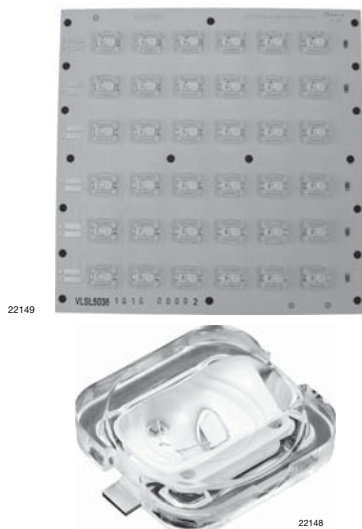


## High Brightness LED Power Module



### DESCRIPTION

The VLSL50xxA are metal core based high brightness LED power modules, assembled with 12, 24 or 36 HB white LEDs. The colour temperature is cool white in the typical range of 5000 K to 7000 K. The LED's are designed with a clear silicone lens for a butterfly shaped radiation characteristic.

### PRODUCT GROUP AND PACKAGE DATA

- Product group: LED
- Package: LED module
- Product series: power
- Angle of half intensity: vertical:  $\pm 35^\circ$ , horizontal:  $\pm 60^\circ$

### PARTS TABLE

| PART      | COLOR      | LUMINOUS FLUX<br>(at $I_F = 700$ mA typ.) | COLOR TEMPERATURE<br>K | TECHNOLOGY |
|-----------|------------|-------------------------------------------|------------------------|------------|
| VLSL5012A | Cool white | $\Phi_V = 1740$ lm                        | 5000 to 7000           | InGaN      |
| VLSL5024A | Cool white | $\Phi_V = 3480$ lm                        | 5000 to 7000           | InGaN      |
| VLSL5036A | Cool white | $\Phi_V = 5220$ lm                        | 5000 to 7000           | InGaN      |

### ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25^\circ\text{C}$ , unless otherwise specified) VLSL5012A, VLSL5024A, VLSL5036A

| PARAMETER                   | TEST CONDITION | SYMBOL    | VALUE        | UNIT             |
|-----------------------------|----------------|-----------|--------------|------------------|
| Forward current             | Per row        | $I_F$     | 750          | mA               |
| Power dissipation VLSL5012A | Total (max.)   | $P_{tot}$ | 35           | W                |
| Power dissipation VLSL5024A |                | $P_{tot}$ | 69           | W                |
| Power dissipation VLSL5036A |                | $P_{tot}$ | 104          | W                |
| Junction temperature        |                | $T_j$     | 120          | $^\circ\text{C}$ |
| Operating temperature range |                | $T_{amb}$ | - 40 to + 85 | $^\circ\text{C}$ |
| Storage temperature range   |                | $T_{stg}$ | - 40 to + 85 | $^\circ\text{C}$ |

\*\* Please see document "Vishay Material Category Policy": [www.vishay.com/doc/299902](http://www.vishay.com/doc/299902)

### FEATURES

- Metal core PCB: Al > 0.75 thickness
- Single side/single layer PCB
- Shiny white surface
- 12, 24 or 36 LED's minimum 82 lm at 350 mA per LED. Max. current per LED 1 A
- Conductive top layer: Cu (min. 18  $\mu\text{m}$ )
- Isolation layer prepreg > 63  $\mu\text{m}$
- Luminous flux and colour binning
- ESD withstand voltage: up to 2 kV according to JESD22-A114-B
- LM80 certified LEDs
- Compliant to RoHS Directive 2002/95/EC

### APPLICATIONS

- Streetlight
- Internal lighting in buildings
- Tunnel lights
- General lighting application



**RoHS**  
COMPLIANT  
**GREEN**  
(5-2008)\*\*

### OPTICAL AND ELECTRICAL CHARACTERISTICS <sup>(1)</sup> ( $T_{amb} = 25^{\circ}\text{C}$ , unless otherwise specified) VLSL5012A, COOL WHITE

| PARAMETER                                                   | TEST CONDITION                       | SYMBOL        | MIN. | TYP.  | MAX. | UNIT |
|-------------------------------------------------------------|--------------------------------------|---------------|------|-------|------|------|
| Luminous flux per row <sup>(2)</sup>                        | $I_F = 700\text{ mA}$                | $\Phi_V$      | 760  | 870   | -    | lm   |
| Luminous flux total <sup>(2)</sup>                          | $I_{board} = 2 \times 700\text{ mA}$ | $\Phi_V$      | 1520 | 1740  | -    | lm   |
| Color temperature                                           | $I_F = 700\text{ mA}$                | TK            | 5000 | -     | 7000 | K    |
| Forward voltage per row                                     | $I_F = 700\text{ mA}$                | $V_F$         | 19   | 20    | 23   | V    |
| Class A ( $V_{Fmax.} - V_{Fmin.}$ ) all rows <sup>(3)</sup> | $I_F = 700\text{ mA}$                | $\Delta V_F$  | -    | -     | 0.9  | V    |
| Temperature coefficient of $V_F$ per row                    | $I_F = 350\text{ mA}$                | $TC_{VF}$     | -    | - 20  | -    | mV/K |
| Temperature coefficient of $\Phi_V$                         | $I_F = 350\text{ mA}$ (per row)      | $TC_{\Phi_V}$ | -    | - 0.4 | -    | %/K  |

#### Notes

- <sup>(1)</sup> Forward voltages are tested at a current pulse duration of 1 ms and a tolerance of  $\pm 0.1\text{ V}$ . Luminous flux is measured at a current pulse duration of 25 ms and an accuracy of  $\pm 11\%$ .  
<sup>(2)</sup> Calculated based on single LED unit.  
<sup>(3)</sup>  $V_F$  classes are marked at the LED cluster and represent the technical classification only. The single groups cannot be specifically ordered.

### OPTICAL AND ELECTRICAL CHARACTERISTICS <sup>(1)</sup> ( $T_{amb} = 25^{\circ}\text{C}$ , unless otherwise specified) VLSL5024A, COOL WHITE

| PARAMETER                                                   | TEST CONDITION                       | SYMBOL        | MIN. | TYP.  | MAX. | UNIT |
|-------------------------------------------------------------|--------------------------------------|---------------|------|-------|------|------|
| Luminous flux per row <sup>(2)</sup>                        | $I_F = 700\text{ mA}$                | $\Phi_V$      | 760  | 870   | -    | lm   |
| Luminous flux total <sup>(2)</sup>                          | $I_{board} = 4 \times 700\text{ mA}$ | $\Phi_V$      | 3040 | 3480  | -    | lm   |
| Color temperature                                           | $I_F = 700\text{ mA}$                | TK            | 5000 | -     | 7000 | K    |
| Forward voltage per row                                     | $I_F = 700\text{ mA}$                | $V_F$         | 19   | 20    | 23   | V    |
| Class A ( $V_{Fmax.} - V_{Fmin.}$ ) all rows <sup>(3)</sup> | $I_F = 700\text{ mA}$                | $\Delta V_F$  | -    | -     | 0.9  | V    |
| Temperature coefficient of $V_F$ per row                    | $I_F = 350\text{ mA}$                | $TC_{VF}$     | -    | - 20  | -    | mV/K |
| Temperature coefficient of $\Phi_V$                         | $I_F = 350\text{ mA}$ (per row)      | $TC_{\Phi_V}$ | -    | - 0.4 | -    | %/K  |

#### Notes

- <sup>(1)</sup> Forward voltages are tested at a current pulse duration of 1 ms and a tolerance of  $\pm 0.1\text{ V}$ . Luminous flux is measured at a current pulse duration of 25 ms and an accuracy of  $\pm 11\%$ .  
<sup>(2)</sup> Calculated based on single LED unit.  
<sup>(3)</sup>  $V_F$  classes are marked at the LED cluster and represent the technical classification only. The single groups cannot be specifically ordered.

### OPTICAL AND ELECTRICAL CHARACTERISTICS <sup>(1)</sup> ( $T_{amb} = 25^{\circ}\text{C}$ , unless otherwise specified) VLSL5036A, COOL WHITE

| PARAMETER                                                   | TEST CONDITION                       | SYMBOL        | MIN. | TYP.  | MAX. | UNIT |
|-------------------------------------------------------------|--------------------------------------|---------------|------|-------|------|------|
| Luminous flux per row <sup>(2)</sup>                        | $I_F = 700\text{ mA}$                | $\Phi_V$      | 760  | 870   | -    | lm   |
| Luminous flux total <sup>(2)</sup>                          | $I_{board} = 6 \times 700\text{ mA}$ | $\Phi_V$      | 4560 | 5220  | -    | lm   |
| Color temperature                                           | $I_F = 700\text{ mA}$                | TK            | 5000 | -     | 7000 | K    |
| Forward voltage per row                                     | $I_F = 700\text{ mA}$                | $V_F$         | 19   | 20    | 23   | V    |
| Class A ( $V_{Fmax.} - V_{Fmin.}$ ) all rows <sup>(3)</sup> | $I_F = 700\text{ mA}$                | $\Delta V_F$  | -    | -     | 0.9  | V    |
| Temperature coefficient of $V_F$ per row                    | $I_F = 350\text{ mA}$                | $TC_{VF}$     | -    | - 20  | -    | mV/K |
| Temperature coefficient of $\Phi_V$                         | $I_F = 350\text{ mA}$ (per row)      | $TC_{\Phi_V}$ | -    | - 0.4 | -    | %/K  |

#### Notes

- <sup>(1)</sup> Forward voltages are tested at a current pulse duration of 1 ms and a tolerance of  $\pm 0.1\text{ V}$ . Luminous flux is measured at a current pulse duration of 25 ms and an accuracy of  $\pm 11\%$ .  
<sup>(2)</sup> Calculated based on single LED unit.  
<sup>(3)</sup>  $V_F$  classes are marked at the LED cluster and represent the technical classification only. The single groups cannot be specifically ordered.



### SPECIFICATION OF SINGLE LEDs USED FOR THE MODULES

- VLSL5012A, VLSL5024A, VLSL5036A: LED: VLMW92KYKZ6P7R

#### LUMINOUS FLUX CLASSIFICATION FOR THE SINGLE LED

| GROUP<br>STANDARD | LUMINOUS FLUX $\Phi_v$ (lm) CORRELATION TABLE |         |
|-------------------|-----------------------------------------------|---------|
|                   | MIN.                                          | MAX.    |
| KY                | 82 000                                        | 97 000  |
| KZ                | 97 000                                        | 112 000 |

### COLOR RANGE AND COLOR BINNING

VLSL5012A, VLSL5024A, VLSL5036A: 5000 K to 7000 K group 6P to 7R

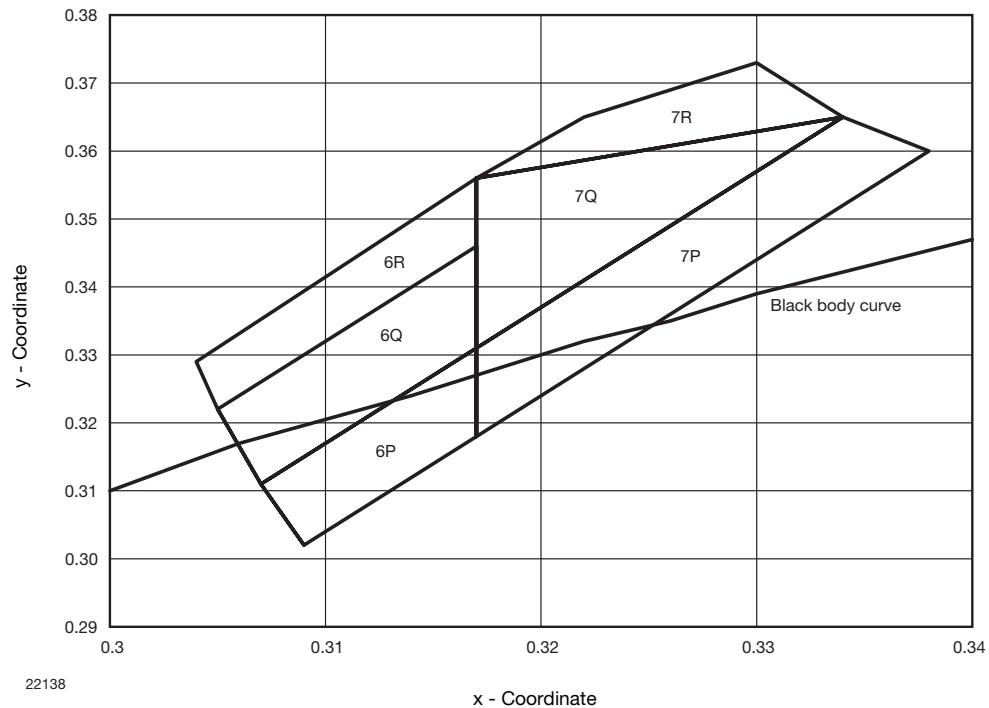
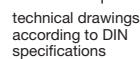


Fig. 1 - Chromaticity Coordinates of Colorgroups

## Vishay Semiconductors High Brightness LED Power Module



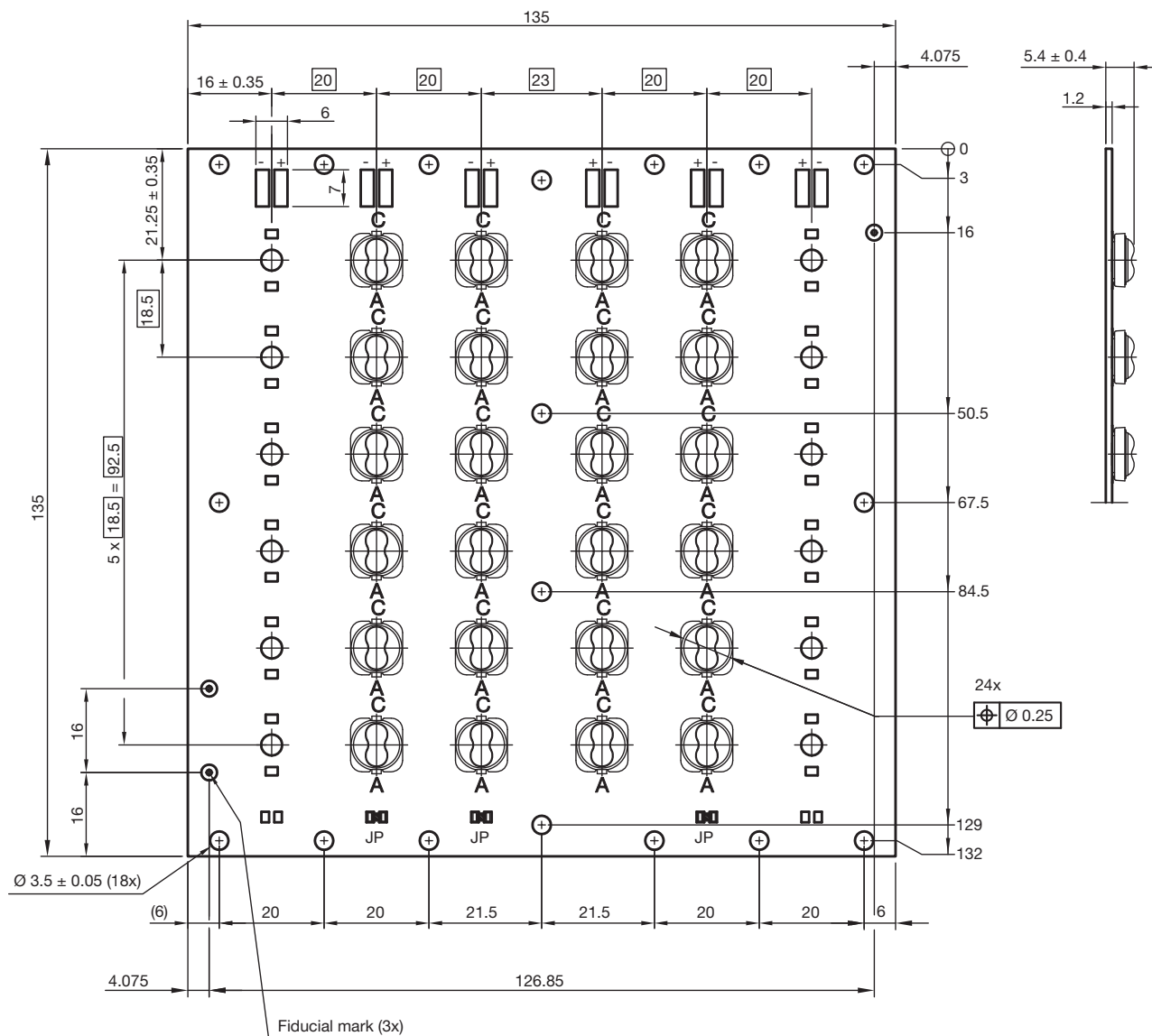
www.vishay.com  
4

For technical questions, contact: [LED@vishay.com](mailto:LED@vishay.com)

Document Number: 83353  
Rev. 1.2, 13-Apr-11

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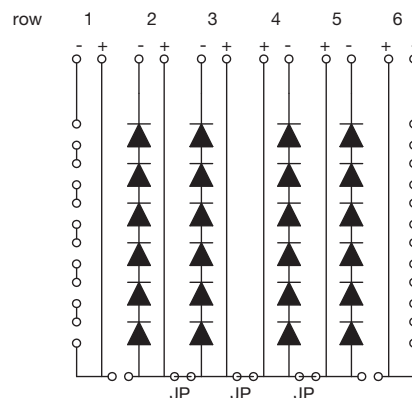
### PCB BASIC DESIGN VL5024A Dimensions in millimeters



Not indicated tolerances  $\pm 0.15$



technical drawings  
according to DIN  
specifications



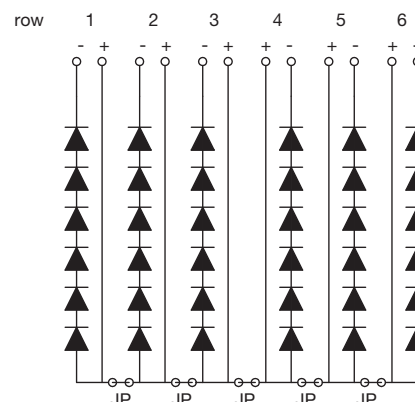
Drawing-No.: 9.920-6727.02-4

Issue:1; 11.05.10

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Assembled with all jumpers. Jumpers can be removed according driver design

## Vishay Semiconductors High Brightness LED Power Module



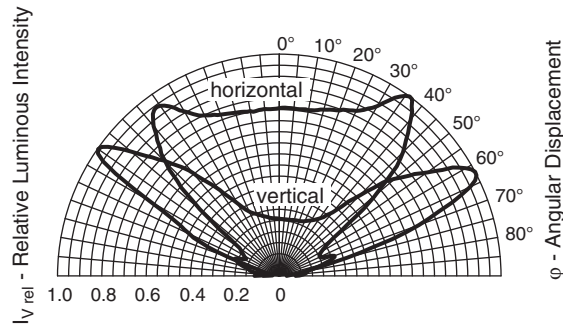
22152

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### PCB CHARACTERISTICS

- Metal core PCB with typical Al thickness of 800  $\mu\text{m}$
- Prepreg thickness typical 127  $\mu\text{m}$
- Conductive pattern Cu typical 25  $\mu\text{m}$
- Total board thickness: 1 mm  $\pm$  15 %
- Warpage max. 0.75 % of board dimension
- Solder resist on top side
- Shiny white surface
- Galvanic of solder pads pure matte Sn ( $\geq 0.8 \mu\text{m}$ ), immersion plated
- Assembled with 12, 24 or 36 VLMW92xxx LED's. LED position accuracy  $\pm 0.125$  mm from middle axis, horizontal tilt max. 2°

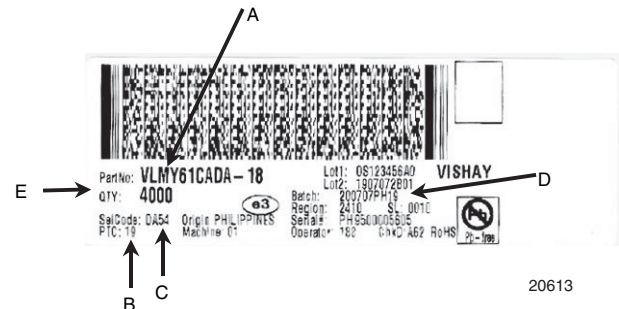
### EMISSION CHARACTERISTIC



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Fig. 2 - Rel. Luminous Intensity vs. Angular Displacement

### BAR CODE PRODUCT LABEL



- A. Type of component
- B. Manufacturing plant
- C. SEL - selection code (bin):  
e.g.: code for  $V_F$  class (A, B, C)
- D. Batch:  
200707 = year 2007, week 07  
PH19 = plant code
- E. Total quantity



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