Featured Products

Industrial & General Purpose | Consumer & Home Appliance | Automotive | PC/Smart devices

LED

ROHM SEMICONDUCTOR

Easily distinguishable even for various types of colorblindness

Color Universal Design Compatible 1608(0603)Size LEDs

SMLD12BN1W/SMLD12E2N1W/SML-D15DW

- **Achieves superior visibility with respect to different types of color vision**
- **Offered in the industry-standard 1608 (1603) size**

Applications

■ Indicators (home appliances, medical systems) ■ Office equipment ■ Automotive

SML-D1 Series

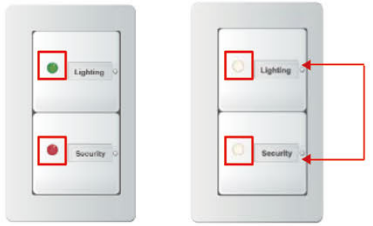
What is Color Universal Design (CUD)?

A design system to ensure that information is accurately conveyed even to people with color deficiencies

Color blindness often causes a number of inconveniences in daily life, and can even lead to serious injuries and/or death (i.e. when overlooking a warning lamp). CUD involves designing color schemes and measures to minimize or eliminate these inconveniences and allow even those who are colorblind to receive correct information.

Differences in Color Vision

Normal Color Vision Impaired Color Vision

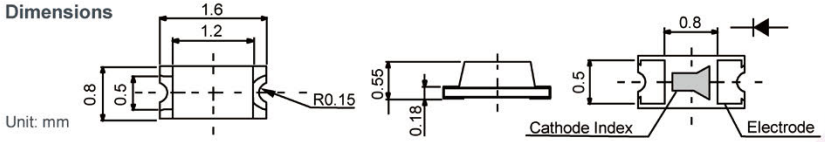


Green is easily recognized - even with impaired color vision

Green and red appear yellowish

High Precision 1608 Package with High Reliability Resin

Dimensions

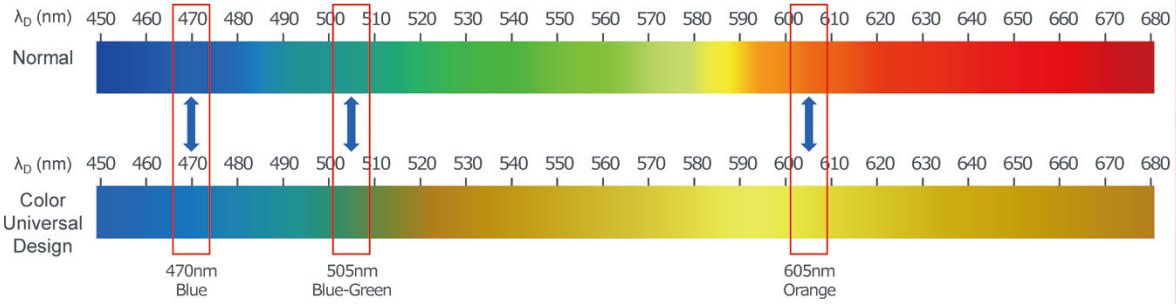


Unit: mm

Specifications

Part No.	Color	I_V (mcd)	λ_D (nm)	V_F (V)	I_F (mA)
SMLD12BN1W	Blue	40	470	2.9	5
SMLD12E2N1W	Blue-Green	120	505	2.9	5
SML-D15DW	Orange	224	605	2.0	20

Color Universal Design Example



Normal color schemes call for blue (470nm), green (530nm), and red (630nm), but it is often difficult for colorblind people to discriminate between green and red. In response, Color Universal Design utilizes blue (470nm), blue-green (505nm), and orange (605nm) that are more easily distinguishable by people with various types of colorblindness.

1608 (0603) Size LED Lineup

➡: Models that support Universal Color Design

Part No.	Color	Absolute Maximum Ratings (Ta=25°C)						Electro-Optical Characteristics (Ta=25°C)									Automotive Grade AEC-Q101
		Permissible Loss P_D(mW)	Forward Current I_F(mA)	Peak Forward Current I_{FP}(mA)	Reverse Voltage V_R(V)	Operating Temp. Topr(°C)	Storgage Temp. Tstg(°C)	Forward Voltage V_F Typ. (V)	I_F (mA)	Reverse Current I_R Max. (μA)	V_R (V)	Emission Wavelength λD/Chromaticity (x,y) Typ.* (nm)	I_F (mA)	Luminosity I_V Min. (mcd)	Typ. (mcd)	I_F (mA)	
SML-D12W 8W (A)	Yellow	52	20	100*2	12	−40 to +100	−40 to +100	2.0	2	10	12	588	2	5	7	2	YES
SML-D12V1W	Red											630		25	40		
SML-D12U1W												620		40	63		
SML-D12D1W	Orange	54	20	100*2	5	−40 to +85	−40 to +100	2.2	20	10	5	605	20	63	100	20	—
SML-D12Y1W	Yellow											590					
SML-D12M1W	Yellow-Green											572		16	30		
SML-D12V8W	Red											630		16	40		YES
SML-D12U8W												620		25	63		
SML-D12D8W	Orange											605		40	100		
SML-D12Y8W	Yellow	54	20					2.2	20	10	5	590	20	25	63	20	
SML-D12Y3W												581		16	40		—
SML-D12M8W	Yellow-Green			100*2	5	−40 to +85	−40 to +100					572		10	25		YES
SML-D12P8W	Green											560		3	6		
SML-D12FW		67	25									565		14	18		—
☆ SMLD12EN1W		70				−40 to +100		3.0			12	527		56	140		
☆ SMLD12E2N1W	Blue-Green	66	20			−40 to +85		2.9	5		5	505	5	−56	120	5	(YES)
☆ SMLD12E3N1W												496		56	85		
☆ SMLD12BN1W	Blue					−40 ~ +100				10		470		−14	40		
☆ SMLD12W BN1W	White											(x,y)(0.295,0.280)		56	120		
SML-D13VW (A)	Red	72						2.0				630		36	55		
SML-D13UW (A)												620		56	85		
SML-D13DW (A)	Orange		30									605		71	120		YES
SML-D13W W (A)	Yellow											587			110		
SML-D13MW (A)	Yellow-Green	75						2.1				571		28	45		
SML-D13U8W	Red	52	20	100*2	5	−40 to +100	−40 to +100		20	10	5	620	20	40	70	20	
SML-D13Y8W	Yellow	54						2.2				590		63	100		—
SML-D13Y2W		78	30					2.1				581		40	80		
SML-D13M8W	Yellow-Green	52	20					2.2				572		16	30		
SML-D13FW	Green	81	30					2.1				565		18	22		YES
SML-D14VW (A)	Red	72						2				630		71	100		
SML-D14U2W (A)												615		90	160		
SML-D14DW (A)	Orange											605			200		
SML-D14YW (A)	Yellow	75	30	100*2	5	−40 to +100	−40 to +100	2.1	20	10	5	590	20	112		20	YES
SML-D14W W (A)												587			180		
SML-D14MW (A)	Yellow-Green											571		36	60		
SML-D15VW	Red	84						2				630		71	90		
SML-D15UW												620		90	112		
SML-D15U2W												615		112	140		
SML-D15DW	Orange		35	100*2	5	−40 to +100	−40 to +100		20	−10	5	605	20	180	224	20	YES
SML-D15YW	Yellow							2.1				590					
SML-D15MW	Yellow-Green	87										571		56	71		

*1: Duty1/5, 200Hz *2: Duty1/10, 1kHz *3: Duty≦1/20, 1ms *4: Duty≦1/5, 1kHz *5:Duty≦1/10, pulse width less than 10ms

( ): Reference value ☆: Under Development

*: White is expressed in chromaticity coordinates (x,y)

Note: Automotive-grade products (AEC-Q101) will include a 'C' in the part number (YES): Planned

The content specified in this document is correct as of March 1st, 2018.

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