltage excursions much higher than V_{CC}.

Both the open-collector "Data" output Pin 6 and V_{CC} Pin 2 are referenced to "Com" Pin 3, 7. The "Data" output allows busing, strobing and wired "OR" circuit configurations. The transmitter is designed to operate from a single +5 V supply. It is essential that a bypass capacitor (0.1 µF ceramic) be connected from Pin 2 (V_{CC}) to Pin 3 (circuit common) of the receiver.

CAUTION: The small junction sizes inherent to the design of this component increases the component's susceptibility to damage from electrostatic discharge (ESD). It is advised that normal static precautions be taken in handling and assembly of this component to prevent damage and/or degradation which may be induced by ESD.

Housed Product





BOTTOM VIEW — PIN 1 INDICATOR

PIN	FUNCTION
1†	N.C.
2	V_{CC} (5 V)
3*	COMMON
4†	N.C
5†	N.C
6	DATA
7*	COMMON
8†	N.C

*PINS 3 AND 7 ARE ELECTRICALLY CONNECTED TO HEADER

†PINS 1, 4, 5, AND 8 ARE ELECTRICALLY CONNECTED

Unhoused Product

BOTTOM VIEW

PIN	FUNCTION
1	V_{CC} (5 V)
2	COMMON
3	DATA
4	COMMON

Absolute Maximum Ratings

Parameter		Symbol	Min.	Max.	Units	Reference
Storage Temperature		T_S	–55	+85	°C	
Operating Temperature		T_A	–40	+85	°C	
Lead Soldering Cycle	Temp.			+260	°C	Note 1
	Time			10	sec	
Supply Voltage		V_{CC}	–0.5	7.0	V	
Output Current		I_O		25	mA	
Output Voltage		V_O	–0.5	18.0	V	
Output Collector Power Dissipation		$P_{O\,AV}$		40	mW	
Fan Out (TTL)		N		5		Note 2

Electrical / Optical Characteristics –40°C to + 85°C unless otherwise specified;

Fiber sizes with core diameter ≤ 100 µm and NA ≤ 0.35, 4.75 V ≤ V_{CC} ≤ 5.25 V

Parameter	Symbol	Min.	Typ.[3]	Max.	Units	Conditions	Reference
High Level Output Current	I_{OH}		5	250	µA	V_O = 18 V P_R < –40 dBm	
Low Level Output Voltage	V_{OL}		0.4	0.5	V	I_O = 8 mA P_R > –24 dBm	
High Level Supply Current	I_{CCH}		3.5	6.3	mA	V_{CC} = 5.25 V P_R < –40 dBm	
Low Level Supply Current	I_{CCL}		6.2	10	mA	V_{CC} = 5.25 V P_R > –24 dBm	
Equivalent N.A.	NA		0.50				
Optical Port Diameter	D_R		400		µm		Note 4

Dynamic Characteristics –40°C to +85°C unless otherwise specified; 4.75 V ≤ V_{CC} ≤ 5.25 V; BER ≤ 10^{-9}

Parameter	Symbol	Min.	Typ.[3]	Max.	Units	Conditions	Reference
Peak Input Power Level Logic HIGH	P_{RH}			–40 0.1	dBm µW	λ_P = 820 nm	Note 5
Peak Input Power Level Logic LOW	P_{RL}	–25.4		–9.2	dBm	T_A = +25°C,	Note 5
		2.9		120	µW	I_{OL} = 8 mA	
		–24.0		–10.0	dBm	I_{OL} = 8 mA	
		4.0		100	µW		
Propagation Delay LOW to HIGH	t_{PLHR}		65		nsec	T_A = 25°C, P_R = –21 dBm, Data Rate = 5 MBd	Note 6
Propagation Delay HIGH to LOW	t_{PHLR}		49		nsec		

Notes:
1. 2.0 mm from where leads enter case.
2. 8 mA load (5 x 1.6 mA), R_L = 560 Ω.
3. Typical data at T_A = 25° C, V_{CC} = 5.0 Vdc.
4. D_R is the effective diameter of the detector image on the plane of the fiber face. The numerical value is the product of the actual detector diameter and the lens magnification.
5. Measured at the end of 100/140 µm fiber optic cable with large area detector.
6. Propagation delay through the system is the result of several sequentially-occurring phenomena. Consequently it is a combination of data-rate-limiting effects and of transmission-time effects. Because of this, the data-rate limit of the system must be described in terms of time differentials between delays imposed on falling and rising edges.
   As the cable length is increased, the propagation delays increase at 5 ns per metre of length. Data rate, as limited by pulse width distortion, is not affected by increasing cable length if the optical power level at the receiver is maintained.