



Electronics for the Future

PICOLED™

2024
Module Business Unit
LED Division
Rev.004

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

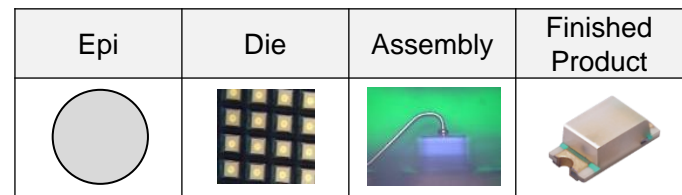
No. 65AN026E Rev.004
Oct.2024

Features of ROHM LEDs



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

Integrated production



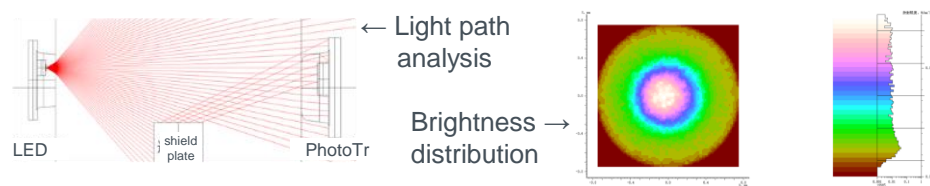
- Quality Management
- Production Control
- Development System

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

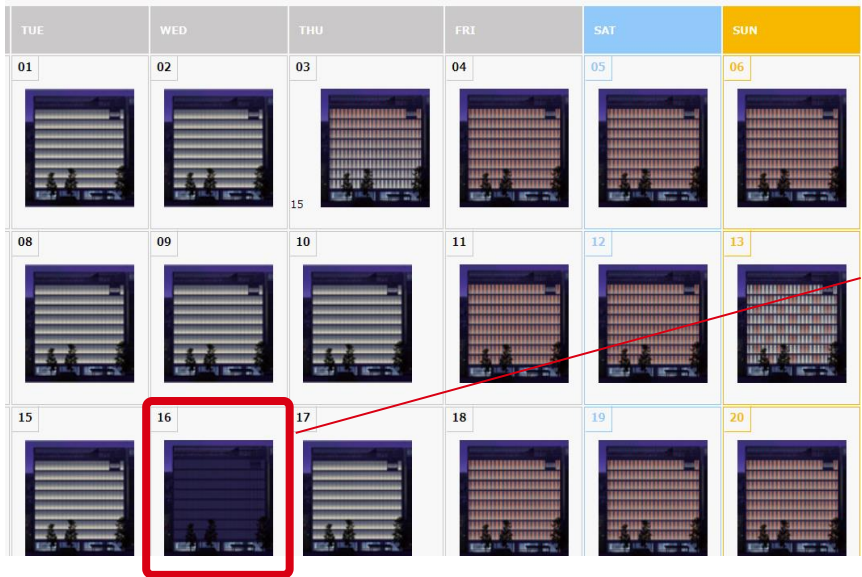


“Kyo-no-Hikari-Koyomi”

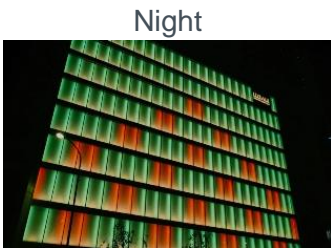
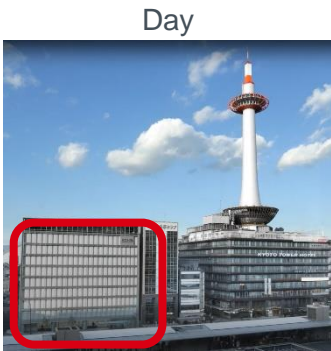
ROHM has been lighting up the Kyoto Station building since 2010. Created using original LED technology in collaboration with Mikiko Ishii’s design, ‘Kyo no Hikari Koyomi’ expresses Kyoto’s delicate seasonal atmosphere and traditional events through light.

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〉

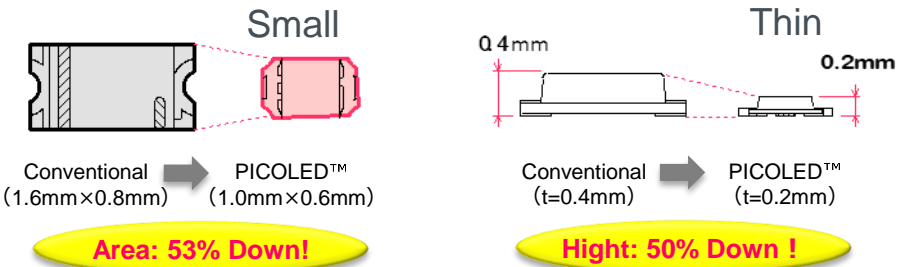


Delicate Japanese sensibility is expressed by subtly adjusting the color temperature according to the season.



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 the miniaturization and low height of customer products



PICOLED™ Commitment: Product Height

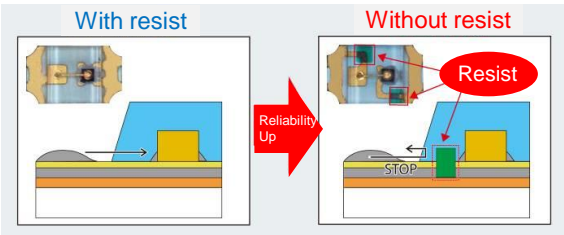
* ROHM research

	0402 Package Thickness				
	0.2mm	0.3mm	0.35mm	0.45mm	0.5mm
ROHM	20 models				
Company A	5	3		12	
Company B	9				16
Company C	4	1	12		

Other companies have more models with product heights of 0.35 to 0.5 mm.

- All 20 models in the PICOLED™ lineup have a unified product height of 0.2mm.
- Since its debut in 2007 as the world's smallest package at that time, ROHM has boasted an overwhelming number of achievements.

PICOLED™ Commitment: Quality and Control

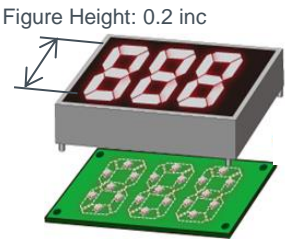


Measures are taken to prevent solder penetration during reflow. Excellent reflow reliability despite its ultra-compact size.

Traceability by dot marking has been introduced even for ultra-compact products. We take responsibility for the products we ship.



It also contributes to the miniaturization of segment and dot displays.



The PICOLED™ can display segments up to 0.2 inch high, whereas the 1608LED can display segments up to 0.3inch high.

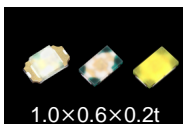


High-density mounting possible (1.5mm pitch)

Two series lineups



- Wide range of 15 colors: PICOLED™ details p.4
- Low Current 1mA Characteristic Guaranteed: PICOLED™-eco p.5


















PICOLED™ Series



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Lineup of 15 colors

Part No.	Color	IF(mA)	Dominant Wavelength(nm)	Brightness (mcd)	VF(V)
 SML-P12VT(R)	Red	20	630	60	2.0
 SML-P12UT(R)			620	85	
 SML-P12U2T(R)			615	70	
 SML-P12DT(R)	Orange		605	100	2.1
 SML-P12Y3T(R)			596	90	
 SML-P12YT(R)	Yellow		590	100	
 SML-P12WT(R)			585	70	
 SML-P12Y2T(R)	Yellow-Green		580	50	
 SML-P12M2T(R)			576	25	
 SML-P12MT(R)			572		
 SML-P13FT(R)	Green		566	18	2.1
 SML-P13PT(R)			560	10	
 SMLP14ECNW			Blue	5	527
 SMLP14BCNW	470	25			2.9
 SMLP14WBCN1W	White	(0.30,0.30) Chromaticity Coordinates (x, y)	180		



SML-P1 Series

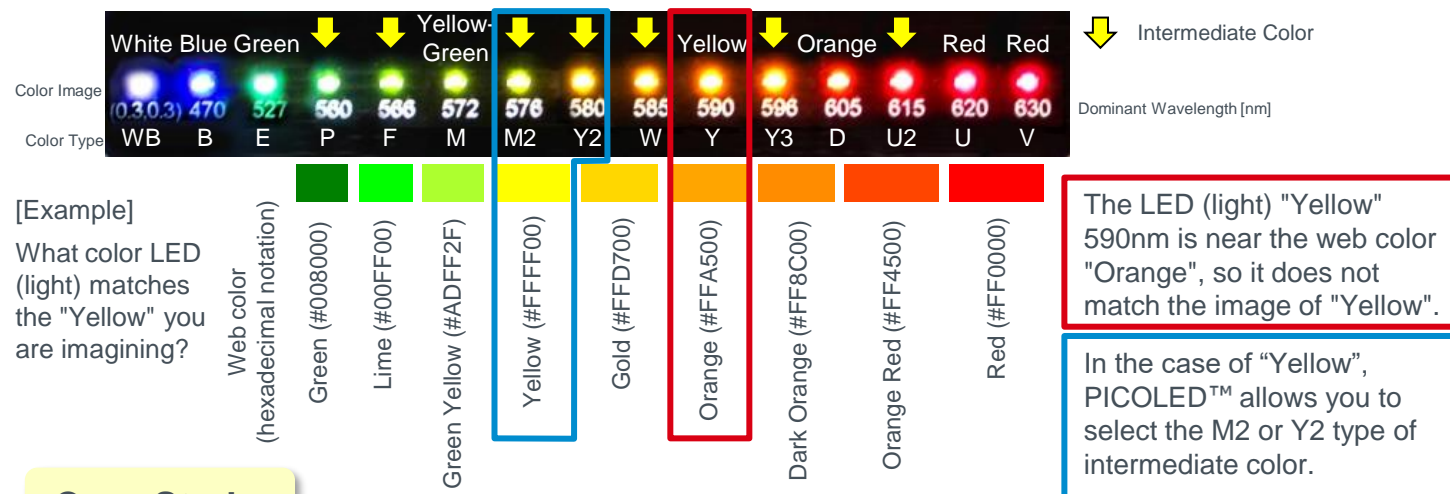


SMLP14 Series

Available in two mold types to match the internal elements.
Both are 1.0 mm x 0.6 mm in size, and the product height is ROHM's signature 0.2 mm.

You can choose the color of the LED that best suits your design

PICOLED™ is available in 8 colors as well as 7 intermediate colors. You can find the light that fits your image.

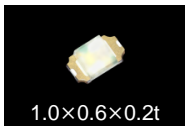


Case Study

Consumer electronics such as Wearable Devices, Mobile Devices, Home Appliances



PICORED™ has been adopted by many products as a indicator for design-oriented wearable devices and home appliances.



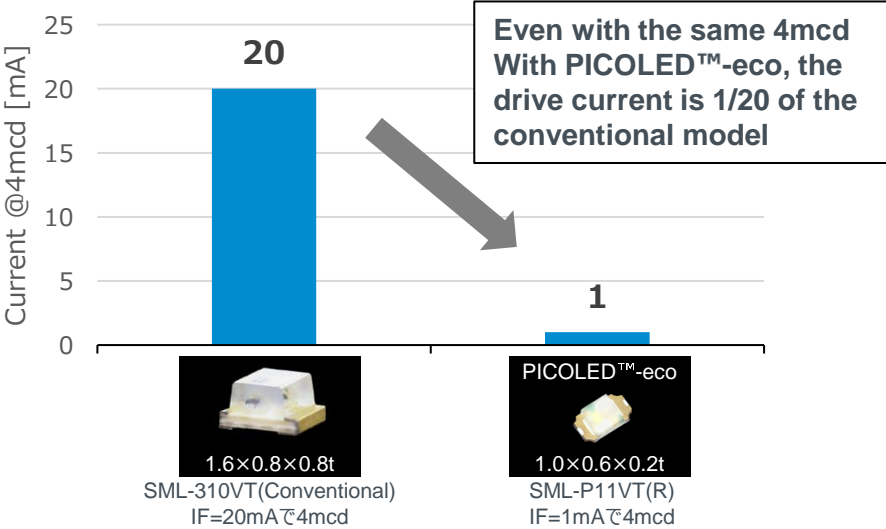
PICOLED™-eco Series

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Low current 1mA characteristic guaranteed

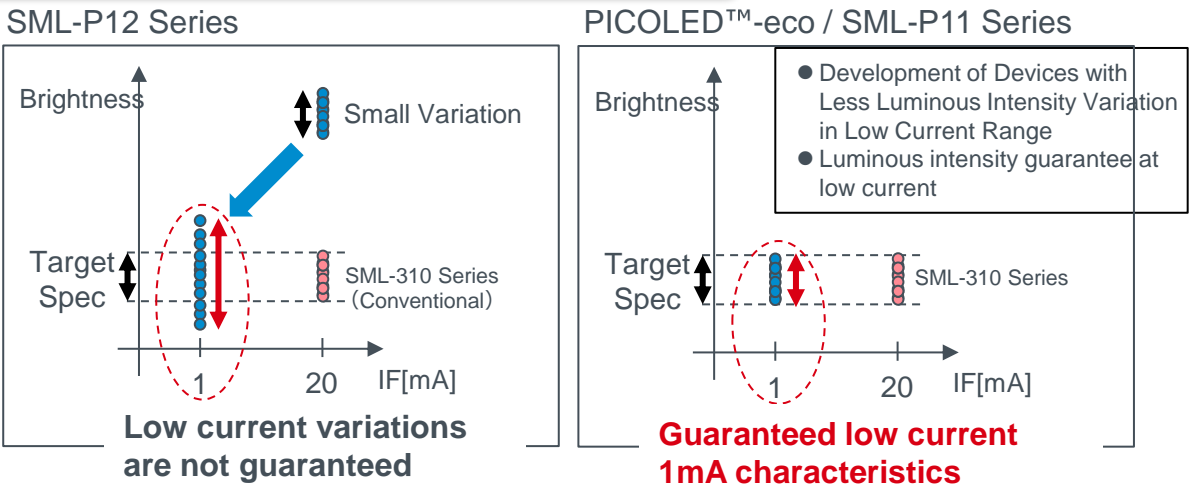
Part No.	Color	IF(mA)	Wavelength (nm)	Brightness (mcd)	VF(V)
■ SML-P11VT(R)	Red	1	626	4	1.8
■ SML-P11UT(R)			621	3	
■ SML-P11DT(R)	Orange		605	7	1.9
■ SML-P11YT(R)	Yellow		586	8	
■ SML-P11MT(R)	Yellow-Green		569	2	

Technological Innovation in Light Emitting Devices



Thanks to the technological innovation of the light-emitting element, the luminous intensity has been greatly improved compared to conventional models. There are still many situations where the brightness of conventional models is sufficient.

If the drive current is about 1-5mA, we will recommend to use PICOLED™-eco.



Case Study

Industrial · Consumer

Temperature Regulator

PLC

Control Panel of Gas Cooker



Figure Height 0.2 inch

[Request]
1mA, same luminous intensity as conventional model (20mA)

The PICOLED™ can display segments up to 0.2 inch high, whereas the 1608LED can display segments up to 0.3inch high.

Lineup of PICOLED™ Series

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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 T _{opr} (°C)	Storage Temperature T _{stg} (°C)	Forward Voltage V _F		Reverse Current I _R		Dominant Wavelength λ _D / Chromaticity Coordinates (x, y)		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)		
 PICOLED™ 1.0×0.6 (t=0.2)	Red	SML-P12VT (R)	50	20	100*2	5	-40 to +85	-40 to +100	2.0	20	10	5	630	20	25	60	100	20	—	
		SML-P12UT (R)											620		40	85	160		—	
		SML-P12U2T (R)											615		25	70	160		—	
	Orange	SML-P12DT (R)	52	20	100*2	5	-40 to +85	-40 to +100	2.1	20	10	5	605	20	63	100	250	20	—	
	Yellow	SML-P12Y3T (R)	52	20	100*2	5	-40 to +85	-40 to +100	2.1	20	10	5	596	20	40	90	250	20	—	
		SML-P12YT (R)											590			100	160		—	
		SML-P12WT (R)											585			25	70		160	—
		SML-P12Y2T (R)											580			16	50		100	160
	Yellow Green	SML-P12M2T (R)	54	20	100*2	5	-40 to +85	-40 to +100	2.2	20	10	5	576	20	10	25	63	20	—	
		SML-P12MT (R)											572						—	
	Green	SML-P13FT (R)	52	20	100*2	5	-40 to +85	-40 to +100	2.1	20	10	5	566	20	6	18	40	20	—	
		SML-P13PT (R)											560		4	10	16		—	
		SMLP14ECNW	34	10	50*2				3.0	5	100		527	5	56	110	220	5	—	
Blue	SMLP14BCNW	33	10	50*2	5	-40 to +85	-40 to +100	2.9	5	100	5	470	5	9	25	56	5	—		
White	SMLP14WBCN1W	33	10	50*2	5	-40 to +85	-40 to +100	2.9	5	100	5	(x, y) (0.30, 0.30)	5	90	180	360	5	—		
 PICOLED™-eco 1.0×0.6 (t=0.2)	Red	SML-P11VT (R)	50	20	100*2	5	-40 to +85	-40 to +100	1.8	1	10	5	626	1	2	4	6	1	—	
		SML-P11UT (R)											621		1	3			—	
	Orange	SML-P11DT (R)	52	20	100*2	5	-40 to +85	-40 to +100	1.9	1	10	5	605	1	4	7	16	1	—	
	Yellow	SML-P11YT (R)	52	20	100*2	5	-40 to +85	-40 to +100	1.9	1	10	5	586	1	4	8	16	1	—	
	Yellow Green	SML-P11MT (R)	54	20	100*2	5	-40 to +85	-40 to +100	1.9	1	10	5	569	1	1	2	4	1	—	

*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

(): Reference

*Brightness for white color is noted with chromaticity coordinate (x, y).

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PICOLED™ Series

Package Structure	Package Size (mm)	Height (mm)	Luminous Intensity (mcd) I _F (mA)	1.0 to 1.6	1.6 to 2.5	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	160 to 250	250 to 400	400 to 630	630 to 1000	1000 to 1600
Mold	1006	0.2	20								SML-P12VT (R)								
											SML-P12UT (R)								
											SML-P12U2T (R)								
											SML-P12DT (R)								
											SML-P12Y3T (R)								
											SML-P12YT (R)								
											SML-P12WT (R)								
											SML-P12Y2T (R)								
											SML-P12M2T (R)								
											SML-P12MT (R)								
	1608										SML-P13FT (R)								
											SML-P13PT (R)								

Package Structure	Package Size (mm)	Height (mm)	Luminous Intensity (mcd) I _F (mA)	0.9 to 1.4	1.4 to 2.2	2.2 to 3.6	3.6 to 5.6	5.6 to 9.0	9 to 14	14 to 22	22 to 36	36 to 56	56 to 90	90 to 140	140 to 220	220 to 360	360 to 560	560 to 900	900 to 1400
Mold	1006	0.2	5										SMLP14ECNW						
										SMLP14BCNW									
													SMLP14WBCN1W						

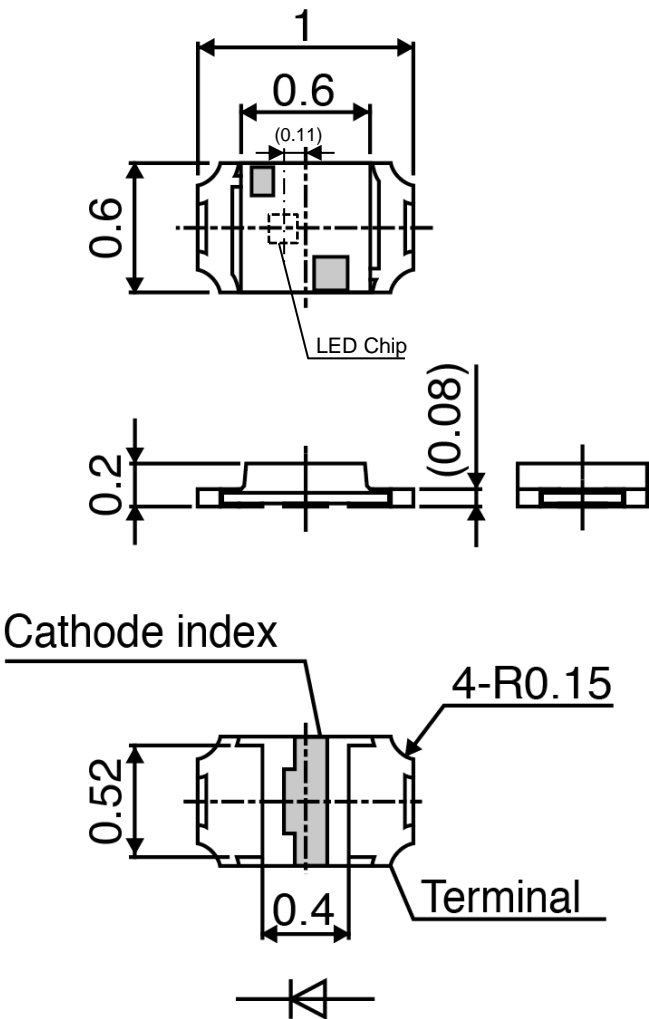
PICOLED™-eco Series

Package Structure	Package Size (mm)	Height (mm)	Luminous Intensity (mcd) I _F (mA)	1.0 to 1.6	1.6 to 2.5	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	160 to 250	250 to 400	400 to 630	630 to 1000	1000 to 1600
Mold	1006	0.2	1		SML-P11VT (R)														
					SML-P11UT (R)														
							SML-P11DT (R)												
							SML-P11YT (R)												
					SML-P11MT (R)														

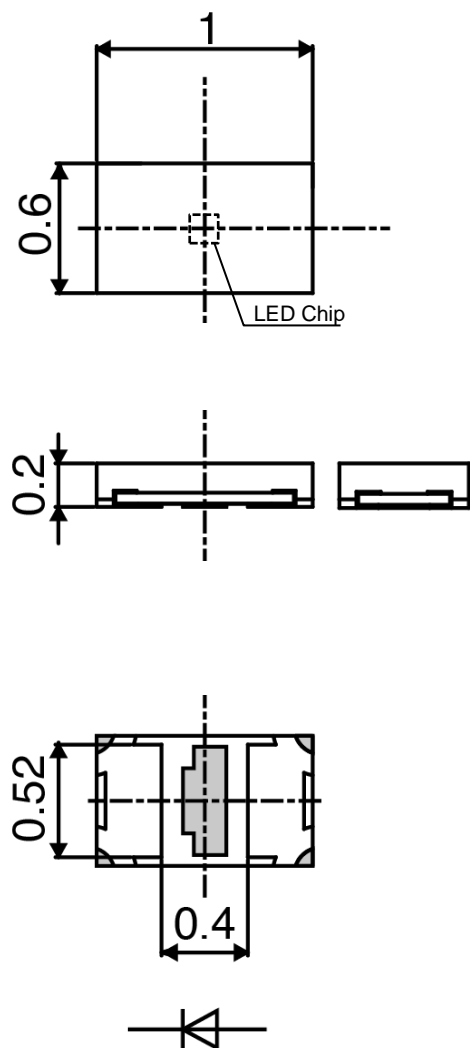
Outline drawing and Recommended pattern

【Outline Drowing】

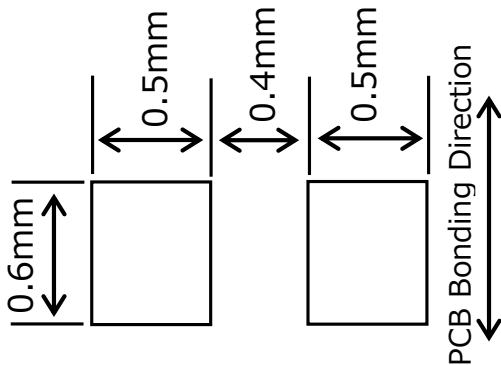
■ SML-P1 series



■ SMLP14 series



【Recommended pattern】



Reference

Mask open area ratio : 80%
Mask thickness : 80~100μm

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

① ROHM HP(LED) click

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 click

~LED Product Videos~



 click



 click



 click



 click



 click



 click

We will continue to distribute product videos

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

- 1) The information contained herein is subject to change without notice.
- 2) Before you use our Products, please contact our sales representative and verify the latest specifications :
- 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.
ROHM shall have no responsibility for any damages arising out of the use of our Products beyond the rating specified by ROHM.
- 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.
- 5) The technical information specified herein is intended only to show the typical functions of and examples of application circuits for the Products.
ROHM does not grant you, explicitly or implicitly, any license to use or exercise intellectual property or other rights held by ROHM or any other parties.
ROHM shall have no responsibility whatsoever for any dispute arising out of the use of such technical information.
- 6) The Products specified in this document are not designed to be radiation tolerant.
- 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 :
transportation equipment (i.e. cars, ships, trains), primary communication equipment, traffic lights, fire/crime prevention, safety equipment, medical systems, servers, solar cells, and power transmission systems.
- 8) Do not use our Products in applications requiring extremely high reliability, such as aerospace equipment, nuclear power control systems, and submarine repeaters.
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- 10) ROHM has used reasonable care to ensure the accuracy of the information contained in this document.
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Electronics for the Future