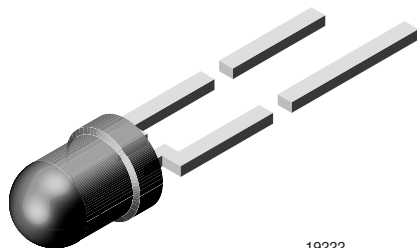




Ultrabright White LED, Ø 3 mm



19222

DESCRIPTION

The VLHW4400 is a diffused, untinted 3 mm LED for high end applications where supreme luminous intensity is required.

These lamps utilize the highly developed ultrabright InGaN technologies.

The lens and the viewing angle is optimized to achieve best performance of light output and visibility.

PRODUCT GROUP AND PACKAGE DATA

- Product group: LED
- Package: 3 mm
- Product series: standard
- Angle of half intensity: $\pm 30^\circ$

FEATURES

- Diffused, untinted lens
- Utilizing ultrabright InGaN technology
- High luminous intensity
- Luminous intensity and color categorized for each packing unit
- ESD-withstand voltage: up to 2 kV according to JESD22-A114-B
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

APPLICATIONS

- Interior and exterior lighting
- Outdoor LED panels
- Instrumentation and front panel indicators
- Replaces incandescent lamps
- Light guide compatible



RoHS
COMPLIANT
HALOGEN
FREE
GREEN
(5-2008)

| PARTS TABLE | | | | | | | | | | | | | | |
|---------------|------------|--------------------------|------|------|------------------------|-------------------|------------|------|------------------------|---------------------|------|------|------------------------|---------------------|
| PART | COLOR | LUMINOUS INTENSITY (mcd) | | | at I _F (mA) | COORDINATE (x, y) | | | at I _F (mA) | FORWARD VOLTAGE (V) | | | at I _F (mA) | TECHNOLOGY |
| | | MIN. | TYP. | MAX. | | MIN. | TYP. | MAX. | | MIN. | TYP. | MAX. | | |
| VLHW4400-JKPL | Cool white | 560 | 900 | 1400 | 5 | - | 0.33, 0.33 | - | 5 | 2.6 | 2.8 | 3.2 | 5 | InGaN and converter |
| VLHW4400-LKNL | Cool white | 560 | 900 | 1400 | 5 | - | 0.33, 0.33 | - | 5 | 2.6 | 2.8 | 3.2 | 5 | InGaN and converter |
| VLHW4400-QPMM | Warm white | 450 | 800 | 1125 | 5 | - | 0.44, 0.41 | - | 5 | 2.6 | 2.8 | 3.2 | 5 | InGaN and converter |

| ABSOLUTE MAXIMUM RATINGS (T _{amb} = 25 °C, unless otherwise specified) VLHW4400-JKPL, VLHW4400-LKNL, VLHW4400-QPMM | | | | |
|--|-----------------------------------|-------------------|------------|------|
| PARAMETER | TEST CONDITION | SYMBOL | VALUE | UNIT |
| Reverse voltage | | V _R | 5 | V |
| DC forward current | | I _F | 20 | mA |
| Peak forward current | at 1 kHz, t _p /T = 0.1 | I _{FSM} | 0.1 | A |
| Power dissipation | | P _V | 85 | mW |
| Junction temperature | | T _j | +120 | °C |
| Operating temperature range | | T _{amb} | -40 to +85 | °C |
| Storage temperature range | | T _{stg} | -40 to +85 | °C |
| Soldering temperature | t ≤ 5 s | T _{sd} | 260 | °C |
| Thermal resistance junction-to-ambient | | R _{thJA} | 400 | K/W |


OPTICAL AND ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)
VLHW4400-JKPL, VLHW4400-LKLN, COOL WHITE

| PARAMETER | TEST CONDITION | SYMBOL | MIN. | TYP. | MAX. | UNIT |
|---|---------------------|-----------|------|----------|------|---------------|
| Luminous intensity | $I_F = 5\text{ mA}$ | I_V | 560 | 900 | 1400 | mcd |
| Chromatically coordinate x acc. to CIE 1931 | $I_F = 5\text{ mA}$ | x | - | 0.33 | - | |
| Chromatically coordinate y acc. to CIE 1931 | $I_F = 5\text{ mA}$ | y | - | 0.33 | - | |
| Angle of half intensity | $I_F = 5\text{ mA}$ | φ | - | ± 30 | - | $^{\circ}$ |
| Forward voltage ⁽¹⁾ | $I_F = 5\text{ mA}$ | V_F | 2.6 | 2.8 | 3.2 | V |
| Reverse current | $V_R = 5\text{ V}$ | I_R | - | - | 10 | μA |

Note

⁽¹⁾ Forward voltage is tested at a current pulse duration of 1 ms and a tolerance of $\pm 0.1\text{ V}$

OPTICAL AND ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)
VLHW4400-QPMM, WARM WHITE

| PARAMETER | TEST CONDITION | SYMBOL | MIN. | TYP. | MAX. | UNIT |
|---|---------------------|-----------|------|----------|------|---------------|
| Luminous intensity | $I_F = 5\text{ mA}$ | I_V | 450 | 800 | 1125 | mcd |
| Chromatically coordinate x acc. to CIE 1931 | $I_F = 5\text{ mA}$ | x | - | 0.44 | - | |
| Chromatically coordinate y acc. to CIE 1931 | $I_F = 5\text{ mA}$ | y | - | 0.41 | - | |
| Angle of half intensity | $I_F = 5\text{ mA}$ | φ | - | ± 30 | - | $^{\circ}$ |
| Forward voltage ⁽¹⁾ | $I_F = 5\text{ mA}$ | V_F | 2.6 | 2.8 | 3.2 | V |
| Reverse current | $V_R = 5\text{ V}$ | I_R | - | - | 10 | μA |

Note

⁽¹⁾ Forward voltage is tested at a current pulse duration of 1 ms and a tolerance of $\pm 0.1\text{ V}$



| CHROMATICALLY COORDINATED CLASSIFICATION ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified) | | | | | | |
|--|--------|--------|--|----|--------|--------|
| COOL WHITE | | | | | | |
| | X | Y | | X | Y | |
| JK | 0.2960 | 0.2590 | | ML | 0.3189 | 0.3302 |
| | 0.2910 | 0.2680 | | | 0.3288 | 0.3452 |
| | 0.3005 | 0.2825 | | | 0.3288 | 0.3282 |
| | 0.3045 | 0.2715 | | | 0.3197 | 0.3131 |
| JL | 0.2910 | 0.2680 | | NK | 0.3288 | 0.3081 |
| | 0.2850 | 0.2790 | | | 0.3288 | 0.3282 |
| | 0.2960 | 0.2955 | | | 0.3386 | 0.3426 |
| | 0.3005 | 0.2825 | | | 0.3386 | 0.3235 |
| KK | 0.3045 | 0.2715 | | NL | 0.3288 | 0.3282 |
| | 0.3005 | 0.2825 | | | 0.3288 | 0.3453 |
| | 0.3100 | 0.2970 | | | 0.3386 | 0.3591 |
| | 0.3130 | 0.2840 | | | 0.3386 | 0.3426 |
| KL | 0.3005 | 0.2825 | | OK | 0.3386 | 0.3235 |
| | 0.2960 | 0.2955 | | | 0.3386 | 0.3426 |
| | 0.3070 | 0.3120 | | | 0.3484 | 0.3571 |
| | 0.3100 | 0.2970 | | | 0.3484 | 0.3388 |
| LK | 0.3100 | 0.2970 | | OL | 0.3386 | 0.3426 |
| | 0.3197 | 0.3131 | | | 0.3386 | 0.3591 |
| | 0.3205 | 0.2956 | | | 0.3484 | 0.3730 |
| | 0.3130 | 0.2840 | | | 0.3484 | 0.3571 |
| LL | 0.3070 | 0.3120 | | PK | 0.3484 | 0.3388 |
| | 0.3189 | 0.3302 | | | 0.3484 | 0.3571 |
| | 0.3197 | 0.3131 | | | 0.3582 | 0.3715 |
| | 0.3100 | 0.2970 | | | 0.3582 | 0.3542 |
| MK | 0.3197 | 0.3131 | | PL | 0.3484 | 0.3571 |
| | 0.3288 | 0.3282 | | | 0.3484 | 0.3730 |
| | 0.3288 | 0.3081 | | | 0.3582 | 0.3792 |
| | 0.3205 | 0.2956 | | | 0.3582 | 0.3715 |

Note

- Chromaticity coordinate groups are tested at a current pulse duration of 25 ms and a tolerance of ± 0.01



| CHROMATICALLY COORDINATED CLASSIFICATION ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified) | | | | | |
|--|-------|-------|----|-------|-------|
| WARM WHITE | | | | | |
| | X | Y | | X | Y |
| QM | 0.421 | 0.433 | NM | 0.452 | 0.443 |
| | 0.437 | 0.438 | | 0.469 | 0.448 |
| | 0.430 | 0.421 | | 0.460 | 0.431 |
| | 0.415 | 0.416 | | 0.444 | 0.426 |
| QN | 0.415 | 0.416 | NN | 0.444 | 0.426 |
| | 0.430 | 0.421 | | 0.460 | 0.431 |
| | 0.423 | 0.405 | | 0.451 | 0.414 |
| | 0.409 | 0.400 | | 0.436 | 0.409 |
| QO | 0.409 | 0.400 | NO | 0.436 | 0.409 |
| | 0.423 | 0.405 | | 0.451 | 0.414 |
| | 0.416 | 0.387 | | 0.443 | 0.397 |
| | 0.402 | 0.382 | | 0.428 | 0.392 |
| QP | 0.402 | 0.382 | NP | 0.428 | 0.392 |
| | 0.416 | 0.387 | | 0.443 | 0.397 |
| | 0.409 | 0.372 | | 0.435 | 0.382 |
| | 0.397 | 0.367 | | 0.421 | 0.377 |
| PM | 0.437 | 0.438 | MM | 0.469 | 0.448 |
| | 0.452 | 0.443 | | 0.487 | 0.454 |
| | 0.444 | 0.426 | | 0.477 | 0.437 |
| | 0.430 | 0.421 | | 0.460 | 0.431 |
| PN | 0.430 | 0.421 | MN | 0.460 | 0.431 |
| | 0.444 | 0.426 | | 0.477 | 0.437 |
| | 0.436 | 0.409 | | 0.467 | 0.420 |
| | 0.423 | 0.405 | | 0.451 | 0.414 |
| PO | 0.423 | 0.405 | MO | 0.451 | 0.414 |
| | 0.436 | 0.409 | | 0.467 | 0.420 |
| | 0.428 | 0.392 | | 0.458 | 0.403 |
| | 0.416 | 0.387 | | 0.443 | 0.397 |
| PP | 0.416 | 0.387 | MP | 0.443 | 0.397 |
| | 0.428 | 0.392 | | 0.458 | 0.403 |
| | 0.421 | 0.377 | | 0.449 | 0.388 |
| | 0.409 | 0.372 | | 0.435 | 0.382 |

Note

- Chromaticity coordinate groups are tested at a current pulse duration of 25 ms and a tolerance of ± 0.01

| LUMINOUS INTENSITY CLASSIFICATION | | |
|--|-----------------------|------|
| GROUP | LIGHT INTENSITY (mcd) | |
| STANDARD | MIN. | MAX. |
| U1 | 450 | 560 |
| U2 | 560 | 715 |
| V1 | 715 | 900 |
| V2 | 900 | 1125 |
| W1 | 1125 | 1400 |

Note

- Luminous intensity is tested with an accuracy of $\pm 15\%$.
The above type Numbers represent the order groups which include only a few brightness groups. Only one group will be shipped on each reel (there will be no mixing of two groups on each reel). In order to ensure availability, single brightness groups will not be orderable.
In a similar manner for colors where color groups are measured and binned, single color groups will be shipped on any one reel. In order to ensure availability, single color groups will not be orderable



TYPICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

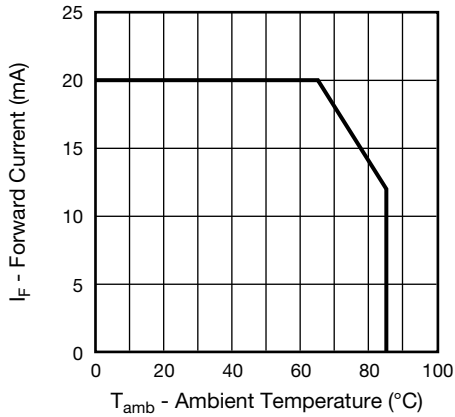


Fig. 1 - Forward Current vs. Ambient Temperature

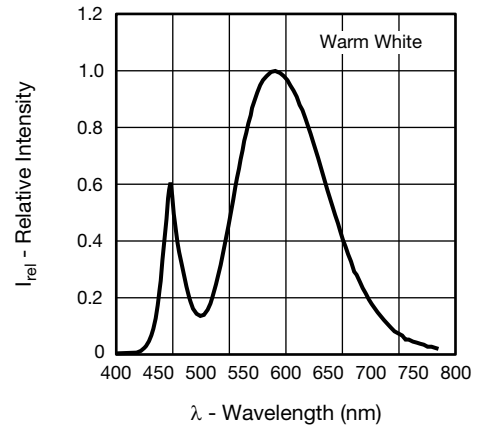


Fig. 4 - Relative Intensity vs. Wavelength

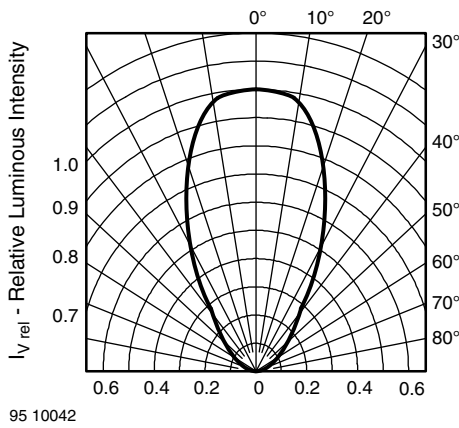


Fig. 2 - Relative Luminous Intensity vs. Angular Displacement

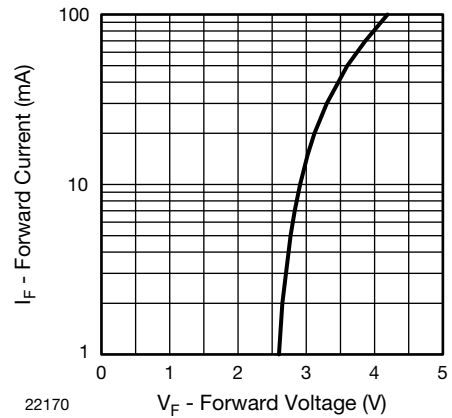


Fig. 5 - Forward Current vs. Forward Voltage

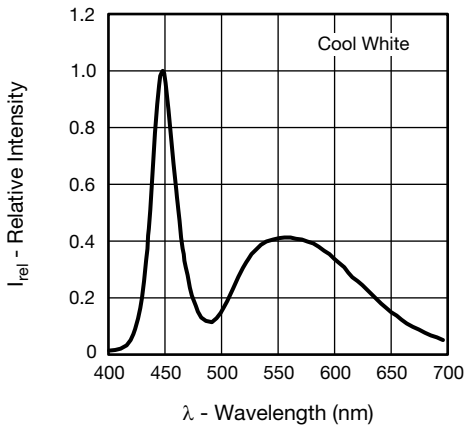


Fig. 3 - Relative Intensity vs. Wavelength

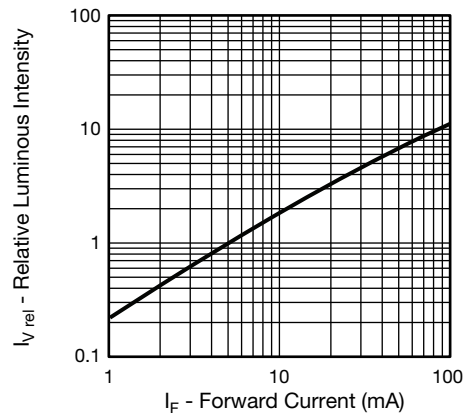


Fig. 6 - Relative Luminous Intensity vs. Forward Current

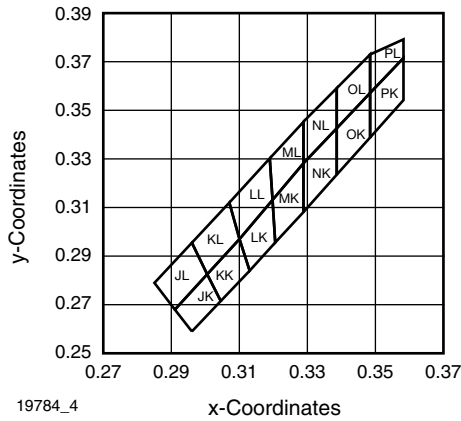


Fig. 7 - Coordinates of Colorgroups for Cool White

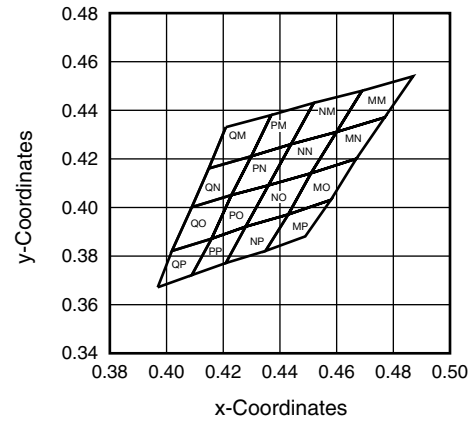
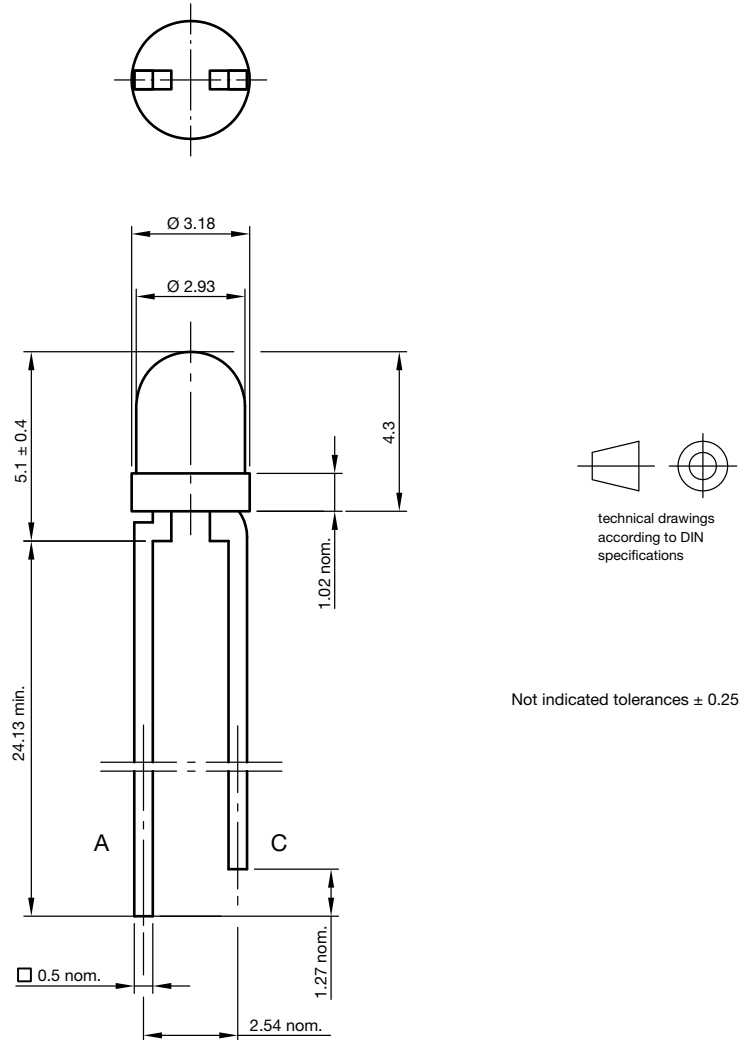


Fig. 8 - Coordinates of Colorgroups for Warm White

PACKAGE DIMENSIONS in millimeters



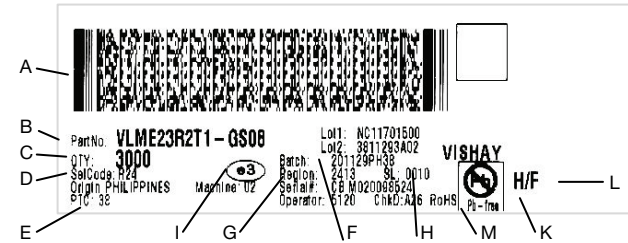
Drawing-No.: 6.544-5403.01-4

Issue: 2; 18.06.10

21948



BAR CODE PRODUCT LABEL (example only)



- A) 2D barcode
- B) Vishay part number
- C) Quantity
- D) PTC = selection code (binning)
- E) Code of manufacturing plant
- F) Batch = date code: year / week / plant code
- G) Region code
- H) SL = sales location
- I) Terminations finishing
- K) Lead (Pb)-free symbol
- L) Halogen-free symbol
- M) RoHS symbol



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