DATA SHEET

CITILED Standard CL-395 Series

Multi-color Type

CL-395S-E8-SD-T

CONTENTS

CITIZEN ELECTRONICS CO., LTD.

1-23-1, Kamikurechi, Fujiyoshida-shi, Yamanashi, 403-0001, Japan Tel. +81-555-23-4121 http://ce.citizen.co.jp

1. Scope of Application

These specifications apply to chip type LED lamp, CITILED, model CL-395S-E8-SD-T

2. Part code

Product Nomenclature

CL - 395S [1] - E8 [2] - SD [3] - T [4]

[1]	Series	:	Multi--color Top-emitting type
[2]	Lighting color	:	E8 R : High brightness Red G : High brightness Green B : High brightness Blue
[3]	Diffusion	:	SD Diffused
[4]	Shipping mode	:	T Taping (standard)
		:	Non-coded Bulk

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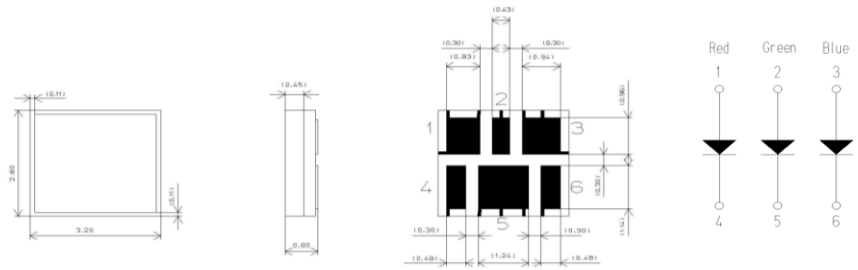
3. Outline drawing

Unit : mm
Tolerance : ±0.1



※ Dimensions in parentheses are reference values.
※ Any resin unevenness than has no effects on optical characteristics can be used without any quality problem.

4. Performance

4-1. Absolute Maximum Rating

Parameter	Symbol	Red	Green	Blue	Rating
Total value of Power Dissipation	P^{*1}	288			mW
Power Dissipation	P_d	90	130	131	mW
Single color forward current	I_F	40	40	40	mA
Simultaneous lighting forward current	I_F	40	40	35	mA
Forward Pulse Current	$I_{FP}{}^{*2}$	100	100	100	mA
Reverse Current	V_R	10	5	5	V
Operating Temperature	T_{OP}	-25 ～ +80			℃
Storage Temperature	T_{ST}	-30 ～ +85			℃

*1 P means the Total Value of Power Dissipation when both colors are ON.
*2 Duty ＜ 1/10, Pulse width ＜ 0.1 msec

4-2. Electro-optical Characteristic

(Ta=25℃)

Parameter	Symbol	Color	Condition	MIN	TYP	MAX
Forward Voltage	V_F	R	IF=36mA	-	1.89	2.57
		G	IF=32mA	-	2.75	3.97
		B	IF=34mA	-	2.81	3.83
Reverse Current	I_R	R	Vr=10V	-	-	1
		G	Vr=5V	-	-	2
		B	Vr=5V	-	-	2
Luminous Intensity	I_V	R	IF=36mA	-	(1916)	-
		G	IF=32mA	-	(4583)	-
		B	IF=34mA	-	(1198)	-
Dominant Wavelength	λ_d	R	IF=36mA	-	(620)	-
		G	IF=32mA	-	(526)	-
		B	IF=34mA	-	(470)	-

Note 1) The measurement tolerance of forward voltage is ±3% at our tester.
Note 2) The measurement tolerance of luminous intensity is ±10% at our tester.
Note 3) The measurement tolerance of dominant wavelength is 2 nm at our tester.
Note 4) Please be aware that the above electro-optical characteristics are achieved when applying the current values shown in the table.
Please consult us when this product is used under any other conditions.

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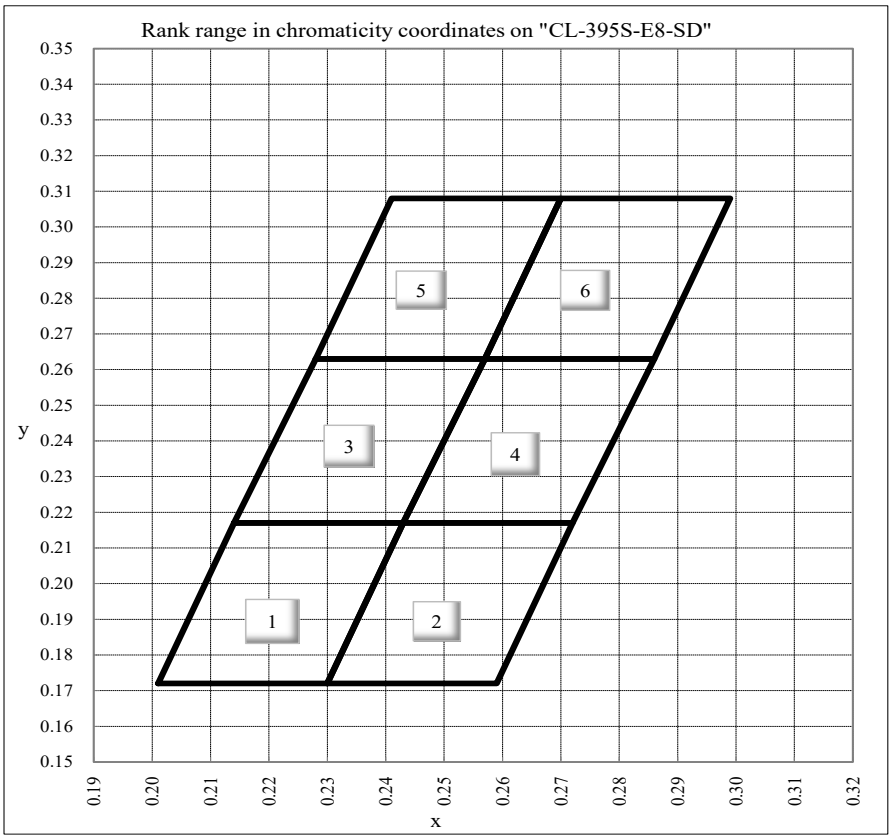
CL-395S-E8-SD rank

Chromaticity coordinates

Condition : IF=R : 36mA
IF=G : 32mA
IF=B : 34mA



※Chromaticity coordinates are within the area surrounded by a, b, c and d.

◆Chromaticity Rank

Rank1	x	y
a	0.201	0.172
b	0.214	0.217
c	0.243	0.217
d	0.230	0.172

Rank2	x	y
a	0.230	0.172
b	0.243	0.217
c	0.272	0.217
d	0.259	0.172

Rank3	x	y
a	0.214	0.217
b	0.228	0.263
c	0.257	0.263
d	0.243	0.217

Rank4	x	y
a	0.243	0.217
b	0.257	0.263
c	0.286	0.263
d	0.272	0.217

Rank5	x	y
a	0.228	0.263
b	0.241	0.308
c	0.270	0.308
d	0.257	0.263

Rank6	x	y
a	0.257	0.263
b	0.270	0.308
c	0.299	0.308
d	0.286	0.263

Luminosity class

A	min	max
	8711	10298
B	min	max
	7124	8711
C	min	max
	5537	7124

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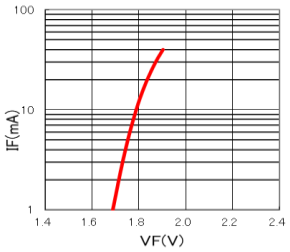
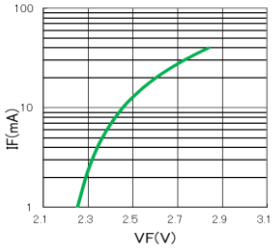
5. Characteristic (Typical characteristics)

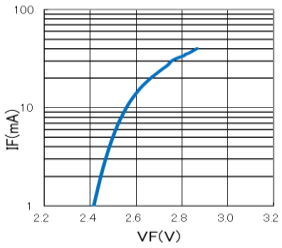
◆ IF-VF Characteristics （Red）



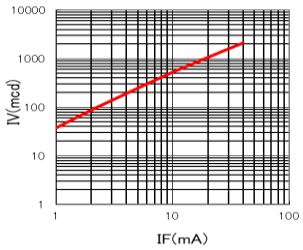
◆ IF-VF Characteristics （Green）



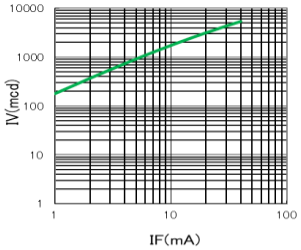
◆ IF-VF Characteristics （Blue）



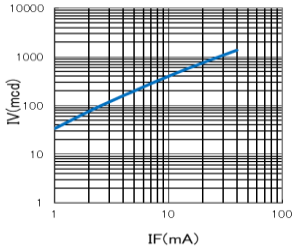
◆ Iv-If Characteristics （Red）



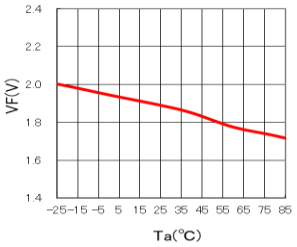
◆ Iv-If Characteristics （Green）



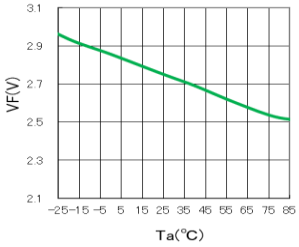
◆ Iv-If Characteristics （Blue）



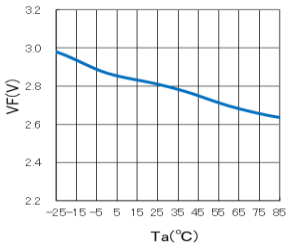
◆ IV-Ta Characteristics （Red） IF=36mA



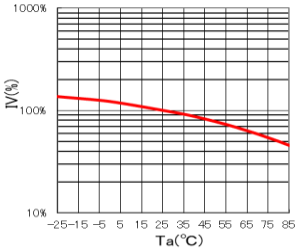
◆ IV-Ta Characteristics （Green） IF=32mA



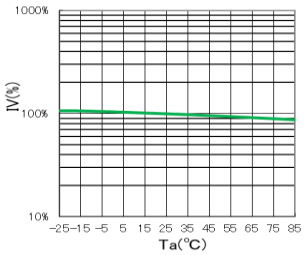
◆ IV-Ta Characteristics （Blue） IF=34mA



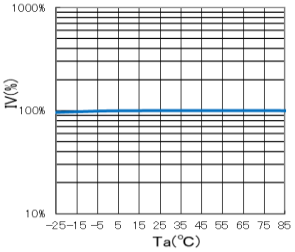
◆ V_F-Ta Characteristics （Red） IF=36mA



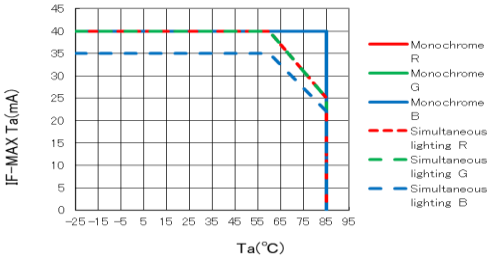
◆ V_F-Ta Characteristics （Green） IF=32mA



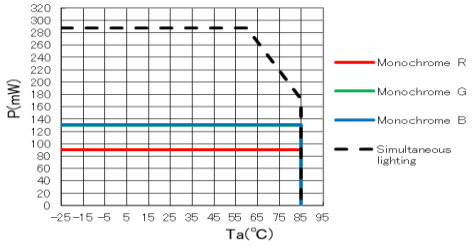
◆ V_F-Ta Characteristics （Blue） IF=34mA



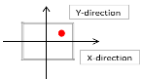
◆ IF-Max Ta Characteristics （Blue）



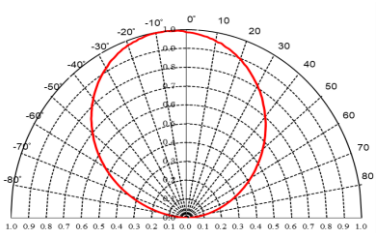
◆ P-Ta Characteristics



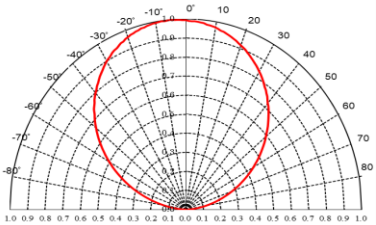
5. Characteristic (Typical characteristics)



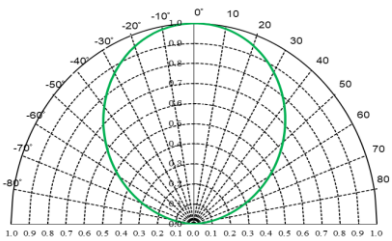
◆Directive Characteristics Red(x)



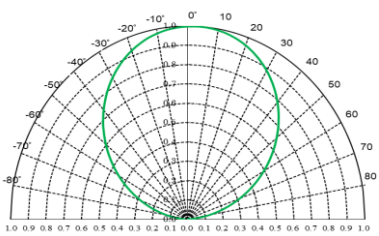
◆Directive Characteristics Red(y)



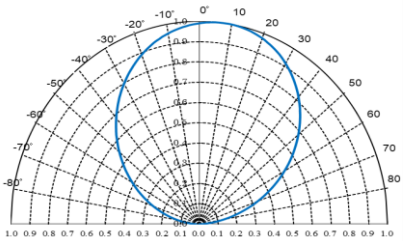
◆Directive Characteristics Green(x)



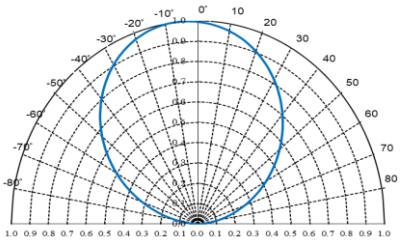
◆Directive Characteristics Green(y)



◆Directive Characteristics Green(x)



◆Directive Characteristics Green(y)



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6. Reliability

6-1. Details of the tests

Test Item	Test Condition
Life Test in Continuous Operation	25 ±3 ℃, maximum rated value × 500 $^{+24}_{-12}$ hours
Low Temperature Storage Test	-30 $^{+3}_{-5}$ oC × 500 $^{+24}_{-12}$ hours
High Temperature Storage Test	'85 $^{+3}_{-5}$ oC × 500 $^{+24}_{-12}$ hours
Moisture-proof Test	60 ±2℃, 90±5 %RH for 500 $^{+24}_{-12}$ hours
Thermal Shock Test	-30 ℃ × 30 minutes ～ 85℃ × 30 minutes, 5- cycle
Solder Heat Resistance Test	Recommended temperature profile (reflow soldering) × 2, (2nd test must be started after the samples are stabilized thermally.)

6-2. Judgment Criteria of Failure for Reliability Test

Measuring Item	Symbol	Measuring Condition	Failure Criteria
Forward Voltage	Vf	I_F=20mA	>U × 1.2
Reverse Current	I_R	V_R=4V	>U × 2
Luminous Intensity	I_V	I_F=20mA	<S × 0.5

U means the upper limit of the specified characteristics.
S means the initial value.

Note : Measurement shall be taken between 2 hours and 24 hours, having returned the test pieces to the normal ambient conditions after the completion of each test.

6-3. Influence with static electricity

This product is susceptible to accumulation of static electricity and surge voltage, which may decrease reliability or result in damage to LED dies.

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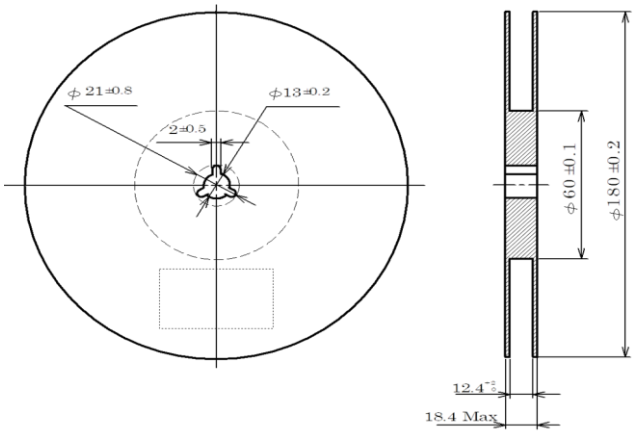
7. Taping Specifications (in accordance with JIS standard)

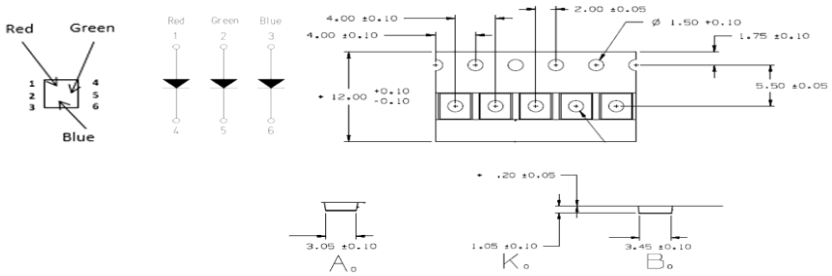
7-1. Shape and Dimensions of Reel

(Unit: mm)



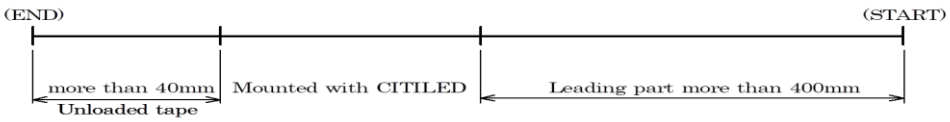
7-2. Dimensions of Tape

Unit : mm



※ Dimensions in parentheses are reference values.

7-3. Configuration of Tape



7-4. Quantity:2,500 pcs/reel

(Please note that the shipping quantity of this product may be less than 500 pieces per reel (minimum quantity: 500 pieces) depending on the shipping quantity, shipping delivery date and other conditions. However, in this case, we will notify you in advance.)

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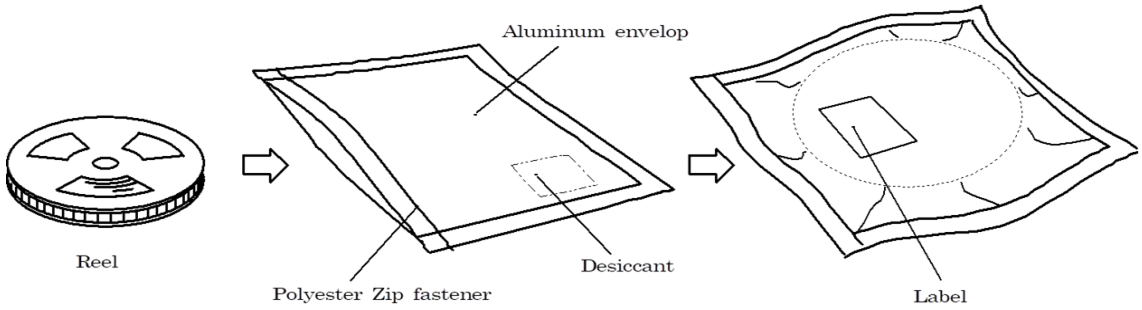
8. Packing Specifications

8-1. Moisture-proof Packing

To prevent moisture absorption during transportation and storage,
reels are packed in aluminum envelopes.



8-2. Storage

To prevent moisture absorption, it is strongly recommended that reels (in bulk or taped) should be stored in the dry box (or the desiccator) with a desiccant as the appropriate storage place.If not, the following is recommended.

Temperature: 5～30℃
Humidity: 60%RH max.

The devices should be mounted as soon as possible after unpacking. If you store the unpacked reels, please store them in the dry box or seal them into the envelop again.

8-3. Baking

After the storage period
(6 months in moisture proof packaging, or 7 days after unpacking moisture proof packaging), please bake the goods before use under the conditions described below.

Baking conditions: 60 oC × 12 hours or more (reeled one)
100 oC × 45 minutes or more (loose one)
Baking times: Up to one time

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9. Precautions

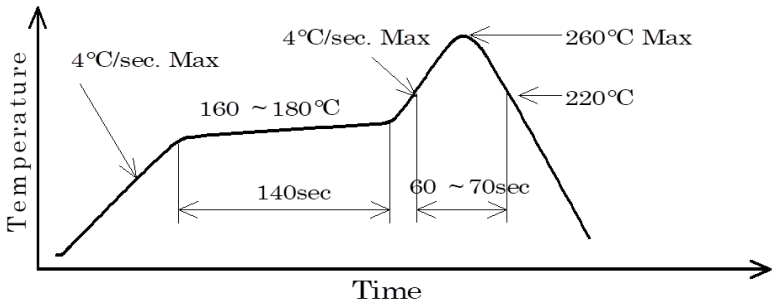
9-1. Soldering

(1) Manual soldering

1) Solder of 96.5Sn 3Ag 0.5Cu is recommended.
2) Bake the goods before manual soldering,
because otherwise it may cause resin to crack on account of moisuture absorption.
3) Use a soldering iron of 25W or smaller. Adjust the temperature of the soldering iron below 350°C.
4) Force or stress must not be applied to the resin portion while soldering.
5) Finish soldering within 3 seconds.
6) Handle the devices only after temperature is cooled down.

(2) Lead free soldering

1) Following soldering paste is recommended
Melting temperature : 216 ～ 220oC
Composition : 96.5Sn 3Ag 0.5Cu
2) The temperature profile at the top surface of the parts is recommended as shown below.
3) It is requested that products should be handled after their temperature has dropped down to the normal room temperature.



(3) Caution

1) Reflow soldering is allowed up to two times, and manual soldering up to one time.
2) When conducting reflow twice, please shorten the interval between the first and second reflow to prevent moisture absorption.
Also, please cool (naturally) the product to the room temperature after the first reflow to start the second reflow.
3) Make sure to avoid rapid cooling so that the temperature gradient from the peak temperature is gentle.
4) Air relow may cause an optical deterioration because of heat in the reflow and impact of atmosphre.
Nitrogen reflow is recommended.
5) It is not recommended to repair the product after soldering.
6) When soldering, please do not apply stress to LED while it is heated.

9-2. Handling precautions

(1) Please avoid any stress added to the resin portion while it is heated.
(2) Please avoid any friction by sharp metal nail etc. to the resin portion.
(3) Please avoid handling the product with bare hands.
(4) Please avoid applying any pressure to the product.
(5) Please avoid stacking PCBs after mounting.
(6) Please take countermeasures against static electricity to the same degree as those used for CMOS LSI.

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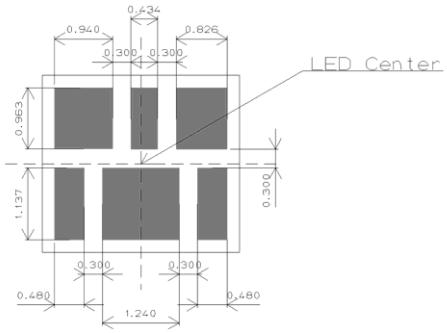
10. Designing precautions

(1) The current limiting resistor should be placed in the circuit so that is driven within its rating.
Also avoid reverse voltage (over-current) applied instantaneously when ON or OFF.

(2) When pulse driving current is applied, average current consumption should be within the rating.
Also avoid reverse voltage applied when put off.

(3) Recommended soldering pattern



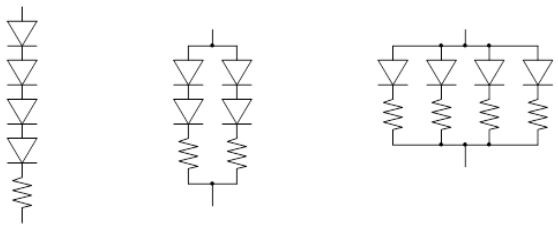
The above dimensions are not the one which guarantee the performance of mountability.
The use of the above pattern is recommended to use after deep study at your site

※ Recommended land pattern has only a land size on which LED can be mounted without problem.
If mounting accuracy is required for a high-density mounting,
please choose a land pattern that suits it.

(4) When assembling the circuit board into the finished products,
care must be taken to avoid the component parts from touching other parts.

(5) When using multiple LEDs, it is required to connect a current limiting resistor on
each path which the current flows to the LEDs.

(ex-1) **(ex-2)** **(ex-3)**



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11. How to use

(1) Please use forward current for the product.
Make sure that no forward or backward voltage is applied when it is not lighting.
Please avoid applying backward votlage continuously because it may cause migration and damage dice.

(2) Please avoid applying excess voltage such as lighting surge to LED.

(3) The service life may become shorter in areas where hydrogen sulfide is generated
(such as near a hot sprring or a volcano) or there is a lot of salt (such as near the coast).

(4) Please consider generation of heat when using this product.

12. Cleaning

(1) Please do not wipe LED.

(2) A cleaning agent may damage the package and resin to cause malfunctioning.
Before use, make sure it will not affect the goods.

(3) Ultrasonic cleansing is not recommended.

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13. Other precautions

(1) Warranty period is half a year from the day we delivered the product.

(2) If any defect is found during the warranty period, do not disassemble or dismantle the product but contact our sales window to follow its instruction.

(3) Do not reverse-engineer the product including disassemble or analyze without our approval.

(4) The product is intended to be used for general electronic equipment such as general lighing, home appliances, and information-communication equipment.
It is not designed or manufactured to be used for special application
(eg. automobiles, trains, ships, airplanes, spaceships, submarine repeaters,
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CITIZEN ELECTRONICS CO., LTD.
1-23-1, Kamikurechi, Fujiyoshida-shi, Yamanashi, 403-0001, Japan
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1-23-1, Kamikurechi, Fujiyoshida-shi, Yamanashi, 403-0001, Japan
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CITIZEN ELECTRONICS CO., LTD.

1-23-1, Kamikurechi, Fujiyoshida-shi, Yamanashi, 403-0001, Japan
Tel. +81-555-23-4121
http://ce.citizen.co.jp

Requests / Inquiries
cej-inquiry@ml.citizen.co.jp

Website for LEDs for lighting
http://ce.citizen.co.jp/lighting_led/jp/