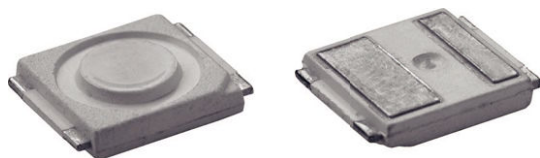




## Little Star® 1 W Power SMD LED White



20784-1

### DESCRIPTION

The VLMW712U2U3XV, VLMW712T3U3US, and VLMW712T2T3QN rank among the most robust and light efficient LEDs in the market. Using recent and reliable nitride phosphor technology, the color stability has been improved. With its extremely high level of brightness and the package height profile, which is only 1.5 mm, the Little Star is highly suitable for both, conventional lighting and specialized application such as signal lights, traffic lights, channel lights, tube lights and garden lights among others.

### PRODUCT GROUP AND PACKAGE DATA

- Product group: LED
- Package: SMD Little Star
- Product series: power
- Angle of half intensity:  $\pm 60^\circ$

### FEATURES

- Super high brightness surface mount LED
- High flux output; up to 113 lm
- $120^\circ$  viewing angle
- Compact package outline (L x W x H) in mm: 6.0 x 6.0 x 1.5
- Ultra low height profile - 1.5 mm
- Designed for high current drive; up to 350 mA
- Low thermal resistance;  $R_{thJP} = 10 \text{ K/W}$
- Qualified according to JEDEC moisture sensitivity level 2a
- Compatible with IR reflow soldering
- Little Star® are class 1M LED products. Do not view directly with optical instrument
- 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

### APPLICATIONS

- Communication: flashLED
- Industry: white goods (e.g.: oven, microwave, etc.)
- Lighting: garden light, architecture lighting, general lighting, etc.

### PARTS TABLE

| PART               | COLOR         | LUMINOUS FLUX<br>(lm) |         |         | at<br>$I_F$<br>(mA) | COORDINATE<br>(x, y) |               |      | FORWARD<br>VOLTAGE<br>(V) |      |      | TECHNOLOGY |
|--------------------|---------------|-----------------------|---------|---------|---------------------|----------------------|---------------|------|---------------------------|------|------|------------|
|                    |               | MIN.                  | TYP.    | MAX.    |                     | MIN.                 | TYP.          | MAX. | MIN.                      | TYP. | MAX. |            |
| VLMW712U2U3XV-GS08 | Cool white    | 87 400                | 100 000 | 113 600 | 350                 | -                    | 0.33,<br>0.33 | -    | 3                         | 3.5  | 4    | InGaN      |
| VLMW712T3U3US-GS08 | Natural white | 76 500                | 90 000  | 113 600 | 350                 | -                    | 0.37,<br>0.38 | -    | 3                         | 3.5  | 4    | InGaN      |
| VLMW712T2T3QN-GS08 | Warm white    | 67 200                | 75 000  | 87 400  | 350                 | -                    | 0.44,<br>0.41 | -    | 3                         | 3.5  | 4    | InGaN      |

### ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25^\circ\text{C}$ , unless otherwise specified) VLMW712U2U3XV, VLMW712T3U3US, VLMW712T2T3QN

| PARAMETER                                      | TEST CONDITION | SYMBOL     | VALUE         | UNIT             |
|------------------------------------------------|----------------|------------|---------------|------------------|
| Forward current                                |                | $I_F$      | 350           | mA               |
| Power dissipation                              |                | $P_{tot}$  | 1.4           | W                |
| Junction temperature                           |                | $T_j$      | + 120         | $^\circ\text{C}$ |
| Surge current $t < 10 \mu\text{s}$ , $d = 0.1$ |                | $I_{FM}$   | 1000          | mA               |
| Operating temperature range                    |                | $T_{amb}$  | - 40 to + 100 | $^\circ\text{C}$ |
| Storage temperature range                      |                | $T_{stg}$  | - 40 to + 100 | $^\circ\text{C}$ |
| Thermal resistance junction/pin                |                | $R_{thJP}$ | 10            | K/W              |

#### Note

- Not designed for reverse operation



## OPTICAL AND ELECTRICAL CHARACTERISTICS ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) VLMW712U2U3XV, COOL WHITE

| PARAMETER                                  | TEST CONDITION        | SYMBOL    | MIN.   | TYP.     | MAX.    | UNIT |
|--------------------------------------------|-----------------------|-----------|--------|----------|---------|------|
| Luminous intensity                         | $I_F = 350\text{ mA}$ | $\phi$    | 87 400 | 100 000  | 113 600 | mlm  |
|                                            |                       | $I_V$     | -      | 33 500   | -       | mcd  |
| Chromaticity coordinate x acc. to CIE 1931 | $I_F = 350\text{ mA}$ | x         | -      | 0.33     | -       |      |
| Chromaticity coordinate y acc. to CIE 1931 | $I_F = 350\text{ mA}$ | y         | -      | 0.33     | -       |      |
| Angle of half intensity                    | $I_F = 350\text{ mA}$ | $\varphi$ | -      | $\pm 60$ | -       | deg  |
| Forward voltage <sup>(1)</sup>             | $I_F = 350\text{ mA}$ | $V_F$     | 3      | 3.5      | 4       | V    |
| Temperature coefficient of $V_F$           | $I_F = 350\text{ mA}$ | $TC_{VF}$ | -      | - 3      | -       | mV/K |
| Temperature coefficient of $I_V$           | $I_F = 350\text{ mA}$ | $TC_{IV}$ | -      | - 0.4    | -       | %/K  |

### Note

<sup>(1)</sup> Forward voltages are tested at a current pulse duration of 1 ms and a tolerance of  $\pm 0.05\text{ V}$

## OPTICAL AND ELECTRICAL CHARACTERISTICS ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) VLMW712T3U3US, NATURAL WHITE

| PARAMETER                                  | TEST CONDITION        | SYMBOL    | MIN.   | TYP.     | MAX.    | UNIT |
|--------------------------------------------|-----------------------|-----------|--------|----------|---------|------|
| Luminous intensity                         | $I_F = 350\text{ mA}$ | $\phi$    | 76 500 | 90 000   | 113 600 | mlm  |
|                                            |                       | $I_V$     | -      | 29 700   | -       | mcd  |
| Chromaticity coordinate x acc. to CIE 1931 | $I_F = 350\text{ mA}$ | x         | -      | 0.37     | -       |      |
| Chromaticity coordinate y acc. to CIE 1931 | $I_F = 350\text{ mA}$ | y         | -      | 0.38     | -       |      |
| Angle of half intensity                    | $I_F = 350\text{ mA}$ | $\varphi$ | -      | $\pm 60$ | -       | deg  |
| Forward voltage <sup>(1)</sup>             | $I_F = 350\text{ mA}$ | $V_F$     | 3      | 3.5      | 4       | V    |
| Temperature coefficient of $V_F$           | $I_F = 350\text{ mA}$ | $TC_{VF}$ | -      | - 3      | -       | mV/K |
| Temperature coefficient of $I_V$           | $I_F = 350\text{ mA}$ | $TC_{IV}$ | -      | - 0.4    | -       | %/K  |

### Note

<sup>(1)</sup> Forward voltages are tested at a current pulse duration of 1 ms and a tolerance of  $\pm 0.05\text{ V}$

## OPTICAL AND ELECTRICAL CHARACTERISTICS ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) VLMW712T2T3QN, WARM WHITE

| PARAMETER                                  | TEST CONDITION        | SYMBOL    | MIN.   | TYP.     | MAX.   | UNIT |
|--------------------------------------------|-----------------------|-----------|--------|----------|--------|------|
| Luminous intensity                         | $I_F = 350\text{ mA}$ | $\phi$    | 67 200 | 75 000   | 87 400 | mlm  |
|                                            |                       | $I_V$     | -      | 25 000   | -      | mcd  |
| Chromaticity coordinate x acc. to CIE 1931 | $I_F = 350\text{ mA}$ | x         | -      | 0.44     | -      |      |
| Chromaticity coordinate y acc. to CIE 1931 | $I_F = 350\text{ mA}$ | y         | -      | 0.41     | -      |      |
| Angle of half intensity                    | $I_F = 350\text{ mA}$ | $\varphi$ | -      | $\pm 60$ | -      | deg  |
| Forward voltage <sup>(1)</sup>             | $I_F = 350\text{ mA}$ | $V_F$     | 3      | 3.5      | 4      | V    |
| Temperature coefficient of $V_F$           | $I_F = 350\text{ mA}$ | $TC_{VF}$ | -      | - 3      | -      | mV/K |
| Temperature coefficient of $I_V$           | $I_F = 350\text{ mA}$ | $TC_{IV}$ | -      | - 0.4    | -      | %/K  |

### Note

<sup>(1)</sup> Forward voltages are tested at a current pulse duration of 1 ms and a tolerance of  $\pm 0.05\text{ V}$



| LUMINOUS INTENSITY/FLUX CLASSIFICATION |                                               |         |
|----------------------------------------|-----------------------------------------------|---------|
| GROUP                                  | LUMINOUS FLUX $\Phi_v$ (lm) CORRELATION TABLE |         |
| STANDARD                               | MIN.                                          | MAX.    |
| T2                                     | 67 200                                        | 76 500  |
| T3                                     | 76 500                                        | 87 400  |
| U2                                     | 87 400                                        | 99 400  |
| U3                                     | 99 400                                        | 113 600 |

**Note**

- Luminous intensity is tested at a current pulse duration of 25 ms and an accuracy of  $\pm 11\%$ .  
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 in any one reel. In order to ensure availability, single color groups will not be orderable.

| CHROMATICITY COORDINATED GROUPS FOR COOL WHITE SMD LED |       |       |
|--------------------------------------------------------|-------|-------|
| BIN                                                    | Cx    | Cy    |
| XM                                                     | 0.301 | 0.342 |
|                                                        | 0.314 | 0.353 |
|                                                        | 0.315 | 0.343 |
|                                                        | 0.303 | 0.333 |
|                                                        | 0.301 | 0.342 |
| XN                                                     | 0.303 | 0.333 |
|                                                        | 0.315 | 0.343 |
|                                                        | 0.316 | 0.332 |
|                                                        | 0.305 | 0.322 |
|                                                        | 0.303 | 0.333 |
| XO                                                     | 0.305 | 0.322 |
|                                                        | 0.316 | 0.332 |
|                                                        | 0.318 | 0.319 |
|                                                        | 0.308 | 0.311 |
|                                                        | 0.305 | 0.322 |
| XP                                                     | 0.308 | 0.311 |
|                                                        | 0.318 | 0.319 |
|                                                        | 0.32  | 0.301 |
|                                                        | 0.311 | 0.293 |
|                                                        | 0.308 | 0.311 |
| WM                                                     | 0.314 | 0.353 |
|                                                        | 0.329 | 0.366 |
|                                                        | 0.329 | 0.354 |
|                                                        | 0.315 | 0.343 |
|                                                        | 0.314 | 0.353 |
| WN                                                     | 0.315 | 0.343 |
|                                                        | 0.329 | 0.354 |
|                                                        | 0.329 | 0.343 |
|                                                        | 0.316 | 0.332 |
|                                                        | 0.315 | 0.343 |
| WO                                                     | 0.316 | 0.332 |
|                                                        | 0.329 | 0.343 |
|                                                        | 0.329 | 0.33  |
|                                                        | 0.318 | 0.319 |
|                                                        | 0.316 | 0.332 |
| WP                                                     | 0.318 | 0.319 |
|                                                        | 0.329 | 0.33  |
|                                                        | 0.329 | 0.319 |
|                                                        | 0.319 | 0.31  |
|                                                        | 0.318 | 0.319 |

**CHROMATICITY COORDINATED GROUPS FOR COOL WHITE SMD LED**

| BIN | Cx    | Cy    |
|-----|-------|-------|
| WQ  | 0.319 | 0.31  |
|     | 0.329 | 0.319 |
|     | 0.33  | 0.311 |
|     | 0.32  | 0.301 |
|     | 0.319 | 0.31  |
| VM  | 0.329 | 0.366 |
|     | 0.348 | 0.383 |
|     | 0.347 | 0.368 |
|     | 0.329 | 0.354 |
|     | 0.329 | 0.366 |
| VN  | 0.329 | 0.354 |
|     | 0.347 | 0.368 |
|     | 0.346 | 0.357 |
|     | 0.329 | 0.343 |
|     | 0.329 | 0.354 |
| VO  | 0.329 | 0.343 |
|     | 0.346 | 0.357 |
|     | 0.344 | 0.343 |
|     | 0.329 | 0.33  |
|     | 0.329 | 0.343 |
| VP  | 0.329 | 0.33  |
|     | 0.344 | 0.343 |
|     | 0.343 | 0.331 |
|     | 0.329 | 0.319 |
|     | 0.329 | 0.33  |

**Note**

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

**CHROMATICITY COORDINATED GROUPS FOR NATURAL WHITE SMD LED**

| BIN | Cx    | Cy    |
|-----|-------|-------|
| UM  | 0.348 | 0.383 |
|     | 0.367 | 0.4   |
|     | 0.364 | 0.383 |
|     | 0.347 | 0.368 |
| UN  | 0.347 | 0.368 |
|     | 0.364 | 0.383 |
|     | 0.362 | 0.372 |
|     | 0.346 | 0.357 |
| UO  | 0.346 | 0.357 |
|     | 0.362 | 0.372 |
|     | 0.359 | 0.356 |
|     | 0.344 | 0.343 |
| UP  | 0.344 | 0.343 |
|     | 0.359 | 0.356 |
|     | 0.357 | 0.343 |
|     | 0.343 | 0.331 |
| TM  | 0.367 | 0.4   |
|     | 0.364 | 0.383 |
|     | 0.381 | 0.394 |
|     | 0.386 | 0.411 |

**CHROMATICITY COORDINATED GROUPS FOR NATURAL WHITE SMD LED**

| BIN | Cx    | Cy    |
|-----|-------|-------|
| TN  | 0.364 | 0.383 |
|     | 0.362 | 0.372 |
|     | 0.378 | 0.381 |
|     | 0.381 | 0.394 |
| TO  | 0.362 | 0.372 |
|     | 0.359 | 0.356 |
|     | 0.374 | 0.365 |
|     | 0.378 | 0.381 |
| TP  | 0.359 | 0.356 |
|     | 0.357 | 0.343 |
|     | 0.37  | 0.351 |
|     | 0.374 | 0.365 |
| SM  | 0.386 | 0.411 |
|     | 0.381 | 0.394 |
|     | 0.396 | 0.404 |
|     | 0.402 | 0.421 |
| SN  | 0.381 | 0.394 |
|     | 0.378 | 0.381 |
|     | 0.392 | 0.389 |
|     | 0.396 | 0.404 |
| SO  | 0.378 | 0.381 |
|     | 0.374 | 0.365 |
|     | 0.387 | 0.373 |
|     | 0.392 | 0.389 |
| SP  | 0.374 | 0.365 |
|     | 0.37  | 0.351 |
|     | 0.382 | 0.358 |
|     | 0.387 | 0.373 |

**Note**

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

**CHROMATICITY COORDINATED GROUPS FOR WARM WHITE SMD LED**

| BIN | Cx    | Cy    |
|-----|-------|-------|
| QM  | 0.421 | 0.433 |
|     | 0.437 | 0.438 |
|     | 0.43  | 0.421 |
|     | 0.415 | 0.416 |
|     | 0.421 | 0.433 |
| QN  | 0.415 | 0.416 |
|     | 0.43  | 0.421 |
|     | 0.423 | 0.405 |
|     | 0.409 | 0.4   |
|     | 0.415 | 0.416 |
| QO  | 0.409 | 0.4   |
|     | 0.423 | 0.405 |
|     | 0.416 | 0.387 |
|     | 0.402 | 0.382 |
|     | 0.409 | 0.4   |



| CHROMATICITY COORDINATED GROUPS FOR WARM WHITE SMD LED |       |       |
|--------------------------------------------------------|-------|-------|
| BIN                                                    | Cx    | Cy    |
| QP                                                     | 0.402 | 0.382 |
|                                                        | 0.416 | 0.387 |
|                                                        | 0.409 | 0.372 |
|                                                        | 0.397 | 0.367 |
|                                                        | 0.402 | 0.382 |
| PM                                                     | 0.437 | 0.438 |
|                                                        | 0.452 | 0.443 |
|                                                        | 0.444 | 0.426 |
|                                                        | 0.43  | 0.421 |
|                                                        | 0.437 | 0.438 |
| PN                                                     | 0.43  | 0.421 |
|                                                        | 0.444 | 0.426 |
|                                                        | 0.436 | 0.409 |
|                                                        | 0.423 | 0.405 |
|                                                        | 0.43  | 0.421 |
| PO                                                     | 0.423 | 0.405 |
|                                                        | 0.436 | 0.409 |
|                                                        | 0.428 | 0.392 |
|                                                        | 0.416 | 0.387 |
|                                                        | 0.423 | 0.405 |
| PP                                                     | 0.416 | 0.387 |
|                                                        | 0.428 | 0.392 |
|                                                        | 0.421 | 0.377 |
|                                                        | 0.409 | 0.372 |
|                                                        | 0.416 | 0.387 |
| NM                                                     | 0.452 | 0.443 |
|                                                        | 0.469 | 0.448 |
|                                                        | 0.46  | 0.431 |
|                                                        | 0.444 | 0.426 |
|                                                        | 0.452 | 0.443 |
| NN                                                     | 0.444 | 0.426 |
|                                                        | 0.46  | 0.431 |
|                                                        | 0.451 | 0.414 |
|                                                        | 0.436 | 0.409 |
|                                                        | 0.444 | 0.426 |
| NO                                                     | 0.436 | 0.409 |
|                                                        | 0.451 | 0.414 |
|                                                        | 0.443 | 0.397 |
|                                                        | 0.428 | 0.392 |
|                                                        | 0.436 | 0.409 |
| NP                                                     | 0.428 | 0.392 |
|                                                        | 0.443 | 0.397 |
|                                                        | 0.435 | 0.382 |
|                                                        | 0.421 | 0.377 |
|                                                        | 0.428 | 0.392 |

**Note**

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



## TYPICAL CHARACTERISTICS ( $T_{amb} = 25^{\circ}\text{C}$ , unless otherwise specified)

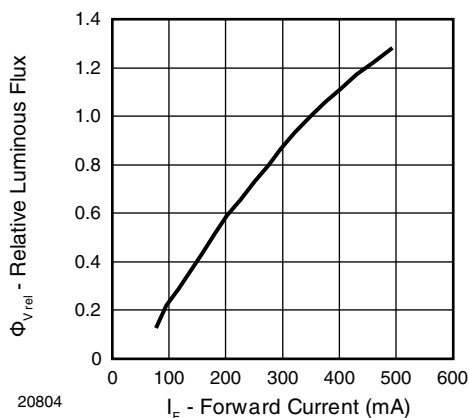


Fig. 1 - Relative Luminous Flux vs. Forward Current

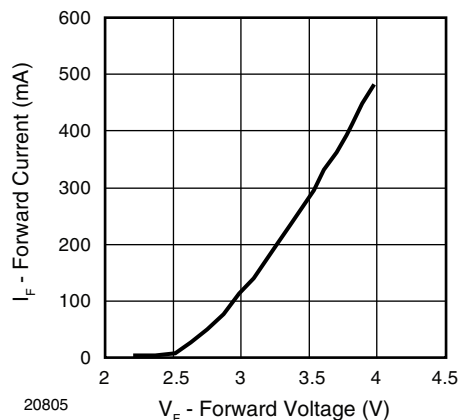


Fig. 4 - Forward Current vs. Forward Voltage

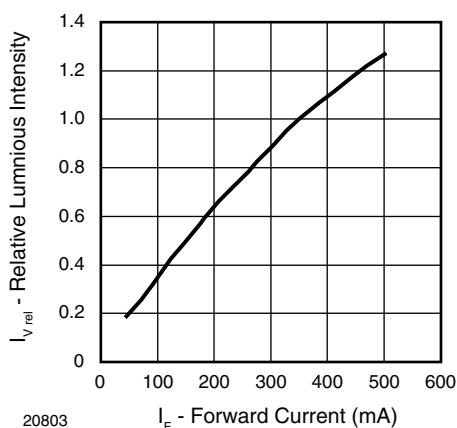


Fig. 2 - Relative Luminous Intensity vs. Forward Current

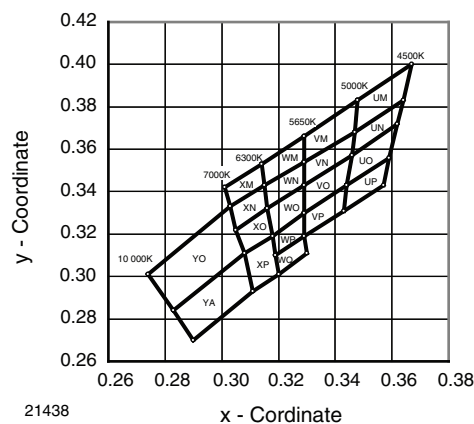


Fig. 5 - Coordinates of Color Groups for Cool White

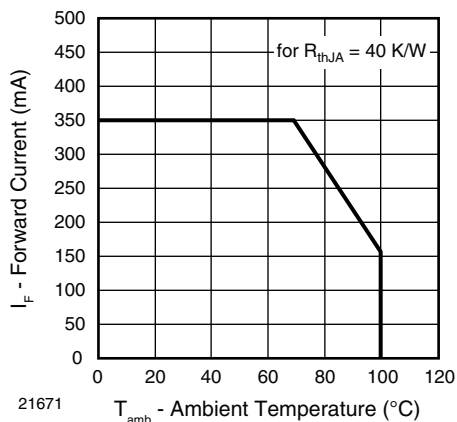


Fig. 3 - Forward Current vs. Solder Point Temperature

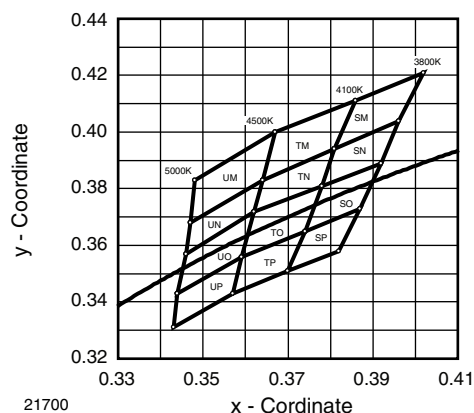
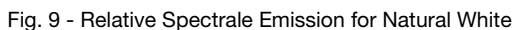
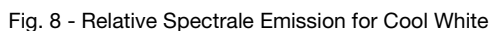
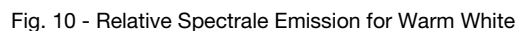


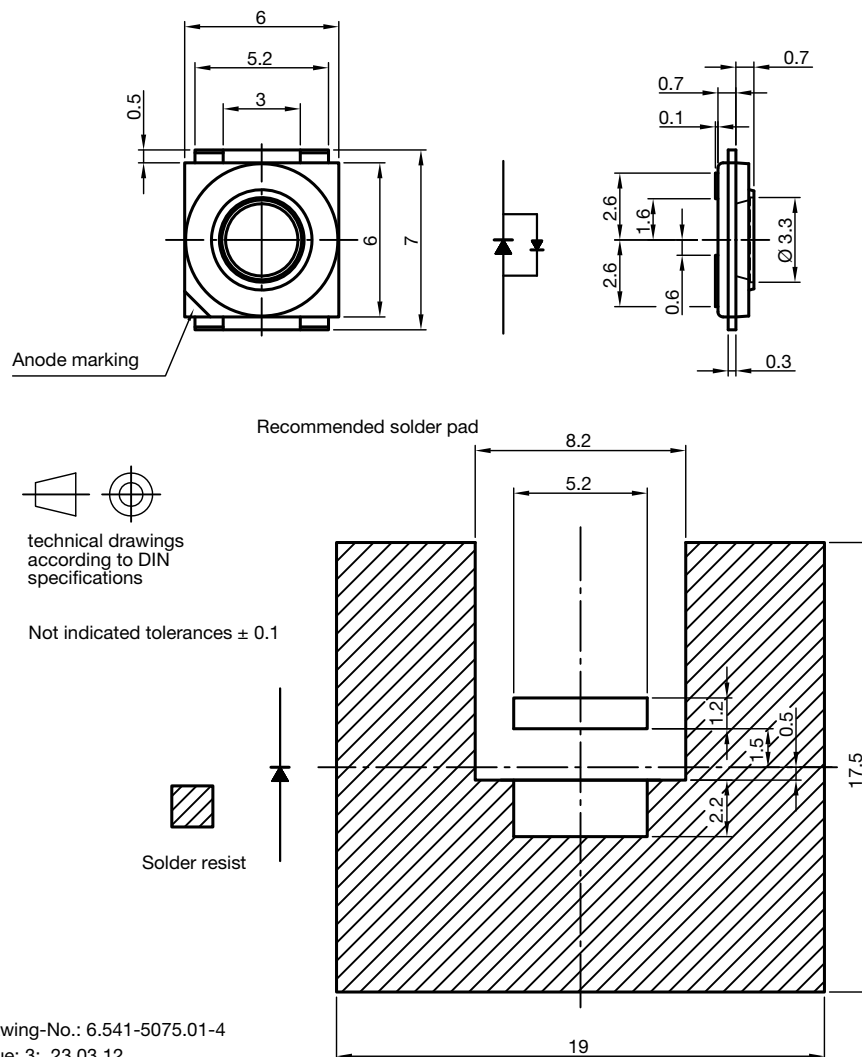
Fig. 6 - Coordinates of Color Groups for Natural White



## 20846



## PACKAGE DIMENSIONS/SOLDERING PADS DIMENSIONS in millimeters



## SOLDERING PROFILE

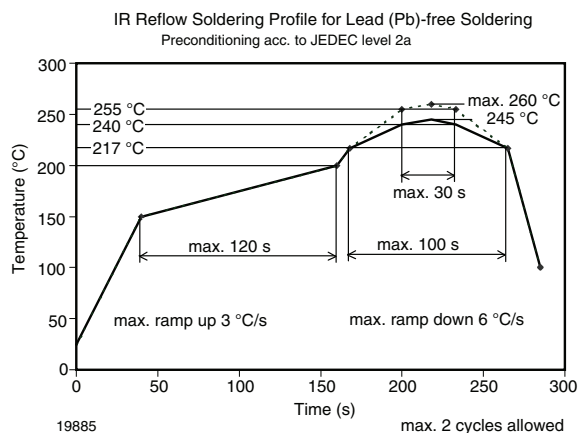
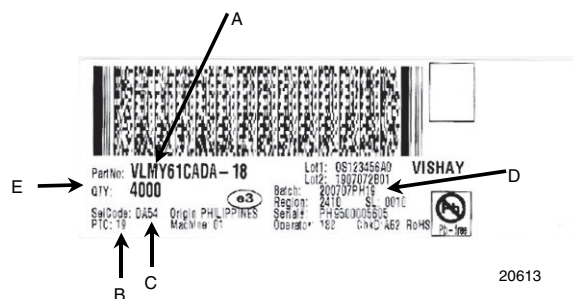


Fig. 12 - Vishay Lead (Pb)-free Reflow Soldering Profile (acc. to J-STD-020C)

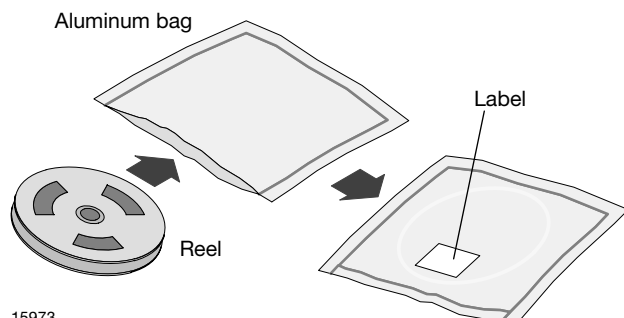
## BAR CODE PRODUCT LABEL (example)





## 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  $\leq 60\%$  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.

## 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. Electro-static 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.

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                   |                    |                                                                                                                  |           |                                                                  |                           |           |                                              |                                 |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|--------------------|------------------------------------------------------------------------------------------------------------------|-----------|------------------------------------------------------------------|---------------------------|-----------|----------------------------------------------|---------------------------------|--|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>CAUTION</b><br>This bag contains<br>MOISTURE-SENSITIVE DEVICES | LEVEL<br><b>2a</b> |                                                                                                                  |           |                                                                  |                           |           |                                              |                                 |  |
| <p>1. Shelf life in sealed bag 12 months at &lt;40°C and &lt; 90% relative humidity (RH)</p> <p>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:</p> <ul style="list-style-type: none"><li>a) Mounted within <b>672 hours</b> at factory condition of <math>\leq 30^\circ\text{C}/60\%\text{RH}</math> or</li><li>b) Stored at <math>\leq 10\%</math> RH.</li></ul> <p>3. Devices require baking before mounting if:</p> <ul style="list-style-type: none"><li>a) Humidity Indicator Card is <math>&gt; 10\%</math> when read at <math>23^\circ\text{C} \pm 5^\circ\text{C}</math> or</li><li>b) 2a or 2b is not met.</li></ul> <p>4. If baking is required, devices may be baked for:</p> <table border="0"><tr><td><b>192 hours</b> at <math>40^\circ\text{C} + 5^\circ\text{C}/0^\circ\text{C}</math> and <math>&lt; 5\%\text{RH}</math> (dry air/nitrogen)</td><td><b>or</b></td></tr><tr><td><b>96 hours</b> at <math>60 \pm 5^\circ\text{C}</math> and <math>&lt; 5\%\text{RH}</math></td><td>For all device containers</td><td><b>or</b></td></tr><tr><td><b>24 hours</b> at <math>100 \pm 5^\circ\text{C}</math></td><td>Not suitable for reels or tubes</td><td></td></tr></table> |                                                                   |                    | <b>192 hours</b> at $40^\circ\text{C} + 5^\circ\text{C}/0^\circ\text{C}$ and $< 5\%\text{RH}$ (dry air/nitrogen) | <b>or</b> | <b>96 hours</b> at $60 \pm 5^\circ\text{C}$ and $< 5\%\text{RH}$ | For all device containers | <b>or</b> | <b>24 hours</b> at $100 \pm 5^\circ\text{C}$ | Not suitable for reels or tubes |  |
| <b>192 hours</b> at $40^\circ\text{C} + 5^\circ\text{C}/0^\circ\text{C}$ and $< 5\%\text{RH}$ (dry air/nitrogen)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>or</b>                                                         |                    |                                                                                                                  |           |                                                                  |                           |           |                                              |                                 |  |
| <b>96 hours</b> at $60 \pm 5^\circ\text{C}$ and $< 5\%\text{RH}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | For all device containers                                         | <b>or</b>          |                                                                                                                  |           |                                                                  |                           |           |                                              |                                 |  |
| <b>24 hours</b> at $100 \pm 5^\circ\text{C}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Not suitable for reels or tubes                                   |                    |                                                                                                                  |           |                                                                  |                           |           |                                              |                                 |  |
| Bag Seal Date: _____<br>(If blank, see bar code label)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                   |                    |                                                                                                                  |           |                                                                  |                           |           |                                              |                                 |  |
| Note: LEVEL defined by EIA JEDEC Standard JESD22-A113                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                   |                    |                                                                                                                  |           |                                                                  |                           |           |                                              |                                 |  |

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Example of JESD22-A112 level 2a label



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