

## Development of LED for lighting, new 'CITILED Vivid Series': high chromatic LED that expresses colors more vividly and pursues high "chroma"

Citizen Electronics Co., Ltd. (Head Office: Fujiyoshida City, Yamanashi Prefecture. President: Yoshihiro Gohta) has developed LEDs for lighting, 'CITILED Vivid Series Brilliant Type' and 'CITILED Vivid Series Natural Type' as new in the 'CITILED Vivid Series.' The CITILED Vivid Series Brilliant Type, the chroma of which increases to twice that of our current model, illuminates an object more vividly. The CITILED Vivid Series Natural Type also enhances vividness while the color of an illuminated object looks natural. The products will be exhibited during the 'Hong Kong International Lighting Fair 2016' starting on October 27, 2016.

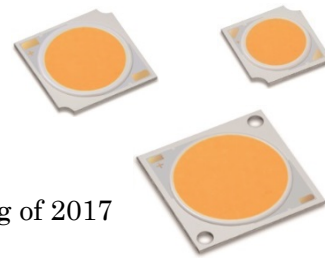
### Two types of high chromatic LED for lighting, 'CITILED Vivid Series'

**CITILED**  
The Light Engine

#### ■ Developed products:

1. CITILED Vivid Series Brilliant Type (25 models)
2. CITILED Vivid Series Natural Type (25 models)

#### ■ Mass production is scheduled to start in the spring of 2017



### ■ Background of development

With the widespread availability of LEDs, not only are there needs for brightness and efficacy, but applications in which light is used for dramatic impact to make an illuminated object look more beautiful have been expanding and the demand for 'quality of light' has diversified more and more. In response to these needs for lighting, Citizen Electronics has developed high chromatic LEDs, the CITILED Vivid Series, in order to make the original colors of the object look more vivid through enhancement of chroma. As our newly developed products will be available in two lineups, which pursue high chroma, customers can choose depending on their purpose and needs.

#### 1. CITILED Vivid Series Brilliant Type

- illuminate an object more vividly
- most suitable for spotlights such as for display

#### 2. CITILED Vivid Series Natural Type

- enhance vividness while an object looks natural
- most suitable for space lighting

These products are the most suitable for store lighting, museums and picture studios in which color vividness is emphasized, along with lighting for educational facilities such as schools and libraries as a result of the contrast between brightness and darkness improving and this making letters on paper easier to read. Citizen Electronics has been creating a new value of light as a pioneer of the COB-type <sup>\*1</sup> LED.

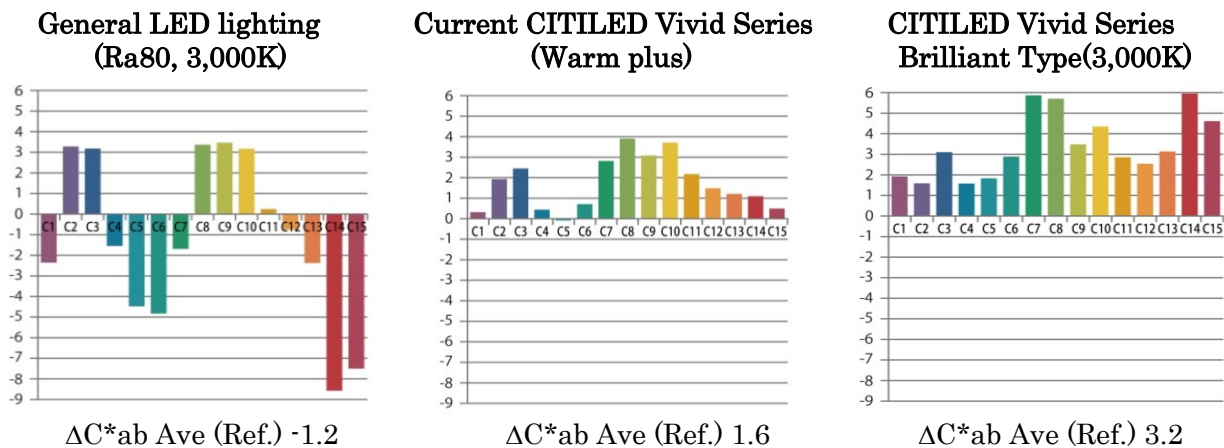
<sup>\*1</sup> COB stands for Chip on Board and is a structure where LED dice are directly mounted on a board.

## ■ Product features

### 1. CITILED Vivid Series Brilliant Type

When chroma of light increases, colors of an object look beautiful. As the CITILED Vivid Series has positive values of  $\Delta C^*ab^{*2}$  that indicates chroma for all colors compared to general LED lighting, it can bring out the original colors of an object more vividly. The newly developed Brilliant type has increased vividness twofold by adjusting the material composition of phosphors, etc. It has achieved increase in the chroma of red and green which was conventionally low while maintaining the entire balance. As it is possible to express more subtle beauty of colors, this type is the most suitable for spot lighting for store displays and museums, etc.

\*2  $\Delta C^*ab$  is an index that represents chroma difference defined in CIE 1976 established by the Commission Internationale de l'Eclairage (CIE). It consists of 15 standard colors, and the greater a value is, the more vivid it looks.



General LED lighting



CITILED Vivid Series Brilliant Type

### 2. CITILED Vivid Series Natural Type

This product emphasizes vividness of an illuminated object by retaining the  $\Delta C^*ab$  value (chroma) of the current CITILED Vivid Series, and makes the object look natural by adjusting the chroma balance.



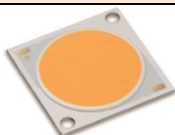


## ■ Common features between two types

Citizen Electronics has adopted the Chip on Aluminum technique (patented by Citizen Electronics), which is a high heat dissipation technique where LED dice are directly mounted on an aluminum board. In addition, as these products have the same package size as the current COB Series and CITILED Vivid Series, it is possible to promote efficiency of luminaire design.

## ■ Main specifications

(common among Brilliant Type and Natural Type of CITILED Vivid Series)

Package	CLU028	CLU038	CLU048
	 φ9.8mm	 φ14.5mm	 φ22.0mm
Size (mm)	13.5×13.5×1.4	19.0×19.0×1.4	28.0×28.0×1.4
Die configuration	1204 1206	1208 1212	1818
Color variation	2,700K, 3,000K, 3,500K, 4,000K, 5,000K		



“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.

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