

## Multi SMD LED RGB



20777

### 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
- Automotive qualified AEC-Q101
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC
- ESD-withstand voltage: up to 1 kV according to JESD22-A114-B


**RoHS**  
COMPLIANT

### 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:  $\pm 60^\circ$

### 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 ( $\lambda_d$ ), LUMINOUS INTENSITY	TECHNOLOGY
VLMRGB343-ST-UV-RS	Red, $I_V = (140 \text{ to } 285) \text{ mcd}$ , (typ 625 nm)	AlInGaP
	True green, $I_V = (285 \text{ to } 560) \text{ mcd}$ , (typ 525 nm)	InGaN
	Blue, $I_V = (100 \text{ to } 200) \text{ mcd}$ , (typ 470 nm)	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 °C.

<b>ABSOLUTE MAXIMUM RATINGS <sup>1)</sup> VLMRGB343.., RED</b>				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Forward current		$I_F$	30	mA
Reverse voltage		$V_R$	12	V
Power dissipation		$P_{tot}$	75	mW
Junction temperature		$T_j$	125	°C
Surge current $t_p < 10 \mu s$ , duty cycle = 0.005		$I_{FM}$	1000	mA
Thermal resistance junction/solder point 1 chip ON 3 chip ON		$R_{thJP}$	260 420	K/W
Thermal resistance junction/ambient 1 chip ON 3 chip ON		$R_{thJA}$	480 770	K/W
Operating temperature		$T_{amb}$	- 40 to + 100	°C
Storage temperature		$T_{stg}$	- 40 to + 100	°C
Forward voltage	20 mA	$V_F$	1.8 to 2.45	V

Note:

<sup>1)</sup>  $T_{amb} = 25 \text{ }^\circ\text{C}$ , unless otherwise specified

<b>ABSOLUTE MAXIMUM RATINGS <sup>1)</sup> VLMRGB343.., TRUE GREEN, BLUE</b>				
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	°C
Surge current $t_p < 10 \mu s$ , 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	°C
Storage temperature		$T_{stg}$	- 40 to + 100	°C
Forward voltage	20 mA	$V_F$	3.7 to 4.25	V

Note:

<sup>1)</sup>  $T_{amb} = 25 \text{ }^\circ\text{C}$ , unless otherwise specified

<b>OPTICAL AND ELECTRICAL CHARACTERISTICS <sup>1)</sup> VLMRGB343.., RED, TRUE GREEN, BLUE</b>														
PARAMETER	TEST CONDITION	PART	FLOATING GROUPS	COLOR	SYMBOL	MIN.	TYP.	MAX.	UNIT					
Luminous intensity	$I_F = 20 \text{ mA}$	VLMRGB343-ST-UV-RS		red	$I_V$	140		285	mcd					
				true green		285		560						
				blue		100		200						
				VLMRGB343	S3U3R3	red	$I_V$	140		200	mcd			
						true green		285		400				
						blue		100		140				
					S3U3S3	red	$I_V$	140		200	mcd			
						true green		285		400				
						blue		140		200				
					S3V3R3	red	$I_V$	140		200	mcd			
						true green		400		560				
						blue		100		140				
					S3V3S3	red	$I_V$	140		200	mcd			
						true green		400		560				
						blue		140		200				
					T3U3R3	red	$I_V$	200		285	mcd			
						true green		285		400				
						blue		100		140				
					T3U3S3	red	$I_V$	200		285	mcd			
						true green		285		400				
						blue		140		200				
					T3V3R3	red	$I_V$	200		285	mcd			
						true green		400		560				
						blue		100		140				
					T3V3S3	red	$I_V$	200		285	mcd			
						true green		400		560				
						blue		140		200				
					Dominant wavelength	$I_F = 20 \text{ mA}$	VLMRGB343..		red	$\lambda_d$	618	625	628	nm
									true green		521	526	536	
									blue		465	470	475	
Angle of half intensity				red	$\phi$					$\pm 60$		deg		
				true green										
				blue										
Forward voltage				red	$V_F$					1.8	2.45	V		
				true green						3.7	4.25			
				blue						3.6	4.25			

Note:

Not designed for reverse direction

<sup>1)</sup>  $T_{amb} = 25 \text{ }^\circ\text{C}$ , unless otherwise specified

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		

Note:

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**

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

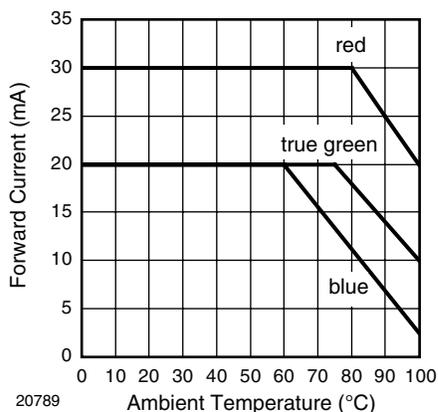


Figure 1. Forward Current vs. Ambient Temperature (1 Chip On)

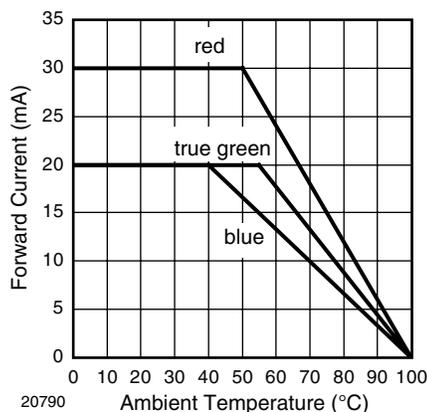


Figure 2. Forward Current vs. Ambient Temperature (3 Chips On)

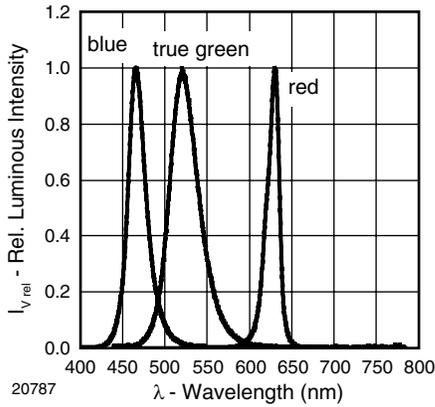


Figure 3. Relative Intensity vs. Wavelength

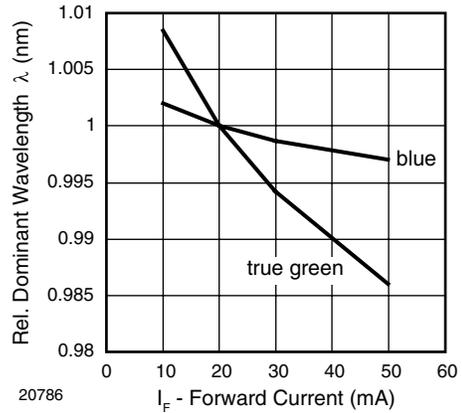


Figure 6. Relative Dominant Wavelength vs. Forward Current

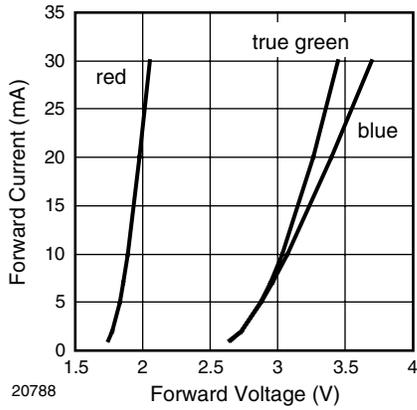


Figure 4. Forward Current vs. Forward Voltage

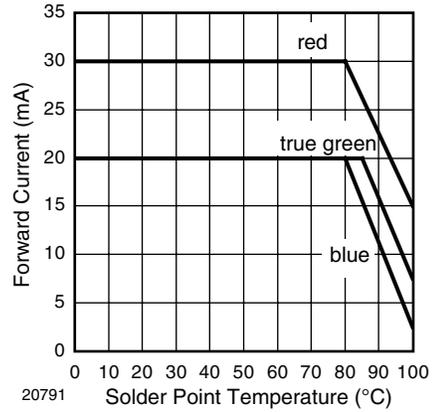


Figure 7. Forward Current vs. Solder Point Temperature (1 Chip On)

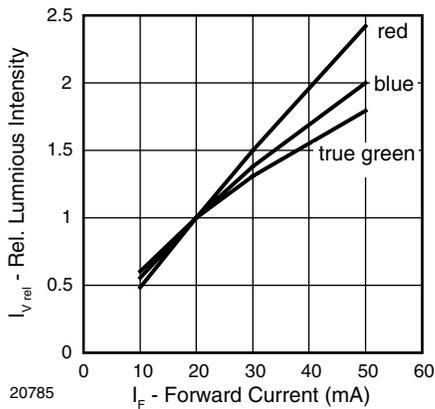


Figure 5. Relative Luminous Intensity vs. Forward Current

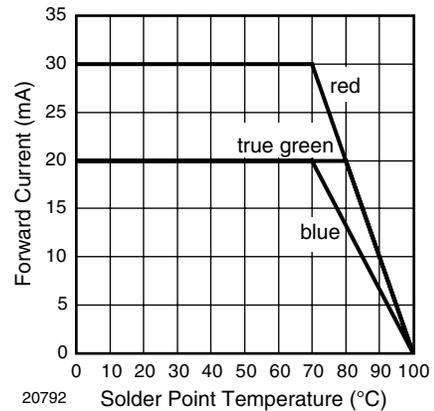
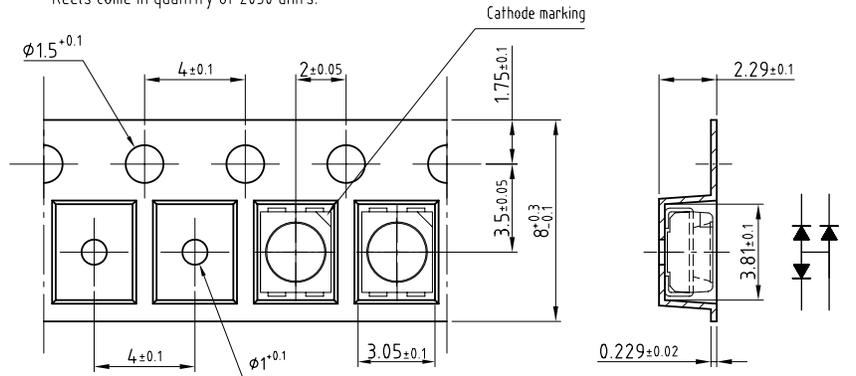


Figure 8. Forward Current vs. Solder Point Temperature (3 Chips On)

**TAPING DIMENSIONS** in millimeters

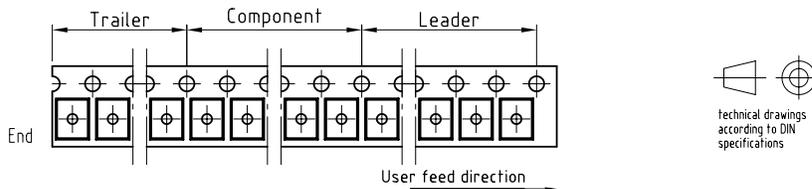
Taping and orientation

Reels come in quantity of 2050 units.



200mm min. for φ330 reel

9600mm min. for φ330 reel

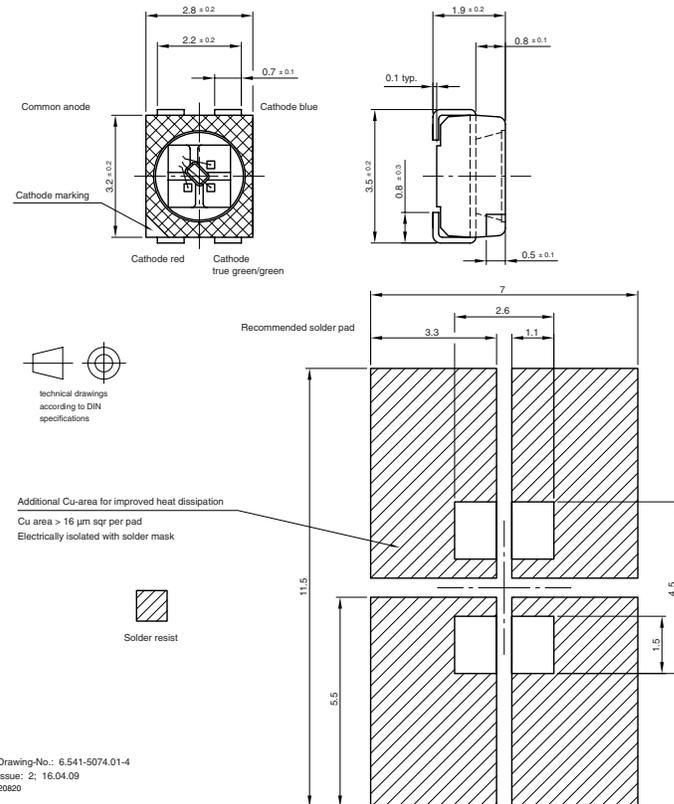


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**PACKAGE DIMENSIONS/SOLDERING PADS DIMENSIONS** in millimeters



## SOLDERING PROFILE

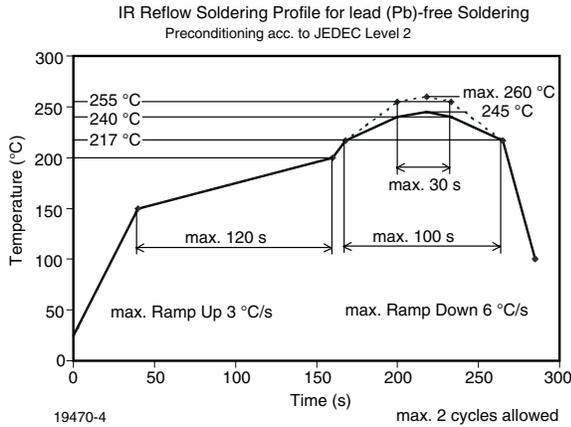
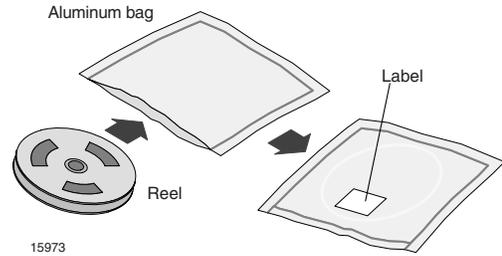


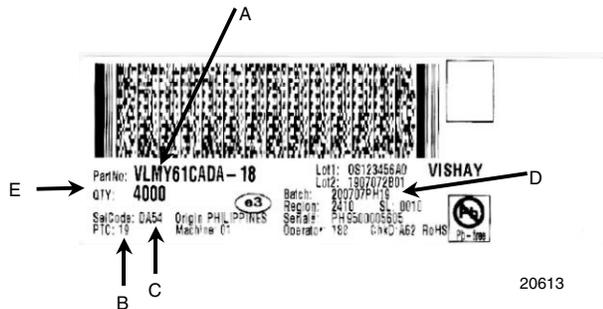
Figure 9. Vishay Lead (Pb)-free Reflow Soldering Profile (acc. to J-STD-020)

## DRY PACKING

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



## 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

## 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 72 h under these conditions moisture content will be too high for reflow soldering.

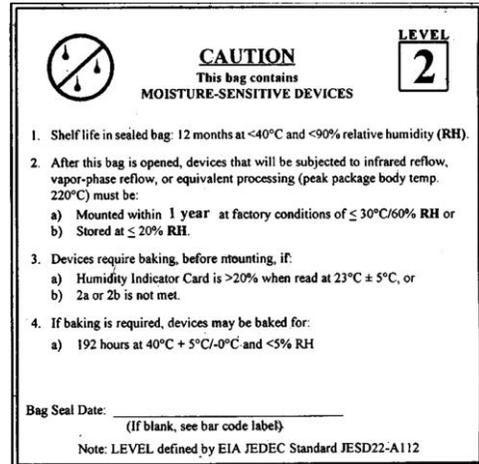
In case of moisture absorption, the devices will recover to the former condition by drying under the following condition:

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 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. 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.



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