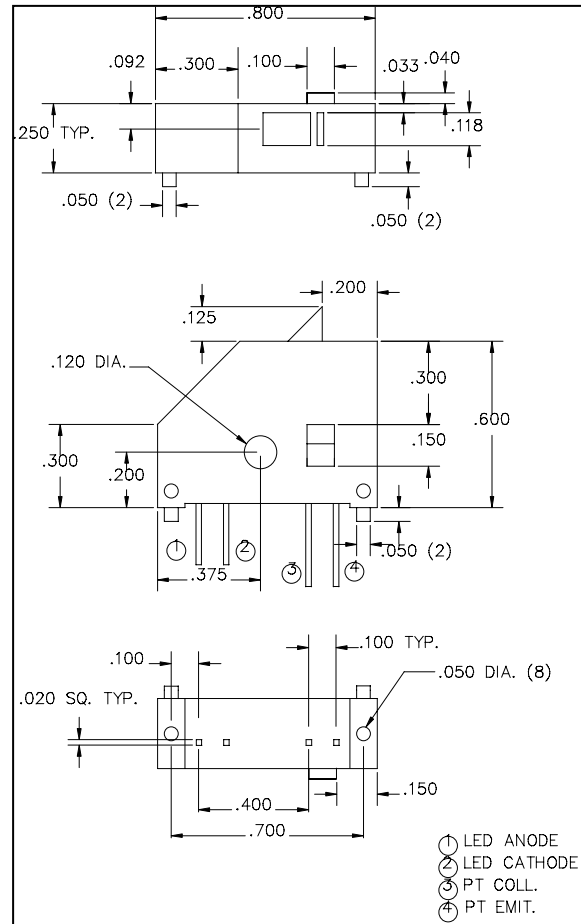
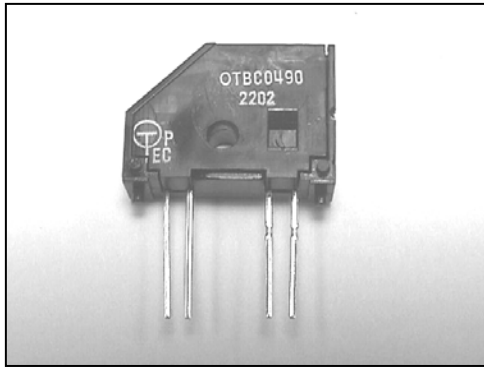


Single Emitter Bar Code Optic Head

OTBC-04XX Series (OTR480/490/482)



FEATURES:

- **Single Emitter Bar Code / Fine Line Sensor**
- **Better than 0.010" Resolution**
- **Compact Size**
- **Easily Ganged for Multiple Channels**

PRODUCT DESCRIPTION

The OTBC-04XX series combine a single emitter with a phototransistor in a compact low cost package containing a lens and aperture. The OTBC-0480 has a 940 nm infrared emitter and a phototransistor. The OTBC-0490 has a 660 nm visible red emitter and a phototransistor. The OTBC-0482 has a 940 nm infrared emitter and a phototransistor with an ambient light filter, for use in high ambient light conditions. These devices are easily ganged for multi-channel applications. Consult factory for custom apertures, emitters, or sensors.

Absolute Maximum Ratings

General

Storage Temperature Range ----- - 55°C to +100°C
 Operating Temperature Range ----- - 40°C to +85°C
 Lead Soldering Temperature (1/16" from case
 for 5 seconds soldering iron, 10 seconds flow soldering) ----- 260°C

Infrared Emitter (940 nm)

Reverse Voltage ----- 5 V
 Continuous Forward Current ----- 120 mA
 Peak Forward Current ----- 1.5 A
 Power Dissipation ----- 100 mW

Visible Emitter (660 nm)

Reverse Voltage ----- 4 V
 Continuous Forward Current ----- 40 mA
 Peak Forward Current ----- 300 mA
 Power Dissipation ----- 100 mW

Phototransistor

Collector-Emitter Voltage ----- 30 V
 Emitter-Collector Voltage ----- 5 V
 Power Dissipation (Derate 2.4 mW/°C above 25°C) ----- 100 mW

RHOPOINT COMPONENTS LTD

Holland Road, Hurst Green, Oxted, Surrey, RH8 9AX

Tel: +44 (0)1883 717988 Fax: +44 (0)1883 712938

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Product Specifications ($T_A = 25^\circ\text{C}$ unless noted)

Infrared Emitter (OTBC-048X)

Parameter	Symbol	Min	Typ	Max	Units
Forward Voltage ($I_F = 50\text{ mA}$)	V_F		1.3	1.45	V
Reverse Current ($V_R = 5\text{ V}$)	I_R			100	μA
Peak Wavelength ($I_F = 20\text{ mA}$)	λ_P		940		nm
Radiant Intensity ($I_F = 20\text{ mA}$)	I	1.3	2.5		mW/sr
Spectral Bandwidth at 50% ($I_F = 20\text{ mA}$)	$\Delta\lambda$		50		nm
Half Intensity Beam Angle	θ		10		Degrees

Visible Emitter (OTBC-049X)

Parameter	Symbol	Min	Typ	Max	Units
Forward Voltage ($I_F = 20\text{ mA}$)	V_F		1.8	2.4	V
Reverse Current ($V_R = 4\text{ V}$)	I_R			100	μA
Peak Wavelength ($I_F = 20\text{ mA}$)	λ_P		660		nm
Luminous Intensity ($I_F = 20\text{ mA}$)	I_V	250	500		mcd
Spectral Bandwidth at 50% ($I_F = 20\text{ mA}$)	$\Delta\lambda$		20		nm
Half Intensity Beam Angle	θ		10		Degrees

Phototransistor (OTBC-04X0)

Parameter	Symbol	Min	Typ	Max	Units
Light Current ($E_e=0.1\text{mW/cm}^2$, $V_{CE}=5\text{V}$)	$I_{CE(ON)}$	1	2.8		mA
Dark Current ($E_e=0$, $V_{CE}=10\text{V}$)	I_{CE0}			100	nA
Saturation Voltage ($I_C=0.5\text{mA}$, $E_e=0.1\text{mW/cm}^2$)	$V_{CE(SAT)}$			0.4	V
Rise Time ($V_{CC}=5\text{V}$, $R_L=1\text{k}\Omega$, $I_C=1\text{mA}$)	T_r		15		μs
Fall Time ($V_{CC}=5\text{V}$, $R_L=1\text{k}\Omega$, $I_C=1\text{mA}$)	T_f		15		μs

Coupled Characteristics

Parameter	Symbol	Min	Typ	Max	Units
Light Current ($I_F = 20\text{ mA}$, $V_{CE} = 5\text{ V}$, $d = 0.125\text{ in}$) ¹	$I_{CE(ON)}$	5	10		μA
Dark Current ($I_F = 0\text{ mA}$, $V_{CE} = 5\text{ V}$)	I_{CE0}			200	nA
6 dB Bandwidth		3			kHz

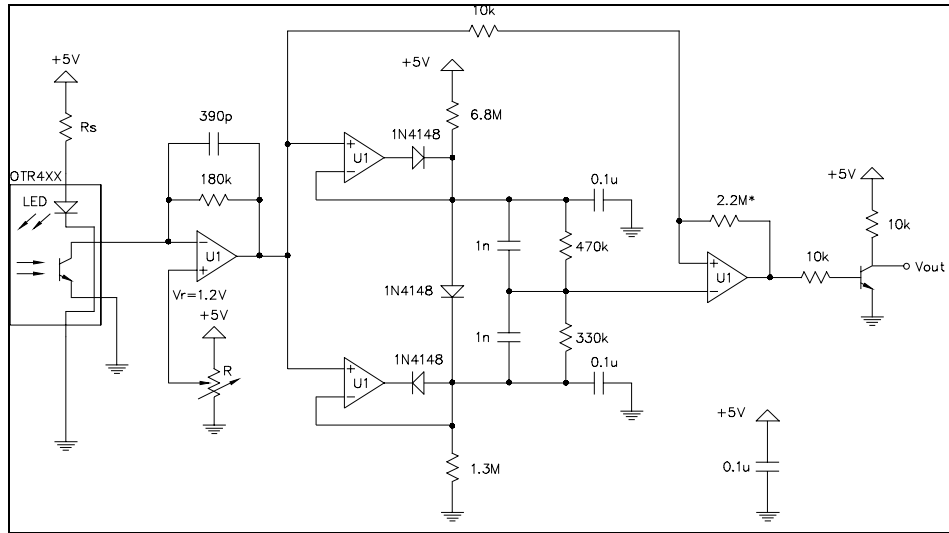
¹ Reflecting surface is Eastman Kodak neutral white test card having a 90% diffused reflectance.

Reflective Surface

Parameter	Symbol	Min	Typ	Max	Units
Element Contrast		(80%)			%
Diffused Reflectance		(90%)			%
Element Width	W_N	0.010			in
Narrow Element to Narrow Space Ratio			0.95		
Depth of Field	d	0.090	0.125	0.160	in

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Suggested Application Circuit



The above circuit represents an adaptive dual peak detector with a first stage transimpedance amplifier. This circuit is recommended for typical bar code or fine element sensing applications using the OTBC-04XX series optic heads. The first amplifier serves as a current-to-voltage amplifier (transimpedance). The second part of the circuit provides positive and negative peak detection. The peak voltages are temporarily stored in the 0.1 μ F capacitors. The comparator reference is approximately 45% of the peak-to-peak amplitude. This, in effect, provides an adaptive threshold to the comparator based on the voltage peaks of the incoming signal. The 2.2 M Ω resistor on the last stage (indicated with an *) sets the positive feedback, and combined with the 10 k Ω input resistor the hysteresis is set to approximately 25 mV. Setting the 2.2 M Ω resistor to 100 k Ω will increase the hysteresis to 500 mV, but response will be sacrificed. V_{out} is low for reflectance and high (+5V) for no reflectance (i.e., sensing a dark mark).

Ordering Information

