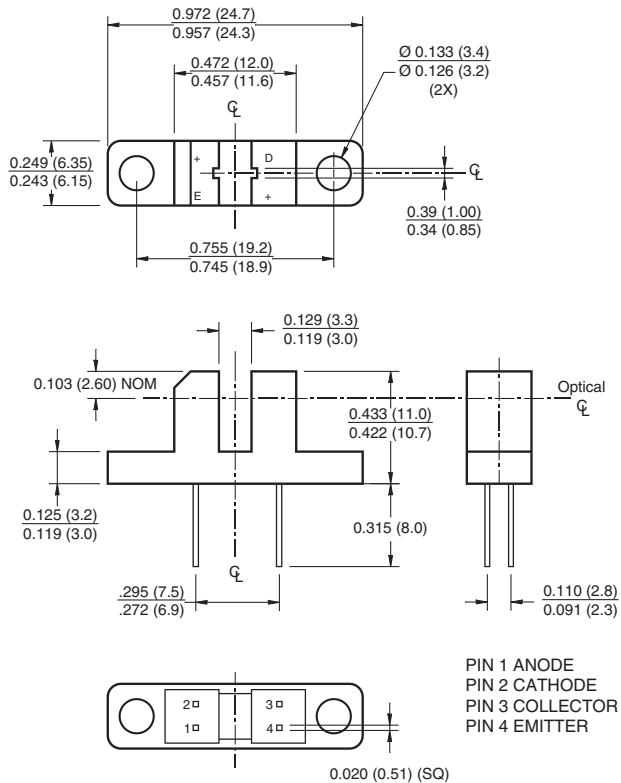


**H21B1**

**H21B2**

**H21B3**

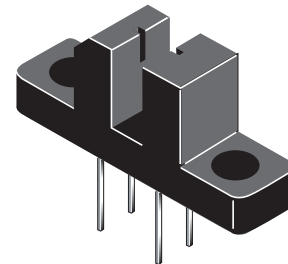
**PACKAGE DIMENSIONS**



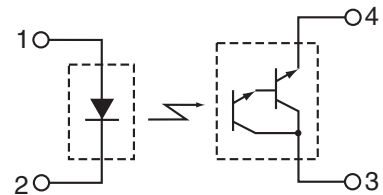
PIN 1 ANODE  
PIN 2 CATHODE  
PIN 3 COLLECTOR  
PIN 4 EMITTER

**NOTES:**

1. Dimensions for all drawings are in inches (mm).
2. Tolerance of  $\pm .010$  (.25) on all non-nominal dimensions unless otherwise specified.



**SCHEMATIC**



**DESCRIPTION**

The H21B1, H21B2 and H21B3 consist of a gallium arsenide infrared emitting diode coupled with a silicon photodarlington in a plastic housing. The packaging system is designed to optimize the mechanical resolution, coupling efficiency, ambient light rejection, cost and reliability. The gap in the housing provides a means of interrupting the signal with an opaque material, switching the output from an "ON" to an "OFF" state.

**FEATURES**

- Opaque housing
- Low cost
- .035" apertures
- High  $I_{C(ON)}$

**H21B1**

**H21B2**

**H21B3**

**ABSOLUTE MAXIMUM RATINGS** ( $T_A = 25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Rating	Unit
Operating Temperature	$T_{OPR}$	-55 to +100	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-55 to +100	$^\circ\text{C}$
Soldering Temperature (Iron) <sup>(2,3 and 4)</sup>	$T_{SOL-I}$	240 for 5 sec	$^\circ\text{C}$
Soldering Temperature (Flow) <sup>(2 and 3)</sup>	$T_{SOL-F}$	260 for 10 sec	$^\circ\text{C}$
<b>INPUT (EMITTER)</b>			
Continuous Forward Current	$I_F$	50	mA
Reverse Voltage	$V_R$	6	V
Power Dissipation <sup>(1)</sup>	$P_D$	100	mW
<b>OUTPUT (SENSOR)</b>			
Collector to Emitter Voltage	$V_{CEO}$	30	V
Emitter to Collector Voltage	$V_{ECO}$	6	V
Collector Current	$I_C$	40	mA
Power Dissipation ( $T_C = 25^\circ\text{C}$ ) <sup>(1)</sup>	$P_D$	150	mW

**NOTES:**

1. Derate power dissipation linearly 1.67 mW/ $^\circ\text{C}$  above 25 $^\circ\text{C}$ .
2. RMA flux is recommended.
3. Methanol or isopropyl alcohols are recommended as cleaning agents.
4. Soldering iron 1/16" (1.6 mm) minimum from housing.

**H21B1**

**H21B2**

**H21B3**

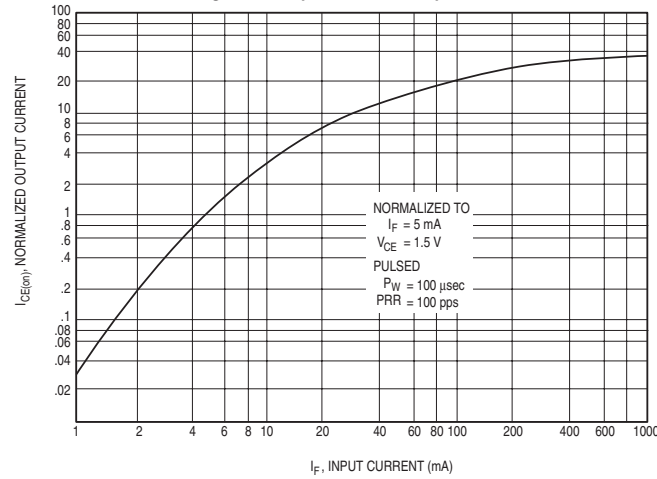
ELECTRICAL/OPTICAL CHARACTERISTICS (T <sub>A</sub> = 25°C)							
PARAMETER	TEST CONDITIONS	SYMBOL	DEVICES	MIN	TYP	MAX	UNITS
<b>INPUT (EMITTER)</b>							
Forward Voltage	I <sub>F</sub> = 60 mA	V <sub>F</sub>	All	—	—	1.7	V
Reverse Breakdown Voltage	I <sub>R</sub> = 10 μA	V <sub>R</sub>	All	6.0	—	—	V
Reverse Leakage Current	V <sub>R</sub> = 3 V	I <sub>R</sub>	All	—	—	1.0	μA
<b>OUTPUT (SENSOR)</b>							
Emitter to Collector Breakdown	I <sub>F</sub> = 100 μA, E <sub>e</sub> = 0	BV <sub>ECO</sub>	All	7.0	—	—	V
Collector to Emitter Breakdown	I <sub>C</sub> = 1 mA, E <sub>e</sub> = 0	BV <sub>CEO</sub>	All	30	—	—	V
Collector to Emitter Leakage	V <sub>CE</sub> = 25 V, E <sub>e</sub> = 0	I <sub>CEO</sub>	All	—	—	100	nA
<b>COUPLED</b>							
On-State Collector Current	I <sub>F</sub> = 2 mA, V <sub>CE</sub> = 1.5 V	I <sub>C(ON)</sub>	H21B1	0.5	—	—	mA
			H21B2	1.0	—	—	
			H21B3	2.0	—	—	
	I <sub>F</sub> = 5 mA, V <sub>CE</sub> = 1.5 V		H21B1	2.5	—	—	
			H21B2	5.0	—	—	
			H21B3	10	—	—	
	I <sub>F</sub> = 10 mA, V <sub>CE</sub> = 1.5 V		H21B1	7.5	—	—	
			H21B2	14	—	—	
			H21B3	25	—	—	
Saturation Voltage	I <sub>F</sub> = 10 mA, I <sub>C</sub> = 1.8 mA	V <sub>CE(SAT)</sub>	All	—	—	1.0	V
	I <sub>F</sub> = 60 mA, I <sub>C</sub> = 50 mA		H21B1/2	—	—	1.5	V
Turn-On Time	I <sub>F</sub> = 10 mA, V <sub>CC</sub> = 5 V, R <sub>L</sub> = 750Ω	t <sub>on</sub>	All	—	45	—	μs
	I <sub>F</sub> = 60 mA, V <sub>CC</sub> = 5 V, R <sub>L</sub> = 75Ω		All	—	7	—	
Turn-Off Time	I <sub>F</sub> = 10 mA, V <sub>CC</sub> = 5 V, R <sub>L</sub> = 750Ω	t <sub>off</sub>	All	—	250	—	μs
	I <sub>F</sub> = 60 mA, V <sub>CC</sub> = 5 V, R <sub>L</sub> = 75Ω		All	—	45	—	

**H21B1**

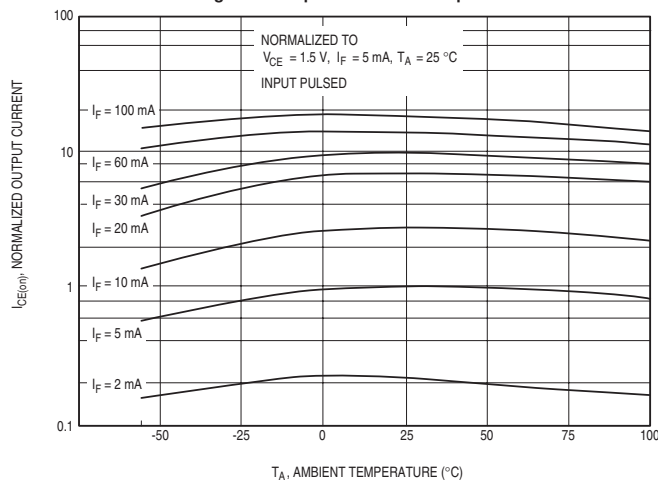
**H21B2**

**H21B3**

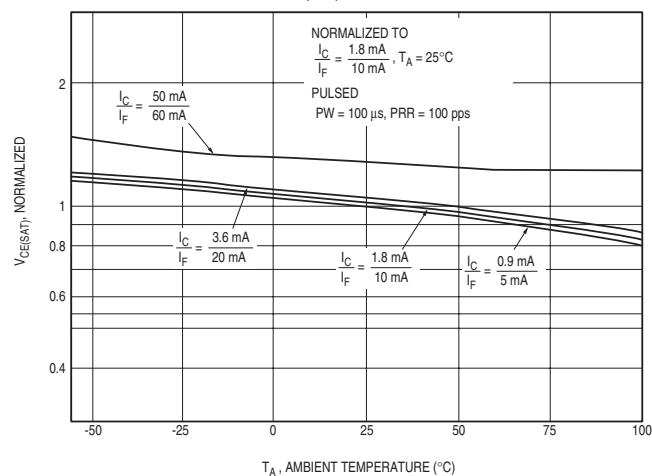
**Figure 1. Output Current vs. Input Current**



**Figure 2. Output Current vs. Temperature**



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

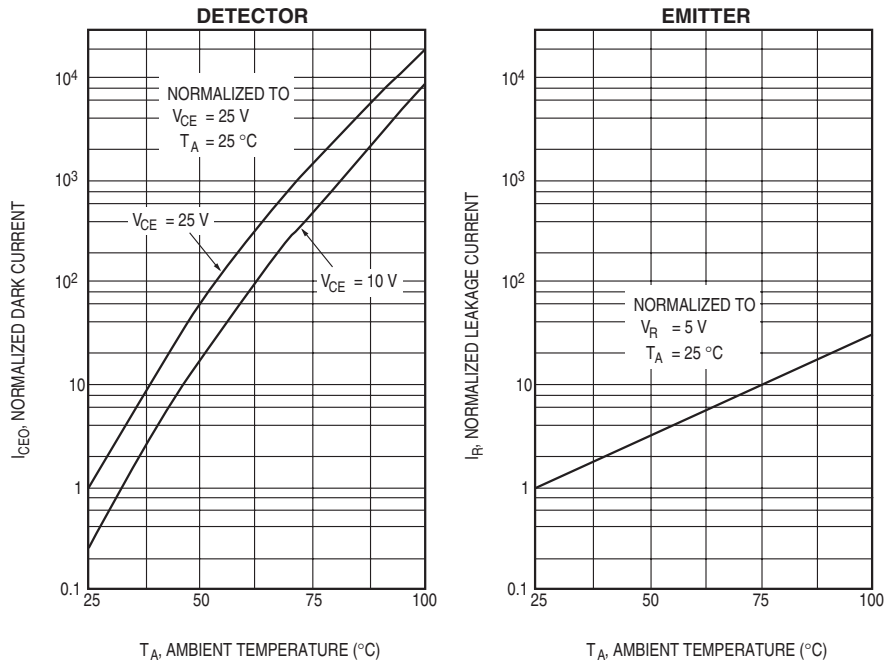


**H21B1**

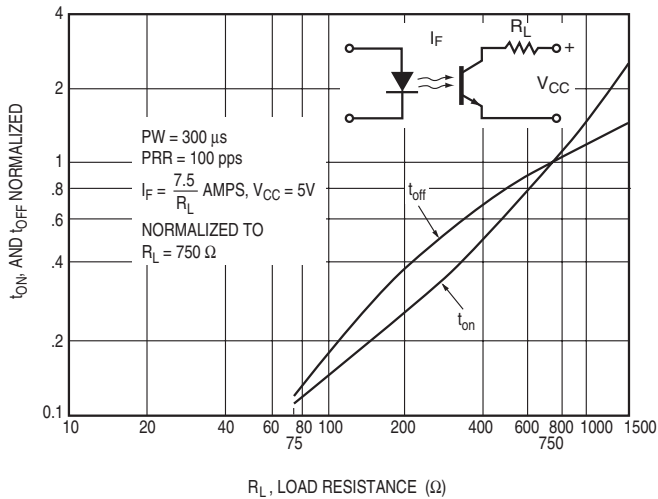
**H21B2**

**H21B3**

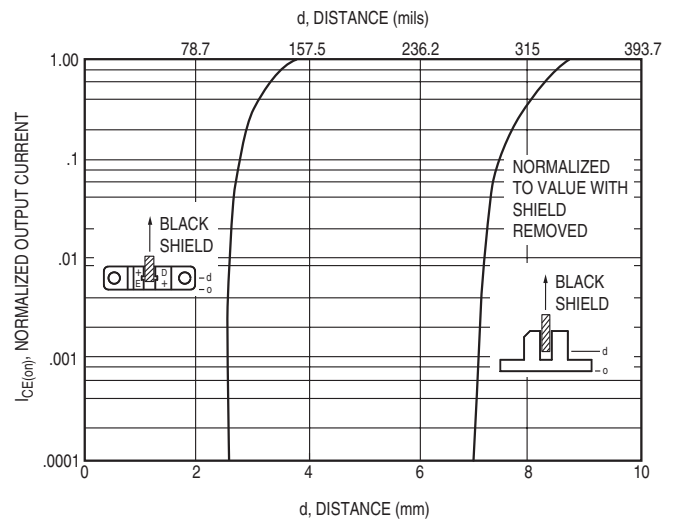
**Figure 4. Leakage Current vs. Temperature**



**Figure 5. Switching Speed vs.  $R_L$**



**Figure 6. Output Current vs. Distance**



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**H21B1**

**H21B2**

**H21B3**

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