# Development of "Multi-color LED with Reflector" that is now the world's thinnest [1]

Citizen Electronics Co., Ltd. (Head Office: Fujiyoshida City, Yamanashi Prefecture. President: Yoshihiro Gohta) has developed the CL-426 Series that is the world's thinnest side-lighting type multi-color LED with a reflector. Shipment of samples will start in July 2015.
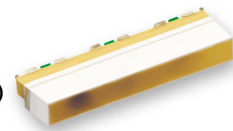
## Multi-color LED

Type: Side-lighting type
Model: [2 models]   CL-426F-AA (Common anode)
                    CL-426F-AACC (Common cathode)
Size: 2.8 mm (width) × 0.85 mm (length) × 0.35 mm (height)
Launch date: Shipment of samples will start in July 2015.

A multi-color LED incorporates three RGB (Red, Green, and Blue) dies in one package and can express various colors through combinations of emitted light. It is mainly used for indicators serving as alert lamps and illumination applications in products such as smartphones, wearable terminals, personal computers, and game hardware.

As mobile terminal products such as smartphones and wearable terminals have increasingly become smaller and thinner in recent years, the need for small and thin parts to be incorporated in such products has also been increasing. In particular, smartphone makers tend to apply different color illumination in order to distinguish their products from those of their competitors.

This new product has achieved brightness equal to that of our current model being the world's thinnest at 0.35 mm (22 % reduction compared to our current model) thanks to our unique structure. Side-lighting LEDs require a reflector to increase the efficiency of light reaching a lightguide plate and this product has achieved thinness and high luminous efficacy by integration of the LED and the reflector. It is possible to further make smartphones thinner and wearable devices smaller and thinner by adoption of this product.

Application 1: indicators (alert lamp)                 Application 2: illumination
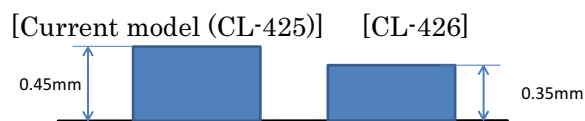


## Main features

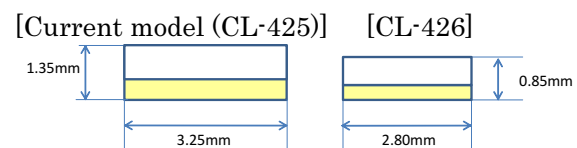### 1. The world's thinnest multi-color LED with reflector

The CL-426 is the world's thinnest side-lighting type multi-color LED with a reflector at 0.35 mm (22 % reduction compared to that of our current model) thanks to a new structure that Citizen Electronics has independently developed.  At the same time, dimensions of width and length have also been reduced by 45 % and this miniaturization contributes to smaller, thinner and higher-performance mobile terminals such as smartphones and wearable terminals.

* Comparison of size with our current model
- Height                                                                            - Width and length

[Current model (CL-425)]     [CL-426]              [Current model (CL-425)]     [CL-426]



0.45mm                                            0.35mm        1.35mm                              0.85mm

                                                                           3.25mm              2.80mm

### 2. Brightness equal to or more than that of our current model has been achieved despite the smallness and thinness of the product

Usually, making a product thinner impairs brightness, but this product has achieved luminous intensity equal to or more than that of our current model through our unique design while reducing thickness by 22 % compared to that of our current model.

* Comparison of luminous intensity with our current model

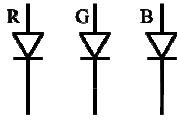|         | Current model (CL-425) | CL-426 |
|---------|------------------------|--------|
| Red     | 115mcd                 | 120mcd |
| Green   | 180mcd                 | 250mcd |
| Blue    | 45mcd                  | 62mcd  |

IF=5mA

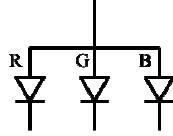### 3. Lineup of both versions of common anodes/cathodes *2

It is possible to select a common anode or common cathode, depending on the drive conditions in customers' products.

*1: According to the results of a survey of side-lighting type multi-color LEDs with reflectors conducted by Citizen Electronics as at June 2015

*2: Usually, anodes (positive electrodes) and cathodes (negative electrodes) are both needed for three colors (six terminals in total) to use multi-color LEDs.  But Citizen Electronics has reduced the number to four terminals by connecting anodes or cathodes respectively in order to make products smaller.
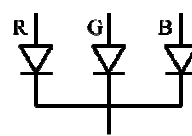
[Old product configuration]          [Common anode]          [Common cathode]

CITILED is a registered trademark of CITIZEN ELECTRONICS CO., Japan.

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

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