

HST6-C190

Top-View Surface-Mount Phototransistor

Description

The Broadcom® HST6-C190 is a top-view phototransistor available in the industry-popular footprint of 1.7 mm × 0.8 mm. This product features a compact and robust design, making it easy to use and an ideal solution for a wide range of applications in consumer and industrial segments.

Its wide spectral range of sensitivity from 400 nm to 700 nm with peak sensitivity at 600 nm enables efficient visible light detection, for instance, ambient light sensing.

This product has an angle of half sensitivity of ± 50 degrees, and it is built with clear epoxy. It comes in tape-and-reel packing that is compatible with industry-standard automatic machine placement and IR reflow soldering.

Features

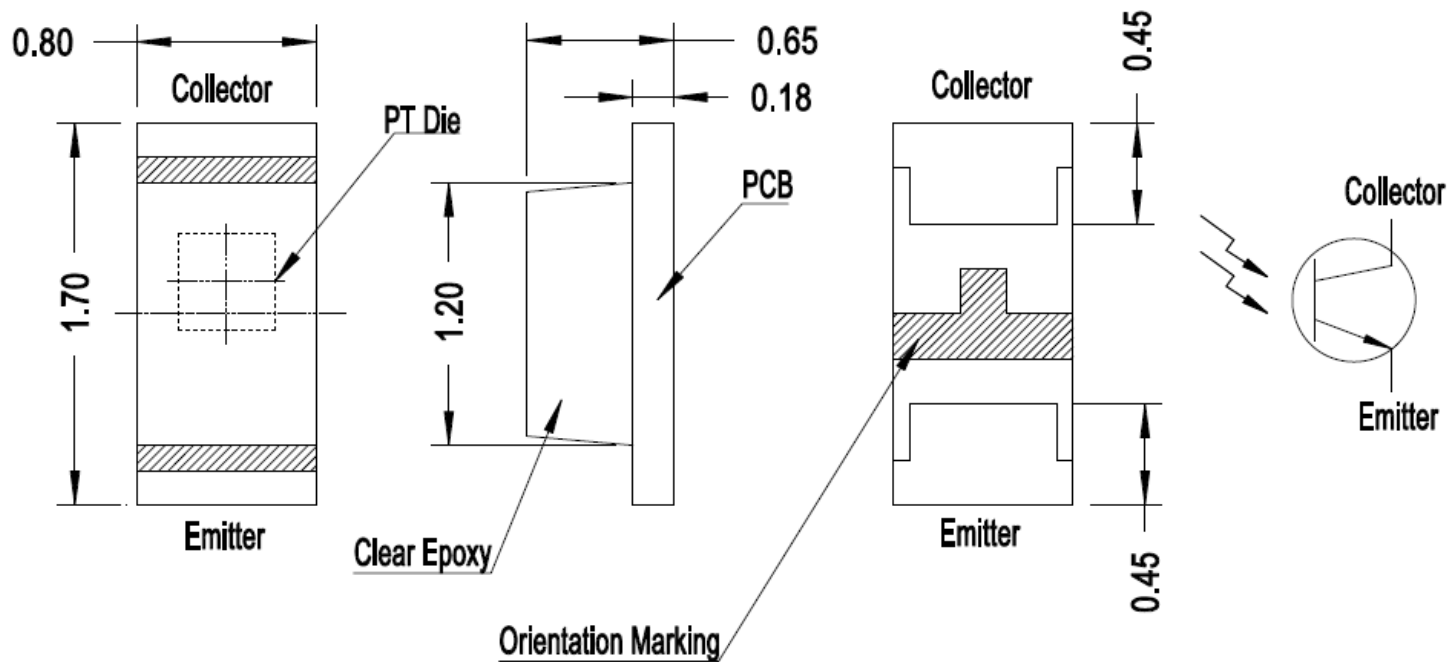
- Silicon NPN phototransistor in a 0603 footprint
- Clear epoxy
- Wide spectral range of sensitivity from 400 nm to 700 nm
- Peak sensitivity at 600 nm
- Angle of half sensitivity of ± 50 degrees

Applications

- Home appliances
- Ambient light sensing
- Industrial

CAUTION! This package is ESD sensitive per ANSI/ESDA/JEDEC JS-001. Observe appropriate precautions during handling and processing. Refer to [Application Note 1142](#) for additional details.

Figure 1: Package Drawing

**NOTE:**

- All dimensions are in millimeters (mm).
- The tolerance is ± 0.10 mm unless otherwise specified.

Absolute Maximum Ratings

Parameter	Value	Unit
Collector-Emitter Voltage, V_{CE}	6	V
Emitter-Collector Voltage, V_{EC}	5	V
Collector Current, I_{CA}	20	mA
Power Dissipation, P_d	100	mW
Operating Temperature Range	-40 to +85	°C
Storage Temperature Range	-40 to +85	°C

Optical and Electrical Characteristics ($T_A = 25^\circ\text{C}$)

Parameter	Value			Unit	Test Condition
	Min.	Typ.	Max.		
Collector Light Current, I_{ca}	100	280	—	μA	$E_V = 1000 \text{ lx}$, CCT = 6500K, $V_{CE} = 5\text{V}$
Wavelength of Peak Sensitivity, λ_{smax}	—	600	—	nm	—
Spectral Range of Sensitivity, $\lambda_{0.1}$	400	—	700	nm	—
Angle of Half Sensitivity, ϕ	—	± 50	—	°	—
Dark Current, I_{CEO}	—	—	100	nA	$E_V = 0 \text{ lx}$, $V_{CE} = 5\text{V}$
Collector-Emitter Saturation Voltage, V_{CESAT}	—	—	1.6	V	$E_V = 1000 \text{ lx}$, CCT = 6500K, $I_{ca} = 100 \mu\text{A}$

Figure 2: Relative Sensitivity vs. Wavelength

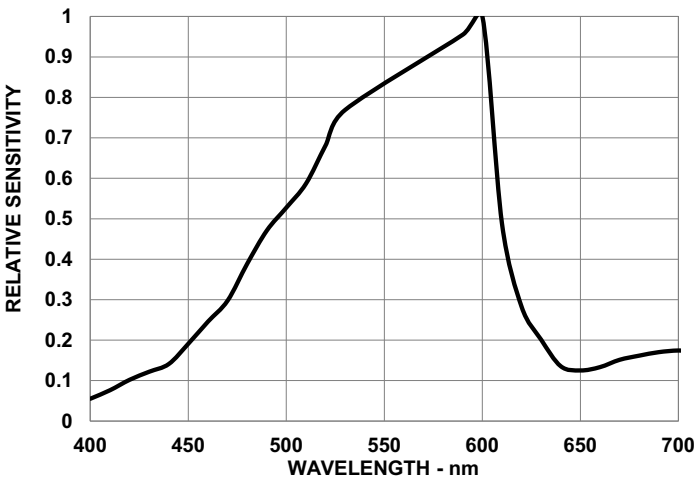


Figure 3: Relative Sensitivity vs. Angular Displacement

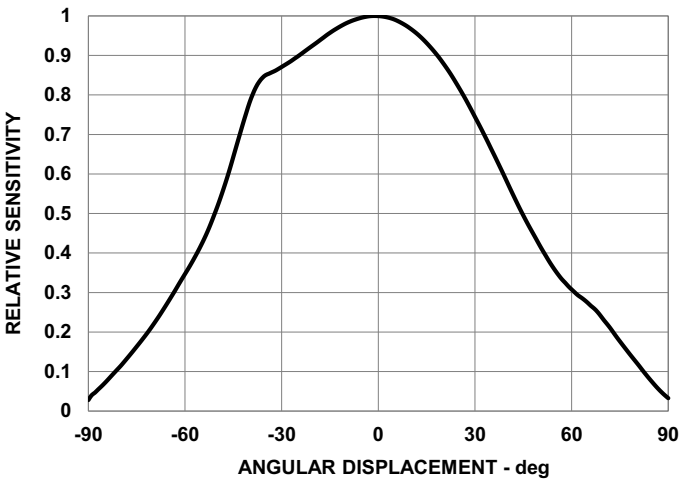


Figure 4: Collector Current vs Illuminance ($V_{CE} = 5V$, CCT = 6500K)

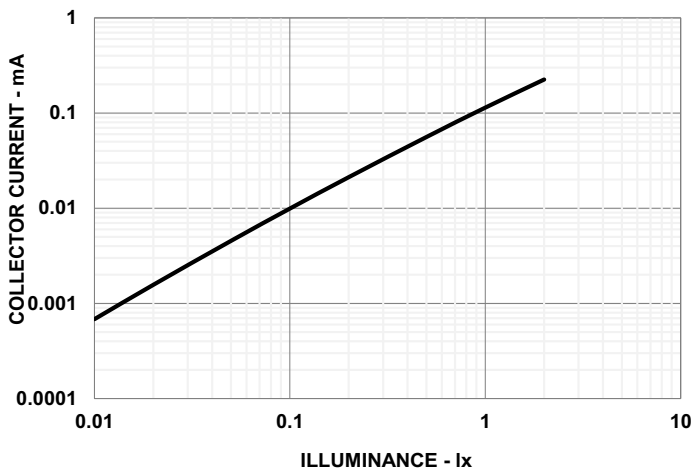


Figure 5: Collector Current vs Collector Emitter Voltage

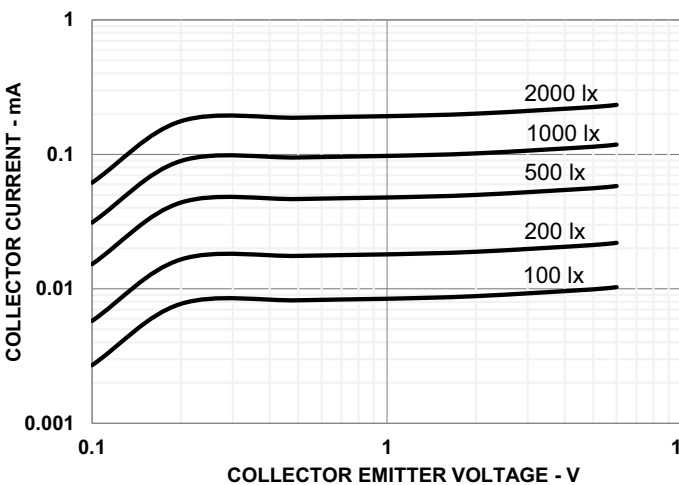


Figure 6: Relative Light Current vs. Ambient Temperature ($V_{ce} = 5V$, $E_v = 1000\text{ lx}$, CCT = 6500K)

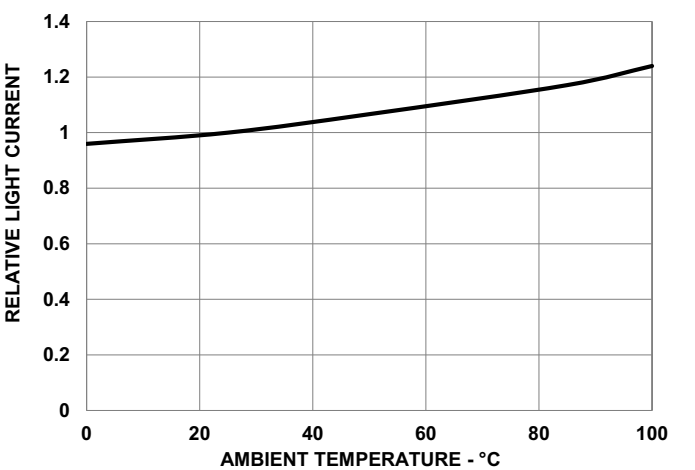


Figure 7: Dark Current vs Ambient Temperature

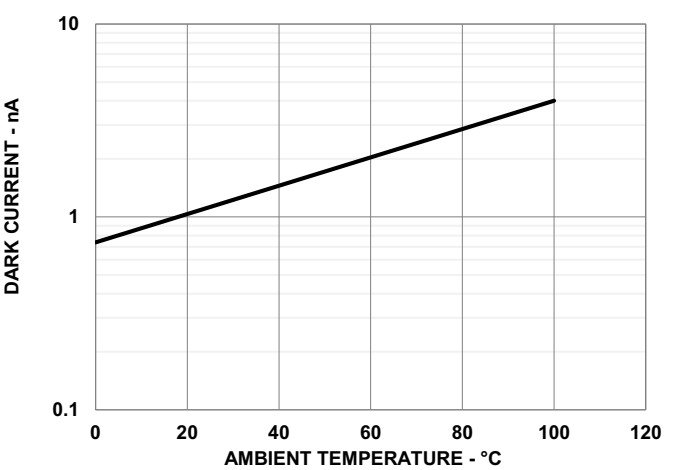


Figure 8: Recommended Soldering Land Pattern

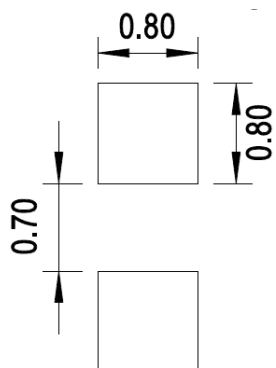
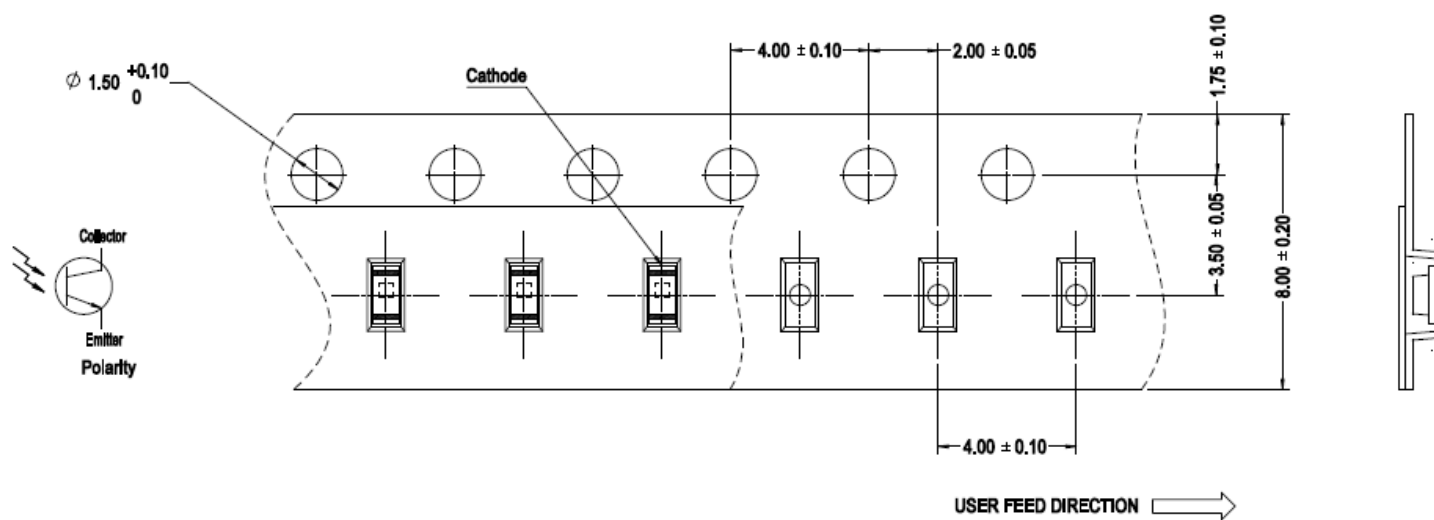
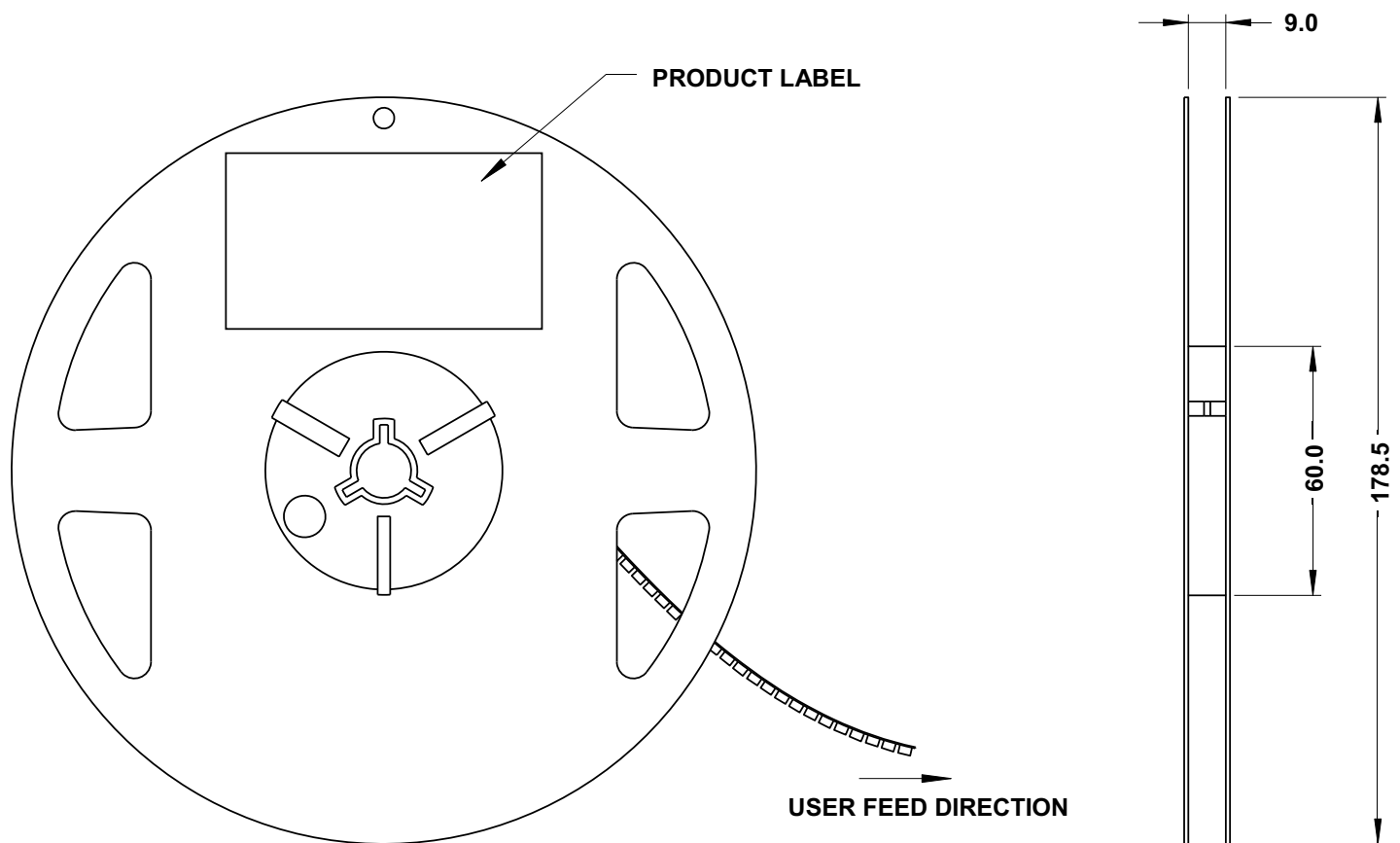


Figure 9: Carrier Tape Dimensions



NOTE: All dimensions are in millimeters (mm).

Figure 10: Reel Dimensions

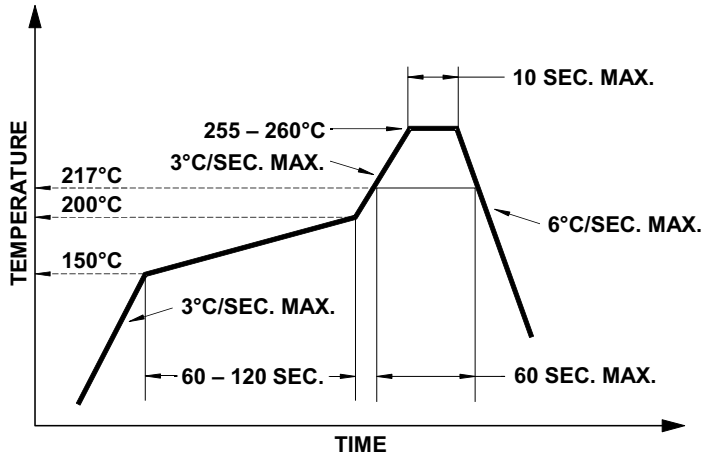
NOTE: All dimensions are in millimeters (mm).

Precautionary Notes

Soldering

- Do not perform reflow soldering more than twice. Observe necessary precautions of handling moisture-sensitive devices as stated in the following section.
- Do not apply any pressure or force on the package during reflow and after reflow when the package is still hot.
- Use reflow soldering to solder the package. Use hand soldering only for rework if unavoidable, but it must be strictly controlled to following conditions:
 - Soldering iron tip temperature = 310°C max.
 - Soldering duration = 2 seconds max.
 - Number of cycles = 1 only
 - Power of soldering iron = 50W max.
- Do not touch the package body with the soldering iron except for the soldering terminals, as it may cause damage to the package.
- Confirm beforehand whether the functionality and performance of the package are affected by hand soldering.

Figure 11: Recommended Lead-Free Reflow Soldering Profile



Handling Precautions

This product has a Moisture Sensitive Level 3 rating per JEDEC J-STD-020. Refer to Broadcom Application Note 5305, [Handling Moisture-Sensitive Surface-Mount LEDs](#), for additional details and a review of proper handling procedures.

- Before use:
 - An unopened moisture barrier bag (MBB) can be stored at <40°C/90% RH for 12 months. If the actual shelf life exceeds 12 months and the humidity indicator card (HIC) indicates that baking is not required, then it is safe to reflow the packages per the original MSL rating.
 - Do not open the MBB prior to assembly (for example, for IQC). If unavoidable, the MBB must be properly resealed with fresh desiccant and HIC. The exposed duration must be taken in as floor life.
- Control after opening the MBB:
 - Read the HIC immediately upon opening the MBB.
 - Keep the packages at <30°/60% RH at all times, and complete all high-temperature-related processes, including soldering, curing, or rework, within 168 hours.
- Control for unfinished reels:
 - Store unused packages in a sealed MBB with desiccant or a desiccator at <5% RH.
- Control of assembled boards:
 - If the PCB soldered with the packages is to be subjected to other high-temperature processes, store the PCB in a sealed MBB with desiccant or a desiccator at <5% RH to ensure that all packages have not exceeded their floor life of 168 hours.
- Baking is required if:
 - The HIC indicates a change in color for 10% and 5%, as stated on the HIC.
 - The LEDs are exposed to conditions of >30°C/60% RH at any time.
 - The LED's floor life exceeds 168 hours.

The recommended baking condition is 60±5°C for 20 hours.

Baking can be done only once.

Application Precautions

- If the package is intended to be used in a harsh or outdoor environment, protect it against damages caused by rain water, water, dust, oil, corrosive gases, external mechanical stresses, and so on.

Disclaimer

Broadcom's products and software are not specifically designed, manufactured, or authorized for sale as parts, components, or assemblies for the planning, construction, maintenance, or direct operation of a nuclear facility or for use in medical devices or applications. The customer is solely responsible, and waives all rights to make claims against Broadcom or its suppliers, for all loss, damage, expense, or liability in connection with such use.

Copyright © 2024 Broadcom. All Rights Reserved. The term "Broadcom" refers to Broadcom Inc. and/or its subsidiaries. For more information, go to www.broadcom.com. All trademarks, trade names, service marks, and logos referenced herein belong to their respective companies.

Broadcom reserves the right to make changes without further notice to any products or data herein to improve reliability, function, or design. Information furnished by Broadcom is believed to be accurate and reliable. However, Broadcom does not assume any liability arising out of the application or use of this information, nor 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.



Lead (Pb) Free
RoHS Compliant