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TOKEN

Ambient Light Sensor Glossary

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Ambient Light Sensor Glossary

Light Sensors (Phototransistor, Ambient Light Sensor) Glossary

Absolute Maximum Ratings: Maximum value of limit per each item.

Operating Temperature (T_{opr}): Allowable temperature range of power application.
Usually when the operating temperature increases, the power consumption decreases. In addition, the power application is prohibited when the actual operating temperature is out of range. In the case of a phototransistor, the temperature that can be applied is not described as the surface temperature of the package, but is described as working temperature (the ambient air temperature around the device).

Storage Temperature (T_{stg}): In the stored state, allowable temperature range when power is not applied.

Power Dissipation (P_C): When the operating temperature is 25°C, the light receives the allowable power dissipation of the phototransistor. Often, as the ambient temperature increases, the allowable power consumption (PC) tends to drop.

Collector Current (I_C): When the light-receiving phototransistor conducts current at 25°C ambient temperature, the maximum allowable collector current flows through the phototransistor in the permissible power dissipation (P_C) range.

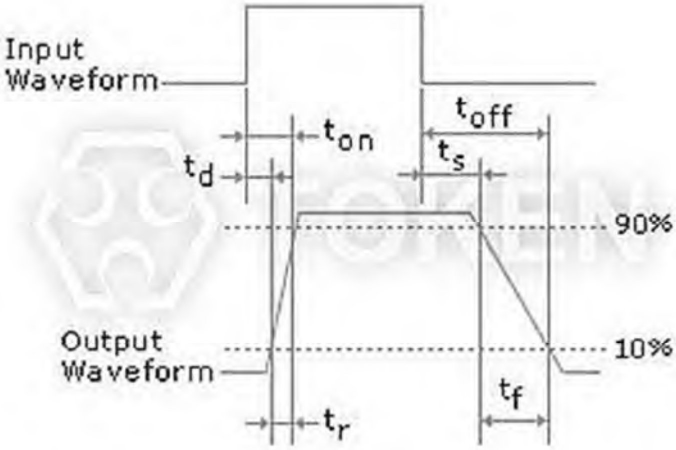
Peak wavelength (λ_p): λ_p Is the most sensitive wavelength value of the phototransistor, measured in nanometers (nm). The Phototransistor responds to the light from the wavelength range of the fluorescence or incandescent light source, and when matched with the IR LED light source, they perform optimally. This is because the phototransistor has a peak spectral response at approximately 840nm of near-infrared.

Breakdown Voltage: (V_{BR}): V_{BR} is the maximum voltage allowed between the collector and emitter. Exceeding the maximum voltage can cause permanent damage to the phototransistor. The breakdown voltages are 100% sorting parameters.

- **Collect-emitter breakdown voltage B_{vceo}:** typically ranges from 20 V to 60 V.
- **Emitter-collector breakdown voltage B_{veco}:** typically ranges from 3 V to 7 V.

Collector to Emitter Voltage: (V_{CEO}): The maximum voltage is allowed between the collector and the emitter on light-receiving side, and when no forward current flows through the led of the light emission side (the indicator light does not emit light). Under normal circumstances, when the power supply voltage close to this value, the transient operating trajectory can not be maintained at the actual maximum operating temperature of the allowable power range, in the process of switching, the device may occur over power damage. Note that the supply voltage is kept within a sufficient safe range so that no excessive power loss occurs even during this switching moment.

Emitter to Collector Voltage (V_{ECO}): The allowable reverse voltage of the phototransistor that can be applied to the light receiving side. Typically, the voltage depends on the reverse withstand voltage between the emitter and the base of the phototransistor, or below the reverse withstand voltage. Damage or irreversible damage may occur if a reverse voltage exceeding this value is applied.



Rise Time/ Fall Time

Collector Dark Current (I_{ceo}): When the phototransistor is in the dark and a voltage is applied from the collector to the emitter, a certain amount of current will flow. This current is called a dark current. The current consists of the collector-base junction leakage current and the transistor's DC current gain. The presence of this current prevents the phototransistor from being considered "off", or is ideal for "on" the switch. The dark current is specified as the maximum collector current that allows flow at a given collector-emitter test voltage. The dark current is a function of the applied collector-emitter voltage and ambient temperature. Dark current increases with increasing temperature. This value is usually specified at 25°C. The value of the load resistance must be designed with the maximum value of the current within the conditions of use.

Collector-Emitter Saturation Voltage ($V_{ce(sat)}$): Saturation is the state in which both the emitter base and the collector base of the phototransistor become forward based. From a practical point of view, the collector-emitter saturation voltage $V_{ce(sat)}$ is a factor that represents the proximity switch (closed state) of the photodetector. This is because $V_{ce(sat)}$ is the voltage that drops when the detector is in the "on" state. $V_{ce(sat)}$ is usually the maximum allowable collector emitter voltage given the specified light intensity and collector current value.

IR Receiving Current ($I_{L(4)}$): The infrared phototransistor acts as a transistor, and its basic voltage is determined by the amount of light that impinges on the transistor.Therefore, it acts as a variable current source. More IR light will cause a larger current to flow through the collector-emitter lead. $I_{L(4)}$ is specified at V_{EC} = 5V, IR LED 850nm.

Rise Time/ Fall Time:

1. Pulse Rise Time t_r: The photosensitive transistor adjusts the input pulse light under the specified working conditions, so that the photosensitive transistor output the corresponding pulse current to the specified value to output the time required for 10%-90% of the pulse front amplitude.
2. Pulse Fall Time t_f: The time required to output the pulse along the magnitude of 90%-10%.
3. Pulse Delay Time t_d: The time required to start from the input pulse to 10% of the leading edge of the output electrical pulse.
4. Pulse Storage Time t_s: The time required for the output electrical pulse to drop to 90% of the pulse amplitude after the input pulse has been completed.