BRIGHT LED ELECTRONICS CORP.

Specification for Approval

SAMPLES ATTACHED AREA

- **DEVICE NUMBER: BL-C9/G-31E-LC12**
- **CUSTOMER:**

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2016/6/21	1.0	1.0	1.0	1.0							Original Released

FOR CUSTOMER'S APPROVAL STAMP OR SIGNATURE

APPROVED	PURCHASE	MANUFACTURE	QUALITY	ENGINEERING

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ISSUED	APPROVED	PREPARED
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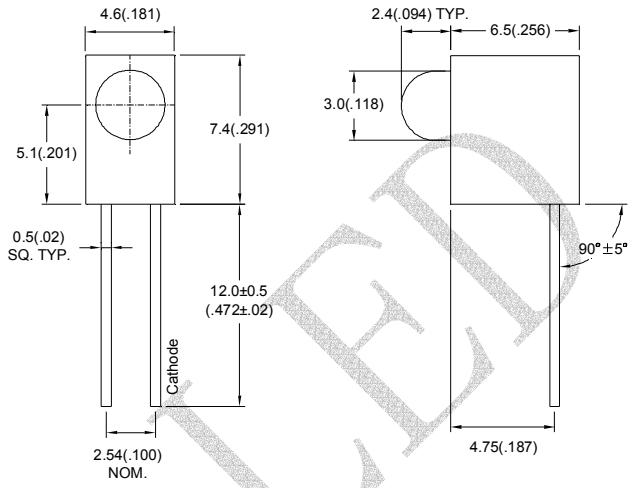
● Features:

1. Chip material: GaP /GaP
2. Emitted Color : Green
3. Lens Appearance : Green Diffused
4. Designed for ease in circuit board assembly.
5. Black case enhance contrast ratio.
6. Solid state light source.
7. Reliable and rugged.
8. This product don't contained restriction substance, compliance RoHS standard.

● Package dimensions



Notes:

1. All dimensions are in millimeters (inches).
2. Tolerance is ±0.25mm (0.01") unless otherwise specified.
3. Lead spacing is measured where the leads emerge from the package.
4. Specifications are subject to change without notice.

● Applications:

1. TV set
2. Monitor
3. Telephone
4. Computer
5. Circuit board

● Absolute maximum ratings(Ta=25℃)

Parameter	Symbol	Rating	Unit
Power Dissipation	Pd	80	mW
Forward Current	I_F	30	mA
Peak Forward Current*[1]	I_{FP}	150	mA
Reverse Voltage	V_R	5	V
Operating Temperature	Topr	-40℃~85℃	
Storage Temperature	Tstg	-40℃~85℃	

*[1]Condition for I_{FP} is pulse of 1/10 duty and 0.1msec width.

● Electrical and optical characteristics(Ta=25℃)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Forward Voltage	V_F	I_F=20mA	-	2.2	2.6	V
Luminous Intensity	Iv	I_F=20mA	-	35	-	mcd
Reverse Current	I_R	V_R=5V	-	-	100	μA
Peak Wave Length	λp	I_F=20mA	-	568	-	nm
Dominant Wave Length	λd	I_F=20mA	560	-	574	nm
Spectral Line Half-width	Δλ	I_F=20mA	-	30	-	nm
Viewing Angle	$2\theta_{1/2}$	I_F=20mA	-	45	-	deg

● Typical electro-optical characteristics curves

Fig.1 Relative intensity vs. Wavelength

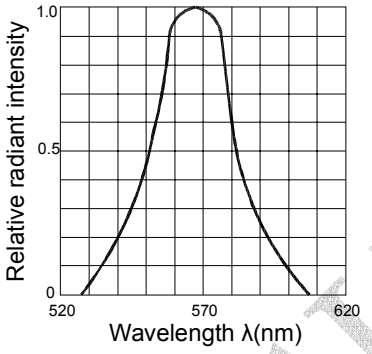


Fig.2 Forward current derating curve vs. Ambient temperature

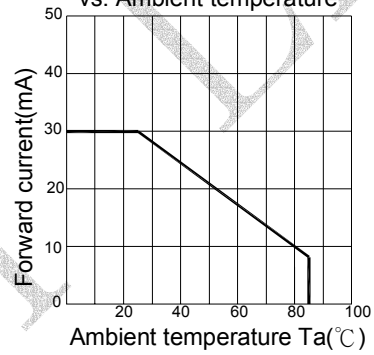


Fig.3 Forward current vs. Forward voltage

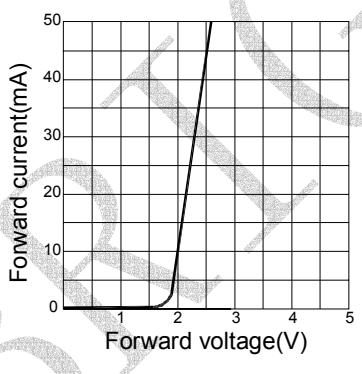


Fig.4 Relative luminous intensity vs. Ambient temperature

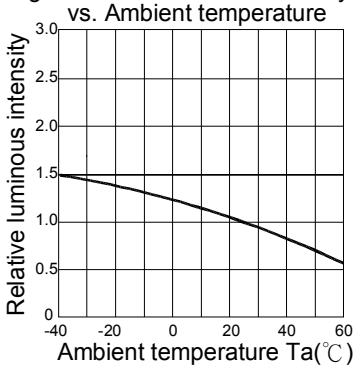


Fig.5 Relative luminous intensity vs. Forward current

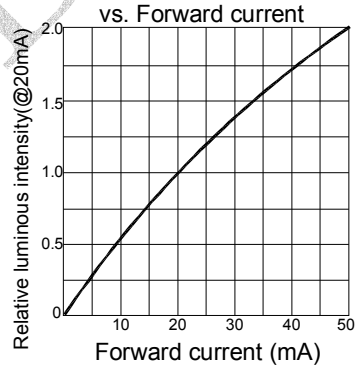
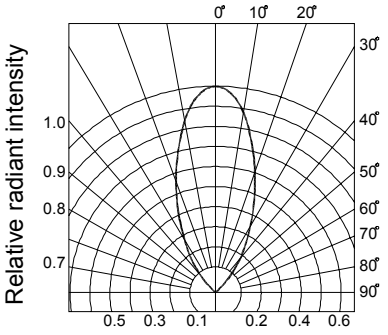


Fig.6 Radiation diagram



● Reliability Test

Classification	Test Item	Reference Standard	Test Conditions	Result
Endurance Test	Operation Life	MIL-STD-750:1026 MIL-STD-883:1005 JIS-C-7021 :B-1	I_F=20mA Ta=+25℃±5℃ Test time=1,000hrs	0/32
	High Temperature High Humidity Storage	MIL-STD-202:103B JIS-C-7021 :B-11	Ta=+85℃±5℃ RH=90%-95% Test time=240hrs	0/32
	High Temperature Storage	MIL-STD-883:1008 JIS-C-7021 :B-10	High Ta=+85℃±5℃ Test time=1,000hrs	0/32
	Low Temperature Storage	JIS-C-7021 :B-12	Low Ta=-45℃±5℃ Test time=1,000hrs	0/32
Environmental Test	Temperature Cycling	MIL-STD-202:107D MIL-STD-750:1051 MIL-STD-883:1010 JIS-C-7021 :A-4	Ta： +85℃(30min) ~ +25℃(5min) ~ -45℃(30min) ~ +25℃(5min) Test Time ： 70min/ctcle 10cycle	0/32
	Thermal Shock	MIL-STD-202:107D MIL-STD-750:1051 MIL-STD-883:1011	-45℃±5℃ ~+85℃±5℃ 20min 20min Test Time=10cycle	0/32
	Solder Resistance	MIL-STD-202:201A MIL-STD-750:2031 JIS-C-7021 :A-1	Preheating： 120℃,within 120-180 sec. Operation heating： 255℃±5℃within 5 sec.260℃ (Max)	0/32
	Solderability	MIL-STD-202F:208D MIL-STD-750D:2026 MIL-STD-883D:2003 JIS C 7021:A-2	T.sol=230±5℃ Dwell Time=5±1secs	0/32

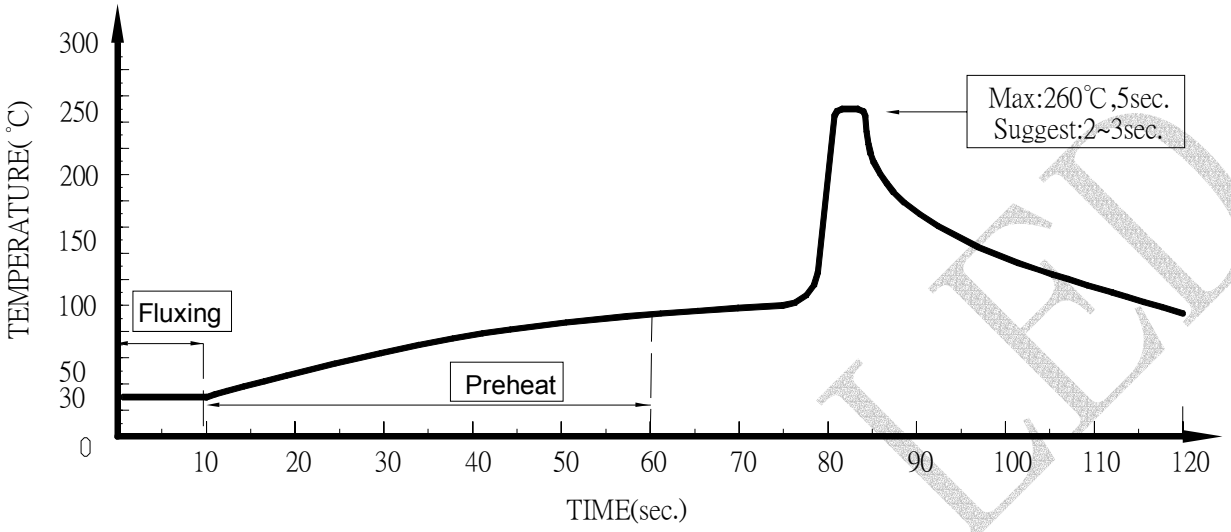
● Judgment criteria of failure for the reliability

Measuring items	Symbol	Measuring conditions	Judgment criteria for failure
Forward voltage	V_F (V)	I_F=20mA	Over U^1x1.2
Reverse current	I_R (uA)	V_R=5V	Over U^1x2
Luminous intensity	Iv (mcd)	I_F=20mA	Below S^1X0.5

Note: 1. U means the upper limit of specified characteristics. S means initial value.

2. Measurment shall be taken between 2 hours and after the test pieces have been returned to normal ambient conditions after completion of each test.

●Dip Soldering



1. Please avoid any external stress applied to the lead-frames and epoxy while the LEDs are at high temperature,especially during soldering
2. DIP soldering and hand soldering should not be done more than one time.
3. After soldering, avoid the epoxy lens from mechanical shock or vibration until the LEDs are back to room temerature.
4. Avoid rapid cooling during temperature ramp-down process
5. Although the soldering condition is recommended above, soldering at the lowest possible temperature is feasible for the LEDs

●IRON Soldering

A：Max：350℃ Within 3 sec. One time only.

B：The products of 3mm without flange, welding condition of flat plate PCB Max：350℃ Within 2 sec. One time only