

In recent years, tuneable color application and dynamic ambient lighting have become a major market trend. Nevertheless, design engineers are always facing the challenge of variation in mixed color output of RGB LEDs. This is caused by variations of intensity and wavelength within the color & brightness groupings as well as forward current and temperature dependencies. Everyone is enthusiastic to search for a better solution.

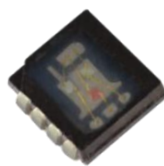
DOMINANT Opto Technologies launched the new package family known as seddLED (Smart Embedded Digital Driver LED) since the Electronica 2016 - the world's first digital LED which combines RGB LED, LED Driver and advanced ISELED® communication protocol integrated into a single package. It is a revolutionary approach for automotive ambient lighting with fully-calibrated RGB LED to target coordinates.



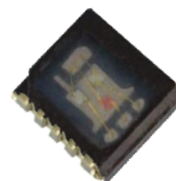
seddLED Product Family



- A3A-FKG-1400-1
- High brightness
- Pre-calibrated to D65 White



- A3B-FKG-800-1
- Black package for high contrast ratio



- A3B-FCKG-800-1
- Built in Capacitor to Simplify circuit design



- A3A-FKG-RGB-1
- High brightness
- Individual Red, Green and Blue calibrated

The first introduction is seddLED3.0 part number A3A-FKG-1400-1 which is pre-calibrated to D65 white point with an accuracy within 3 SDCM steps at 1,400mcd.

This year DOMINANT proudly presents its' new seddLED3.0 family member: A3A-FKG-RGB-1, which is pre-calibrated to individual Red, True Green and Blue color at 400mcd, 1600mcd & 250mcd respectively. Interestingly, the True Green and Blue color is pre-calibrated to only a single wavelength (1nm)!

Most of the standard RGB LEDs are binned for both color and intensity of each chip in a package. Usually, it will have 3-6 binning categories depending on the LED maker. While, binning significantly reduces possible color distribution, it does not remove color mixed inconsistencies completely.

The advantage of A3A-FKG-RGB-1 is that it is able to fine tune the variation of color & intensity by controlling the LED Peak Current (PWM), Wavelength Calibration and Temperature Compensation.

Figure 1 shows the color gamut comparison between standard RGB LEDs and A3A-FKG-RGB-1. Standard RGB LED have multiple color groupings and each grouping consists of 4nm wavelength range. The standard RGB color gamut varies from each color grouping which will affect the accuracy of color mixed. A3A-FKG-RGB-1 with pre-calibrated True Green & Blue clearly have excellent & stable color gamut.

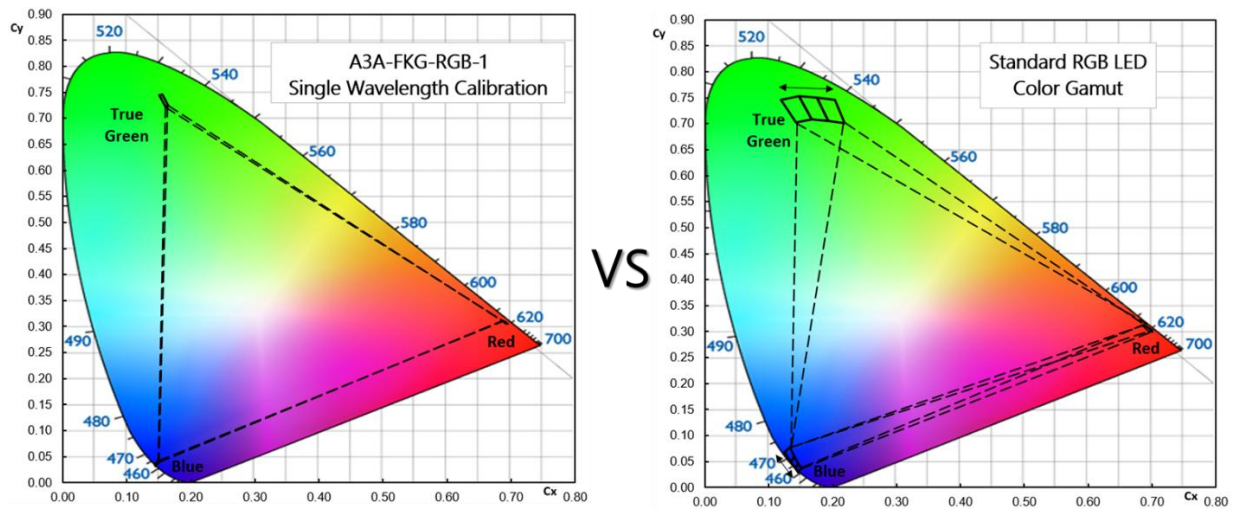


Figure 1 seddLED A3A-FKG-RGB-1 vs Standard RGB LED

Moreover, seddLED3.0 product family is embedded with temperature sensor to enable brightness compensation for Red LED. Figure 2 show the intensity versus temperature characteristic for all three chips used in the standard RGB LED. The luminous intensity of Red LEDs decreases with increasing LED operating temperatures. For Blue and True Green LEDs the decrease in luminous intensity is less noticeable. seddLED3.0 is able to maintain the Red LED intensity with the auto temperature compensation feature as shown in Figure 3.

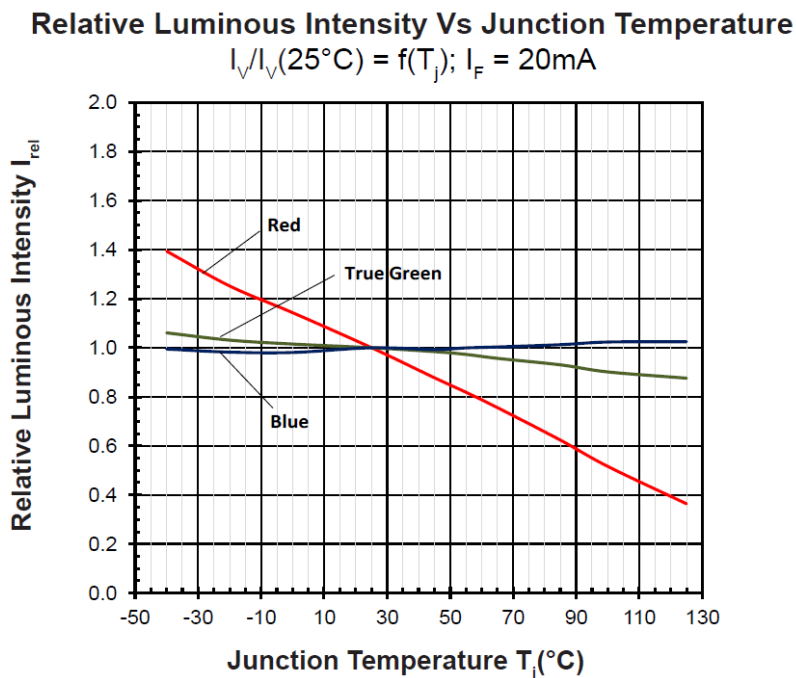


Figure 2 Relative luminous intensity $I_V/I_V(25^\circ\text{C}) = f(T_J); I_F = 20\text{ mA}$

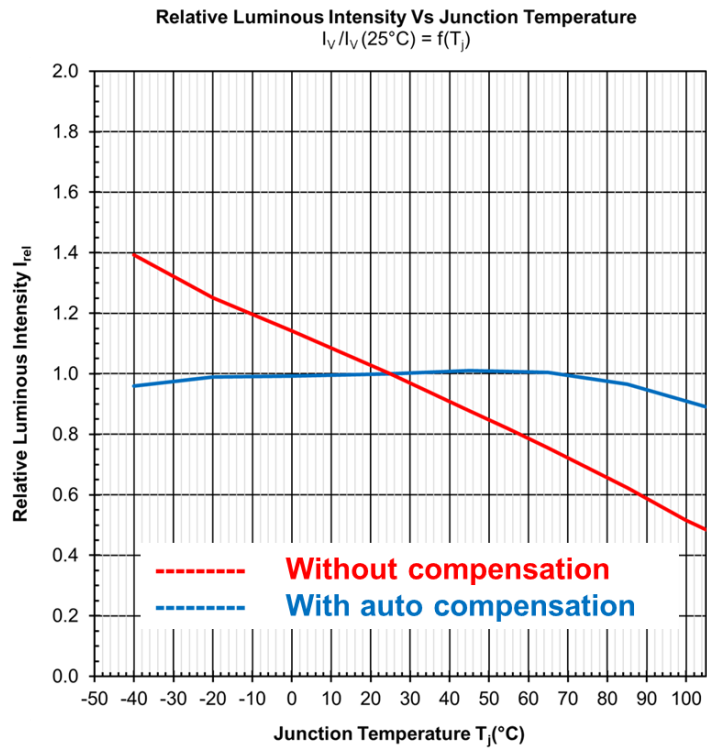


Figure 3 Relative luminous intensity $I_V/I_V(25^\circ\text{C}) = f(T_J)$

Both A3A-FKG-1400-1 & A3A-FKG-RGB-1 help to reduce costs, simplify control and expand the functionality of RGB lighting in automobiles significantly. Table 1 shows the optical specifications of both LEDs.

A3A-FKG-RGB-1 is perfectly-crafted for applications that require high brightness for individual R.G.B color. Each R.G.B LED is calibrated to maximum brightness which has better dimming resolution.

On the other hand, A3A-FKG-1400-1 is an excellent choice for applications that require high accuracy of White color coordinate, for example: D65 white.

	A3A-FKG-RGB-1	A3A-FKG-1400-1
Color Calibration		
Brightness	SetRGB(255,255,255) = 2250mcd	SetRGB(255,255,255) = 1400mcd
	SetRGB(255,0,0), Red = 400mcd	SetRGB(255,0,0), Red = 381mcd
	SetRGB(0,255,0), True Green = 1600mcd	SetRGB(0,255,0), True Green = 946mcd
	SetRGB(0,0,255), Blue = 250mcd	SetRGB(0,0,255), Blue = 73mcd

Table 1 Color & Intensity Specification

The prototype sample of A3A-FKG-RGB-1 will be available in October 2019.

DOMINANT will continue to drive Digital RGB LEDs development forward in this field and for the next 5 years, seddLED technological roadmap is expected to focus on miniaturization, integration and digitalization.

About DOMINANT Opto Technologies

DOMINANT Opto Technologies is a dynamic company that is amongst the world's leading automotive LED manufacturers. With an extensive industry experience and relentless pursuit of innovation, DOMINANT's state-of-art manufacturing and development capabilities have become a trusted and reliable brand across the globe. More information about DOMINANT Opto Technologies, a ISO/TS 16949 and ISO 14001 certified company, can be found under <http://www.dominant-semi.com>.