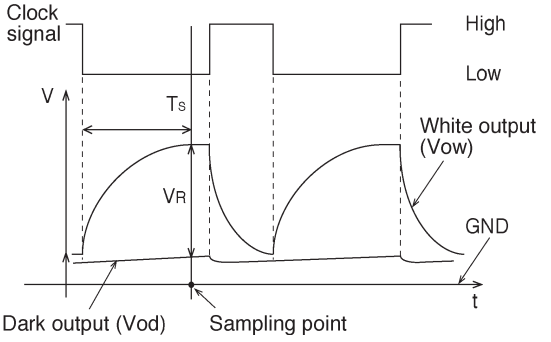
# 3. Technical explanation

(1) Output values

For ROHM CISs, the output values are regulated by the dynamic range VR (white output and dark output). Here, the white output (Vow) is the output value scanned from the white reference paper (O.D. = 0.05 to 0.09), and the dark output (Vod) is the output value when the light source is turned off. Their various samplings were performed within the stable output times (Ts) listed in the separate specifications for each product.




(2) Output uniformity

For ROHM, whether within one CIS or between multiple CISs, the output uniformity is regulated by the formula given below.

$$\frac{VR_{min.}}{VR_{max.}} \geqq 0.5$$

Here the $VR_{max.}$ represents the maximum dynamic range value within one CIS. The variations for $VR_{max.}$ between CISs are regulated by the specifications given for each product. Also, the $VR_{min.}$ represents the minimum dynamic range value within one CIS.

(3) Dark output value

This value regulates the output when the LED or CCFL light source is turned off. The values listed in the product specifications are valid regardless of whether taken within one CIS or between multiple CISs.

(4) MTF

MTF (Modulation Transfer Function) is one way of explaining the resolution and is regulated by the formula given below.

$$MTF = \frac{V_{max.} - V_{min.}}{V_{max.} + V_{min.}} \times 100\ (\%)$$

Here $V_{max.}$ and $V_{min.}$ are the maximum and minimum output voltages for two adjacent dots in any spacial frequency subtracted by the dark output. At ROHM, the spacial frequency when regulating the MTF is 4LP / mm for products of 203 dpi resolution and 3LP / mm for products of 300 dpi resolution.

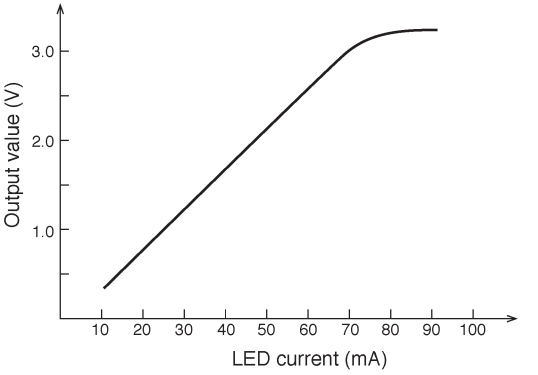
(5) Linearity

The linearity represents the locus of the output values with respect to the admitted amount of light. The curve below represents the changes in the output voltage with respect to the amount of light (LED current) admitted to any one pixel. If the slope of the curve is constant, the linearity is considered to be good. Nevertheless, as the amount of light admitted increases, the output voltage value will become saturated. Therefore, in order for the output voltage to not become saturated, the input amount of light (the LED current), or the time of illumination, must be properly adjusted. The linearity ($\gamma$) is determined by the slope and therefore can be defined by the formula given below.

$$\gamma = \frac{\log\ [\ (V2 - Vod)\ /\ (V1 - Vod)\ ]}{\log\ (E2\ /\ E1)}$$

V1: Analog output voltage for input light amount E1 (E1 = E2 / 10).

V2: Analog output voltage for input light amount E2. E2 is the input light amount when V2 equals the white level.



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