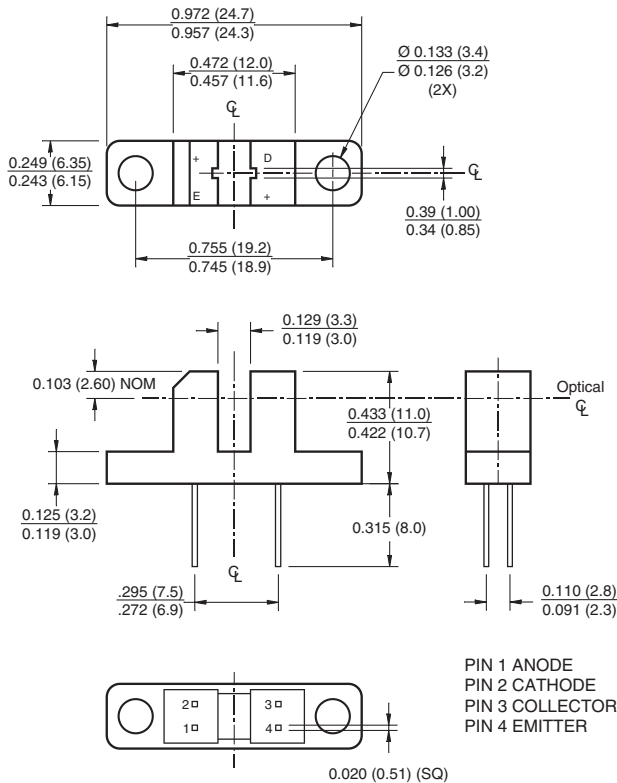


**H21B1**

**H21B2**

**H21B3**

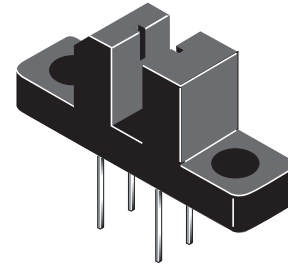
**PACKAGE DIMENSIONS**



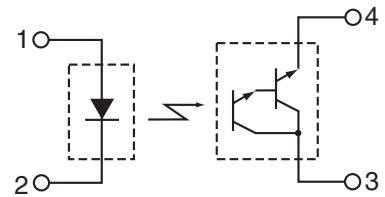
PIN 1 ANODE  
PIN 2 CATHODE  
PIN 3 COLLECTOR  
PIN 4 EMITTER

**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** ( $T_A = 25^\circ\text{C}$ )

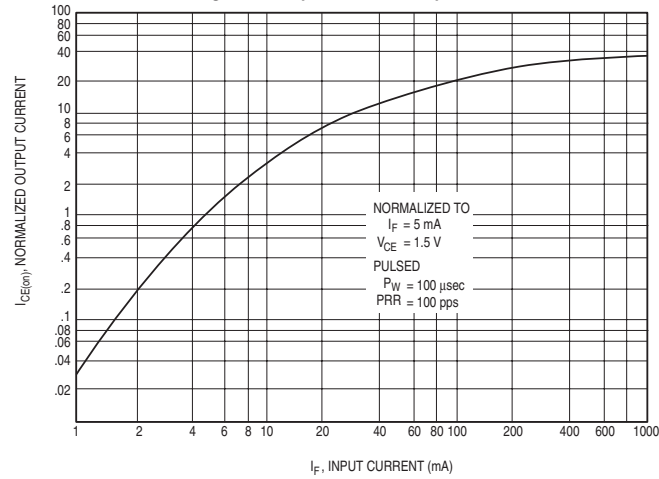
PARAMETER	TEST CONDITIONS	SYMBOL	DEVICES	MIN	TYP	MAX	UNITS
<b>INPUT (EMITTER)</b>							
Forward Voltage	$I_F = 60 \text{ mA}$	$V_F$	All	—	—	1.7	V
Reverse Breakdown Voltage	$I_R = 10 \mu\text{A}$	$V_R$	All	6.0	—	—	V
Reverse Leakage Current	$V_R = 3 \text{ V}$	$I_R$	All	—	—	1.0	$\mu\text{A}$
<b>OUTPUT (SENSOR)</b>							
Emitter to Collector Breakdown	$I_F = 100 \mu\text{A}, E_e = 0$	$BV_{ECO}$	All	7.0	—	—	V
Collector to Emitter Breakdown	$I_C = 1 \text{ mA}, E_e = 0$	$BV_{CEO}$	All	30	—	—	V
Collector to Emitter Leakage	$V_{CE} = 25 \text{ V}, E_e = 0$	$I_{CEO}$	All	—	—	100	nA
<b>COUPLED</b>							
On-State Collector Current	$I_F = 2 \text{ mA}, V_{CE} = 1.5 \text{ V}$	$I_{C(ON)}$	H21B1	0.5	—	—	mA
			H21B2	1.0	—	—	
			H21B3	2.0	—	—	
	$I_F = 5 \text{ mA}, V_{CE} = 1.5 \text{ V}$		H21B1	2.5	—	—	
			H21B2	5.0	—	—	
			H21B3	10	—	—	
	$I_F = 10 \text{ mA}, V_{CE} = 1.5 \text{ V}$		H21B1	7.5	—	—	
			H21B2	14	—	—	
			H21B3	25	—	—	
Saturation Voltage	$I_F = 10 \text{ mA}, I_C = 1.8 \text{ mA}$	$V_{CE(SAT)}$	All	—	—	1.0	V
	$I_F = 60 \text{ mA}, I_C = 50 \text{ mA}$		H21B1/2	—	—	1.5	V
Turn-On Time	$I_F = 10 \text{ mA}, V_{CC} = 5 \text{ V}, R_L = 750\Omega$	$t_{on}$	All	—	45	—	$\mu\text{s}$
	$I_F = 60 \text{ mA}, V_{CC} = 5 \text{ V}, R_L = 75\Omega$		All	—	7	—	
Turn-Off Time	$I_F = 10 \text{ mA}, V_{CC} = 5 \text{ V}, R_L = 750\Omega$	$t_{off}$	All	—	250	—	$\mu\text{s}$
	$I_F = 60 \text{ mA}, V_{CC} = 5 \text{ V}, R_L = 75\Omega$		All	—	45	—	

**H21B1**

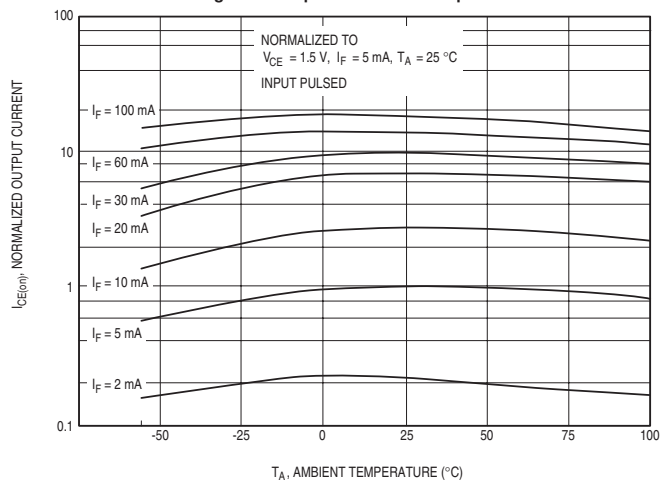
**H21B2**

**H21B3**

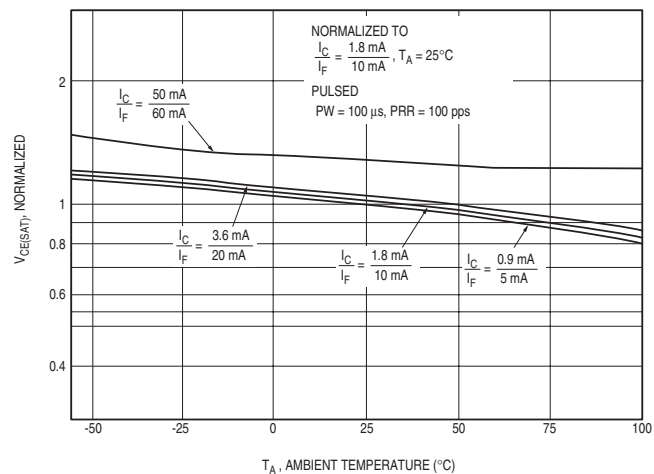
**Figure 1. Output Current vs. Input Current**



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



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

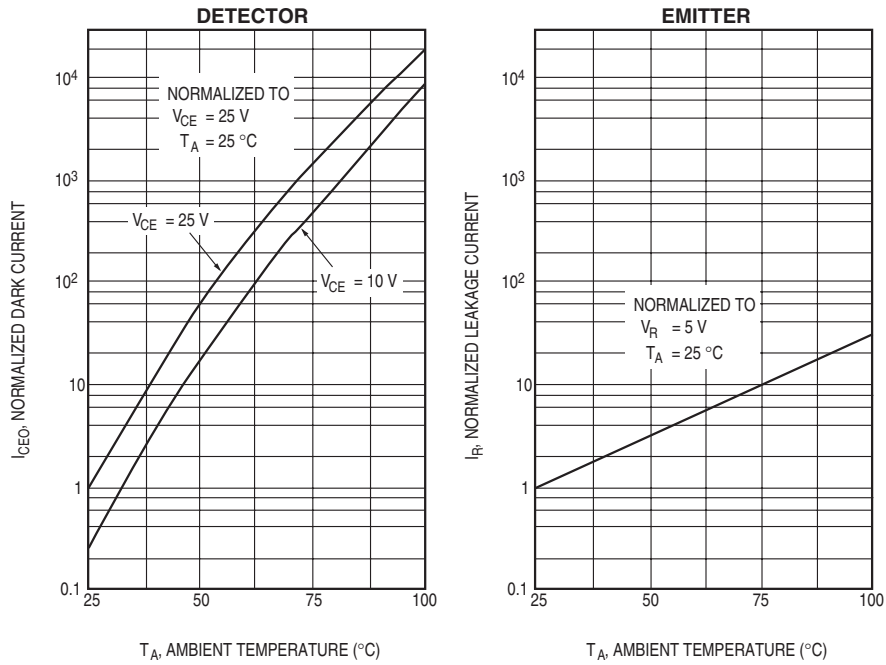


**H21B1**

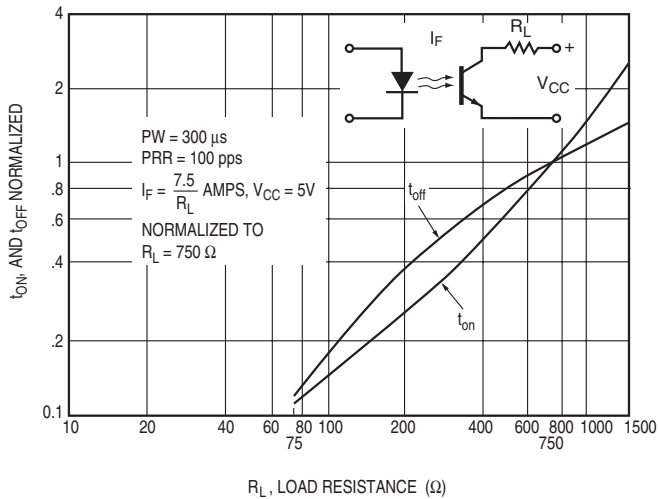
**H21B2**

**H21B3**

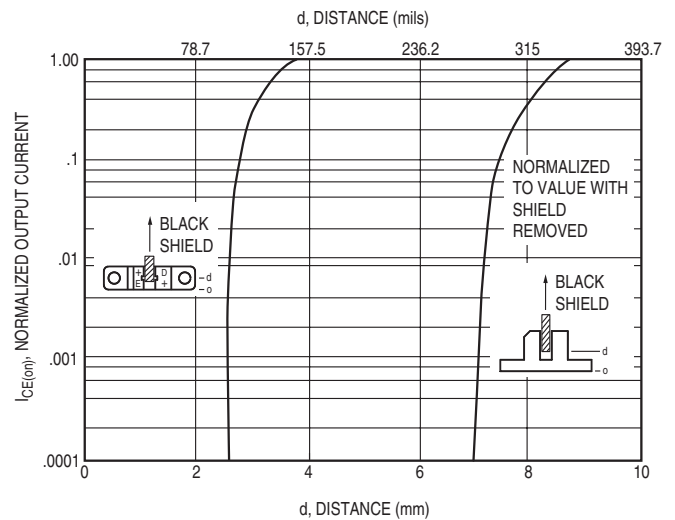
**Figure 4. Leakage Current vs. Temperature**



**Figure 5. Switching Speed vs. RL**



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



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**H21B1**

**H21B2**

**H21B3**

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