

## High Brightness LED Power Module



22454



22159

### DESCRIPTION

The VLSL3212A2, VLSL3224A2 are metal core based high brightness LED power modules, assembled with 12 or 24 HB white LEDs. The color temperature is warm white. The typical color temperature is 3500 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
VLSL3212A2	Warm white	$\Phi_V = 1500$ lm	typ. 3500	InGaN
VLSL3224A2	Warm white	$\Phi_V = 3000$ lm	typ. 3500	InGaN

### ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25^\circ\text{C}$ , unless otherwise specified) VLSL3212A2, VLSL3224A2

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Forward current	Per row	$I_F$	750	mA
Power dissipation VLSL3212A2	Total (max.)	$P_{tot}$	34.5	W
Power dissipation VLSL3224A2		$P_{tot}$	69	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	$^\circ\text{C}$

### FEATURES

- Metal core PCB: Al > 0.75 thickness
- Single side/single layer PCB
- Shiny white surface
- 12 or 24 LEDs minimum 61 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  $\mu\text{m}$
- 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



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

### APPLICATIONS

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

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

### OPTICAL AND ELECTRICAL CHARACTERISTICS ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) VLSL3212A2, WARM WHITE

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous flux per row <sup>(1)</sup>	$I_F = 700\text{ mA}$	$\Phi_V$	550	750	-	lm
Luminous flux total <sup>(1)</sup>	$I_{board} = 2 \times 700\text{ mA}$	$\Phi_V$	1100	1500	-	lm
Color temperature	$I_F = 700\text{ mA}$	TK	-	3500	-	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) VLSL3224A2, WARM WHITE

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous flux per row <sup>(1)</sup>	$I_F = 700\text{ mA}$	$\Phi_V$	550	750	-	lm
Luminous flux total <sup>(1)</sup>	$I_{board} = 4 \times 700\text{ mA}$	$\Phi_V$	2200	3000	-	lm
Color temperature	$I_F = 700\text{ mA}$	TK	-	3500	-	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.

### LUMINOUS FLUX CLASSIFICATION FOR THE SINGLE LED AT 350 mA

GROUP	LUMINOUS FLUX $\Phi_V$ (mIm) CORRELATION TABLE	
	MIN.	MAX.
STANDARD		
JZ	61 000	71 000
KX	71 000	82 000
KY	82 000	97 000
KZ	97 000	112 000



**COLOR RANGE AND COLOR BINNING**

VLSL3212A2, VLSL3224A2: typ. 3500 K; group 4O to 9Q

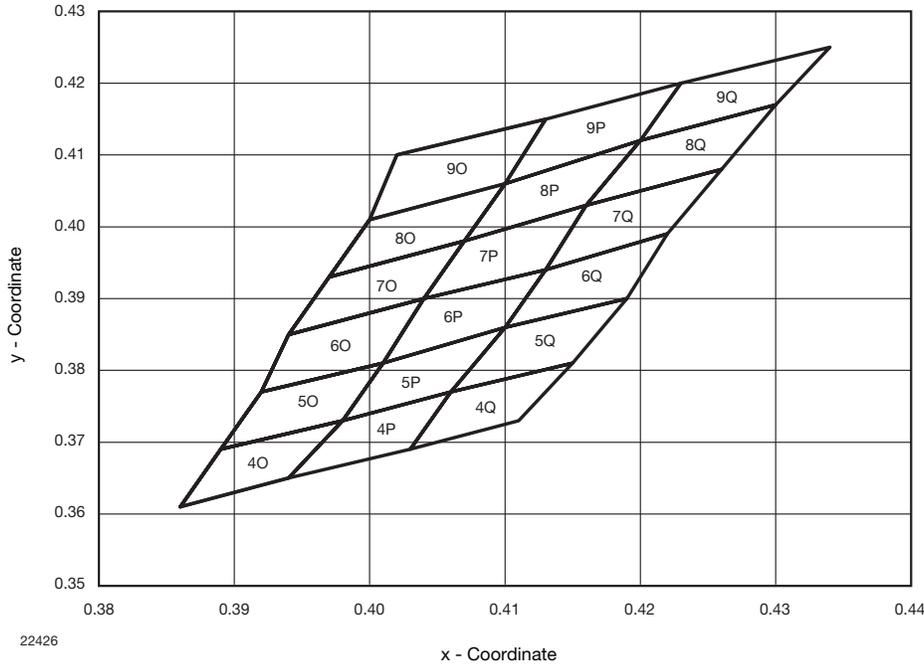


Fig. 1 - Chromaticity Coordinates of Colorgroups

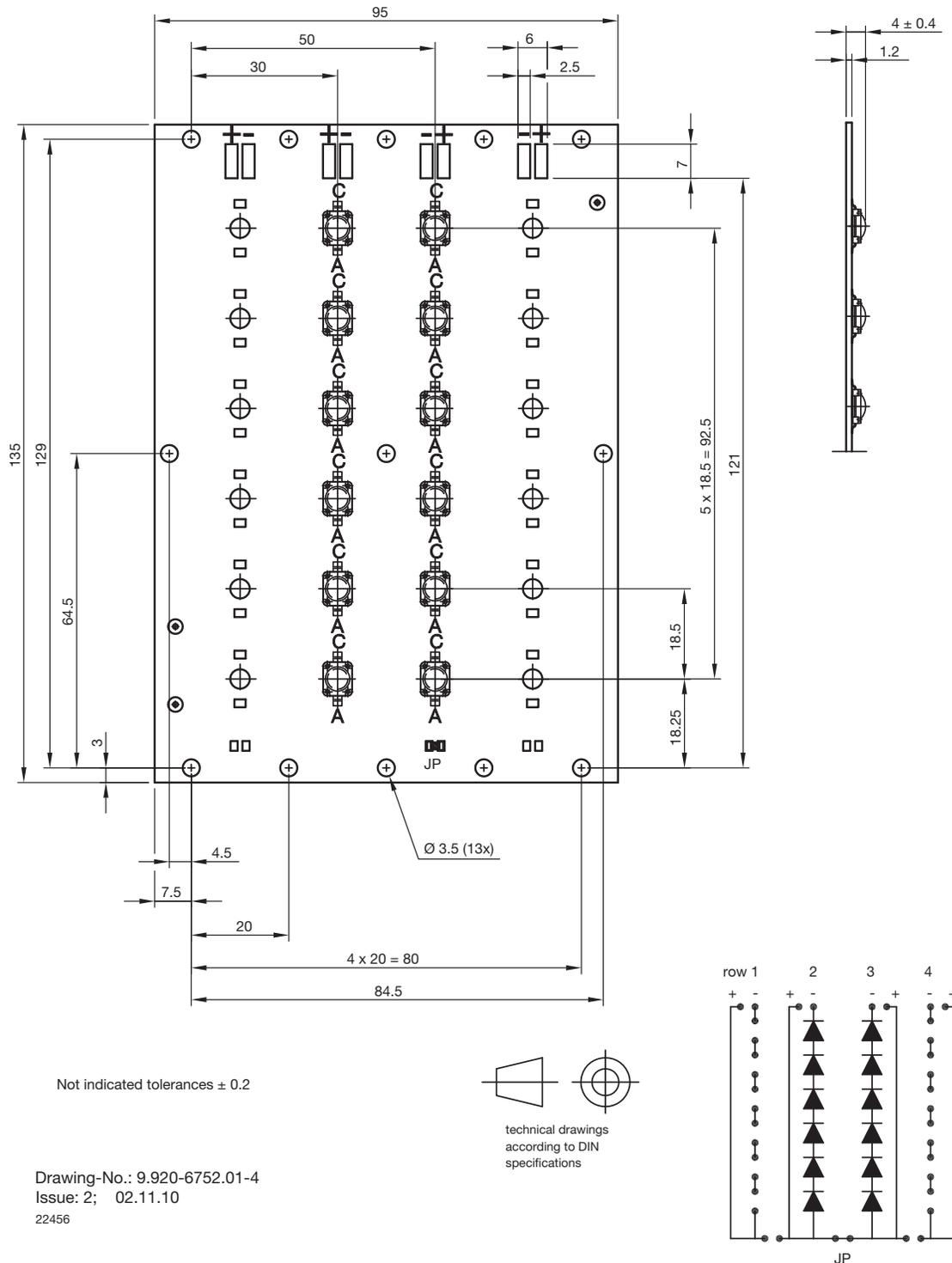
CHROMATICITY COORDINATED GROUPS FOR WHITE SMD LED								
GROUP	X	Y	GROUP	X	Y	GROUP	X	Y
4O	0.386	0.361	4P	0.394	0.365	4Q	0.403	0.369
	0.389	0.369		0.398	0.373		0.406	0.377
	0.398	0.373		0.406	0.377		0.415	0.381
	0.394	0.365		0.403	0.369		0.411	0.373
5O	0.389	0.369	5P	0.398	0.373	5Q	0.406	0.377
	0.392	0.377		0.401	0.381		0.410	0.386
	0.401	0.381		0.410	0.386		0.419	0.390
	0.398	0.373		0.406	0.377		0.415	0.381
6O	0.392	0.377	6P	0.401	0.381	6Q	0.410	0.386
	0.394	0.385		0.404	0.390		0.413	0.394
	0.404	0.390		0.413	0.394		0.422	0.399
	0.401	0.381		0.410	0.386		0.419	0.390
7O	0.394	0.385	7P	0.404	0.390	7Q	0.413	0.394
	0.397	0.393		0.407	0.398		0.416	0.403
	0.407	0.398		0.416	0.403		0.426	0.408
	0.404	0.390		0.413	0.394		0.422	0.399
8O	0.397	0.393	8P	0.407	0.398	8Q	0.416	0.403
	0.400	0.401		0.410	0.406		0.420	0.412
	0.410	0.406		0.420	0.412		0.430	0.417
	0.407	0.398		0.416	0.403		0.426	0.408
9O	0.400	0.401	9P	0.410	0.406	9Q	0.420	0.412
	0.402	0.410		0.413	0.415		0.423	0.420
	0.413	0.415		0.423	0.420		0.434	0.425
	0.410	0.406		0.420	0.412		0.430	0.417

# VLSL3212A2, VLSL3224A2

Vishay Semiconductors High Brightness LED Power Module



## PCB BASIC DESIGN VLSL3212A2 DIMENSIONS in millimeters



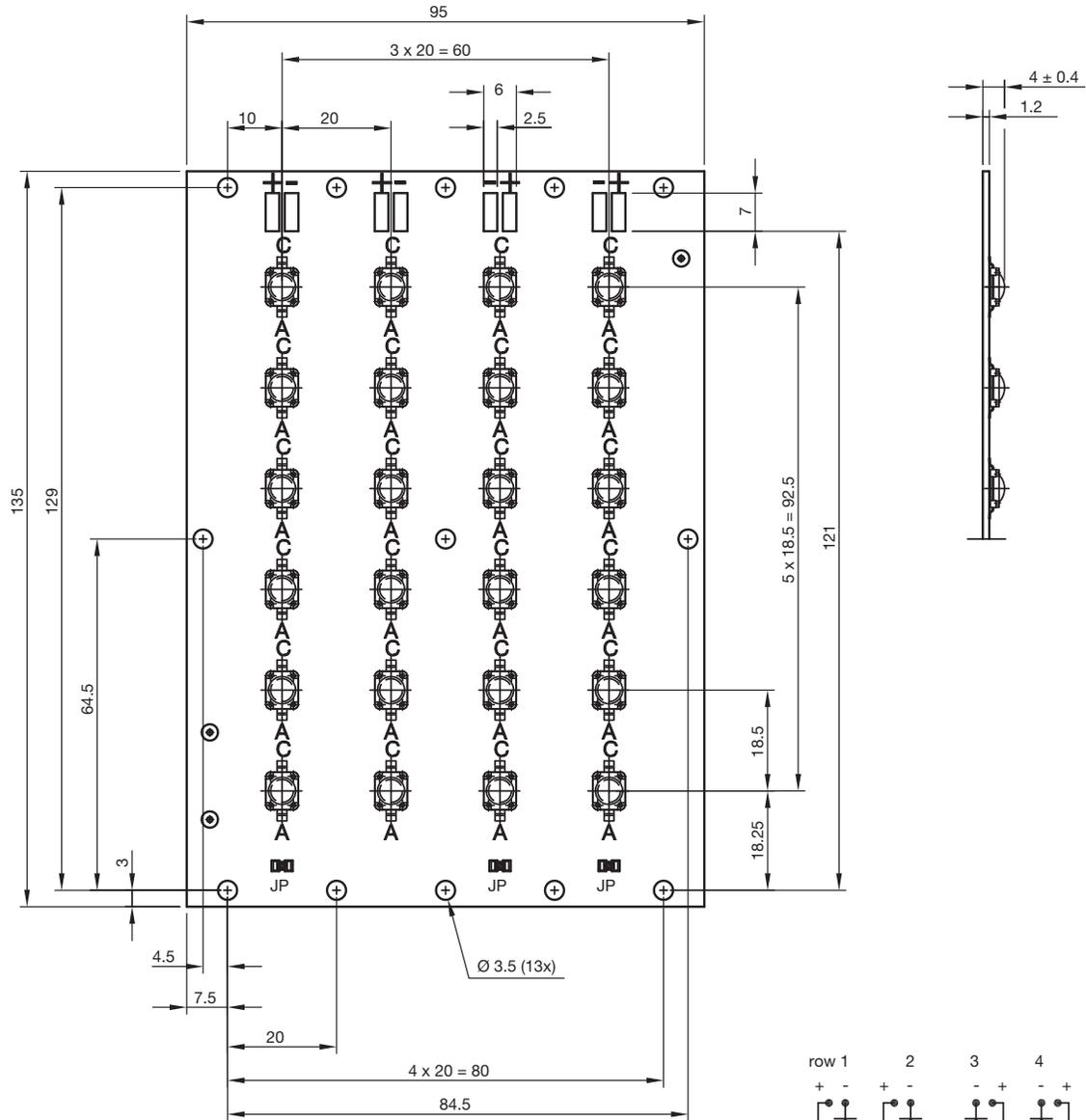
Assembled with all jumpers. Jumpers can be removed according driver design



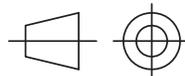
# VLSL3212A2, VLSL3224A2

High Brightness LED Power Module Vishay Semiconductors

## PCB BASIC DESIGN VLSL3224A2 DIMENSIONS in millimeters

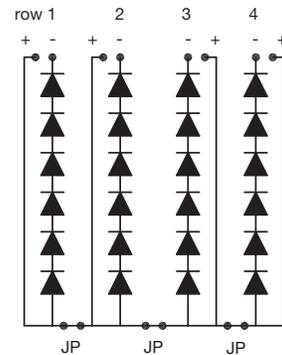


Not indicated tolerances ± 0.2



technical drawings according to DIN specifications

Drawing-No.: 9.920-6751.01-4  
Issue: 2; 02.11.10  
22455



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 or 24 VLMW91xxx LEDs. LED position accuracy  $\pm$  0.125 mm from middle axis, horizontal tilt max. 2°

### EMISSION CHARACTERISTIC

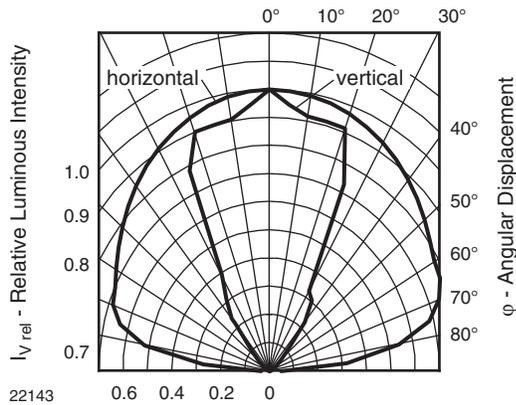


Fig. 2 - Rel. Luminous Intensity vs. Angular Displacement

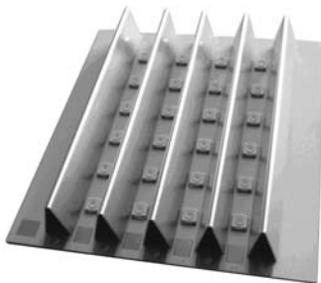
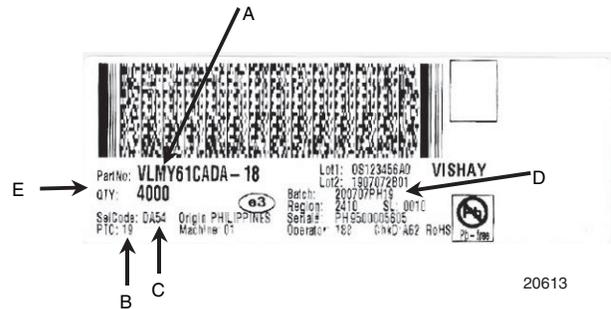


Fig. 3 - Sample Board with Reflectors (for Info only)

### BAR CODE PRODUCT LABEL (example)



- 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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