LITEON
OPTOELECTRONICS

Through Hole Lamp

Product Data Sheet

LTL403FDBK

Spec No.: DS20-2013-0061

Effective Date: 04/10/2013

Revision: -

LITE-ON DCC

RELEASE

BNS-OD-FC001/A4

Features

* Lead (Pb) free product – RoHS compliant
* Most suitable for use like level indicator.
* Long life solid state reliability.
* I.C. compatible.

Package Dimensions

Part No.	Lens	Source Color
LTL403FDBK	Water Clear	AlInGaP Orange

Notes:

1. All dimensions are in millimeters (inches).
2. Tolerance is ±0.25mm (.010") unless otherwise noted.
3. Protruded resin under flange is 1.0mm (.04") max.
4. Lead spacing is measured where the leads emerge from the package.
5. Specifications are subject to change without notice.

Absolute Maximum Ratings at TA=25℃

Parameter	Maximum Rating	Unit
Power Dissipation	72	mW
Peak Forward Current (1/10 Duty Cycle, 0.1ms Pulse Width)	60	mA
DC Forward Current	20	mA
Operating Temperature Range	-40 °C to + 85 °C	
Storage Temperature Range	-40 °C to + 100 °C	
Lead Soldering Temperature [2.0 mm(0.078") From Body]	260 °C for 5 Seconds	

Electrical / Optical Characteristics at TA=25℃

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition
Luminous Intensity	Iv	50	140	240	mcd	IF = 10mA Note 1,4
Viewing Angle	2θ1/2	-	40	-	deg	Note 2 (Fig.6)
Peak Emission Wavelength	λp	-	611	-	nm	Measurement @Peak (Fig.1)
Dominant Wavelength	λd	598.0	605.0	613.5	nm	IF = 10mA Note 3
Spectral Line Half-Width	Δλ	-	17	-	nm	
Forward Voltage	V_F		1.9	2.4	V	IF = 10mA
Reverse Current	I_R	-	-	100	μA	VR = 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. θ1/2 is the off-axis angle at which the luminous intensity is half the axial luminous intensity.

3. The dominant wavelength, λd 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

Packing Spec

1000, 500, 200 or 100 pcs per packing bag

10 packing bags per inner carton
total 10000 pcs per inner carton

8 Inner cartons per outer carton
total 80000 pcs per outer carton

Bin Table Specification

Luminous Intensity Unit : mcd @10mA		
Bin Code	Min.	Max.
CD	50	85
EF	85	140
GH	140	240

Note: Tolerance of each bin limit is ±15%

Dominant Wavelength Unit : nm @10mA		
Bin Code	Min.	Max.
H22	598.0	600.0
H23	600.0	603.0
H24	603.0	606.5
H25	606.5	610.0
H26	610.0	613.5

Note: Tolerance of each bin limit is ±1nm

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 DSL?
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 MIL-STD-883G:1005
	High Temperature High Humidity Storage	Ta= 60°C RH= 90% Test Time= 240HRS	MIL-STD-202G:103B JEITA ED-4701:100 103
	High Temperature Storage	Ta= 105±5°C Test Time= 1000HRS	MIL-STD-750D:1031 MIL-STD-883G:1008 JEITA ED-4701:200 201
	Low Temperature Storage	Ta= -55±5°C Test Time=1000HRS	JEITA ED-4701:200 202
Environmental Test	Temperature Cycling	100°C ～ 25°C～ -40°C ～ 25°C 30mins 5mins 30mins 5mins 30 Cycles	MIL-STD-750D:1051 MIL-STD-883G:1010 JEITA ED-4701:100 105 JESD22-A104C
	Thermal Shock	105 ± 5°C ～ -30°C ± 5°C 15mins ～ 15mins 30 Cycles (< 20 secs transfer)	MIL-STD-750D:1056 MIL-STD-883G:1011 MIL-STD-202G: 107G JESD22-A106B
	Solder Resistance (no pre-condition)	T.sol = 260 ± 5°C Max. Dwell Time = 10 ± 1 sec	MIL-STD-750D:2031 JEITA ED-4701:300 302
	Solderability (no pre-condition)	T. sol = 245 ± 5°C Dwell Time= 5 ± 0.5 sec (Lead Free Solder , Coverage≥ 95% of the dipped surface)	MIL-STD-750D:2026 MIL-STD-883G:2003 MIL-STD-202G: 208H IPC/EIA J-STD-002
	Soldering Iron (no pre-condition)	T. sol = 350 ± 5°C Dwell Time= 3.5 ± 0.5 sec	MIL-STD-202G: 208H JEITA ED-4701:300 302

9. Others

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