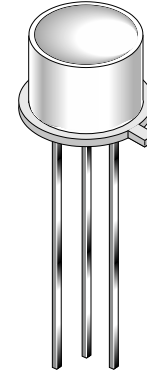
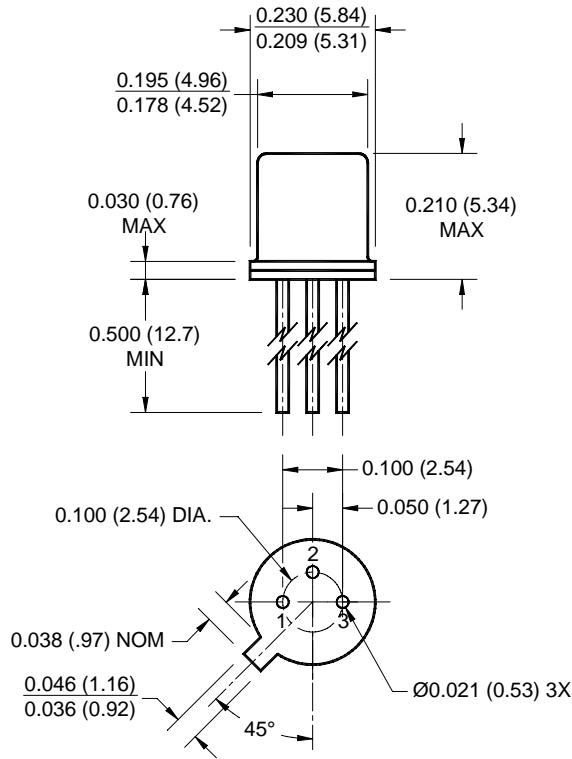
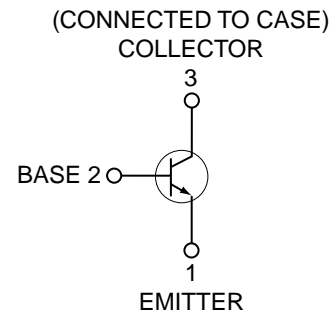


**PACKAGE DIMENSIONS**



**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 L14N1/L14N2 are silicon phototransistors mounted in a wide angle, TO-18 package.

**FEATURES**

- Hermetically sealed package
- Wide reception angle
- Device can be used as a photodiode by using the collector and base leads.

| <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   | $V_{CEO}$   | 30             | V                |
| Collector to Base Breakdown Voltage  | $V_{CBO}$   | 40             | V                |
| Emitter to Base Breakdown 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               |

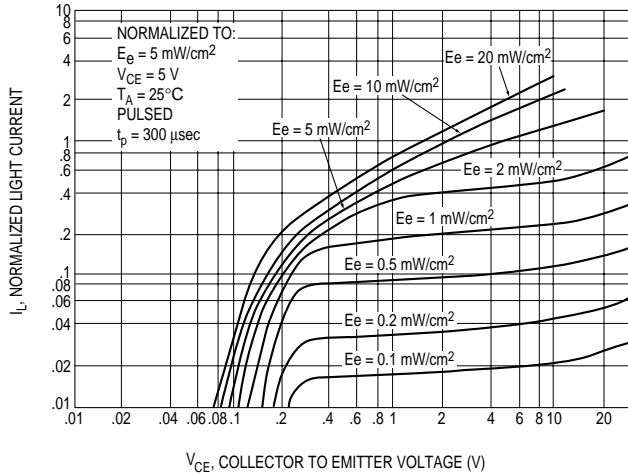
**NOTE:**

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°K color temperature. A GaAs source of 3.0 mW/cm<sup>2</sup> is approximately equivalent to a tungsten source, at 2870°K, of 10 mW/cm<sup>2</sup>.

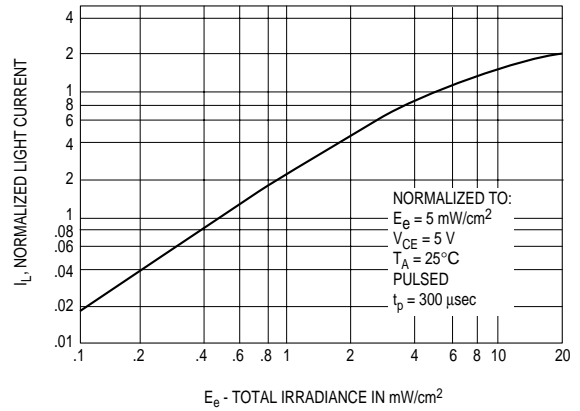
| <b>ELECTRICAL / OPTICAL CHARACTERISTICS</b> ( $T_A = 25^\circ\text{C}$ ) (All measurements made under pulse conditions) |  |               |     |     |      |               |
|---|--|---------------|-----|-----|------|---------------|
| PARAMETER   | TEST CONDITIONS  | SYMBOL        | MIN | TYP | MAX  | UNITS         |
| Collector-Emitter Breakdown   | $I_C = 10\text{ mA}, E_e = 0$                                | $BV_{CEO}$    | 30  |     | —    | V             |
| Emitter-Base Breakdown  | $I_E = 100\ \mu\text{A}, E_e = 0$                            | $BV_{EBO}$    | 5   |     | —    | V             |
| Collector-Base Breakdown  | $I_C = 100\ \mu\text{A}, E_e = 0$                            | $BV_{CBO}$    | 40  |     | —    | V             |
| Collector-Emitter Leakage   | $V_{CE} = 10\text{ V}, E_e = 0$                              | $I_{CEO}$     | —   |     | 100  | nA            |
| Collector-Base leakage  | $V_{CB} = 25\text{ V}, E_e = 0$                              | $I_{CBO}$     | —   |     | 25   | nA            |
| Reception Angle at 1/2 Sensitivity  |  | $\theta$      |     | ±40 |      | Degrees       |
| On-State Collector Current L14N1  | $E_e = 0.5\text{ mW/cm}^2, V_{CE} = 5\text{ V}^{(7,8)}$      | $I_{C(ON)}$   | 1.0 |     | —    | mA            |
| On-State Collector Current L14N2  | $E_e = 0.5\text{ mW/cm}^2, V_{CE} = 5\text{ V}^{(7,8)}$      | $I_{C(ON)}$   | 2.0 |     |      | mA            |
| On-State Photodiode Current   | $E_e = 1.5\text{ mW/cm}^2, V_{CB} = 5\text{ V}^{(7,8)}$      | $I_{CB(ON)}$  |     | 5.0 |      | $\mu\text{A}$ |
| Rise Time   | $I_C = 10\text{ mA}, V_{CC} = 5\text{ V}, R_L = 100\ \Omega$ | $t_r$         |     | 14  |      | $\mu\text{s}$ |
| Fall Time   | $I_C = 10\text{ mA}, V_{CC} = 5\text{ V}, R_L = 100\ \Omega$ | $t_f$         |     | 16  |      | $\mu\text{s}$ |
| Saturation Voltage L14N1  | $I_C = 0.8\text{ mA}, E_e = 3.0\text{ mW/cm}^2^{(7,8)}$      | $V_{CE(SAT)}$ | —   |     | 0.40 | V             |
| Saturation Voltage L14N2  | $I_C = 1.6\text{ mA}, E_e = 3.0\text{ mW/cm}^2^{(7,8)}$      | $V_{CE(SAT)}$ | —   |     | 0.40 | V             |

**L14N1 L14N2**

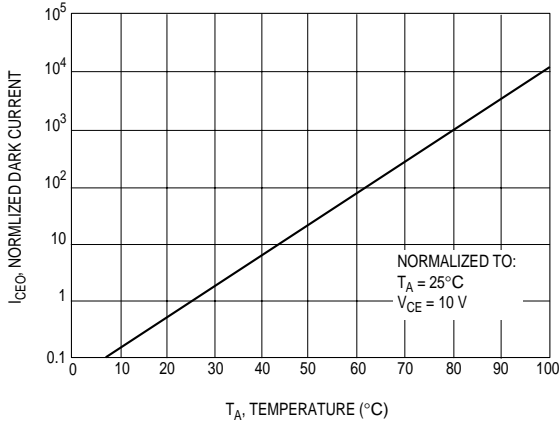
**Figure 1. Light Current vs. Collector to Emitter Voltage**



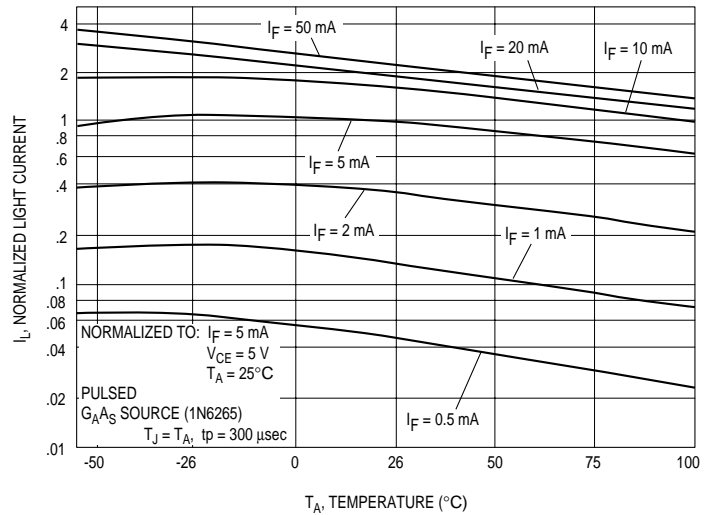
**Figure 2. Normalized Light Current vs. Radiation**



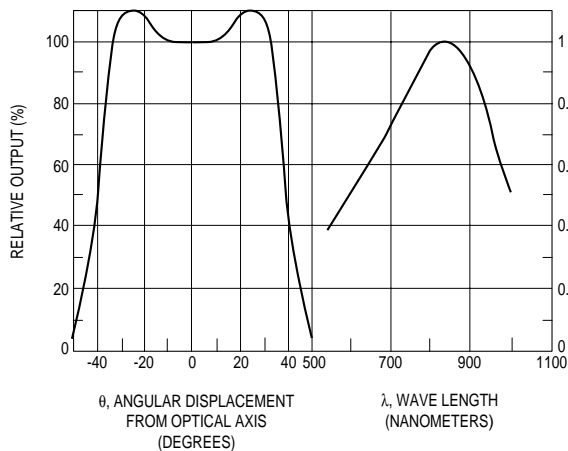
**Figure 3. Dark Current vs. Temperature**



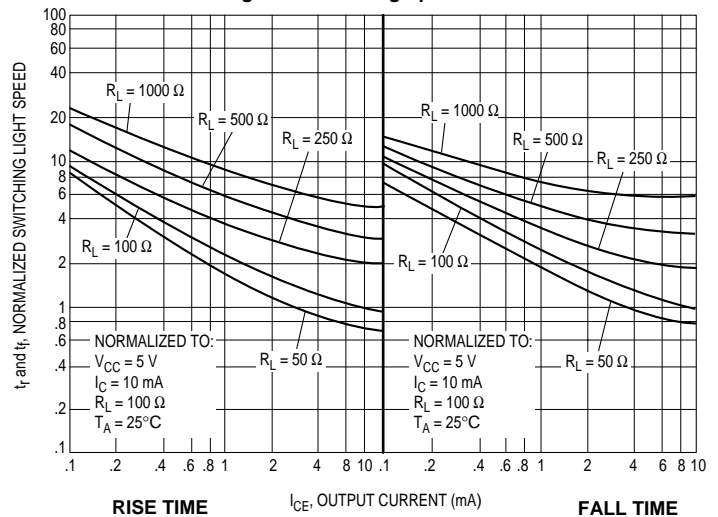
**Figure 4. Light Current vs. Temperature**



**Figure 5. Angular and Spectral Response**



**Figure 6. Switching Speed vs. Bias**



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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.