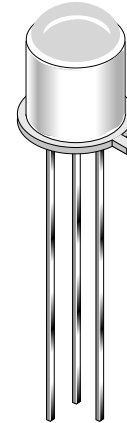
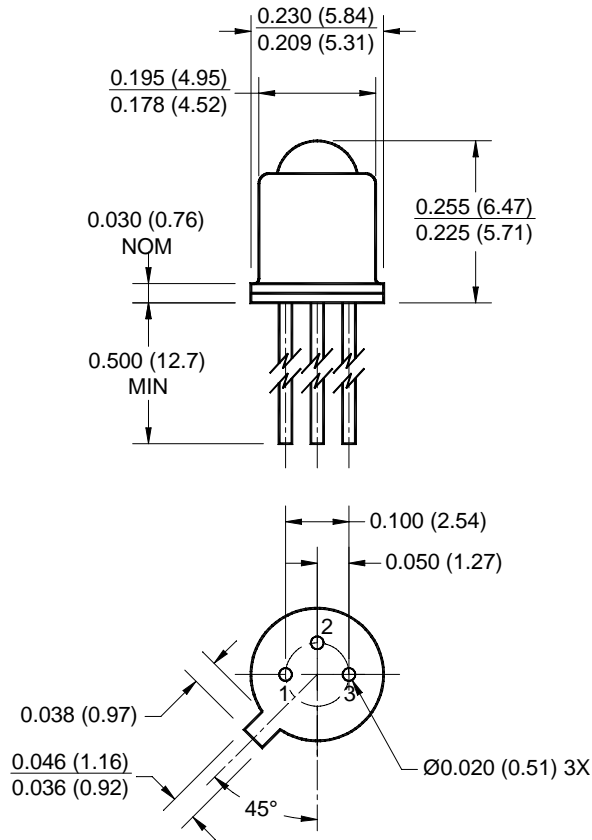
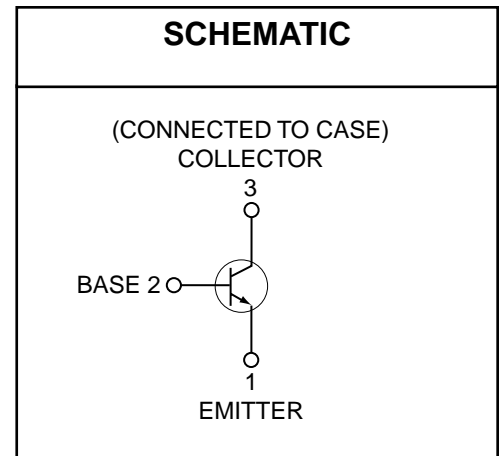


**PACKAGE DIMENSIONS**



**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 L14G1/L14G2/L14G3 are silicon phototransistors mounted in a narrow angle, TO-18 package.

**FEATURES**

- Hermetically sealed package
- Narrow reception angle

**L14G1 L14G2 L14G3**

| <b>ABSOLUTE MAXIMUM RATINGS</b> ( $T_A = 25^\circ\text{C}$ unless otherwise specified) |             |                |                  |
|--|-------------|----------------|------------------|
| Parameter  | Symbol      | Rating         | Unit             |
| Operating Temperature  | $T_{OPR}$   | -65 to +125    | $^\circ\text{C}$ |
| Storage Temperature  | $T_{STG}$   | -65 to +150    | $^\circ\text{C}$ |
| Soldering Temperature (Iron) <sup>(3,4,5 and 6)</sup>                                  | $T_{SOL-I}$ | 240 for 5 sec  | $^\circ\text{C}$ |
| Soldering Temperature (Flow) <sup>(3,4 and 6)</sup>                                    | $T_{SOL-F}$ | 260 for 10 sec | $^\circ\text{C}$ |
| Collector to Emitter Breakdown Voltage   | $V_{CEO}$   | 45             | V                |
| Collector to Base Breakdown Voltage  | $V_{CBO}$   | 45             | V                |
| Emitter to Base Breakdwon Voltage  | $V_{EBO}$   | 5              | V                |
| Power Dissipation ( $T_A = 25^\circ\text{C}$ ) <sup>(1)</sup>                          | $P_D$       | 300            | mW               |
| Power Dissipation ( $T_C = 25^\circ\text{C}$ ) <sup>(2)</sup>                          | $P_D$       | 600            | mW               |

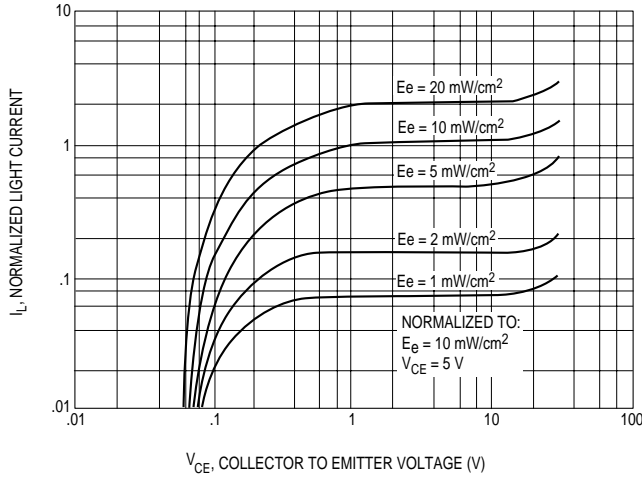
**NOTE:**

1. Derate power dissipation linearly 3.00 mW/ $^\circ\text{C}$  above 25 $^\circ\text{C}$  ambient.
2. Derate power dissipation linearly 6.00 mW/ $^\circ\text{C}$  above 25 $^\circ\text{C}$  case.
3. RMA flux is recommended.
4. Methanol or isopropyl alcohols are recommended as cleaning agents.
5. Soldering iron tip 1/16" (1.6mm) minimum from housing.
6. As long as leads are not under any stress or spring tension.
7. Light source is a GaAs LED emitting light at a peak wavelength of 940 nm.
8. Figure 1 and figure 2 use light source of tungsten lamp at 2870 $^\circ\text{K}$  color temperature. A GaAs source of 3.0 mW/cm<sup>2</sup> is approximately equivalent to a tungsten source, at 2870 $^\circ\text{K}$ , of 10 mW/cm<sup>2</sup>.

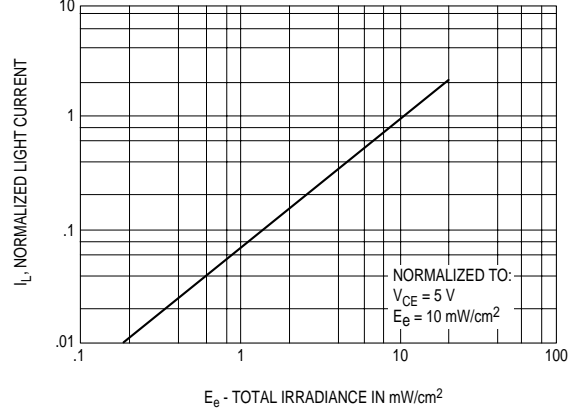
| <b>ELECTRICAL / OPTICAL CHARACTERISTICS</b> ( $T_A = 25^\circ\text{C}$ ) (All measurements made under pulse conditions) |  |               |     |          |      |               |
|---|--|---------------|-----|----------|------|---------------|
| PARAMETER   | TEST CONDITIONS  | SYMBOL        | MIN | TYP      | MAX  | UNITS         |
| Collector-Emitter Breakdown   | $I_C = 10\text{ mA}, E_e = 0$                                | $BV_{CEO}$    | 45  |          | —    | V             |
| Emitter-Base Breakdown  | $I_E = 100\ \mu\text{A}, E_e = 0$                            | $BV_{EBO}$    | 5.0 |          | —    | V             |
| Collector-Base Breakdown  | $I_C = 100\ \mu\text{A}, E_e = 0$                            | $BV_{CBO}$    | 45  |          | —    | V             |
| Collector-Emitter Leakage   | $V_{CE} = 10\text{ V}, E_e = 0$                              | $I_{CEO}$     | —   |          | 100  | nA            |
| Reception Angle at 1/2 Sensitivity  |  | $\theta$      |     | $\pm 10$ |      | Degrees       |
| On-State Collector Current L14G1  | $E_e = 0.5\text{ mW/cm}^2, V_{CE} = 5\text{ V}^{(7,8)}$      | $I_{C(ON)}$   | 1.0 |          | —    | mA            |
| On-State Collector Current L14G2  | $E_e = 0.5\text{ mW/cm}^2, V_{CE} = 5\text{ V}^{(7,8)}$      | $I_{C(ON)}$   | 0.5 |          |      | mA            |
| On-State Collector Current L14G3  | $E_e = 0.5\text{ mW/cm}^2, V_{CE} = 5\text{ V}^{(7,8)}$      | $I_{C(ON)}$   | 2.0 |          |      | mA            |
| Turn-On Time  | $I_C = 2\text{ mA}, V_{CC} = 10\text{ V}, R_L = 100\ \Omega$ | $t_{on}$      |     | 8        |      | $\mu\text{s}$ |
| Turn-Off Time   | $I_C = 2\text{ mA}, V_{CC} = 10\text{ V}, R_L = 100\ \Omega$ | $t_{off}$     |     | 7        |      | $\mu\text{s}$ |
| Saturation Voltage  | $I_C = 1.0\text{ mA}, E_e = 3.0\text{ mW/cm}^2^{(7,8)}$      | $V_{CE(SAT)}$ | —   |          | 0.40 | V             |

**L14G1 L14G2 L14G3**

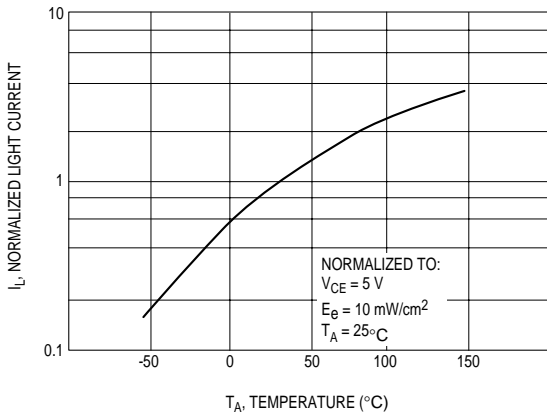
**Figure 1. Light Current vs. Collector to Emitter Voltage**



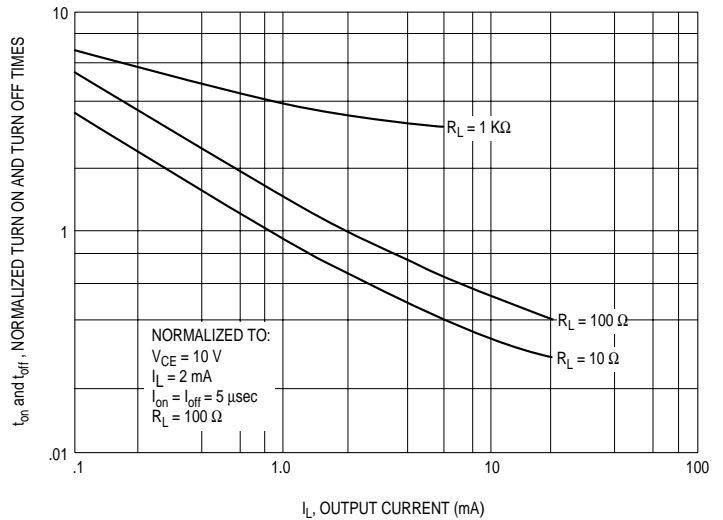
**Figure 2. Light Current vs. Temperature**



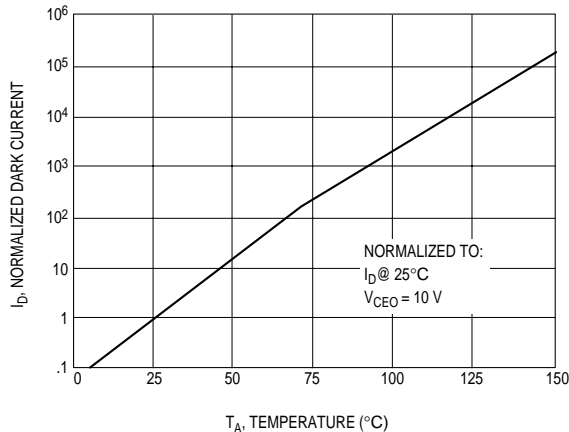
**Figure 3. Normalized Light Current vs. Temperature**



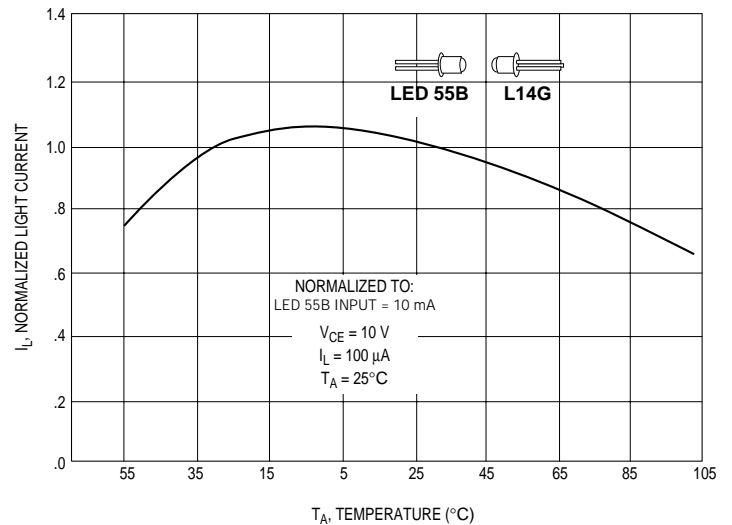
**Figure 4. Switching Times vs. Output Current**



**Figure 5. Dark Current and Temperature**



**Figure 6. Normalized Light Current vs. Temperature Both Emitter (LED 55B) and Detector (L14G) at Same Temperature**



**DISCLAIMER**

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

**LIFE SUPPORT POLICY**

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT OF FAIRCHILD SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in labeling, can be reasonably expected to result in a significant injury of the user.
2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.