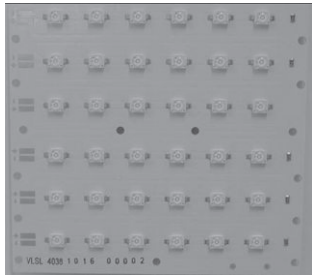




## High Brightness LED Power Module



22140



22139



### FEATURES

- Metal core PCB: Al > 0.75 thickness
- Single side/single layer PCB
- Shiny white surface
- 12, 24, or 36 LEDs, max. current per LED 1 A
- Conductive top layer: Cu (min. 18 μm)
- Isolation layer prepreg > 63 μm
- 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



### Note

\*\* Please see document "Vishay Material Category Policy": [www.vishay.com/doc?99902](http://www.vishay.com/doc?99902)

### 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.

### APPLICATIONS

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

### PRODUCT GROUP AND PACKAGE DATA

- Product group: LED
- Package: LED module
- Product series: power
- Angle of half intensity: ± 80°

PARTS TABLE				
PART	COLOR	LUMINOUS FLUX (at I <sub>F</sub> = 700 mA typ.)	COLOR TEMPERATURE K	TECHNOLOGY
VLSL4012A	Cool white	Φ <sub>V</sub> = 2100 lm	5000 to 7000	InGaN
VLSL4024A	Cool white	Φ <sub>V</sub> = 4200 lm	5000 to 7000	InGaN
VLSL4036A	Cool white	Φ <sub>V</sub> = 6300 lm	5000 to 7000	InGaN

ABSOLUTE MAXIMUM RATINGS (T <sub>amb</sub> = 25 °C, unless otherwise specified) VLSL4012A, VLSL4024A, VLSL4036A				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Forward current	Per row	I <sub>F</sub>	750	mA
Power dissipation VLSL4012A	Total (max.)	P <sub>tot</sub>	35	W
Power dissipation VLSL4024A		P <sub>tot</sub>	69	W
Power dissipation VLSL4036A		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

**OPTICAL AND ELECTRICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)  
**VLSSL4012A, COOL WHITE**

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous flux per row <sup>(1)</sup>	$I_F = 700\text{ mA}$	$\Phi_V$	860	1050	-	lm
Luminous flux total <sup>(1)</sup>	$I_{board} = 2 \times 700\text{ mA}$	$\Phi_V$	1720	2100	-	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>(2)</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**

- 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>(1)</sup> Calculated based on single LED unit.
- <sup>(2)</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** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)  
**VLSSL4024A, COOL WHITE**

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous flux per row <sup>(1)</sup>	$I_F = 700\text{ mA}$	$\Phi_V$	860	1050	-	lm
Luminous flux total <sup>(1)</sup>	$I_{board} = 4 \times 700\text{ mA}$	$\Phi_V$	3440	4200	-	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>(2)</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**

- 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>(1)</sup> Calculated based on single LED unit.
- <sup>(2)</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** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)  
**VLSSL4036A, COOL WHITE**

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous flux per row <sup>(1)</sup>	$I_F = 700\text{ mA}$	$\Phi_V$	860	1050	-	lm
Luminous flux total <sup>(1)</sup>	$I_{board} = 6 \times 700\text{ mA}$	$\Phi_V$	5160	6300	-	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>(2)</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**

- 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>(1)</sup> Calculated based on single LED unit.
- <sup>(2)</sup>  $V_F$  classes are marked at the LED cluster and represent the technical classification only. The single groups cannot be specifically ordered.



## COLOR RANGE AND COLOR BINNING

VLSL4012A, VLSL4024A, VLSL4036A: 5000 K to 7000 K group 6P to 7R

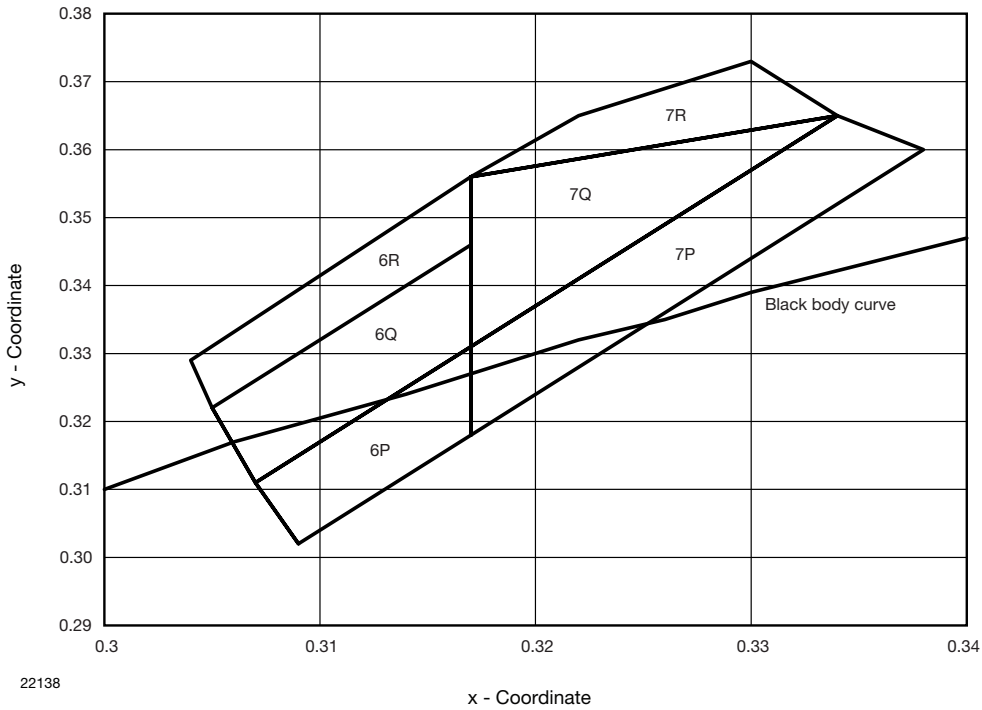
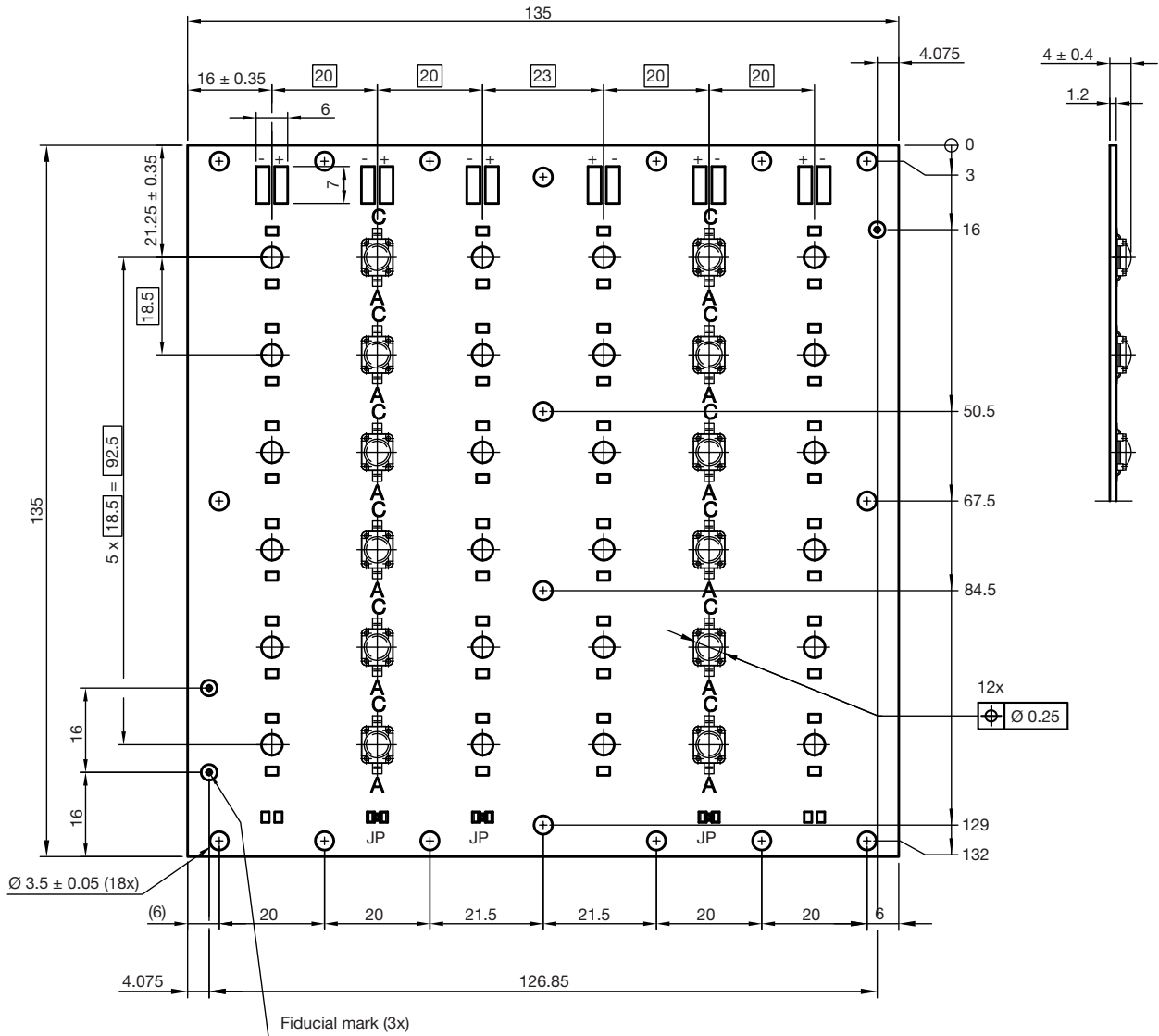


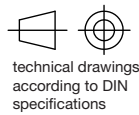
Fig. 1 - Chromaticity Coordinates of Colorgroups



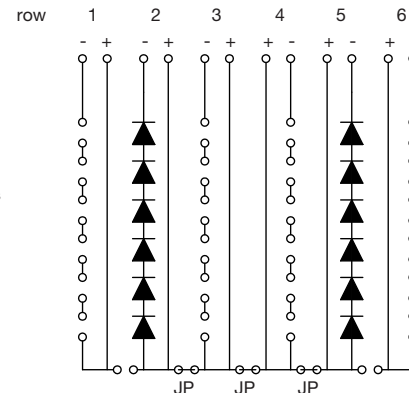
## PCB BASIC DESIGN VLSL4012A DIMENSIONS in millimeters



Not indicated tolerances ± 0.15



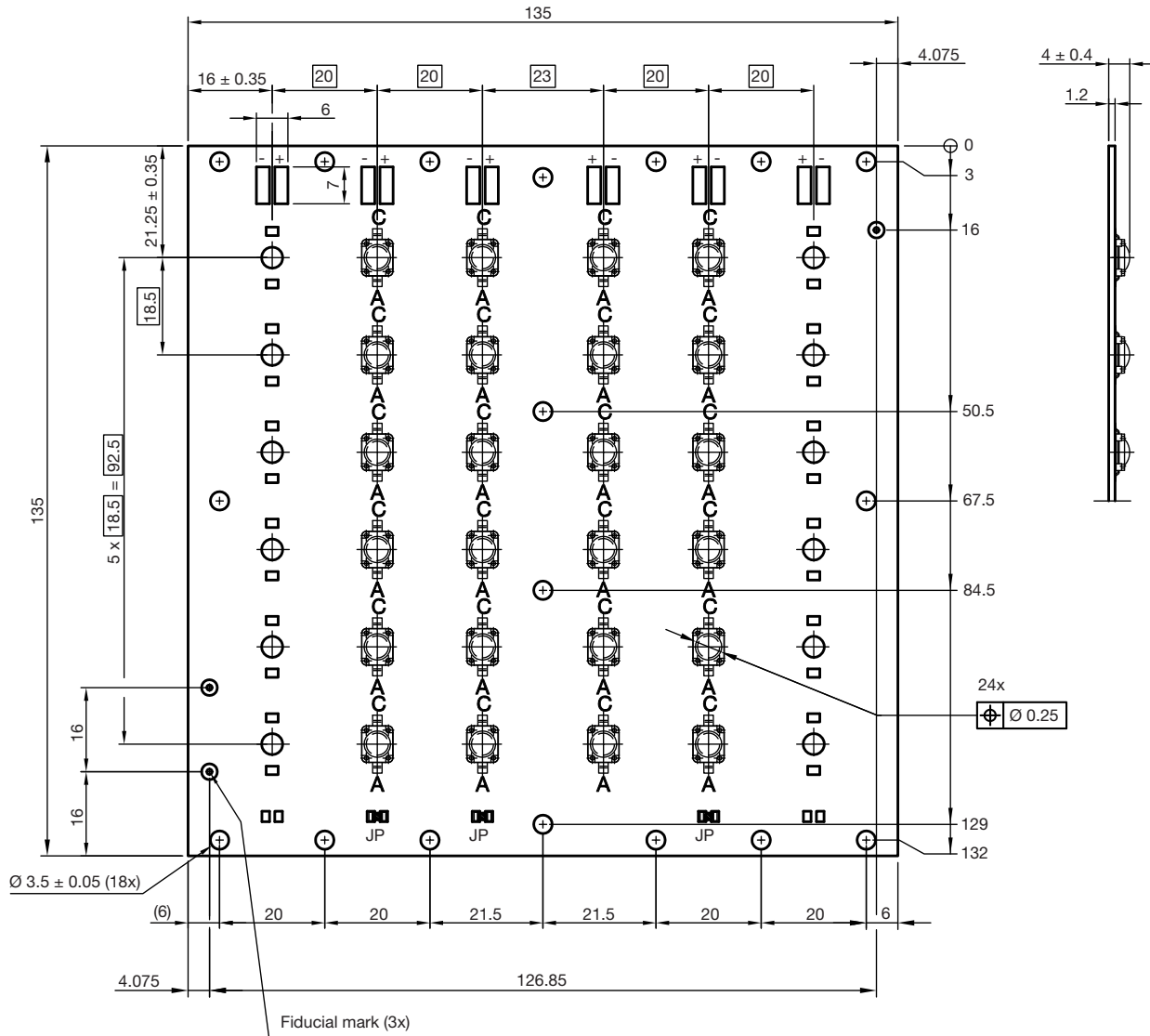
Drawing-No.: 9.920-6726.03-4  
 Issue:1; 11.05.10  
 22137



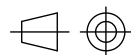
Assembled with all jumpers. Jumpers can be removed according driver design



## PCB BASIC DESIGN VLSL4024A DIMENSIONS in millimeters

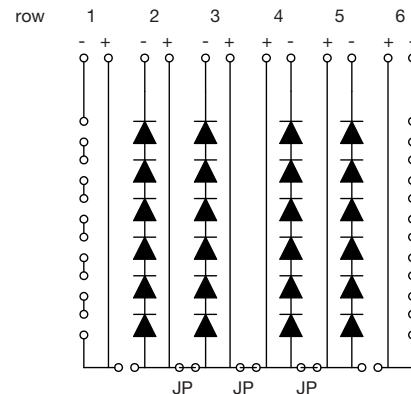


Not indicated tolerances ± 0.15



technical drawings according to DIN specifications

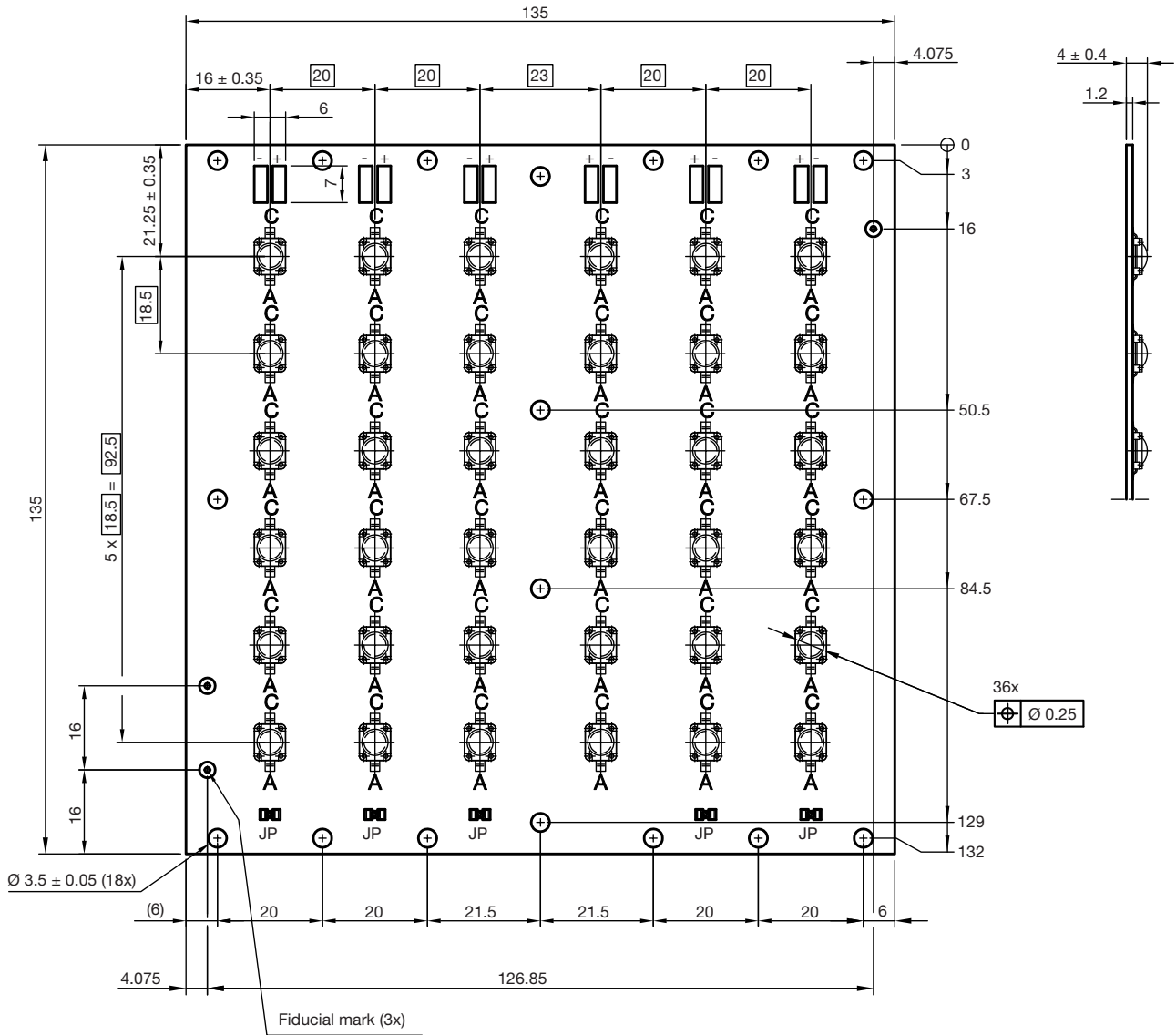
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Issue:1; 11.05.10  
22136



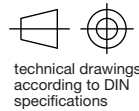
Assembled with all jumpers. Jumpers can be removed according driver design



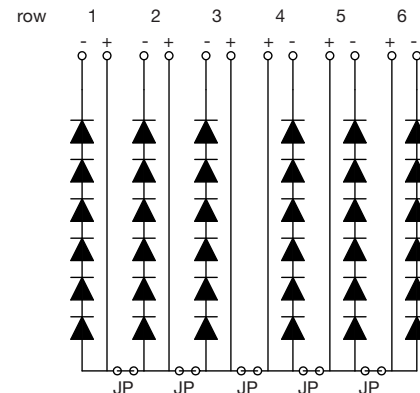
## PCB BASIC DESIGN VL4036A DIMENSIONS in millimeters



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 high brightness power LEDs. LED position accuracy  $\pm$  0.125 mm from middle axis, horizontal tilt max. 2°

## EMISSION CHARACTERISTICS

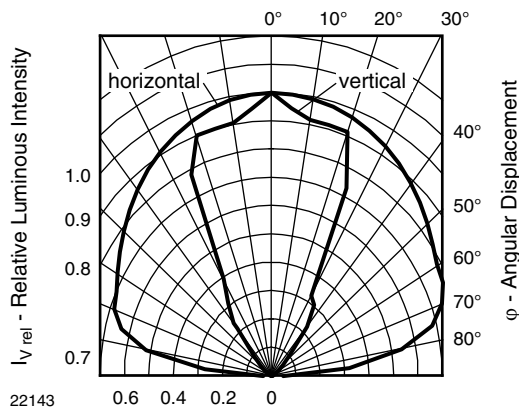


Fig. 2 - Rel. Luminous Intensity vs. Angular Displacement

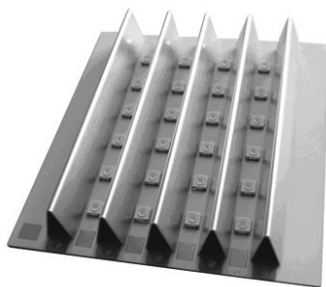
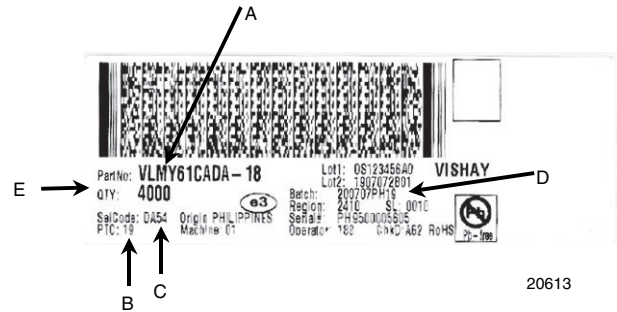


Fig. 3 - Sample Board with Reflectors (for Info only)

## 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



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