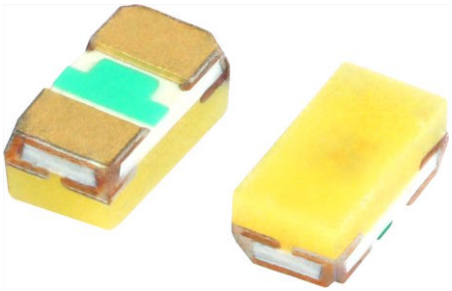
Ultrabright 0402 ChipLED



DESCRIPTION

The new 0402 ChipLED series has been designed in the smallest SMD package. This innovative 0402 ChipLED technology opens the way to

- Smaller products of higher performance
- More design-in flexibility
- Enhanced applications

The 0402 LED is an obvious solution for small-scale products that are expected to work reliably in an arduous environment.

This package is filled with a mixture of epoxy and yellow converter.

The yellow converter converts the blue emission partially to yellow, which mixes with the remaining blue to give white.

PRODUCT GROUP AND PACKAGE DATA

- Product group: LED
- Package: SMD 0402 ChipLED
- Product series: standard
- Angle of half intensity: ± 65°

FEATURES

- High efficient InGaN technology
- Super thin ChipLED with exceptional brightness 1.0 mm x 0.5 mm x 0.35 mm (L x W x H)
- High reliability, PCB based
- Temperature range -30 °C to +80 °C
- Chromaticity coordinates categorized according to CIE 1931 per packing unit
- Typical color temperature 7000 K
- EIA standard package
- Compatible to IR reflow soldering
- Available on 7" diameter reel
- Preconditioning according to JEDEC® level 2a
- ESD-sensitive device
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free
e4
RoHS COMPLIANT
HALOGEN FREE
GREEN (5-2008)

APPLICATIONS

- Telecommunication: indicator and backlighting in telephone and fax
- Backlighting for audio and video equipment
- Backlighting in office equipment
- Indoor and outdoor message boards
- Flat backlight for LCDs, switches, and symbols

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.		
VLMW1500-GS08	White	45	90	180	5	-	0.304, 0.300	-	5	2.65	2.90	3.05	5	InGaN / yellow converter
VLMW1501-GS08	White	71	90	180	5	-	0.294, 0.286	-	5	2.65	2.90	3.05	5	InGaN / yellow converter
VLMW1502-GS08	White	71	90	180	5	-	0.314, 0.315	-	5	2.65	2.90	3.05	5	InGaN / yellow converter
VLMW1503-GS08	White	71	90	180	5	-	0.304, 0.300	-	5	2.65	2.90	3.05	5	InGaN / yellow converter

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)
VLMW15..

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
DC forward current	$T_{amb} \leq 25$ °C	I_F	20	mA
Surge forward current	$t_p \leq 10$ µs	I_{FSM}	0.1	A
Power dissipation		P_V	70	mW
Operating temperature range		T_{amb}	-30 to +80	°C
Storage temperature range		T_{stg}	-55 to +105	°C
Thermal resistance junction/ambient		R_{thJA}	550	K/W

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)
VLMW15.., WHITE

PARAMETER	TEST CONDITION	TYPE	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity	I_F = 5 mA	VLMW1500	I_V	45	90	180	mcd
		VLMW1501	I_V	71	90	180	mcd
		VLMW1502	I_V	71	90	180	mcd
		VLMW1503	I_V	71	90	180	mcd
Chromatically coordinate x acc. to CIE 1931	I_F = 5 mA	VLMW1500, VLMW1503	x	-	0.304	-	
Chromatically coordinate y acc. to CIE 1931	I_F = 5 mA		y	-	0.300	-	
Chromatically coordinate x acc. to CIE 1931	I_F = 5 mA	VLMW1501	x	-	0.294	-	
Chromatically coordinate y acc. to CIE 1931	I_F = 5 mA		y	-	0.286	-	
Chromatically coordinate x acc. to CIE 1931	I_F = 5 mA	VLMW1502	x	-	0.314	-	
Chromatically coordinate y acc. to CIE 1931	I_F = 5 mA		y	-	0.315	-	
Angle of half intensity	I_F = 5 mA		φ	-	± 65	-	deg
Forward voltage	I_F = 5 mA		V_F	2.65	2.90	3.05	V
Reverse current (1)	V_R = 5 V		I_R	-	10	-	µA

Note

(1) Driving the LED in reverse direction is suitable for short term application

LUMINOUS INTENSITY CLASSIFICATION

GROUP	LUMINOUS INTENSITY (mcd) at 5 mA	
	MIN.	MAX.
P	45	71
Q	71	112
R	112	180

Note

- Luminous intensity is tested at a current pulse duration of 25 ms and an accuracy of ± 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 wavelength groups are measured and binned, single wavelength groups will be shipped in any one reel.
  In order to ensure availability, single wavelength groups will not be orderable.

FORWARD VOLTAGE CLASSIFICATION

GROUP	FORWARD VOLTAGE (V)	
	MIN.	MAX.
V2	2.65	2.75
V3	2.75	2.85
V4	2.85	2.95
V5	2.95	3.05

Note

- Forward voltage is measured with a tolerance of ± 0.1 V.

TYPE	CC GROUP
VLMW1500,VLMW1503	S1 to S6
VLMW1501	S1 to S4
VLMW1502	S3 to S6

CHROMATICITY COORDINATED GROUPS FOR WHITE SMD LED						
	X	Y			X	Y
S1	0.274	0.226		S4	0.294	0.286
	0.274	0.258			0.294	0.319
	0.294	0.286			0.314	0.347
	0.294	0.254			0.314	0.315
S2	0.274	0.258		S5	0.314	0.282
	0.274	0.291			0.314	0.315
	0.294	0.319			0.334	0.343
	0.294	0.286			0.334	0.311
S3	0.294	0.254		S6	0.314	0.315
	0.294	0.286			0.314	0.347
	0.314	0.315			0.334	0.376
	0.314	0.282			0.334	0.343

Note

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

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

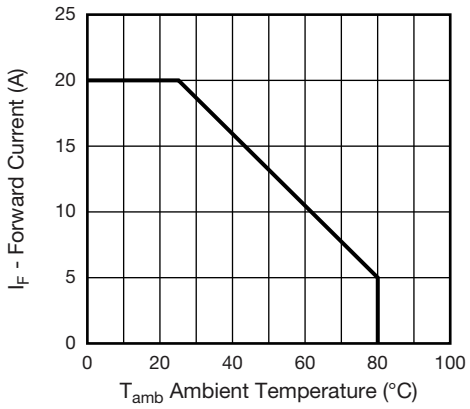


Fig. 1 - Forward Current vs. Ambient Temperature

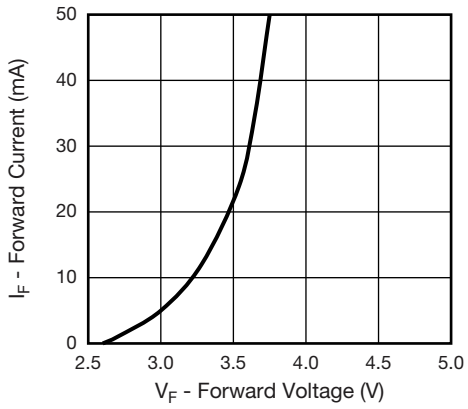


Fig. 3 - Forward Current vs. Forward Voltage

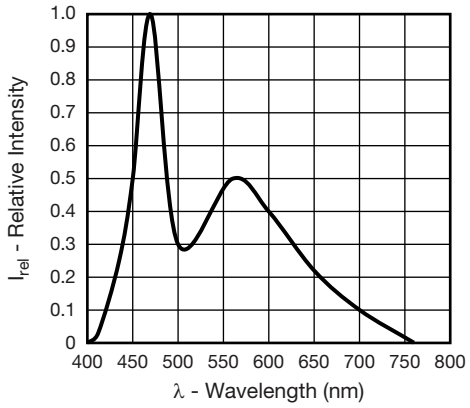


Fig. 2 - Relative Intensity vs. Wavelength

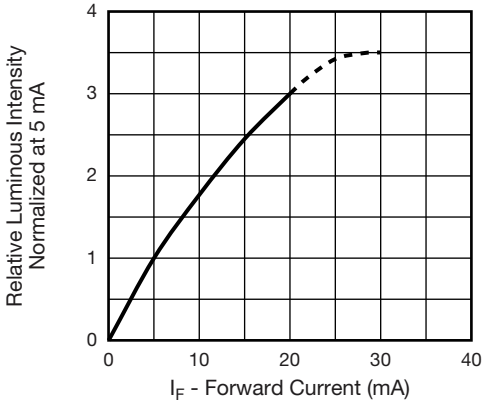


Fig. 4 - Relative Luminous Intensity vs. Forward Current

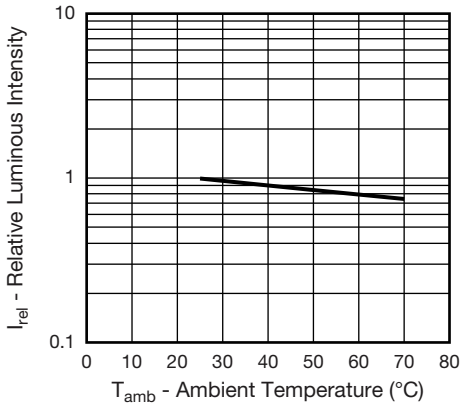


Fig. 5 - Relative Luminous Intensity vs. Ambient Temperature

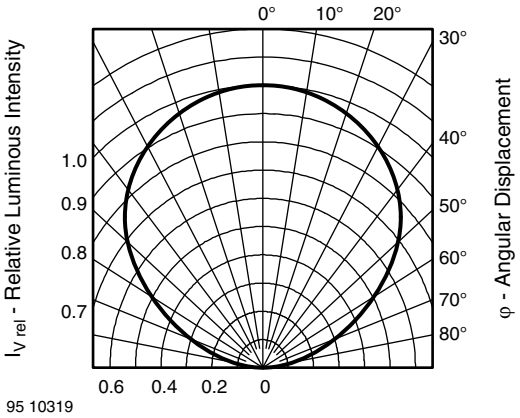


Fig. 7 - Relative Luminous Intensity vs. Angular Displacement

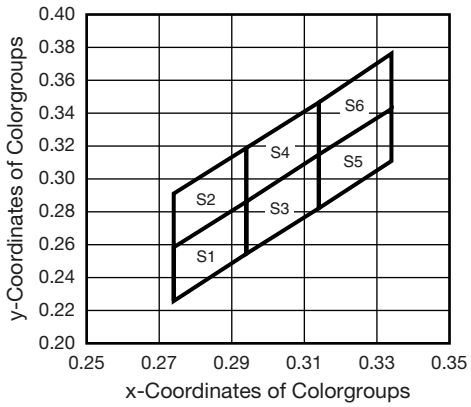
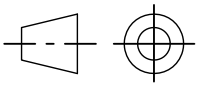
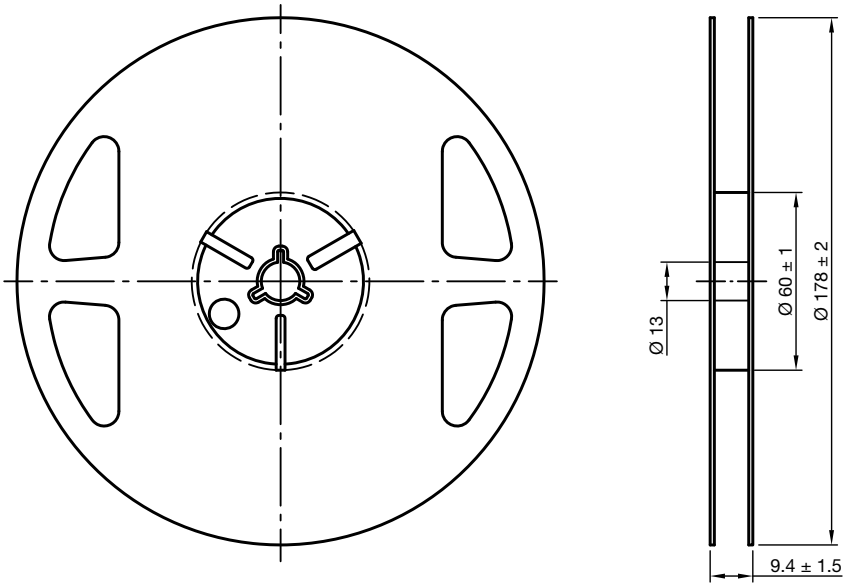


Fig. 6 - Coordinates of Colorgroups

REEL DIMENSIONS in millimeters



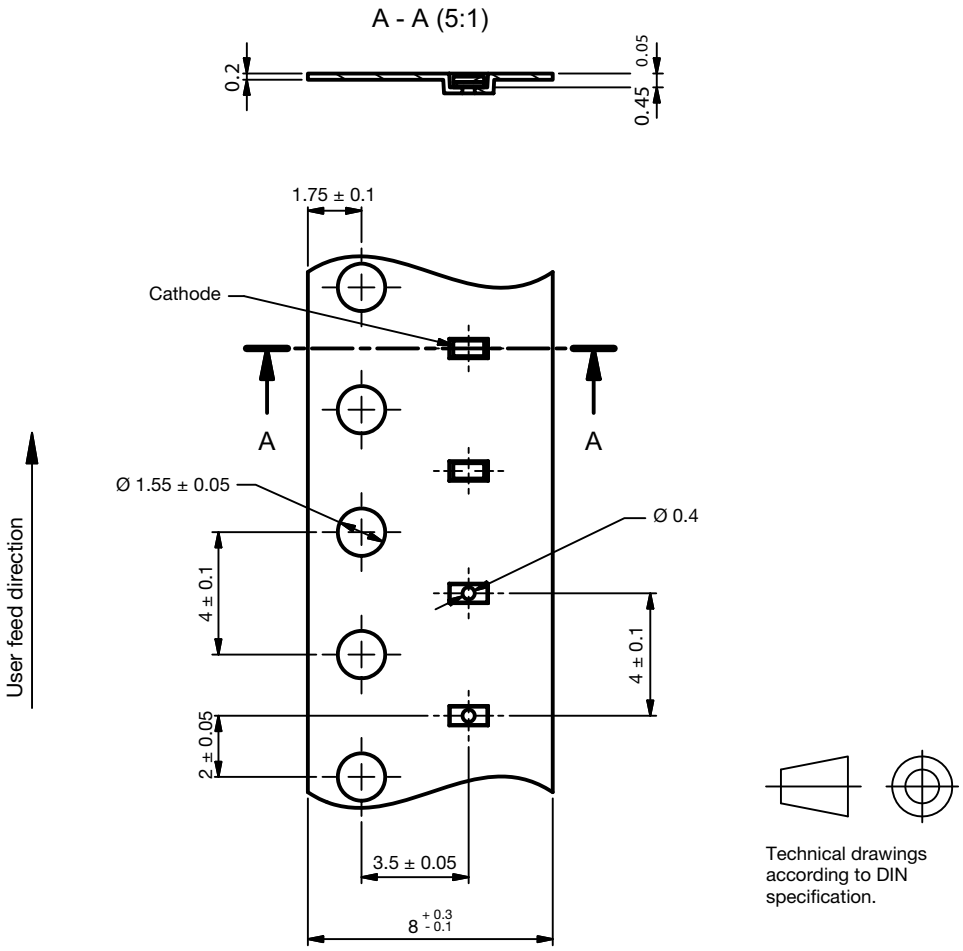
technical drawings
according to DIN
specifications



Drawing-No.: 9.800-5122.01-4
Issue: 2; 03.11.11
22611

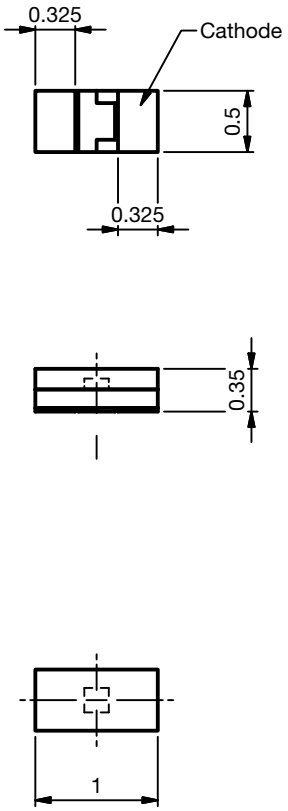
3000 pieces per reel / 3 reels per box

TAPE DIMENSIONS in millimeters

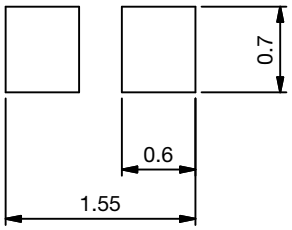


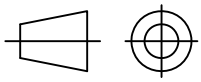
Drawing-No.: 9.700-5388.01-4
Issue: 1; 20.03.12

PACKAGE DIMENSIONS in millimeters

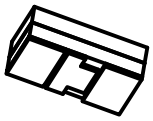


Recommended solder pad footprint





Technical drawings according to DIN specification



Not indicated tolerances ± 0.2

Drawing-No.: 6.541-5096.01-4
Issue: 1; 20.03.12

SOLDERING PROFILE

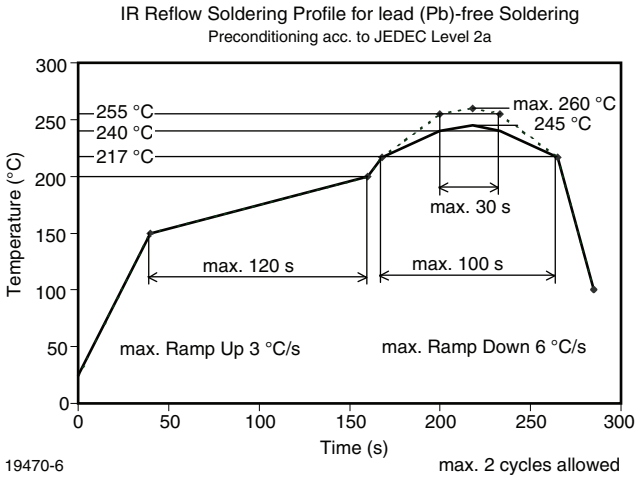
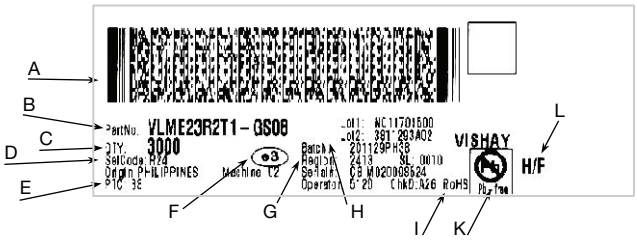


Fig. 8 - Vishay Lead (Pb)-free Reflow Soldering Profile (according to J-STD-020C)

BAR CODE PRODUCT LABEL (example)



A) 2D barcode

B) PartNo = Vishay part number

C) QTY = quantity

D) SelCode = selection code (binning)

E) PTC = code of manufacturing plant

F) Terminations finishing

G) Region code

H) Batch = date code: year / week / plant code

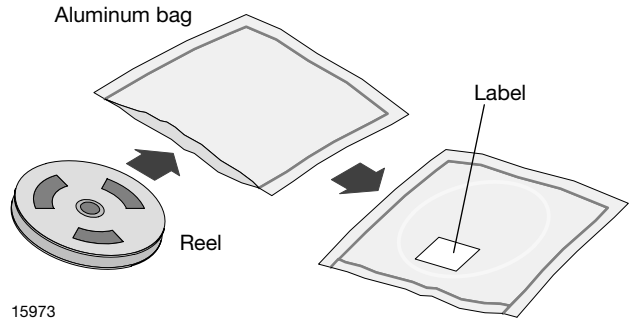
I) RoHS symbol

K) Lead (Pb)-free symbol

L) Halogen-free symbol

DRY PACKING

The reel is packed in an anti-humidity bag to protect the devices from absorbing moisture during transportation and storage.



15973

FINAL PACKING

The sealed reel is packed into a cardboard box. A secondary cardboard box is used for shipping purposes.

RECOMMENDED METHOD OF STORAGE

Dry box storage is recommended as soon as the aluminum bag has been opened to prevent moisture absorption. The following conditions should be observed, if dry boxes are not available:

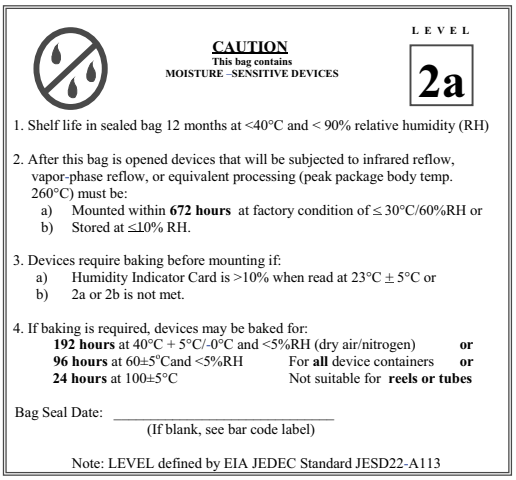
- Storage temperature 10 °C to 30 °C
- Storage humidity ≤ 60 % RH max.

After more than 672 h under these conditions moisture content will be too high for reflow soldering.

In case of moisture absorption, the devices will recover to the former condition by drying under the following condition:

192 h at 40 °C + 5 °C / - 0 °C and < 5 % RH (dry air / nitrogen)
or
96 h at 60 °C + 5 °C and < 5 % RH for all device containers
or
24 h at 100 °C + 5 °C not suitable for reel or tubes.

An EIA JEDEC standard JESD22-A112 level 2a label is included on all dry bags.


CAUTION
This bag contains
MOISTURE –SENSITIVE DEVICES

LEVEL
2a

1. Shelf life in sealed bag 12 months at <40°C and < 90% relative humidity (RH)

2. After this bag is opened devices that will be subjected to infrared reflow, vapor-phase reflow, or equivalent processing (peak package body temp. 260°C) must be:
   a) Mounted within **672 hours** at factory condition of ≤ 30°C/60%RH or
   b) Stored at ≤10% RH.

3. Devices require baking before mounting if:
   a) Humidity Indicator Card is >10% when read at 23°C ± 5°C or
   b) 2a or 2b is not met.

4. If baking is required, devices may be baked for:
   192 hours at 40°C + 5°C/-0°C and <5%RH (dry air/nitrogen) **or**
   96 hours at 60±5°Cand <5%RH For **all** device containers **or**
   24 hours at 100±5°C Not suitable for **reels or tubes**

Bag Seal Date: _____
(If blank, see bar code label)

Note: LEVEL defined by EIA JEDEC Standard JESD22-A113

19786

Example of JESD22-A112 Level 2a Label

ESD PRECAUTION

Proper storage and handling procedures should be followed to prevent ESD damage to the devices especially when they are removed from the antistatic shielding bag. Electrostatic sensitive devices warning labels are on the packaging.

VISHAY SEMICONDUCTORS STANDARD BAR CODE LABELS

The Vishay Semiconductors standard bar code labels are printed at final packing areas. The labels are on each packing unit and contain Vishay Semiconductors specific data.

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