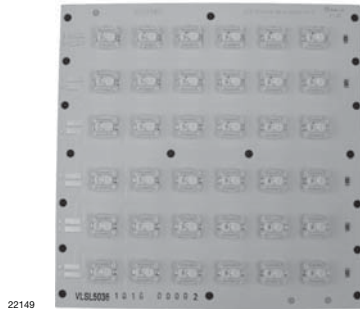


## High Brightness LED Power Module



### 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  $\mu$ m)
- Isolation layer prepreg > 63  $\mu$ 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



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

### APPLICATIONS

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

### 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 (at $I_F = 700$ mA typ.)	COLOR TEMPERATURE 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?99902](http://www.vishay.com/doc?99902)

### OPTICAL AND ELECTRICAL CHARACTERISTICS <sup>(1)</sup> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , 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	$I_F = 350\text{ mA}$	$TC_{V_F}$	-	- 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> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , 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	$I_F = 350\text{ mA}$	$TC_{V_F}$	-	- 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> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , 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	$I_F = 350\text{ mA}$	$TC_{V_F}$	-	- 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 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 to7R

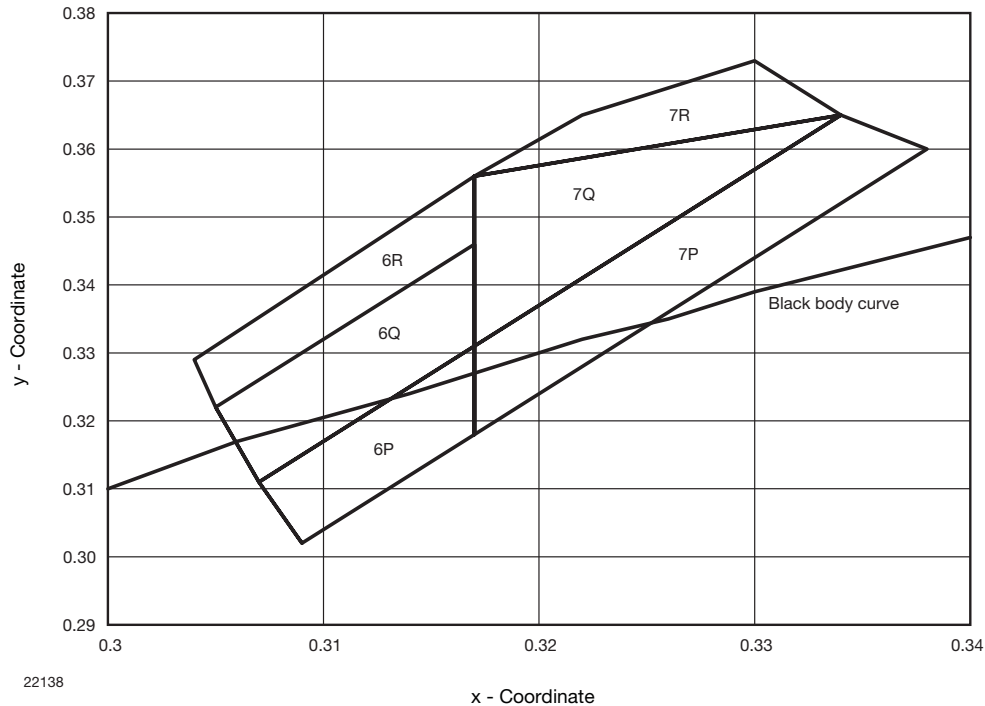


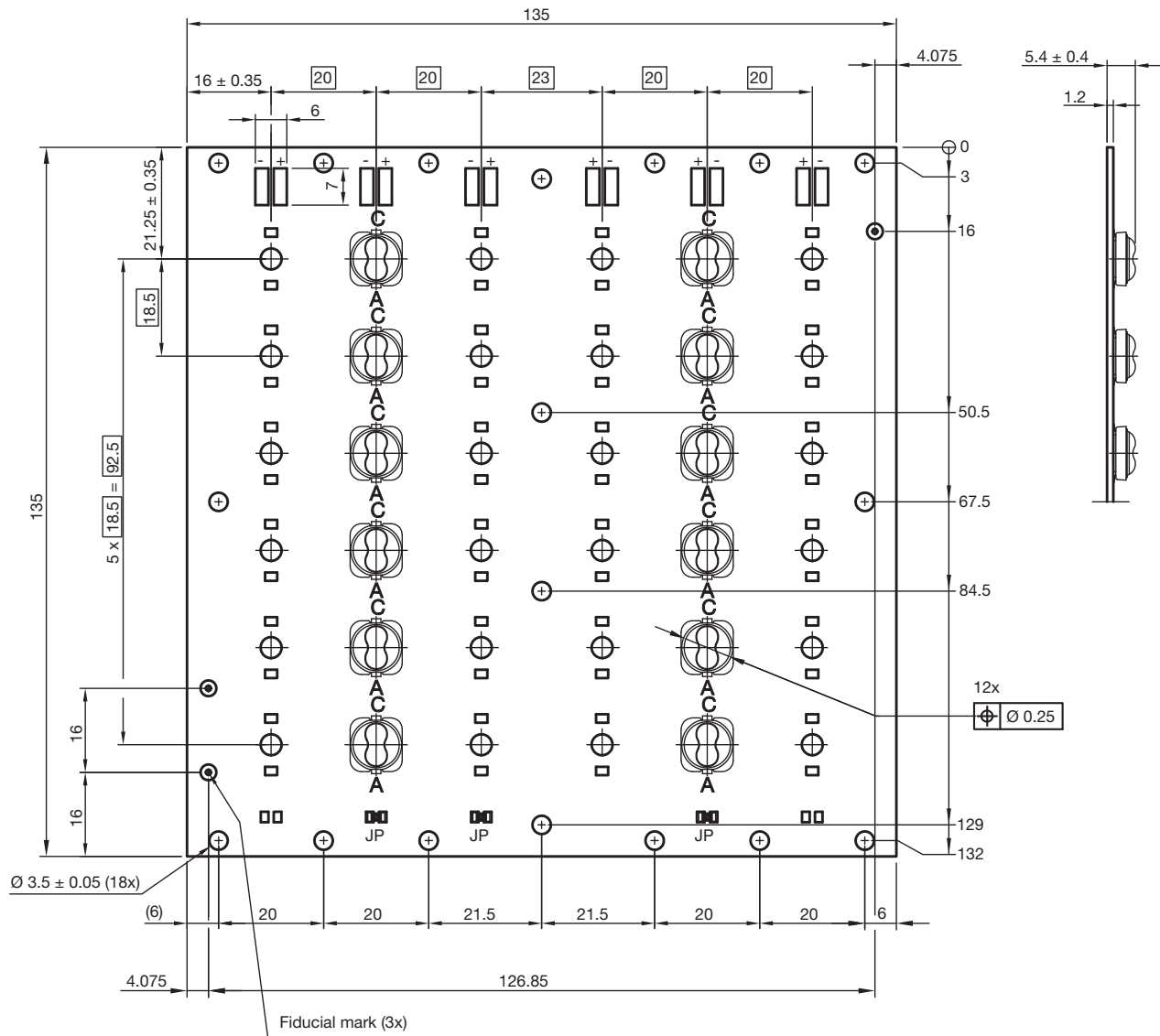
Fig. 1 - Chromaticity Coordinates of Colorgroups

# VLSL5012A, VLSL5024A, VLSL5036A

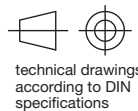
Vishay Semiconductors High Brightness LED Power Module



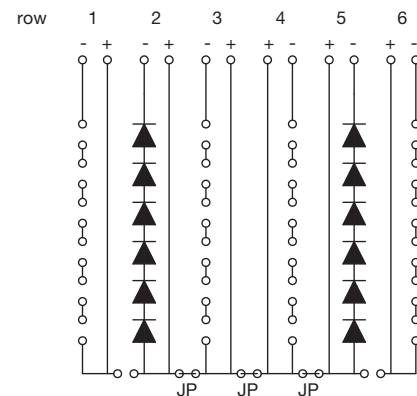
## PCB BASIC DESIGN VLSL5012A Dimensions in millimeters



Not indicated tolerances ± 0.15



Drawing-No.: 9.920-6727.03-4  
 Issue:1; 11.05.10  
 22150



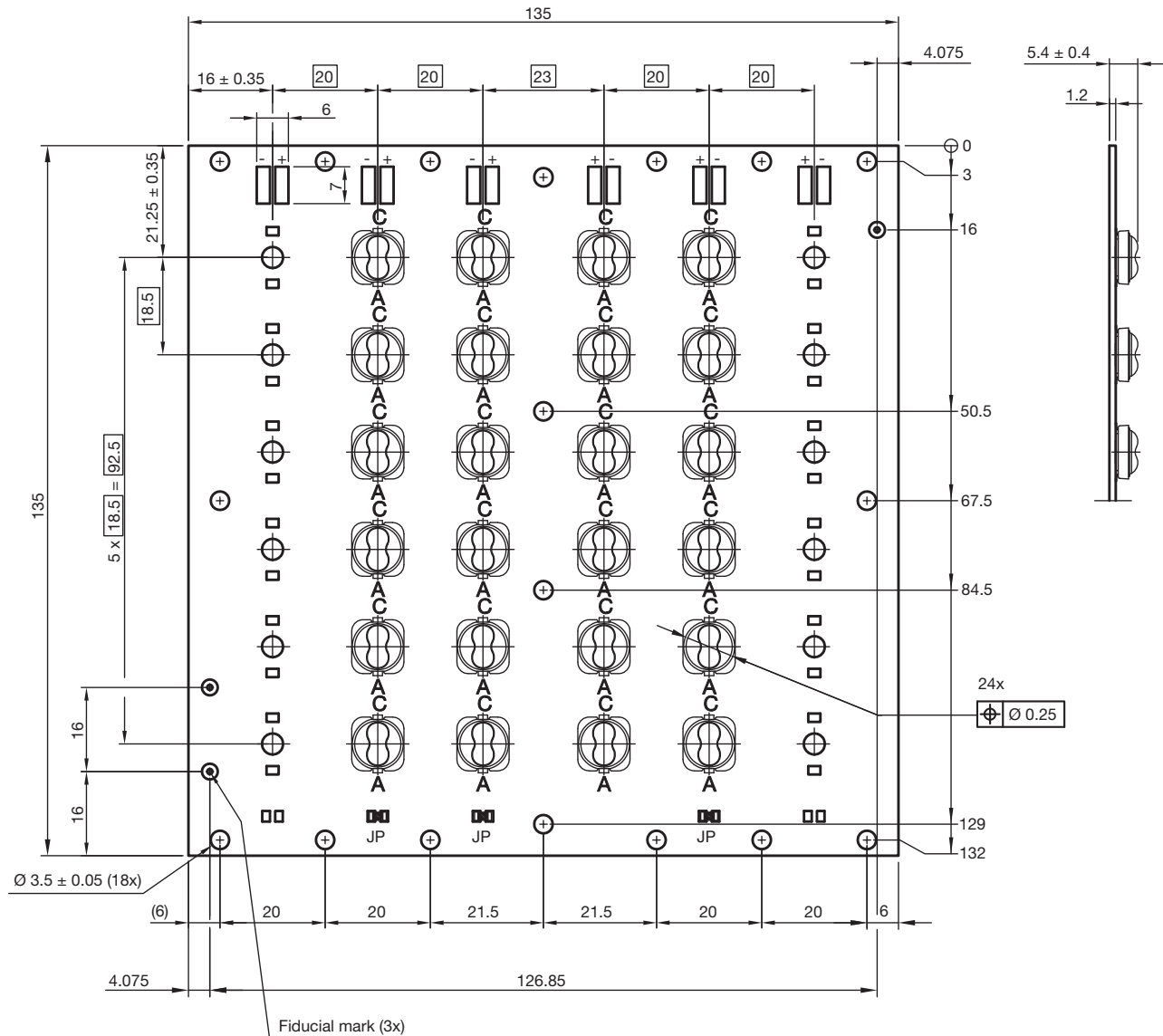
Assembled with all jumpers. Jumpers can be removed according driver design



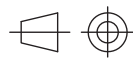
# VLSL5012A, VLSL5024A, VLSL5036A

High Brightness LED Power Module Vishay Semiconductors

## PCB BASIC DESIGN VLSL5024A Dimensions in millimeters



Not indicated tolerances ± 0.15

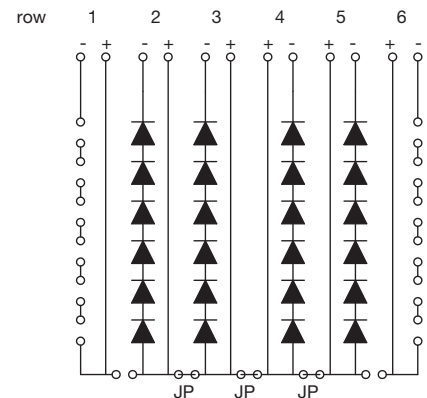


technical drawings according to DIN specifications

Drawing-No.: 9.920-6727.02-4

Issue:1; 11.05.10

22151



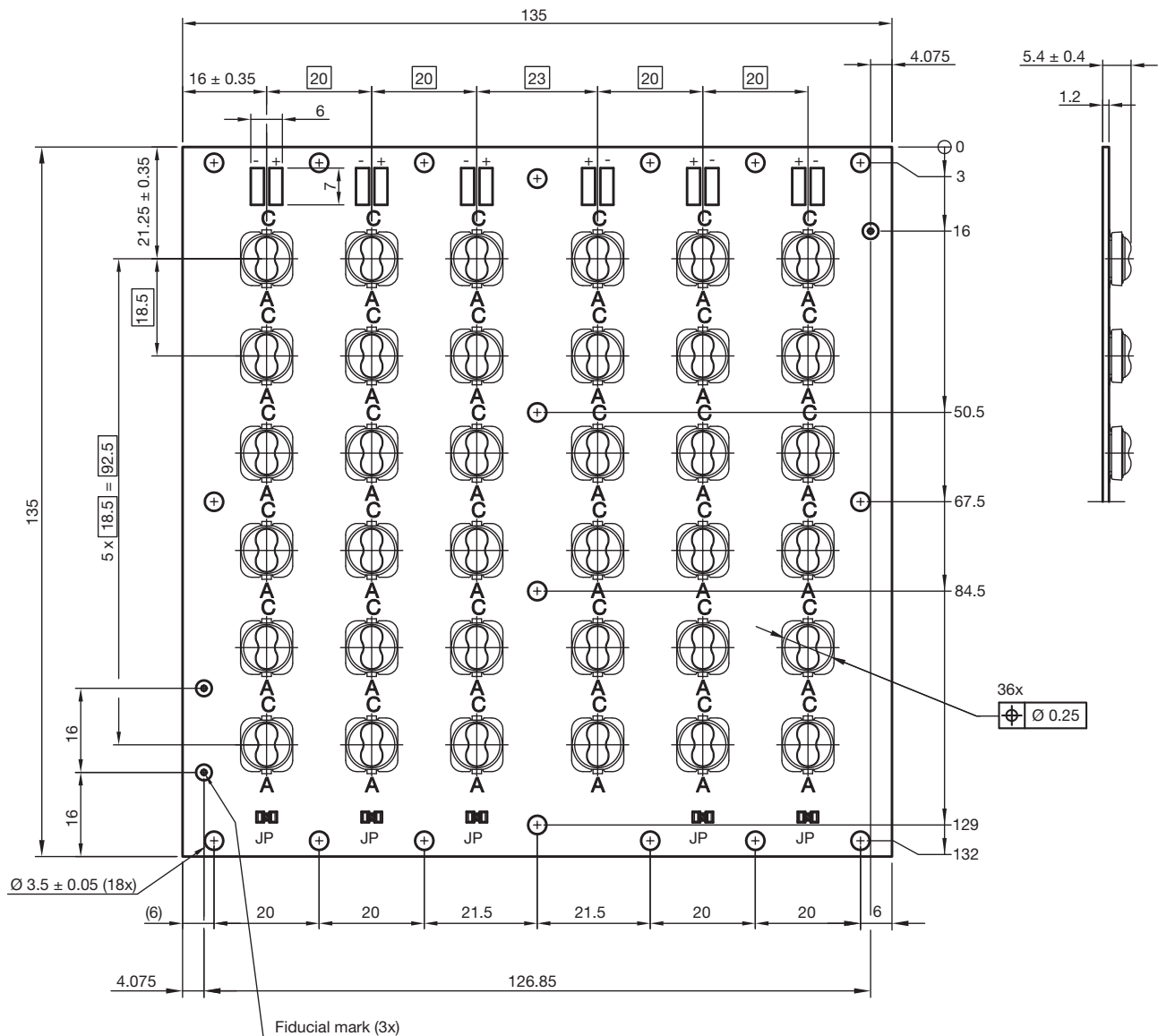
Assembled with all jumpers. Jumpers can be removed according driver design

# VLSL5012A, VLSL5024A, VLSL5036A

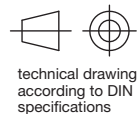
Vishay Semiconductors High Brightness LED Power Module



## PCB BASIC DESIGN VLSL5036A Dimensions in millimeters



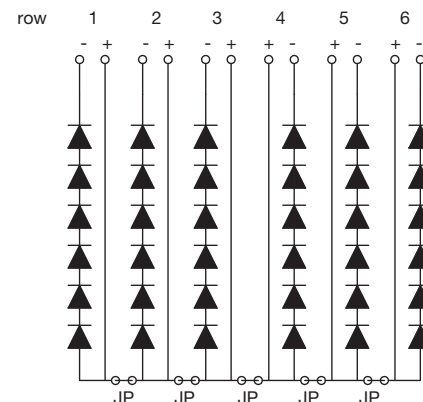
Not indicated tolerances ±0.15



Drawing-No.: 9.920-6727.01-4

Issue: 1; 11.05.10

22152

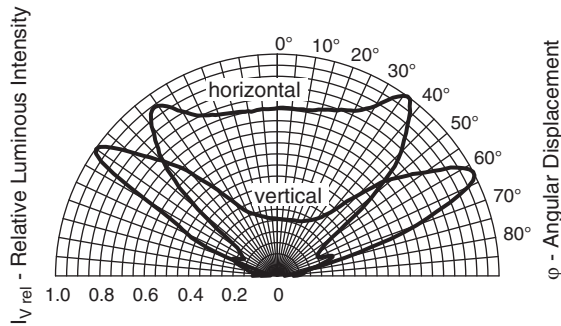


Assembled with all jumpers. Jumpers can be removed according driver design

### 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°

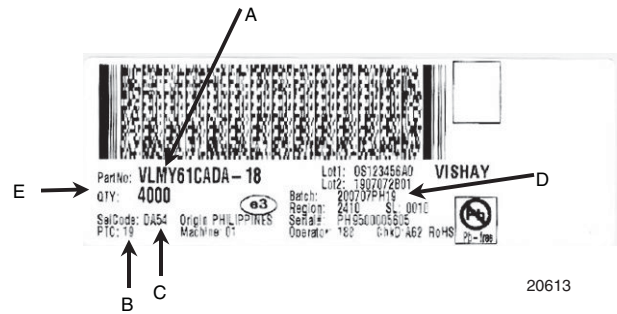
### EMISSION CHARACTERISTIC



22153

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

### BAR CODE PRODUCT LABEL



20613

- 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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