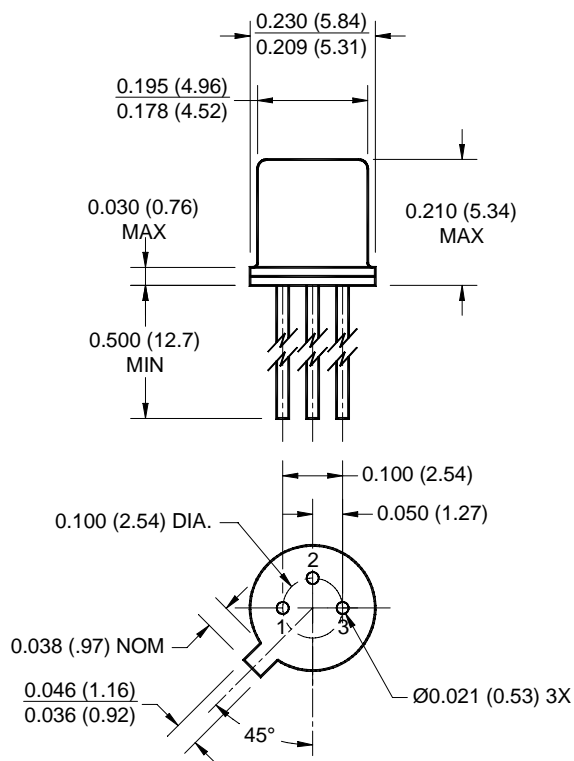


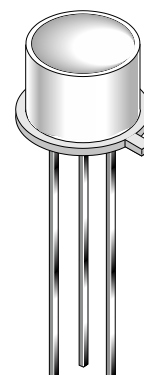
**L14N1 L14N2**

## PACKAGE DIMENSIONS

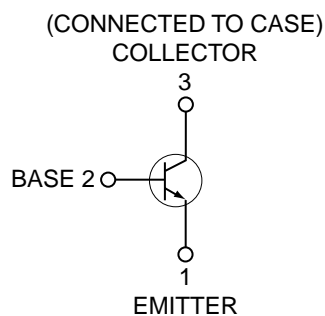


### NOTES:

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



## SCHEMATIC



## 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.

## L14N1 L14N2

### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ 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:

- Derate power dissipation linearly 3.00 mW/ $^\circ\text{C}$  above  $25^\circ\text{C}$  ambient.
- Derate power dissipation linearly 6.00 mW/ $^\circ\text{C}$  above  $25^\circ\text{C}$  case.
- RMA flux is recommended.
- Methanol or isopropyl alcohols are recommended as cleaning agents.
- Soldering iron tip 1/16" (1.6mm) minimum from housing.
- As long as leads are not under any stress or spring tension.
- Light source is a GaAs LED emitting light at a peak wavelength of 940 nm.
- 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>.

### ELECTRICAL / OPTICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ ) (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	$I_E = 100\text{ }\mu\text{A}$ , $E_e = 0$	$BV_{EBO}$	5		—	V
Collector-Base Breakdown	$I_C = 100\text{ }\mu\text{A}$ , $E_e = 0$	$BV_{CBO}$	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		$\theta$		$\pm 40$		Degrees
On-State Collector Current L14N1	$E_e = 0.5\text{ mW/cm}^2$ , $V_{CE} = 5\text{ V}$ <sup>(7,8)</sup>	$I_{C(ON)}$	1.0		—	mA
On-State Collector Current L14N2	$E_e = 0.5\text{ mW/cm}^2$ , $V_{CE} = 5\text{ V}$ <sup>(7,8)</sup>	$I_{C(ON)}$	2.0			mA
On-State Photodiode Current	$E_e = 1.5\text{ mW/cm}^2$ , $V_{CB} = 5\text{ V}$ <sup>(7,8)</sup>	$I_{CB(ON)}$		5.0		$\mu\text{A}$
Rise Time	$I_C = 10\text{ mA}$ , $V_{CC} = 5\text{ V}$ , $R_L = 100\text{ }\Omega$	$t_r$		14		$\mu\text{s}$
Fall Time	$I_C = 10\text{ mA}$ , $V_{CC} = 5\text{ V}$ , $R_L = 100\text{ }\Omega$	$t_f$		16		$\mu\text{s}$
Saturation Voltage L14N1	$I_C = 0.8\text{ mA}$ , $E_e = 3.0\text{ mW/cm}^2$ <sup>(7,8)</sup>	$V_{CE(SAT)}$	—		0.40	V
Saturation Voltage L14N2	$I_C = 1.6\text{ mA}$ , $E_e = 3.0\text{ mW/cm}^2$ <sup>(7,8)</sup>	$V_{CE(SAT)}$	—		0.40	V

## L14N1 L14N2

Figure 1. Light Current vs. Collector to Emitter Voltage

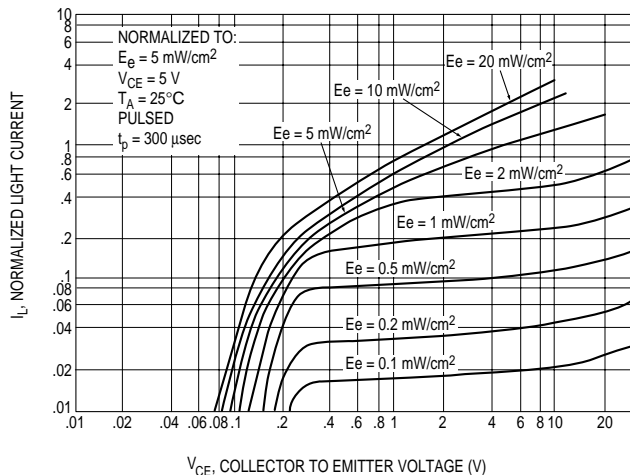


Figure 2. Normalized Light Current vs. Radiation

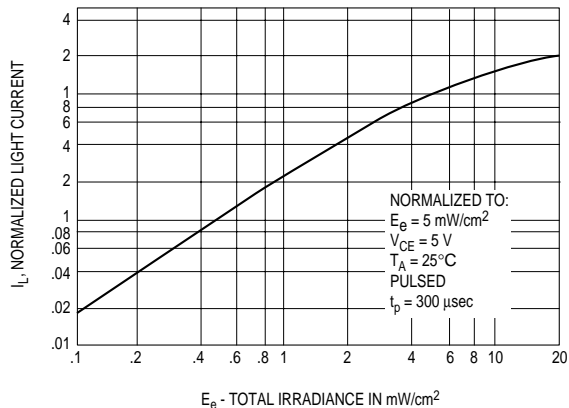


Figure 3. Dark Current vs. Temperature

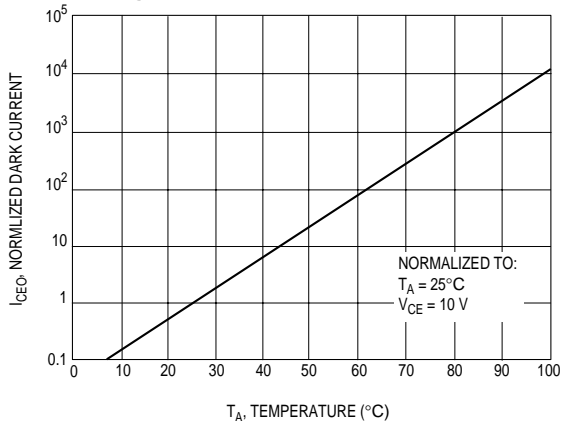


Figure 4. Light Current vs. Temperature

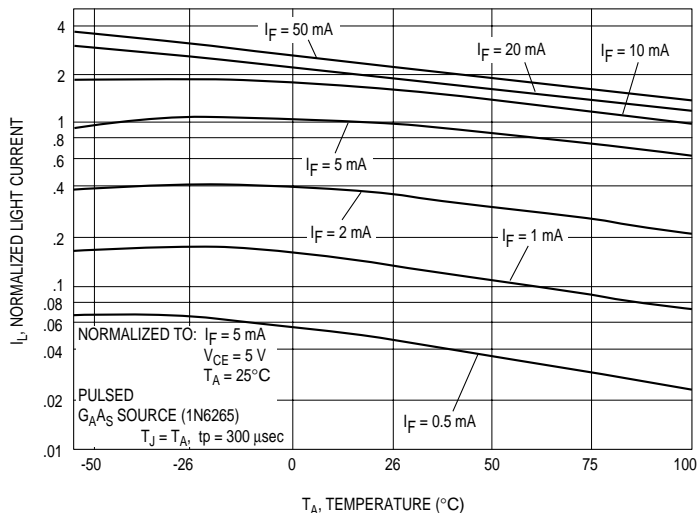


Figure 5. Angular and Spectral Response

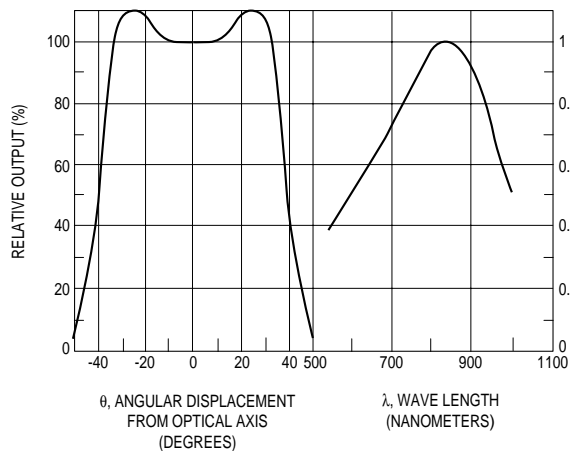
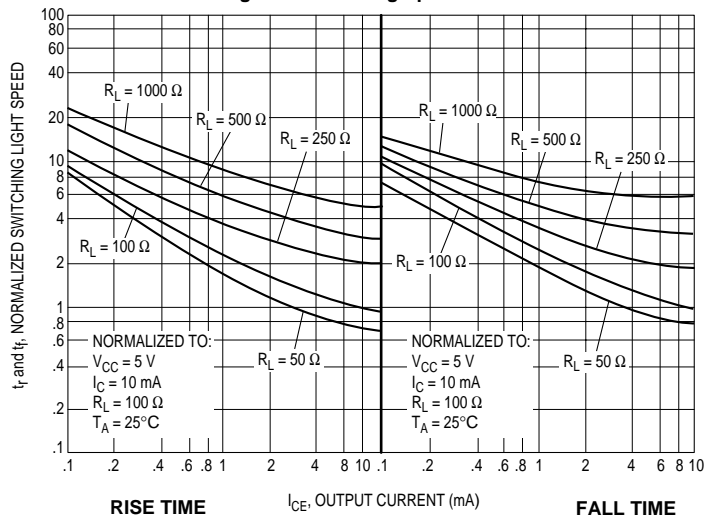


Figure 6. Switching Speed vs. Bias



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