SPECIFICATIONS

1. Scope of Application

These specifications are applied to the chip type LED lamp , model M15001-C13N

2. Part code

M15001 - C13 N

Series
M15001 : White power LED for general lighting.

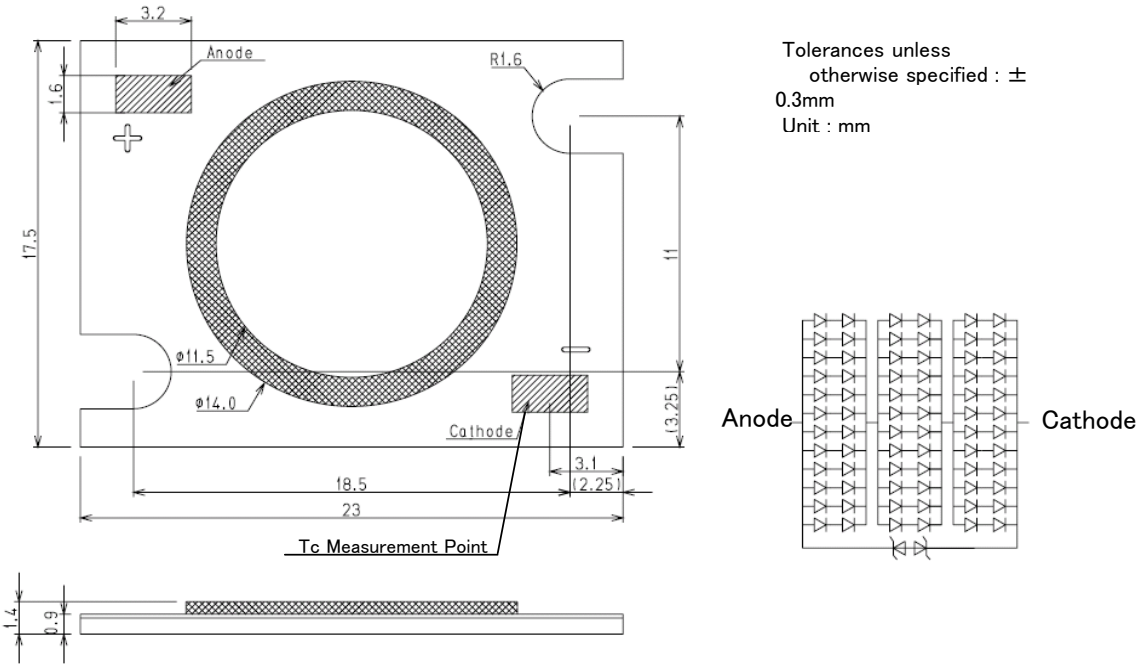
Watt Class
C13 : 13 watt package.

Lighting color
N : White color rank N

Product picture

			Approved	Checked	Drawn	Symbol	
						Name	M15001-C13N
						Drawing No	
-	Apr.20.'09	New implementation					
Mark	Date	Description Appro.					

3. Outline drawing



4. Performance

(1) Absolute Maximum Rating

Parameter	Symbol	Rating Value	Unit	
Power Dissipation	Pd	17.7	W	
Forward Current	I_F	0.84	A	
Forward Pulse Current	I_{FP}	1.2	A	*1
Operating Temperature	T_{OP}	−20 ～ +85	℃	
Storage Temperature	T_{ST}	−30 ～ +100	℃	
Junction Temperature	Tj_{Max}	120	℃	*2

*1Forward Current : Duty≦1/10 , Pulse Width≦10msec
*2 D.C. Current : Tj = Tc + Rj−c x Pd
Pulse Current : Tj = Tc + Rj−c x Pw(Power Dissipation / one−Pulse) x duty

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(2) Electro-optical Characteristics (Tc=25℃)

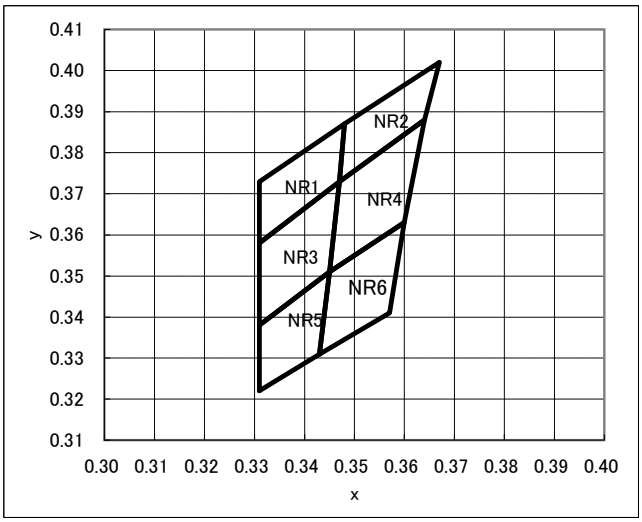
Parameter	Symbol	Condition	MIN	TYP	MAX	Unit
Forward Voltage	V_F	I_F=720mA	17.5	18.6	21.0	V
Reverse Current	I_R	V_R=15V	–	–	100	μA
Thermal resistance	R_{J-C}	Junction-case	–	2.4	–	℃/W
Luminous Flax	ϕ_V	I_F=720mA	1000	1335	–	lm
High General Color	Ra	I_F=720mA	60	65	–	–

Chromaticity coordinates (Condition : I_F=720mA ,Tc=25℃

Color Rank	x	y	Color Rank	x	y
NR1	0.331	0.358	NR2	0.347	0.373
	0.331	0.373		0.348	0.387
	0.348	0.387		0.367	0.402
	0.347	0.373		0.364	0.388

Color Rank	x	y	Color Rank	x	y
NR3	0.331	0.338	NR4	0.345	0.351
	0.331	0.358		0.347	0.373
	0.347	0.373		0.364	0.388
	0.345	0.351		0.360	0.363

Color Rank	x	y	Color Rank	x	y
NR5	0.331	0.322	NR6	0.343	0.331
	0.331	0.338		0.345	0.351
	0.345	0.351		0.360	0.363
	0.343	0.331		0.357	0.341



Note 1) The tolerance of measurement at our tester is VF±3% , φv±10% , Chromaticity(x,y)±0.01.
Note 2) For handling ,please apply CMOS LSI or equivalent any electrostatic effect.

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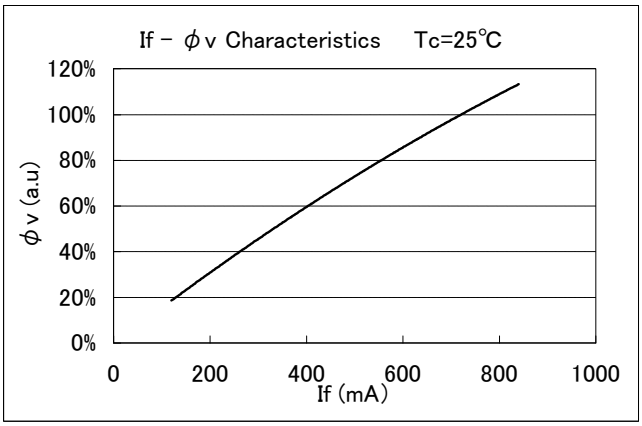
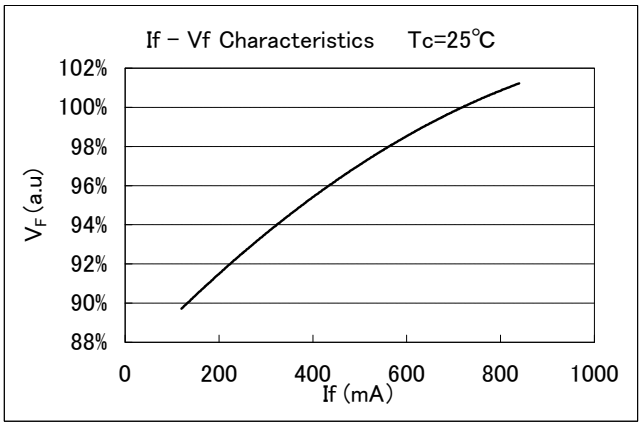
5. Characteristics

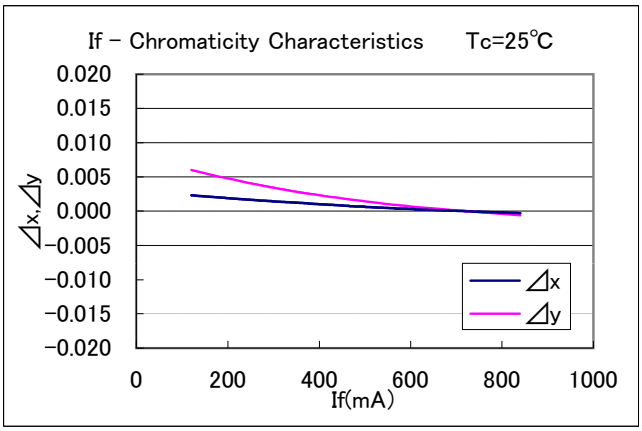
◆Forward Current vs. Relative Luminous Flux



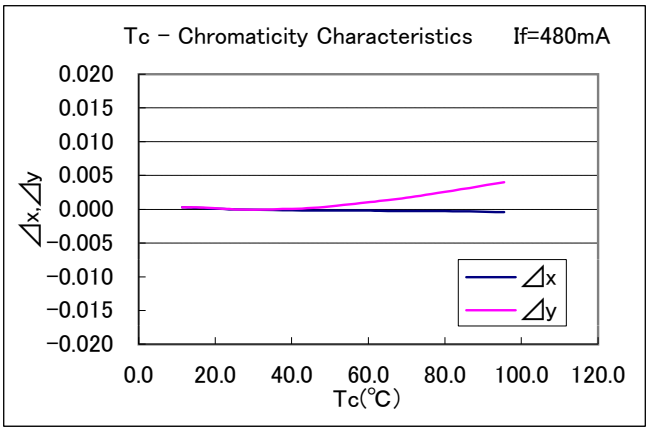
◆Forward Current vs. Forward Voltage



◆Forward Current vs. Chromaticity Coordinate



◆Case Temperature vs. Chromaticity Coordinate



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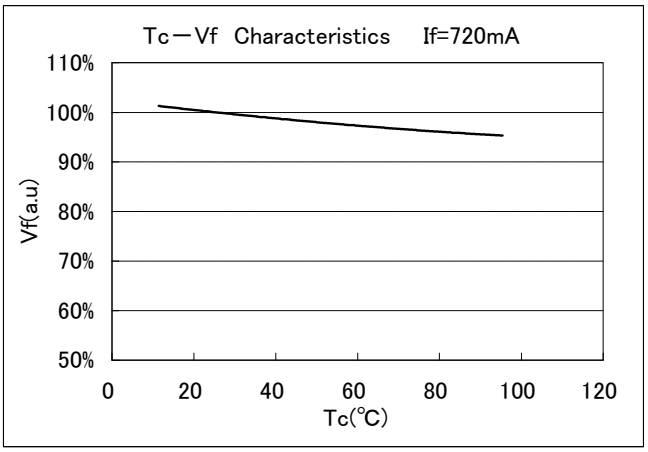
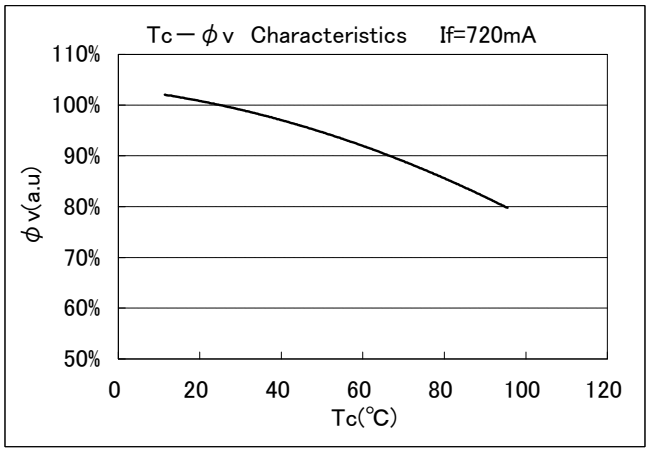
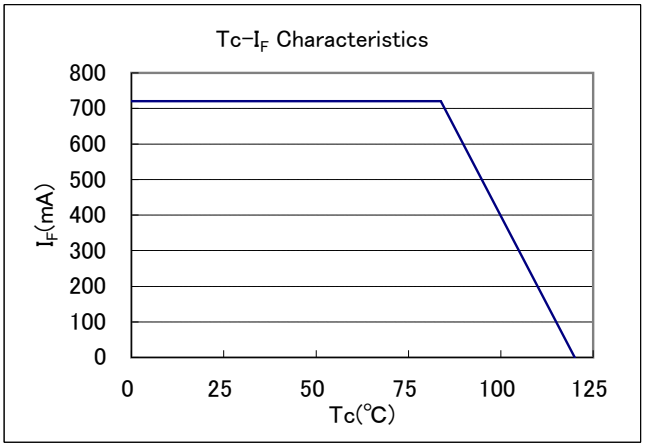
◆Case Temperature vs. Forward Voltage



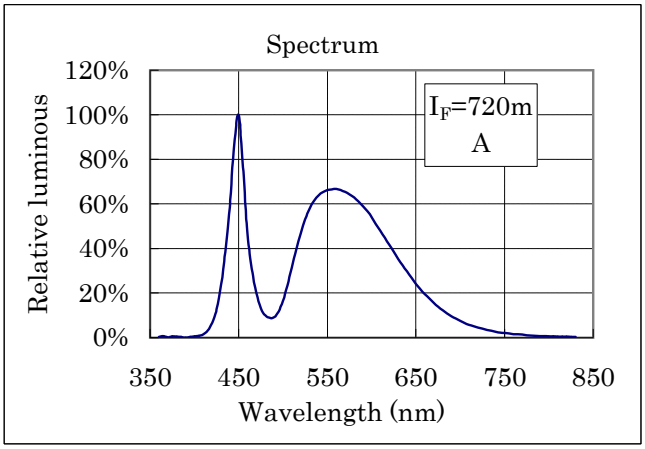
◆Case Temperature vs. Relative Luminous Flux



◆Case Temperature vs. Allowable Forward Current



◆Spectrum



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6. Reliability

(1)Details of the tests

Test Item	Test Condition
Room Temperature Operating Life Test	Ta=25℃,IF=720mA(Tj=72℃)×1000 hours (with Al-fin)
High Temperature Operating Life Test	Ta=50℃,IF=720mA(Tj=94℃)×1000 hours (with Al-fin)
Low Temperature Storage Test	-30℃× 1000 hours
High Temperature Storage Test	100℃× 1000 hours
Moisture proof Test	60±2℃, 90±5%RH for 1000 hours
Thermal Shock Test	-30℃×30minutes - 100℃× 30minutes,100 cycle

(2)Judgment Criteria of Failure for Reliability Test (Ta=25℃)

Measuring Item	Symbol	Measuring Condition	Judgment Criteria for Failure
Forward Voltage	VF	IF=720mA	>U×1.1
Total Luminous Flux	ΦV	IF=720mA	<S×0.85

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

Note1: Measurement shall be taken between 2 hours and 24 hours, and the test pieces should be returned to the normal ambient conditions after the completion of each test.

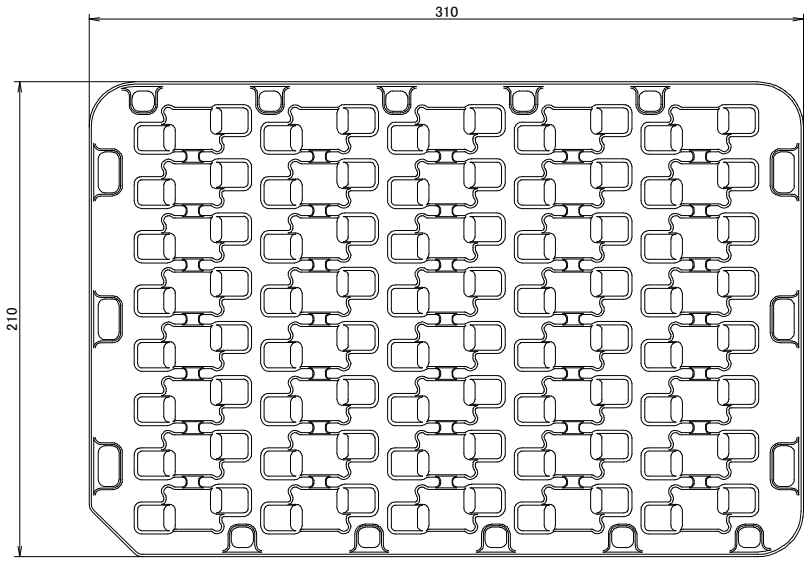
Note2: reliability test results will be used for M15001-C13N1.

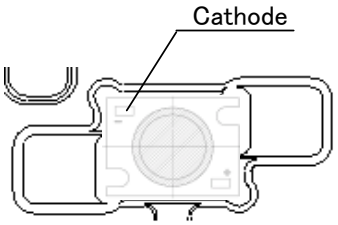
7. Packing Specifications

(1) Packing
One packing includes 200 pieces of LED packages. So, packing unit is 200 pieces.

Note : All LED packages are placed on the tray individually. One tray includes 40 pieces of LED packages. In the packing, five trays filled with LED packages and one empty tray are stacked. The empty one tray is put on the top of trays and attached the indication label which specifies product name, quantity, lot number .

< Packing figure >
*Tray (Dimensions: 310 200 14.6mm / Materials: Electrically conductive PS)





Example of indication label

CUSTOMER

TYPE **M15001**-C13N1
P.NO
Lot No XXXXXX
Q'ty pcs

PASS

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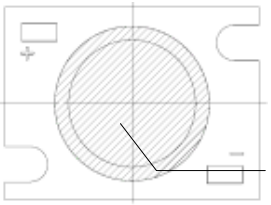
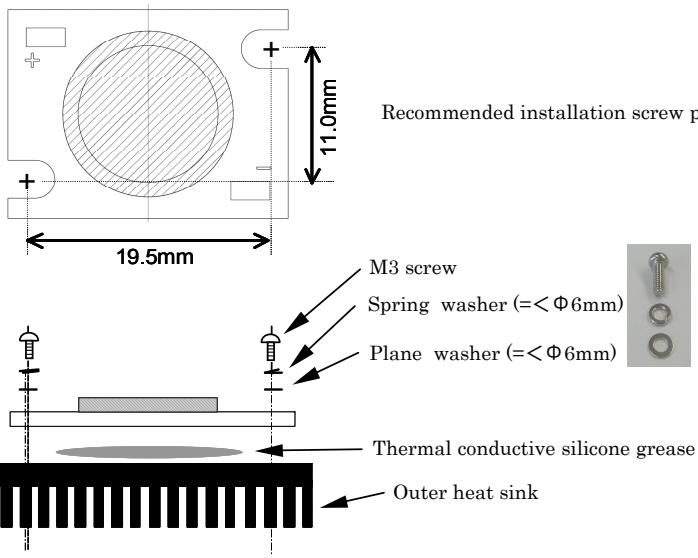
Precautions

1. Avoid the application of any stress to the Resin.
2. Avoid any contact by a sharp metal nail or other materials with the Resin portion.



3. This product should be secured firmly by fastening an M3 screw on both sides of the product.
Please be careful not to apply any stress to the product during the clamping operation.
As the connection status could vary depending on materials of outer heat sink, please check thoroughly.



4. A heat radiating grease should be applied to the whole rear surface so that this product can dissipate heat as a whole. This product could be bent during the clamping operation if heat grease in sheet form is used. For this reason, it is recommended that grease in paste form is used.

5. Handling of static electricity
- These products are sensitive to static electricity charge.
  Please take measures to prevent any static electricity being produced such as the wearing of a wristband or anti-static gloves when handling this product.
- All devices, equipment and machinery must be properly grounded. It is recommended that precautions be taken against surge voltage to the equipment that mounts the LEDs.
- When inspecting the final products in which LEDs were assembled, it is recommended to check whether the assembled LEDs are damaged by static electricity or not.
  It is easy to find static-damaged LEDs by a light-on test.
  'Light-on test criterion

Condition	Judgmental criterion
IF=1mA / die	No-lighting should not exist.

- ESD tolerance of this product is 300V (HBM, based on JEITA ED-4701 Test B).

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Precautions (continued)

6. Please be aware that this product should not come into contact with other parts in assembled status.

7.Drive circuit
- A constant current circuit is recommended as a drive circuit.
And when two or more LED packages are connected, the series connection between each package is recommended.
- Please design a circuit that prevents any reverse voltage (excess current) from being applied to this product instentaneously when the circuit is ON or OFF.

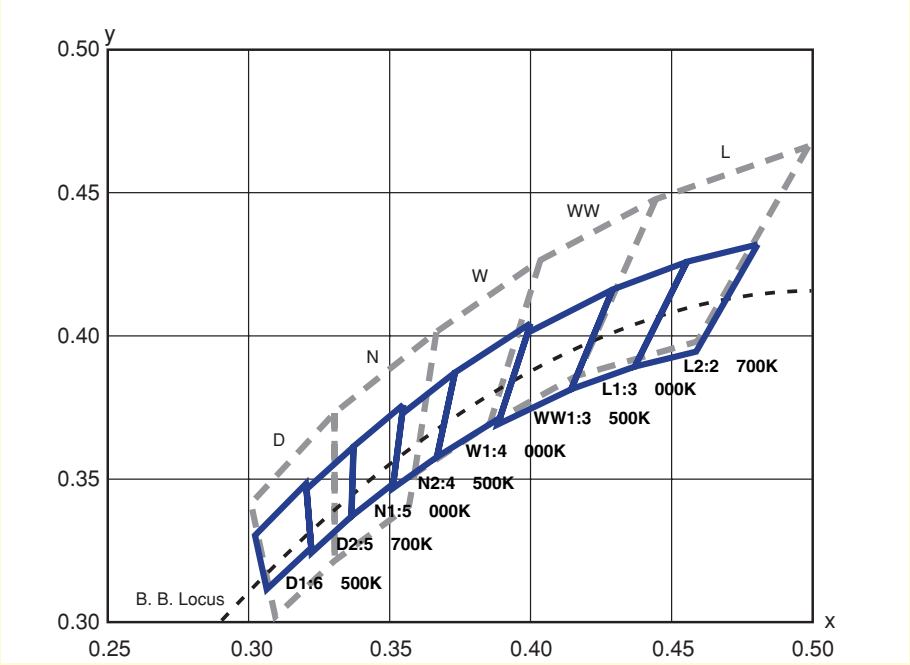
8. Heat generation
- As this product is designed with consideration of the heat release property of module, a heat release design is required to use this product efficiently.
Please ensure that heat generation is not in excess of the absolute maximum rating. (Refer to 4-1 Performance)
- Factors responsible for an increase in temperature include heat generation attributed to ambient temperature conditions or power dissipation. Thus, drive conditions should be taken into consideration, depending on ambient temperature (Ta).

9. Recommended soldering
- Soldering operation should be performed within 3.5 seconds per land using a soldering iron of 40W or lower. The temperature of a soldering iron should be adjusted 350C or lower.
- No external force is applied to sealing resin during soldering operation.
- Please do not handle a product until it returns to a normal temperature.
Note: This product is not adaptable to reflow process.

10. Other
- This product complies with RoHs directives.
- This product is intended for the application in general electronic devices (such as office automation equipment, communication devices, audio-video equipment, home electrical appliances, measurement hardware and others).
In cases where this product is used for the applications that requires high reliability or could directly affect human life or health due to failure or malfunction (aerospace hardware, medical equipment, atomic control equipment and others), please consult with our sales representatives beforehand.
- Our warranty does not cover situations where this product undergoes secondary fabrication such as changes in shape.
-An agreement of formal product specifications is required prior to mass production.
- The specifications and appearance of this product are subject to change without advanced notice.

■Compliance with ANSI

High color rendering use in M15001 series

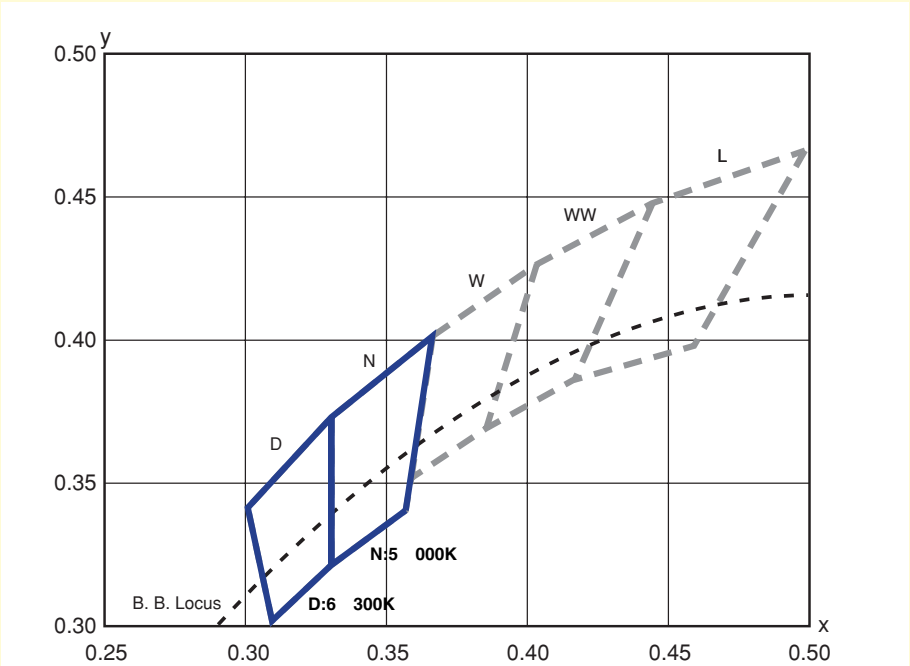


Package

Package name	L2 2 700K	L1 3 000K	WW1 3 500K	W1 4 000K	N2 4 500K	N1 5 000K	D2 5 700K	D1 6 500K
M15001-MC13	—	○	—	—	—	—	—	—

■High efficiency type

High effciency type in M15001 series



Package

Package name	N 5 000K	D 6 300K
M15001-C13	○	—

Driving LEDs

1. Introduction

Prior to driving an LED, which is a kind of semiconductor product, it is necessary to thoroughly comprehend its properties. For instance, fluctuation of the forward voltage *Vf* on an LED causes steep variations in the forward current *If*. In the case of Fig. 1, if the temperature conditions are constant, a 10% rise in *Vf* results in an increase of *If* by more than 40%.

Fluctuations in the forward current have a significant effect on light emission, heat generation, and other phenomena on LEDs. Especially regarding high-output lighting LEDs driven by large current, strict control of the forward current is important. In addition, the forward voltage fluctuates due to temperature, and measures for heat release are therefore a crucial factor.

Thus, when driving our LEDs, be sure to read the specifications and application notes for the relevant products and take measures according to their properties.

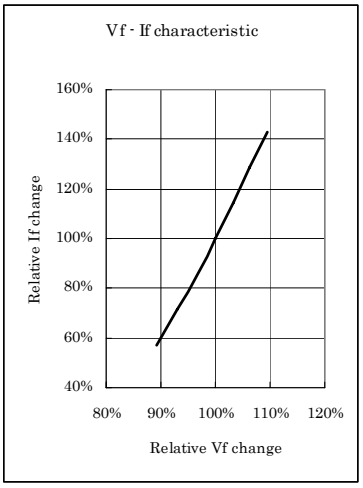


Fig. 1

2. Constant current driving system (recommended)

Even under the condition that the forward voltage fluctuates due to heat generation or other reasons, the constant current driving system supplies a certain current to LEDs and allows relatively stable driving under varying environmental conditions.

In general, as shown in the example of Fig. 2, the forward voltage to apply constant current to an LED tends to decrease as the temperature increases.

We recommend the constant current driving system with the object of stable light-emitting output and reliability.

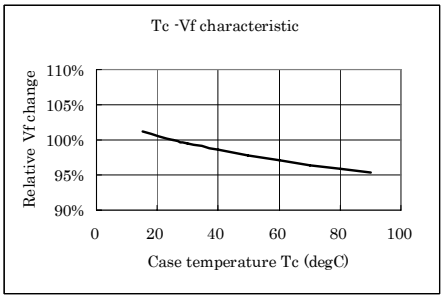


Fig. 2

3. Constant voltage driving system

As mentioned above, the forward voltage to apply constant current to an LED tends to decrease as the temperature increases. In the case of Fig. 2, when the case temperature *Tc* is 90°C, the same amount of current is achieved by the approx. 5% lower forward voltage than at *Tc* = 25°C. If constant voltage driving is provided under these conditions, comparative overvoltage and overcurrent driving status is possible.

If constant voltage driving is employed, assume the temperature in actual usage and implement appropriate measures to limit the current.

4. Precautions on inrush current

If an LED is connected to capacitive loads, such as capacitors, an instantaneous inrush current may occur when the system is turned on/off. (For instance, when the secondary side of a power supply circuit in the energized state is turned on/off.) Avoid any possible occurrence of inrush current. If it is unavoidable, implement measures so that the absolute maximum rating of the LED will not be exceeded.

5. Connection among multiple LEDs (Serial connection is recommended.)

When multiple units of identical LED products are connected, a serial connection makes the current through LEDs uniform. We recommend serial connections with the object of stable light-emitting output and reliability.

When they are connected in parallel, you need to consider variations in the forward voltage among the LEDs. To apply even current to each LED connected in parallel and which has different properties on forward voltage, implementation of measures is required such that an appropriate current-regulation resistor for the actual temperature conditions is connected to each LED in serial.