

LED displays

LED displays are being applied to an increasingly wider variety of uses. Among the reasons for this are no doubt new advances such as multi-color and high-luminance displays. These are the result of improvements in LED emitter manufacturing technology. Previously, the need to house LED products in a transparent package limited to materials that could be added to the resin and LEDs were therefore regarded as being less reliable than ICs and other semiconductor components. However, with recent improvements in LED emitter manufacturing technology, assembly technology and packaging technology, LEDs are responding to demands for the same level of reliability as other semiconductor products, and they are finding applications in an ever expanding range of fields.

LEDs were first used on a wide scale commercial basis as monolithic numeric displays in clocks and calculators. Recently GaAsP, GaP and other emitting materials are being adeptly applied to uses suitable to their individual characteristics, including direct-view LEDs, reflector LEDs, flat displays for illumination and dot matrix units of sizes from 40 to 200.

Typical examples of LED applications include industrial equipment, measuring instruments, household appliances, deluxe cameras, medical equipment and toys. Recently LEDs have also come into use as car displays and electrical decorations. At ROHM, we have established a system for accepting custom orders, and are aggressively undertaking the development of products in these new fields.

●Featured of ROHM LED displays

(1) High luminance

GaP and GaAsP and AlGaInP are used for the emitting material together with a reflective structure for increased efficiency with no waste of light, enabling the attainment of a high luminance.

(2) Colors

In addition to red, orange, yellow and green, blue and high-luminance colors are available.

Color	Material	Peak emission wavelength (nm)
High Brightness red	GaAlAs	660
Red	GaAsP/GaP	650
High Brightness red	AlGaInP/GaAs	626
High Brightness Orange	AlGaInP/GaAs	610
High Brightness Yellow	AlGaInP/GaAs	589
Green	GaP	563
Blue	InGaN	470

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●Precautions

Observe the following precautions when using ROHM LED displays.

(1) Operating temperature

In general the brightness of an LED display depends on how effectively the emitted light is brought out of the LED. For this reason, LEDs are encased in a nearly transparent resin with excellent light transmission. ROHM LED displays use an epoxy resin with a high heat tolerance, however, the materials which are added to transistors and other semiconductor components to increase heat tolerance and moisture resistance cannot be added to the resin for LED packages. For this reason, observe the following precautions when handling LEDs.

- 1) Do not apply a temperature hotter than the storage temperature to an LED (in general, do not apply a temperature in excess of 100°C).
- 2) Absolutely do not subject the resin body of an LED display to stress when it is hot.
The glass transformation point of the epoxy resin used in LEDs is approximately 115°C. If the resin is heated above this point, its linear expansion coefficient will increase to 2 or 3 times the coefficient at normal temperature, leading to wire breakage. In addition the resin will soften, and if a lead is subjected to stress, the lead will move and possibly cause wire breakage.

(2) Precautions when soldering

For the above reasons, observe the following precautions when soldering.

- 1) Perform soldering quickly under the temperature and time conditions indicated below.
- 2) During soldering, do not subject the light to an external force or stress (this applies as well when forming leads).
- 3) We recommend the following soldering conditions.

Item	Temperature	Work time	Conditions
Soldering iron	300°C, max.	3 seconds, max.	Watts : 30W, max. Diameter of soldering iron tip : ϕ 3.0mm, max.

(3) Forming leads

To avoid subjecting an LED display lead to stress during forming, we recommend holding the base of lead with a jig or similar tool.

(4) Cleaning

Some cleaning solvents may cause corrosion of the package, and active materials in a solvent may cause illumination failure. Make sure a solvent is safe before using it for cleaning.

We recommend alcohol-based cleaning solvents such as isopropyl alcohol.

Recommended cleaning conditions

Cleaning methodItem	Conditions
Solvent cleaning	Solvent temperature : 45°C max. Immersion time : 3 minutes max.
Ultrasonic cleaning	Ultrasonic output : 15 W/liter max. Cleaning time : 3 minutes max.

(5) Mounting

- 1) If the leads are subjected to stress when soldering is performed on a printed circuit board, illumination failure may result immediately or later during use. For this reason, make sure that the intervals between the installation holes in the board are equal to the intervals between the leads (after forming if done) so that no stress remains.

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●Storage precautions

Storage in a dry box is best. However, if this is not possible we recommend the following conditions :

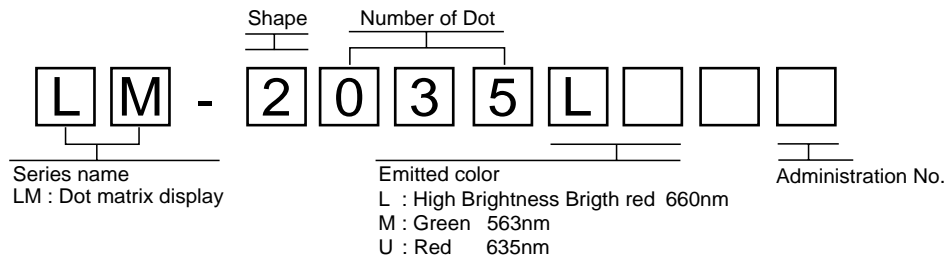
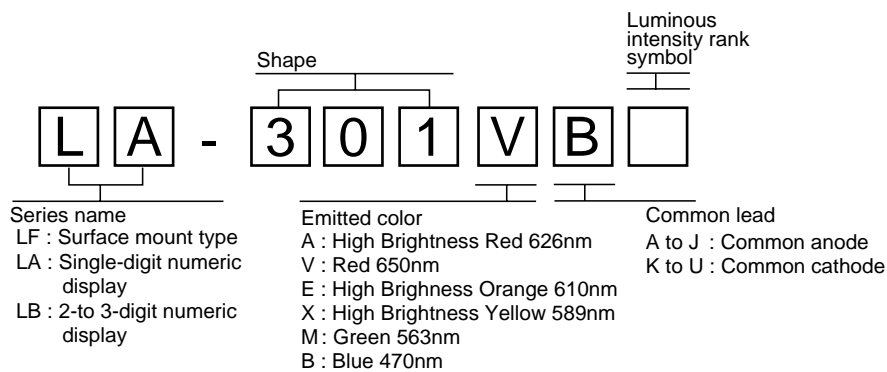
Temperature : 5 to 30°C

Humidity : 60% RH max.

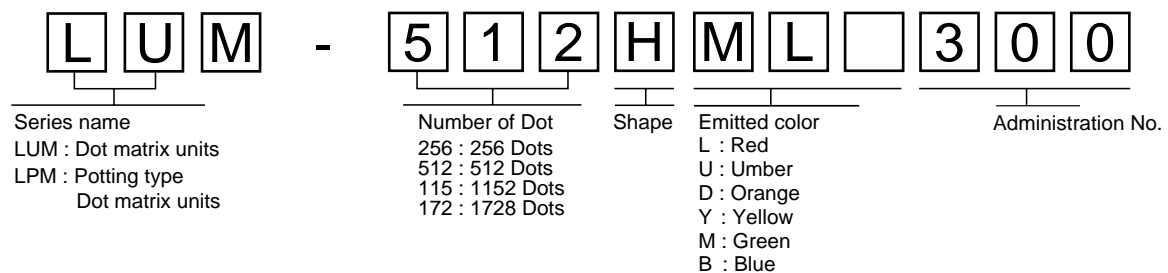
●LED display product names

The product names of ROHM LED displays are coded as follows :

[Displays]



[Unit displays]



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