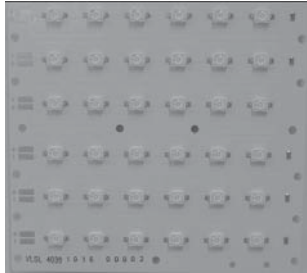


## High Brightness LED Power Module



22140



22139

### 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
- Standard solder mask material
- 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

### DESCRIPTION

The VLSL40xxA are metal core based high brightness LED power modules, assembled with 12, 24 or 36 HB white LEDs. The color temperature is cool white in the typical range of 5000 K to 7000 K. The modules are designed for flexible use due to the option for using special reflectors to adjust the emission characteristics.

### PRODUCT GROUP AND PACKAGE DATA

- Product group: LED
- Package: LED module
- Product series: power
- Angle of half intensity:  $\pm 80^\circ$

PARTS TABLE				
PART	COLOR	LUMINOUS FLUX (at $I_F = 700$ mA typ.)	COLOR TEMPERATURE K	TECHNOLOGY
VLSL4012A	Cool white	$\Phi_V = 1740$ lm	5000 to 7000	InGaN
VLSL4024A	Cool white	$\Phi_V = 3480$ lm	5000 to 7000	InGaN
VLSL4036A	Cool white	$\Phi_V = 5220$ lm	5000 to 7000	InGaN

ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25^\circ\text{C}$ , unless otherwise specified) VLSL4012A, VLSL4024A, VLSL4036A				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Forward current	Per row	$I_F$	750	mA
Power dissipation VLSL4012A	Total (max.)	$P_{tot}$	35	W
Power dissipation VLSL4024A		$P_{tot}$	69	W
Power dissipation VLSL4036A		$P_{tot}$	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) VLSL4012A, 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	21	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

- (1) 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  $\pm 11\%$ .  
 (2) Calculated based on single LED unit.  
 (3)  $V_F$  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) VLSL4024A, 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	21	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

- (1) 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  $\pm 11\%$ .  
 (2) Calculated based on single LED unit.  
 (3)  $V_F$  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) VLSL4036A, 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	21	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

- (1) 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  $\pm 11\%$ .  
 (2) Calculated based on single LED unit.  
 (3)  $V_F$  classes are marked at the LED cluster and represent the technical classification only. The single groups cannot be specifically ordered.



# VLSL4012A, VLSL4024A, VLSL4036A

High Brightness LED Power Module Vishay Semiconductors

## SPECIFICATION OF SINGLE LEDs USED FOR THE MODULES

- VLSL4012A, VLSL4024A, VLSL4036A: LED: VLMW91KYKZ6P7R

LUMINOUS FLUX CLASSIFICATION FOR THE SINGLE LED		
GROUP STANDARD	LUMINOUS FLUX $\Phi_V$ (mIm) CORRELATION TABLE	
	MIN.	MAX.
KY	82 000	97 000
KZ	97 000	112 000

## COLOR RANGE AND COLOR BINNING

VLSL4012A, VLSL4024A, VLSL4036A: 5000 K to 7000 K group 6P to7R

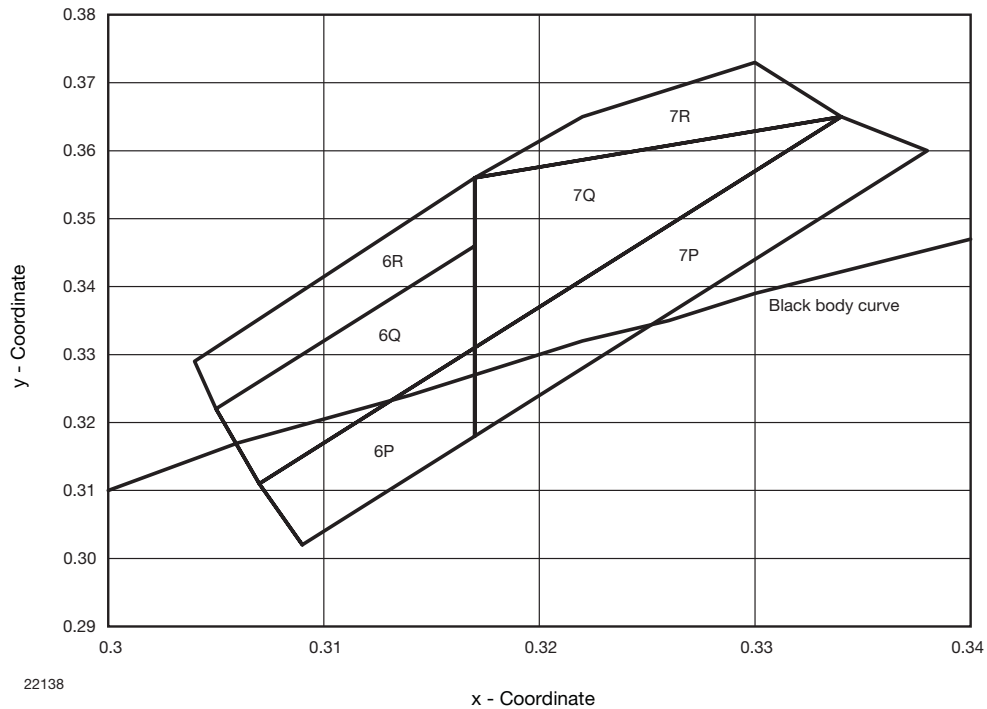


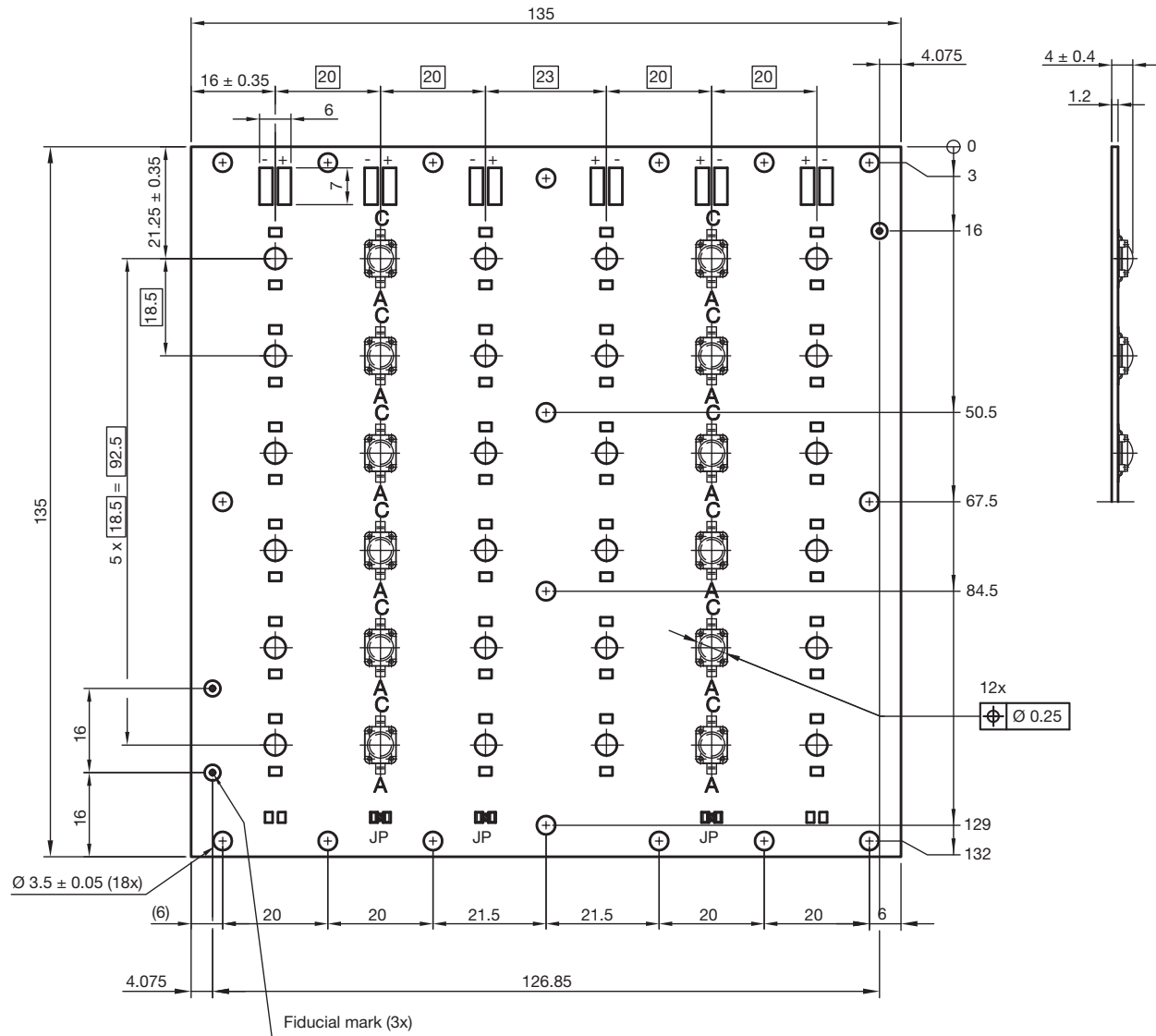
Fig. 1 - Chromaticity Coordinates of Colorgroups

# VLSL4012A, VLSL4024A, VLSL4036A

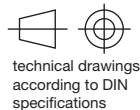


Vishay Semiconductors High Brightness LED Power Module

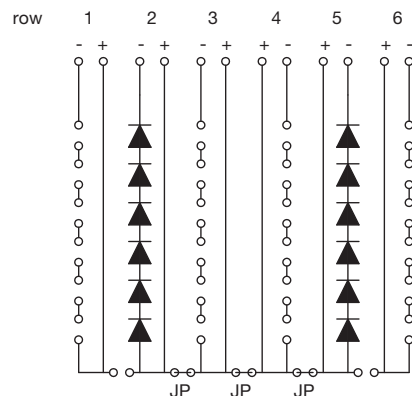
## PCB BASIC DESIGN VLSL4012A Dimensions in millimeters



Not indicated tolerances  $\pm 0.15$



Drawing-No.: 9.920-6726.03-4  
 Issue:1; 11.05.10  
 22137



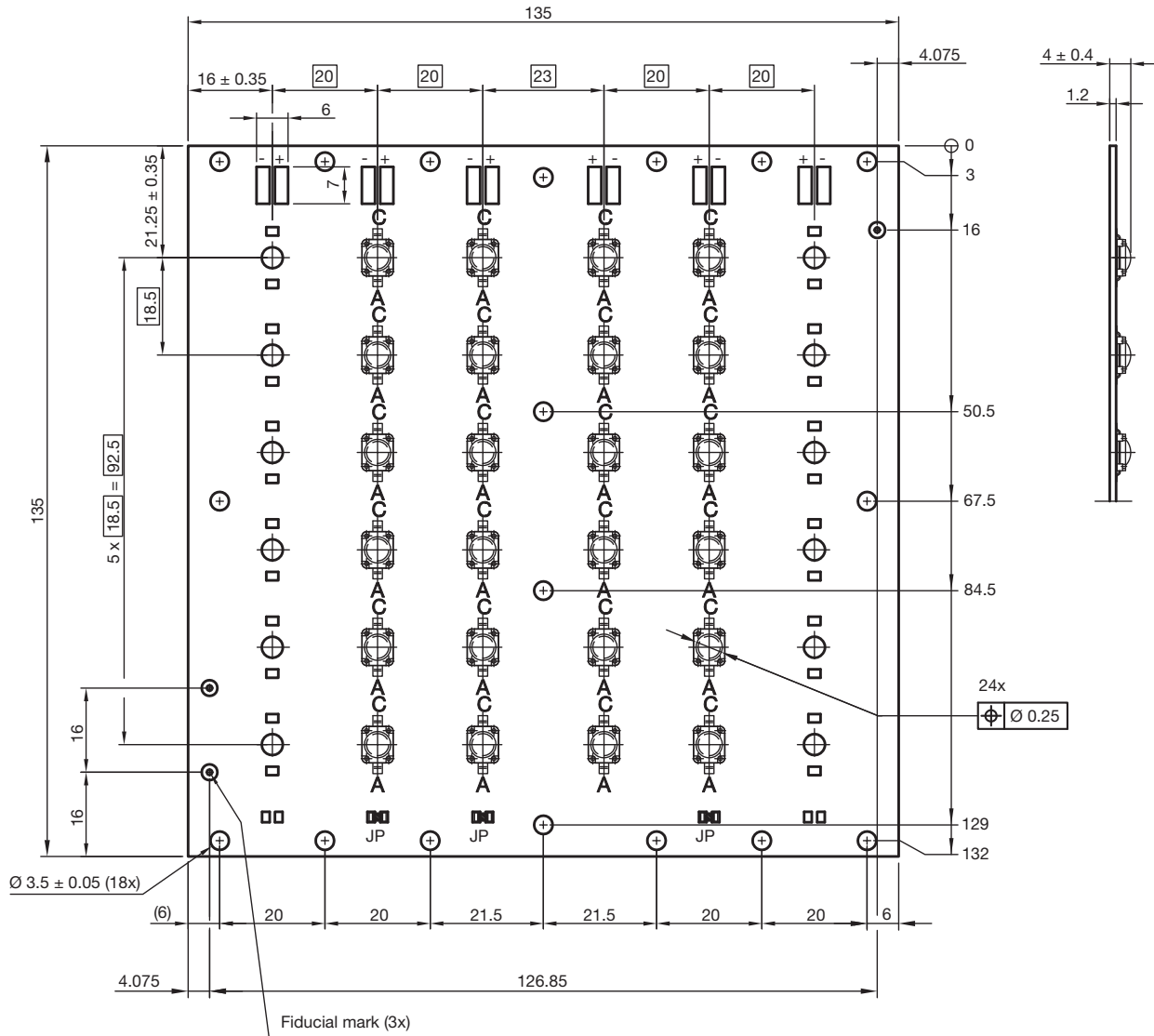
Assembled with all jumpers. Jumpers can be removed according driver design



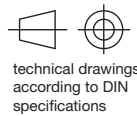
# VLSL4012A, VLSL4024A, VLSL4036A

High Brightness LED Power Module Vishay Semiconductors

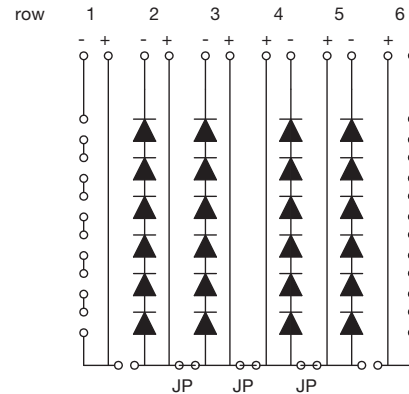
## PCB BASIC DESIGN VLSL4024A Dimensions in millimeters



Not indicated tolerances ± 0.15



Drawing-No.: 9.920-6726.02-4  
 Issue:1; 11.05.10  
 22136



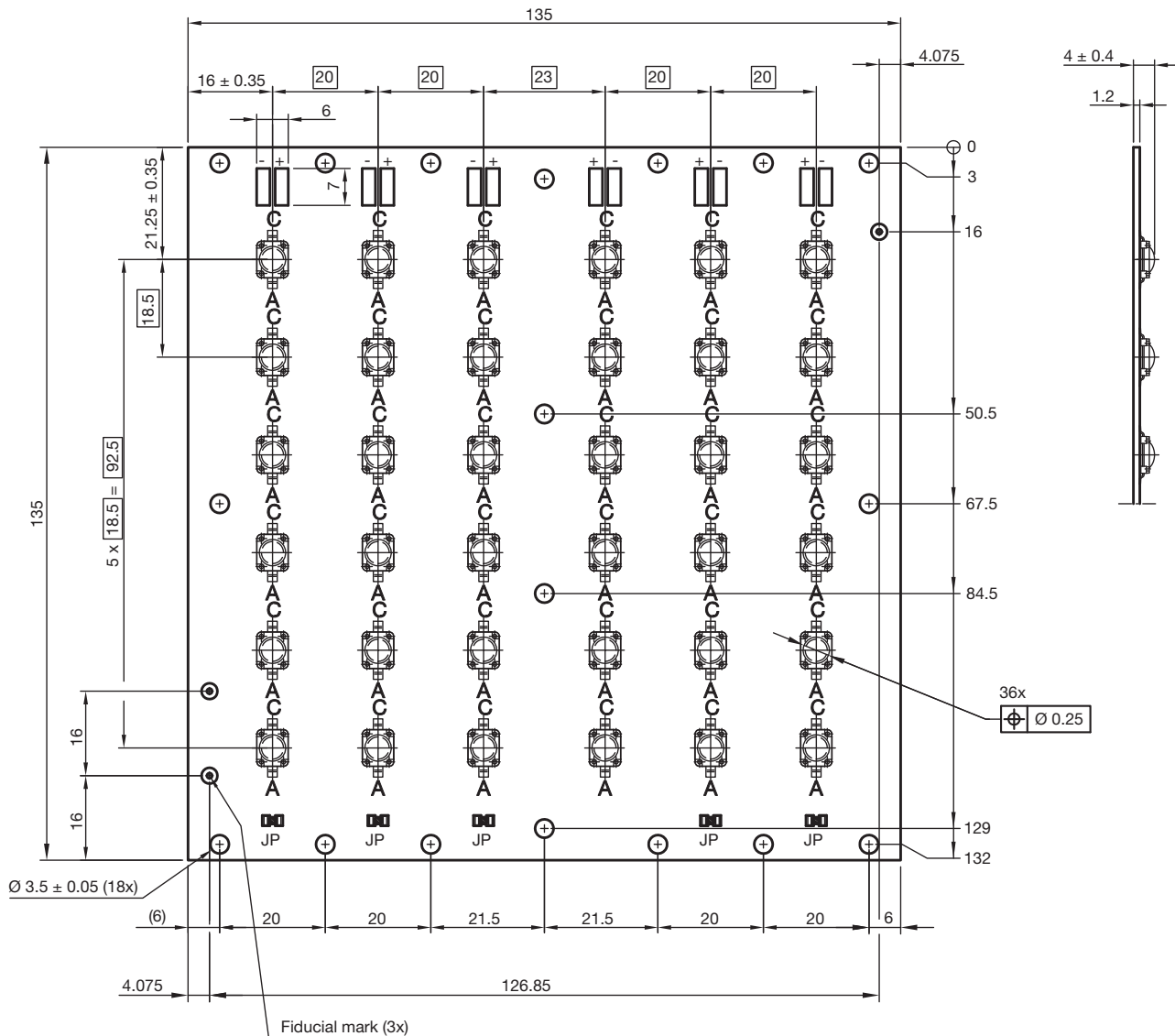
Assembled with all jumpers. Jumpers can be removed according driver design

# VLSL4012A, VLSL4024A, VLSL4036A

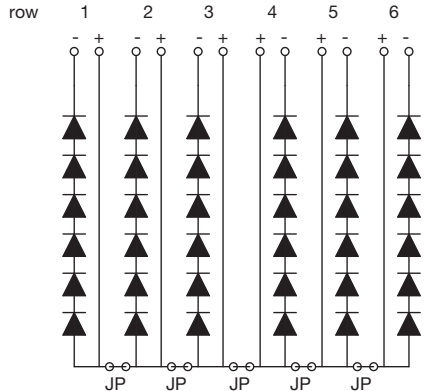
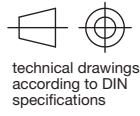
Vishay Semiconductors High Brightness LED Power Module



## PCB BASIC DESIGN VLSL4036A Dimensions in millimeters



Not indicated tolerances ± 0.15



Drawing-No.: 9.920-6726.01-4  
 Issue: 1; 11.05.10  
 22135

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 VLMW91xxx LED's. LED position accuracy  $\pm$  0.125 mm from middle axis, horizontal tilt max. 2°

### EMISSION CHARACTERISTIC

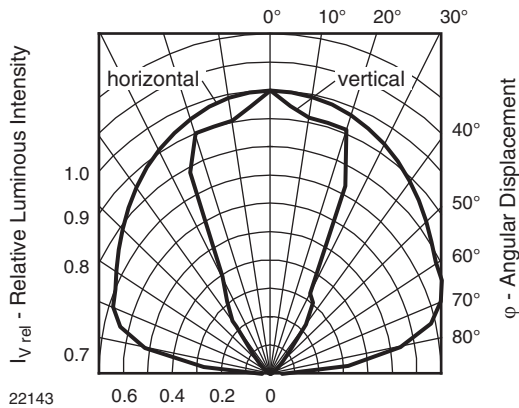


Fig. 2 - Rel. Luminous Intensity vs. Angular Displacement

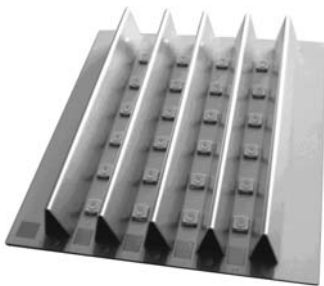
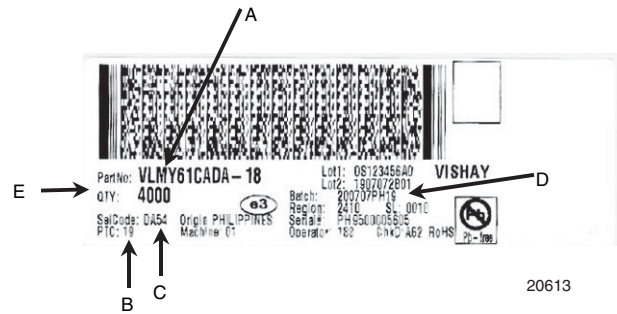


Fig. 3 - Sample Board with Reflectors (for Info only)

### 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



## Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk and agree to fully indemnify and hold Vishay and its distributors harmless from and against any and all claims, liabilities, expenses and damages arising or resulting in connection with such use or sale, including attorneys fees, even if such claim alleges that Vishay or its distributor was negligent regarding the design or manufacture of the part. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.