LITEON®
OPTOELECTRONICS

Through Hole Lamp

Product Data Sheet

LTL1BETBEK5-HF

Spec No.: DS20-2011-0132

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Revision: B

LITE-ON DCC

RELEASE

BNS-OD-FC001/A4

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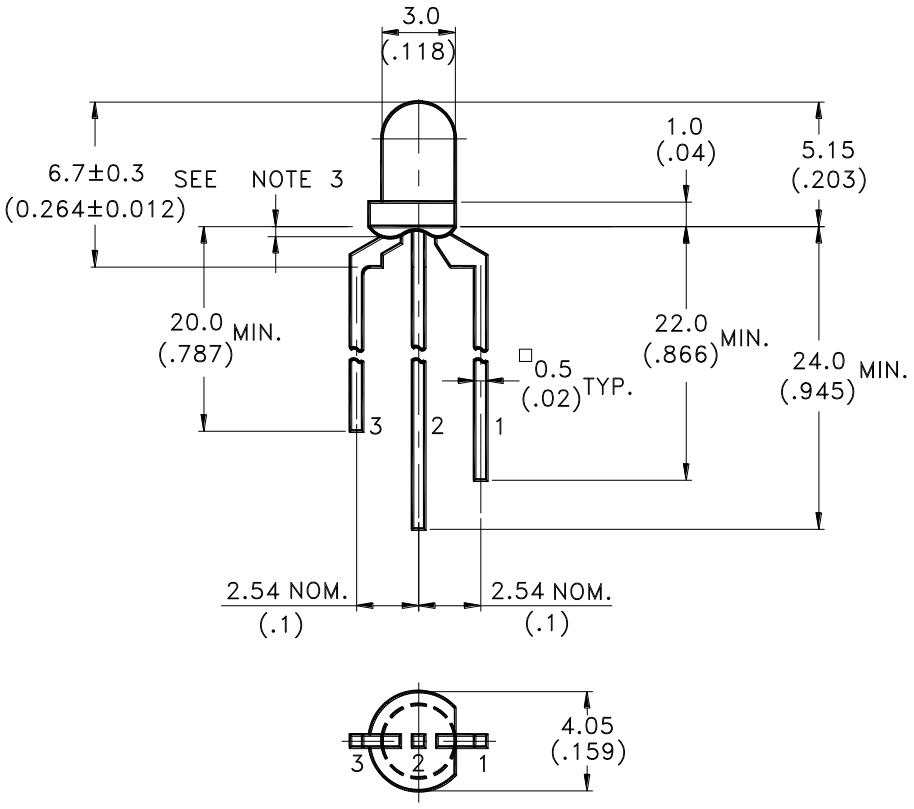
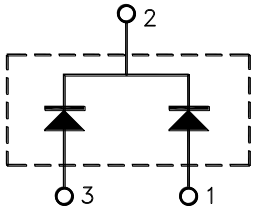
Features

* Lead (Pb) free product – RoHS compliant.
* Halogen free product (Cl<900ppm, Br<900ppm; Cl+Br<1500ppm).
* Blue and Red chips are matched for uniform light output.
* T-1 type package.
* Long life-solid state reliability.
* Low power consumption.

Package Dimensions





1. Blue Anode
2. Common Cathode
3. Red Anode

Part No.	Lens	Source Color
LTL1BETBEK5 -HF	Water Clear	InGaN Blue / AlGaInP Red

Notes:

1. All dimensions are in millimeters (inches).
2. Tolerance is ±0.25mm(.010") unless otherwise noted.
3. Lead spacing is measured where the leads emerge from the package.
4. Specification is subject to change without notice.

Absolute Maximum Ratings at T_A=25℃

Parameter	Blue	Red	Unit
Power Dissipation	120	75	mW
Peak Forward Current (1/10 Duty Cycle, 0.1ms Pulse Width)	100	90	mA
DC Forward Current	30	30	mA
Derating Linear From 30℃ and 50℃	0.6	0.4	mA/℃
Electrostatic Discharge Threshold(HBM) Note A	1000		V
Operating Temperature Range	-20℃ to + 80℃		
Storage Temperature Range	-30℃ to + 100℃		
Lead Soldering Temperature [2 mm(.08") From Body]	260℃ for 5 Seconds Max.		

Electrical Optical Characteristics at T_A=25°C

Parameter	Symbol	Color	Min.	Typ.	Max.	Unit	Test Condition
Luminous Intensity	Iv	Blue Red	180 400	520 680	1500 1900	mcd	I_F = 20 mA Note 1,4
Viewing Angle	$2\theta_{1/2}$	Blue Red		30 30		deg	Note 2 (Fig.6)
Peak Emission	λp	Blue Red		468 632		nm	Measurement @Peak (Fig.1)
Dominant Wavelength	λd	Blue Red	465 619	470 624	475 629	nm	Note 3
Spectral Line Half-Width	$\Delta\lambda$	Blue Red		22 20		nm	
Forward Voltage	V_F	Blue Red		3.5 2.05	3.9 2.5	V	I_F = 20 mA
Reverse Current	I_R	Blue Red			100	μA	Note 5 V_R = 5V

Note: 1. Luminous intensity is measured with a light sensor and filter combination that approximates the CIE (Commission International De L'Eclairage) eye-response curve.

2. $\theta_{1/2}$ is the off-axis angle at which the luminous intensity is half the axial luminous intensity.

3. The dominant wavelength, λ_d is derived from the CIE chromaticity diagram and represents the single wavelength which defines the color of the device.

4. The Iv guarantee should be added ±15%.

5. Reverse Voltage (V_R) condition is applied for IR test only. The device is not designed for reverse operation.

Typical Electrical / Optical Characteristics Curves

(25℃ Ambient Temperature Unless Otherwise Noted)

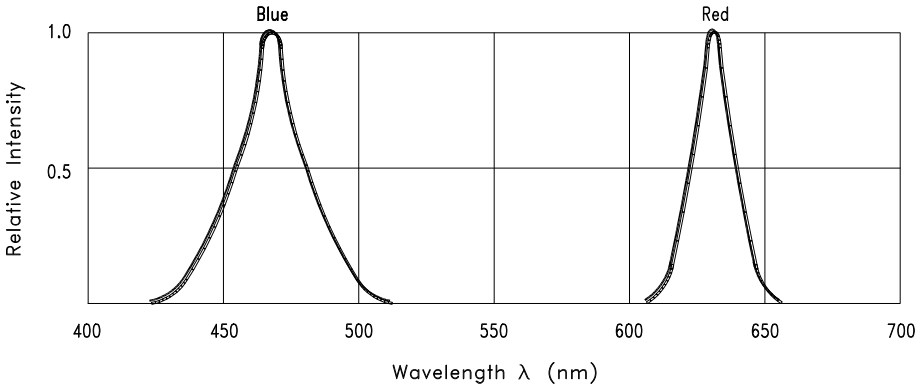


Fig.1 Relative Intensity vs. Wavelength

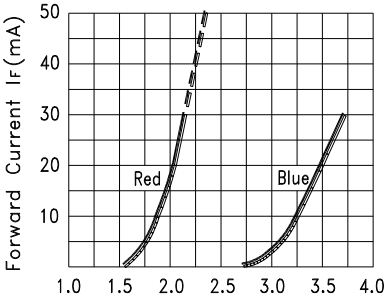


Fig.2 Forward Current vs. Forward Voltage

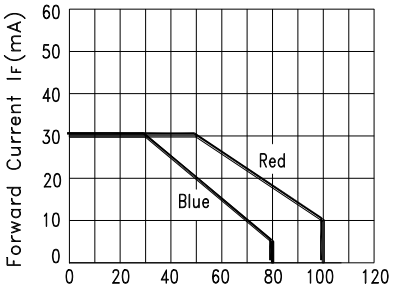


Fig.3 Forward Current Derating Curve

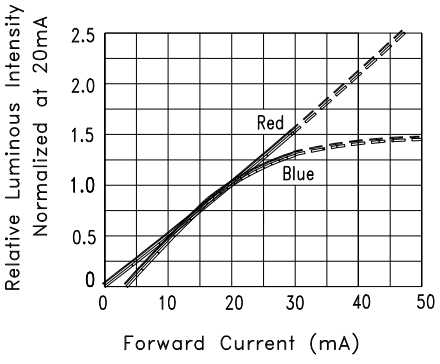


Fig.4 Relative Luminous Intensity vs. Forward Current

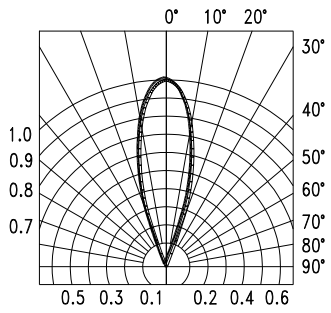
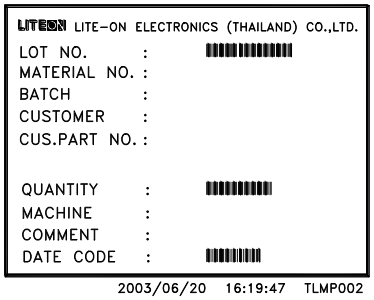
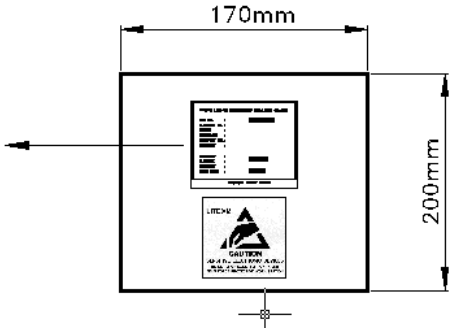


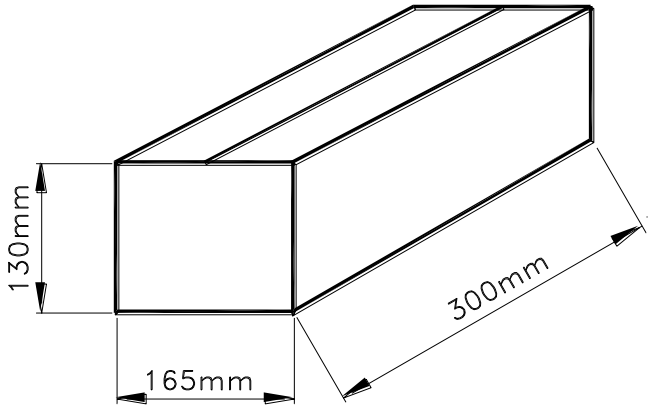
Fig.5 Spatial Distribution

500 or 200 pcs per packing bag

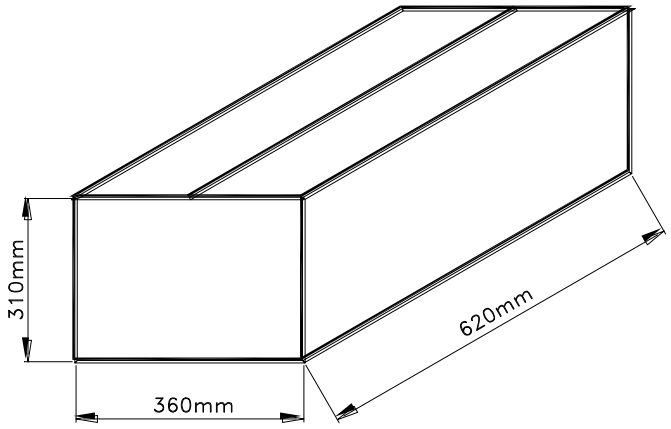




10 packing bags per inner carton
total 5000 pcs per inner carton



8 Inner cartons per outer carton
total 40000 pcs per outer carton
In every shipping lot, only the last pack will be non-full packing



Bin Table Specification

Bin Code	Luminous Intensity (Blue) Unit : mcd @20mA		Luminous Intensity (Red) Unit : mcd @20mA	
	Min.	Max.	Min.	Max.
HJ-LM	180	310	400	680
HJ-NP	180	310	680	1150
HJ-QR	180	310	1150	1900
KL-LM	310	520	400	680
KL-NP	310	520	680	1150
KL-QR	310	520	1150	1900
MN-LM	520	880	400	680
MN-NP	520	880	680	1150
MN-QR	520	880	1150	1900
PQ-LM	880	1500	400	680
PQ-NP	880	1500	680	1150
PQ-QR	880	1500	1150	1900

Note: Tolerance of each bin limit is ±15%

CAUTIONS

1. Application

The LEDs described here are intended to be used for ordinary electronic equipment (such as office equipment, communication equipment and household applications). Consult Liteon's Sales in advance for information on applications in which exceptional reliability is required, particularly when the failure or malfunction of the LEDs may directly jeopardize life or health (such as in aviation, transportation, traffic control equipment, medical and life support systems and safety devices).

2. Storage

The storage ambient for the LEDs should not exceed 30°C temperature or 70% relative humidity.
It is recommended that LEDs out of their original packaging are used within three months.
For extended storage out of their original packaging, it is recommended that the LEDs be stored in a sealed container with appropriate desiccant or in desiccators with nitrogen ambient.

3. Cleaning

Use alcohol-based cleaning solvents such as isopropyl alcohol to clean the LEDs if necessary.

4. Lead Forming & Assembly

During lead forming, the leads should be bent at a point at least 3mm from the base of LED lens.
Do not use the base of the lead frame as a fulcrum during forming.
Lead forming must be done before soldering, at normal temperature.
During assembly on PCB, use minimum clinch force possible to avoid excessive mechanical stress.

5. Soldering

When soldering, leave a minimum of 2mm clearance from the base of the lens to the soldering point.
Dipping the lens into the solder must be avoided.
Do not apply any external stress to the lead frame during soldering while the LED is at high temperature.
Recommended soldering conditions :

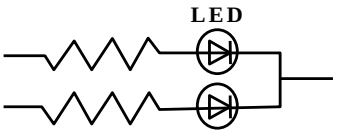
Soldering iron		Wave soldering	
Temperature Soldering time	350°C Max. 3 sec. Max. (one time only)	Pre-heat Pre-heat time Solder wave Soldering time	100°C Max. 60 sec. Max. 260°C Max. 5 sec. Max.

Note: Excessive soldering temperature and/or time might result in deformation of the LED lens or catastrophic failure of the LED. IR reflow is not suitable process for through hole type LED lamp product.

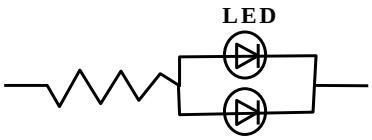
6. Drive Method

An LED is a current-operated device. In order to ensure intensity uniformity on multiple LEDs connected in parallel in an application, it is recommended that a current limiting resistor be incorporated in the drive circuit, in series with each LED as shown in Circuit A below.

Circuit model A



Circuit model B



(A) Recommended circuit

(B) The brightness of each LED might appear different due to the differences in the I-V characteristics of those LEDs

7. ESD (Electrostatic Discharge)

Static Electricity or power surge will damage the LED.

Suggestions to prevent ESD damage:

- Use a conductive wrist band or anti- electrostatic glove when handling these LEDs
- All devices, equipment, and machinery must be properly grounded
- Work tables, storage racks, etc. should be properly grounded
- Use ion blower to neutralize the static charge which might have built up on surface of the LEDs plastic lens as a result of friction between LEDs during storage and handing

Suggested checking list :

Training and Certification

1. Everyone working in a static-safe area is ESD-certified?
2. Training records kept and re-certification dates monitored?

Static-Safe Workstation & Work Areas

1. Static-safe workstation or work-areas have ESD signs?
2. All surfaces and objects at all static-safe workstation and within 1 ft measure less than 100V?
3. All ionizer activated, positioned towards the units?
4. Each work surface mats grounding is good?

Personnel Grounding

1. Every person (including visitors) handling ESD sensitive (ESDS) items wear wrist strap, heel strap or conductive shoes with conductive flooring?
2. If conductive footwear used, conductive flooring also present where operator stand or walk?
3. Garments, hairs or anything closer than 1 ft to ESD items measure less than 100V*?
4. Every wrist strap or heel strap/conductive shoes checked daily and result recorded for all DLs?
5. All wrist strap or heel strap checkers calibration up to date?

Note: *50V for Blue LED.

Device Handling

1. Every ESDS items identified by EIA-471 labels on item or packaging?
2. All ESDS items completely inside properly closed static-shielding containers when not at static-safe workstation?
3. No static charge generators (e.g. plastics) inside shielding containers with ESDS items?
4. All flexible conductive and dissipative package materials inspected before reuse or recycle?

Others

1. Audit result reported to entity ESD control coordinator?
2. Corrective action from previous audits completed?
3. Are audit records complete and on file?

8. Reliability Test

Classification	Test Item	Test Condition	Reference Standard
Endurance Test	Operation Life	Ta= Under Room Temperature As Per Data Sheet Maximum Rating *Test Time= 1000HRS	MIL-STD-750D:1026 (1995) MIL-STD-883D:1005 (1991) JIS C 7021:B-1 (1982)
	High Temperature High Humidity Storage	Ta= 65±5℃ RH= 90 ～ 95% Test Time= 240HRS	MIL-STD-202F: 103B(1980) JIS C 7021 : B-11(1982)
	High Temperature High Humidity Reverse BIAS	Ta= 65±5℃ RH= 90 ～ 95% VR=5V Test Time = 500HRS	JIS C 7021 : B-11(1982)
	High Temperature Storage	Ta= 105±5℃ *Test Time= 1000HRS	MIL-STD-883D:1008 (1991) JIS C 7021:B-10 (1982)
	Low Temperature Storage	Ta= -55±5℃ *Test Time=1000HRS	JIS C 7021:B-12 (1982)
Environmental Test	Temperature Cycling	100℃ ～ 25℃ ～ -40℃ ～ 25℃ 30mins 5mins 30mins 5mins 10 Cycles	MIL-STD-202F:107D (1980) MIL-STD-750D:1051(1995) MIL-STD-883D:1010 (1991) JIS C 7021: A-4(1982)
	Thermal Shock	105 ± 5℃ ～ -55℃ ± 5℃ 10mins 10mins 10 Cycles	MIL-STD-202F:107D(1980) MIL-STD-750D:1051(1995) MIL-STD-883D:1011 (1991)
	Solder Resistance	T.sol = 260 ℃ Max. Dwell Time= 5 secs Max. 3 Times dip	MIL-STD-202F:210A(1980) MIL-STD-750D:2031(1995) JIS C 7021: A-1(1982)
	Solderability	T. sol = 245 ± 5℃ Dwell Time= 5 ± 1secs	MIL-STD-202F:208D(1980) MIL-STD-750D:2026(1995) MIL-STD-883D:2003(1991) JIS C 7021: A-2(1982)

9. Others

The appearance and specifications of the product may be modified for improvement, without prior notice.