SML-Z1 series

Datasheet

●Features

- High brightness
- 20/50mA guaranteed specifications
- PLCC2 package

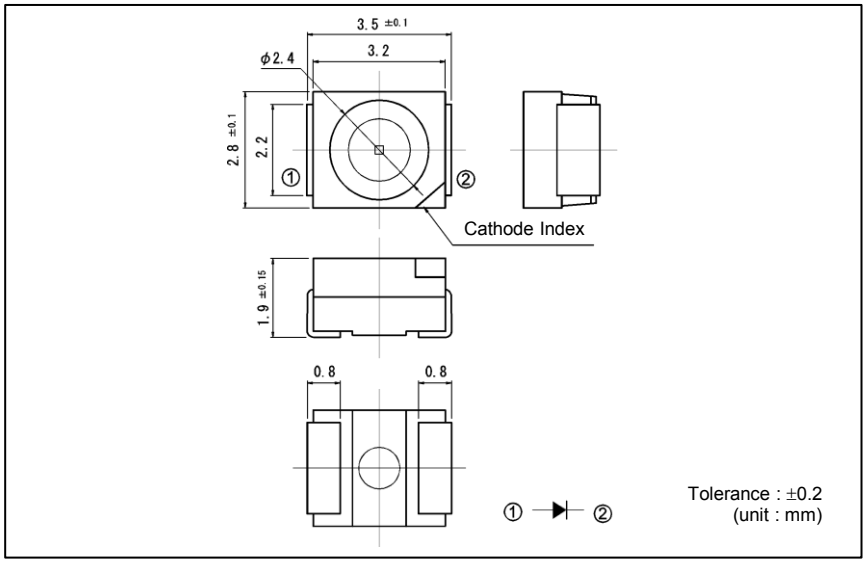
●Outline

●Size

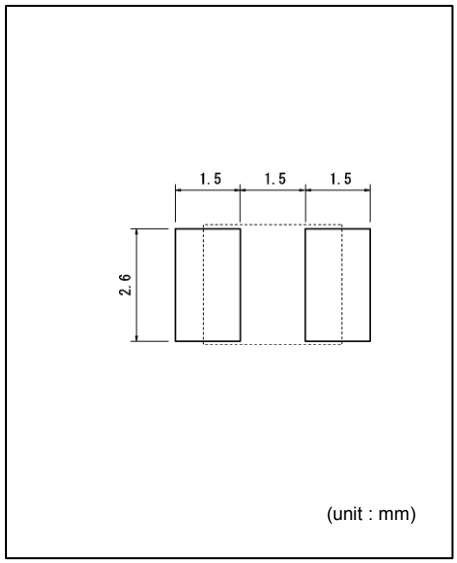
Actual size
3528 (1411)
3.5×2.8mm (t=1.9mm)

Color Type: V U D Y M / F P E B WB

●Dimensions



●Recommended Solder Pattern



●Specifications

Part No.	Chip Structure	Emitting Color	Absolute Maximum Ratings (Ta=25°C)						Electrical and Optical Characteristics (Ta=25°C)										
			Power Dissipation P_D(mW)	Forward Current I_F(mA)	Peak Forward Current I_{FP}(mA)	Reverse Voltage V_R(V)	Operating Temp. Topr(°C)	Storage Temp. Tstg(°C)	Forward Voltag V_F Typ. (V)	Forward Voltag V_F I_F (mA)	Reverse Current I_R Max. (μA)	Reverse Current I_R V_R (V)	Dominant Wavelength λD Min.*3 (nm)	Dominant Wavelength λD Typ. (nm)	Dominant Wavelength λD Max.*3 (nm)	Dominant Wavelength λD I_F (mA)	Luminous Intensity I_V Min. (mcd)	Luminous Intensity I_V Typ. (mcd)	Luminous Intensity I_V I_F (mA)
SML-Z14VT(A)	AlGaInP	Red	168	70	200*1	12	−40 to +100	−40 to +100	1.9	20	10	12	625	630	635	20	56	112	20
SML-Z14UT(A)													615	620	625		112	224	
SML-Z14DT(A)		Orange											602	605	608		140	280	
SML-Z14YT(A)		Yellow	175						2.0				586	589	592				
SML-Z14MT(A)		Yellowish Green											568	571	574		45	90	
SML-Z14FT(A)		Green											561.5	564	566.5		22.4	45	
SML-Z14PT(A)													557	560	563		11.2	22.4	
SML-Z14V4T		Red	189	70	200*1	12	−40 to +100	−40 to +100	2.0	50	100	12	625	630	635	50	140	280	50
SML-Z14U4T													615	620	625		280	560	
SML-Z14D4T		Orange											602	605	608		355	710	
SML-Z14Y4T		Yellow							2.1				587	590	593				
SML-Z14M4T		Yellowish Green											569	572	575		112	224	
SML-Z14F4T		Green											562	565	568		71	120	
SML-Z14P4T													558	561	564		22.4	56	
SMLZ14EGT(A)	InGaN	Bluish Green	120	30	100*2	5	−40 to +100	−40 to +100	3.3	20	10	5	519	528	536	20	710	1100	20
SMLZ14BGT(A)		Blue	114						3.2				464	470	476		140	280	
SMLZ14WBGCW(A)		White		30	100*2	5	−40 to +100	−40 to +100	3.3	20	100	5	(x, y) (0.30, 0.28)			20	1800	2200	20
SMLZ14WBGDW(A)													(x, y) (0.34, 0.34)				2200	3200	

*1:Duty1/10, 1kHz *2:Duty1/5, 200Hz *3:Reference

●Electrical Characteristics Curves

Fig.1 Forward Current - Forward Voltages

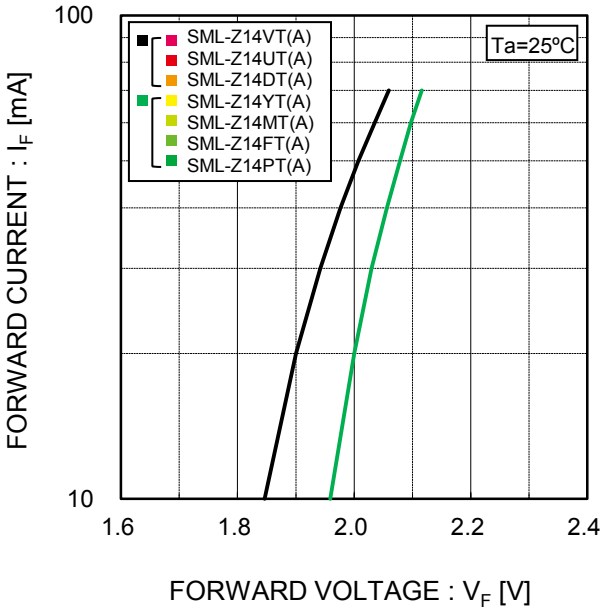


Fig.2 Luminous Intensity - Atmosphere Temperature

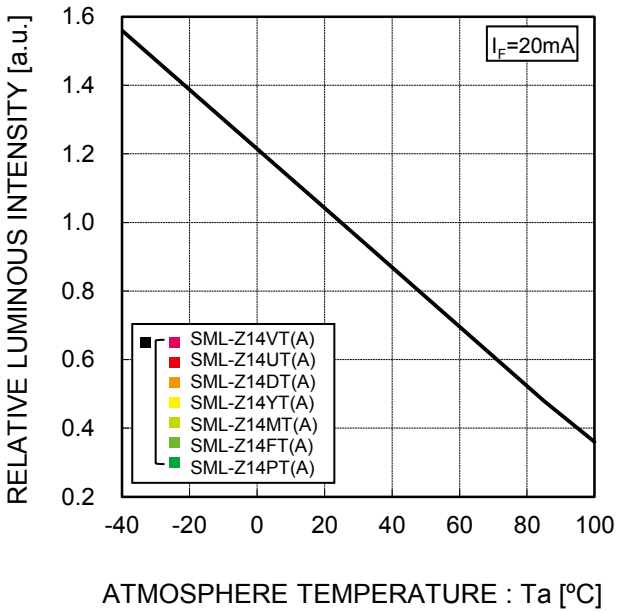


Fig.3 Luminous Intensity - Forward Current

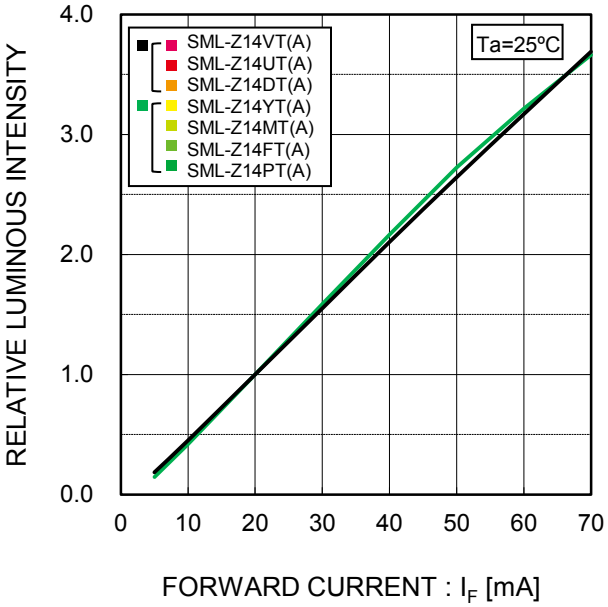
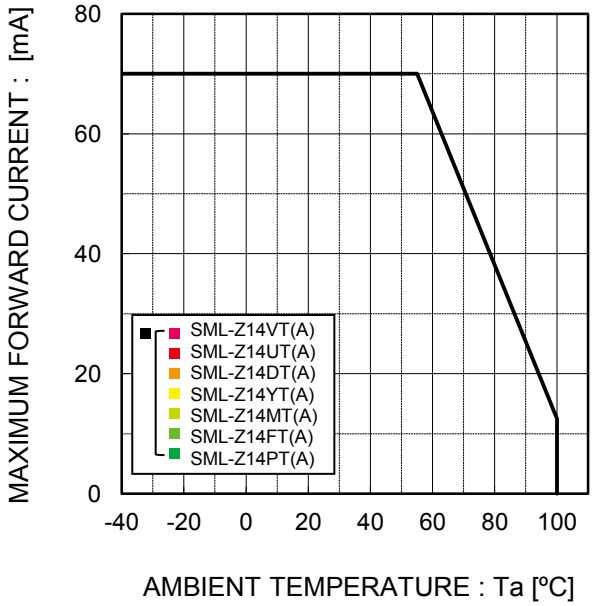


Fig.4 Derating



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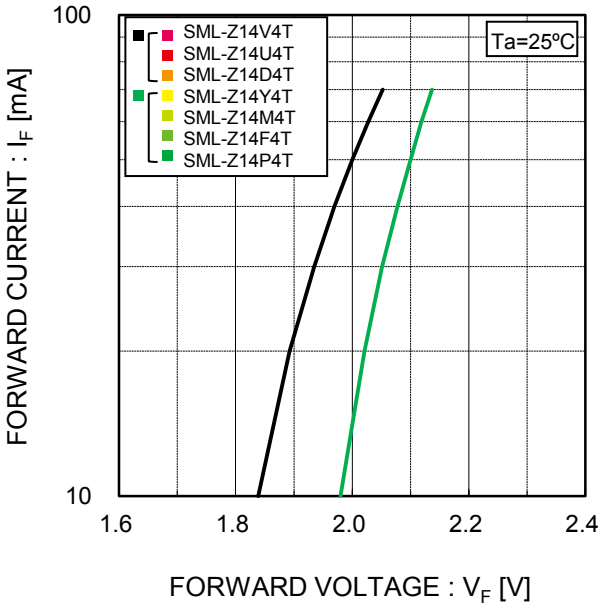


Fig.2 Luminous Intensity - Atmosphere Temperature

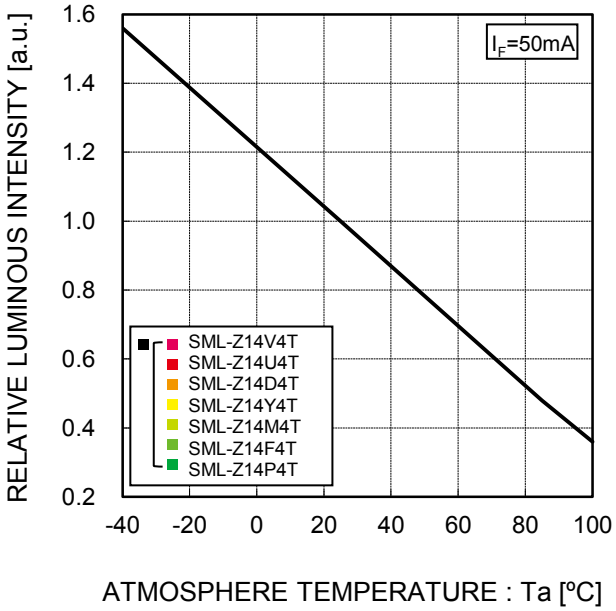


Fig.3 Luminous Intensity - Forward Current

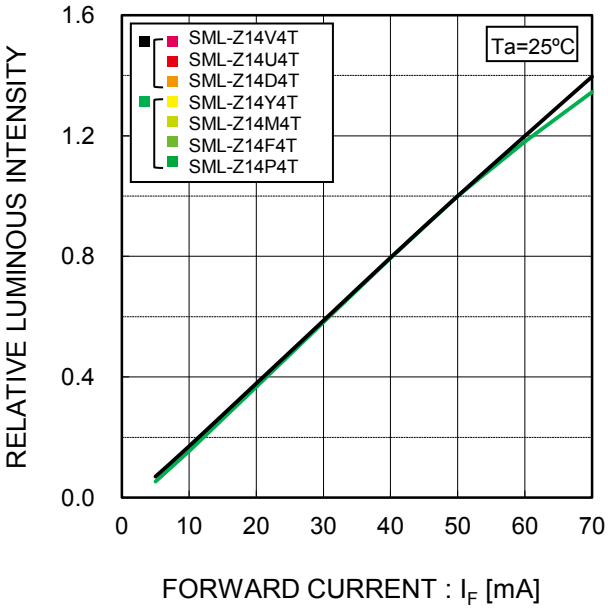
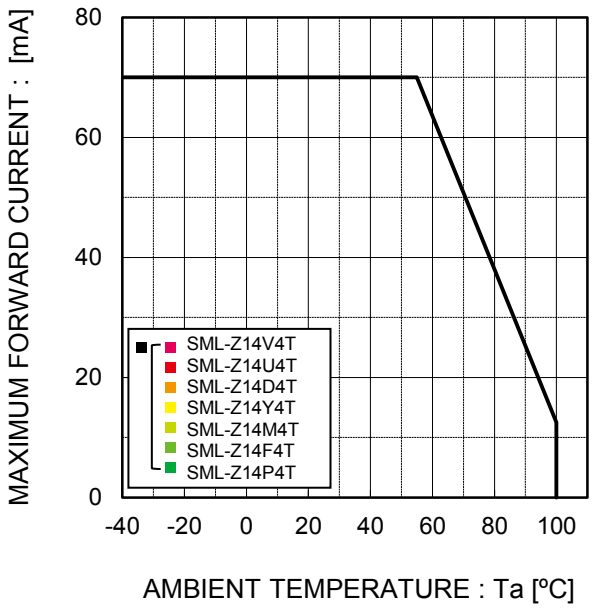


Fig.4 Derating



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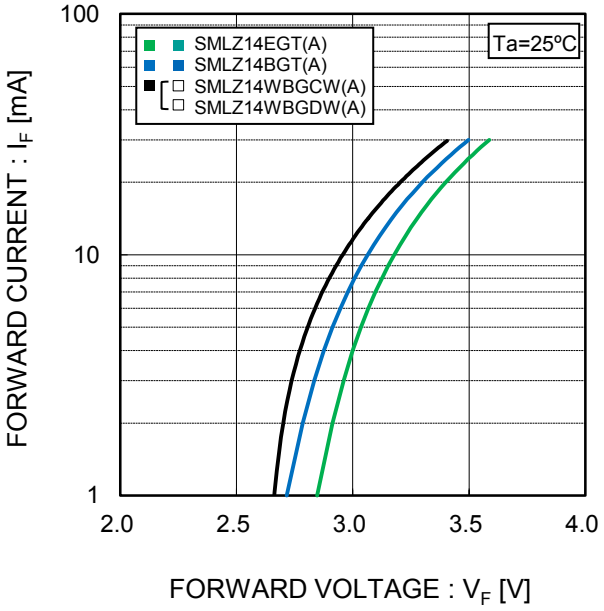


Fig.2 Luminous Intensity - Atmosphere Temperature

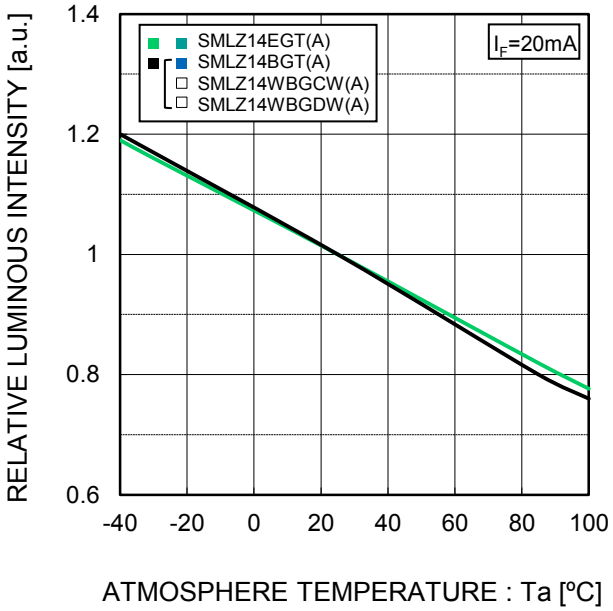


Fig.3 Luminous Intensity - Forward Current

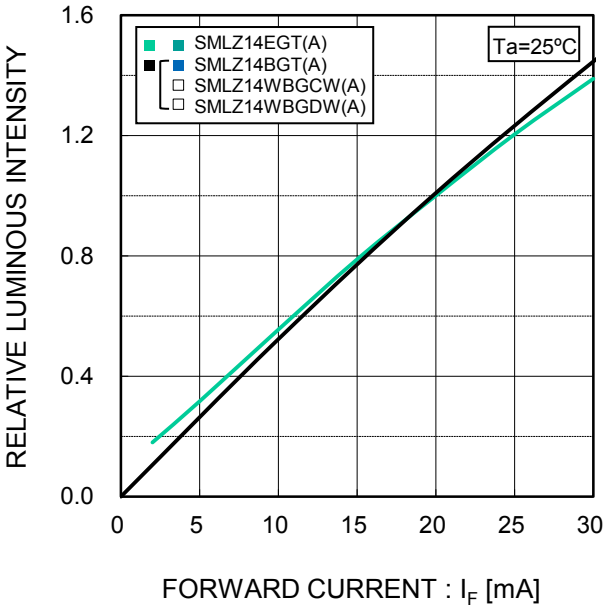
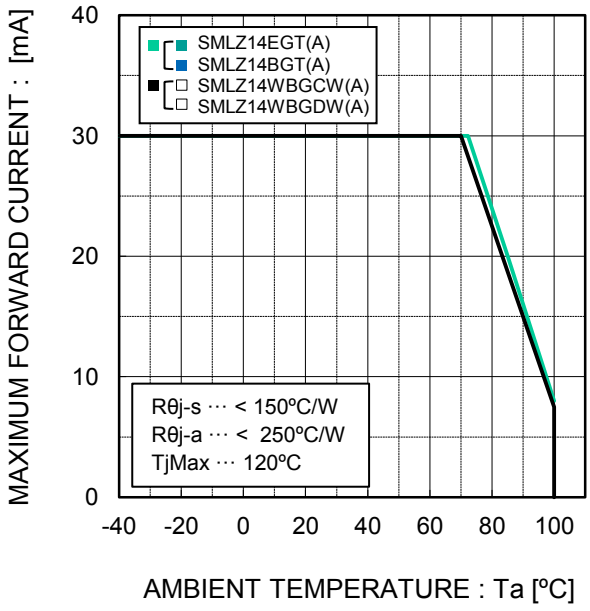
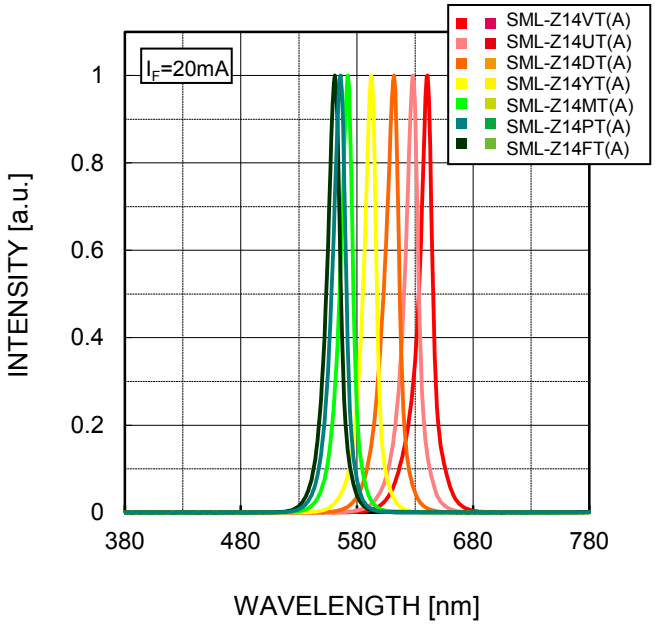
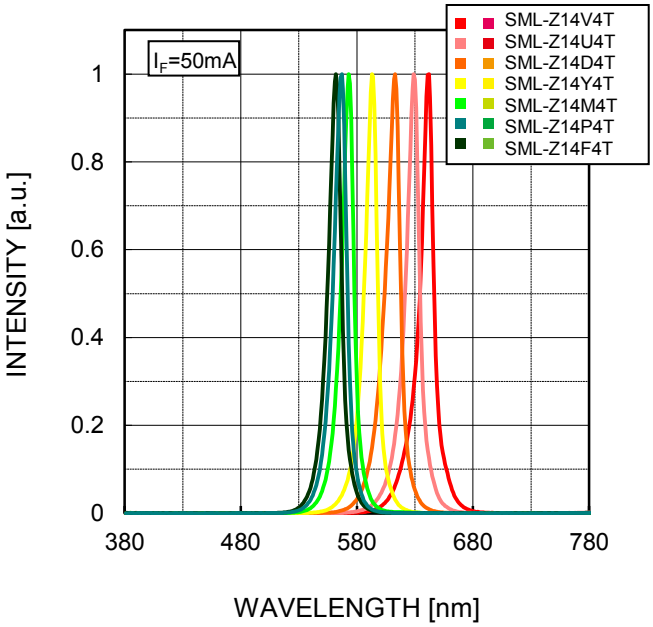


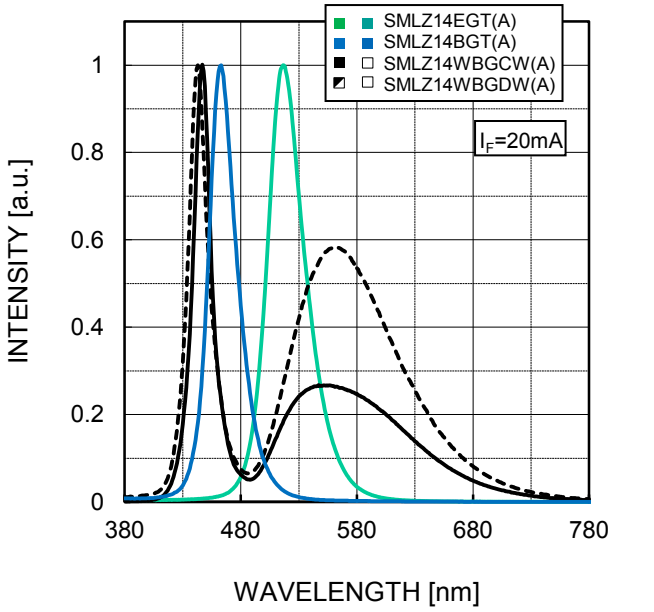
Fig.4 Derating



●Spectrum Data

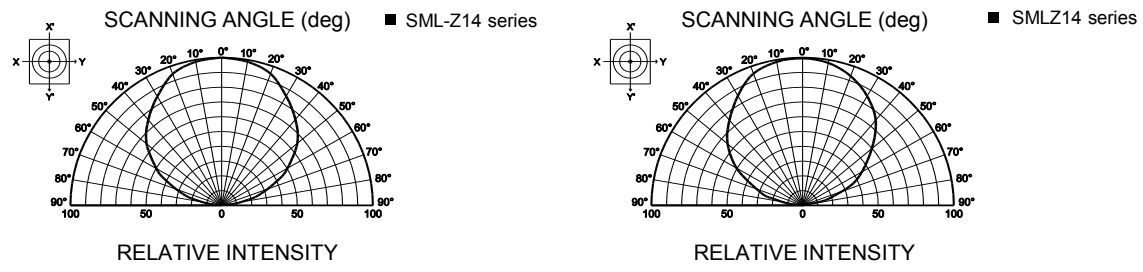






* Please take this data as a reference data for the samples are measured randomly.
* The data is relativized for each color. It is NOT to show the spectrum peaks are equal.

●Viewing Angle



●Rank Reference of Brightness

Red(V,U)

(Ta=25°C, I_F=20mA)

Rank	AM	AN	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD	BE
Iv (mcd)	28 to 35.5	35.5 to 45	45 to 56	56 to 71	71 to 90	90 to 112	112 to 140	140 to 180	180 to 224	224 to 280	280 to 355	355 to 450	450 to 560	560 to 710	710 to 900	900 to 1120	1120 to 1400	1400 to 1800
SML-Z14VT(A)																		
SML-Z14UT(A)																		

(Ta=25°C, I_F=50mA)

Rank	AM	AN	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD	BE
Iv (mcd)	28 to 35.5	35.5 to 45	45 to 56	56 to 71	71 to 90	90 to 112	112 to 140	140 to 180	180 to 224	224 to 280	280 to 355	355 to 450	450 to 560	560 to 710	710 to 900	900 to 1120	1120 to 1400	1400 to 1800
SML-Z14V4T																		
SML-Z14U4T																		

Orange(D)

(Ta=25°C, I_F=20mA)

Rank	AM	AN	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD	BE
Iv (mcd)	28 to 35.5	35.5 to 45	45 to 56	56 to 71	71 to 90	90 to 112	112 to 140	140 to 180	180 to 224	224 to 280	280 to 355	355 to 450	450 to 560	560 to 710	710 to 900	900 to 1120	1120 to 1400	1400 to 1800
SML-Z14DT(A)																		

(Ta=25°C, I_F=50mA)

Rank	AM	AN	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD	BE
Iv (mcd)	28 to 35.5	35.5 to 45	45 to 56	56 to 71	71 to 90	90 to 112	112 to 140	140 to 180	180 to 224	224 to 280	280 to 355	355 to 450	450 to 560	560 to 710	710 to 900	900 to 1120	1120 to 1400	1400 to 1800
SML-Z14D4T																		

Yellow(Y)

(Ta=25°C, I_F=20mA)

Rank	AM	AN	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD	BE
Iv (mcd)	28 to 35.5	35.5 to 45	45 to 56	56 to 71	71 to 90	90 to 112	112 to 140	140 to 180	180 to 224	224 to 280	280 to 355	355 to 450	450 to 560	560 to 710	710 to 900	900 to 1120	1120 to 1400	1400 to 1800
SML-Z14YT(A)																		

(Ta=25°C, I_F=50mA)

Rank	AM	AN	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD	BE
Iv (mcd)	28 to 35.5	35.5 to 45	45 to 56	56 to 71	71 to 90	90 to 112	112 to 140	140 to 180	180 to 224	224 to 280	280 to 355	355 to 450	450 to 560	560 to 710	710 to 900	900 to 1120	1120 to 1400	1400 to 1800
SML-Z14Y4T																		

Green(M,P)

(Ta=25°C, I_F=20mA)

Rank	AG	AH	AJ	AK	AL	AM	AN	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ
Iv (mcd)	9 to 11.2	11.2 to 14	14 to 18	18 to 22.4	22.4 to 28	28 to 35.5	35.5 to 45	45 to 56	56 to 71	71 to 90	90 to 112	112 to 140	140 to 180	180 to 224	224 to 280	280 to 355	355 to 450	450 to 560
SML-Z14MT(A)																		
SML-Z14PT(A)																		
SML-Z14FT(A)																		

(Ta=25°C, I_F=50mA)

Rank	AG	AH	AJ	AK	AL	AM	AN	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ
Iv (mcd)	9 to 11.2	11.2 to 14	14 to 18	18 to 22.4	22.4 to 28	28 to 35.5	35.5 to 45	45 to 56	56 to 71	71 to 90	90 to 112	112 to 140	140 to 180	180 to 224	224 to 280	280 to 355	355 to 450	450 to 560
SML-Z14M4T																		
SML-Z14P4T																		
SML-Z14F4T																		

Bluish Green(E)

(Ta=25°C, I_F=20mA)

Rank	S1	S2	T1	T2	U1	U2	V1	V2	W1	W2	X1	X2	Y1	Y2	Z1	Z2
Iv (mcd)	90 to 110	110 to 140	140 to 180	180 to 220	220 to 280	280 to 360	360 to 450	450 to 560	560 to 710	710 to 900	900 to 1100	1100 to 1400	1400 to 1800	1800 to 2200	2200 to 2800	2800 to 3600
SMLZ14EGT(A)																

Blue(B)

(Ta=25°C, I_F=20mA)

Rank	S1	S2	T1	T2	U1	U2	V1	V2	W1	W2	X1	X2	Y1	Y2	Z1	Z2
Iv (mcd)	90 to 110	110 to 140	140 to 180	180 to 220	220 to 280	280 to 360	360 to 450	450 to 560	560 to 710	710 to 900	900 to 1100	1100 to 1400	1400 to 1800	1800 to 2200	2200 to 2800	2800 to 3600
SMLZ14BGT(A)																

White(WB)

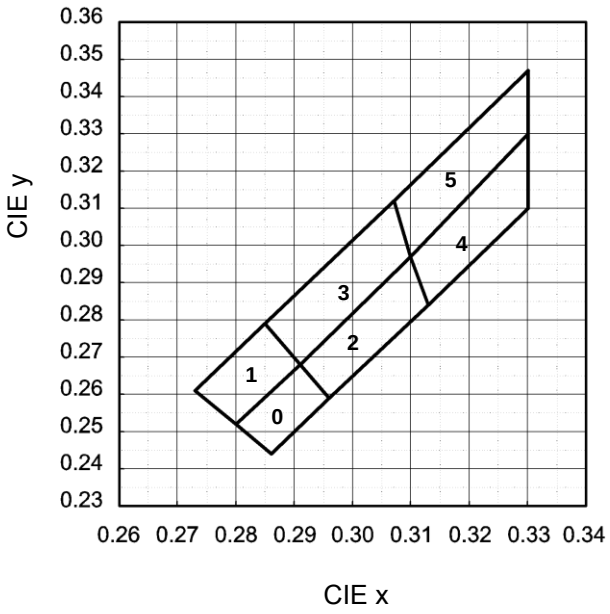
(Ta=25°C, I_F=20mA)

Rank	S1	S2	T1	T2	U1	U2	V1	V2	W1	W2	X1	X2	Y1	Y2	Z1	Z2
Iv (mcd)	90 to 110	110 to 140	140 to 180	180 to 220	220 to 280	280 to 360	360 to 450	450 to 560	560 to 710	710 to 900	900 to 1100	1100 to 1400	1400 to 1800	1800 to 2200	2200 to 2800	2800 to 3600
SMLZ14WBGCW(A)																
SMLZ14WBGDW(A)																

∗Please note that the brightness of some products may fall between ranks (half rank).

●Chromaticity Diagram

SMLZ14WBGCW1(A)



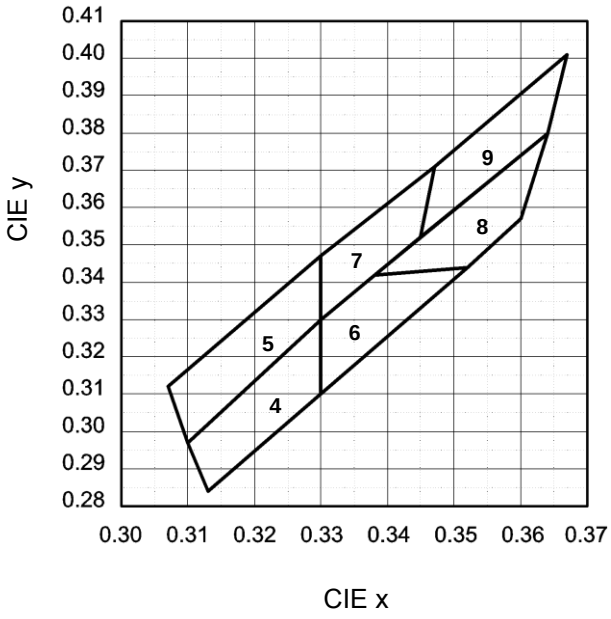
[Chromaticity Coordimates] (Ta=25ºC, I_F=20mA)

0		1		2	
x	y	x	y	x	y
0.286	0.244	0.280	0.252	0.296	0.259
0.280	0.252	0.273	0.261	0.291	0.268
0.291	0.268	0.285	0.279	0.310	0.297
0.296	0.259	0.291	0.268	0.313	0.284

3		4		5	
x	y	x	y	x	y
0.291	0.268	0.313	0.284	0.310	0.297
0.285	0.279	0.310	0.297	0.307	0.312
0.307	0.312	0.330	0.330	0.330	0.347
0.310	0.297	0.330	0.310	0.330	0.330

Measurement tolerance : ±0.02

SMLZ14WBGDW1(A)



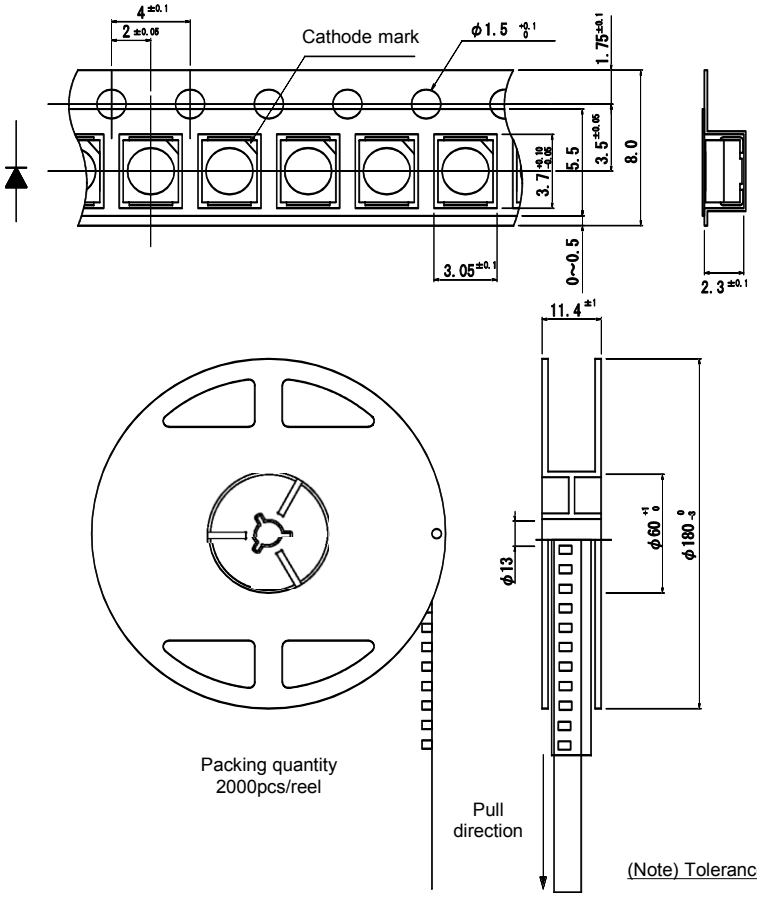
[Chromaticity Coordimates] (Ta=25ºC, I_F=20mA)

4		5		6	
x	x	x	y	x	y
0.313	0.284	0.310	0.297	0.330	0.310
0.310	0.297	0.307	0.312	0.330	0.330
0.330	0.330	0.330	0.347	0.338	0.342
0.330	0.310	0.330	0.330	0.352	0.344

7		8		9	
x	y	x	y	x	y
0.330	0.330	0.352	0.344	0.345	0.352
0.330	0.347	0.338	0.342	0.347	0.371
0.347	0.371	0.364	0.380	0.367	0.401
0.345	0.352	0.360	0.357	0.364	0.380

Measurement tolerance : ±0.02

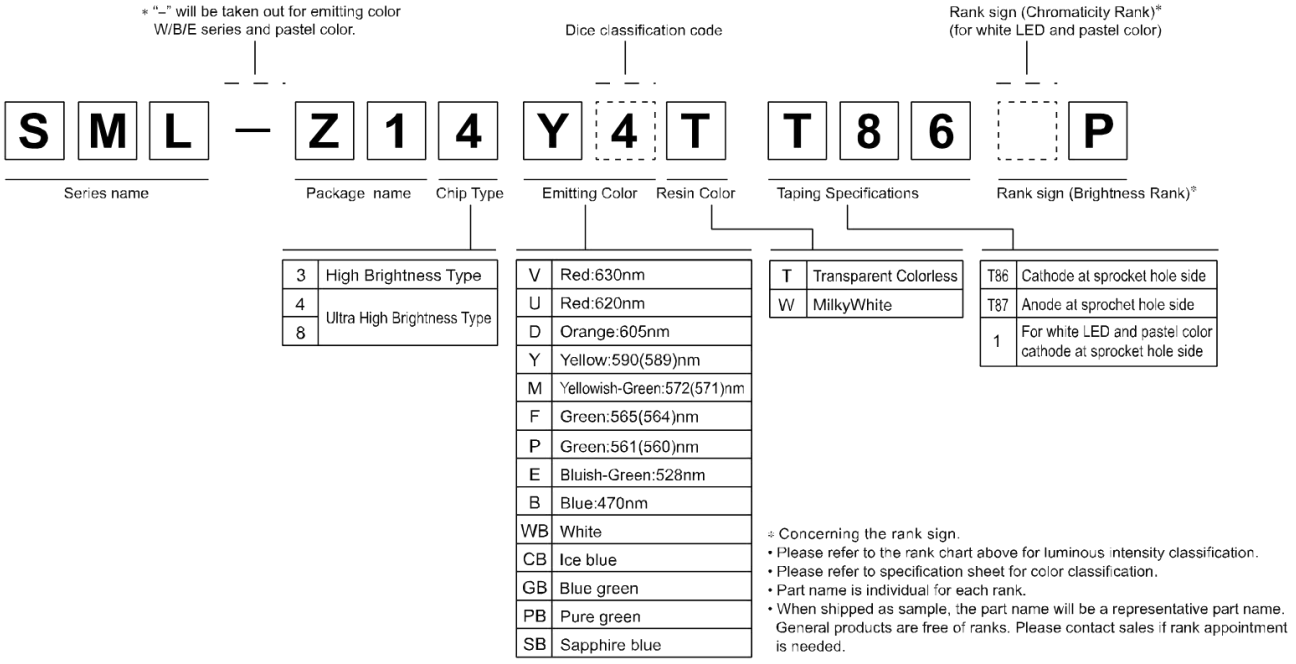
●Taping



(unit : mm)

(Note) Tolerance is ±0.2mm, unless otherwise specified.

●Part No. Construction



3	High Brightness Type
4	Ultra High Brightness Type
8	

V	Red:630nm
U	Red:620nm
D	Orange:605nm
Y	Yellow:590(589)nm
M	Yellowish-Green:572(571)nm
F	Green:565(564)nm
P	Green:561(560)nm
E	Bluish-Green:528nm
B	Blue:470nm
WB	White
CB	Ice blue
GB	Blue green
PB	Pure green
SB	Sapphire blue

T	Transparent Colorless
W	MilkyWhite

T86	Cathode at sprocket hole side
T87	Anode at sprochet hole side
1	For white LED and pastel color cathode at sprocket hole side

* Concerning the rank sign.
- Please refer to the rank chart above for luminous intensity classification.
- Please refer to specification sheet for color classification.
- Part name is individual for each rank.
- When shipped as sample, the part name will be a representative part name. General products are free of ranks. Please contact sales if rank appointment is needed.

●Packing Specification

ROHM LED products are being shipped with desiccant (silica gel) concluded 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.

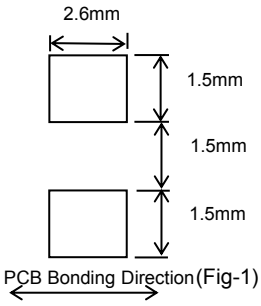
Please contact the nearest sales office or distributer if necessary.

●Attention Points In Handling

This product was developed as a surface mount LED especially suitable for reflow soldering.
Please take care of following points when using this device.

1.DESIGNING OF PCB

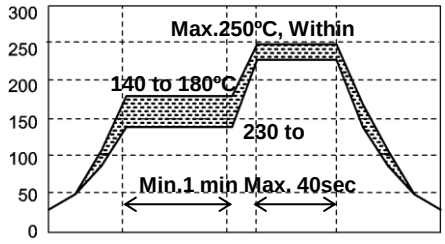
As for a recommendable solder pattern, Please refer to Fig-1.
The size and direction of the pad pattern
depends on the condition of the PCB,
So, please investigate about the adjustment
thoroughly before designing.



(Fig-1)

2.SOLDERING (Sn-Cu, Sn-Ag-Cu, Sn-Ag-Bi-Cu)

LED products do not contain reinforcement
materials such as glass fillers.
Therefore, thermal stress by soldering greatly
influence its reliability.
The temperature conditions for reflow soldering
should therefore be set up according to the
characteristic of this product. (See Fig-2)
Number of reflow process shall be max 2 times
and these processes shall be performed in a row.
Cooling process to normal temperature shall be required
between first and second soldering process.



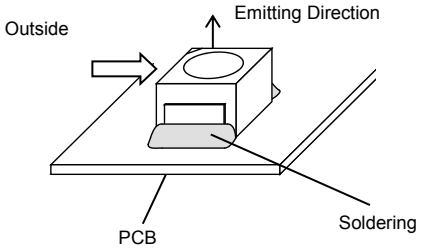
(Fig-2)

3.USE OF AUTOMATIC MOUNTING MACHINE

As for this product, the silicone resin is used as encapsulate material and the sealing part on top of LED is soft.
Therefore, please make sure not to apply the pressure upon it, as it might influence reliability.
Moreover, please use the adsorption nozzle when you use the automatic mounting machine so as not to apply
the force directly to this top sealing part.

4.HANDLING AFTER MOUNTING

As shown right drawing, in case outside force is given
to the device, stress is concentrated to the jointed part
between mold resin and substrate.
Therefore there is a possibility to breath the device or PCB.
Careful handing is needed as ROHM cannot guarantee the falling
of the device by outside force after mounting.



5.WASHING

Please note the following points when washing is required after soldering.

5-1) WASHING SOLVENT

Isopropyl alcohol or other alcohol solvent is recommendable.

5-2) TEMPERATURE

Below 30ºC, immersion time ; within 3 minutes.

5-3) ULTRA SONIC WASHING

Below 15/1 litter of solvent tub.

54) COOLING

Below 100ºC within 3 minutes.

6.EROSION GAS

Utilization in erosion gas atmosphere may degenerate the plating surface which might cause deterioration of solder strength, optical characteristics, or functions.

Please take precautions against occurrence of gas from the surrounding parts on the occasion of custody, and also after mounted on circuit board.

7.STORAGE

At reflow soldering, the reliability of this product is often influenced by moisture absorption so we apply the packaging with moisture proof for better condition is use, please also note that

7-1) Not to be opened before using.

7-2) To be kept in our moisture proof packaging with some desiccant (SILICA GEL) after opening it.

To be baked in case the SILICA GEL indicator changed its color from either blue to clear or green to pink.

7-3) Please use within 72 hours after the package was opened. (Condition at 30°C, max.70%Rh.)

In case it is not used within 72 hours, please put it back into our packaging.

7-4) BAKING

Please bake under reel condition at 60°C, 40～48 hours (max.20%Rh) after un-sealing.

While baking is done, the reel and emboss tape may be easily deformed.

Please be careful not to give any stress.

7.LIFE TIME

This product will cause reduction of luminous intensity depending on the using conditions and environmental.

Please inquire our sales contact if long life time is required on your application.

Notes

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 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.

13) When providing our Products and technologies contained in this document to other countries, you must abide by the procedures and provisions stipulated in all applicable export laws and regulations, including without limitation the US Export Administration Regulations and the Foreign Exchange and Foreign Trade Act.

14) This document, in part or in whole, may not be reprinted or reproduced without prior consent of ROHM.

ROHM SEMICONDUCTOR

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