



Through Hole Lamp Product Data Sheet LTL-42M8NHKP

Spec No. :DS20-2011-0076
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LITE-ON DCC

RELEASE

BNS-OD-FC001/A4

Through Hole Lamp
LTL-42M8NHKP

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<u>Rev</u>	<u>Description</u>	<u>By</u>	<u>Date</u>
Above data for PD and Customer tracking only			
-	New Specification	Pachinee C.	06/04/2011
A	Update Format and Bin Table Specification	Javy H.	08/25/2020

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3. Absolute Maximum Ratings at TA=25°C

Parameter	Red	Yellow	Green (Yellow Green)	Unit
Power Dissipation	100	60	100	mW
Peak Forward Current (Duty Cycle ≤ 1/10, Pulse Width ≤ 10ms)	120	80	120	mA
DC Forward Current	30	20	30	mA
Operating Temperature Range	-40°C to + 85°C			
Storage Temperature Range	-40°C to + 100°C			
Lead Soldering Temperature [2.0mm (.079") From Body]	260°C for 5 Seconds Max.			

4. Electrical / Optical Characteristics at TA=25°C

Parameter	Symbol	Color		Min.		Typ.		Max.		Unit	Test Condition
		LED1, 2	LED3								
Luminous Intensity	IV	Red	Yellow	2.5	3.7	8.7	12.5	50	30	mcd	IF=10mA Note 1,4
		Yellow Green		5.6		12.6		50			
Viewing Angle	2θ1/2	Red	Yellow			60	60			deg	Note 2 (Fig.6)
		Yellow Green				60					
Peak Emission Wavelength	λP	Red	Yellow			630	585			nm	Measurement @Peak (Fig.1)
		Yellow Green				565					
Dominant Wavelength	λd	Red	Yellow	615	584	625	587	632	595	nm	IF=10 mA, Note 3
		Yellow Green		564		569		574			
Spectral Line Half-Width	Δλ	Red	Yellow			40	35			nm	
		Yellow Green				30					
Forward Voltage	VF	Red	Yellow			2.0	2.1	2.6	2.6	V	IF=10mA
		Yellow Green				2.1		2.6			
Reverse Current	IR	Red	Yellow					100		μA	VR = 5V, Note 5
		Yellow Green									

NOTE:

- Luminous intensity is measured with a light sensor and filter combination that approximates the CIE eye-response curve.
- θ1/2 is the off-axis angle at which the luminous intensity is half the axial luminous intensity.
- The dominant wavelength, λd is derived from the CIE chromaticity diagram and represents the single wavelength which defines the color of the device.
- Iv guarantee must be included with ±15% testing tolerance.
- Reverse voltage (VR) condition is applied for IR test only. The device is not designed for reverse operation.

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5. Typical Electrical / Optical Characteristics Curves

(25°C Ambient Temperature Unless Otherwise Noted)

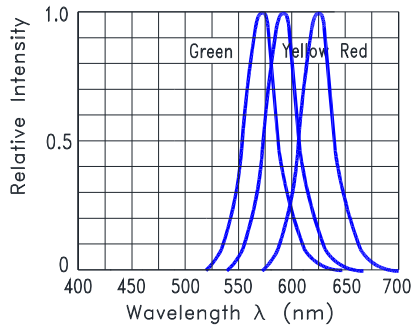


Fig.1 Relative Intensity VS. Wavelength

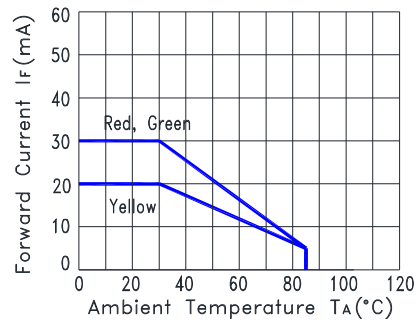


Fig.2 Forward Current Derating Curve

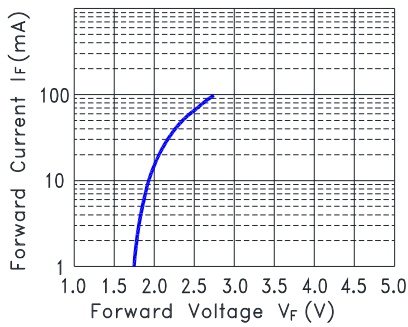


Fig.3 Forward Current vs. Forward Voltage

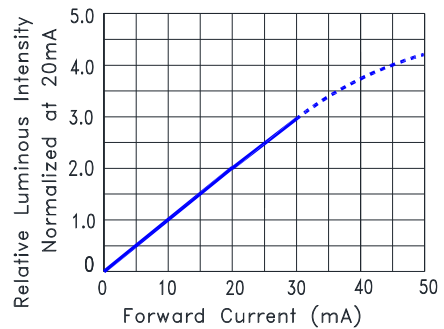


Fig.4 Relative Luminous Intensity vs. Forward Current

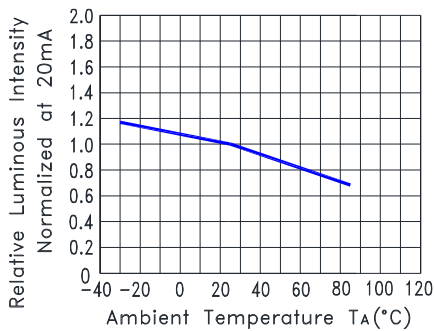


Fig.5 Relative Luminous Intensity VS. Ambient Temperature

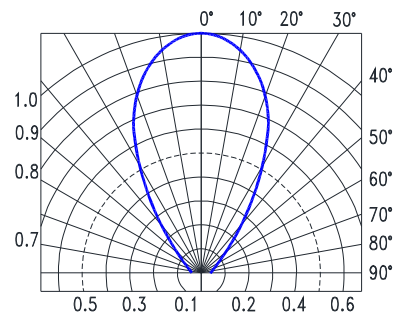
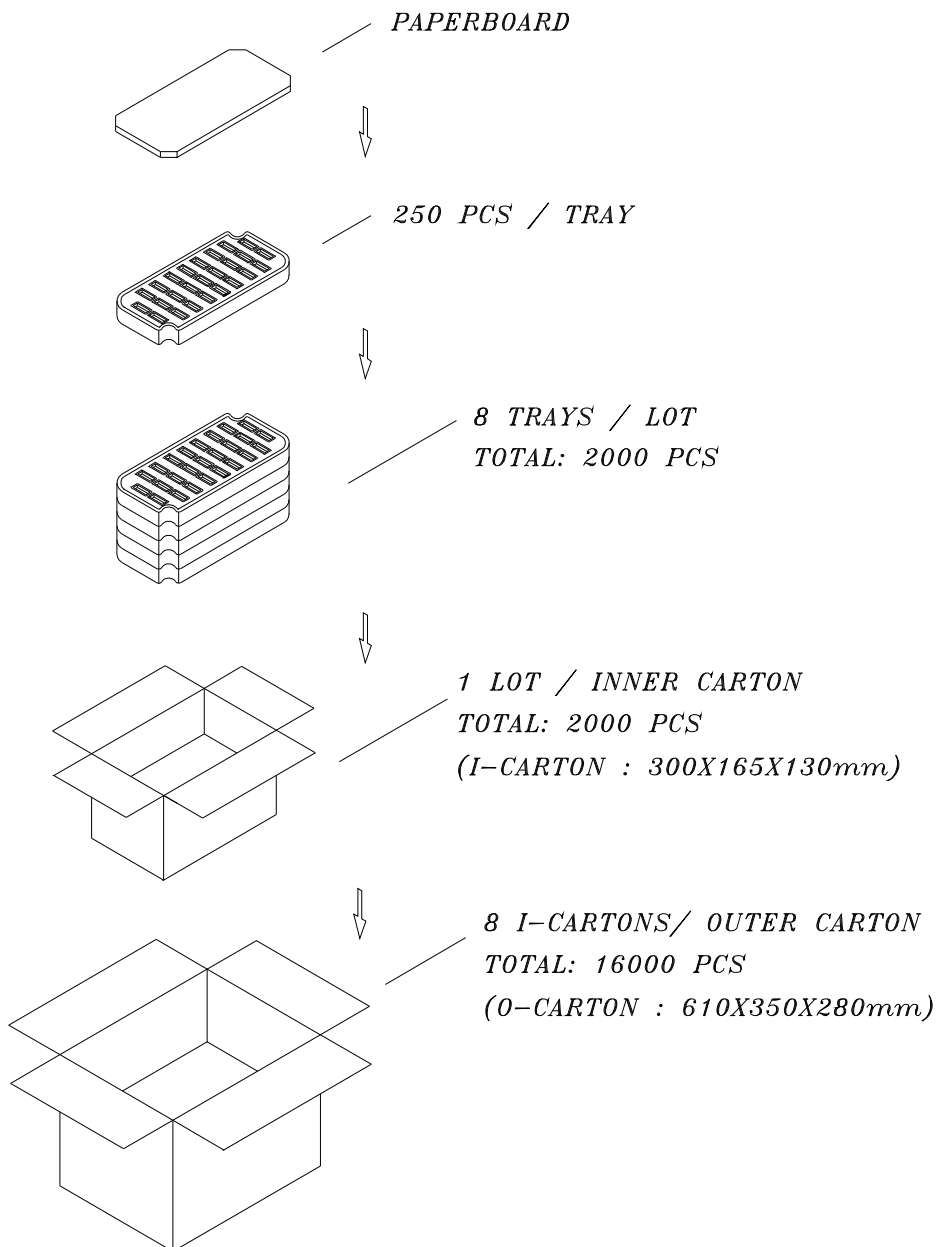


Fig.6 Spatial Distribution

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6. Packing Specification



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7. Bin Table Specification

CBI Ranks			
CBI Bin Code	Red (LED1)	Yellow (LED2)	Yellow Green (LED3)
A	K1,K2,K3,K4,K5	1Y,1PY,1Y,1OY	L1GG2,L1GG1,L1GG, M1GG2,M1GG1,M1GG
B	K1,K2,K3,K4,K5	1Y,1PY,1Y,1OY	L1PG,L1YG, M1PG,M1YG
C	K1,K2,K3,K4,K5	1Y,1PY,1Y,1OY	L2GG2,L2GG1,L2GG,L3GG2,L3GG1,L3GG L4GG2,L4GG1,L4GG
D	K1,K2,K3,K4,K5	1Y,1PY,1Y,1OY	L2PG,L2YG,L3PG,L3YG,L4PG,L4YG
E	K1,K2,K3,K4,K5	J1YY,J1PY,J1Y,J1OY,J2AYY,J2APY,J2AY,J2AOY J2BYY,J2BPY,J2BY,J2BOY, J3YY,J3PY,J3Y,J3OY	L1GG2,L1GG1,L1GG, M1GG2,M1GG1,M1GG
F	K1,K2,K3,K4,K5	J1YY,J1PY,J1Y,J1OY,J2AYY,J2APY,J2AY,J2AOY J2BYY,J2BPY,J2BY,J2BOY, J3YY,J3PY,J3Y,J3OY	L1PG,L1YG, M1PG,M1YG
G	K1,K2,K3,K4,K5	J1YY,J1PY,J1Y,J1OY,J2AYY,J2APY,J2AY,J2AOY J2BYY,J2BPY,J2BY,J2BOY, J3YY,J3PY,J3Y,J3OY	L2GG2,L2GG1,L2GG,L3GG2,L3GG1,L3GG L4GG2,L4GG1,L4GG
H	K1,K2,K3,K4,K5	J1YY,J1PY,J1Y,J1OY,J2AYY,J2APY,J2AY,J2AOY J2BYY,J2BPY,J2BY,J2BOY, J3YY,J3PY,J3Y,J3OY	L2PG,L2YG,L3PG,L3YG,L4PG,L4YG
I	L1,M1	1Y,1PY,1Y,1OY	L1GG2,L1GG1,L1GG, M1GG2,M1GG1,M1GG
J	L1,M1	1Y,1PY,1Y,1OY	L1PG,L1YG, M1PG,M1YG
K	L1,M1	1Y,1PY,1Y,1OY	L2GG2,L2GG1,L2GG,L3GG2,L3GG1,L3GG L4GG2,L4GG1,L4GG
L	L1,M1	1Y,1PY,1Y,1OY	L2PG,L2YG,L3PG,L3YG,L4PG,L4YG
M	L1,M1	J1YY,J1PY,J1Y,J1OY,J2AYY,J2APY,J2AY,J2AOY J2BYY,J2BPY,J2BY,J2BOY, J3YY,J3PY,J3Y,J3OY	L1GG2,L1GG1,L1GG, M1GG2,M1GG1,M1GG
N	L1,M1	J1YY,J1PY,J1Y,J1OY,J2AYY,J2APY,J2AY,J2AOY J2BYY,J2BPY,J2BY,J2BOY, J3YY,J3PY,J3Y,J3OY	L1PG,L1YG, M1PG,M1YG
O	L1,M1	J1YY,J1PY,J1Y,J1OY,J2AYY,J2APY,J2AY,J2AOY J2BYY,J2BPY,J2BY,J2BOY, J3YY,J3PY,J3Y,J3OY	L2GG2,L2GG1,L2GG,L3GG2,L3GG1,L3GG L4GG2,L4GG1,L4GG
P	L1,M1	J1YY,J1PY,J1Y,J1OY,J2AYY,J2APY,J2AY,J2AOY J2BYY,J2BPY,J2BY,J2BOY, J3YY,J3PY,J3Y,J3OY	L2PG,L2YG,L3PG,L3YG,L4PG,L4YG

Note: Tolerance of each bin limit is $\pm 15\%$

Tolerance of each bin limit is $\pm 1\text{nm}$

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Lamp LED for Reference

Red color (LED1)

Luminous Intensity, Unit: mcd, IF=10mA		
Iv Bin Code	Min.	Max.
M1	29.0	50
L1	19.0	29.0
K1	12.6	19.0
K2	8.74	12.6
K3	5.62	8.74
K4	3.75	5.62
K5	2.5	3.75

Note: Tolerance of each bin limit is $\pm 15\%$

Yellow color (LED2)

Luminous Intensity, Unit: mcd, IF=10mA		
Iv Bin Code	Min.	Max.
1	14.5	30.0
J1	8.74	14.5
J2A	7.4	8.74
J2B	5.6	7.4
J3	3.7	5.6

Note: Tolerance of each bin limit is $\pm 15\%$

Dominant Wavelength, Unit :nm, IF=10mA		
Hue Bin Code	Min.	Max.
OY	592	595
Y	589	592
PY	587	589
YY	584	587

Note: Tolerance of each bin limit is $\pm 1\text{nm}$

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Green color (LED3)

Luminous Intensity, Unit: mcd, IF=10mA		
Iv Bin Code	Min.	Max.
M2	29	50
L1	19	29
L2	12.6	19
L3	8.7	12.6
L4	5.6	8.7

Note: Tolerance of each bin limit is $\pm 15\%$

Dominant Wavelength, Unit :nm, IF=10mA		
Hue Bin Code	Min.	Max.
YG	572.0	574.0
PG	570.0	572.0
GG	568.0	570.0
GG1	566.0	568.0
GG2	564.0	566.0

Note: Tolerance of each bin limit is $\pm 1\text{nm}$

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8. CAUTIONS

8.1. Application

This LED lamp is good for application of indoor and outdoor sign, also ordinary electronic equipment.

8.2. 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.

8.3. Cleaning

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

8.4. 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.

8.5. 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	350°C Max.	Pre-heat	120°C Max.
Soldering time	3 seconds Max. (one time only)	Pre-heat time	100 seconds Max.
Position	No closer than 2mm from the base of the epoxy bulb	Solder wave	260°C Max.
		Soldering time	5 seconds Max.
		Dipping Position	No lower than 2mm from the base of the epoxy bulb

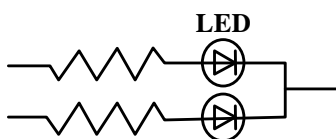
Note: Excessive soldering temperature and/or time might result in deformation of the LED lens or catastrophic failure of the LED.

IR reflow is not suitable process for through hole type LED lamp product. Max temperature of wave soldering is not mean that Holder's HDT/Melting temperature.

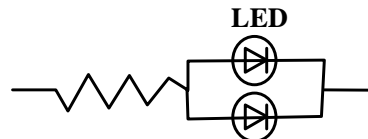
8.6. Drive Method

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.

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8.7. 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

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

Static-Safe Workstation & Work Areas

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

Personnel Grounding

- 8.7.3.1. Every person (including visitors) handling ESD sensitive (ESDS) items wear wrist strap, heel strap or conductive shoes with conductive flooring?
- 8.7.3.2. If conductive footwear used, conductive flooring also present where operator stand or walk?
- 8.7.3.3. Garments, hairs or anything closer than 1 ft to ESD items measure less than 100V*?
- 8.7.3.4. Every wrist strap or heel strap/conductive shoes checked daily and result recorded for all DLs?
- 8.7.3.5. All wrist strap or heel strap checkers calibration up to date?
Note: *50V for Blue LED.

Device Handling

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

Others

- 8.7.5.1. Audit result reported to entity ESD control coordinator?
- 8.7.5.2. Corrective action from previous audits completed?
- 8.7.5.3. Are audit records complete and on file?

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9. Reliability Test

Classification	Test Item	Test Condition	Reference Standard
Endurance Test	Operation Life	Ta = Under room temperature IF = per datasheet maximum drive current Test Time= 1000hrs	MIL-STD-750D:1026 (1995) MIL-STD-883G:1005 (2006)
	High Temperature High Humidity storage	Ta = 60°C RH = 90% Test Time= 240hrs	MIL-STD-202G:103B (2002) JEITA ED-4701:100 103 (2001)
	High Temperature Storage	Ta= 105 ± 5°C Test Time= 1000hrs	MIL-STD-750D:1031 (1995) MIL-STD-883G:1008 (2006) JEITA ED-4701:200 201 (2001)
	Low Temperature Storage	Ta= -55 ± 5°C Test Time= 1000hrs	JEITA ED-4701:200 202 (2001)
Environmental Test	Temperature Cycling	100°C ~ 25°C ~ -40°C ~ 25°C 30mins 5mins 30mins 5mins 30 Cycles	MIL-STD-750D:1051 (1995) MIL-STD-883G:1010 (2006) JEITA ED-4701:100 105 (2001) JESD22-A104C (2005)
	Thermal Shock	100 ± 5°C ~ -30°C ± 5°C 15mins 15mins 30 Cycles (<20 secs transfer)	MIL-STD-750D:1056 (1995) MIL-STD-883G:1011 (2006) MIL-STD-202G:107G (2002) JESD22-A106B (2004)
	Solder Resistance	T.sol = 260 ± 5°C Dwell Time= 10±1 seconds 3mm from the base of the epoxy bulb	MIL-STD-750D:2031(1995) JEITA ED-4701: 300 302 (2001)
	Solderability	T. sol = 245 ± 5°C Dwell Time= 5 ± 0.5 seconds (Lead Free Solder, Coverage ≥ 95% of the dipped surface)	MIL-STD-750D:2026 (1995) MIL-STD-883G:2003 (2006) MIL-STD-202G:208H (2002) IPC/EIA J-STD-002 (2004)

10. Others

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