

**3mm T-1 Super Bright Red Through-Hole LED
Water-Clear Lens with 30° Viewing Angle****Technical Data Sheet**

Features

- High luminous efficiency with low power consumption
- Solid state design for long term reliability
- Standard T-1 3mm package with general purpose leads
- Flexible bulk and tape reel packaging options
- RoHS and EU REACH compliant

Description

The 304VC2P-NB3CD is a super bright red through-hole LED designed for clear and reliable visual indication. Its water-clear lens and 30-degree viewing angle deliver concentrated light output, making it ideal for applications requiring strong visibility in a compact 3mm package.

Applications

- Status and diagnostic indicators
- Industrial control panels and automation equipment
- Networking, telecom, and IT infrastructure
- Home appliances and smart consumer electronics
- Power supplies and battery charging stations
- Commercial electronic displays and signage

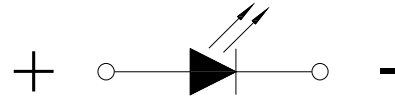
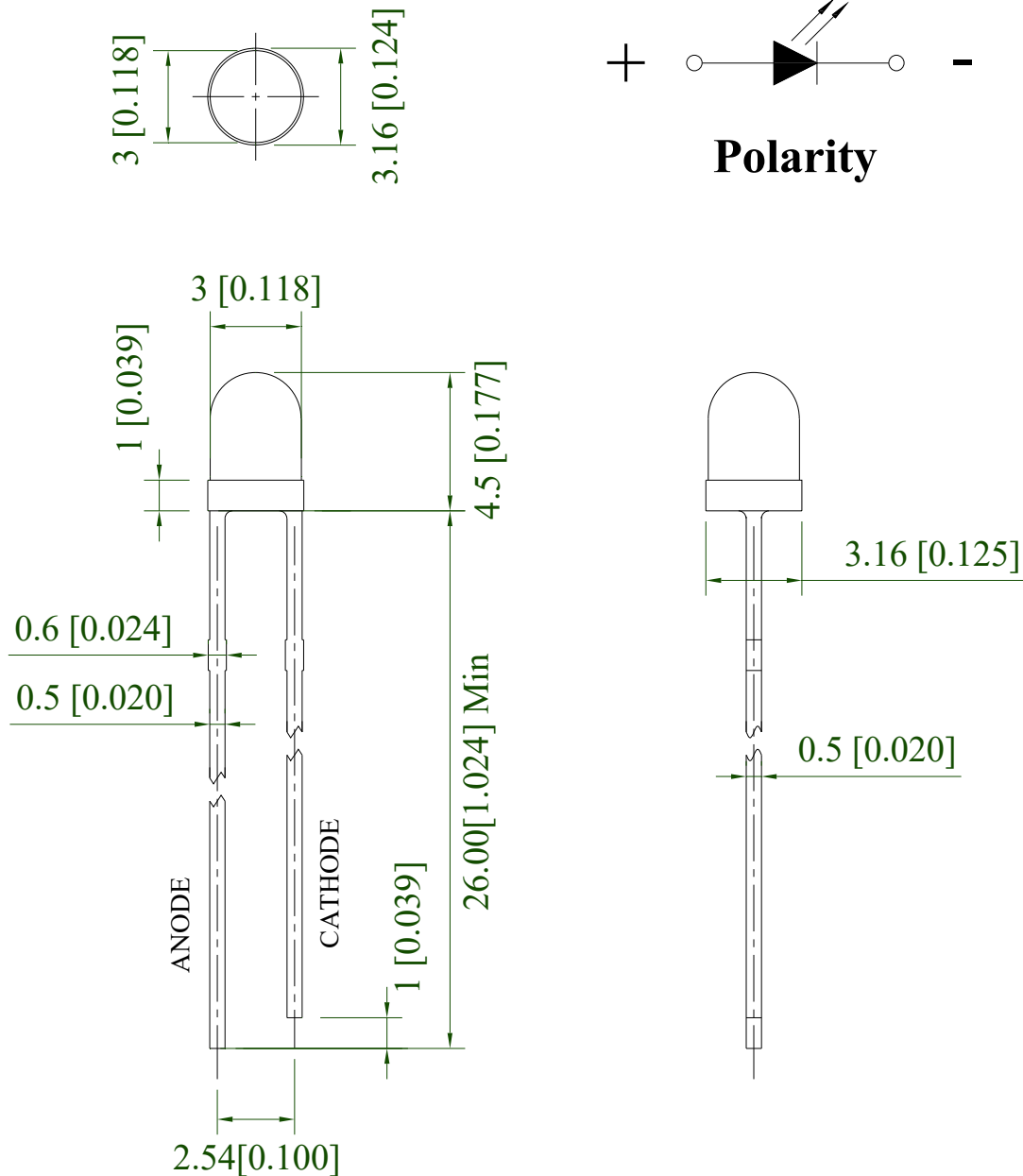
Device Selection Guide

Part No.	Emitting Color	Lens Color
304VC2P-NB3CD	Super Bright Red	Water Clear

3mm T-1 Super Bright Red Through-Hole LED
Water-Clear Lens with 30° Viewing Angle

Technical Data Sheet

Package Dimension



Polarity

Notes:

1. All dimensions are in millimeters (inches).
2. Tolerance is ± 0.25 mm (.010") unless otherwise noted.
3. Protruded resin under flange is 1.00mm (.039") max.

3mm T-1 Super Bright Red Through-Hole LED

Water-Clear Lens with 30° Viewing Angle

Technical Data Sheet

Absolute Maximum Ratings at Ta=25°C

Parameters	Symbol	Max.	Unit
Power Dissipation	P_d	60	mW
Peak Forward Current ^(a)	I_{FP}	100	mA
DC Forward Current ^(b)	I_F	25	mA
Reverse Voltage	V_R	5	V
Operating Temperature Range	T_{opr}	-40°C to +85°C	
Storage Temperature Range	T_{stg}	-40°C to +85°C	
Soldering Temperature	T_{sld}	260°C for 5 Seconds	

Notes:

- a. Duty Factor = 10%, Frequency = 1 kHz.
- b. Derate linearly as shown in derating curve.

Electrical Optical Characteristics at Ta=25°C

Parameters	Symbol	Min.	Typ.	Max.	Unit	Test Condition
Luminous Intensity ^(a)	I_v	2200	3800	8500	mcd	$I_F=20mA$
Viewing Angle ^(b)	$2\theta_{1/2}$	---	30	---	deg.	$I_F=20mA$
Peak Emission Wavelength	λ_p	---	632	---	nm	$I_F=20mA$
Dominant Wavelength ^(c)	λ_d	---	624	---	nm	$I_F=20mA$
Spectral Line Half-Width	$\Delta\lambda$	---	20	---	nm	$I_F=20mA$
Forward Voltage	V_F	1.6	2.0	2.4	V	$I_F=20mA$
Reverse Current	I_R	---	---	10	μA	$V_R=5V$

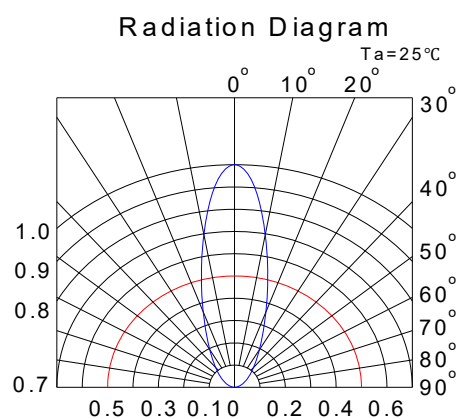
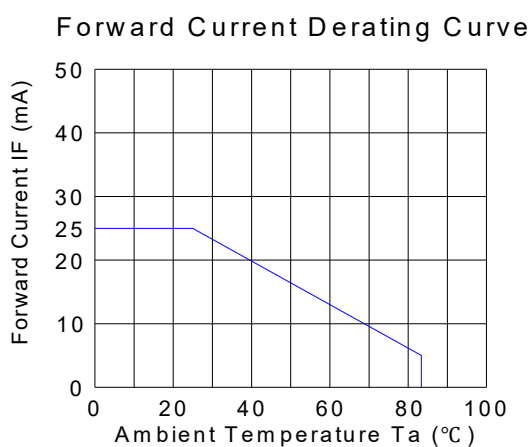
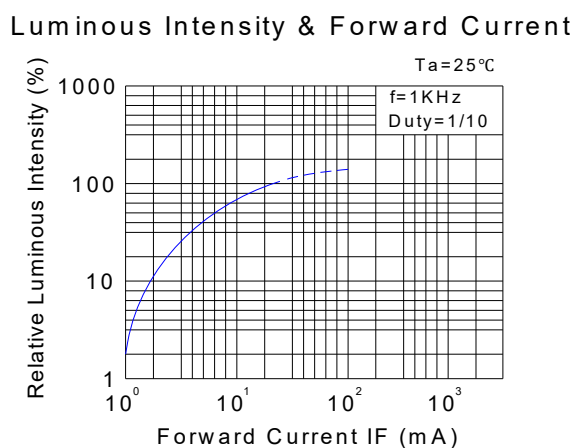
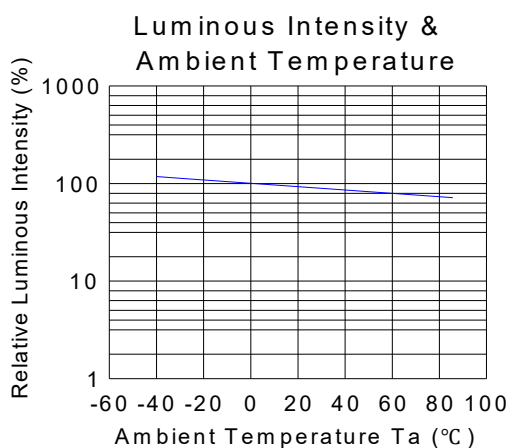
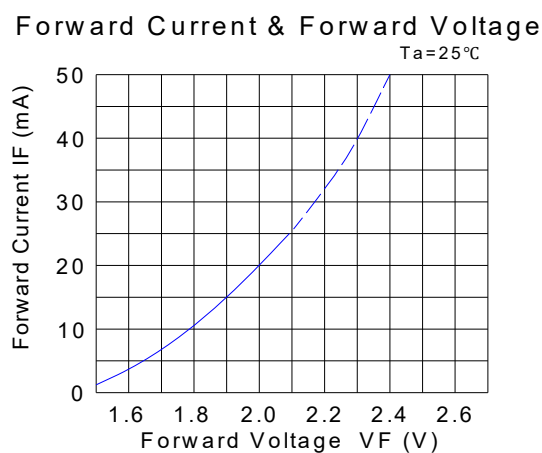
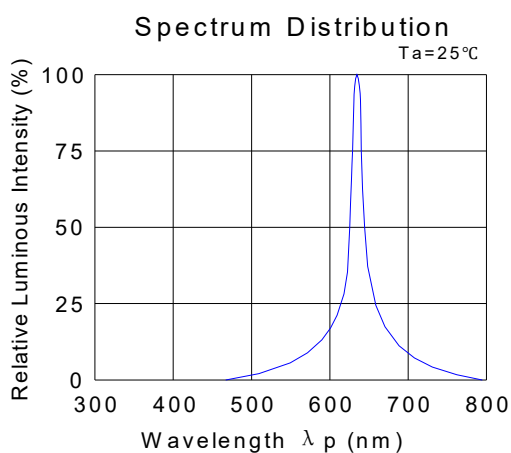
Notes:

- a Luminous intensity is measured using a light sensor and filter combination that approximates the CIE photopic eye-response curve. The specified luminous intensity values include a measurement tolerance of $\pm 10\%$.
- b The viewing angle $2\theta_{1/2}$ is defined as the full angle between the two directions at which the luminous intensity is 50% of the maximum on-axis intensity.
- c The dominant wavelength λ_d is derived from the CIE chromaticity diagram and represents the perceived color of the device.

3mm T-1 Super Bright Red Through-Hole LED Water-Clear Lens with 30° Viewing Angle

Technical Data Sheet

Typical Electrical / Optical Characteristics Curves (25°C Ambient Temperature Unless Otherwise Noted)



3mm T-1 Super Bright Red Through-Hole LED
Water-Clear Lens with 30° Viewing Angle**Technical Data Sheet**

Bin Information**Luminous Intensity I_v (mcd) @ $I_F=20\text{mA}$**

Bin Code	Min	Max.
21	2200	2900
22	2900	3800
23	3800	5000
24	5000	6500
25	6500	8500

Note: Tolerance of each bin limit is $\pm 10\%$.

Forward Voltage V_F (V) @ $I_F=20\text{mA}$

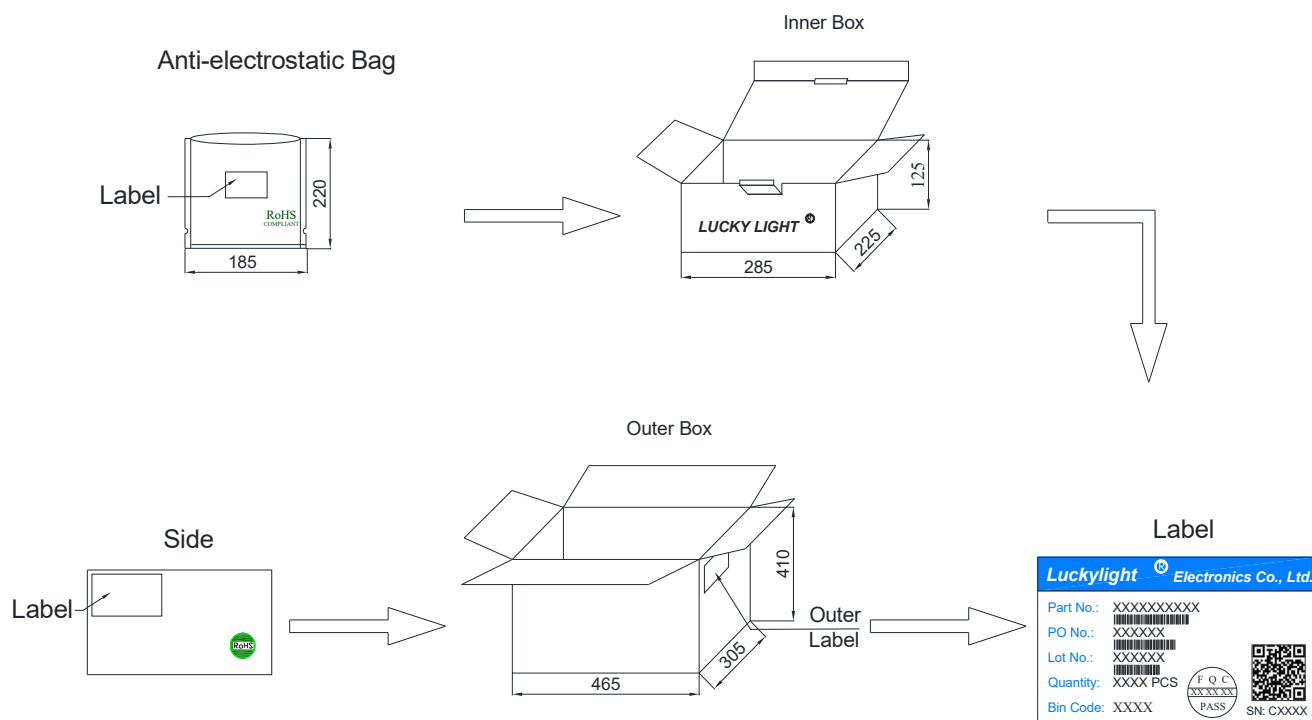
Bin Code	Min.	Max.
B	1.6	1.8
C	1.8	2.0
D	2.0	2.2
E	2.2	2.4

Note: Forward Voltage Measurement allowance is $\pm 0.05\text{V}$.

Dominant Wavelength λ_D @ $I_F=20\text{mA}$

Bin Code	Min	Max.
B	620	625
C	625	630

Note: Tolerance for the measurement of dominant wavelength: $\pm 1\text{nm}$

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Water-Clear Lens with 30° Viewing Angle****Technical Data Sheet****Packing & Label Specifications****Packing Quantity:**

- a. 1000 PCS/Bag.
- b. 12000 PCS/Inner Box.
- c. 6 Inner Boxes/Outer Box.

**3mm T-1 Super Bright Red Through-Hole LED
Water-Clear Lens with 30° Viewing Angle****Technical Data Sheet**

Precautions**1. Overcurrent Protection**

LEDs are current-driven devices. A suitable current-limiting resistor or constant-current circuit must be used to prevent excessive current. Operation without proper current control may result in device damage or failure.

2. Storage

The LEDs should be stored in a clean and dry environment at a temperature of 30°C or below and a relative humidity of 70% RH or below.

Avoid rapid changes in temperature, particularly in high-humidity environments, as condensation may form on the device.

For long-term storage, the products should be kept in a sealed container with desiccant or in a nitrogen atmosphere.

3. Cleaning

When cleaning is required, use an alcohol-based solvent such as isopropyl alcohol.

Other cleaning agents may damage the epoxy resin or affect the optical and electrical performance of the LED. Suitability of the cleaning process should be verified before mass production.

4. Lead Forming and Assembly

Lead forming must be completed before soldering and should be performed at room temperature.

The leads should be bent at least 1.6mm away from the base of the LED body. Do not use the LED body or lead-frame base as a fulcrum during lead forming.

Avoid applying excessive mechanical stress to the leads or epoxy body during PCB assembly.

5. Soldering

Do not apply mechanical stress to the leads or epoxy body during soldering or while the device is at an elevated temperature.

Maintain sufficient clearance between the soldering point and the base of the LED body.

3mm T-1 Super Bright Red Through-Hole LED Water-Clear Lens with 30° Viewing Angle

Technical Data Sheet

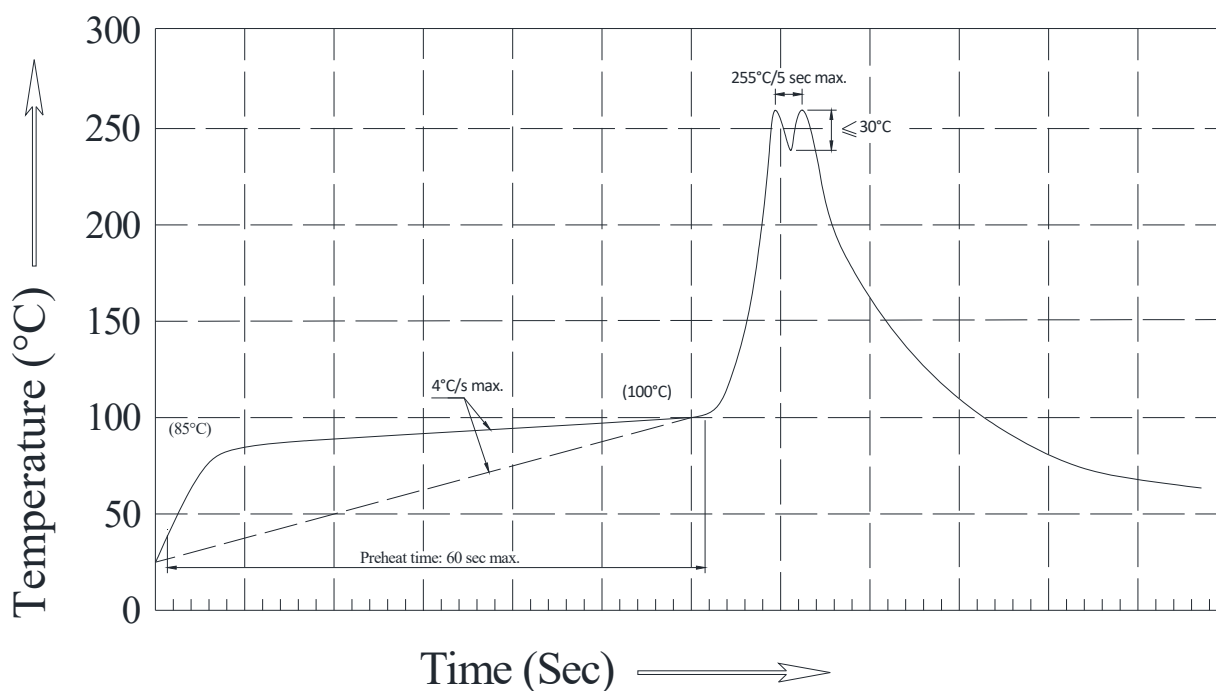
Recommended soldering conditions:

Soldering Iron		Wave Soldering	
Temperature	300°C Max.	Pre-heat	100°C Max.
Soldering Time	3 sec. Max. (one time only)	Pre-heat Time	60 sec. Max.
		Solder Wave	260°C Max.
		Soldering Time	5 sec. Max.

Note

Excessive soldering temperature or time may deform the epoxy lens or cause permanent device failure.

Recommended Wave Soldering Profiles



Notes:

- The recommended preheating temperature is 105°C maximum, as measured with a thermocouple attached to the LED leads, before immersion in the solder wave. The maximum solder bath temperature is 260°C.

3mm T-1 Super Bright Red Through-Hole LED Water-Clear Lens with 30° Viewing Angle

Technical Data Sheet

- b The recommended peak wave soldering temperature is 245°C to 255°C for 3 seconds, with a maximum of 5 seconds.
- c Do not apply mechanical stress to the epoxy resin while its temperature is above 85°C.
- d Mounting fixtures must not apply mechanical stress to the component during assembly or soldering.
- e Only one wave soldering pass is permitted.

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 A: Recommended circuit

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

7. Repairing

Rework after soldering is not recommended.

When repair is unavoidable, the soldering conditions should be evaluated in advance to ensure that the optical, electrical and mechanical characteristics of the LED are not affected.

**3mm T-1 Super Bright Red Through-Hole LED
Water-Clear Lens with 30° Viewing Angle****Technical Data Sheet**

Disclaimer

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3mm T-1 Super Bright Red Through-Hole LED
Water-Clear Lens with 30° Viewing Angle

Technical Data Sheet

Revision History

Version	Date	Revision History	Page
Rev-1	18-Mar-2020	Initial release	-
