H21B1 H21B2 H21B3
Photodarlington Optical Interrupter Switch

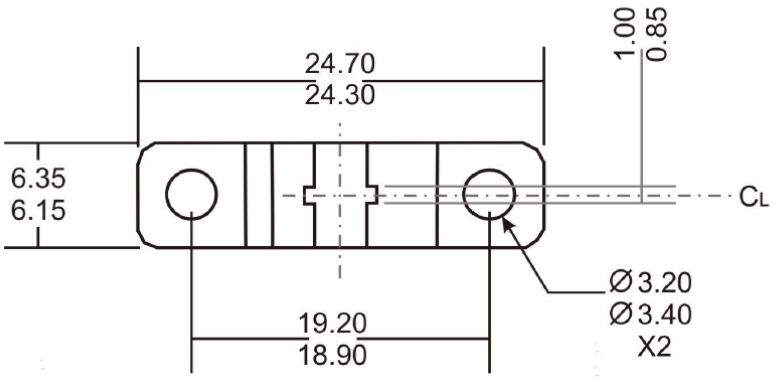
Features

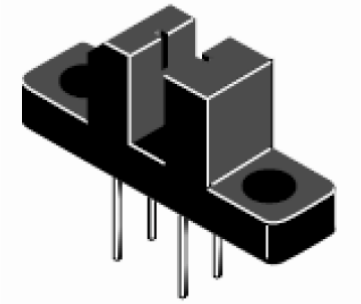
- No Contact Sensing
- 1mm Aperture
- High $I_{C(ON)}$
- PCB mount
- Darlington output

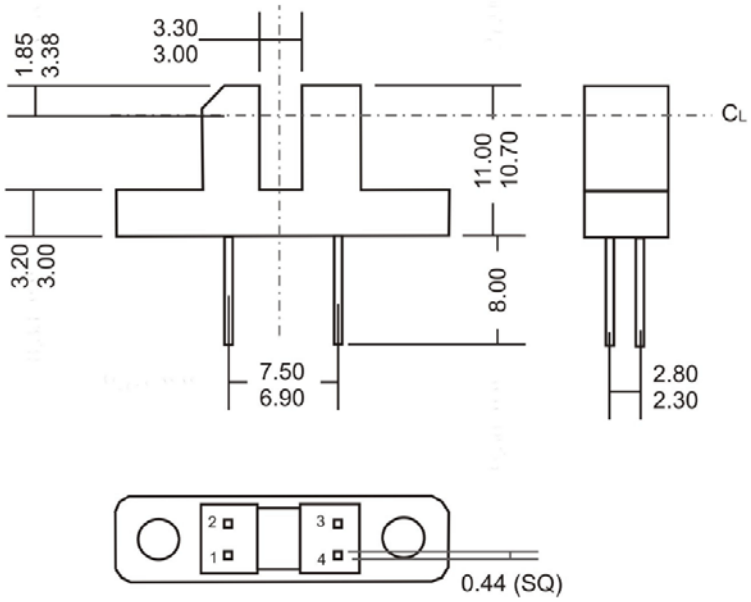
Description

The H21BX products consist of a infrared light emitting diode coupled to an NPN silicon photodarlington packaged in a injection molded housing. The package is designed to optimize the mechanical resolution, coupling efficiency, ambient light rejection, and reliability. Inserting/removing an opaque material into the gap when the LED is operating, switches the darlington on/off.

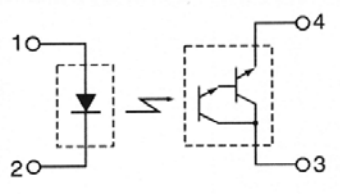
Package Dimensions







Schematic



Pin 1 Anode
Pin 2 Cathode
Pin 3 Collector
Pin 4 Emitter

Notes

1. Dimensions for all drawings are in millimeters.
2. Tolerance of +/- 0.25 on all non nominal dimensions unless otherwise specified

Absolute Maximum Ratings (T_A = 25^O C unless otherwise specified)
Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In Addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

Symbol	Parameter	Rating	Units
T_{OPR}	Operating Temperature	-55 to +100	^{O}C
T_{STG}	Storage Temperature	-55 to +100	^{O}C
T_{SOL-I}	Soldering Temperature (Iron) (2,3,4,5)	240 for 5 sec	^{O}C
T_{SOL-F}	Soldering Temperature (Flow) (2,3,5)	260 for 10 sec	^{O}C
Emitter			
I_F	Continuous Forward Current (6)	50	mA
V_R	Reverse Voltage	6	V
P_D	Power Dissipation (1)	100	mW
Sensor			
V_{CEO}	Collector-Emitter Voltage	30	V
V_{ECO}	Emitter-Collector Voltage	6	V
I_C	Collector Current	40	mA
P_D	Power Dissipation (1)	150	mW

Notes:
1. Derate power dissipation linearly, on Sensor, 1.33 mW/^{O}C above 25^{O}C.
2. RMA Flux is recommended.
3. Methanol or isopropyl alcohols are recommended as cleaning agents.
4. Soldering iron tip 1.6mm from housing.
5. As long as leads are not under stress or spring tension

Electrical/Optical Characteristics (T_A = 25^O C)

EMITTER						
Symbol	**Parameter**	**Test Conditions**	**Min.**	**Typ.**	**Max.**	**Units**
V_F	Forward Voltage	I_F = 60mA			1.7	V
V_R	Reverse Breakdown Voltage	I_R = 10µA	6			V
I_R	Reverse Leakage Current	V_R = 3V			1.0	µA
SENSOR						
Symbol	**Parameter**	**Test Conditions**	**Min.**	**Typ.**	**Max.**	**Units**
BV_{CEO}	Collector-Emitter Breakdown Voltage	I_C = 1mA, Ee = 0	30			V
BV_{ECO}	Emitter-Collector Breakdown Voltage	I_{EC} = 100uA, Ee = 0	7.0			V
I_{CEO}	Collector-Emitter Leakage	V_{CE} = 25V, Ee = 0			100	nA

Electrical/Optical Characteristics Cont. (T_A = 25° C)

COUPLED

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$t_{(ON)}$	Turn-on Time	I_F = 10mA, V_{CC} = 5V, R_L = 750Ω		45		µs
		I_F = 60mA, V_{CC} = 5V, R_L = 75Ω		7		
$t_{(OFF)}$	Turn-Off Time	I_F = 10mA, V_{CC} = 5V, R_L = 750Ω		250		µs
		I_F = 60mA, V_{CC} = 5V, R_L = 75Ω		45		

ON-STATE COLLECTOR CURRENT

Symbol	Device	Test Conditions	Min.	Typ.	Max.	Units
$I_{C\ (ON)}$	H21B1	I_F = 2mA, V_{CE} = 1.5V	0.50			mA
	H21B2		1.00			
	H21B3		2.00			
	H21B1	I_F = 10mA, V_{CE} = 1.5V	7.5			mA
	H21B2		14			
	H21B3		25			

COLLECTOR CURRENT SATURATION VOLTAGE

Symbol	Device	Test Conditions	Min.	Typ.	Max.	Units
$V_{CE\ (SAT)}$	H21B1, H21B2, H21B3	I_C = 1.8mA, I_F = 10mA	All		1.00	V
		I_C = 50mA, I_F = 60mA	H21B1/2		1.50	V

Typical Performance Characteristics

Figure 1. Output Current vs. Input Current

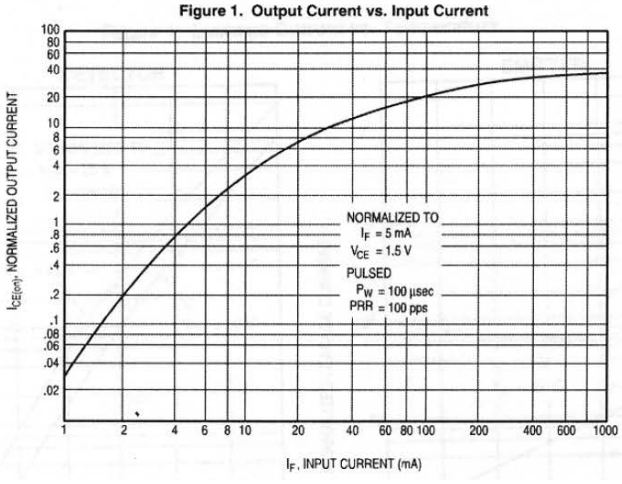
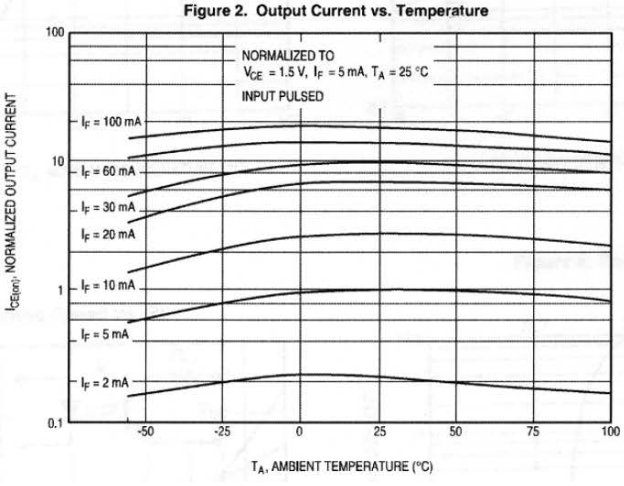


Figure 2. Output Current vs. Temperature



Typical Performance Characteristics

Figure 3. $V_{CE(SAT)}$ vs. Temperature

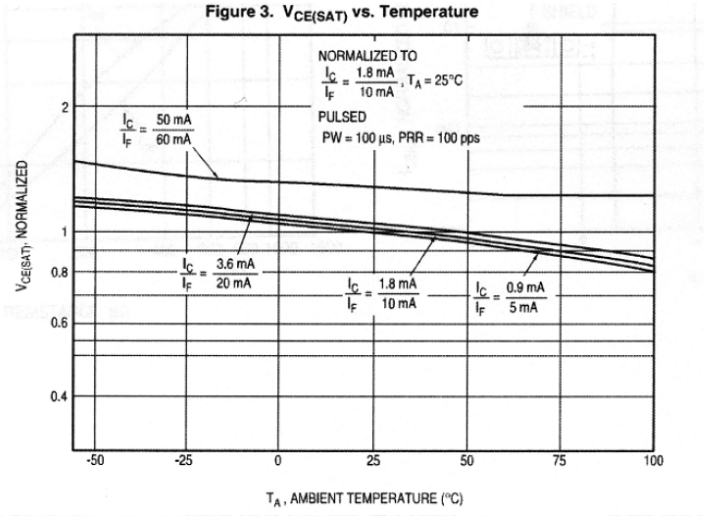


Figure 5. Switching Speed vs. RL

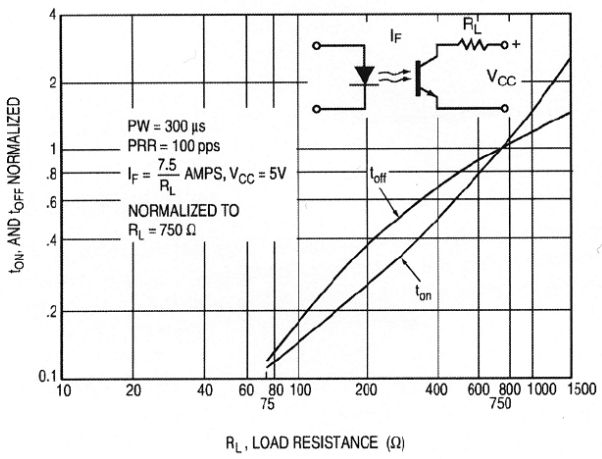


Figure 4. Leakage Current vs. Temperature

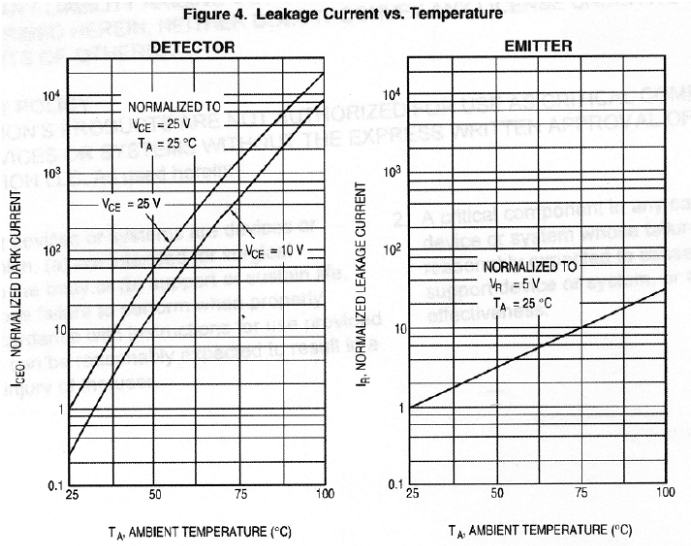


Figure 6. Output Current vs. Distance