

The LED can function properly for 100,000 hours or more of maintenance-free life, if the conditions of drive current and T_J temperature are properly engineered.

Definitions and Concepts

Forward Current (I_F): The amount of current flowing through an LED lamp operating in forward bias, typically measured in milliamps (mA).

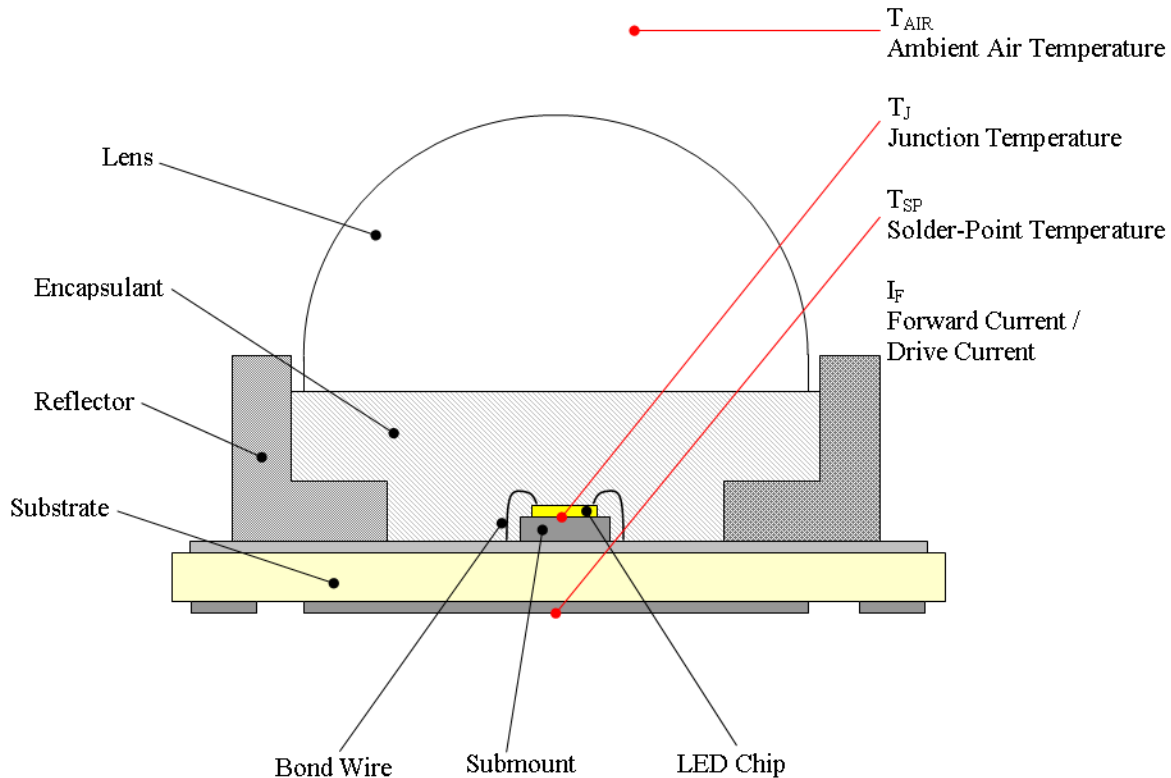
Ambient Air Temperature (T_{AIR}): The temperature of the air immediately surrounding the LED.

Junction Temperature (T_J): The temperature of the junction of the LED die inside the LED lamp. This measurement is often difficult to measure. Cree recommends measuring the T_J indirectly through measurement of T_{SP} , V_F and I_F and using the following equation:

$$T_J = T_{SP} + ([R_{th\ j-sp}] \times [V_F] \times [I_F])$$

Note: $R_{th\ j-sp}$ is the thermal resistance between the LED junction and the solder-point of the LED lamp.

Solder-Point Temperature (T_{SP}): The temperature of the thermal pad on the bottom of the LED lamp. Also called Case Temperature (T_C).



Forward Voltage (V_F): The voltage potential across an LED lamp operating in forward bias, typically measured in Volts (V).