Superline LED Series Reference Data

■Lineup

12V lamps

ESSENTIAL	Standard model boasting superior cost-effectiveness
PREMIUM	High-spec model with high output and wide applications
VIVID	Model with high color-rendering property (Ra95) and superior color reproducibility
OUTDOOR	Model compatible with highly encapsulated fixtures, and which can be used in outdoor fixtures

■Major features of Superline LED series LED lamps

1) Capable of delivering the same brightness and expanse of light as those of a halogen lamp[*1]
2) Single shadows, not multiple shadows, with beautiful gradations
3) A lineup of four distinctive models, including one with high color-rendering property (Ra: 95) and a high-spec model
4) Dimmable (compatible with dimmers for halogen lamps[*2])
5) Superior compatibility with halogen lamp fixtures, enabled by a size equivalent to that of halogen lamps
6) Compatible with many step-down transformers
7) Reduced flaws enabled by fanless, solder-free operations
8) Low power consumption and long lamp life, which contribute to energy conservation and cost reduction
9) 30,000 hour lamp life, greatly reducing relamping and maintenance costs

12V lamp with a GU5.3 base

USHIO + SORAA

*1: A 50-mm-diameter, 50W halogen lamp from USHIO LIGHTING,INC.

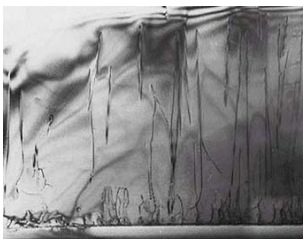
*2: Dimming may be impossible depending on the combination of the dimmer, power supply, transformer, and other elements.

■Features of GaN on GaN LED chip

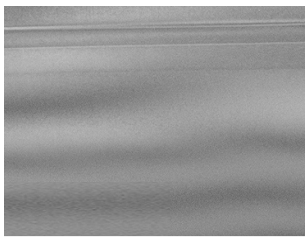
High luminous efficiency

The lattice constant of the GaN substrate is close to that of the GaN semiconductor deposited on the substrate. This allows reduced density of the crystal defect called dislocation, which causes efficiency degradation, to 1/100 or less. And since the refractive index of the substrate is identical to that of the luminous layer, light reflection is low at the interface, which permits easy extraction of light, high luminous efficiency, and even high output.

LED crystals micrographed using a transmission electron microscope



Crystal of sapphire substrate LED
Many crystal defects are seen.

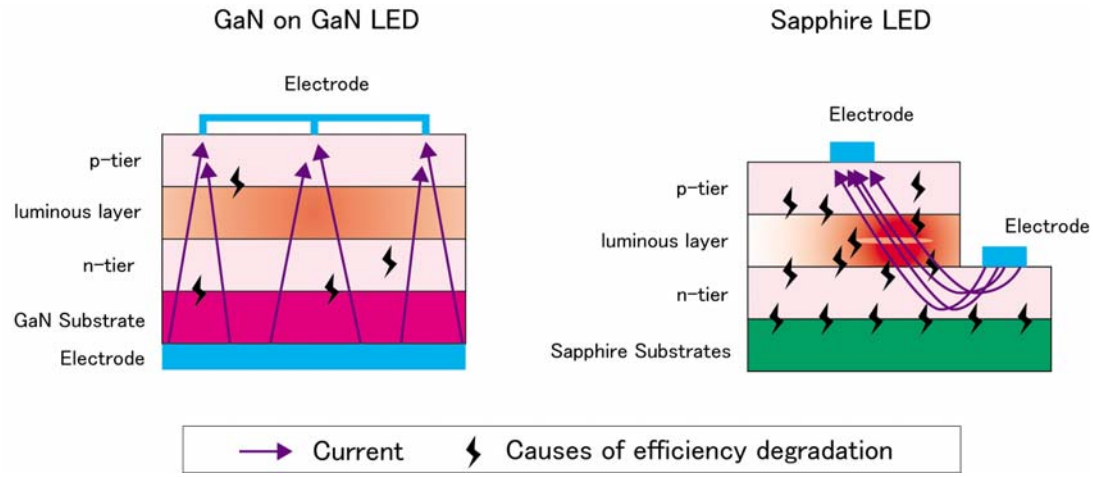


Crystal of GaN substrate LED
Virtually no crystal defects are seen.

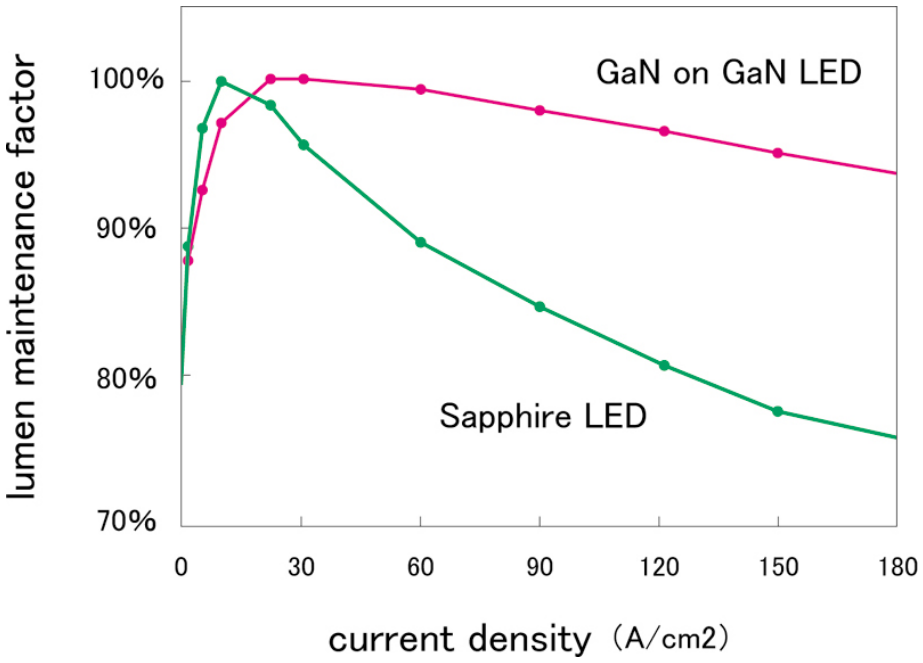
Larger current

GaN has superior electrical conductivity when compared with sapphire and silicone, which are close in property to insulators. It therefore ensures an LED structure with higher efficiency per unit area and enables uniform current at the luminous layer. Since the crystal defect is small, it can also inhibit degradation of luminous efficiency in areas with large current. As a result, GaN even enables higher output of LED.

Difference of current flows attributed to LED structure



Changes in luminous efficiency of LED caused by increase of current



Superior heat conductivity and heat radiation performance

Since the current density at the luminous layer is made uniform, temperature rise at the joint can be inhibited even if the current value is increased. The GaN on GaN LED chip also features superior heat radiation performance approximately five times that of sapphire, so it minimizes heat-related damage to LEDs.

■Feature comparison of Superline LED and halogen lamp

	Superline LED Vivid MR16-50-B01-12-830-25-95	**Superline LED Premium** MR16-50-B01-12-830-25	**Halogen lamp** *3 EUROSTAR TITAN HRGS/C-35-12-GU5.3-51/24
Wattage	12W	12W	35W
Maximum luminous intensity*4 ／Beam angle	2175cd／20° 1,900cd／24°	2725cd／20° 2,375cd／24°	2,300 cd／24°
Color temperature	3,000 K	3,000 K	3,000 K
Color rendering index*5	Ra 95	Ra 80	Ra 100
Dimming	Yes*6	Yes*6	Yes
Rated life	30,000 h*7	30,000 h*7	5,000 h*7
Weight	40 g	40 g	32 g
Dimensions	L46.2 (max) ×φ50	L46.2 (max) ×φ50	L45.2 (max) ×φ50
Image			

*3: A 50-mm-diameter, 50W halogen lamp from USHIO LIGHTING, INC.

*4: Values at a lamp voltage of 11.3V, which is a standard real average.

*5: Average color-rendering index: Typical indexes of color reproducibility include the average color-rendering index (Ra). When colors in light from a particular source look completely identical to the same colors in the base light, the Ra value of the light source is 100. Ra is an index for color fidelity concerning color reproducibility. This is not an indicator for subjective assessment of whether or not colors look favorable.

*6: Dimming may not be possible depending on the combination of dimmer, power supply, transformer, and other elements.

*7: Definition of LED lamp life: 70% maintenance on all lamps. Definition of halogen lamp life: 50% of lamps dead.

＊All information, data and specifications shown are subject to change without notice,

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