SHARP

Spec No.	DG-099005B
Issue	16-Apr-10

SPECIFICATIONS

Product Type

Light Emitting Diode Module

Model No.

GW5BTC30K00

*These specifications contain<u>14</u> pages including the cover and appendix. If you have any objections, please contact us before issuing purchasing order.

CUSTOMERS ACCEPTANCE

DATE: _____

BY:

PRESENTED

BY: M.Katoh Dept. General Manager

REVIEWED BY:

PREPARED BY:

Development Department II System Device Division III Electronic Components And Devices Group SHARP CORPORATION

Model No. **GW5BTC30K00**



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• When using the products covered herein, please observe the conditions written herein and the precautions outlined in the following paragraphs. In no event shall the company be liable for any damages resulting form failure to strictly adhere to these conditions and precautions.

(1) Please do verify the validity of this part after assembling it in customer's products, when customer wants to make catalogue and instruction manual based on the specification sheet of this part.

(2) The products covered herein are designed and manufactured for the following application areas. When using the products covered herein for the equipment listed in paragraph (3), even for the following application areas, be sure to observe the precautions given in Paragraph (3). Never use the products for the equipment listed in Paragraph (4).

- \cdot Office electronics
- ·Instrumentation and measuring equipment
- Machine tools
- Audiovisual equipment
- •Home appliances
- ·Communication equipment other than for trunk lines
- (3) These contemplating using the products covered herein for the following

equipment which demands high reliability, should first contact a sales representative of the company and then accept responsibility for incorporating into the design fail-safe operation, redundancy, and other appropriate measures for ensuring reliability and safety of the equipment and the overall system.

·Control and safety devices for airplanes, trains, automobiles, and other

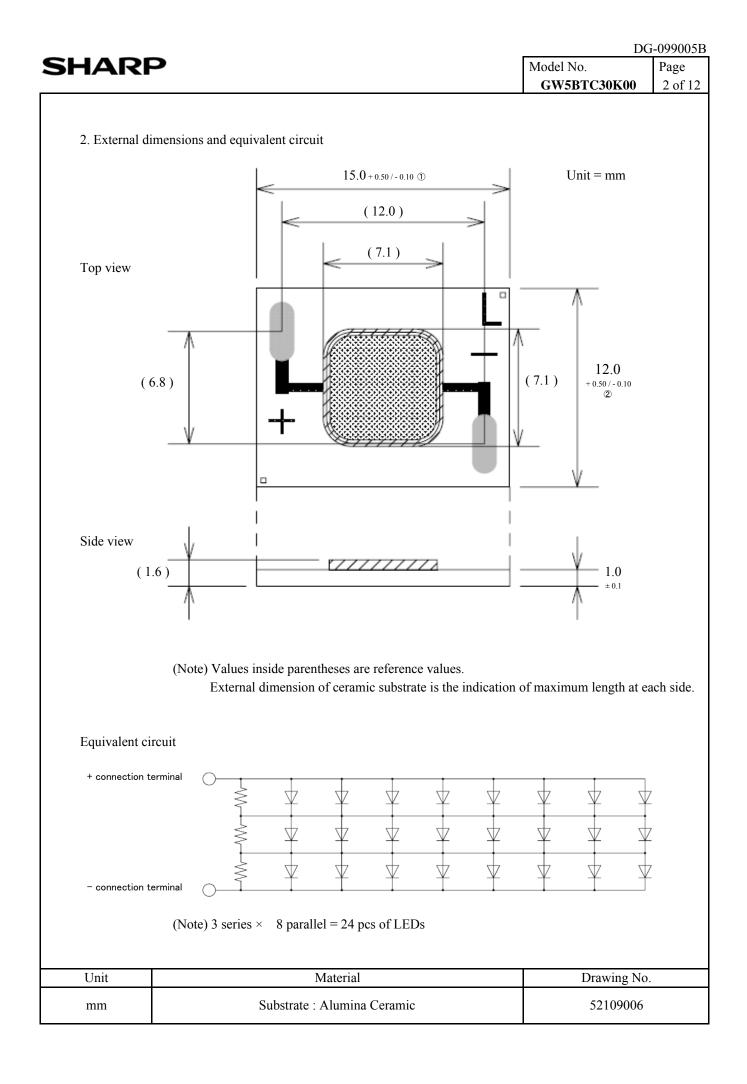
- transportation equipment
- · Mainframe computers
- ·traffic control systems
- ·Gas leak detectors and automatic cutoff devices
- ·Rescue and security equipment
- ·Other safety devices and safety equipment, etc.

(4) Do not use the products covered herein for the following equipment which

- demands extremely high performance in terms of functionality, reliability, or accuracy.
 - ·Aerospace equipment
 - ·Communications equipment for trunk lines
 - ·Control equipment for the nuclear power industry
 - ·Medical equipment related to life support, etc.
- (5) please direct all queries and comments regarding the interpretation of the above four Paragraphs to a sales representative of the company.

 Please direct all queries regarding the products covered herein to a sales representative of the company.

	DG-0990
HARP	Model No.PageGW5BTC30K001 or
	GWSBICSUK00 10.
CWEDTC201200	
GW5BTC30K00 spe	cirications
1. Application These specifications apply to the light emitting diode mo	dule Model No. GW5BTC30K00
[High color rendering Warm White (from InGaN Blue L	
Main application : Lighting	· · · · · · · · · · · · · · · · · · ·
2. External dimensions and equivalent circuit	Refer to Page 2.
3. Ratings and characteristics	Refer to Page 3 - 5.
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4-2. Failure criteria	
5. Quality level	Refer to Page 7
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6-2. Packing	
6-3. Label	
6-4. Indication printed on product	
7. Precautions	Refer to Page 10 - 12.
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SHARP

3. Ratings and characteristics

3-1. Absolute maximum ratings

Item	Symbol	Rating	Unit
Power Dissipation *1,4	Р	4.6	W
Forward Current *1,4	I _F	400	mA
Reverse Voltage *2,4	V _R	-15	V
Operating Temperature *3	T _{opr}	- 30 ~ + 90	°C
Storage Temperature	T _{stg}	- 40 ~ + 100	°C

*1 Power dissipation and forward current are the value when the module temperature is set lower than the rating by using an adequate heat sink.

*2 Voltage resistible at initial connection error

(Not dealing with the possibility of always-on reverse voltage.)

*3 Case temperature Tc (Refer to measuring point for case temperature in the next page.) Refer to "Derating curve" in the next page as for operating current.

*4 $T_c = 25 \ ^{\circ}C$

3-2. Electro-optical characteristics

 $(T_c = 25 \ ^{\circ}C)$

						(° /
Item	Symbol	Condition	MIN.	TYP.	MAX.	Unit
Forward Voltage *5	$V_{\rm F}$	$I_{\rm F} = 360 {\rm mA}$	9.0	(10.2)	11.5	V
Luminous Flux *6	Φ	$I_{\rm F} = 360 {\rm mA}$	160	(210)	-	lm
Chromaticity Coordinates *7	х	$I_{\rm F} = 360 {\rm mA}$	-	(0.435)	-	-
Chromatienty Coordinates • 7	У	$I_{\rm F} = 500 {\rm mA}$	-	(0.403)	-	-
Color Temperature	-	$I_{\rm F} = 360 {\rm mA}$	(2900)	(3025)	(3150)	K
General Color Rendering Index *8	Ra	$I_{\rm F} = 360 {\rm mA}$	83	(87)	-	-

(Note) Values inside parentheses are shown for reference purpose only.

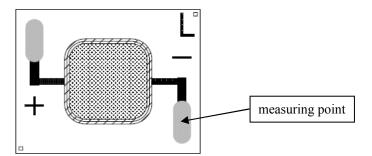
- *5 (After 20 ms drive, Measurement tolerance: ± 3 %)
- *6 Monitored by Sharp's 8 inch integrating sphere and Otsuka electronics MCPD-LE3400 (After 20 ms drive, Measurement tolerance: ± 20 %)
- *7 Monitored by Sharp's 8 inch integrating sphere and Otsuka electronics MCPD-LE3400 (After 20 ms drive, Measurement tolerance: ± 0.01)
- *8 Monitored by Sharp's 8 inch integrating sphere and Otsuka electronics MCPD-LE3400 (After 20 ms drive, Measurement tolerance: ± 4)

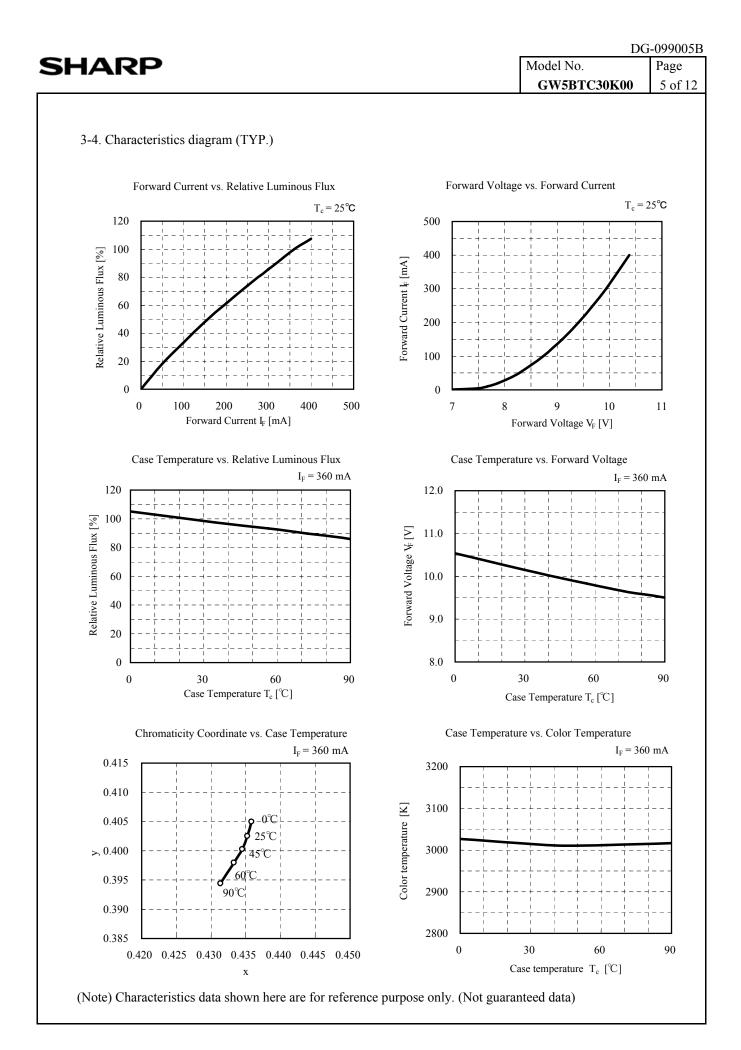
>														C30K00	
curve															
			Forv	vard C	Curren	t Dera	ating (Curve							
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														_	
	a curve			Forve	Forward C	Forward Curren	Forward Current Der	Forward Current Derating (Forward Current Derating Curve	Forward Current Derating Curve			GV	GW5BT	GW5BTC30K00

(Note) To keep the case temperature lower than the rating, enough heat-radiation performance needs to be secured by using an adequate heat sink.

Case Temperature T_c [°C]

(Measuring point for case temperature)





4. Reliability

The reliability of products shall be satisfied with items listed below.

4-1.7	Test items and test condition	tions	Co	nfidence le	vel: 90 %
No.	Test item	Test conditions	Samples	Defective	LTPD
			n	C	(%)
1	Temperature Cycle	- 40 °C(30 min) \sim + 100 °C(30 min), 100 cycles			
			11	0	20
2	Temperature Humidity	$T_{stg} = +60 ^{\circ}\text{C}, \text{RH} = 90 ^{\circ}\text{, Time} = 1000 \text{ h}$			
	Storage		11	0	20
3	High Temperature	$T_{stg} = +100^{\circ}C$, Time = 1000 h			
	Storage		11	0	20
4	Low Temperature	$T_{stg} = -40 \text{ °C}, \text{ Time} = 1000 \text{ h}$			
	Storage		11	0	20
5	Steady State Operating	$T_c = 60 \text{ °C}, I_F = 400 \text{ mA}, \text{ Time} = 1000 \text{ h}$			
	Life		11	0	20
6	Shock	Acceleration: 15000 m/s ² , Pulse width: 0.5 ms			
		Direction: 3 directions (X, Y and Z)			
		3 trials in each direction	5	0	50
7	Vibration	Frequency: 100 to 2000 Hz for 4 minutes per trial			
		Acceleration: 200 m/s ²			
		Direction: 3 directions (X, Y and Z)			
		4 trials in each direction	5	0	50

4-2. Failure criteria

No.	Parameter	Symbol	Failure criteria
1	Forward Voltage	$V_{\rm F}$	$V_F > U.S.L \times 1.1$
2	Luminous Flux	Φ	$\Phi \le$ Initial value $\times 0.7$

(Note) U.S.L. stands for Upper Specification Limit.

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	NRP	1	Model No.	
			GW5BTC301	K00
5. Qu	ality level			
	Applied standard			
I	SO2859-1			
5-2.	Sampling inspecti	ion		
		mpling plan, level S-4.		
5 2	Inspection items	and defect criteria		
5-3. No.	Inspection items a	and defect criteria Defect criteria	Classification	AQL
			Major	
No. 1	Item No radiation	Defect criteria No light emitting		AQL 0.1%
No.	Item No radiation Electro-optical	Defect criteria No light emitting Not conforming to the specification	Major	
<u>No.</u> 1 2	Item No radiation Electro-optical characteristics	Defect criteria No light emitting Not conforming to the specification (Forward voltage, Luminous flux and Chromaticity)	Major	
No. 1	Item No radiation Electro-optical characteristics External	Defect criteria No light emitting Not conforming to the specification (Forward voltage, Luminous flux and Chromaticity) Not conforming to the specified dimensions	Major	
No. 1 2 3	Item No radiation Electro-optical characteristics	Defect criteria No light emitting Not conforming to the specification (Forward voltage, Luminous flux and Chromaticity)	Major defect	
<u>No.</u> 1 2	Item No radiation Electro-optical characteristics External	Defect criteria No light emitting Not conforming to the specification (Forward voltage, Luminous flux and Chromaticity) Not conforming to the specified dimensions	Major	
No. 1 2 3	Item No radiation Electro-optical characteristics External dimensions	Defect criteria No light emitting Not conforming to the specification (Forward voltage, Luminous flux and Chromaticity) Not conforming to the specified dimensions (External dimensions of ① and ② shown in Page 2)	Major defect	
No. 1 2 3	Item No radiation Electro-optical characteristics External dimensions	Defect criteria No light emitting Not conforming to the specification (Forward voltage, Luminous flux and Chromaticity) Not conforming to the specified dimensions (External dimensions of ① and ② shown in Page 2) Nonconformity observed in product appearance is determined	Major defect Minor	0.1%
No. 1 2 3	Item No radiation Electro-optical characteristics External dimensions	Defect criteria No light emitting Not conforming to the specification (Forward voltage, Luminous flux and Chromaticity) Not conforming to the specified dimensions (External dimensions of ① and ② shown in Page 2) Nonconformity observed in product appearance is determined as defective only when electro-optical characteristics is affected by.	Major defect Minor	0.1%
No. 1 2 3	Item No radiation Electro-optical characteristics External dimensions	Defect criteria No light emitting Not conforming to the specification (Forward voltage, Luminous flux and Chromaticity) Not conforming to the specified dimensions (External dimensions of ① and ② shown in Page 2) Nonconformity observed in product appearance is determined as defective only when electro-optical characteristics is affected by. <if above="" any="" arises="" criterion="" mentioned="" of="" question="" regardless=""></if>	Major defect Minor	0.1%
No. 1 2 3	Item No radiation Electro-optical characteristics External dimensions	Defect criteria No light emitting Not conforming to the specification (Forward voltage, Luminous flux and Chromaticity) Not conforming to the specified dimensions (External dimensions of ① and ② shown in Page 2) Nonconformity observed in product appearance is determined as defective only when electro-optical characteristics is affected by. <if above="" any="" arises="" criterion="" mentioned="" of="" question="" regardless=""> ■ Foreign material, scratch, or bubble at emitting area: 0.8 mm φ</if>	Major defect Minor	0.1%

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IARP					Model No.	Page
					GW5BTC30K00	8 of 12
6. Supplements						
6-1. Chromaticity ra	ank table				(Tolerance: $x,y \pm$	0.01)
o 1. enfollationy id					(Totorunee: x,y =	0.01)
		<pre><pre><pre><pre><pre><pre><pre><pre></pre></pre></pre></pre></pre></pre></pre></pre>				
		$50 \text{ mA}, \text{T}_{c} = 1$	25°C)			
Range	Chromaticity					
	Point 1 Point 2		oint 4			
x	0.4310 0.4243		0.4460			
у	0.4100 0.3950	0.3950 (0.4100			
Davil	Chromaticity	coordinates				
Rank	Point 1 Point 2		oint 4			
1 X	0.4310 0.4243	0.4311 ().4383			
$1 \frac{x}{y}$	0.4100 0.3950	0.3950 (0.4100			
2 <u>x</u>	0.4383 0.4311	0.4384 ().4460			
2 у	0.4100 0.3950	0.3950 (0.4100			
	Chror	naticity Diagra	n			
	Child	national Diagram				
0.420		1 ;	í			
		· /			.1	
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		[Ý		<i>:</i>	
0.410				· · ·		
0.110		<i>i</i> /	: [;			
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> 0.400		/ ./				
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L	.' _ <i>_ </i> <u>+</u> _ <u>-</u> <u>-</u>					
	3100	X 3000K	2900K	·		

0.450

0.390

0.380

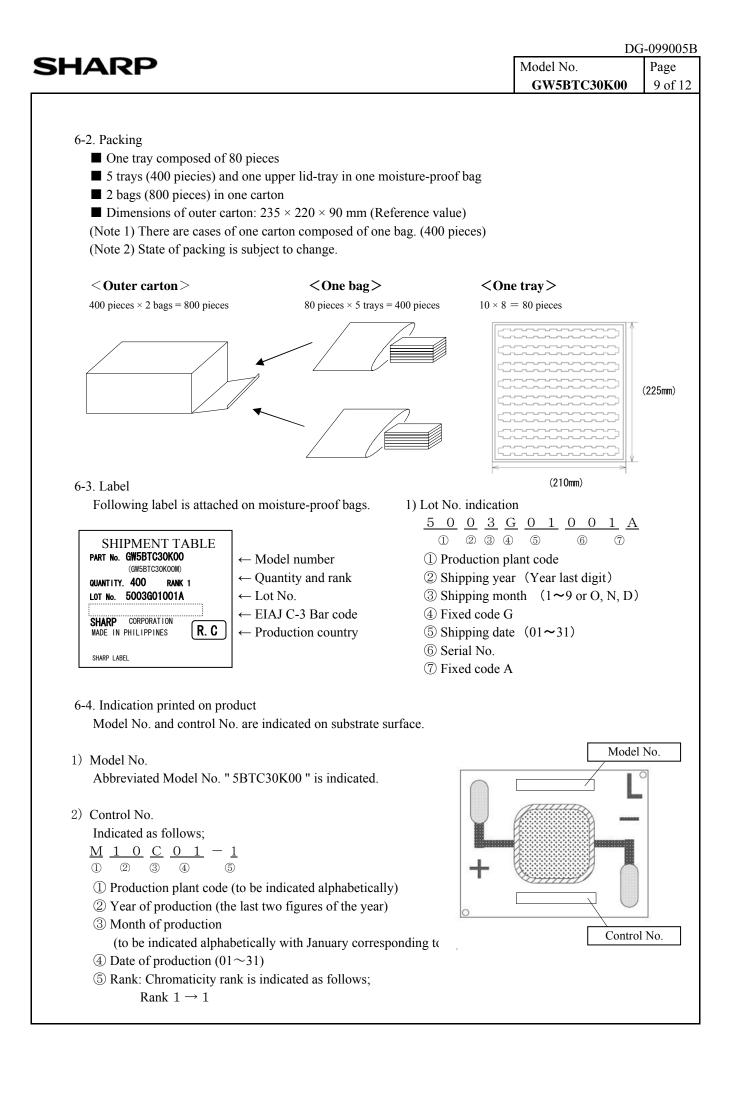
0.410

0.420

0.430

x

0.440



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IARP	GW5BTC30K00	Pag 10 c
	GWSBICS0K00	100
7. Precautions		
① Storage conditions		
Please follow the conditions below.		
• Before opened: Temperature 5 \sim 30 °C, Relative humidity less than 6	i0 %.	
(Before opened LED should be used within a year)		
• After opened: Temperature 5 \sim 30 °C, Relative humidity less than 60	%.	
(Please apply soldering within 1 week)		
•After opened LED should be kept in an aluminum moisture proof bag v	vith a moisture	
absorbent material (silica gel).		
 Avoid exposing to air with corrosive gas. 		
If exposed, electrode surface would be damaged, which may affect sold	lering.	
② Usage conditions		
This product is not designed for the use under any of the following cond	litions.	
Please confirm performance and reliability well enough if you use under	r any of the following condition	ions;
• In a place with a lot of moisture, dew condensation, briny air, and corr	osive gas.	
(Cl, H_2S , NH_3 , SO_2 , NO_{X_1} etc.)		
• Under the direct sunlight, outdoor exposure, and in a dusty place.		
• In water, oil, medical fluid, and organic solvent.		
③ Heat radiation		
If forward current (I_F) is applied to single-state module at any current, the	nere is a risk of damaging LE	D
or emitting smoke.		
Equip with specified heat radiator, and avoid heat stuffed inside the mod	lule.	
④ Installation		
Material of board is alumina ceramic. If installed inappropriately, trouble	e of no radiation may occur d	ue to
board crack or overheat. Please take particular notice for installation.		
Refer to the following cautions on installation.		
Apply thermolysis adhesive, adhesive sheet or peculiar connector wh		
In case of applying adhesive or adhesive sheet only, check the effecti		-
If LED comes off from heat radiator, unusual temperature rise entails	•	ding
device deterioration, coming off of solder at leads, and emitting smol		
• When LED device is mechanically fixed or locked, Please take into c	onsideration regarding the m	ethod
attachment due to fail from stress.		
Avoid convexly uneven boards.		
Convex board is subject to substrate cracking or debasement of heat r		
• It is recommended to apply adhesive or adhesive sheet with high ther	mai conductivity	
for radiation of heat effectively.	lhagiva ghast in initial and 1-	na tam
• Please take care about the influence of color change of adhesive or ac		ng tern
period, which may affect light output or color due to change of reflec	tance nom backside.	

		G-09900:
IARP	Model No.	Page
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 Do not touch resin part including white resin part on the surface of LE No light emission may occur due to damage of resin or cutting wire of When using tweezers, please handle by ceramic substrate part and avo For mounting, please handle by side part of ceramic or the specified ar 	ELEDs by outer force. Id touching resin part.	
 ⑤ Connecting method In case of solder connecting method, follow the conditions mentioned below the following the following state of th		
 Use Soldering iron with thermo controller (tip temperature 380 °C), wi Secure the solderwettability on whole solder pad and leads. During the soldering process, put the ceramic board on materials whose 		
not to radiate heat of soldering. • Warm up (with using a heated plate) the substrate is recommended before	ore soldering.	
(preheat condition: 100 $^\circ\mathrm{C}$ \sim 150 $^\circ\mathrm{C}$, within 60 sec)		
• Avoid touching a part of resin with soldering iron.		
• This product is not designed for reflow and flow soldering.		
• Avoid such lead arrangement as applying stress to solder-applied area.		
Please do not detach solder and make re-solder.		
Please solder evenly on each electrodes.Please prevent flux from touching to resin.		
6 Static electricity		
This product is subject to static electricity, so take measures to cope with	it	
Install circuit protection device to drive circuit, if necessary.	11.	
⑦ Drive method		
• Any reverse voltage cannot be applied to LEDs when they are in operat	tion or not.	
Design a circuit so that any flow of reverse or forward voltage can not be when they are out of operation.		
• Module is composed of LEDs connected in both series and parallel. Constant voltage power supply runs off more than specified current amo	unt due to lowered V_F	
caused by temperature rise. Constant current power supply is recommended to drive.		
(8) Cleaning		
Avoid cleaning, since silicone resin is eroded by cleaning.		
O Color-tone variation		
Chromaticity of this product is monitored by integrating sphere right after		
Chromaticity varies depending on measuring method, light spread condit	ion, or ambient temperature.	
Please verify your actual conditions before use.		

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10 Safety		
·Looking directly at LEDs for a long time may result in hurt your ey	es.	
•In case that excess current (over ratings) are supplied to the device,	hazardous phenomena includin	ıg
abnormal heat generation, emitting smoke, or catching fire can be c	aused.	
Take appropriate measures to excess current and voltage.		
•In case of solder connecting method, there is a possibility of fatigue	failure by heat.	
Please fix the leads in such case to protect from short circuit or leak	age of electricity caused by con	ntact.
·Please confirm the safety standards or regulations of application de	vices.	
•Please careful not to injure your hand by edge of ceramic substrate.		
① Other cautions		
Guarantee covers the compliance to the quality standards mentioned	in the Specifications,	
however it does not cover the compatibility with application of the e	nd-use, including assembly	
and usage environment.		
In case any quality problems occurred in the application of end-use,	details will be separately discu	ssed