

Development of LED packages for lighting that have achieved the world's highest level of luminous efficacy

– Providing a lineup of 207 models in total that can be used in applications from bulbs to stadium lighting. –

Citizen Electronics Co., Ltd. (Head Office: Fujiyoshida City, Yamanashi Prefecture. President: Yoshihiro Gohta) has developed LED packages for lighting (207 models in total), 'COB *1 Series, Version 4,' that provide the world's highest level of luminous efficacy. The products will be exhibited during the 'LIGHTFAIR INTERNATIONAL 2015' in New York, USA from May 5, 2015.

LED packages for lighting, 'COB Series, Version 4'

Series: 5 series and 13 types (207 models in total including color variations)

Luminous flux: 24 lm to 57,463 lm (0.1 W to 526 W)

Applications: LED bulbs, downlights, streetlights, floodlights, stadium lighting, etc.

Mass production is scheduled to start in May 2015



CLU027 Series	CLU026 Series	CLU036 Series	CLU046 Series	CLU056 Series
				

Background and advantages of development

Citizen Electronics developed LED packages for lighting, 'COB Series, Version 1,' in 2011 and has introduced upgraded products into the market as the COB Series thereafter. We are releasing 'COB Series, Version 4' in which performances such as luminous efficacy and luminous flux have been increased by up to 15 %.

As LED lighting has penetrated the market, there is a wide variety of customer demand for not only brightness and luminous efficacy, but 'quality of light,' in order to enable an illuminated object to look more beautiful. The developed products, Version 4, meet these diversified demands through significant expansion of the lineup including 13 types and 207 models.

◆Main features

1. Luminous efficacy and luminous flux have been improved by a maximum of 15 % over that of the current model and the world's highest level of luminous efficacy has been achieved

Luminous efficacy and luminous flux have been improved by a maximum of 15 % over those of the current model through enhancement of light extraction efficiency and heat dissipation. The developed products have achieved the world's highest level of luminous efficacy in COB-type high-wattage LEDs and contribute to energy conservation for luminaires.

* Comparison of the two models below made when they light up under the same conditions (3,000K, Ra 80 min., Tj=85°C)

	Luminous flux	Luminous efficacy	Product code
New product:	2,182 lm	140 lm/W	CLU036-1205C1
Current model:	1,896 lm	122 lm/W	CLU034-1205B8
	[about 15 % increase]	[about 15 % increase]	

2. Lineup of 207 models in total

As not only has brightness been focused on but the need for quality of light such as improved color rendering *2 has increased in recent years, Citizen Electronics has expanded the lineup of the ultra-high color rendering type (Ra 97 typ.) and the preferable color type (below B.B.L.) *3. Moreover, a color variation of 6,500K has been added to the standard type (Ra 80 min.) and 207 models in total are being released at the same time. These models meet the diversified demand of customers.

3. Brightness has increased by up to 50 % through expansion of the driving power range

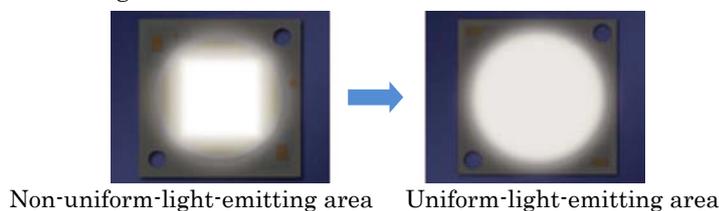
Larger current can be applied to one LED package than that of the current model due to enhancement of heat dissipation with improvement of the package. Expansion of the range of driving power has expanded the range of luminous flux and increased brightness by up to 50 %.

	Range of driving power	Luminous flux	Product code
New product:	0.8 W to 45.3 W	144 lm to 5,518 lm	CLU036-1205C1
Current model:	0.8 W to 33.1 W	111 lm to 3,637 lm	CLU034-1205B8
	[12 W expansion]	[about 50 % increase]	

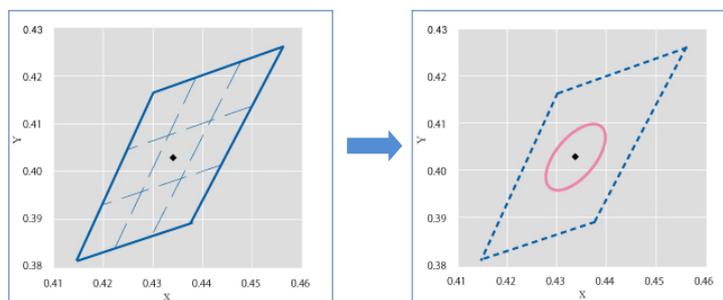
4. High-heat dissipation structure and uniform-light-emitting area

- Citizen Electronics has adopted the Chip on Aluminum technique (patented by Citizen Electronics), which is a high-heat dissipation technique where LED dies are directly mounted on an aluminum board.

- LED dies are placed to generate uniform light in the light emitting area considering optimization of the light distribution design of luminaires.



- As the new products are compliant with the chromaticity control standard “3-Step MacAdam ellipses” which is about a ninth of the chromaticity range of ANSI C78.377 *4, chromaticity variations in LEDs are rarely noticed (excluding the Ra 70 min. type).



Chromaticity range of ANSI C78.377 Chromaticity range of 3-Step MacAdam ellipse

5. Selection of LEDs is simplified through use of a selector tool

In order to support luminaire makers to select the desired LED, Citizen Electronics provides a product selector tool (software tool) on its website. By entering desired conditions such as the amount of luminous flux, it is possible to narrow down the selection of appropriate types of LEDs.

◆Main specifications

(5,000K, Ra 80 min., Tc=25°C)

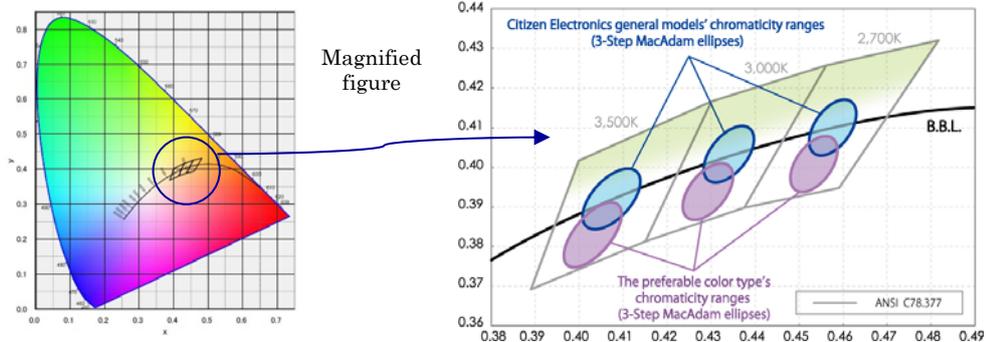
Series	CLU027 Series	CLU026 Series	CLU036 Series	CLU046 Series	CLU056 Series
Product name	CLU027-0303	CLU026-1201 CLU026-1202 CLU026-1203 CLU026-1204	CLU036-1205 CLU036-1206 CLU036-1208	CLU046-1212 CLU046-1812 CLU046-1818	CLU056-1825 CLU056-3618
Size (mm)	13.5×13.5×1.4	13.5×13.5×1.4	19.0×19.0×1.4	28.0×28.0×1.4	38.0×38.0×1.4
Power (W)	0.1–7.3	0.2–39.2	0.8–78.3	1.9–263.8	6.0–526.0
Luminous flux (lm)	24–817	33–4,307	163–8,687	390–28,626	1,193–57,463
Color temperature (K)	Ra 70 min. (ANSI C78.377): 3,000K, 4,000K, and 5,000K Ra 80 min. (3-Step MacAdam ellipse): 2,700K, 3,000K, 3,500K, 4,000K, 5,000K, and 6,500K Ra 90 min. (3-Step MacAdam ellipse): 2,700K, 3,000K, 3,500K, and 4,000K Ra 97 typ. (3-Step MacAdam ellipse): 2,700K, 3,000K, and 4,000K Below B.B.L. (3-Step MacAdam ellipse): 2,700K, 3,000K, 3,500K, and 4,000K				
Applications					

*1 COB: stands for Chip on Board and is a structure where LED dies are directly mounted on a board.

*2 Color rendering: If quality of a light source changes, an object may appear to be a different color. Thus, 'color rendering' is the effect of quality of a light source on the color appearance of objects. Color rendering is generally indicated in a general color rendering index (Ra) and it is said that the nearer to 100 Ra is, the closer to natural light the color of light looks and the better it is.

*3 Preferable color type (below B.B.L.): Generally LEDs for lighting have the white chromaticity range centering on the curve (B.B.L.) located in the center of the chromaticity diagram below. However, as there are different color shades above B.B.L. and below B.B.L., we have set chromaticity ranges only below B.B.L. and unified color shades.

[Chromaticity diagram]



*4 ANSI C78.377: a chromaticity control standard provided by the American National Standards Institute (ANSI).

"CITILED The Light Engine" is a brand name of LEDs for lighting manufactured by CITIZEN ELECTRONICS CO., Japan. CITILED is a registered trademark of CITIZEN ELECTRONICS CO., Japan.

Information provided on this press release was accurate at the time of announcement.

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