

## Multi SMD LED RGB



20777

### DESCRIPTION

VLMRGB343.. tricolor LEDs is a high brightness device designed for demanding applications in efficiency and reduced space. An ideal device in emphasizing visual effects, advertisement, decoration as well as general backlighting needs.

### PRODUCT GROUP AND PACKAGE DATA

- Product group: LED
- Package: SMD PLCC-4
- Product series: RGB
- Angle of half intensity:  $\pm 60^\circ$

### FEATURES

- High brightness tricolor SMD LED
- RGB individual control
- Compact package outline
- Black surface
- Qualified according to JEDEC® moisture sensitivity level 2
- Compatible to IR reflow soldering
- AEC-Q101 qualified
- ESD-withstand voltage: up to 1 kV according to JESD22-A114-B
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

AUTOMOTIVE  
GRADE

**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
**GREEN**  
(5-2008)

### APPLICATIONS

- Wide range of accent and decorative lighting
- Displays: full color message and displays video boards
- Consumer appliances: backlight LCDs, PDAs, TVs
- Industry: white goods such as ovens, microwaves, 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.		
VLMRGB343-ST-UV-RS	Red	140	-	285	20	618	625	628	20	-	1.8	2.45	20	AlInGaP
	True green	285	-	560	20	521	526	536	20	-	3.7	4.25	20	InGaN
	Blue	100	-	200	20	465	470	475	20	-	3.6	4.25	20	InGaN

#### Note

- Reel comes in a quantity of 2050 units per reel. Luminous intensity is measured with an accuracy of  $\pm 11\%$ . All electrical and optical data are measured at room temperature of  $25^\circ\text{C}$ .

### ABSOLUTE MAXIMUM RATINGS ( $T_{\text{amb}} = 25^\circ\text{C}$ , unless otherwise specified) VLMRGB343.., RED

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Forward current		$I_F$	30	mA
Reverse voltage		$V_R$	12	V
Power dissipation		$P_{\text{tot}}$	75	mW
Junction temperature		$T_j$	125	$^\circ\text{C}$
Surge current $t_p < 10 \mu\text{s}$ , duty cycle = 0.005		$I_{\text{FM}}$	1000	mA
Thermal resistance junction/solder point 1 chip on 3 chip on		$R_{\text{thJP}}$	260 420	K/W
Thermal resistance junction/ambient 1 chip on 3 chip on		$R_{\text{thJA}}$	480 770	K/W
Operating temperature		$T_{\text{amb}}$	-40 to +100	$^\circ\text{C}$
Storage temperature		$T_{\text{stg}}$	-40 to +100	$^\circ\text{C}$
Forward voltage	20 mA	$V_F$	1.8 to 2.45	V

**ABSOLUTE MAXIMUM RATINGS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)  
**VLMRGB343.., TRUE GREEN, BLUE**

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Forward current		$I_F$	20	mA
Reverse voltage		$V_R$	5	V
Power dissipation		$P_{tot}$	85	mW
Junction temperature		$T_j$	125	$^{\circ}\text{C}$
Surge current; $t_p < 10\text{ }\mu\text{s}$ , duty cycle = 0.005		$I_{FM}$	200	mA
Thermal resistance junction/solder point 1 chip on 3 chip on		$R_{thJP}$	290 470	K/W
Thermal resistance junction/ambient 1 chip on 3 chip on		$R_{thJA}$	530 820	K/W
Operating temperature		$T_{amb}$	-40 to +100	$^{\circ}\text{C}$
Storage temperature		$T_{stg}$	-40 to +100	$^{\circ}\text{C}$
Forward voltage	20 mA	$V_F$	3.7 to 4.25	V

**OPTICAL AND ELECTRICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)  
**VLMRGB343.., RED, TRUE GREEN, BLUE**

PARAMETER	TEST CONDITION	PART	FLOATING GROUPS	COLOR	SYMBOL	MIN.	TYP.	MAX.	UNIT			
Luminous intensity	I <sub>F</sub> = 20 mA	VLMRGB343- ST-UV-RS		red	I <sub>V</sub>	140		285	mcd			
				true green		285		560				
				blue		100		200				
		VLMRGB343..	S3U3R3	red	I <sub>V</sub>	140		200	mcd			
				true green		285		400				
				blue		100		140				
			S3U3S3	red	I <sub>V</sub>	140		200	mcd			
				true green		285		400				
				blue		140		200				
			S3V3R3	red	I <sub>V</sub>	140		200	mcd			
				true green		400		560				
				blue		100		140				
			S3V3S3	red	I <sub>V</sub>	140		200	mcd			
				true green		400		560				
				blue		140		200				
			T3U3R3	red	I <sub>V</sub>	200		285	mcd			
				true green		285		400				
				blue		100		140				
			T3U3S3	red	I <sub>V</sub>	200		285	mcd			
				true green		285		400				
				blue		140		200				
			T3V3R3	red	I <sub>V</sub>	200		285	mcd			
				true green		400		560				
				blue		100		140				
			T3V3S3	red	I <sub>V</sub>	200		285	mcd			
				true green		400		560				
				blue		140		200				
Dominant wavelength		VLMRGB343..		red	λ <sub>d</sub>	618	625	628	nm			
				true green		521	526	536				
				blue		465	470	475				
Angle of half intensity				red	φ		± 60		deg			
				true green								
				blue								
Forward voltage						red	V <sub>F</sub>		1.8	2.45	V	
						true green			3.7	4.25		
						blue			3.6	4.25		

**Note**

- Not designed for reverse direction

**LUMINOUS INTENSITY CLASSIFICATION RED, TRUE GREEN, BLUE**

GROUP	LUMINOUS INTENSITY $I_V$ (mcd)	
STANDARD	MIN.	MAX.
R3	100	140
S3	140	200
T3	200	285
U3	285	400
V3	400	560

**Note**

- The standard shipping format for serial types includes a family group of 5, 6 or 9 individual brightness groups. Individual brightness groups cannot be ordered.

**COLOR CLASSIFICATION**

GROUP	DOM. WAVELENGTH (nm)					
	RED <sup>(1)</sup>		TRUE GREEN		BLUE	
	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
	618	628	521	536	465	475
A			521	526	465	470
B			526	531	470	475
C			531	536		

**Notes**

- Wavelengths are tested at a current pulse duration of 25 ms and an accuracy of  $\pm 1$  nm. Only one wavelength group is allowed for each chip within one reel.

<sup>(1)</sup> No color grouping for red. Only for check of color.

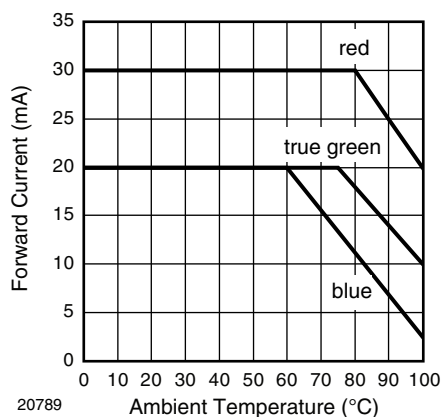
**TYPICAL CHARACTERISTICS** ( $T_{amb} = 25^\circ\text{C}$ , unless otherwise specified)

Fig. 1 - Forward Current vs. Ambient Temperature  
(1 Chip On)

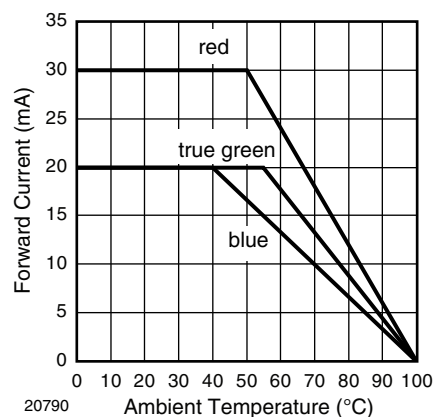


Fig. 2 - Forward Current vs. Ambient Temperature  
(3 Chips On)

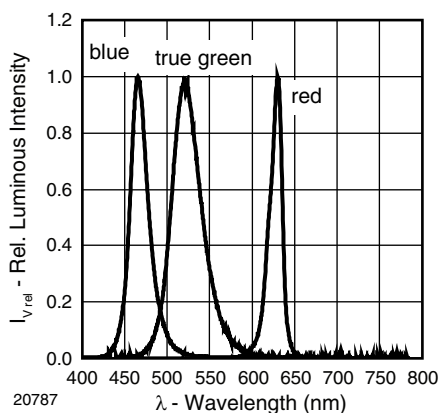


Fig. 3 - Relative Intensity vs. Wavelength

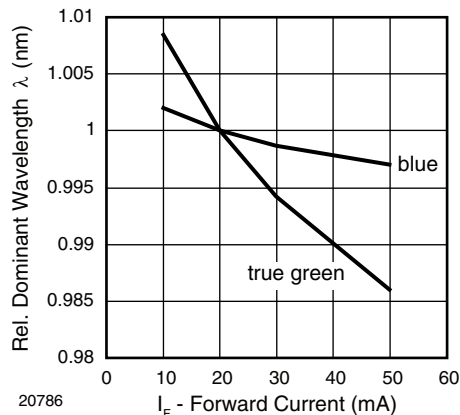


Fig. 6 - Relative Dominant Wavelength vs. Forward Current

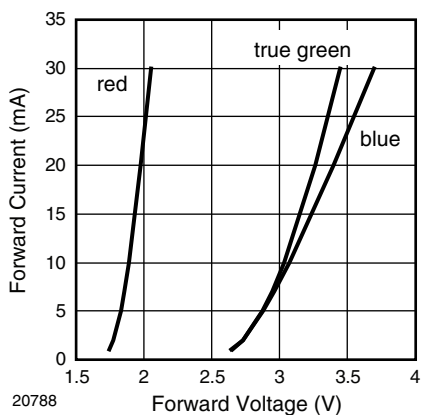


Fig. 4 - Forward Current vs. Forward Voltage

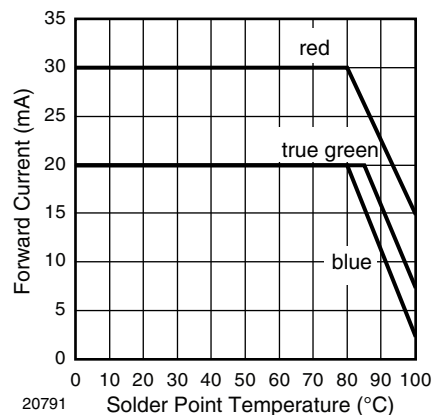


Fig. 7 - Forward Current vs. Solder Point Temperature (1 Chip On)

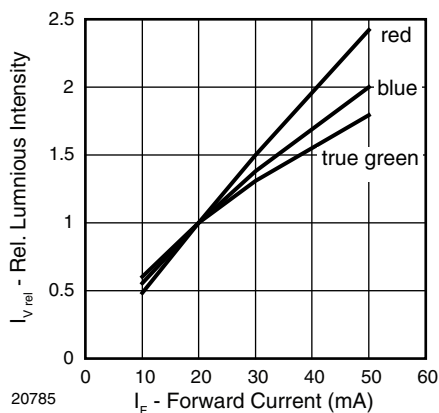


Fig. 5 - Relative Luminous Intensity vs. Forward Current

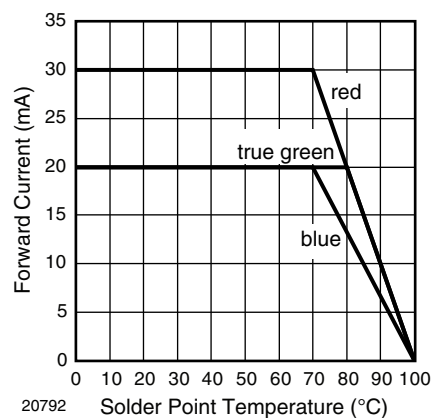
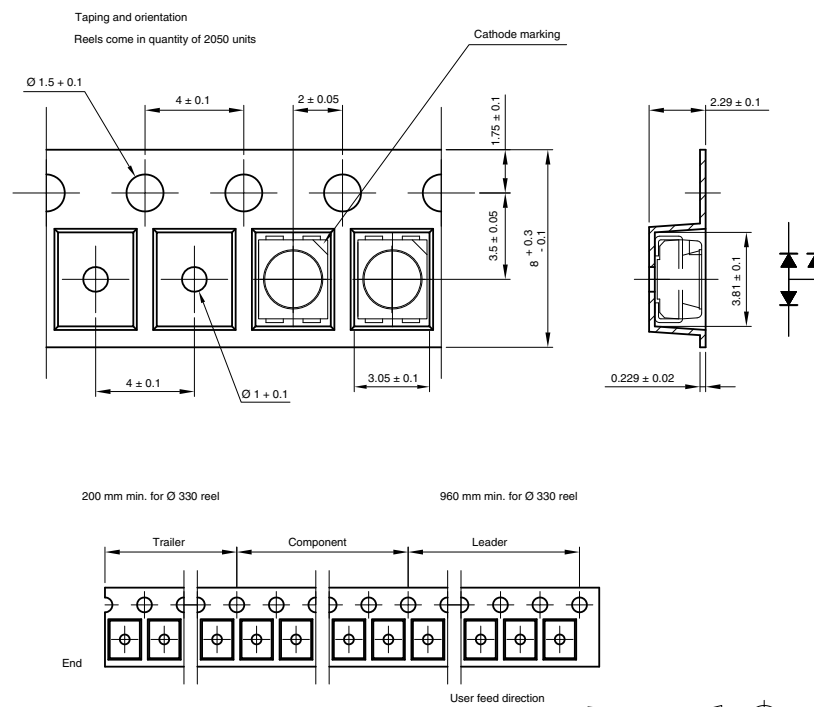
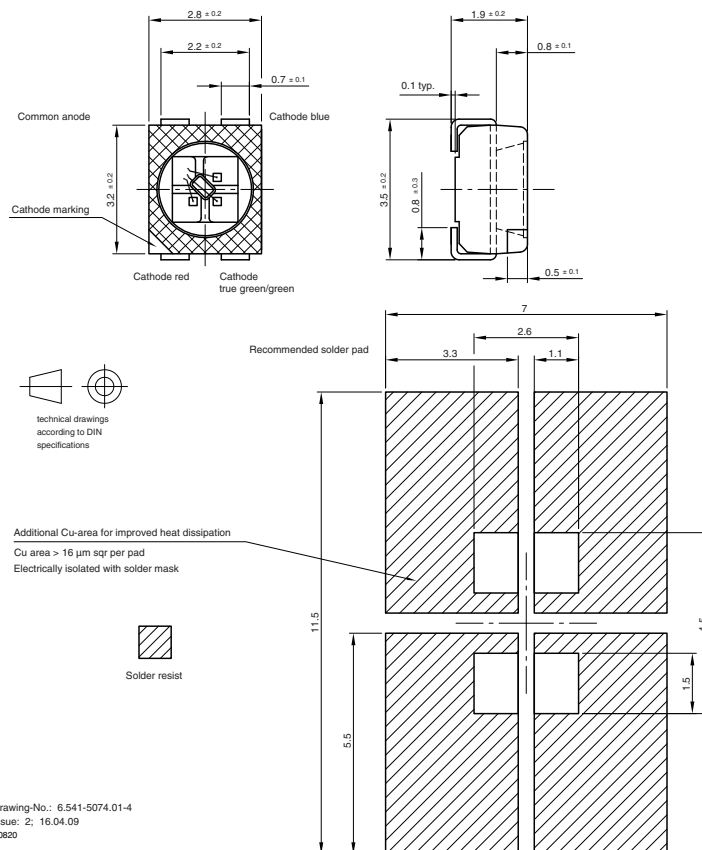


Fig. 8 - Forward Current vs. Solder Point Temperature (3 Chips On)

**TAPING DIMENSIONS** in millimeters


Drawing-No.: 9.700-5323.01-4  
Issue: 3; 19.02.10  
20819


**PACKAGE DIMENSIONS / SOLDERING PADS DIMENSIONS** in millimeters


Drawing-No.: 6.541-5074.01-4  
Issue: 2; 16.04.09  
20820

## SOLDERING PROFILE

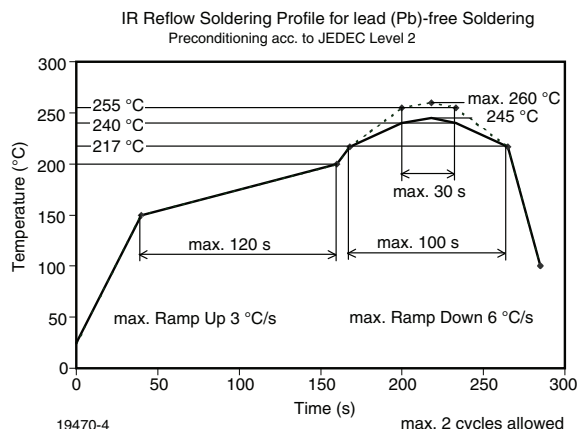
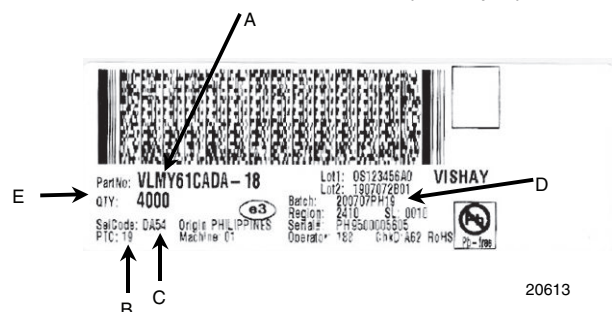


Fig. 9 - Vishay Lead (Pb)-free Reflow Soldering Profile  
(acc. to J-STD-020)

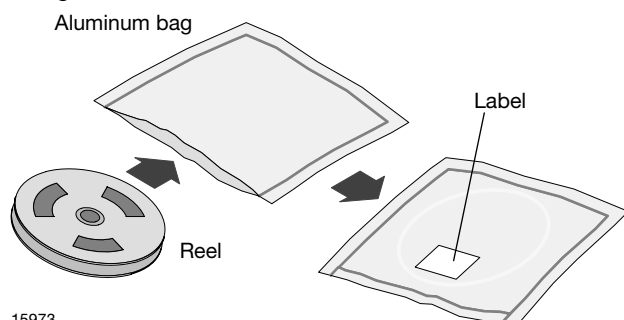
## BAR CODE PRODUCT LABEL (Example)



- 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:  
200707 = 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.



## 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:

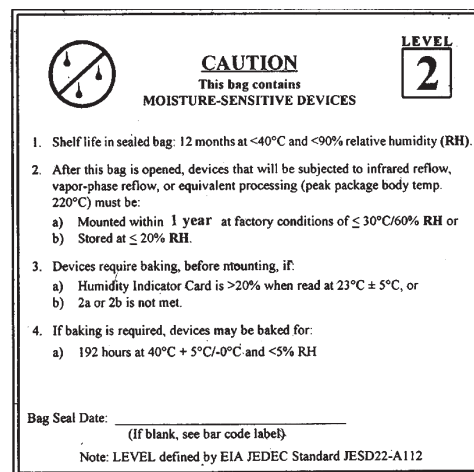
- Storage temperature 10 °C to 30 °C
- Storage humidity ≤ 60 % RH max.

After more than 1 year 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 2 label is included on all aluminum dry bags.



17028

Example of JESD22-A112 level 2 label

## 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. Electrostatic 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.



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