



Electronics for the Future

2color LED ~ Bi COLOR ~

2024
Module Business Unit
LED Division
Rev.004

No. 65AN028E Rev.004
Oct.2024

Features of ROHM LEDs



ROHM is one of the few LED suppliers that manufactures their own dies

Integrated production

Epi	Die	Assembly	Finished Product

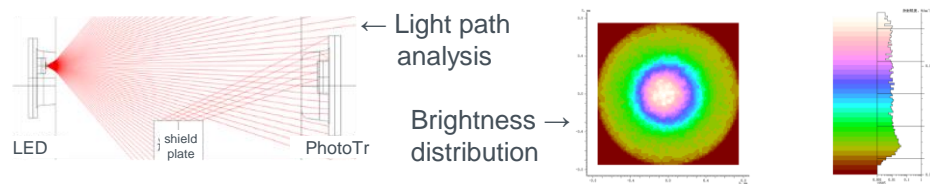
- Quality Management
- Production Control
- Development System

Some products are manufactured by separate processes.

Capable of responding to detailed requests for color and brightness

Color	IR	IR	V	U	U2	D	Y	W	M	P	E	E2	B	WB
Dominant wavelength (nm)	940	850	630	620	615	605	590	580	572	560	525	505	470	White
Chip Type	AlGaAs System		AlGaInP System							InGaN System				

Optical simulation and other support tools are provided for customer development



A wide range of services available from a comprehensive semiconductor manufacturer

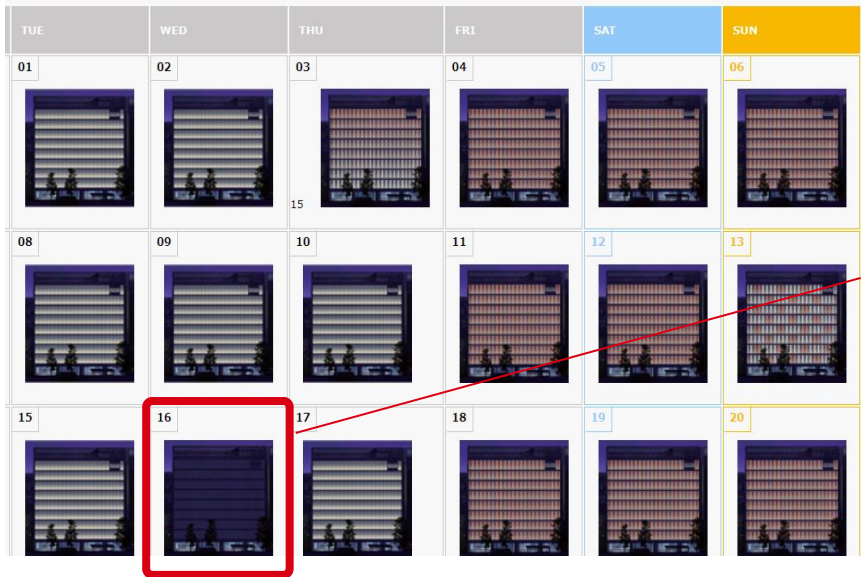


“Kyo-no-Hikari-Koyomi”

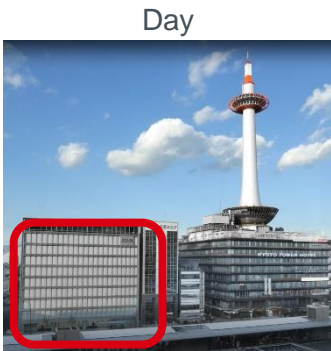
ROHM has been lighting up the Kyoto Station building since 2010. Created using original LED technology in collaboration with Mikiko Ishii’s design, ‘Kyo no Hikari Koyomi’ expresses Kyoto’s delicate seasonal atmosphere and traditional events through light.

Combining ROHM’s full-color LEDs and LED modules with optimizable color temperature in both vertical and horizontal directions ensures gentle, soft lighting similar to that through shoji (paper sliding door), in harmony with the streetscapes of Kyoto.

〈Schedule〉



Delicate Japanese sensibility is expressed by subtly adjusting the color temperature according to the season.

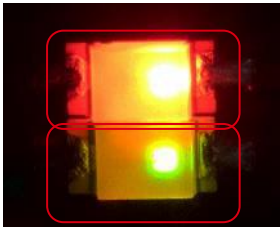


On the 16th of every month, we participate in the "DO YOU KYOTO?" light-down campaign promoted by Kyoto City to turn lights. (Unified Action Light-Down calls for turning off outdoor lights, etc.)

Contributes to miniaturization and multicolor of customer products.

Enables Miniaturization of Products by Reducing Mounting Area

2 pieces of a single color
※ Yellow-green • Red luminescence



Large area for mounting
Yellow-green and red are not mixed.



2color LED
※ Yellow-green • Red 2color LED luminescence

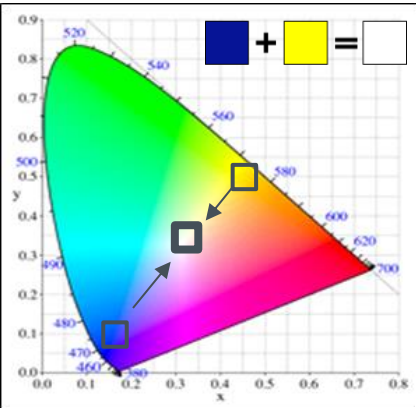
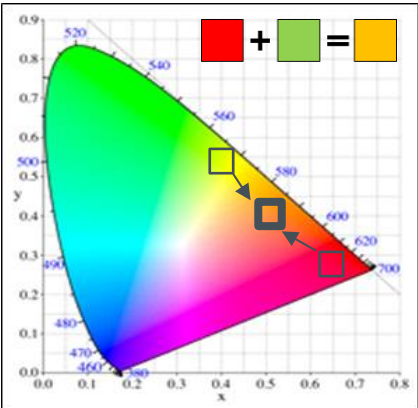


Half the mounting area
Very good color mixing

Half the mounting area
and,
• Reduced number of implementations
• Reduced mount of materials etc.

Contributes to total cost reduction

Improved color mixing and design



The color located between the two colors on the chromaticity coordinate is the intermediate color.

Capable of expressing intermediate colors by mixing colors

You can find the requested 2color LED among ROHM products.

Comparison of 2color LED package lineups with other company

	TOP VIEW			SIDE VIEW
	0402	0603	Reverse mount	
ROHM	○	○	○	○
Company A	-	○	○	○
Company B	-	-	-	○
Company C	-	○	-	○
Company D	-	○	-	○
Company E	-	○	-	○

※Rohm research

Want to make the set smaller...

【Small Type】
SML-D22series PICOLED™-Duo series



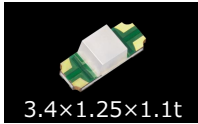
1.6×0.8×0.55t



1.0×1.0×0.2t

Replace from LAMP LED...

【Rear Mounting Type】
SML-82series



3.4×1.25×1.1t

- Please see the next page for details -

Size : mm

Standard type

Basic form of the 0603 inch



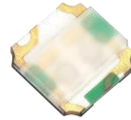
M U Y V

SML-D22 series

1.6×0.8×0.55t Details on page 4

Small type

PICOLED™ Duo series



U M

SML-P24 series

1.0×0.6×0.2t Details on page 4

Reverse Mount

available

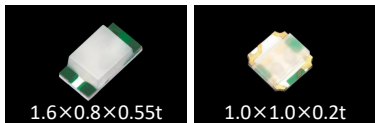


M V

SML-822 series

3.4×1.25×1.1t Details on page 5





Small Type:SML-D22/PICOLED™-Duo series

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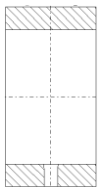
Color lineup

Part No.	Color	IF(mA)	Dominant Wavelength(nm)	IV(mcd)	VF(V)
SML-D22MUW	Red	5	620	16	1.9
	Yellow Green		570	10	2.0
SML-D22YVW	Red	5	630	16	1.9
	Yellow		590	25	2.0
SML-P24MUW(R)	Red	20	620	52	2.0
	Yellow Green		572	21	2.1

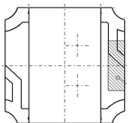
PICOLED™: Small and Thin

•Small Type

SML-D22 Series
(1.6mm×0.8mm)



PICOLED™ Duo Series
(1.0mm×1.0mm)



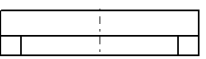
22% area ratio cut

• Thin Type

SML-D22 Series
(t=0.55mm)

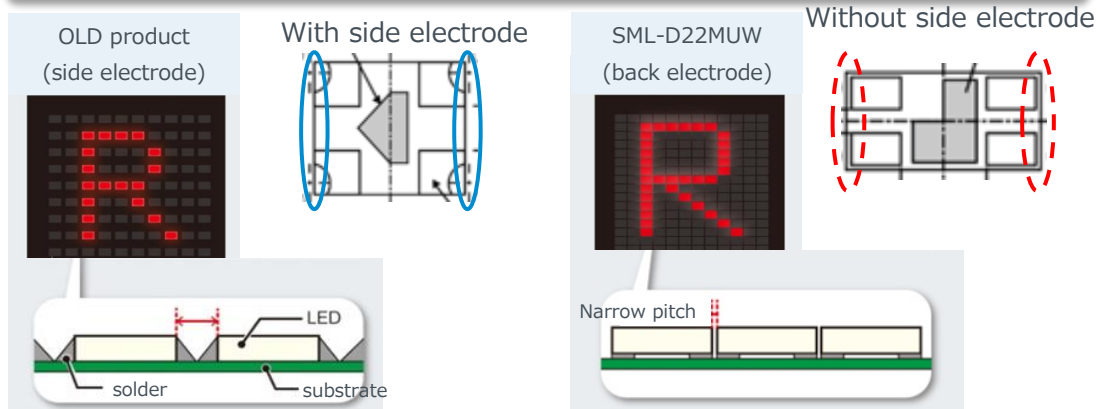


PICOLED™ Duo Series
(t=0.2mm)



Height 70%Down

SML-D22: High-density mounting enables high-definition display



Solder area is larger due to side electrode. No electrodes on the side, so solder spread is small.

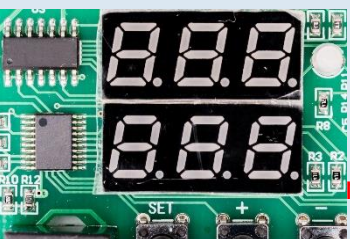
→ High-density mounting is possible

Case Study

7seg numeric display

【Request】

- ①I need a 2color LED to indicate the status of the equipment in color.
- ②7seg case wants to share single color 0603 size, so size 0603 LED is desired.



Normal



abnormality



Information can be communicated instantly through visual

0603 size SML-D22MUW have been adopted



Rear Mounting Type:SML-82 series

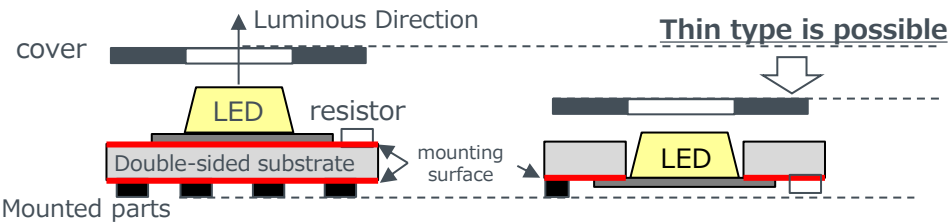
Color lineup

Part No.	Color	IF(mA)	Dominant Wavelength(nm)	IV(mcd)	VF(V)
■ ■ SML-822MV8W	Red	20	630	30	2.2
	Yellow Green		572	25	2.2
■ ■ SML-825MVW	Red		630	63	2.1
	Yellow Green		572	63	2.0

Free design of sets and substrates

- double-sided boards

- single-sided mounting



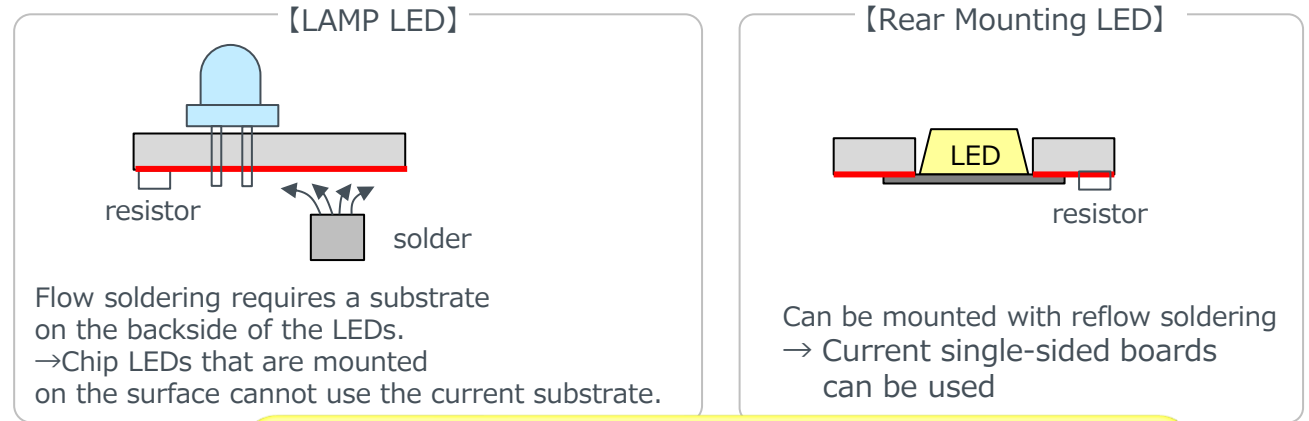
Since LEDs are only mounted on the top surface
There are restrictions on board design

Single-sided mounting is possible by rear mounting

- I want to use a single-sided board
- I want to emit LEDs from the window section.
- There are restrictions on the type of substrate
- I want to make the set thinner.
- etc

Expands the design of sets and substrates

Helps reduce man-hours for evaluation of replacement from LAMP LED



LAMP LED to CHIPLED replacement is easy

Case Study

Electronic piano



【 Request 】

- ① Replacement from LAMP LED
- ② Use the current board.







**Rear Mounting Type
SML-822MV8W have been adopted**

Lineup of ROHM 2color LED

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Package (mm)	Emitting Color	Part No.	Absolute Maximum Ratings (T _a =25°C)						Electrical and Optical Characteristics (T _a =25°C)										Automotive Grade AEC-Q101 AEC-Q102	
			Power Dissipation P _D (mW)	Forward Current I _F (mA)	Peak Forward Current I _{FP} (mA)	Reverse Voltage V _R (V)	Operating Temperature Topr (°C)	Storage Temperature Tstg (°C)	Forward Voltage V _F		Reverse Current I _R		Dominant Wavelength λ _D		Luminous Intensity I _v					
									Typ (V)	I _F (mA)	Max (μA)	V _R (V)	Typ (nm)	I _F (mA)	Min (mcd)	Typ (mcd)	Max (mcd)	I _F (mA)		
 1.6×0.8 (t=0.55)	Yellow Green	SML-D22MUW	67	25	100*2	5	-40 to +105	-40 to +110	2.0	5	10	5	570	5	6	10	16	5	—	
	Red		65	25	100*2	5	-40 to +105	-40 to +110	1.9	5	10	5	620	5	10	16	25	5	—	
	Yellow	SML-D22YVW	67	25	100*2	5	-40 to +105	-40 to +110	2.0	5	10	5	588	5	16	25	40	5	—	
	Red		65	25	100*2	5	-40 to +105	-40 to +110	1.9	5	10	5	629	5	10	16	25	5	—	
 1.3×1.5 (t=0.6)	Blue	SML522BUNW	66	20	60*2	5	-40 to+85	-40 to+100	2.9	5	10	5	470	5	9	22	36	5	—	
	Red		50	20	60*2	5	-40 to+85	-40 to+100	1.9	5	10	5	624	5	10	21	40	5	—	
	Yellow Green	SML-522MUW	52	20	60*2	4	-30 to+85	-40 to+85	2.1	20	100	4	570	20	14	40	71	20	—	
	Red		50	20	60*2	4	-30 to+85	-40 to+85	1.9	20	100	4	630	20	22	63	110	20	—	
	Yellow Green	SML-522MU8W	54	20	100*2	4	-40 to+85	-40 to+100	2.2	20	100	4	572	20	16	40	63	20	—	
	Red		54	20	100*2	4	-40 to+85	-40 to+100	2.2	20	100	4	620	20	25	63	100	20	—	
	Yellow Green	SML-522MD8W	54	20	100*2	4	-40 to+85	-40 to+100	2.2	20	100	4	572	20	10	25	40	20	—	
	Orange		54	20	100*2	4	-40 to+85	-40 to+100	2.2	20	100	4	605	20	40	100	160	20	—	
	Yellow Green	SML-522MY8W	54	20	100*2	4	-40 to+85	-40 to+100	2.2	20	100	4	572	20	16	40	63	20	—	
	Yellow		54	20	100*2	4	-40 to+85	-40 to+100	2.2	20	100	4	590	20	40	63	160	20	—	
 PICOLED™-Duo 1.0×1.0 (t=0.2)	Yellow Green	SML-P24MUW (R)	54	20	100*2	5	-40 to+85	-40 to+100	2.2	20	10	5	572	20	10	21	40	20	—	
	Red		52	20	100*2	5	-40 to+85	-40 to+100	2.1	20	10	5	620	20	25	52	100	20		
 2 Color type 3.4×1.25 (t=1.1)	Yellow Green	SML-822MV8W	54	20	100*2	5	-40 to +85	-40 to +100	2.2	20	100	5	572	20	16	25	40	20	—	
	Red		54	20	100*2	5	-40 to +85	-40 to +100	2.2	20	100	5	630	20	16	30	63	20	—	
	Yellow Green	SML-825MVW	80	30	100*2	5	-40 to +85	-40 to +100	2.1	20	100	5	572	20	40	63	100	20	—	
	Red		80	30	100*2	5	-40 to +85	-40 to +100	2.0	20	100	5	630	20	40	63	100	20		

*1 Duty1/5, 200Hz *2 Duty1/10, 1kHz *3 Duty≤1/20, 1ms *4 Duty≤1/5, 1kHz *5 Duty1/10, pulse width 10ms Max

*6 Total power dissipation in case of lighting three colors. (when lighting three colors, it will be reduced down to 30% of it.)

*7 50mm×50mm, Substrate: FR4: t=1.6mm Cu foil: t=0.07mm

*8 Epoxy resin *9 Silicon resin *10 Peak wavelength

Note: PICOLED™ is a trademark or a registered trademark of ROHM Co., Ltd.

(): Reference

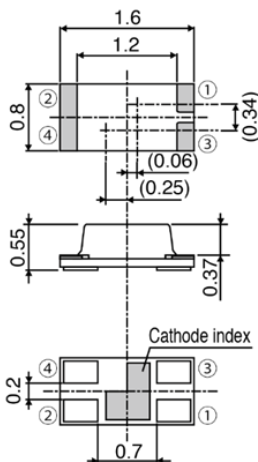
Luminous RANK

Package Structure	Package Size (mm)	Height (mm)	I _F (mA)	Luminous Intensity (mcd) Emitting Color	2.5 to 4.0	4.0 to 6.3	6.3 to 10	10 to 16	16 to 25	25 to 40	40 to 63	63 to 100	100 to 160
Mold	1608	0.55	5	Yellow Green				SML-D22MUW					
				Red									
				Yellow					SML-D22YVW				
				Red									
	1315	0.6	5	Blue				SML522BUNW					
				Red									
			20	Yellow Green					SML-522MUW				
				Red						SML-522MU8W			
				Yellow Green					SML-522MD8W				
				Orange									
				Yellow Green					SML-522MY8W				
				Yellow									
	1010	0.2	20	Yellow Green					SML-P24MUW (R)				
				Red									
Reverse Mount	34125	1.1	20	Yellow Green					SML-822MV8W				
				Red									
				Yellow Green							SML-825MVW		
				Red									

Outline Drawing and Recommended Pattern

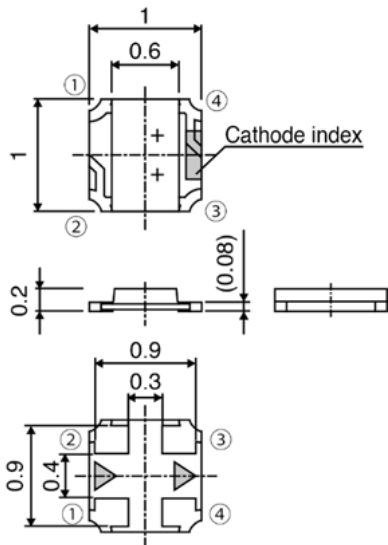
【Outline Drawing】

■ SML-D2 series



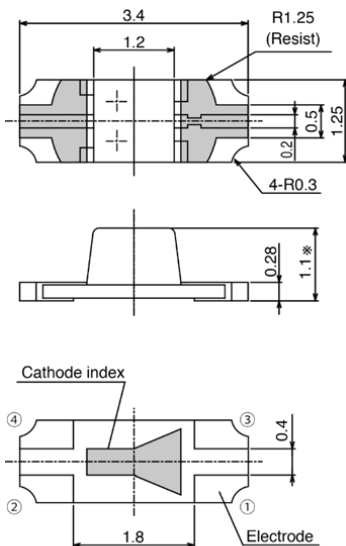
RED
② —|— ①
④ —|— ③
YELLOW GREEN,
YELLOW

■ SML-P24 series



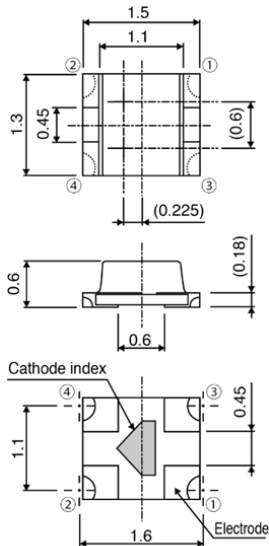
YELLOW GREEN
① —|— ④
② —|— ③
RED

■ SML-82 series



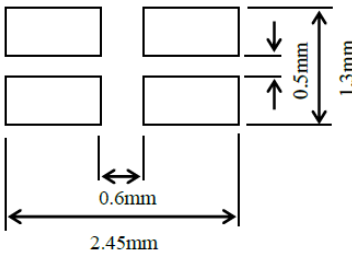
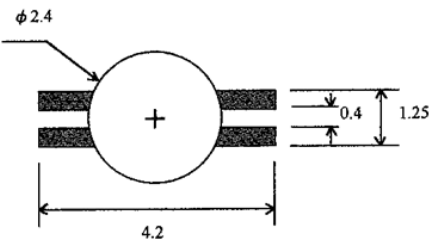
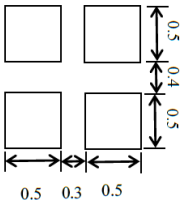
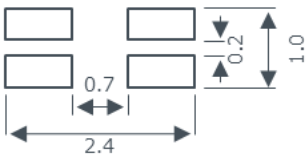
RED
② —|— ①
④ —|— ③
YELLOW GREEN

■ SML-52 series



RED, ORANGE,
YELLOW
② —|— ①
④ —|— ③
YELLOW GREEN, BLUE

【Recommended Pattern】



[Unit:mm]

Package Lineup

Top view
★ AEC-Q102
★ : Reverse mount available
1608size

SML-E1/EN series 1.6×0.8×0.36t V U D Y M P E B WB	SML-D1 series 1.6×0.8×0.55t V U D Y3 Y W M F P E E2 E3 B WB	CSL19 series 1.6×0.8×0.55t V U D Y M	CSL09 series 1.6×0.8×1.24t V U D Y W M P E B	CSL11 series 1.6×0.8×0.55t WB
SML-P1/P14 series PICOLED 1.0×0.6×0.2t V U U2 D Y3 Y W Y2 M2 M F P E B WB IR	SML-H1 series 2.0×1.25×0.8t V U D Y M P TB	SML-M1/MN series 2.0×1.25×0.8t V U D Y M P E B WB IR	SML-Z1/ZN series PLCC 3.5×2.8×1.9t V U D Y M F P E B WB	CSL10 series 1.6×0.8×1.06t E B

High Power(White)

SMLK1 * series 4.5×2.0×0.6t WB	SML-S1 series 3.2×1.6×1.85t V U D Y M P E B IR	SML-81 series 3.4×1.25×1.1t V U D W M B WB TB	CSL07 series 2.9×2.4×3.1t U D
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Side view

CSL04 series 2.8×1.2×0.8t WB	SML-A1 series 1.6×1.15×0.55t V U D Y W M P E B WB
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Multi color

SML-P24 series PICOLED-Duo 1.0×1.0×0.2t M U	SML-D22 series 1.6×0.8×0.55t M U V Y	SML-52 series 1.3×1.5×0.6t B U M U M D M Y
SML-82 series 3.4×1.25×1.1t M V	SMLP34RGB PICO-RGB 1.0×1.0×0.2t RGB	SMLP36RGB PICO-RGB 1.5×1.0×0.2t RGB
MSL0402RGB 1.8×1.6×0.5tz RGB	SMLVN6RGB 3.5×2.8×0.6t RGB	
MSL0601RGB 2.9×1.35×1.0t RGB	MSL0104RGB 6.9×2.2×2.15t RGB	

Lamp
unit (mm)


SLI/SLR-343 series 3φ V U D Y M P E B WB
SLI/SLA-560 series 5φ U D Y M E B WB
SLI/SLA-580 series 5φ U D Y M E B
SLR-56 series 5φ V D Y M E B
SLI-430 series 4φ U D Y M
SLR/SLI-325 series 3.2φ V U D Y M
SLR-322 series 3φ V D Y M


①ROHM HP(LED)

Go to HP for data related !
Can be obtained with individual product data

Tools

MODELS


 SMLD12EN1W SPICE Model

 SMLD12EN1W Ray Data

2D/3D/CAD

 SMLD12EN1W 3D STEP Data

 Parasolid X_T File

 3D eDrawings Data


CHARACTERISTICS DATA

 Electrical Static Discharge (ESD)


Packaging & Quality


MANUFACTURING DATA

 Reliability Test Result

 Factory Information

ENVIRONMENTAL DATA

 About Flammability of Materials

 Compliance of the ELV directive

 MSDS

 Compliance of the RoHS / ELV directive

EXPORT INFORMATION

 About Export Regulations

ROHM YouTube

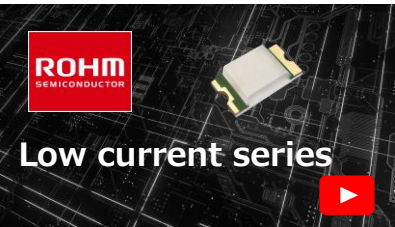
~LED Product Videos~


























We will continue to distribute product videos

Please check our website and YouTube, which are updated as needed.

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- 3) Although ROHM is continuously working to improve product reliability and quality, semiconductors can break down and malfunction due to various factors. Therefore, in order to prevent personal injury or fire arising from failure, please take safety measures such as complying with the derating characteristics, implementing redundant and fire prevention designs, and utilizing backups and fail-safe procedures.
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- 4) Examples of application circuits, circuit constants and any other information contained herein are provided only to illustrate the standard usage and operations of the Products
The peripheral conditions must be taken into account when designing circuits for mass production.
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- 7) For use of our Products in applications requiring a high degree of reliability (as exemplified below), please contact and consult with a ROHM representative :
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Electronics for the Future