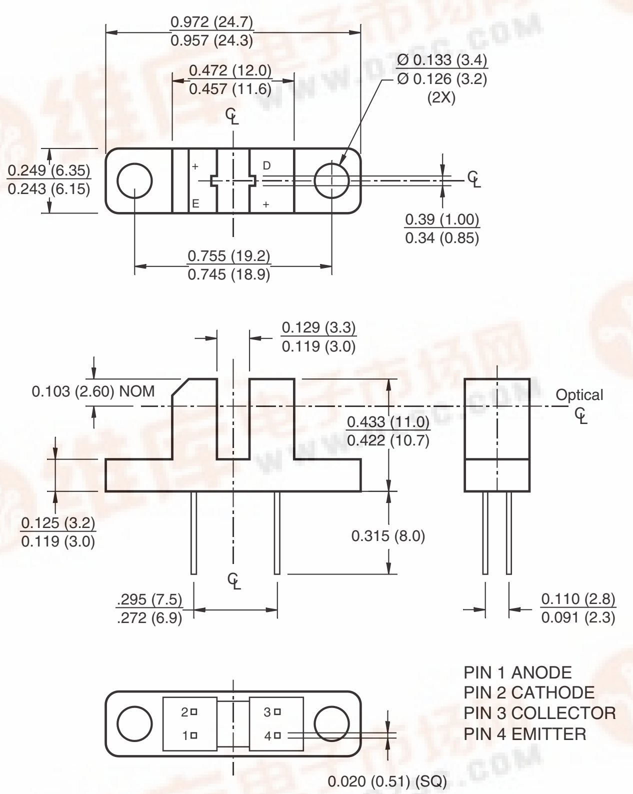
FAIRCHILD SEMICONDUCTOR®

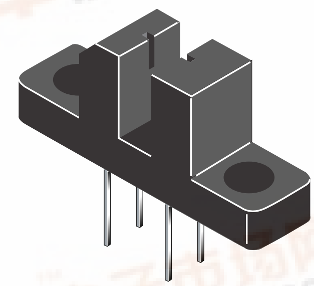
PHOTODARLINGTON OPTICAL INTERRUPTER SWITCH

H21B4 H21B5 H21B6

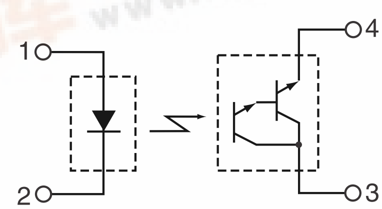
PACKAGE DIMENSIONS



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



SCHEMATIC



DESCRIPTION

The H21B4, H21B5 and H21B6 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 $I_{C(ON)}$

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ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise specified)			
Parameter	**Symbol**	**Rating**	**Unit**
Operating Temperature	T_{OPR}	-55 to +100	°C
Storage Temperature	T_{STG}	-55 to +100	°C
Soldering Temperature (Iron)(2,3 and 4)	T_{SOL-I}	240 for 5 sec	°C
Soldering Temperature (Flow)(2 and 3)	T_{SOL-F}	260 for 10 sec	°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}	55	V
Emitter to Collector Voltage	V_{ECO}	6	V
Collector Current	I_C	40	mA
Power Dissipation (T_C = 25°C)(1)	P_D	150	mW

NOTES:
1. Derate power dissipation linearly 1.33 mW/°C above 25°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.

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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	55	—	—	V
Collector to Emitter Leakage	V_{CE} = 45 V, E_e = 0	I_{CEO}	All	—	—	100	nA
COUPLED	I_F = 2 mA, V_{CE} = 1.5 V	$I_{C(ON)}$	H21B4	0.5	—	—	mA
			H21B5	1.0	—	—	
			H21B6	2.0	—	—	
On-State Collector Current	I_F = 5 mA, V_{CE} = 1.5 V		H21B4	2.5	—	—	
			H21B5	5.0	—	—	
			H21B6	10	—	—	
	I_F = 10 mA, V_{CE} = 1.5 V		H21B4	7.5	—	—	
			H21B5	14	—	—	
			H21B6	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		H21B5/6	—	—	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	—	

Figure 1. Output Current vs. Input Current

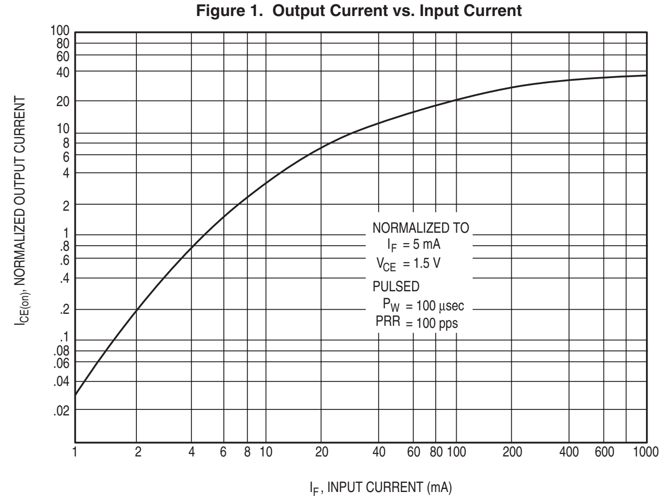


Figure 2. Output Current vs. Temperature

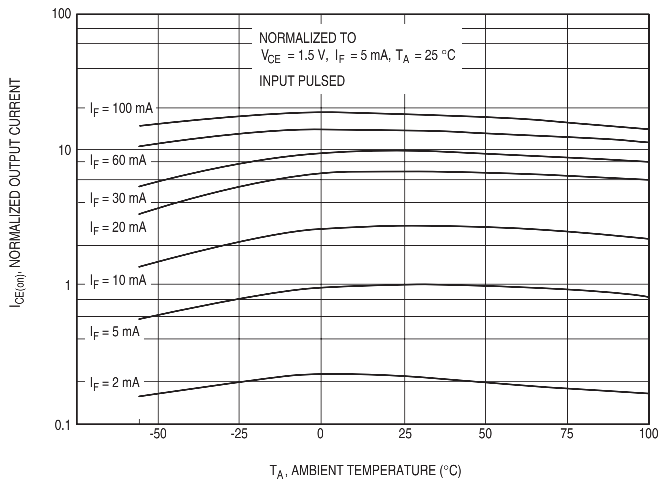


Figure 3. $V_{CE(SAT)}$ vs. Temperature

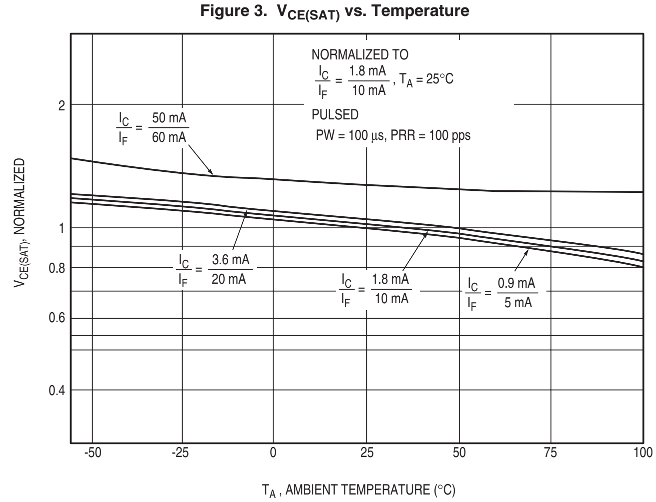


Figure 4. Leakage Current vs. Temperature

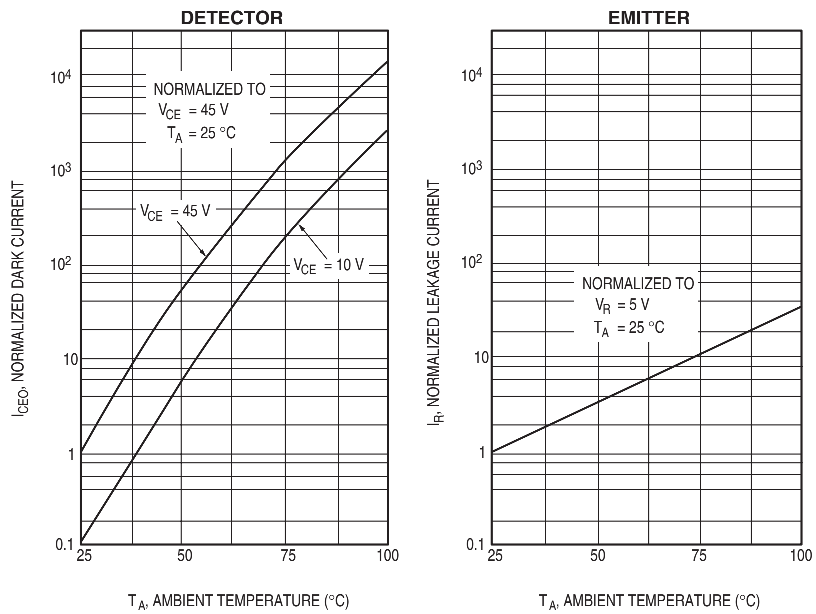


Figure 5. Switching Speed vs. RL

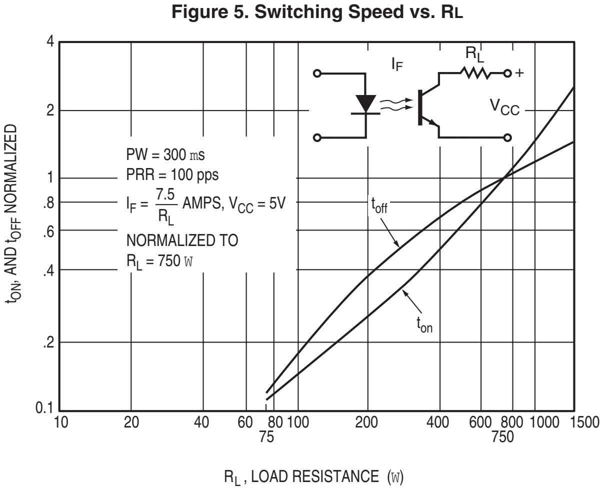
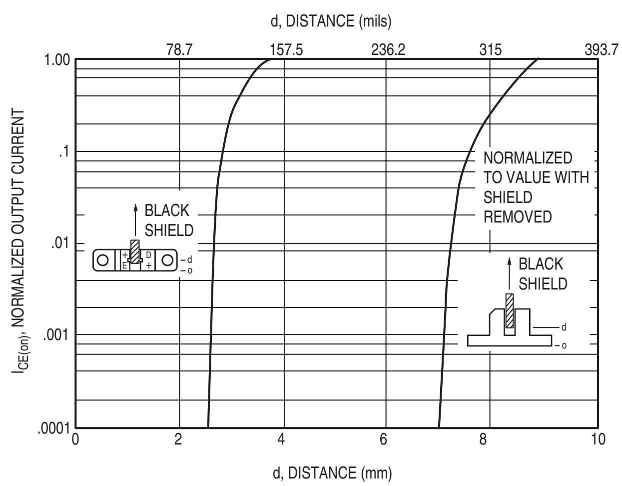


Figure 6. Output Current vs. Distance



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