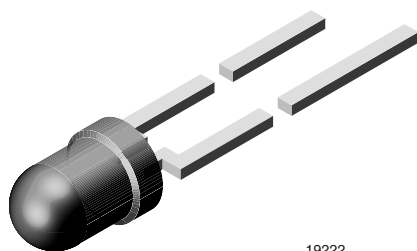




Ultrabright White LED, Ø 3 mm



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



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 _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-LKNL, 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 ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

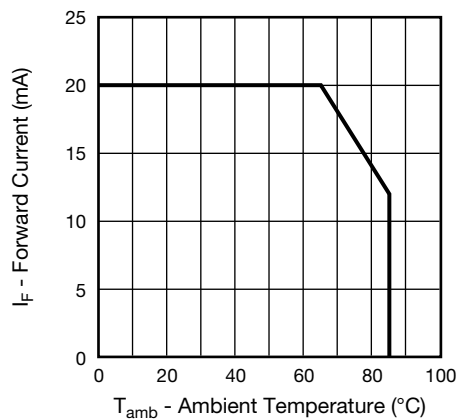


Fig. 1 - Forward Current vs. Ambient Temperature

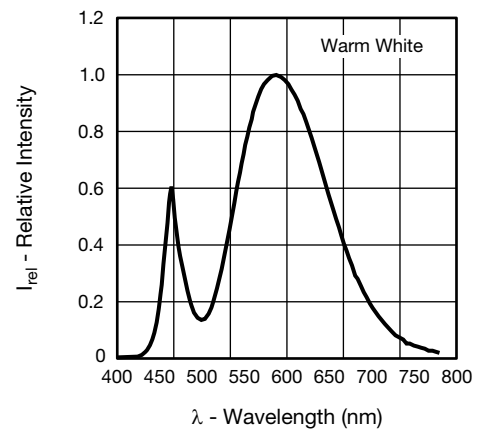


Fig. 4 - Relative Intensity vs. Wavelength

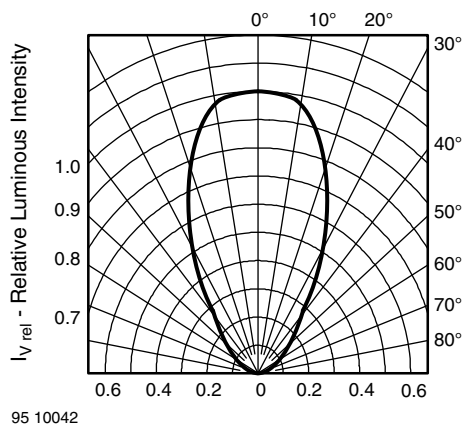


Fig. 2 - Relative Luminous Intensity vs. Angular Displacement

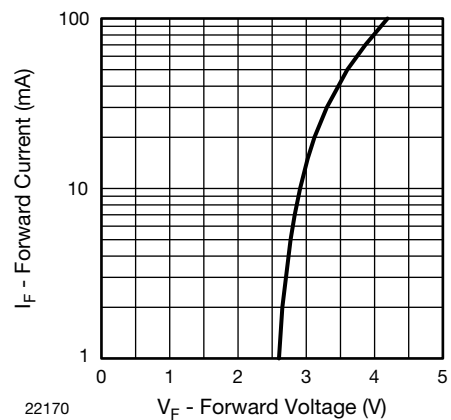


Fig. 5 - Forward Current vs. Forward Voltage

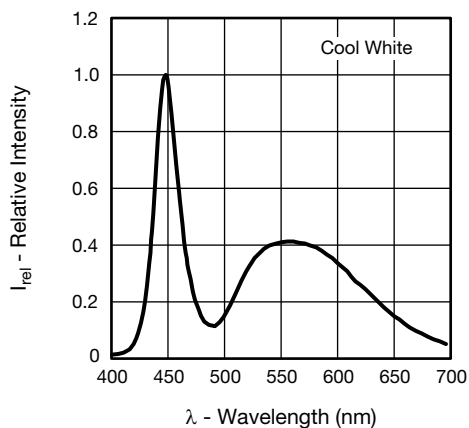


Fig. 3 - Relative Intensity vs. Wavelength

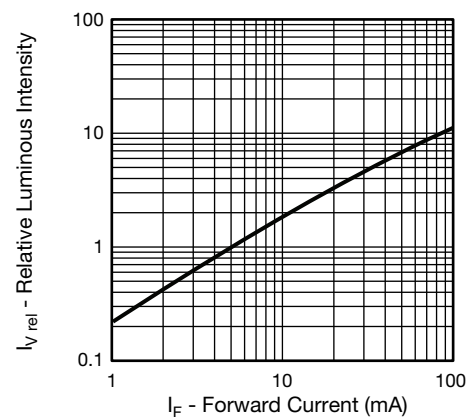


Fig. 6 - Relative Luminous Intensity vs. Forward Current

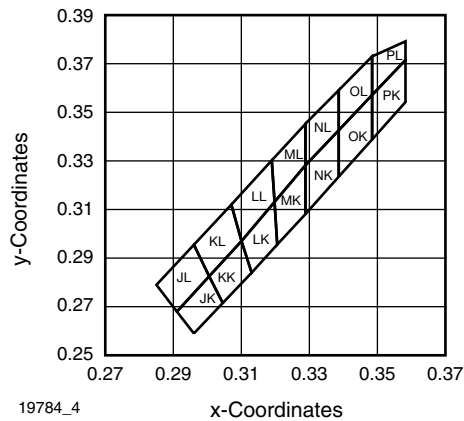


Fig. 7 - Coordinates of Colorgroups for Cool White

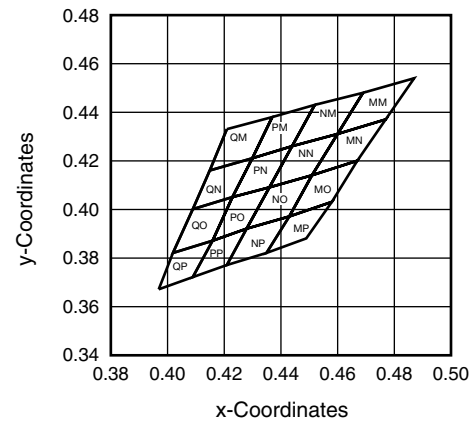
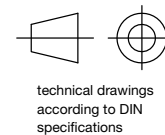
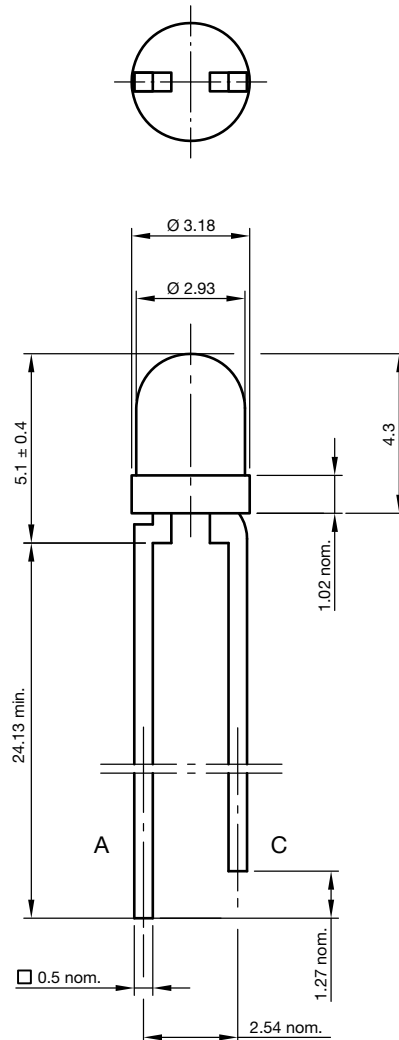


Fig. 8 - Coordinates of Colorgroups for Warm White

PACKAGE DIMENSIONS in millimeters



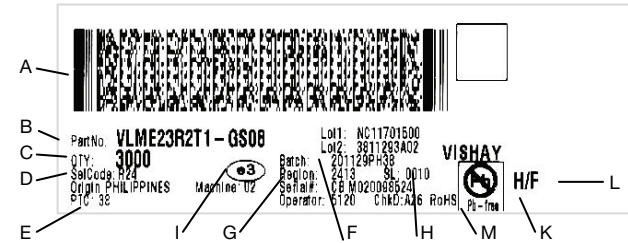
Not indicated tolerances ± 0.25

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



Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.