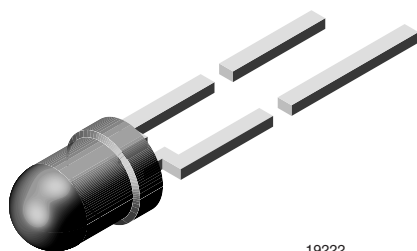




## Ultrabright White LED, Ø 3 mm



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](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
**GREEN**  
(5-2008)

### APPLICATIONS

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

### PARTS TABLE

PART	COLOR	LUMINOUS INTENSITY (mcd)			at I <sub>F</sub> (mA)	COORDINATE (x, y)			at I <sub>F</sub> (mA)	FORWARD VOLTAGE (V)			at I <sub>F</sub> (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<sub>amb</sub> = 25 °C, unless otherwise specified) VLHW4400-JKPL, VLHW4400-LKNL, VLHW4400-QPMM

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		V <sub>R</sub>	5	V
DC forward current		I <sub>F</sub>	20	mA
Peak forward current	at 1 kHz, t <sub>p</sub> /T = 0.1	I <sub>FSM</sub>	0.1	A
Power dissipation		P <sub>V</sub>	85	mW
Junction temperature		T <sub>j</sub>	+120	°C
Operating temperature range		T <sub>amb</sub>	-40 to +85	°C
Storage temperature range		T <sub>stg</sub>	-40 to +85	°C
Soldering temperature	t ≤ 5 s	T <sub>sd</sub>	260	°C
Thermal resistance junction-to-ambient		R <sub>thJA</sub>	400	K/W



<b>OPTICAL AND ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) <b>VLHW4400-JKPL, VLHW4400-LKLN, COOL WHITE</b>						
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	$I_F = 5\text{ mA}$	$\varphi$	-	$\pm 30$	-	$^{\circ}$
Forward voltage <sup>(1)</sup>	$I_F = 5\text{ mA}$	$V_F$	2.6	2.8	3.2	V
Reverse current	$V_R = 5\text{ V}$	$I_R$	-	-	10	$\mu\text{A}$

**Note**

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

<b>OPTICAL AND ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) <b>VLHW4400-QPMM, WARM WHITE</b>						
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	$I_F = 5\text{ mA}$	$\varphi$	-	$\pm 30$	-	$^{\circ}$
Forward voltage <sup>(1)</sup>	$I_F = 5\text{ mA}$	$V_F$	2.6	2.8	3.2	V
Reverse current	$V_R = 5\text{ V}$	$I_R$	-	-	10	$\mu\text{A}$

**Note**

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



<b>CHROMATICALLY COORDINATED CLASSIFICATION</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)						
<b>COOL WHITE</b>						
	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  $\pm 0.01$



<b>CHROMATICALLY COORDINATED CLASSIFICATION</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)					
<b>WARM WHITE</b>					
	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  $\pm 0.01$

<b>LUMINOUS INTENSITY CLASSIFICATION</b>		
GROUP	LIGHT INTENSITY (mcd)	
	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<sub>amb</sub> = 25 °C, unless otherwise specified)

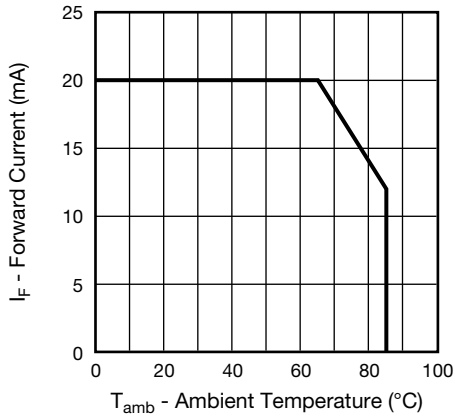


Fig. 1 - Forward Current vs. Ambient Temperature

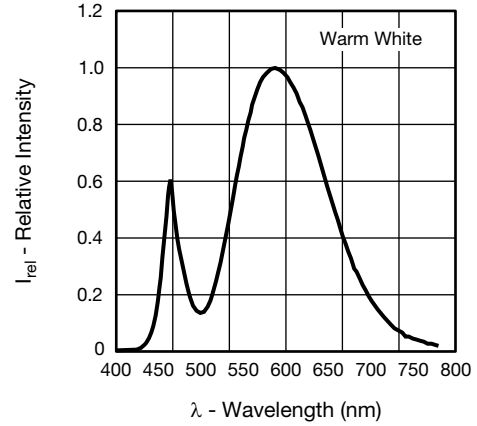


Fig. 4 - Relative Intensity vs. Wavelength

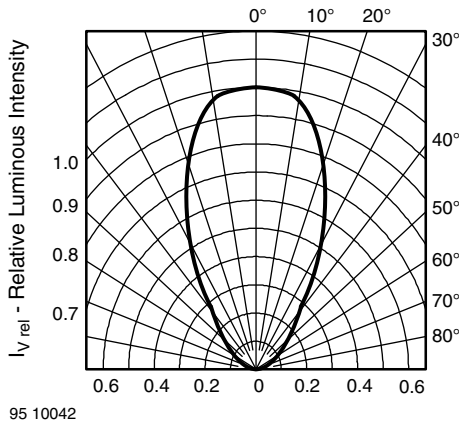


Fig. 2 - Relative Luminous Intensity vs. Angular Displacement

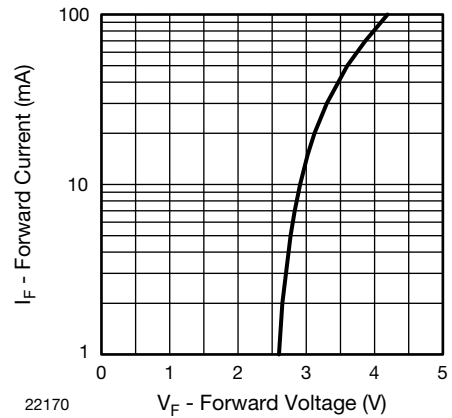


Fig. 5 - Forward Current vs. Forward Voltage

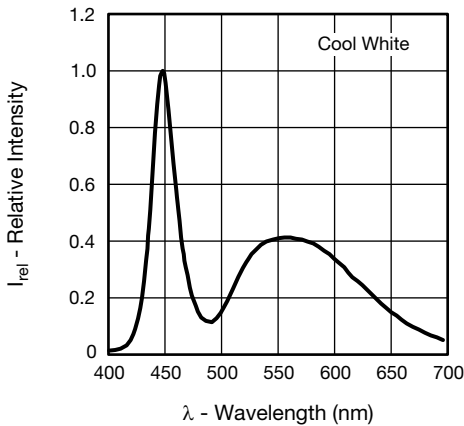


Fig. 3 - Relative Intensity vs. Wavelength

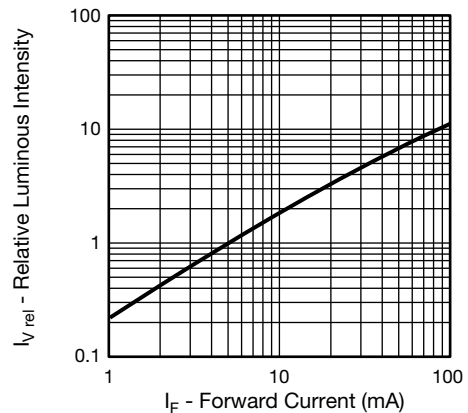


Fig. 6 - Relative Luminous Intensity vs. Forward Current

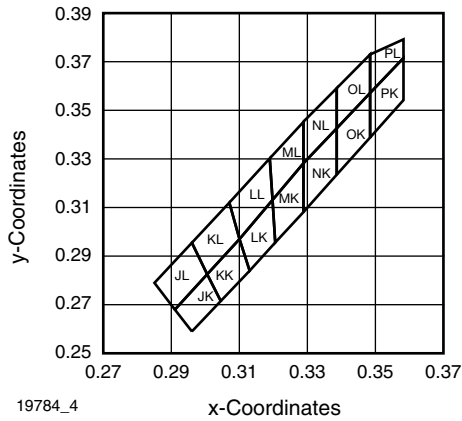


Fig. 7 - Coordinates of Colorgroups for Cool White

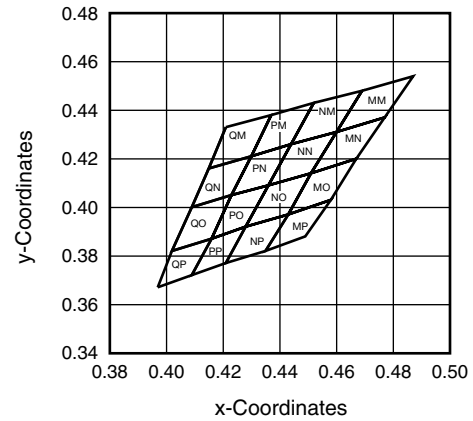
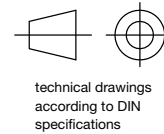
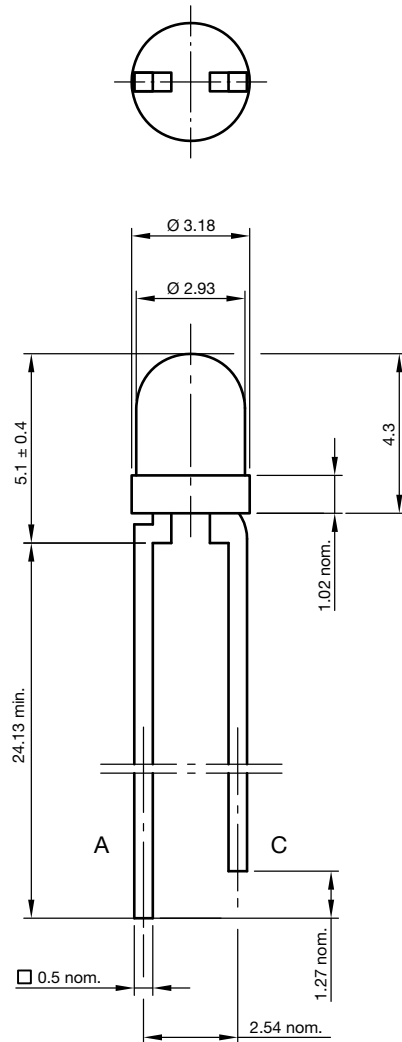


Fig. 8 - Coordinates of Colorgroups for Warm White

**PACKAGE DIMENSIONS** in millimeters



technical drawings according to DIN specifications

Not indicated tolerances ± 0.25

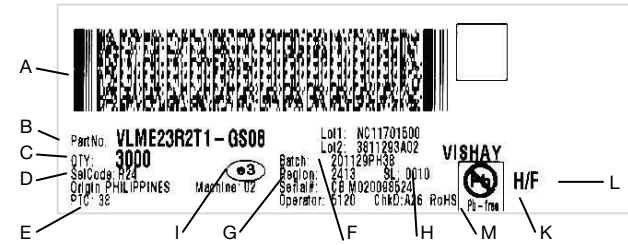
Drawing-No.: 6.544-5403.01-4

Issue: 2; 18.06.10

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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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