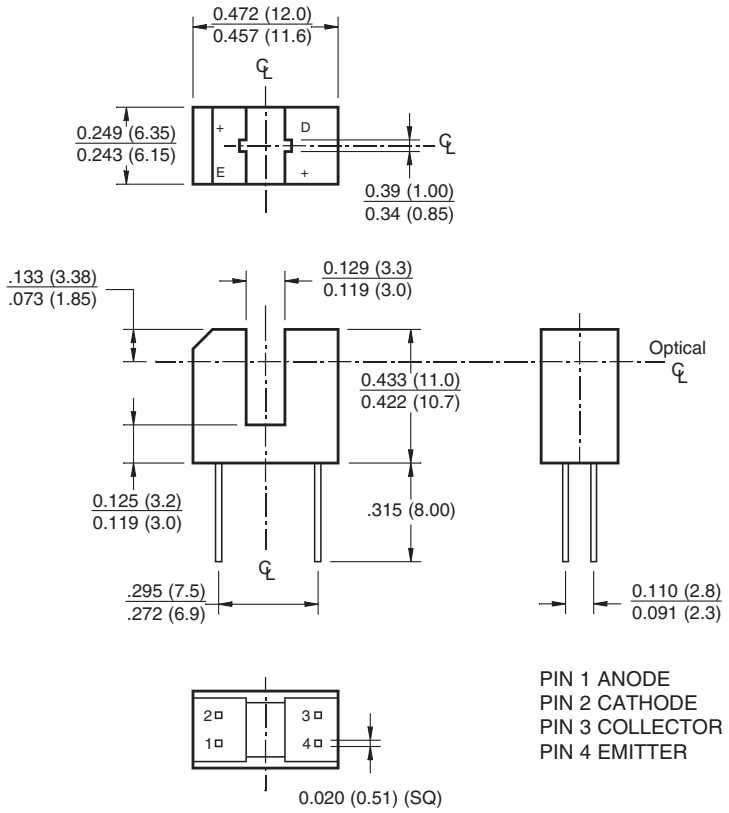
# PHOTODARLINGTON OPTICAL INTERRUPTER SWITCH

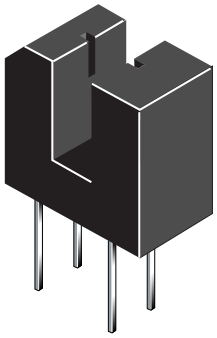
## H22B1 H22B2 H22B3

### PACKAGE DIMENSIONS

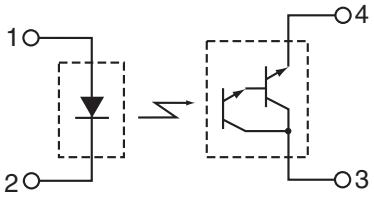



PIN 1 ANODE
PIN 2 CATHODE
PIN 3 COLLECTOR
PIN 4 EMITTER

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



### SCHEMATIC




## DESCRIPTION

The H22B1, H22B2 and H22B3 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 $I_{C(ON)}$

| **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 | $V_{CEO}$ | 30 | 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 1.67 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.

## 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 | $I_{C(ON)}$ | H22B1 | 0.5 | — | — | mA |
| | | | H22B2 | 1.0 | — | — | |
| | | | H22B3 | 2.0 | — | — | |
| | $I_F$ = 5 mA, $V_{CE}$ = 1.5 V | | H22B1 | 2.5 | — | — | |
| | | | H22B2 | 5.0 | — | — | |
| | | | H22B3 | 10 | — | — | |
| | $I_F$ = 10 mA, $V_{CE}$ = 1.5 V | | H22B1 | 7.5 | — | — | |
| | | | H22B2 | 14 | — | — | |
| | | | H22B3 | 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 | | H22B1/2 | — | — | 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 | — | |

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

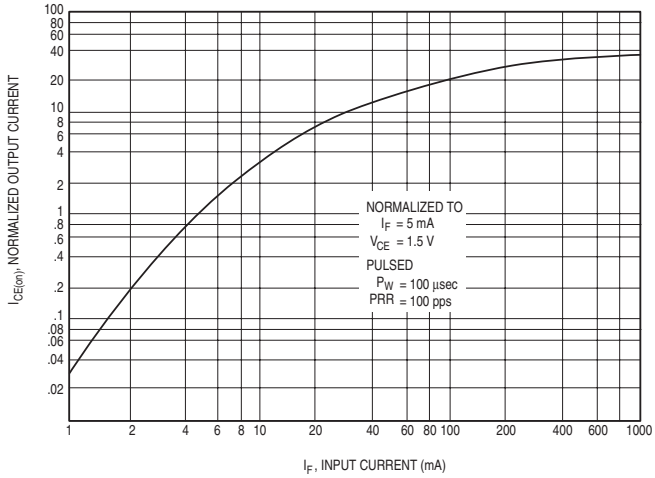



**Figure 2. Output Current vs. Temperature**

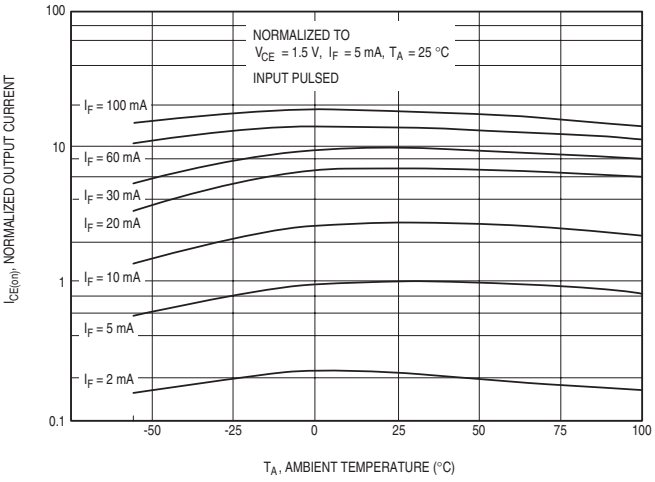



**Figure 3. $V_{CE(SAT)}$ vs. Temperature**

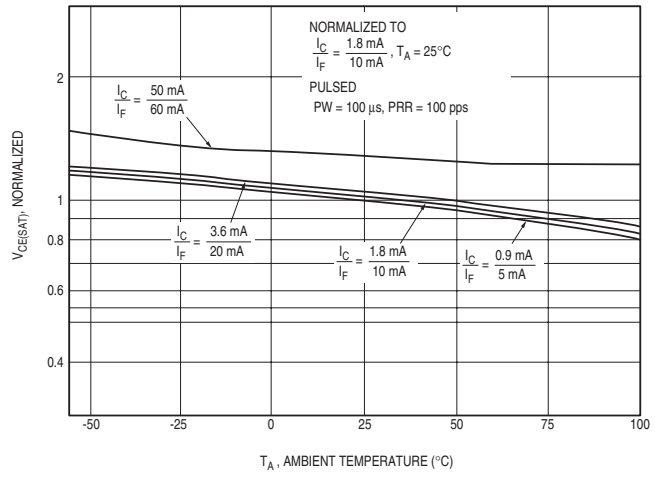


**Figure 4. Leakage Current vs. Temperature**

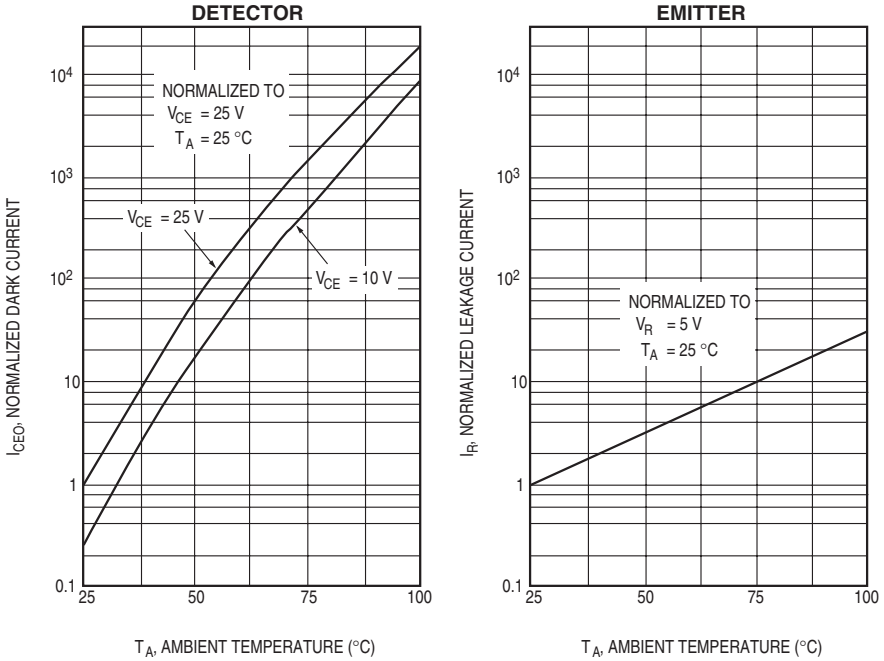



**Figure 5. Switching Speed vs. RL**

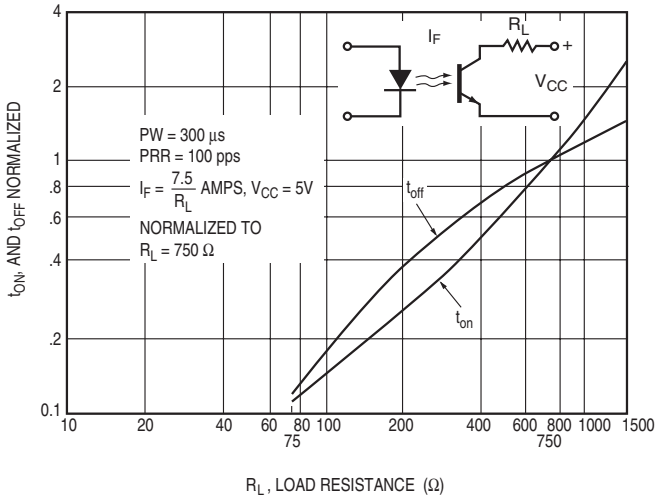
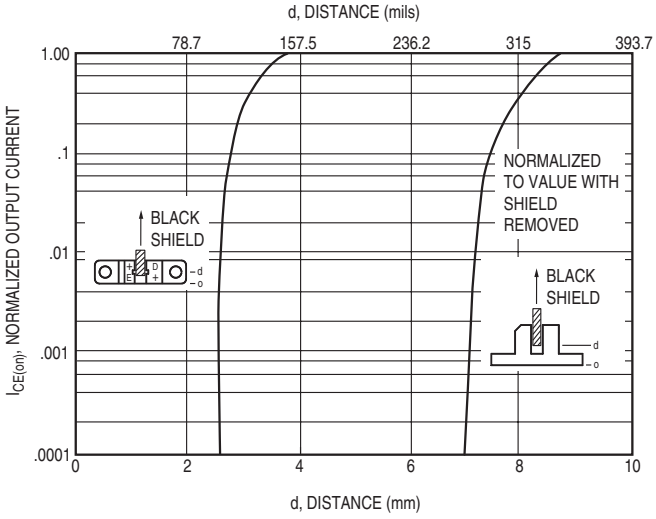



**Figure 6. Output Current vs. Distance**



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