

Features

- Hermetic 3-pin TO-18 package
- Wide 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 IB14C1 / IB14C2 consist of silicon phototransistors mounted in a wide angle hermetic TO-18 package.

Schematic Diagram

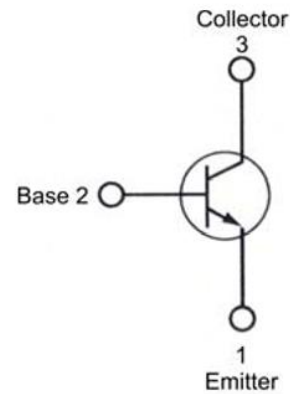


Figure 1. IB14CX Schematic Diagram

Package Dimensions in inches (mm)

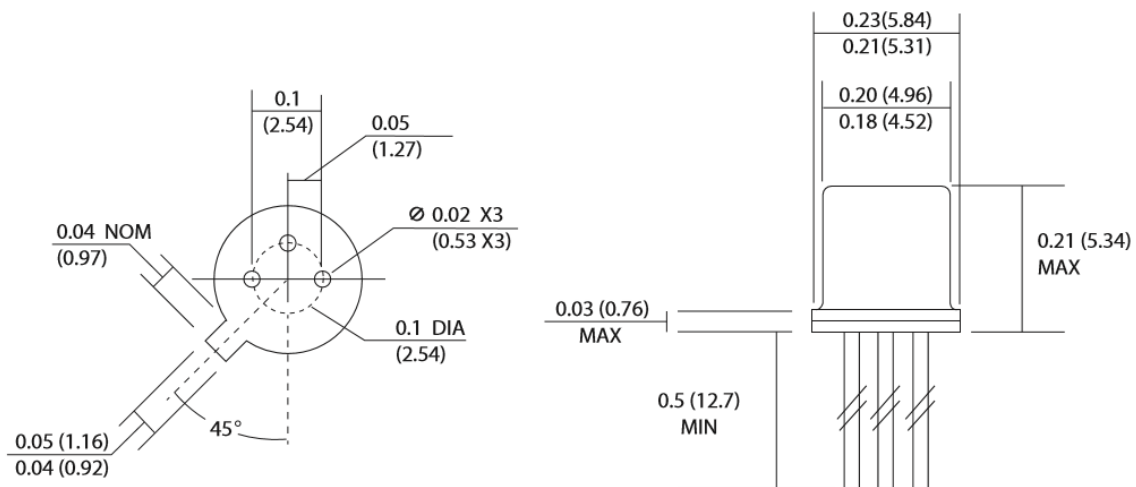


Figure 2. IB14CX Package Dimensions

Absolute Maximum Rating at 25°C (Note 1)

Symbol	Parameters	Ratings	Units	Notes
T _{OPR}	Operating temperature	-65 to +125	°C	
T _{STG}	Storage temperature	-65 to +150	°C	
T _{SOL}	Soldering temperature (10 seconds maximum)	240	°C	
P _D	Power dissipation, ambient	300	mW	2
P _D	Power dissipation, case	600	mW	3
V _{CE}	Collector-Emitter Voltage	50	V	
V _{EB}	Emitter-Base Voltage	7	V	
V _{CB}	Collector-Base Voltage	50	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)

Symbol	Parameters	Test Conditions	Min	Max	Units	Notes
BV_{CEO}	Collector-Emitter Breakdown Voltage	$I_C = 10\text{mA}$, $E_e = 0\text{mW}/\text{cm}^2$	50	-	V	
BV_{CBO}	Collector-Base Breakdown Voltage	$I_C = 100\mu\text{A}$, $E_e = 0\text{mW}/\text{cm}^2$	50	-	V	
BV_{EBO}	Emitter-Base Breakdown Voltage	$I_E = 100\mu\text{A}$, $E_e = 0\text{mW}/\text{cm}^2$	7	-	V	
I_{C_ON}	Collector Current, On-state IB14C1	$V_{CE} = 5\text{V}$, $E_e = 0.5\text{mW}/\text{cm}^2$	0.16	-	mA	2, 3
	Collector Current, On-state IB14C2	$V_{CE} = 5\text{V}$, $E_e = 0.5\text{mW}/\text{cm}^2$	0.08	-	mA	2, 3
		$V_{CE} = 5\text{V}$, $E_e = 1.0\text{mW}/\text{cm}^2$	0.16	-	mA	2, 3
I_{CE_OFF}	Collector-Emitter Dark Current, Off-state	$V_{CE} = 20\text{V}$, $E_e = 0\text{mW}/\text{cm}^2$	-	100	nA	
$V_{CE(SAT)}$	Saturation Voltage	$I_C = 0.4\text{mA}$, $E_e = 0.6\text{mW}/\text{cm}^2$	-	0.4	V	2, 3
Θ	Reception Angle at $\frac{1}{2}$ Sensitivity		-	± 40	$^\circ$	

Switching Characteristics

Symbol	Parameters	Test Conditions	Typ	Max	Units	Notes
t_r	Rise Time	$I_F = 2\text{mA}$, $V_{CC} = 10\text{V}$, $R_L = 100\Omega$	5	-	μs	
t_f	Fall Time		5	-		

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

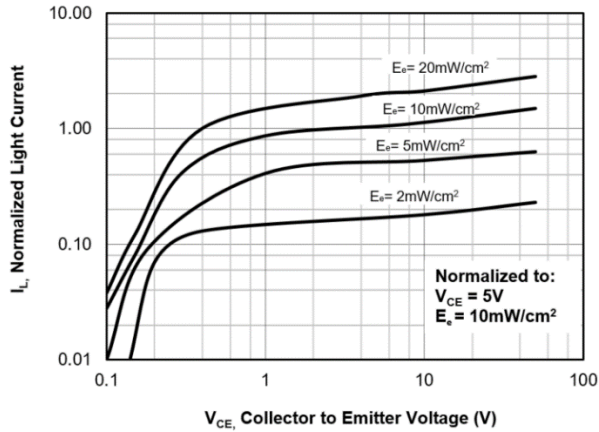


Figure 3. Light Current vs Collector-Emitter Voltage

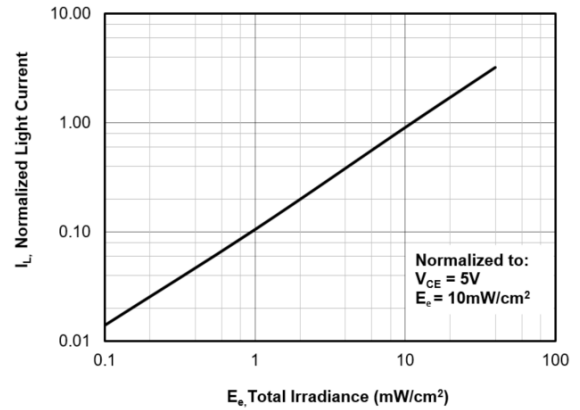


Figure 4. Normalized Light Current vs Radiation

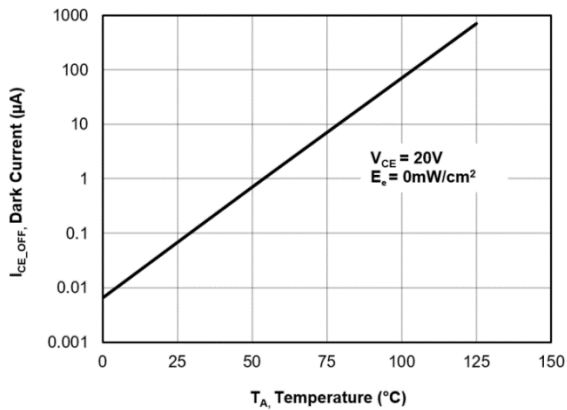


Figure 5. Dark Current vs Temperature

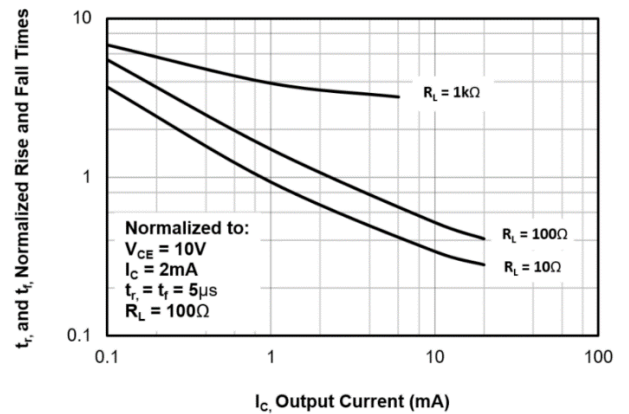


Figure 6. Switching Speed vs Output Current

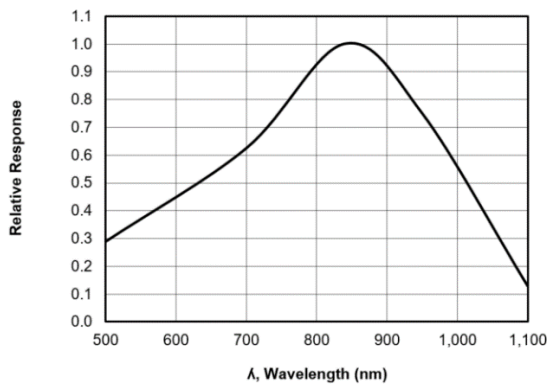


Figure 7. Spectral Response

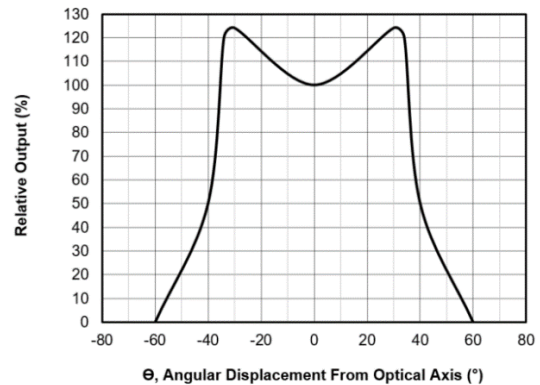


Figure 8. Angular Response Curve



Ordering Information

<i>Manufacturing Part Number</i>	<i>Part Description</i>
IB14C1	Radiation Tolerant Hermetic Silicon Phototransistor 3-pin TO-18 Package
IB14C2	Radiation Tolerant Hermetic Silicon Phototransistor 3-pin TO-18 Package

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