SML-522/SML522 Series

Data Sheet

■ Features

- 2-color type LED
- Abundant 2 color variations

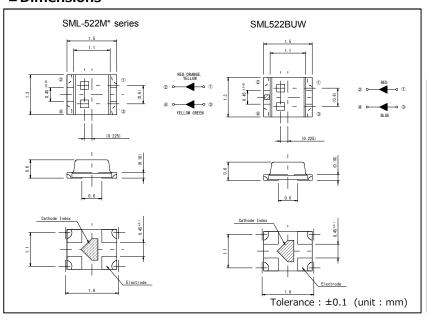
■ Size

1315 (0605) 1.3 × 1.5mm (t=0.6mm)

Color Type B U M U

Outline

■ Dimensions



Recommended Solder Pattern One of the control of t

■ Specifications

			Absolute Maximum Ratings (Ta=25°C)					Electrical and Optical Characteristics (Ta=25°C)																			
Part No.	Chip Structure	Emitting	Power	Forward	Peak Forward	Reverse		Storage Temp.	Forward \	Voltage V _F	Reverse (Current I _R	Domir	nant Wa	aveleng	th λ_D	Lumino	ous Inte	nsity I _V								
r dictio.			Dissipation	Current	Current	Voltage		212.233 Tomp.	Тур.	I _F	Max.	V_R	Min.*3	Тур.	Max.*3	I _F	Min.	Тур.	I _F								
			P _D (mW)	I _F (mA)	I _{FP} (mA)	$V_{R}(V)$	T _{opr} (°C)	T _{stg} (°C)	(V)	(mA)	(μΑ)	(V)	(nm)	(nm)	(nm)	(mA)	(mcd)	(mcd)	(mA)								
SML522BU1W	InGaN	Blue	66		60* ²	5	4005		2.9	5	10	5	465	470	476	5	9	22	5								
SIVILSZZBOTW	AlGalnP	Red	50					-40~+85 -40~+100	1.9	5	10	5	617	624	629	5	10	21									
SML-522MU8W	AlCalaB	Yellowish Green											569	572	575		16	40									
SIVIL-322IVIOOVV	AlGallir	Red		20									617	620	623		25	63									
SMI ESSMEN	AIC ala D	AIC alaD	AIC alaD	AlCalaD	AlCalaD	AlCalaD	AlCalaD	Yellowish Green			54	20	400*2	4	-40° ° +65	-40 ⁷ = 100		20	400	4	569	572	575	20	10	25	20
SML-522MD8W AlGa	AlGaille	Orange	34		100*2	4			2.2	20	100	4	602	605	608	20	40	100									
SML-522MY8W AlGal	AlCalaB	Yellowish Green											569	572	575		16	40									
GIVIL-322IVIT 6VV	Yellow										ĺ	587	590	593		40	63										

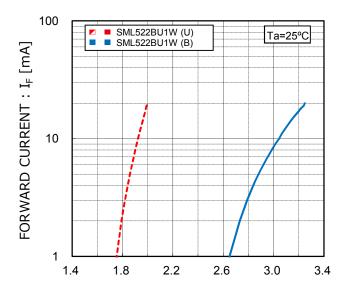
	Absolute Maximum Ratings (Ta=25°C)					Electrical and Optical Characteristics (Ta=25°C)													
5.41		Emitting	Power	Forward	Peak Forward				Forward 1	Voltage V _F	Reverse	Current I _R	Pea	ak Wav	elength	λр	Lumino	ous Inte	nsity I _V
Part No.	Chip Structure	Color	Dissipation	Current	Current			Storage Temp.	Тур.	I _F	Max.	V_R	Min.*3	Тур.	Max.*3	I _F	Min.	Тур.	IF
			P _D (mW)	I _F (mA)	I _{FP} (mA)	V _R (V)	T _{opr} (°C)	T _{stg} (°C)	(V)	(mA)	(μΑ)	(V)	(nm)	(nm)	(nm)	(mA)	(mcd)	(mcd)	(mA)
CAN FOOMUNA	SML-522MUW AlGaInP	Yellowish Green	52	20	00*1	4	20 - 105	40 - 105	2.1	20	100	4	-	570	-	20	14	40	20
SML-522MUW		Red	50	20	60*1	4	-30~+85	-40~+85	1.9	20	100	4	-	630	-	20	22	63	20

*1 : Duty 1/5, 200Hz *2 : 1/10,1kHz *3 :Measurement tolerance±1nm

■ Electrical Characteristics Curves

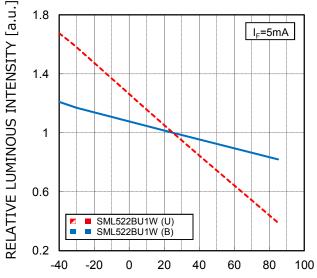
Reference

Fig.1 Forward Current
- Forward Voltages



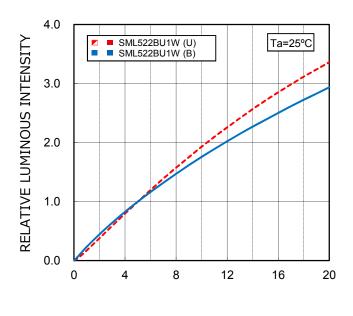
FORWARD VOLTAGE: V_F [V]

Fig.2 Luminous Intensity -Atmosphere Temperature



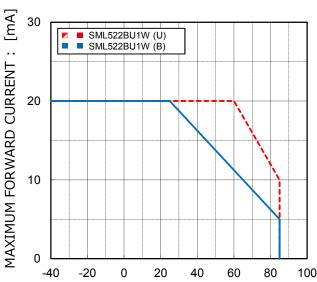
ATMOSPHERE TEMPERATURE: Ta [°C]

Fig.3 Luminous Intensity - Forward Current



FORWARD CURRENT : I_F [mA]

Fig.4 Derating



AMBIENT TEMPERATURE: Ta [°C]

■ Electrical Characteristics Curves

Reference

Fig.1 Forward Current
- Forward Voltages

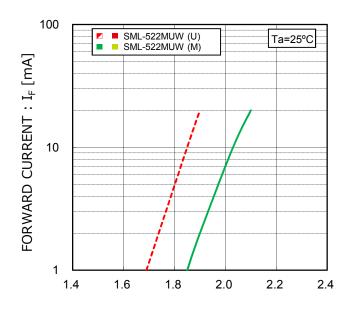
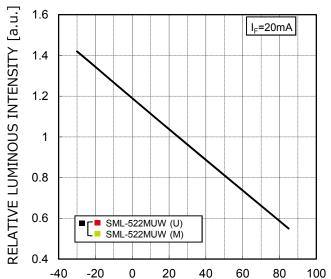


Fig.2 Luminous Intensity - Atmosphere Temperature



FORWARD VOLTAGE: V_F [V]

ATMOSPHERE TEMPERATURE: Ta [°C]

Fig.3 Luminous Intensity - Forward Current

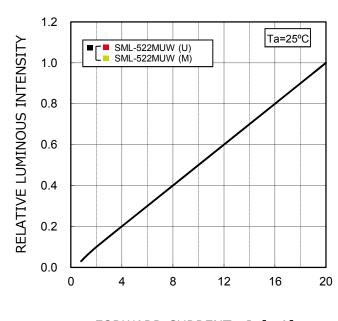
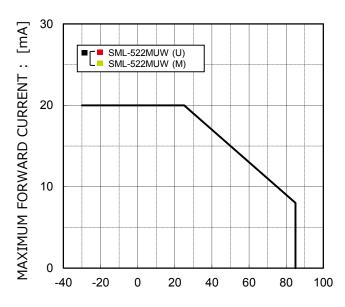


Fig.4 Derating



FORWARD CURRENT : I_F [mA]

AMBIENT TEMPERATURE : Ta [°C]

■ Electrical Characteristics Curves

Reference

Fig.1 Forward Current
- Forward Voltages

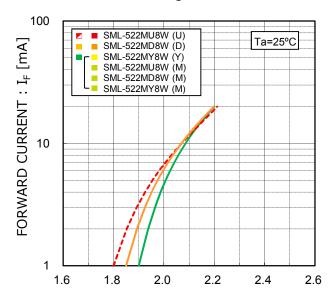
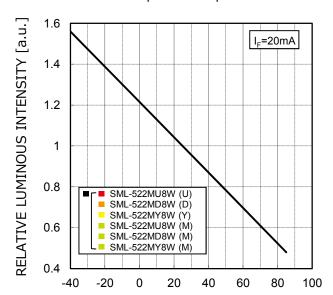


Fig.2 Luminous Intensity - Atmosphere Temperature



FORWARD VOLTAGE: V_F [V]

ATMOSPHERE TEMPERATURE: Ta [°C]

Fig.3 Luminous Intensity - Forward Current

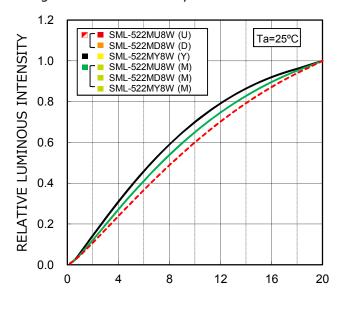
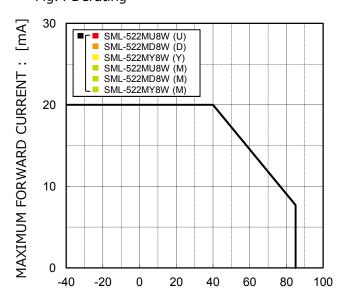


Fig.4 Derating

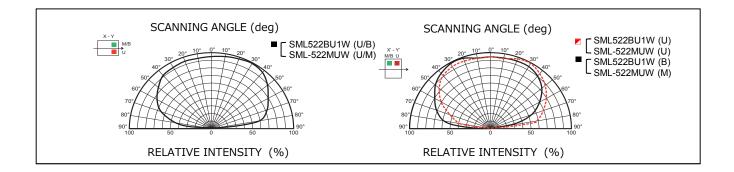


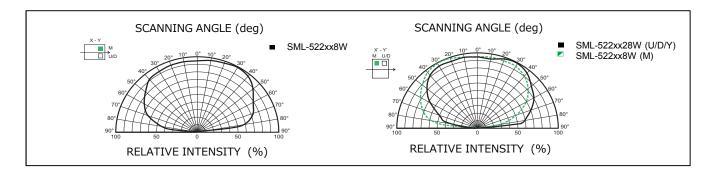
FORWARD CURRENT : I_F [mA]

AMBIENT TEMPERATURE : Ta [°C]

■ Viewing Angle

Reference





[SML-522/SML522 series] [Data Sheet]

■ Rank Reference of Brightness*

*Measurement tolerance: ±10%

(Ta=25°C, I_F=20mA)

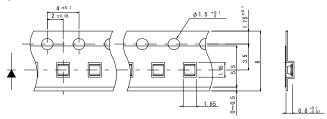
										•	- / 1
Part No.	Rank	K	L	M	N	Р	Q	R	S	T	U
Fait No.	lv (mcd)	4.0~6.3	6.3~10	10~16	16~25	25~40	40~63	63~100	100~160	160~250	250~400
SML-522MUW	Red						U				
SIVIL-322IVIUVV	Yellowish Green					M					
SML-522MU8W	Red						U				
SIVIL-322IVIUOVV	Yellowish Green					M					
SML-522MD8W	Orange							D			
SIVIL-322IVID6VV	Yellowish Green				М						
SML-522MY8W	Yellow							Y	•		
SIVIL-32ZIVI TOVV	Yellowish Green					M					

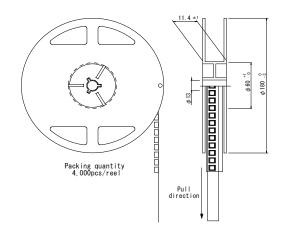
(Ta=25°C, I_F=5mA)

Part No.	Rank	K	L	M	N	Р	Q	R	S	Т	U
Fait No.	lv (mcd)	3.6~5.6	5.6~9	9~14	14~22	22~36	36~56	56~90	90~140	140~220	220~360
SML522BU1W	Red U										
SIVILSZZBOTVV	Blue				В						

[SML-522/SML522 series] [Data Sheet]

■ Taping(T86)

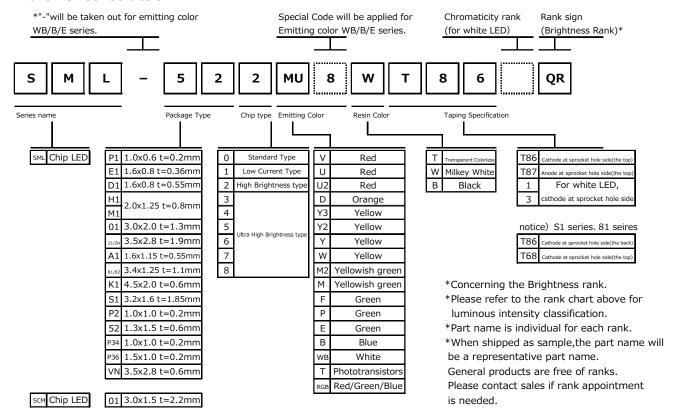




Unit:mm

Note)Tolerance is within ±0.2mm unless otherwise specified.

■ Part No. Construction



■ Packing Specification

ROHM LED products are being shipped with desiccant (silica gel) included in moisture-proof bags. Pasting the moisture sensitive label on the outer surface of the moisture-proof bags or enclosing the humidity indication card inside the bag is available upon request.

Please contact the nearest sales office or distributer if necessary.

■ Precaution (Surface Mount Device)

1. Storage

If the product is heated during the reflow under the condition of hygroscopic state, it may vaporize and expand which will influence the performance of the product. Therefore, the package is waterproof. Please use the product following the conditions:

Using Conditions

Classification	Temperature	Humidity	Expiration Date	Remark
①Before using	5~30℃	30~70%RH	Within 1 year from Receiving	Storage with waterproof package
②After opening package	5~30℃	Below 70%RH	Within 168h	Please storing in the airtight container with our desiccant (silica gel)

Baking

Bake the product in case of below:

- (1) The expiration date is passed.
- ②The color of indicator (silica gel) turned from blue to colorless or from green to pink. (Even if the product is within the expiration date.)

·Baking Conditions

Tempera	Temperature Time		Humidity
60±3℃ 1		12~24h	Below 20%RH
Remark	•Reel and so please	ducts in reel. embossed tape try not to apply end bake once.	are easy to be deformed when baking, stress on it.

2. Application Methods

2 – 1. Precaution for Drive System and Off Mode

Design the circuit without the electric load exceeding the ABSOLUTE MAXIMUM RATING that applies on the products. If drive by constant voltage, it may cause current deviation of the LED and result in deviation of luminous intensity, so we recommend to drive by constant current. (Deviation of VF Value will cause deviation of current in LED.) Furthermore, for off mode, please do not apply voltage neither forward nor reverse. Especially, for the products with the Aq-paste used in the die bonding, there's high possibility to cause electro migration and result in function failure.

2 - 2. Derating

The Derating Characteristics are based on the lifetime of luminous intensity and assumption of degradation & color change of sealing resin or reflector. About its reliability, please evaluate its using conditions and environment and use it after confirmed there is no problem.

2 – 3. Operation Life Span

There's possibility for intensity of light drop according to working conditions and environments (applied current, surrounding temperature and humidity, corrosive gases), please call our Sales staffs for inquiries about the concerned application below.

- 1) Longtime intensity of light life
- 20n mode all the time

2 – 4. Applied Stress on Product

No resin hardening agent such as filler is used in the sealing resin of the product.

Therefore, please pay attention to the overstress on it which may influence its reliability.

2-5. Usage The Product is LED. We are not responsible for the usage as the diode such as Protection Chip, Rectifier, Switching and so on.

[SML-522/SML522 series] [Data Sheet]

3. Others

3 – 1. Surrounding Gas

Notice that if it is stored under the condition of acid gas (chlorine gas, sulfured gas) or alkali gas (ammonia), it may result in low soldering ability (caused by the change in quality of the plating surface) or optical characteristics changes (light intensity, chrominance) and change in quality of cause die bonding (Ag-paste) materials. All of the above will function failure of the products.

Therefore, please pay attention to the storage environment for mounted product (concern the generated gas of the surrounding parts of the products and the atmospheric environment).

3 – 2. Electrostatic Damage

The product is part of semiconductor and electrostatic sensitive, there's high possibility to be damaged by the electrostatic discharge. Please take appropriate measures to avoid the static electricity from human body and earthing of production equipment. Especially, InGaN type LEDs have lower resistance value of electrostatic discharge and it is recommended to introduce the ESD protection circuit. The resistance values of electrostatic discharge (actual values) vary with products, therefore, please call our Sales staffs for inquiries.

3 – 3. Electromagnetic Wave

Applications with strong electromagnetic wave such as, IH cooker, will influence the reliability of LED, therefore please evaluate before using it.

4. Mounting

4 - 1. Soldering

- •No resin hardening agent such as filler is used in the sealing resin of the product. Therefore, resin expansion and moisture absorption at humidity will cause heat stress during soldering process and finally has bad influence on the product's reliability.
- •The product is not guaranteed for flow soldering.
- •Do not expose the product in the environment of high temperature (over 100° C) or rapid temperature shift (within 3° C/sec. of temperature gradient) during the flow soldering of surrounding parts. In case of carrying out flow soldering of surrounding parts without recommended conditions, please contact us for inquiries.
- •Please set appropriate reflow temperature based on our product usage conditions and specification.
- •The max for reflowing is 2 times, please finish the second reflow soldering and flow soldering with other parts within the usage limitation after open the moisture proof package.
- •Compare with N2 reflow, during air reflow, because of the heat and surrounding conditions, it may cause the discoloration of the resin.
- •For our product that has no solder resist, because of its solder amount and soldering conditions, one of its specific characteristics is that solder will penetrate into LED. Thus, there's high possibility that will influence its reliability. Therefore, please be informed, concerning it before using it.

4 - 2. Automatic Mounting

4-2-1. Silicon Resin Sealing Product

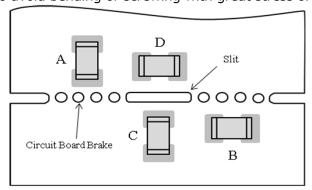
The sealing resin of LED is very soft, so please select adsorption nozzle that would not apply stress directly on the sealing section.

4-2-2. Mini Package (Smaller than 1608 size)

•Vibration may result in low mounting rate since it will cause the static electricity of product and adhere to top cover tape. Therefore, the magnet should be set on parts feeder cassette of the mounter to control the product stabilization. In addition, it is recommended to set ionizer to prevent electrostatic charge.

4 – 3. Mounting Location

The stress like bending stress of circuit board dividing after mounting, may cause LED package crack or damage of LED internal junction, therefore, please concern the mounting direction and position to avoid bending or screwing with great stress of the circuit board.



Stress strength according to he mounting position: A>B>C>D

4-4. Mechanical Stress after Mounting

The mechanical stress may damage the LED after Circuit Mounting, so please pay attention to the touch on product.

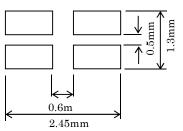
4 – 5. Soldering Pattern for Recommendation

We recommend the soldering pattern that shows on the right. It will be different according to mounting situation of circuit board, therefore, please concern before designing.

*The product has adopted the electrode structure that it should solder with back electrode of the product.

Thus, please be informed that the shape of electrode pin of solder fillet formation is not guaranteed.

The through hole on electrode surface is for conduction of front and rear electrodes but not for formation of solder fillet.

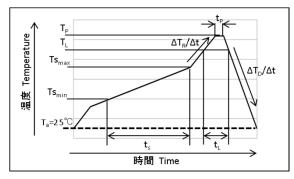


4 – 6. Reflow Profile

For reflow profile, please refer to the conditions below:(%)

■ Meaning of marks, Conditions

= Meaning of marks, conditions								
Mark	Meanings	Conditions						
Ts _{max}	Maximum of pre-heating temperature	180℃						
Ts _{min}	Minimum of pre-heating temperature	140℃						
t _s	Time from Tsmin to Tsmax	Over 60sec.						
T_L	Reference temperature	230~260℃						
t_{L}	Retention time for TL	Within 40sec.						
T _P	Peak temperature	260℃(Max)						
t _P	Time for peak temperature	Within 10sec.						
$\Delta T_R/\Delta t$	Temperature rising rate	Under 3℃/sec.						
$\Delta T_D/\Delta t$	Temperature decreasing rate	Over -3℃/sec.						



*Above conditions are for reference. Therefore, evaluate by customer's own circuit boards and reflow furnaces before using, because stress from circuit boards and temperature variations of reflow furnaces vary by customer's own conditions.

4 – 7. Attention Points in Soldering Operation

This product was developed as a surface mount LED especially suitable for reflow soldering. So reflow soldering is recommended. In case of implementing manual soldering, please take care of following points.

1SOLDER USED

Sn-Cu, Sn-Ag-Cu, Sn-Ag-Bi-Cu

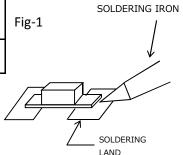
2HAND SOLDERING CONDITION

LED products do not contain reinforcement material such as a glass fillers.

So thermal stress by soldering greatly influence its reliability.

Please keep following points for manual soldering.

	ITEM	RECOMMENDED CONDITION			
a)	Heating method	Condition) Temp. of iron top less than 400°C within 3 sec. Heating on PCB pattern, not direct to the LED. (Fig-1)			
		Please handle after the part temp. goes down to room temp.			



4 – 8. Cleaning after Soldering

Please follow the conditions below if the cleaning is necessary after soldering.

Solvent	We recommend to use alcohols solvent such as, isopropyl alcohols
Temperature	Under 30℃ within 3 minutes
Ultrasonic Cleaning	15W/Below 1 liter (capacity of tank)
Drying	Under 100℃ within 3 minutes

Notes

- 1) The information contained herein is subject to change without notice.
- 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 Poducts 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 are intended for use in general electronic equipment (i.e. AV/OA devices, communication, consumer systems, gaming/entertainment sets) as well as the applications indicated in this document.
- 7) The Products specified in this document are not designed to be radiation tolerant.
- 8) 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.
- 9) Do not use our Products in applications requiring extremely high reliability, such as aerospace equipment, nuclear power control systems, and submarine repeaters.
- 10) ROHM shall have no responsibility for any damages or injury arising from non-compliance with the recommended usage conditions and specifications contained herein.
- 11) ROHM has used reasonable care to ensur the accuracy of the information contained in this document. However, ROHM does not warrants that such information is error-free, and ROHM shall have no responsibility for any damages arising from any inaccuracy or misprint of such information.
- 12) Please use the Products in accordance with any applicable environmental laws and regulations, such as the RoHS Directive. For more details, including RoHS compatibility, please contact a ROHM sales office. ROHM shall have no responsibility for any damages or losses resulting non-compliance with any applicable laws or regulations.
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ROHM Customer Support System

http://www.rohm.com/contact/



SML-522MUW - Web Page

Distribution Inventory

Part Number	SML-522MUW
Package	SML-52
Unit Quantity	4000
Minimum Package Quantity	4000
Packing Type	Taping
Constitution Materials List	inquiry
RoHS	Yes