

High Brightness LED Power Module



DESCRIPTION

VLPC0303A1, VLPN0303A1 and VLPW0303A1 are metal core based high brightness LED power modules assembled with 9 HB white LEDs. VLPC0303A1 is a cool white version in a color temperature range of 5000 K to 7000 K. VLPN0303A1 is natural white with a color temperature of 3800 K to 5000 K and VLPW0303A1 is warm white in a color temperature range 2850 K to 3500 K. Additional to the modules a suitable LED driver is available

PRODUCT GROUP AND PACKAGE DATA

- Product group: LED
- Package: LED module
- Product series: power
- Angle of half intensity: $\pm 60^\circ$

FEATURES

- Metal core PCB: Al > 1 thickness
- Single side/single layer PCB
- Shiny white surface
- 9 LEDs minimum 87 lm for cool white, 76 lm for natural white and 67 lm for warm white at 350 mA each
- Conductive top layer: Cu (min. 18 μm)
- Isolation layer prepreg (100 μm)
- ESD withstand voltage: up to 2 kV according to JESD22-A114-B
- Color binning
- Compliant to RoHS Directive 2002/95/EC

Note

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

APPLICATIONS

- Automotive internal lighting
- Internal lighting in buildings
- Tunnel lights
- Reading lamp, table lamp
- General lighting application



RoHS
COMPLIANT
GREEN
(5-2008)**

PARTS TABLE

PART	COLOR	LUMINOUS FLUX (at $I_F = 350 \text{ mA typ.}$)	COLOR TEMPERATURE K	TECHNOLOGY
VLPC0303A1	Cool white	$\Phi_V = 810 \text{ lm}$	5000 to 7000	InGaN
VLPN0303A1	Natural white	$\Phi_V = 720 \text{ lm}$	3800 to 5000	InGaN
VLPW0303A1	Warm white	$\Phi_V = 660 \text{ lm}$	2850 to 3500	InGaN

ABSOLUTE MAXIMUM RATINGS ($T_{\text{amb}} = 25^\circ\text{C}$, unless otherwise specified) **VLPC0303A1, VLPN0303A1, VLPW0303A1**

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Forward current	Per row	I_F	350	mA
Power dissipation	Total	P_{tot}	12.6	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	$^\circ\text{C}$
Decomposition temperature of PCB (for cable assembly)	3 x 10 s	T_D	350	$^\circ\text{C}$

**OPTICAL AND ELECTRICAL CHARACTERISTICS** ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)
VLPC0303A1, COOL WHITE

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous flux per row ⁽¹⁾	$I_F = 350\text{ mA}$	Φ_V	240	270	-	lm
Luminous flux total ⁽¹⁾	$I_{board} = 3 \times 350\text{ mA}$	Φ_V	720	810	-	lm
Color temperature	$I_F = 350\text{ mA}$	TK	5000	-	7000	K
Forward voltage per row	$I_F = 350\text{ mA}$	V_F	9	10	12	V
$(V_{Fmax.} - V_{Fmin.})$ all rows ⁽²⁾	$I_F = 350\text{ mA}$	ΔV_F	0	-	0.6	V
Temperature coefficient of V_F per row	$I_F = 350\text{ mA}$	TC_{V_F}	-	- 10	-	mV/K
Temperature coefficient of Φ_V	$I_F = 350\text{ mA}$	$TC\Phi_V$	-	- 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 $\pm 11\%$.
- ⁽¹⁾ Calculated based on single LED unit.
- ⁽²⁾ 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)
VLPN0303A1, NATURAL WHITE

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous flux per row ⁽¹⁾	$I_F = 350\text{ mA}$	Φ_V	200	240	-	lm
Luminous flux total ⁽¹⁾	$I_{board} = 3 \times 350\text{ mA}$	Φ_V	600	720	-	lm
Color temperature	$I_F = 350\text{ mA}$	TK	3800	-	5000	K
Forward voltage per row	$I_F = 350\text{ mA}$	V_F	9	10	12	V
$(V_{Fmax.} - V_{Fmin.})$ all rows ⁽²⁾	$I_F = 350\text{ mA}$	ΔV_F	0	-	0.6	V
Temperature coefficient of V_F per row	$I_F = 350\text{ mA}$	TC_{V_F}	-	- 10	-	mV/K
Temperature coefficient of Φ_V	$I_F = 350\text{ mA}$	$TC\Phi_V$	-	- 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 $\pm 11\%$.
- ⁽¹⁾ Calculated based on single LED unit.
- ⁽²⁾ 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)
VLPW0303A1, WARM WHITE

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous flux per row ⁽¹⁾	$I_F = 350\text{ mA}$	Φ_V	180	220	-	lm
Luminous flux total ⁽¹⁾	$I_{board} = 3 \times 350\text{ mA}$	Φ_V	540	660	-	lm
Color temperature	$I_F = 350\text{ mA}$	TK	2850	-	3500	K
Forward voltage per row	$I_F = 350\text{ mA}$	V_F	9	10	12	V
$(V_{Fmax.} - V_{Fmin.})$ all rows ⁽²⁾	$I_F = 350\text{ mA}$	ΔV_F	0	-	0.6	V
Temperature coefficient of V_F per row	$I_F = 350\text{ mA}$	TC_{V_F}	-	- 10	-	mV/K
Temperature coefficient of Φ_V	$I_F = 350\text{ mA}$	$TC\Phi_V$	-	- 0.4	-	%/K

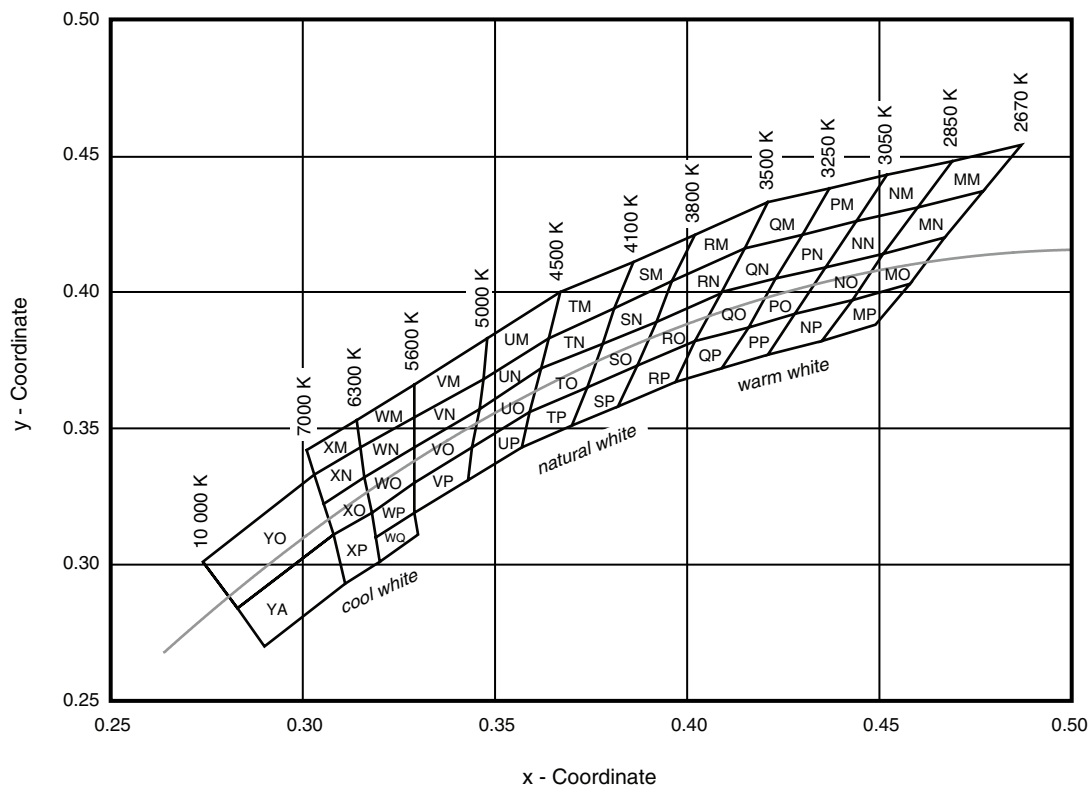
Notes

- 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 $\pm 11\%$.
- ⁽¹⁾ Calculated based on single LED unit.
- ⁽²⁾ 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

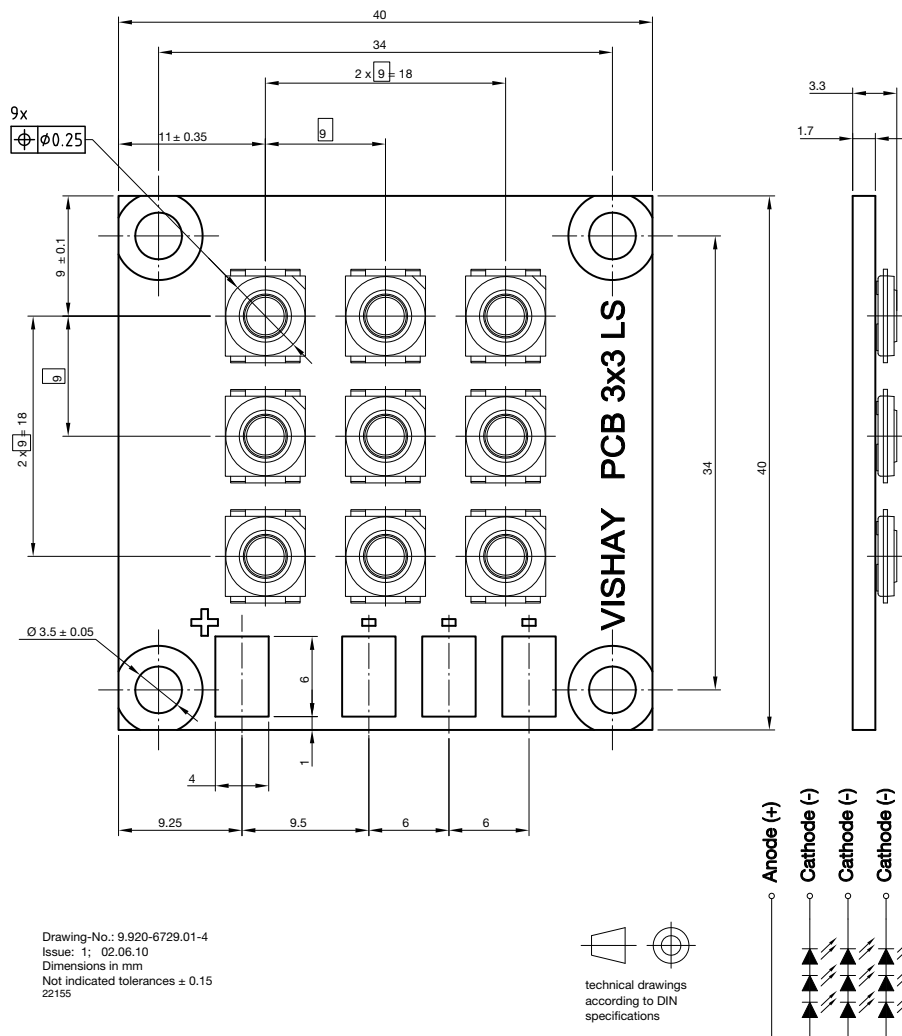
VLPC0303A1: 5000 K to 7000 K group X to V



21851-2

Fig. 1 - Chromaticity Coordinates of Colorgroups

PCB BASIC DESIGN DIMENSIONS in millimeters



PCB CHARACTERISTICS

- Metal core PCB: Al (minimum 1000 μm - thickness)
- Prepreg minimum 63 μm
- Conductive pattern Cu minimum 18 μm
- Free of burrs
- Compliant to RoHS directive 2002/95/EC
- Halogen-free according to IEC 61249-2-21 definition
- Solder resist on top side
- Shiny white surface (glossy-white Taiyo-PSR 2000)
- Galvanic of solder pads and backside pure matte Sn (0.8 μm to 1.2 μm)
- Assembled with 9 high brightness power LEDs. LED position accuracy ± 0.3

EMISSION CHARACTERISTIC

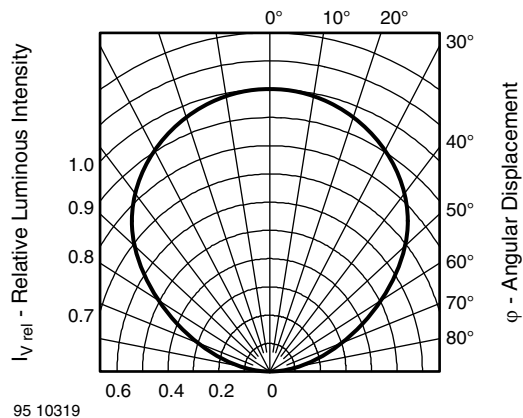
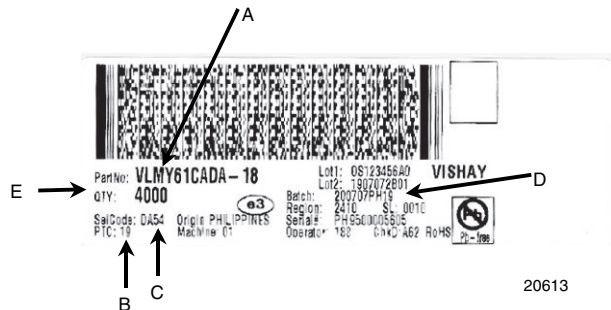


Fig. 2 - Rel. Luminous Intensity vs. Angular Displacement



BAR CODE PRODUCT LABEL



A. Type of component

B. Manufacturing plant

C. SEL - selection code (bin):
X = color group

D. Batch:
200707 = year 2007, week 07
PH19 = plant code

E. Total quantity

Note

- 48 PCB's per box, minimum order quantity 48



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