

## Features

- Hermetic 3-pin TO-18 package
- Narrow reception angle
- High reliability and rugged construction
- High reliability screening available
- Radiation tolerant
- Operating temperature range -65°C to +125°C

## Applications

- Encoders
- Position Sensors
- Level Detection

## Description

The IB14G1 / IB14G2 / IB14G3 consist of silicon phototransistors mounted in a narrow angle hermetic TO-18 package.

## Schematic Diagram

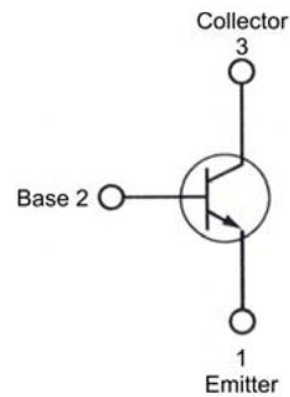


Figure 1. IB14CX Schematic Diagram

## Package Dimensions in inches (mm)

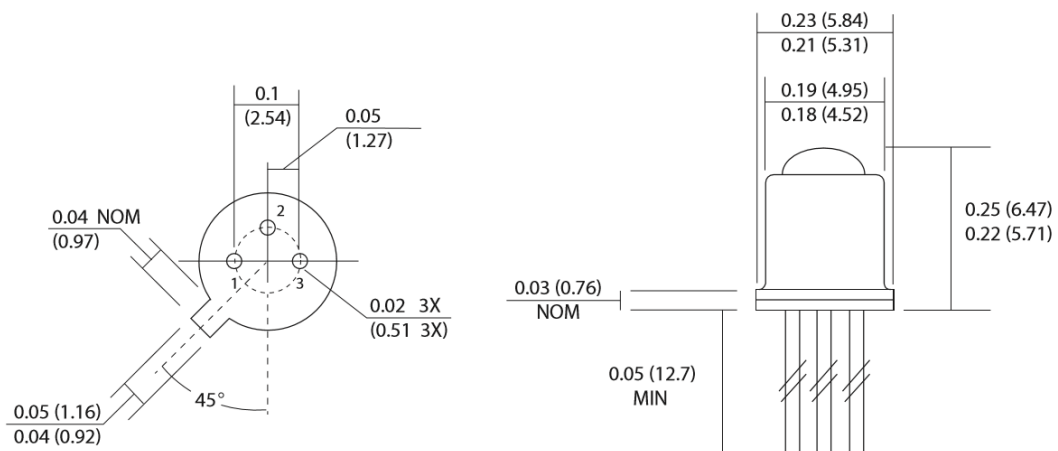


Figure 2. IB14CX Package Dimensions

**Absolute Maximum Rating at 25°C** (Note 1)

<b>Symbol</b>	<b>Parameters</b>	<b>Ratings</b>	<b>Units</b>	<b>Notes</b>
T <sub>OPR</sub>	Operating temperature	-65 to +125	°C	
T <sub>STG</sub>	Storage temperature	-65 to +150	°C	
T <sub>SOL</sub>	Soldering temperature (10 seconds maximum)	240	°C	
P <sub>D</sub>	Power dissipation, ambient	300	mW	2
P <sub>D</sub>	Power dissipation, case	600	mW	3
V <sub>CE</sub>	Collector-Emitter Voltage	45	V	
V <sub>EB</sub>	Emitter-Base Voltage	5	V	
V <sub>CB</sub>	Collector-Base Voltage	45	V	

**Notes**

1. When using this product, please observe the absolute maximum ratings. Only one parameter may be set at the limit to ensure no damage to the device. Exceeding any of the limits listed here may damage the device.
2. Linear derating factor: 3.0 mW/°C above 25°C ambient.
3. Linear derating factor: 6.0 mW/°C above 25°C case.

**ESD Precaution**

Please be advised that normal static precautions should be taken in the handling and assembly of this device to prevent damage or degradation which may be induced by electrostatic discharge (ESD).

**Electrical Characteristics**  $T_A = 25^\circ\text{C}$  (unless otherwise specified) (Note 1)

<b>Symbol</b>	<b>Parameters</b>	<b>Test Conditions</b>	<b>Min</b>	<b>Max</b>	<b>Units</b>	<b>Notes</b>
$BV_{CEO}$	Collector-Emitter Breakdown Voltage	$I_C = 10\text{mA}$ , $E_e = 0\text{mW}/\text{cm}^2$	45	-	V	
$BV_{CBO}$	Collector-Base Breakdown Voltage	$I_C = 100\mu\text{A}$ , $E_e = 0\text{mW}/\text{cm}^2$	45	-	V	
$BV_{EBO}$	Emitter-Base Breakdown Voltage	$I_E = 100\mu\text{A}$ , $E_e = 0\text{mW}/\text{cm}^2$	5	-	V	
$I_{C\_ON}$	Collector Current, On-state IB14G1	$V_{CE} = 5\text{V}$ , $E_e = 0.5\text{mW}/\text{cm}^2$	1	-	mA	2, 3
	Collector Current, On-state IB14G2	$V_{CE} = 5\text{V}$ , $E_e = 0.5\text{mW}/\text{cm}^2$	0.5	-	mA	2, 3
	Collector Current, On-state IB14G3	$V_{CE} = 5\text{V}$ , $E_e = 1.0\text{mW}/\text{cm}^2$	2	-	mA	2, 3
$I_{CE\_OFF}$	Collector-Emitter Dark Current, Off-state	$V_{CE} = 10\text{V}$ , $E_e = 0\text{mW}/\text{cm}^2$	-	100	nA	
$V_{CE(SAT)}$	Saturation Voltage	$I_C = 1\text{mA}$ , $E_e = 3.0\text{mW}/\text{cm}^2$	-	0.4	V	2, 3
$\Theta$	Reception Angle at $\frac{1}{2}$ Sensitivity		-	$\pm 10$	$^\circ$	

**Switching Characteristics**

<b>Symbol</b>	<b>Parameters</b>	<b>Test Conditions</b>	<b>Typ</b>	<b>Max</b>	<b>Units</b>	<b>Notes</b>
$t_r$	Rise Time	$I_F = 2\text{mA}$ , $V_{CC} = 10\text{V}$ , $R_L = 100\Omega$	8	-	$\mu\text{s}$	
$t_f$	Fall Time		7	-		

**Notes**

- Performance guaranteed only under conditions listed in above tables.
- Light Source is a GaAs LED emitting light at a peak wavelength of 940nm.
- Figure 3 and 4 use light source of tungsten lamp at 2870K color temperature. A GaAs source of  $3.0\text{mW}/\text{cm}^2$  is approximately equivalent to a tungsten source of 2870K of  $10\text{mW}/\text{cm}^2$ .

## Typical Characteristic Curves

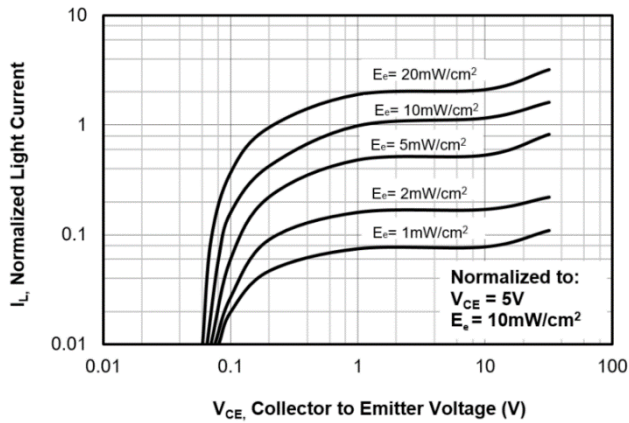


Figure 3. Light Current vs Collector-Emitter Voltage

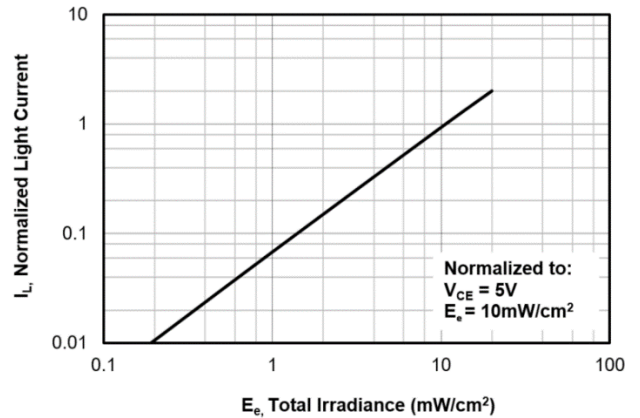


Figure 4. Normalized Light Current vs Radiation

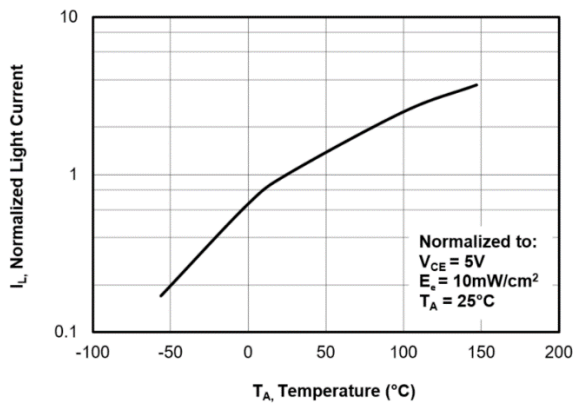


Figure 5. Light Current vs Temperature

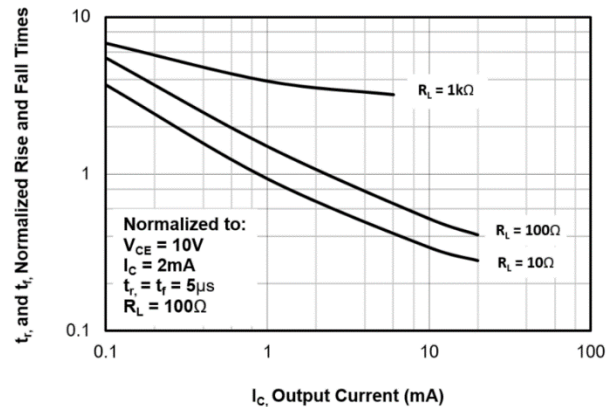


Figure 6. Switching Speed vs Output Current

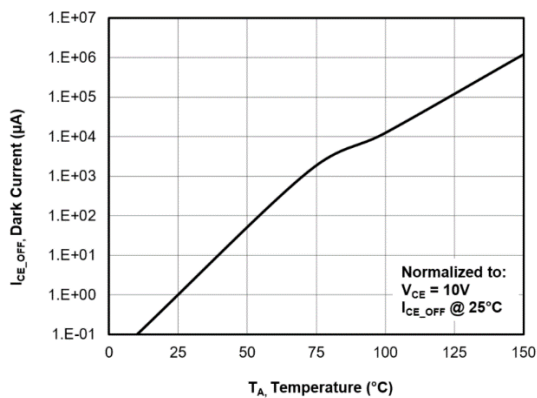


Figure 7. Dark Current vs Temperature

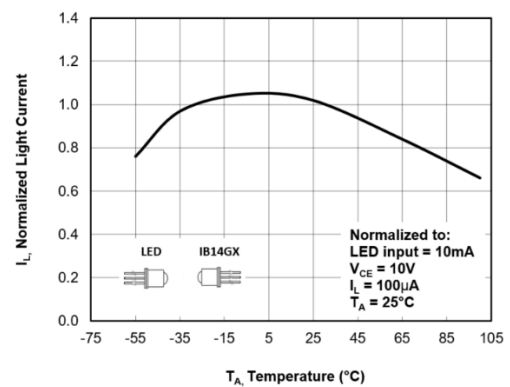


Figure 8. Light Current vs Temperature with LED



---

## Ordering Information

<i>Manufacturing Part Number</i>	<i>Part Description</i>
IB14G1	Radiation Tolerant Hermetic Silicon Phototransistor 3-pin TO-18 Package
IB14G2	Radiation Tolerant Hermetic Silicon Phototransistor 3-pin TO-18 Package
IB14G3	Radiation Tolerant Hermetic Silicon Phototransistor 3-pin TO-18 Package

## DISCLAIMER

Isobaud Inc. reserves the right to make changes without further notice to any products herein to improve reliability, function or design. Isobaud Inc. 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.