

Vishay Semiconductors

### **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.

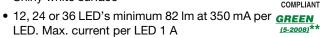
#### PRODUCT GROUP AND PACKAGE DATA

• Product group: LED • Package: LED module • Product series: power

Angle of half intensity: vertical: ± 35°, horizontal: ± 60°

#### **FEATURES**

- Metal core PCB: Al > 0.75 thickness
- Single side/single layer PCB
- Shiny white surface





- Conductive top layer: Cu (min. 18 μm)
- Isolation layer prepreg > 63 μm
- · 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

PARTS TABLE					
PART	COLOR	LUMINOUS FLUX (at $I_F = 700$ mA typ.)	COLOR TEMPERATURE K	TECHNOLOGY	
VLSL5012A	Cool white	$\Phi_{V} = 1740 \text{ Im}$	5000 to 7000	InGaN	
VLSL5024A	Cool white	$\Phi_{V} = 3480 \text{ Im}$	5000 to 7000	InGaN	
VLSL5036A	Cool white	$\Phi_{V} = 5220 \text{ Im}$	5000 to 7000	InGaN	

ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25$ °C, unless otherwise specified) VLSL5012A, VLSL5024A, VLSL5036A					
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT	
Forward current	Per row	I <sub>F</sub>	750	mA	
Power dissipation VLSL5012A		P <sub>tot</sub>	35	W	
Power dissipation VLSL5024A	Total (max.)	P <sub>tot</sub>	69	W	
Power dissipation VLSL5036A		P <sub>tot</sub>	104	W	
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	

<sup>\*\*</sup> Please see document "Vishay Material Category Policy": www.vishay.com/doc?99902

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For technical questions, contact: LED@vishay.com

### VLSL5012A, VLSL5024A, VLSL5036A

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#### OPTICAL AND ELECTRICAL CHARACTERISTICS (1) (T<sub>amb</sub> = 25 °C, unless otherwise specified) **VLSL5012A, COOL WHITE TEST CONDITION SYMBOL PARAMETER** MIN. TYP. MAX. UNIT 760 Luminous flux per row (2) $I_F = 700 \text{ mA}$ 870 lm $\Phi_V$ Luminous flux total (2) $I_{board} = 2 \times 700 \text{ mA}$ 1520 1740 Фγ lm $I_F = 700 \text{ mA}$ ΤK 5000 7000 Color temperature Κ $I_{E} = 700 \text{ mA}$ ٧ Forward voltage per row $V_{F}$ 19 20 23 $I_F = 700 \text{ mA}$ Class A (V<sub>Fmax.</sub> - V<sub>Fmin.</sub>) all rows (3) $\Delta V_F$ \_ 0.9 V Temperature coefficient of V<sub>F</sub> per row $I_F = 350 \text{ mA}$ TC<sub>VF</sub> - 20 mV/K Temperature coefficient of $\Phi_V$ $I_F = 350 \text{ mA (per row)}$ ТСФ<sub>V</sub> - 0.4 %/K

#### Notes

<sup>(3)</sup> V<sub>F</sub> classes are marked at the LED cluster and represent the technical classification only. The single groups cannot be specifically ordered.

OPTICAL AND ELECTRICAL CHARACTERISTICS $^{(1)}$ ( $T_{amb} = 25$ °C, unless otherwise specified) VLSL5024A, COOL WHITE						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous flux per row (2)	I <sub>F</sub> = 700 mA	$\Phi_{V}$	760	870	-	lm
Luminous flux total (2)	$I_{board} = 4 \times 700 \text{ mA}$	$\Phi_{V}$	3040	3480	-	lm
Color temperature	I <sub>F</sub> = 700 mA	TK	5000	-	7000	K
Forward voltage per row	I <sub>F</sub> = 700 mA	V <sub>F</sub>	19	20	23	V
Class A (V <sub>Fmax.</sub> - V <sub>Fmin.</sub> ) all rows (3)	I <sub>F</sub> = 700 mA	$\Delta V_{F}$	-	-	0.9	V
Temperature coefficient of V <sub>F</sub> per row	I <sub>F</sub> = 350 mA	TC <sub>VF</sub>	-	- 20	-	mV/K
Temperature coefficient of $\Phi_V$	I <sub>F</sub> = 350 mA (per row)	ТСФ∨	-	- 0.4	-	%/K

#### Notes

<sup>(3)</sup> V<sub>F</sub> 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 <sub>amb</sub> = 25 °C, unless otherwise specified) VLSL5036A, COOL WHITE						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous flux per row (2)	I <sub>F</sub> = 700 mA	ΦV	760	870	-	lm
Luminous flux total (2)	I <sub>board</sub> = 6 x 700 mA	$\Phi_{V}$	4560	5220	-	lm
Color temperature	I <sub>F</sub> = 700 mA	TK	5000	-	7000	K
Forward voltage per row	I <sub>F</sub> = 700 mA	V <sub>F</sub>	19	20	23	V
Class A (V <sub>Fmax.</sub> - V <sub>Fmin.</sub> ) all rows (3)	I <sub>F</sub> = 700 mA	$\Delta V_{F}$	-	-	0.9	V
Temperature coefficient of V <sub>F</sub> per row	I <sub>F</sub> = 350 mA	TC <sub>VF</sub>	-	- 20	-	mV/K
Temperature coefficient of Φ <sub>V</sub>	I <sub>F</sub> = 350 mA (per row)	ТСФ∨	-	- 0.4	-	%/K

#### **Notes**

<sup>(1)</sup> Forward voltages are tested at a current pulse duration of 1 ms and a tolerance of ± 0.1 V. Luminous flux is measured at a current pulse duration of 25 ms and an accuracy of  $\pm 1\dot{1}$  %.

<sup>(2)</sup> Calculated based on single LED unit.

Forward voltages are tested at a current pulse duration of 1 ms and a tolerance of ± 0.1 V. Luminous flux is measured at a current pulse duration of 25 ms and an accuracy of ± 11 %.

Calculated based on single LED unit.

Forward voltages are tested at a current pulse duration of 1 ms and a tolerance of ± 0.1 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<sub>F</sub> classes are marked at the LED cluster and represent the technical classification only. The single groups cannot be specifically ordered.



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### SPECIFICATION OF SINGLE LEDS USED FOR THE MODULES

VLSL5012A, VLSL5024A, VLSL5036A: LED: VLMW92KYKZ6P7R

LUMINOUS FLUX CLASSIFICATION FOR THE SINGLE LED				
GROUP	LUMINOUS FLUX Φ <sub>V</sub> (mlm) CORRELATION TABLE			
STANDARD	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 to7R

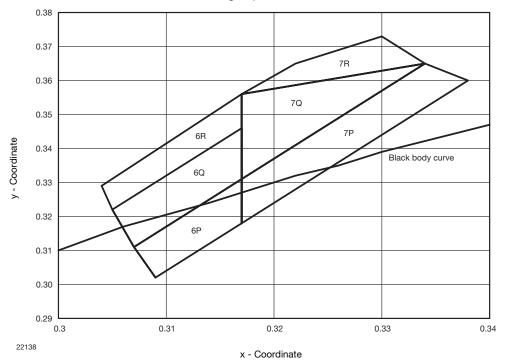


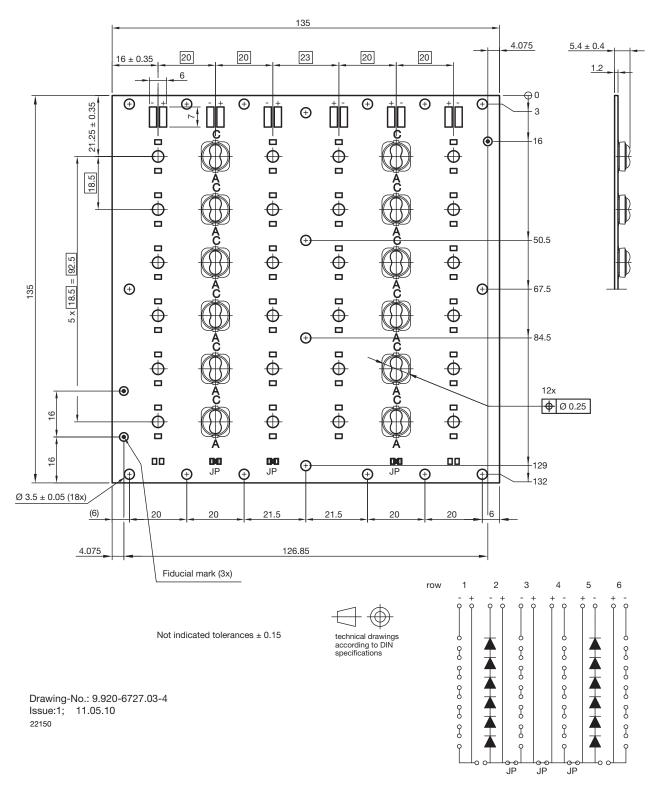
Fig. 1 - Chromaticity Coordinates of Colorgroups

### **VLSL5012A, VLSL5024A, VLSL5036A**

### Vishay Semiconductors High Brightness LED Power Module



### PCB BASIC DESIGN VLSL5012A Dimensions in millimeters

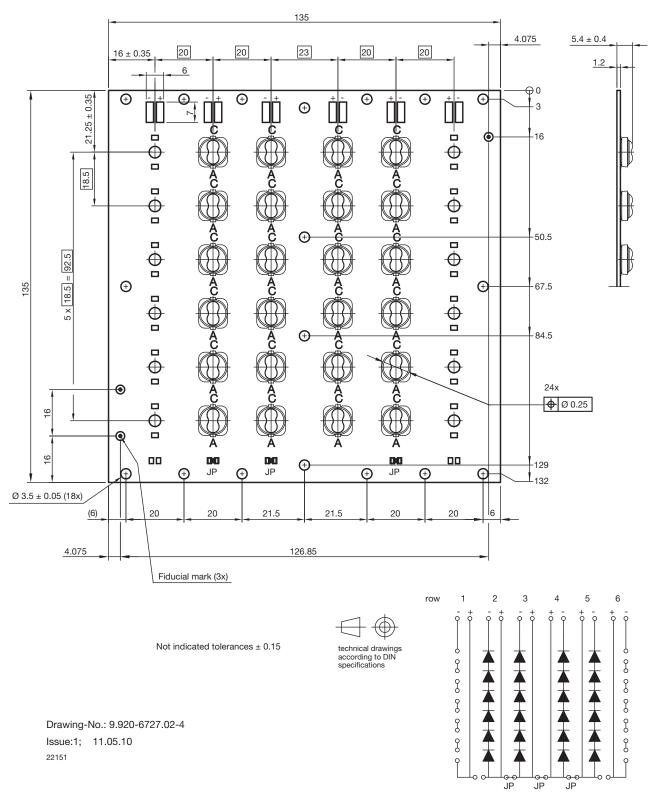


Assembled with all jumpers. Jumpers can be removed according driver design



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### PCB BASIC DESIGN VLSL5024A Dimensions in millimeters



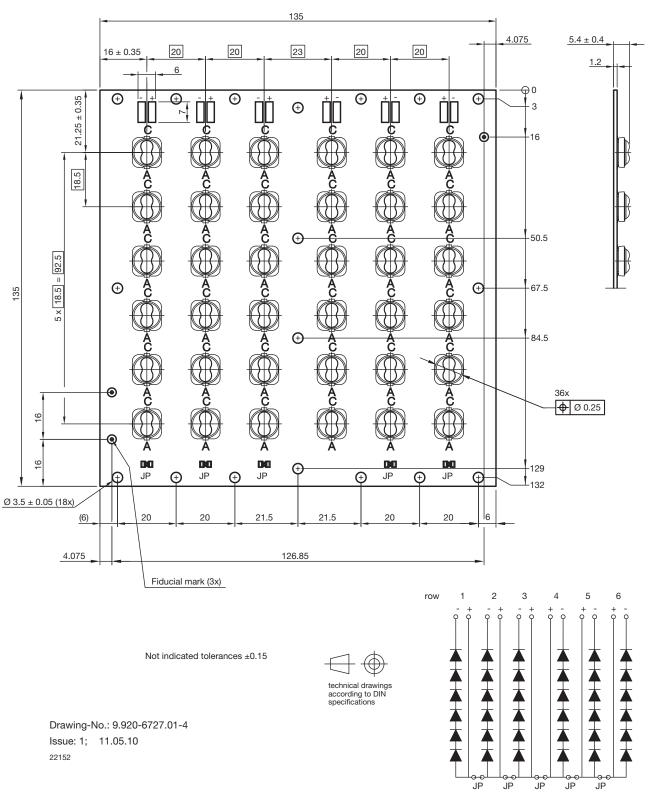
Assembled with all jumpers. Jumpers can be removed according driver design

## VLSL5012A, VLSL5024A, VLSL5036A

### Vishay Semiconductors High Brightness LED Power Module



### PCB BASIC DESIGN VLSL5036A Dimensions in millimeters



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





## High Brightness LED Power Module Vishay Semiconductors

#### **PCB CHARACTERISTICS**

- Metal core PCB with typical Al thickness of 800 µm
- Prepreg thickness typical 127 μm
- Conductive pattern Cu typical 25 µm
- Total board thickness: 1 mm ± 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  $\mu$ m), immersion plated
- Assembled with 12, 24 or 36 VLMW92xxx LED's. LED position accuracy ± 0.125 mm from middle axis, horizontal tilt max. 2°

### **EMISSION CHARACTERISTIC**

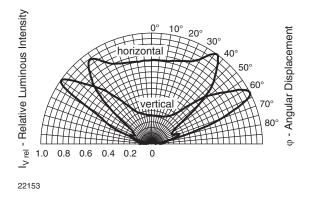
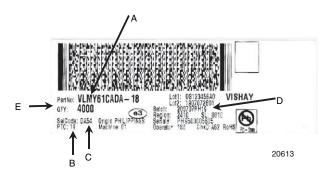


Fig. 2 - Rel. Luminous Intensity vs. Angular Displacement

#### **BAR CODE PRODUCT LABEL**



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



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