Glossary of LED Terms

I comment on a general term used about LED.

LED (Light-Emitting Diode)
A semiconductor diode die that emits light. LEDs have a function that converts part of the electrical energy in the junction (active layer) between the P-layer and N-layer into light energy. The wavelength and intensity of the light generated is dependent on the semiconductor dies used.

Visible-light LED
An LED that emits light in wavelengths visible to the human eye (380 to 780nm).

Infrared LED
An LED that emits light with a peak wavelength of 780nm or more.

Ultraviolet LED
An LED that emits light with a peak wavelength of 400nm or less.

Phtodetector
The device which photoelectricity flows in by receiving light.

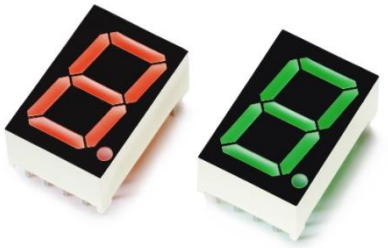
Kind of the LED package

LED lamp
The device which put an LED die on lead frame with LED for the insertion implementation, and resin sealed the tip in a cannonball type shape.

Surface mount LED
The device which I put an LED die on a board or the lead frame with LED for surface mounting it and resin sealed.

PWB-type **PLCC-type**

Numeric display device
An LED with seven linear light-emitting segments arranged so that combinations of segments can be used to represent numbers.



Term about the characteristic

Luminous intensity
The amount of light power emitted per steradian within a solid angle, when an LED is modeled as a point light source.
IRLED is Radiant intensity. Amount of radiant energy when I did the same measurement.

Luminous flux
Total amount of light emitted in all directions, when an LED is modeled as a point light source. IRLED is Light output. Amount of total energy when I did the same measurement.

Dominant wavelength
The light color emitted by an LED as perceived by the human eye, expressed in numbers.

Peak wavelength
Wavelength that corresponds to the maximum value of the light output.

Spectral half-width
The range of wavelengths in the spectral distribution of emitted light with a relative intensity that is 50% or more of peak wavelength.

Chromaticity coordinates
Tristimulus values of an LED's emitted color, expressed in a two-dimensional, orthogonal color coordinates system; an XY coordinate system is used, in general.

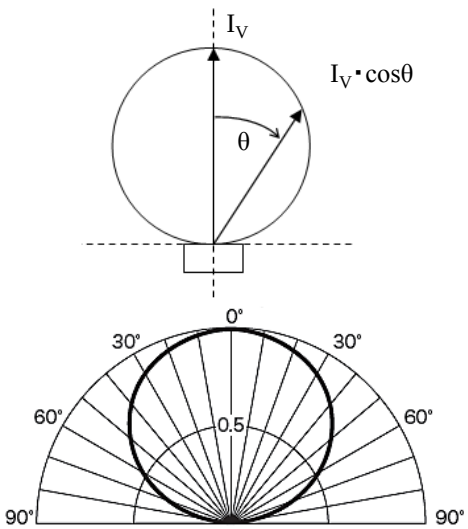
Spatial distribution
Directional pattern of an LED's radiant power distribution, with the central axis of the LED taken as the origin.

Half-intensity angle
The angle at which 50% of the peak intensity is reached on either side of the origin of the spatial distribution graph.

Luminous intensity rank
LED products are classified into various ranks according to their luminous intensity. Ranks are generally set such that values are 2x the ratio between the maximum and minimum values within a rank and √2x between ranks.

Color rank
Ranks used to set or classify LEDs according to their dominant wavelength. Rank settings differ according to the color emitted.

Lambertian distribution
A light distribution pattern in which the luminous intensity in the direction of an angle θ˚ can be expressed using a multiple of cosθ for the luminous intensity on the optical axis (θ = 0˚). The angle that has a luminous intensity half that of the optical axis can then be calculated as 60˚ since cosθ = 0.5. Accordingly, the half-intensity angle ($2\theta_{1/2}$) for an LED with this light distribution is 120˚.



Example Lambertian distribution

Forward voltage
Yield value of voltage drop from anode to cathode when current flows in the forward direction.

Static lighting (static drive)
A method of lighting LEDs that uses a continuous flow of direct current.

Dynamic lighting (dynamic drive)
A method of lighting LEDs that uses a cyclical current flow. Also referred to as time-division drive, this method simplifies LED connections when multiple LEDs are to be lit.

Duty ratio
The proportion of the time during which the LED is on for each cycle when driven by repeated pulses. Normally expressed as a percentage (%).

Reverse current
The current value generated when a reverse bias is applied between the anode and cathode.

Max. forward current
The maximum permitted value for forward current at 25 ˚C.

Max. pulse forward current
The maximum permitted value during repeated pulse lighting as stipulated by the pulse width and duty ratio.

Forward current reduction rate
Reduction in permissible forward current when ambient temperature exceeds a specified point.

Max. power dissipation
The maximum permitted value for the consumption of forward current and the forward voltage it generates at 25˚C.

Thermal resistance
Difference in junction temperature and solder terminal temperature when 1watt power is applied.

Thermal conductivity
A physical property specific to the material. Expressed as a coefficient that indicates the propensity for thermal transfer.

Junction temperature
Maximum junction temperature of a device's die.

ESD (Electrostatic Discharge)
An event where charge flows over a short period of time from an object charged with static electricity to another object with a different charge.

CIE
Acronym for Commission Internationale de l'Eclairage (French)

V series
A range of Stanley LED products that provide a more detailed set setting and selection options for luminous intensity rank and color rank than products sold normally. With specifications that can be more effectively tailored to particular operating temperatures, V-series LEDs offer greater convenience as indicators for center consoles and indicators in cars. These products are referred to as the "V series" since the product names all begin with "V" to distinguish them from ordinary products.