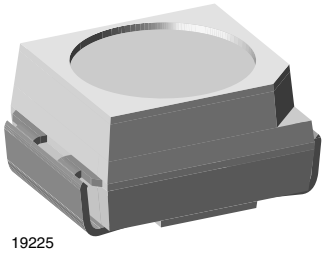
Power SMD LED PLCC-2



19225

DESCRIPTION

The VLM.33.. series is an advanced modification of the Vishay VLM.33.. series. It is designed to incorporate larger chips, therefore, capable of withstanding a 50 mA drive current.

The package of the VLM.33.. is the PLCC-2.

It consists of a lead frame which is embedded in a white thermoplast. The reflector inside this package is filled up with clear epoxy.

PRODUCT GROUP AND PACKAGE DATA

- Product group: LED
- Package: SMD PLCC-2
- Product series: power
- Angle of half intensity: ± 60°

FEATURES

AUTOMOTIVE GRADE

Pb-free

e3

RoHS COMPLIANT

HALOGEN FREE

GREEN (5-2008)

- Utilizing (AS) AlInGaP technology
- Available in 8 mm tape
- Luminous intensity and color categorized per packing unit
- Luminous intensity ratio per packing unit $I_{Vmax.}/I_{Vmin.} \leq 1.6$
- Thermal resistance R = 400 K/W
- ESD-withstand voltage: up to 2 kV according to JESD22-A114-B
- Preconditioning according to JEDEC® level 2a
- Compatible with reflow, vapor phase, and wave solder processes according to CECC 00802 and J-STD-020
- AEC-Q101 qualified
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

APPLICATIONS

- Traffic signals and signs
- Interior and exterior lighting
- Dashboard illumination
- Indicator and backlighting purposes for audio, video, LCDs switches, symbols, illuminated advertising 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.		
VLMS33S1T2-GS08	Super red	180	290	450	30	626	630	638	30	1.7	2.0	2.5	30	AlInGaP on GaAs
VLMS33S1T2-GS18	Super red	180	290	450	30	626	630	638	30	1.7	2.0	2.5	30	AlInGaP on GaAs
VLMS33S1U1-GS08	Super red	180	290	560	30	626	630	638	30	1.7	2.0	2.5	30	AlInGaP on GaAs
VLMS33S1U1-GS18	Super red	180	290	560	30	626	630	638	30	1.7	2.0	2.5	30	AlInGaP on GaAs
VLMR33T1U2-GS08	Amber	280	450	710	30	611	617	622	30	1.7	2.0	2.5	30	AlInGaP on GaAs
VLMR33T1U2-GS18	Amber	280	450	710	30	611	617	622	30	1.7	2.0	2.5	30	AlInGaP on GaAs
VLMO33R2U2-GS08	Soft orange	140	470	710	30	600	605	611	30	1.7	2.0	2.5	30	AlInGaP on GaAs
VLMO33R2U2-GS18	Soft orange	140	470	710	30	600	605	611	30	1.7	2.0	2.5	30	AlInGaP on GaAs
VLMY33T1U2-GS08	Yellow	280	425	710	30	583	588	594	30	1.7	2.0	2.5	30	AlInGaP on GaAs
VLMY33T1U2-GS18	Yellow	280	425	710	30	583	588	594	30	1.7	2.0	2.5	30	AlInGaP on GaAs
VLMY33R2U2-GS08	Yellow	140	425	710	30	583	588	594	30	1.7	2.0	2.5	30	AlInGaP on GaAs
VLMY33R2U2-GS18	Yellow	140	425	710	30	583	588	594	30	1.7	2.0	2.5	30	AlInGaP on GaAs

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified) **VLM.33..**				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
Reverse voltage (1)		V_R	5	V
DC forward current	$T_{amb} \leq 73$ °C (400 K/W)	I_F	50	mA
Power dissipation		P_V	130	mW
Junction temperature		T_j	+125	°C
Operating temperature range		T_{amb}	-40 to +100	°C
Storage temperature range		T_{stg}	-40 to +100	°C
Thermal resistance junction-to-ambient	Mounted on PC board (pad size > 16 mm²)	R_{thJA}	400	K/W

Note
(1) Driving the LED in reverse direction is suitable for a short term application

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified) **VLMS33.., SUPER RED**							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Luminous intensity	I_F = 30 mA	VLMS33S1T2	I_V	180	290	450	mcd
		VLMS33S1U1	I_V	180	290	560	mcd
Luminous flux/luminous intensity			ϕ_V/I_V	-	3	-	mlm/mcd
Dominant wavelength	I_F = 30 mA		λ_d	626	630	638	nm
Peak wavelength	I_F = 30 mA		λ_p	-	641	-	nm
Spectral bandwidth at 50 % $I_{rel\ max.}$	I_F = 30 mA		$\Delta\lambda$	-	17	-	nm
Angle of half intensity	I_F = 30 mA		φ	-	± 60	-	°
Forward voltage	I_F = 30 mA		V_F	1.7	2.0	2.5	V
Reverse current	V_R = 5 V		I_R	-	0.01	10	µA

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified) **VLMR33.., AMBER**							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Luminous intensity	I_F = 30 mA	VLMR33T1U2	I_V	280	450	710	mcd
Luminous flux/luminous intensity			ϕ_V/I_V	-	3	-	mlm/mcd
Dominant wavelength	I_F = 30 mA		λ_d	611	617	622	nm
Peak wavelength	I_F = 30 mA		λ_p	-	624	-	nm
Spectral bandwidth at 50 % $I_{rel\ max.}$	I_F = 30 mA		$\Delta\lambda$	-	18	-	nm
Angle of half intensity	I_F = 30 mA		φ	-	± 60	-	°
Forward voltage	I_F = 30 mA		V_F	1.7	2.0	2.5	V
Reverse current	V_R = 5 V		I_R	-	0.01	10	µA

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified) **VLMO33.., SOFT ORANGE**							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Luminous intensity	I_F = 30 mA	VLMO33R2U2	I_V	140	470	710	mcd
Luminous flux/luminous intensity			ϕ_V/I_V	-	3	-	mlm/mcd
Dominant wavelength	I_F = 30 mA		λ_d	600	605	611	nm
Peak wavelength	I_F = 30 mA		λ_p	-	611	-	nm
Spectral bandwidth at 50 % $I_{rel\ max.}$	I_F = 30 mA		$\Delta\lambda$	-	17	-	nm
Angle of half intensity	I_F = 30 mA		φ	-	± 60	-	°
Forward voltage	I_F = 30 mA		V_F	1.7	2.0	2.5	V
Reverse current	V_R = 5 V		I_R	-	0.01	10	µA

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)
VLMY33.., YELLOW

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity	I_F = 30 mA	VLMY33T1U2	I_V	280	425	710	mcd
		VLMY33R2U2	I_V	140	425	710	mcd
Luminous flux/luminous intensity			ϕ_V/I_V	-	3	-	mlm/mcd
Dominant wavelength	I_F = 30 mA	VLMY33T1U2, VLMY33R2U2	λ_d	583	588	594	nm
Peak wavelength	I_F = 30 mA		λ_p	-	590	-	nm
Spectral bandwidth at 50 % $I_{rel\ max.}$	I_F = 30 mA		$\Delta\lambda$	-	18	-	nm
Angle of half intensity	I_F = 30 mA		φ	-	± 60	-	°
Forward voltage	I_F = 30 mA		V_F	1.7	2.0	2.5	V
Reverse current	V_R = 5 V		I_R	-	0.01	10	µA

COLOR CLASSIFICATION

GROUP	DOMINANT WAVELENGTH (nm)					
	AMBER		SOFT ORANGE		YELLOW	
	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
1	611	618	598	601	581	584
2	614	622	600	603	583	586
3	-	-	602	605	585	588
4	-	-	604	607	587	590
5	-	-	606	609	589	592
6	-	-	608	611	591	594

Note

- Wavelengths are tested at a current pulse duration of 25 ms

LUMINOUS INTENSITY CLASSIFICATION

GROUP	LUMINOUS INTENSITY (mcd)		
STANDARD	OPTIONAL	MIN.	MAX.
P	1	45	56
	2	56	71
Q	1	71	90
	2	90	112
R	1	112	140
	2	140	180
S	1	180	224
	2	224	280
T	1	280	355
	2	355	450
U	1	450	560
	2	560	710

Note

- Luminous intensity is tested at a current pulse duration of 25 ms and an accuracy of ± 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 on any one reel.
  In order to ensure availability, single wavelength groups will not be orderable

CROSSING TABLE

VISHAY	OSRAM
VLMS33S1T2	LST67B-S1T2
VLMS33S1U1	LST67B-T1U1

TYPICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

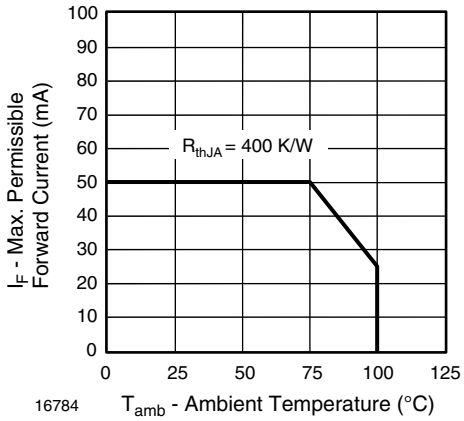


Fig. 1 - Forward Current vs. Ambient Temperature

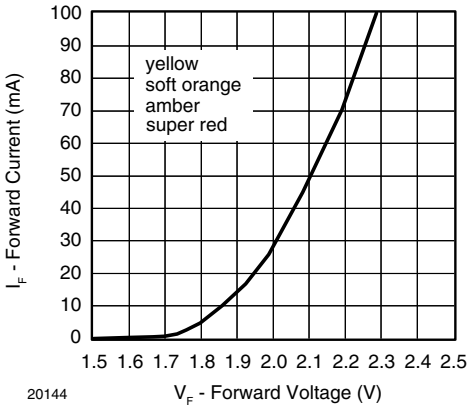


Fig. 4 - Forward Current vs. Forward Voltage

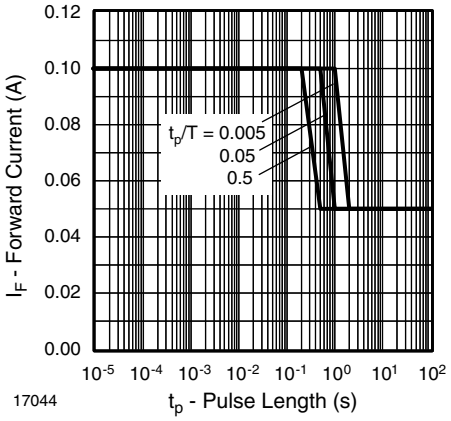


Fig. 2 - Forward Current vs. Pulse Length

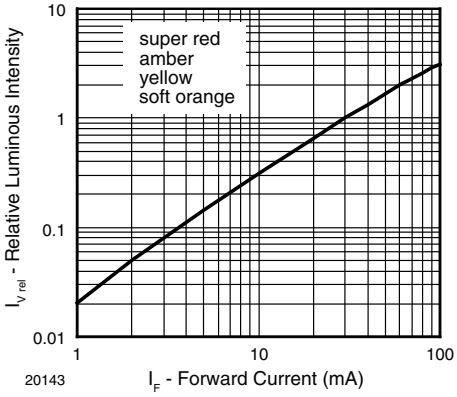


Fig. 5 - Relative Luminous Intensity vs. Forward Current

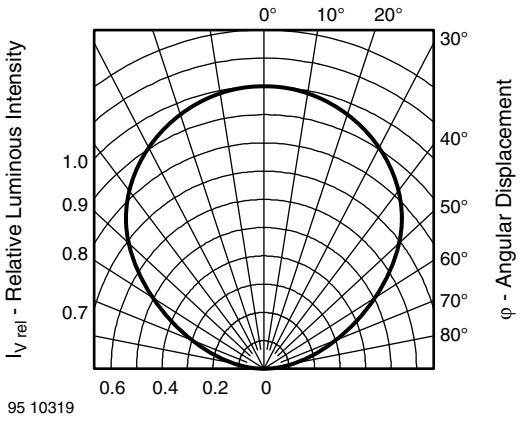


Fig. 3 - Relative Luminous Intensity vs. Angular Displacement

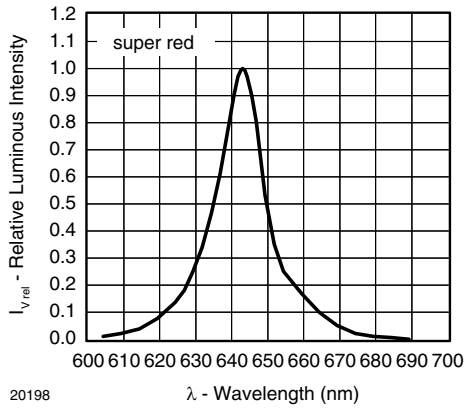


Fig. 6 - Relative Intensity vs. Wavelength

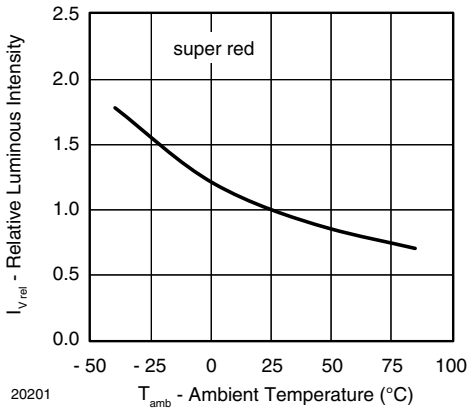


Fig. 7 - Relative Luminous Intensity vs. Ambient Temperature

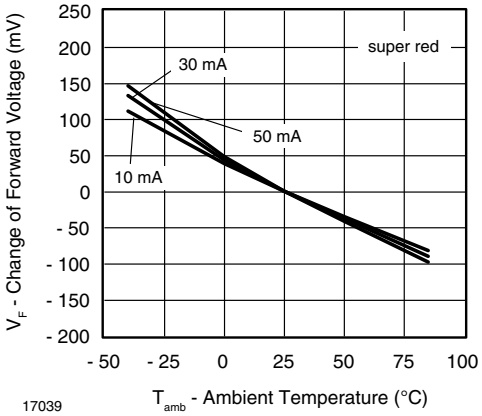


Fig. 10 - Change of Forward Voltage vs. Ambient Temperature

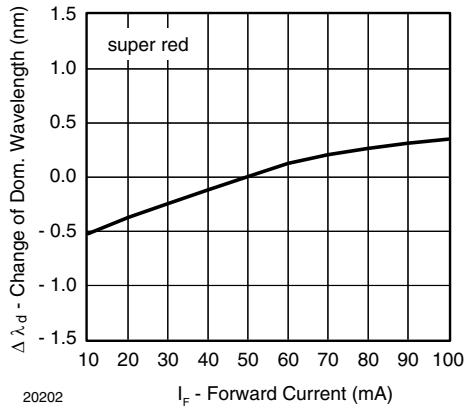


Fig. 8 - Change of Dominant Wavelength vs. Forward Current

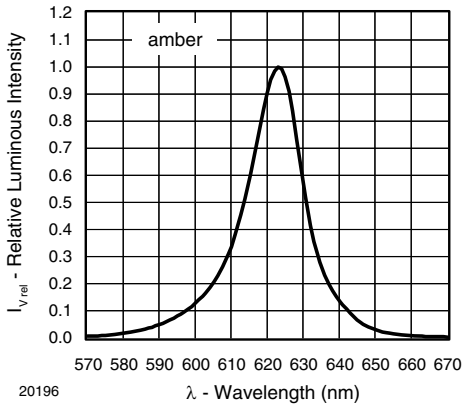


Fig. 11 - Relative Intensity vs. Wavelength

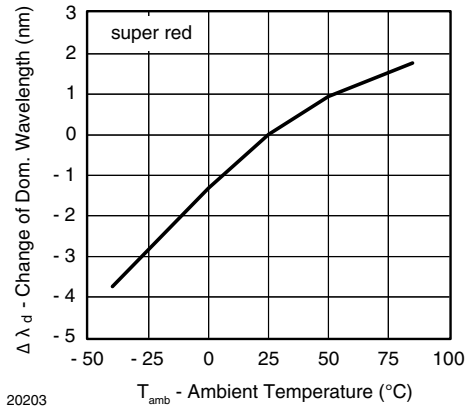


Fig. 9 - Change of Dominant Wavelength vs. Ambient Temperature

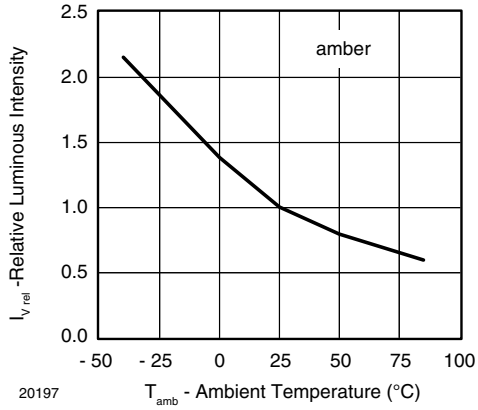


Fig. 12 - Relative Luminous Intensity vs. Ambient Temperature

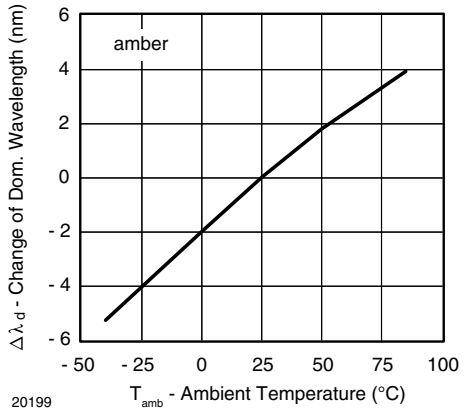


Fig. 13 - Change of Dominant Wavelength vs. Ambient Temperature

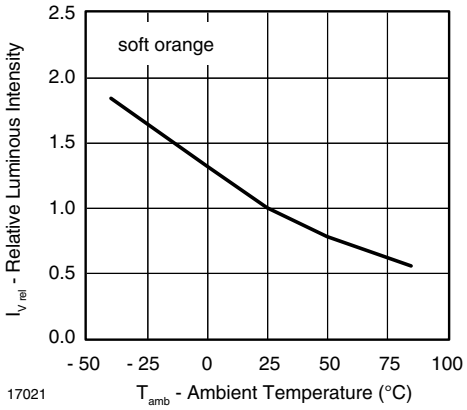


Fig. 16 - Relative Luminous Intensity vs. Ambient Temperature

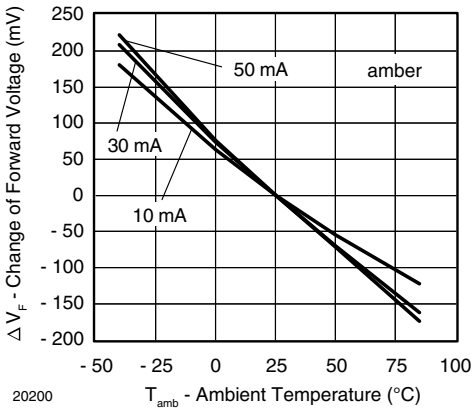


Fig. 14 - Change of Forward Voltage vs. Ambient Temperature

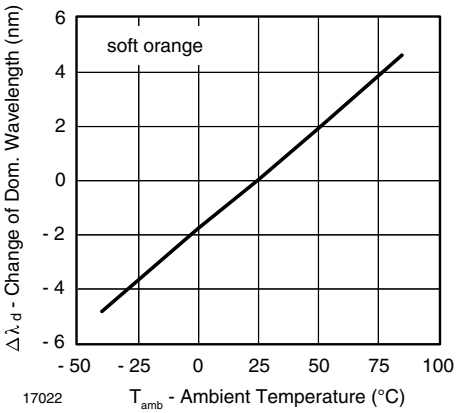


Fig. 17 - Change of Dominant Wavelength vs. Ambient Temperature

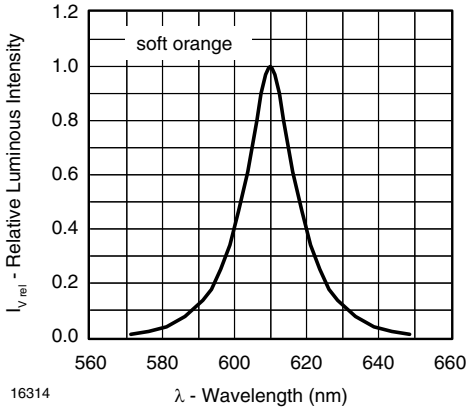


Fig. 15 - Relative Intensity vs. Wavelength

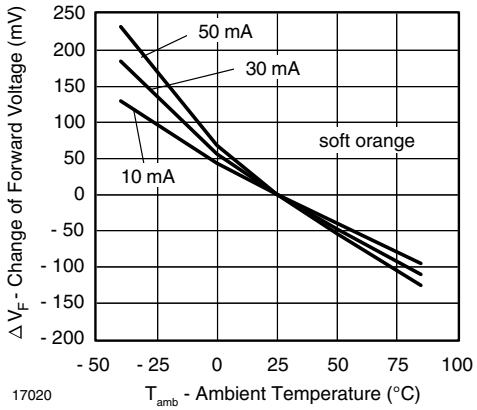


Fig. 18 - Change of Forward Voltage vs. Ambient Temperature

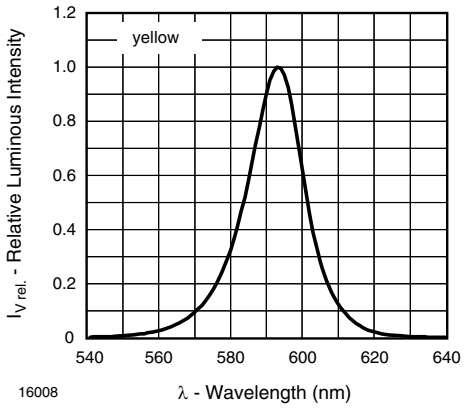


Fig. 19 - Relative Intensity vs. Wavelength

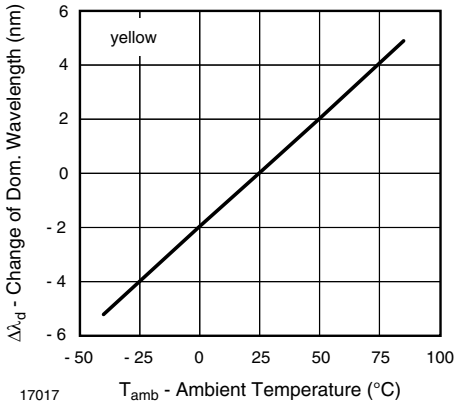


Fig. 21 - Change of Dominant Wavelength vs. Ambient Temperature

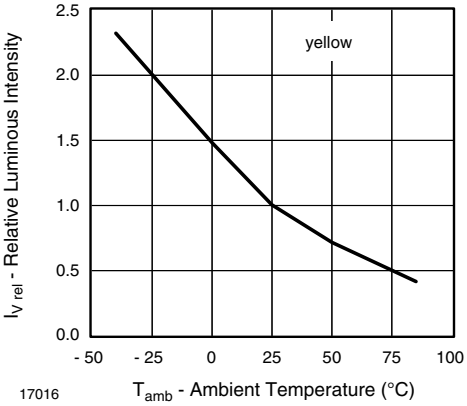


Fig. 20 - Relative Luminous Intensity vs. Ambient Temperature

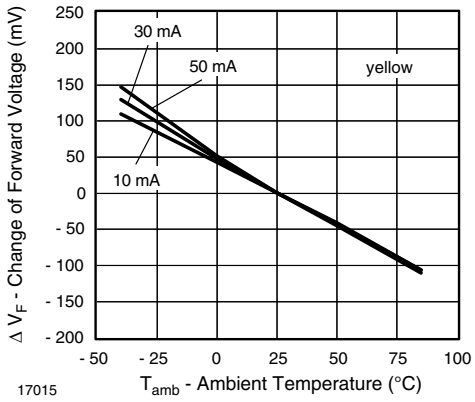
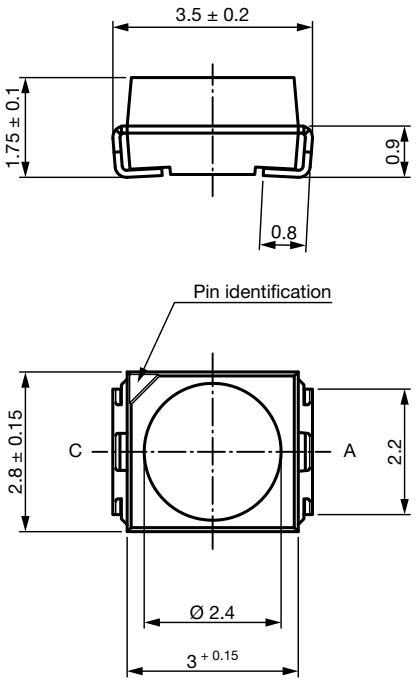


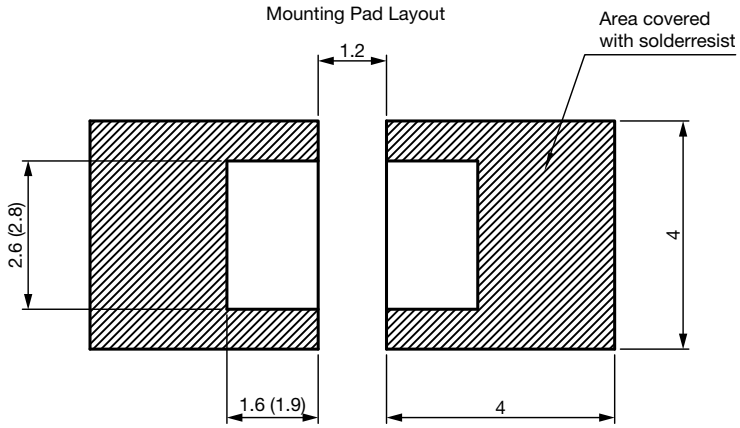
Fig. 22 - Change of Forward Voltage vs. Ambient Temperature

PACKAGE DIMENSIONS in millimeters



technical drawings
according to DIN
specifications

Drawing-No.: 6.541-5067.01-4
Issue: 7; 12.03.14

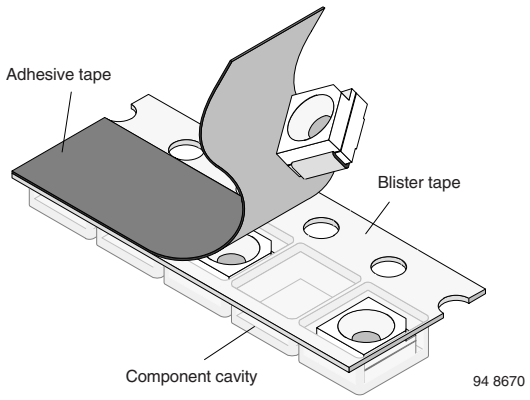


Dimensions: reflow and vapor phase (wave soldering)

METHOD OF TAPING / POLARITY AND TAPE AND REEL

SMD LED (VLM3-SERIES)

Vishay's LEDs in SMD packages are available in an antistatic 8 mm blister tape (in accordance with DIN IEC 40 (CO) 564) for automatic component insertion. The blister tape is a plastic strip with impressed component cavities, covered by a top tape.



TAPING OF VLM.3..

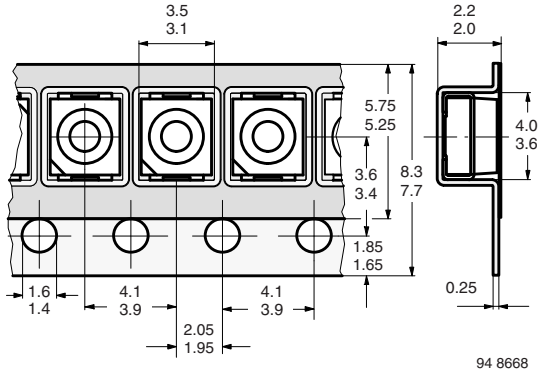


Fig. 23 - Tape Dimensions in mm for PLCC-2

REEL PACKAGE DIMENSION IN MILLIMETERS FOR SMD LEDS, TAPE OPTION GS08 (= 1500 PCS)

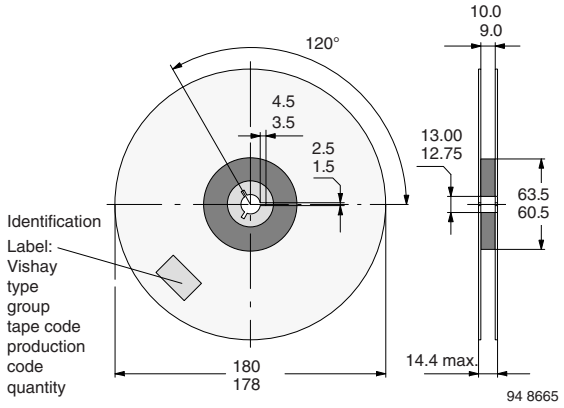


Fig. 24 - Reel Dimensions - GS08

REEL PACKAGE DIMENSION IN MILLIMETERS FOR SMD LEDS, TAPE OPTION GS18 (= 8000 PCS) PREFERRED

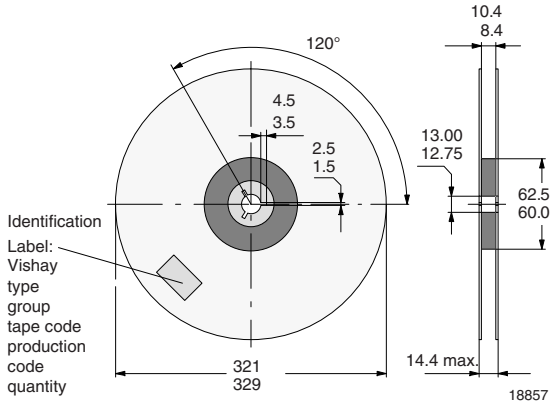


Fig. 25 - Reel Dimensions - GS18

SOLDERING PROFILE

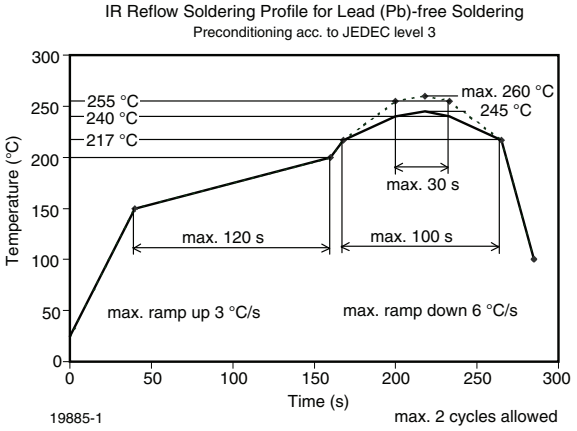


Fig. 26 - Vishay Lead (Pb)-free Reflow Soldering Profile (according to J-STD-020)

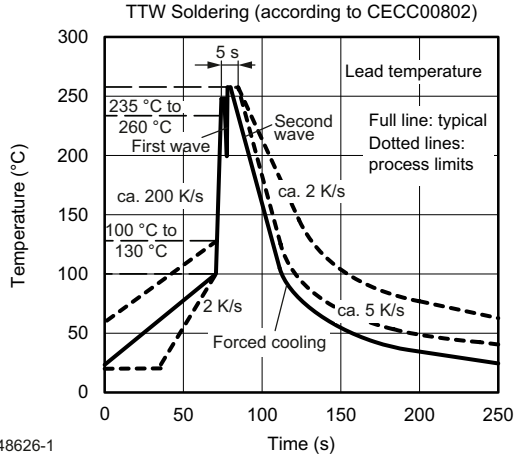
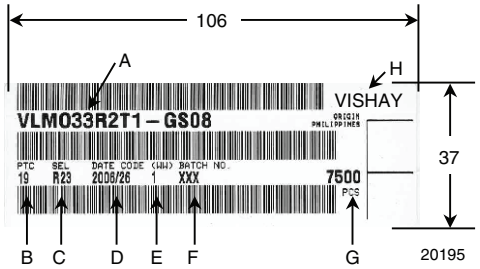


Fig. 27 - Double Wave Soldering of Opto Devices (all packages)

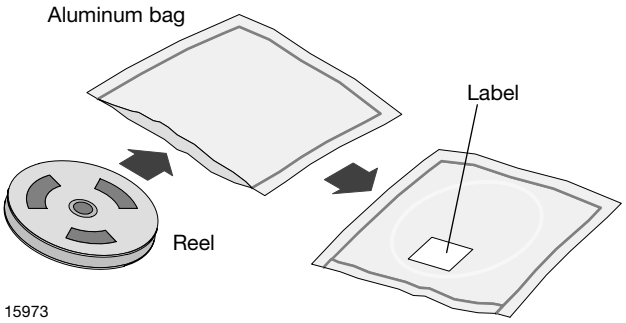
BAR CODE PRODUCT LABEL (example)



A. Type of component
B. Manufacturing plant
C. SEL - selection code (bin):
e.g.: R2 = code for luminous intensity group
3 = code for color group
D. Date code year / week
E. Date code (e.g. 1: Monday)
F. Batch no.
G. Total quantity
H. Company code

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

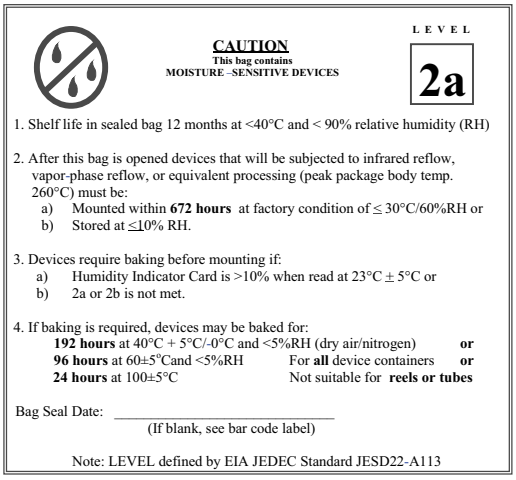
Dry box storage is recommended as soon as the aluminum bag has been opened to prevent moisture absorption. The following conditions should be observed, if dry boxes are not available:

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

After more than 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.


CAUTION
This bag contains
MOISTURE –SENSITIVE DEVICES

LEVEL
2a

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 ≤ 30°C/60%RH or
b) Stored at ≤10% RH.

3. Devices require baking before mounting if:
a) Humidity Indicator Card is >10% when read at 23°C ± 5°C or
b) 2a or 2b is not met.

4. If baking is required, devices may be baked for:
192 hours at 40°C + 5°C/-0°C and <5%RH (dry air/nitrogen) **or**
96 hours at 60±5°Cand <5%RH For **all** device containers **or**
24 hours at 100±5°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

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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