

FAIRCHILD
SEMICONDUCTOR®

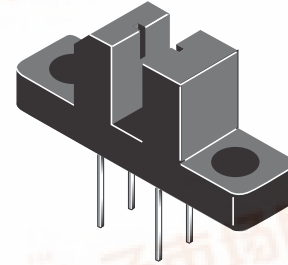
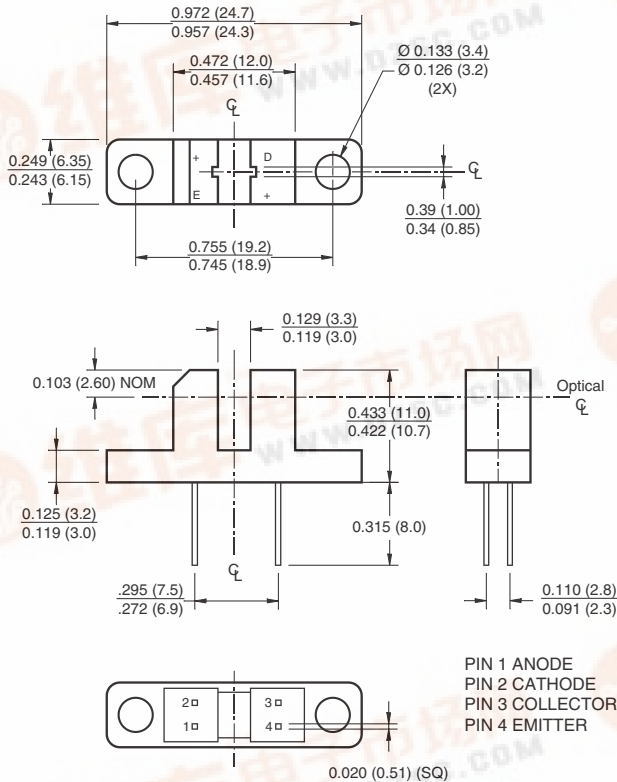
PHOTODARLINGTON OPTICAL INTERRUPTER SWITCH

H21B1

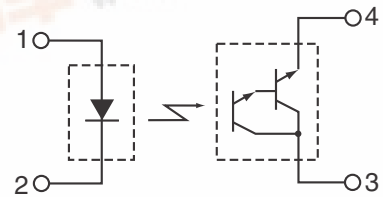
H21B2

H21B3

PACKAGE DIMENSIONS



SCHEMATIC



NOTES:

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

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



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) ^(2,3 and 4)	$T_{\text{SOL-I}}$	240 for 5 sec	$^\circ\text{C}$
Soldering Temperature (Flow) ^(2 and 3)	$T_{\text{SOL-F}}$	260 for 10 sec	$^\circ\text{C}$
INPUT (EMITTER)			
Continuous Forward Current	I_F	50	mA
Reverse Voltage	V_R	6	V
Power Dissipation ⁽¹⁾	P_D	100	mW
OUTPUT (SENSOR)			
Collector to Emitter Voltage	V_{CEO}	30	V
Emitter to Collector Voltage	V_{ECO}	6	V
Collector Current	I_C	40	mA
Power Dissipation ($T_C = 25^\circ\text{C}$) ⁽¹⁾	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°C)							
PARAMETER	TEST CONDITIONS	SYMBOL	DEVICES	MIN	TYP	MAX	UNITS
INPUT (EMITTER)							
Forward Voltage	I _F = 60 mA	V _F	All	—	—	1.7	V
Reverse Breakdown Voltage	I _R = 10 μA	V _R	All	6.0	—	—	V
Reverse Leakage Current	V _R = 3 V	I _R	All	—	—	1.0	μA
OUTPUT (SENSOR)							
Emitter to Collector Breakdown	I _F = 100 μA, E _e = 0	BV _{ECO}	All	7.0	—	—	V
Collector to Emitter Breakdown	I _C = 1 mA, E _e = 0	BV _{CEO}	All	30	—	—	V
Collector to Emitter Leakage	V _{CE} = 25 V, E _e = 0	I _{CEO}	All	—	—	100	nA
COUPLED							
On-State Collector Current	I _F = 2 mA, V _{CE} = 1.5 V	I _{C(ON)}	H21B1	0.5	—	—	mA
			H21B2	1.0	—	—	
			H21B3	2.0	—	—	
	I _F = 5 mA, V _{CE} = 1.5 V		H21B1	2.5	—	—	
			H21B2	5.0	—	—	
			H21B3	10	—	—	
	I _F = 10 mA, V _{CE} = 1.5 V		H21B1	7.5	—	—	
			H21B2	14	—	—	
			H21B3	25	—	—	
Saturation Voltage	I _F = 10 mA, I _C = 1.8 mA	V _{CE(SAT)}	All	—	—	1.0	V
	I _F = 60 mA, I _C = 50 mA		H21B1/2	—	—	1.5	V
Turn-On Time	I _F = 10 mA, V _{CC} = 5 V, R _L = 750Ω	t _{on}	All	—	45	—	μs
	I _F = 60 mA, V _{CC} = 5 V, R _L = 75Ω		All	—	7	—	
Turn-Off Time	I _F = 10 mA, V _{CC} = 5 V, R _L = 750Ω	t _{off}	All	—	250	—	μs
	I _F = 60 mA, V _{CC} = 5 V, R _L = 75Ω		All	—	45	—	

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H21B2

H21B3

Figure 1. Output Current vs. Input Current

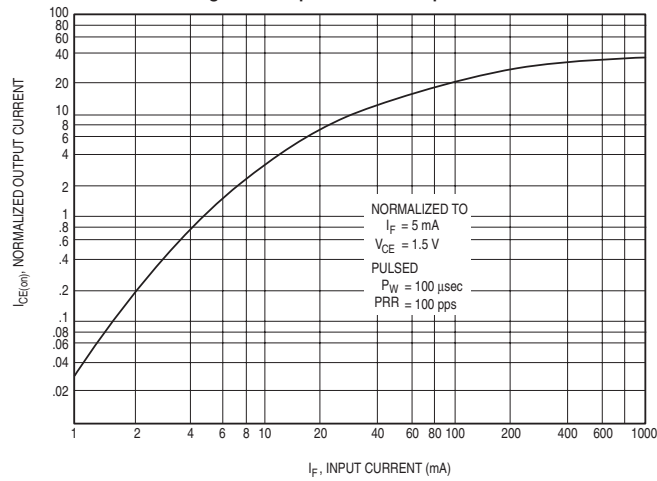


Figure 2. Output Current vs. Temperature

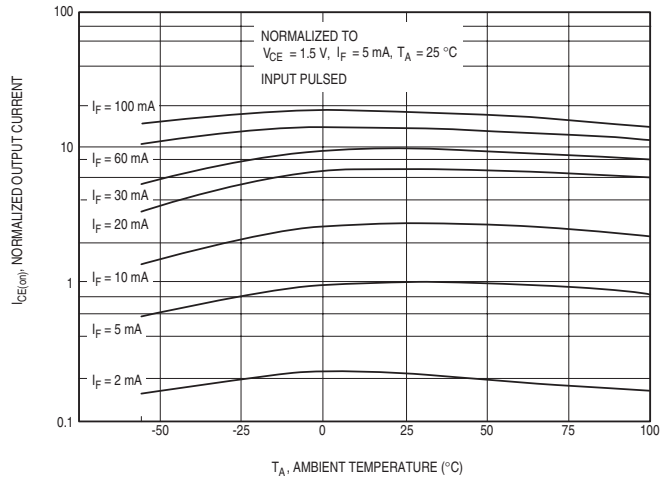
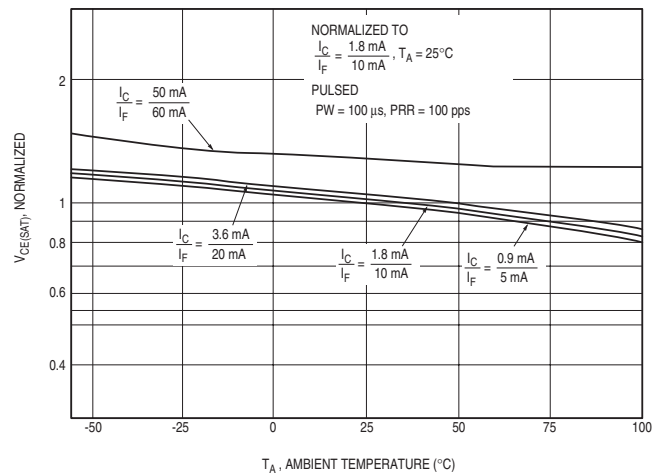


Figure 3. $V_{CE(SAT)}$ vs. Temperature



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H21B2

H21B3

Figure 4. Leakage Current vs. Temperature

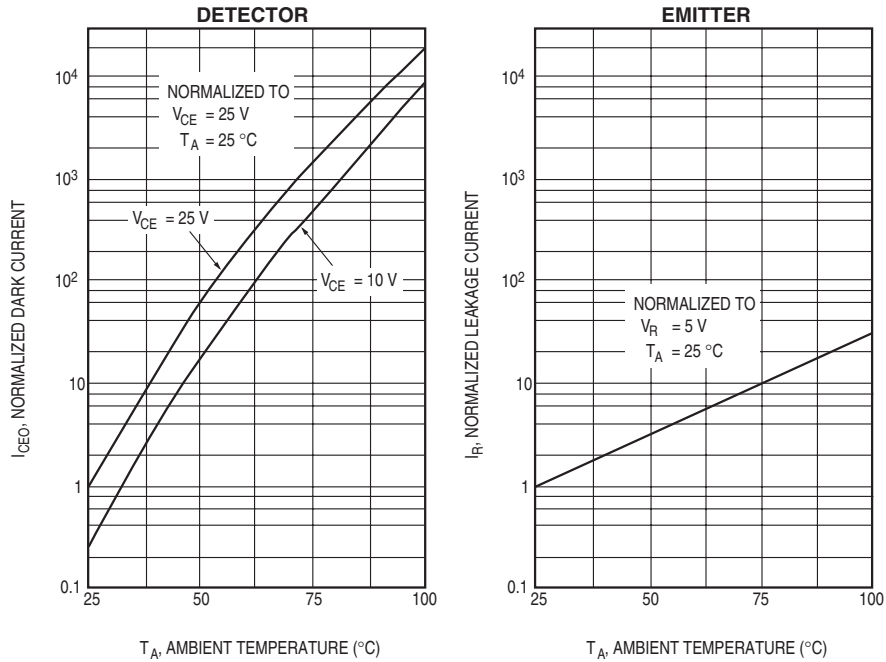
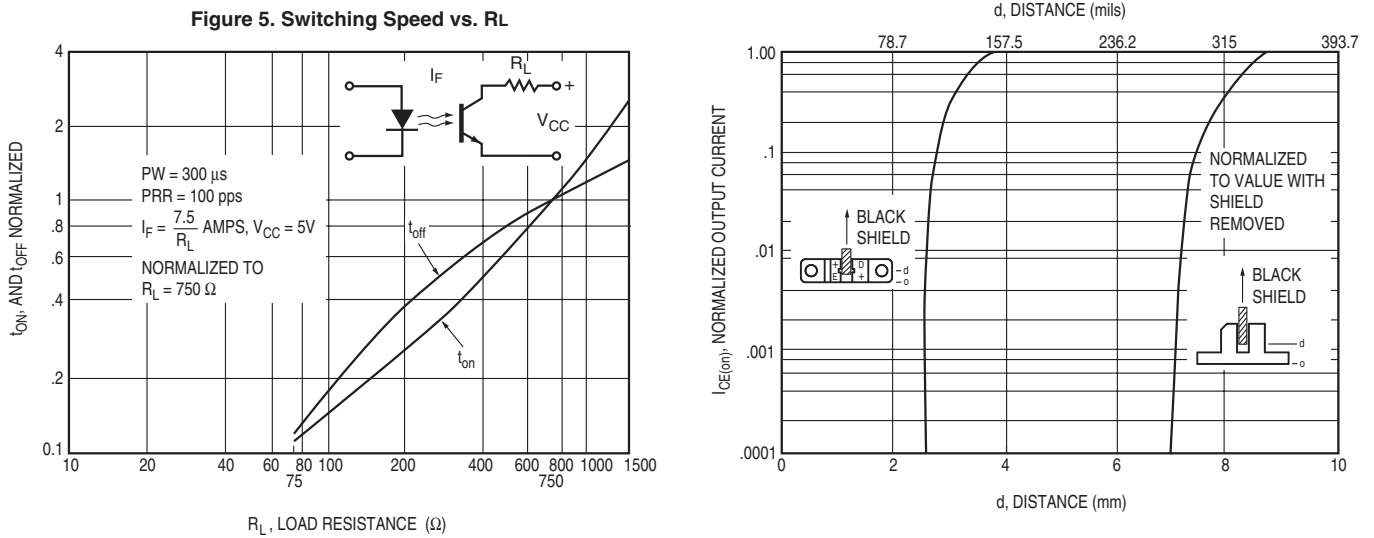


Figure 6. Output Current vs. Distance





PHOTODARLINGTON OPTICAL INTERRUPTER SWITCH

H21B1**H21B2****H21B3**

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