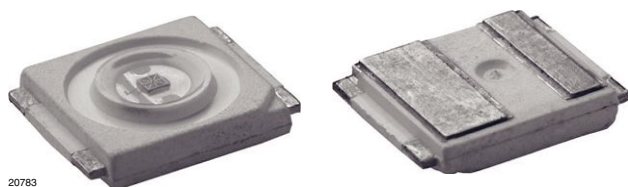




Little Star® 1 W Power SMD LED



DESCRIPTION

The VLMK71.., VLMR71.., VLMY71.. is one of the most robust and light efficient LEDs in the market. With its extremely high level of brightness and the ultra low high profile, which is only 1.5 mm are highly suitable for both conventional lighting and specialized application such as automotive signal lights, traffic lights, channel lights, tube lights and garden lights among others.

PRODUCT GROUP AND PACKAGE DATA

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

FEATURES

- Super high brightness surface mount LED
- High flux output
- 120° viewing angle
- Compact package outline (L x W x H) in mm: 6.0 x 6.0 x 1.5
- Ultra low height profile - 1.5 mm
- Designed for high current drive; typically 400 mA
- Low thermal resistance; $R_{thJP} = 20$ K/W
- Qualified according to JEDEC moisture sensitivity level 2a
- Compatible with IR reflow solder processes according to CECC 00802 and J-STD-020C
- Little Star® are class 1M LED products. Do not view directly with optical instrument
- AEC-Q101 qualified
- ESD-withstand voltage: Up to 2 kV according to JESD22-A114-B
- Optical efficiency typical up to 52 lm/W
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912



APPLICATIONS

- Automotive: Exterior applications, e.g. center high mounted stop light (CHMSL), rear combination lights (RCLs), signal lighting, etc.
- Communication: Indicator and backlight in mobile phone
- Industry: white goods (e.g. oven, microwave, etc.)
- Lighting: Garden light, architecture lighting, general lighting, etc.

PARTS TABLE

PART	COLOR	LUMINOUS INTENSITY (mcd)			at I_F (mA)	WAVELENGTH (nm)			at I_F (mA)	FORWARD VOLTAGE (V)			at I_F (mA)	TECHNOLOGY
		MIN.	TYP.	MAX.		MIN.	TYP.	MAX.		MIN.	TYP.	MAX.		
VLMR71AAAC-GS08	Red	7150	-	14 000	400	620	-	630	400	2.2	-	2.8	400	AlInGaP
VLMK71ABAD-GS08	Amber	9000	-	18 000	400	610	-	620	400	2.2	-	2.8	400	AlInGaP
VLMY71AAAC-GS08	Yellow	7150	-	14 000	400	585	-	597	400	2.2	-	2.8	400	AlInGaP

ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25^\circ\text{C}$, unless otherwise specified)
VLMR71.., VLMK71.., VLMY71..

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Forward current		I_F	400	mA
Power dissipation		P_{tot}	1120	mW
Junction temperature		T_j	+ 120	$^\circ\text{C}$
Surge current $t < 10 \mu\text{s}$, $d = 0.1$		I_{FM}	500	mA
Operating temperature range		T_{amb}	- 40 to + 100	$^\circ\text{C}$
Storage temperature range		T_{stg}	- 40 to + 100	$^\circ\text{C}$
Thermal resistance junction/pin		R_{thJP}	20	K/W

Note

- Not designed for reverse operation

**OPTICAL AND ELECTRICAL CHARACTERISTICS** ($T_{amb} = 25^{\circ}\text{C}$, unless otherwise specified)
VLMR71AAAC-GS08, RED

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity	$I_F = 400\text{ mA}$	VLMR71AAAC	I_V	7150	-	14 000	mcd
Dominant wavelength	$I_F = 400\text{ mA}$		λ_d	620	-	630	nm
Spectral bandwidth at 50 % $I_{rel\text{ max.}}$	$I_F = 400\text{ mA}$		$\Delta\lambda$	-	18	-	nm
Angle of half intensity	$I_F = 400\text{ mA}$		ϕ	-	± 60	-	deg
Forward voltage ⁽¹⁾	$I_F = 400\text{ mA}$		V_F	2.2	-	2.8	V
Optical efficiency	$I_F = 400\text{ mA}$		η_{opt}	-	30	39	lm/W

Note

⁽¹⁾ Forward voltages are tested at a current pulse duration of 1 ms and a tolerance of $\pm 0.05\text{ V}$

OPTICAL AND ELECTRICAL CHARACTERISTICS ($T_{amb} = 25^{\circ}\text{C}$, unless otherwise specified)
VLMK71ABAD-GS08, AMBER

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity	$I_F = 400\text{ mA}$	VLMK71ABAD	I_V	9000	-	18 000	mcd
Dominant wavelength	$I_F = 400\text{ mA}$		λ_d	610	-	620	nm
Spectral bandwidth at 50 % $I_{rel\text{ max.}}$	$I_F = 400\text{ mA}$		$\Delta\lambda$	-	18	-	nm
Angle of half intensity	$I_F = 400\text{ mA}$		ϕ	-	± 60	-	deg
Forward voltage ⁽¹⁾	$I_F = 400\text{ mA}$		V_F	2.2	-	2.8	V
Optical efficiency	$I_F = 400\text{ mA}$		η_{opt}	-	40	52	lm/W

Note

⁽¹⁾ Forward voltages are tested at a current pulse duration of 1 ms and a tolerance of $\pm 0.05\text{ V}$

OPTICAL AND ELECTRICAL CHARACTERISTICS ($T_{amb} = 25^{\circ}\text{C}$, unless otherwise specified)
VLMY71AAAC-GS08, YELLOW

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity	$I_F = 400\text{ mA}$	VLMY71AAAC	I_V	7150	-	14 000	mcd
Dominant wavelength	$I_F = 400\text{ mA}$		λ_d	585	-	597	nm
Spectral bandwidth at 50 % $I_{rel\text{ max.}}$	$I_F = 400\text{ mA}$		$\Delta\lambda$	-	15	-	nm
Angle of half intensity	$I_F = 400\text{ mA}$		ϕ	-	± 60	-	deg
Forward voltage ⁽¹⁾	$I_F = 400\text{ mA}$		V_F	2.2	-	2.8	V
Optical efficiency	$I_F = 400\text{ mA}$		η_{opt}	-	30	39	lm/W

Note

⁽¹⁾ Forward voltages are tested at a current pulse duration of 1 ms and a tolerance of $\pm 0.05\text{ V}$

LUMINOUS INTENSITY/FLUX CLASSIFICATION

GROUP	LUMINOUS INTENSITY I_V (mcd)		LUMINOUS FLUX Φ_V (lm)	
	MIN.	MAX.	CORRELATION TABLE	
STANDARD	MIN.	MAX.	MIN.	MAX.
AA	7150	9000	20 700	26 100
AB	9000	11 250	26 100	33 000
AC	11 250	14 000	33 000	39 000
AD	14 000	18 000	39 000	52 000
AE	18 000	22 400	52 000	71 000
AF	22 400	28 500	71 000	97 000

Note

- Luminous intensity is tested at a current pulse duration of 25 ms and an accuracy of $\pm 11\%$. The above type numbers represent the order groups which include only a few brightness groups. Only one group will be shipped on each reel (there will be no mixing of two groups on each reel). In order to ensure availability, single brightness groups will not be orderable. In a similar manner for colors where wavelength groups are measured and binned, single wavelength groups will be shipped in any one reel. In order to ensure availability, single wavelength groups will not be orderable.



COLOR CLASSIFICATION

GROUP	DOM. WAVELENGTH (nm)		DOM. WAVELENGTH (nm)	
	YELLOW		AMBER	
	MIN.	MAX.	MIN.	MAX.
A	585	588	610	616
B	588	591	616	620
C	591	594		
D	594	597		

Note

- Wavelengths are tested at a current pulse duration of 25 ms and an accuracy of ± 1 nm.

FORWARD VOLTAGE CLASSIFICATION

GROUP	FORWARD VOLTAGE (V)	
	MIN.	MAX.
02	2.2	2.5
03	2.5	2.8

Note

- Forward voltages are tested at a current pulse duration of 25 ms and a tolerance of ± 0.05 V. In order to ensure availability, a single forward voltage group can not be ordered.

TYPICAL CHARACTERISTICS ($T_{amb} = 25^\circ\text{C}$, unless otherwise specified)

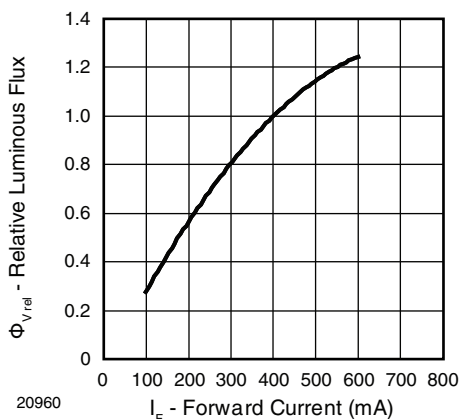


Fig. 1 - Relative Luminous Flux vs. Forward Current

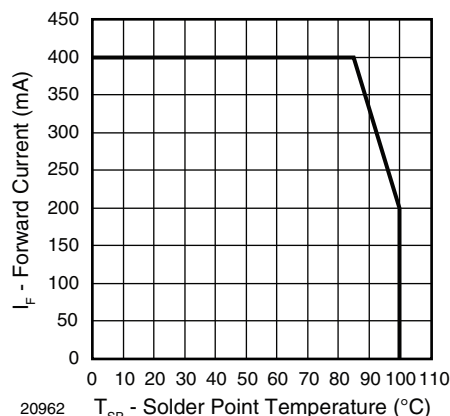


Fig. 3 - Forward Current vs. Solder Point Temperature

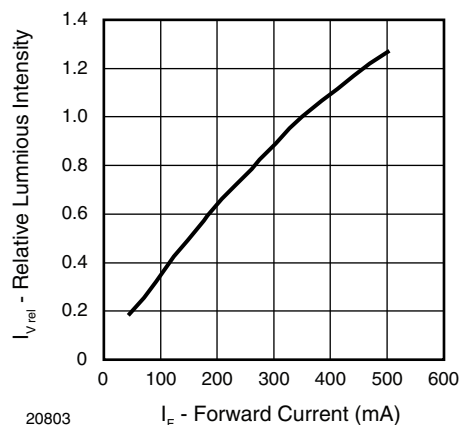


Fig. 2 - Relative Luminous Intensity vs. Forward Current

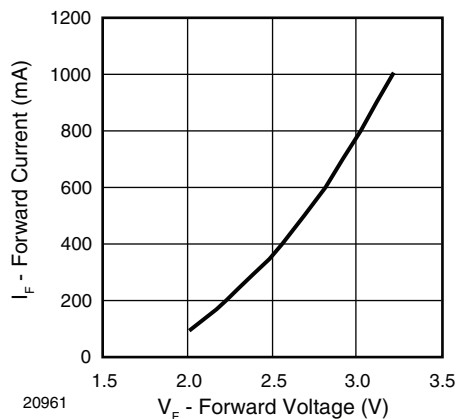


Fig. 4 - Forward Current vs. Forward Voltage

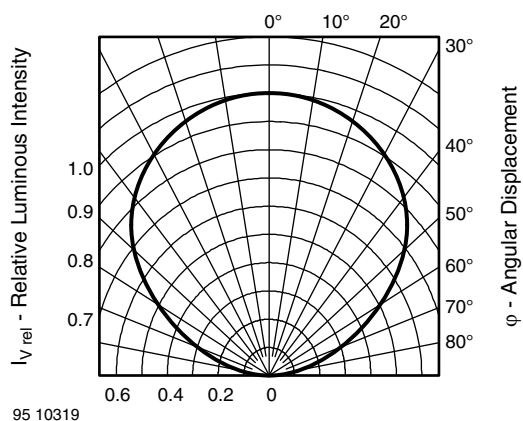
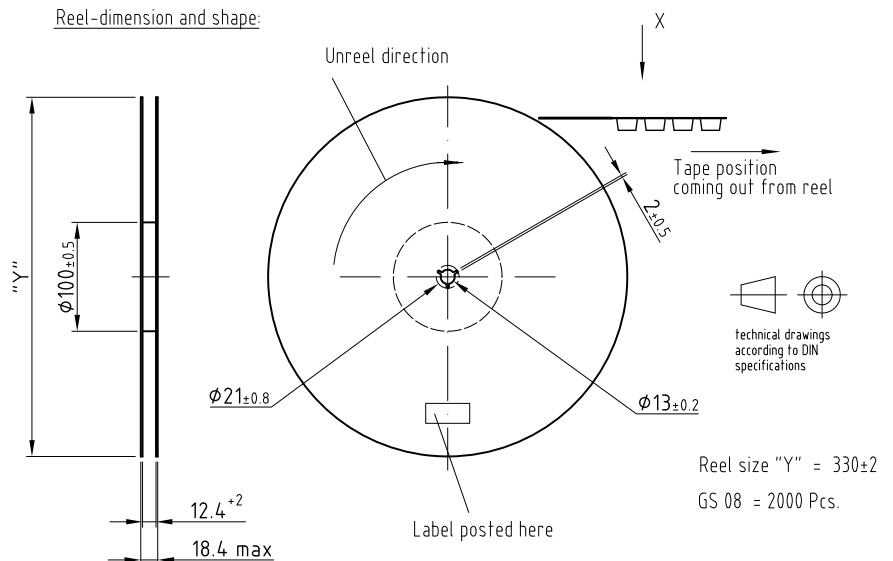


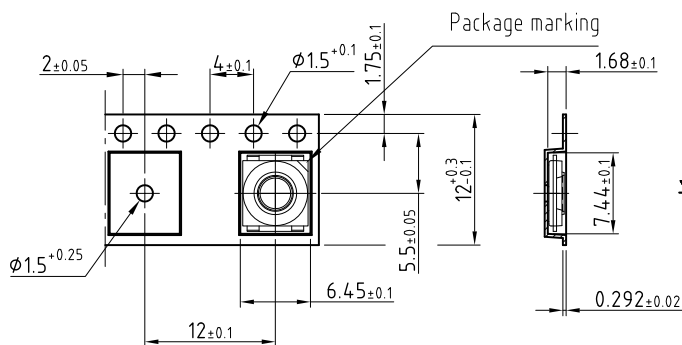
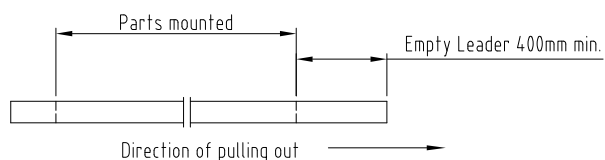
Fig. 5 - Relative Luminous Intensity vs. Angular Displacement

TAPING DIMENSIONS in millimeters

Reel-dimension and shape:



Leader and trailer tape:



Drawing-No.: 9.800-5094.01-4
Issue: 3; 22.01.08

20846

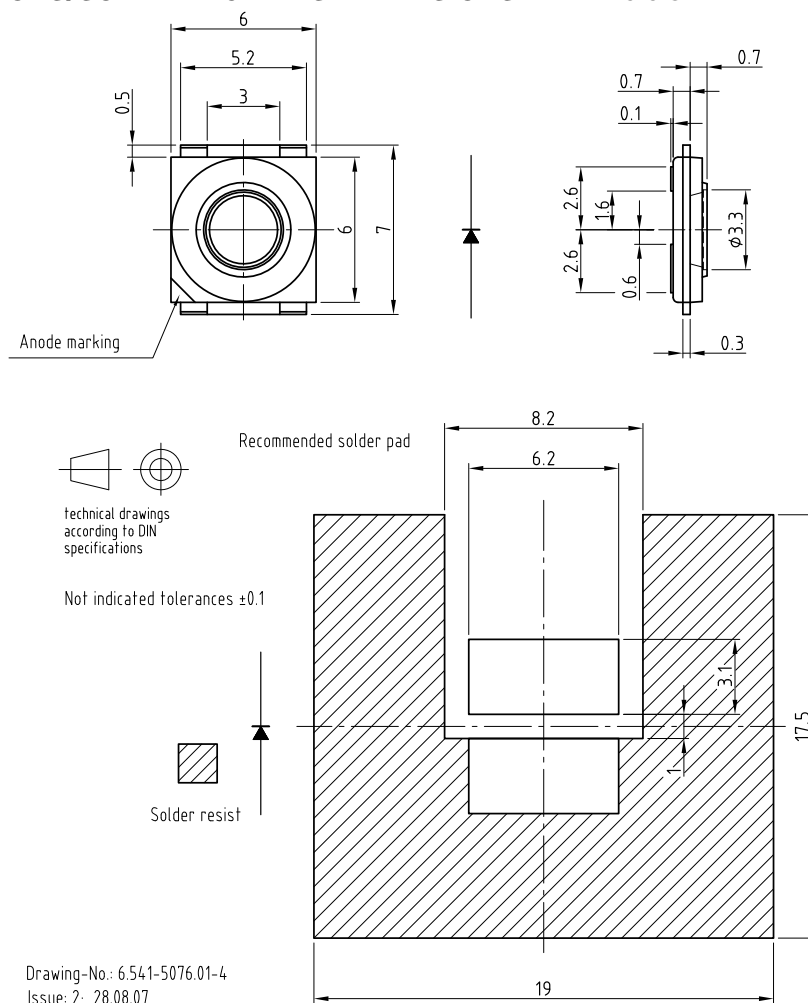
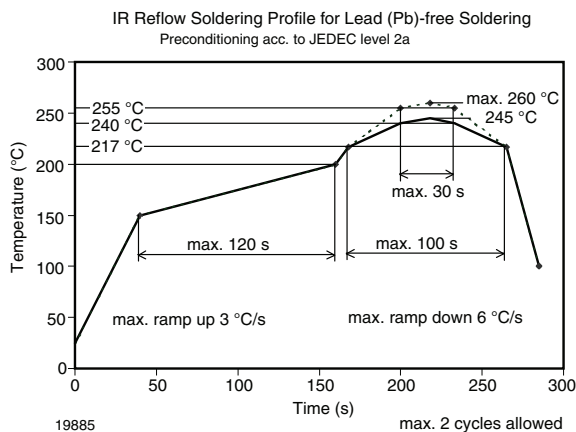
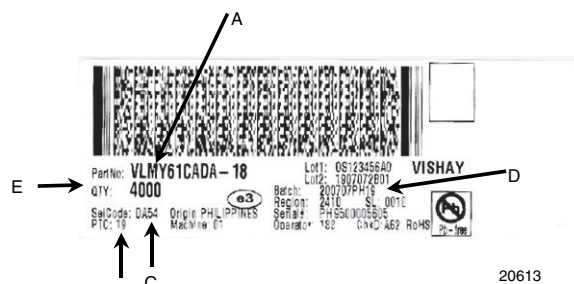
PACKAGE DIMENSIONS/SOLDERING PADS DIMENSIONS in millimeters

SOLDERING PROFILE


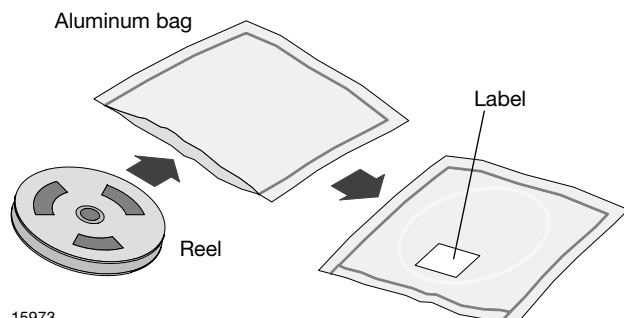
Fig. 6 - Vishay Lead (Pb)-free Reflow Soldering Profile
(acc. to J-STD-020C)

BAR CODE PRODUCT LABEL (example)


- A. Type of component
- B. Manufacturing plant
- C. SEL - selection code (bin):
e.g.: DA = code for luminous intensity group
5 = code for color group
4 = code for forward voltage
- D. Batch no.
20070 = year 2007, week 07
PH19 = plant code
- E. Total quantity

**DRY PACKING**

The reel is packed in an anti-humidity bag to protect the devices from absorbing moisture during transportation and storage.



15973

FINAL PACKING

The sealed reel is packed into a cardboard box. A secondary cardboard box is used for shipping purposes.

RECOMMENDED METHOD OF STORAGE

Dry box storage is recommended as soon as the aluminum bag has been opened to prevent moisture absorption. The following conditions should be observed, if dry boxes are not available:

- Storage temperature 10 °C to 30 °C
- Storage humidity $\leq 60\%$ RH max.

After more than 672 h under these conditions moisture content will be too high for reflow soldering.

In case of moisture absorption, the devices will recover to the former condition by drying under the following condition:

192 h at 40 °C + 5 °C/- 0 °C and < 5 % RH (dry air/nitrogen)
or

96 h at 60 °C + 5 °C and < 5 % RH for all device containers
or

24 h at 100 °C + 5 °C not suitable for reel or tubes.


An EIA JEDEC standard JESD22-A112 level 2a label is included on all dry bags.

ESD PRECAUTION

Proper storage and handling procedures should be followed to prevent ESD damage to the devices especially when they are removed from the antistatic shielding bag. Electro-static sensitive devices warning labels are on the packaging.

VISHAY SEMICONDUCTORS STANDARD BAR CODE LABELS

The Vishay Semiconductors standard bar code labels are printed at final packing areas. The labels are on each packing unit and contain Vishay Semiconductors specific data.

	CAUTION This bag contains MOISTURE - SENSITIVE DEVICES	LEVEL <div style="border: 1px solid black; padding: 5px; display: inline-block;"> 2a </div>						
1. Shelf life in sealed bag 12 months at <40°C and < 90% relative humidity (RH)								
2. After this bag is opened devices that will be subjected to infrared reflow, vapor-phase reflow, or equivalent processing (peak package body temp. 260°C) must be:								
a) Mounted within 672 hours at factory condition of $\leq 30^\circ\text{C}/60\%\text{RH}$ or b) Stored at $\leq 10\%$ RH.								
3. Devices require baking before mounting if:								
a) Humidity Indicator Card is >10% when read at $23^\circ\text{C} \pm 5^\circ\text{C}$ or b) 2a or 2b is not met.								
4. If baking is required, devices may be baked for:								
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">192 hours at $40^\circ\text{C} + 5^\circ\text{C}/-0^\circ\text{C}$ and <5%RH (dry air/nitrogen)</td> <td style="width: 50%; text-align: right;">or</td> </tr> <tr> <td>96 hours at $60 \pm 5^\circ\text{C}$ and <5%RH</td> <td style="text-align: right;">For all device containers or</td> </tr> <tr> <td>24 hours at $100 \pm 5^\circ\text{C}$</td> <td style="text-align: right;">Not suitable for reels or tubes</td> </tr> </table>			192 hours at $40^\circ\text{C} + 5^\circ\text{C}/-0^\circ\text{C}$ and <5%RH (dry air/nitrogen)	or	96 hours at $60 \pm 5^\circ\text{C}$ and <5%RH	For all device containers or	24 hours at $100 \pm 5^\circ\text{C}$	Not suitable for reels or tubes
192 hours at $40^\circ\text{C} + 5^\circ\text{C}/-0^\circ\text{C}$ and <5%RH (dry air/nitrogen)	or							
96 hours at $60 \pm 5^\circ\text{C}$ and <5%RH	For all device containers or							
24 hours at $100 \pm 5^\circ\text{C}$	Not suitable for reels or tubes							
Bag Seal Date: _____ (If blank, see bar code label)								
Note: LEVEL defined by EIA JEDEC Standard JESD22-A113								

19786

Example of JESD22-A112 level 2a label



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