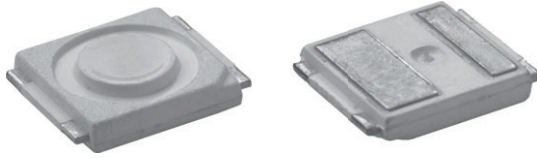




## Little Star<sup>®</sup> 1 W Power SMD LED White



20784-1

### DESCRIPTION

The VLMW712U2U3XV, VLMW712T3U3US, and VLMW712T2T3QN rank among the most robust and light efficient LEDs in the market. Using recent and reliable nitride phosphor technology, the color stability has been improved. With its extremely high level of brightness and the package height profile, which is only 1.5 mm, the Little Star is highly suitable for both, conventional lighting and specialized application such as 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; up to 113 lm
- $120^\circ$  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; up to 350 mA
- Low thermal resistance;  $R_{thJP} = 10$  K/W
- Qualified according to JEDEC<sup>®</sup> moisture sensitivity level 2
- Compatible with IR reflow soldering
- Little Star<sup>®</sup> are class 1M LED products. Do not view directly with optical instrument
- ESD-withstand voltage: up to 2 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)


**RoHS**  
COMPLIANT

### APPLICATIONS

- Communication: FlashLED
- Industry: white goods (e.g.: oven, microwave, etc.)
- Lighting: garden light, architecture lighting, general lighting, etc.

### PARTS TABLE

PART	COLOR	LUMINOUS FLUX (mlm)			at $I_F$ (mA)	COORDINATE (x, y)			at $I_F$ (mA)	FORWARD VOLTAGE (V)			at $I_F$ (mA)	TECHNOLOGY
		MIN.	TYP.	MAX.		MIN.	TYP.	MAX.		MIN.	TYP.	MAX.		
VLMW712U2U3XV-GS08	Cool white	87 400	100 000	113 600	350	-	0.33, 0.33	-	350	3	3.5	4	350	InGaN
VLMW712T3U3US-GS08	Natural white	76 500	90 000	113 600	350	-	0.37, 0.38	-	350	3	3.5	4	350	InGaN
VLMW712T2T3QN-GS08	Warm white	67 200	75 000	87 400	350	-	0.44, 0.41	-	350	3	3.5	4	350	InGaN

### ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25^\circ\text{C}$ , unless otherwise specified) VLMW712U2U3XV, VLMW712T3U3US, VLMW712T2T3QN

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Forward current		$I_F$	350	mA
Power dissipation		$P_{tot}$	1.4	W
Junction temperature		$T_j$	+120	$^\circ\text{C}$
Surge current $t < 10 \mu\text{s}$ , $d = 0.1$		$I_{FM}$	1000	mA
Operating temperature range		$T_{amb}$	- 0 to +100	$^\circ\text{C}$
Storage temperature range		$T_{stg}$	-40 to +100	$^\circ\text{C}$
Thermal resistance junction-to-pin		$R_{thJP}$	10	K/W

#### Note

- Not designed for reverse operation



<b>OPTICAL AND ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) <b>VLMW712U2U3XV, COOL WHITE</b>						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity	$I_F = 350\text{ mA}$	$\phi$	87 400	100 000	113 600	mlm
		$I_V$	-	33 500	-	mcd
Chromaticity coordinate x acc. to CIE 1931	$I_F = 350\text{ mA}$	x	-	0.33	-	
Chromaticity coordinate y acc. to CIE 1931	$I_F = 350\text{ mA}$	y	-	0.33	-	
Angle of half intensity	$I_F = 350\text{ mA}$	$\varphi$	-	$\pm 60$	-	$^{\circ}$
Forward voltage <sup>(1)</sup>	$I_F = 350\text{ mA}$	$V_F$	3	3.5	4	V
Temperature coefficient of $V_F$	$I_F = 350\text{ mA}$	$TC_{V_F}$	-	- 3	-	mV/K
Temperature coefficient of $I_V$	$I_F = 350\text{ mA}$	$TC_{I_V}$	-	- 0.4	-	%/K

**Note**

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

<b>OPTICAL AND ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) <b>VLMW712T3U3US, NATURAL WHITE</b>						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity	$I_F = 350\text{ mA}$	$\phi$	76 500	90 000	113 600	mlm
		$I_V$	-	29 700	-	mcd
Chromaticity coordinate x acc. to CIE 1931	$I_F = 350\text{ mA}$	x	-	0.37	-	
Chromaticity coordinate y acc. to CIE 1931	$I_F = 350\text{ mA}$	y	-	0.38	-	
Angle of half intensity	$I_F = 350\text{ mA}$	$\varphi$	-	$\pm 60$	-	$^{\circ}$
Forward voltage <sup>(1)</sup>	$I_F = 350\text{ mA}$	$V_F$	3	3.5	4	V
Temperature coefficient of $V_F$	$I_F = 350\text{ mA}$	$TC_{V_F}$	-	- 3	-	mV/K
Temperature coefficient of $I_V$	$I_F = 350\text{ mA}$	$TC_{I_V}$	-	- 0.4	-	%/K

**Note**

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

<b>OPTICAL AND ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) <b>VLMW712T2T3QN, WARM WHITE</b>						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity	$I_F = 350\text{ mA}$	$\phi$	67 200	75 000	87 400	mlm
		$I_V$	-	25 000	-	mcd
Chromaticity coordinate x acc. to CIE 1931	$I_F = 350\text{ mA}$	x	-	0.44	-	
Chromaticity coordinate y acc. to CIE 1931	$I_F = 350\text{ mA}$	y	-	0.41	-	
Angle of half intensity	$I_F = 350\text{ mA}$	$\varphi$	-	$\pm 60$	-	$^{\circ}$
Forward voltage <sup>(1)</sup>	$I_F = 350\text{ mA}$	$V_F$	3	3.5	4	V
Temperature coefficient of $V_F$	$I_F = 350\text{ mA}$	$TC_{V_F}$	-	- 3	-	mV/K
Temperature coefficient of $I_V$	$I_F = 350\text{ mA}$	$TC_{I_V}$	-	- 0.4	-	%/K

**Note**

<sup>(1)</sup> 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 FLUX $\phi_v$ (mlm) CORRELATION TABLE	
STANDARD	MIN.	MAX.
T2	67 200	76 500
T3	76 500	87 400
U2	87 400	99 400
U3	99 400	113 600

**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 color groups are measured and binned, single color groups will be shipped in any one reel. In order to ensure availability, single color groups will not be orderable

CHROMATICITY COORDINATED GROUPS FOR COOL WHITE SMD LED		
BIN	Cx	Cy
XM	0.301	0.342
	0.314	0.353
	0.315	0.343
	0.303	0.333
	0.301	0.342
XN	0.303	0.333
	0.315	0.343
	0.316	0.332
	0.305	0.322
	0.303	0.333
XO	0.305	0.322
	0.316	0.332
	0.318	0.319
	0.308	0.311
	0.305	0.322
XP	0.308	0.311
	0.318	0.319
	0.32	0.301
	0.311	0.293
	0.308	0.311
WM	0.314	0.353
	0.329	0.366
	0.329	0.354
	0.315	0.343
	0.314	0.353
WN	0.315	0.343
	0.329	0.354
	0.329	0.343
	0.316	0.332
	0.315	0.343
WO	0.316	0.332
	0.329	0.343
	0.329	0.33
	0.318	0.319
	0.316	0.332
WP	0.318	0.319
	0.329	0.33
	0.329	0.319
	0.319	0.31
	0.318	0.319



CHROMATICITY COORDINATED GROUPS FOR COOL WHITE SMD LED		
BIN	Cx	Cy
WQ	0.319	0.31
	0.329	0.319
	0.33	0.311
	0.32	0.301
	0.319	0.31
VM	0.329	0.366
	0.348	0.383
	0.347	0.368
	0.329	0.354
	0.329	0.366
VN	0.329	0.354
	0.347	0.368
	0.346	0.357
	0.329	0.343
	0.329	0.354
VO	0.329	0.343
	0.346	0.357
	0.344	0.343
	0.329	0.33
	0.329	0.343
VP	0.329	0.33
	0.344	0.343
	0.343	0.331
	0.329	0.319
	0.329	0.33

**Note**

- Chromaticity coordinate groups are tested at a current pulse duration of 25 ms and a tolerance of  $\pm 0.01$

CHROMATICITY COORDINATED GROUPS FOR NATURAL WHITE SMD LED		
BIN	Cx	Cy
UM	0.348	0.383
	0.367	0.4
	0.364	0.383
	0.347	0.368
UN	0.347	0.368
	0.364	0.383
	0.362	0.372
	0.346	0.357
UO	0.346	0.357
	0.362	0.372
	0.359	0.356
	0.344	0.343
UP	0.344	0.343
	0.359	0.356
	0.357	0.343
	0.343	0.331
TM	0.367	0.4
	0.364	0.383
	0.381	0.394
	0.386	0.411



CHROMATICITY COORDINATED GROUPS FOR NATURAL WHITE SMD LED		
BIN	Cx	Cy
TN	0.364	0.383
	0.362	0.372
	0.378	0.381
	0.381	0.394
TO	0.362	0.372
	0.359	0.356
	0.374	0.365
TP	0.378	0.381
	0.359	0.356
	0.357	0.343
	0.37	0.351
SM	0.374	0.365
	0.386	0.411
	0.381	0.394
	0.396	0.404
SN	0.402	0.421
	0.381	0.394
	0.378	0.381
	0.392	0.389
SO	0.396	0.404
	0.378	0.381
	0.374	0.365
	0.387	0.373
SP	0.392	0.389
	0.374	0.365
	0.37	0.351
	0.382	0.358
	0.387	0.373

**Note**

- Chromaticity coordinate groups are tested at a current pulse duration of 25 ms and a tolerance of  $\pm 0.01$

CHROMATICITY COORDINATED GROUPS FOR WARM WHITE SMD LED		
BIN	Cx	Cy
QM	0.421	0.433
	0.437	0.438
	0.43	0.421
	0.415	0.416
	0.421	0.433
QN	0.415	0.416
	0.43	0.421
	0.423	0.405
	0.409	0.4
	0.415	0.416
QO	0.409	0.4
	0.423	0.405
	0.416	0.387
	0.402	0.382
	0.409	0.4



CHROMATICITY COORDINATED GROUPS FOR WARM WHITE SMD LED		
BIN	Cx	Cy
QP	0.402	0.382
	0.416	0.387
	0.409	0.372
	0.397	0.367
	0.402	0.382
PM	0.437	0.438
	0.452	0.443
	0.444	0.426
	0.43	0.421
PN	0.437	0.438
	0.43	0.421
	0.444	0.426
	0.436	0.409
	0.423	0.405
PO	0.43	0.421
	0.423	0.405
	0.436	0.409
	0.428	0.392
	0.416	0.387
PP	0.423	0.405
	0.416	0.387
	0.428	0.392
	0.421	0.377
	0.409	0.372
NM	0.416	0.387
	0.452	0.443
	0.469	0.448
	0.46	0.431
	0.444	0.426
NN	0.452	0.443
	0.444	0.426
	0.46	0.431
	0.451	0.414
	0.436	0.409
NO	0.444	0.426
	0.436	0.409
	0.451	0.414
	0.443	0.397
	0.428	0.392
NP	0.436	0.409
	0.428	0.392
	0.443	0.397
	0.435	0.382
	0.421	0.377
	0.428	0.392
	0.428	0.392

**Note**

- Chromaticity coordinate groups are tested at a current pulse duration of 25 ms and a tolerance of  $\pm 0.01$



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

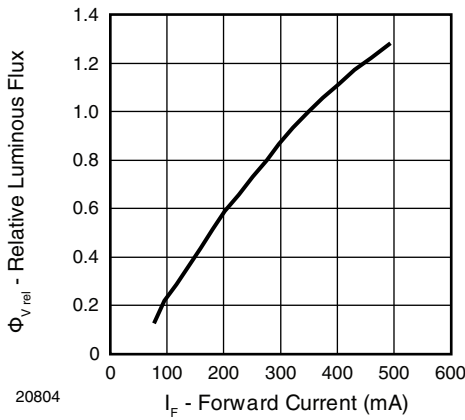


Fig. 1 - Relative Luminous Flux vs. Forward Current

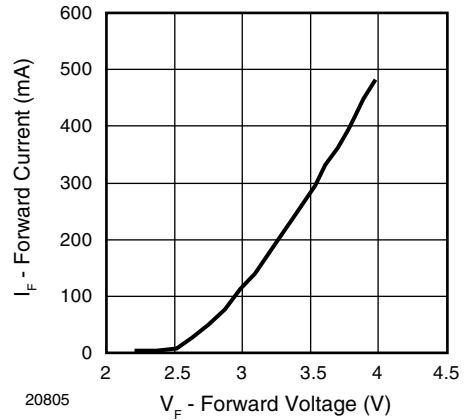


Fig. 4 - Forward Current vs. Forward Voltage

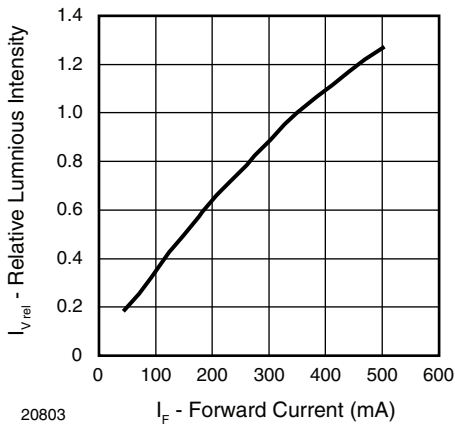


Fig. 2 - Relative Luminous Intensity vs. Forward Current

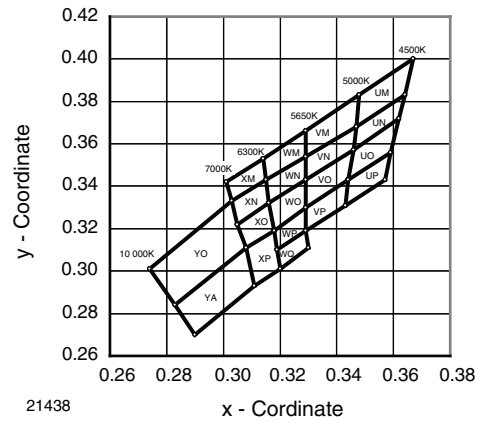


Fig. 5 - Coordinates of Color Groups for Cool White

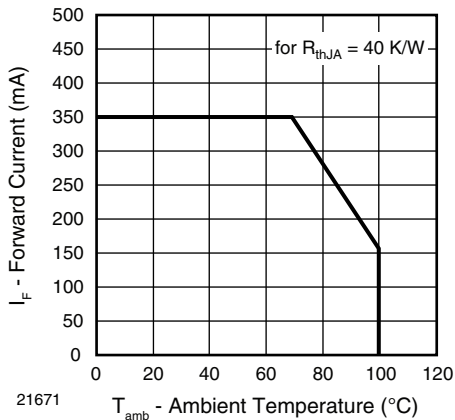


Fig. 3 - Forward Current vs. Solder Point Temperature

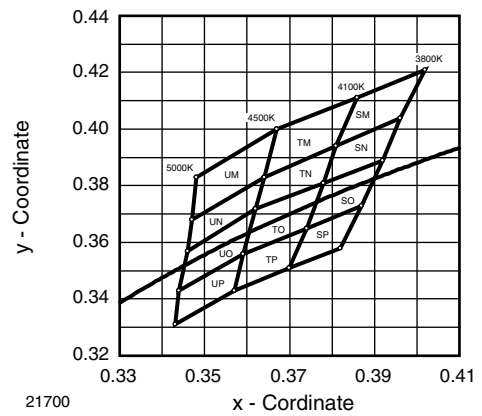


Fig. 6 - Coordinates of Color Groups for Natural White

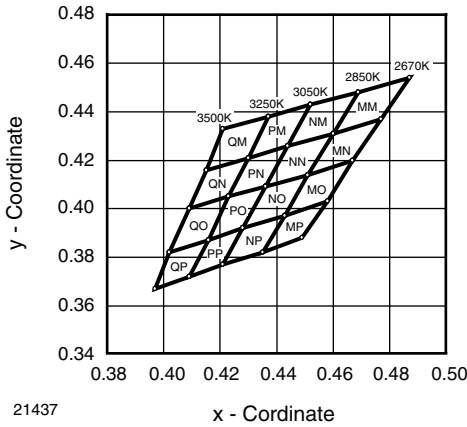


Fig. 7 - Coordinates of Color Groups for Warm White

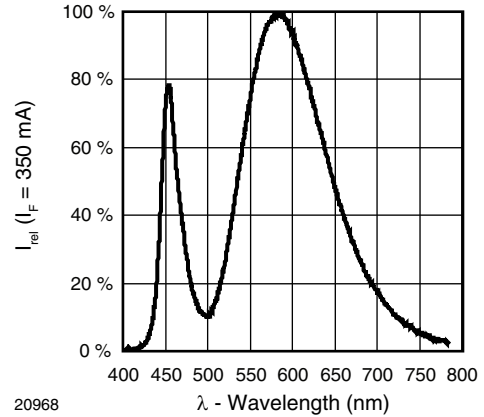


Fig. 10 - Relative Spectrale Emission for Warm White

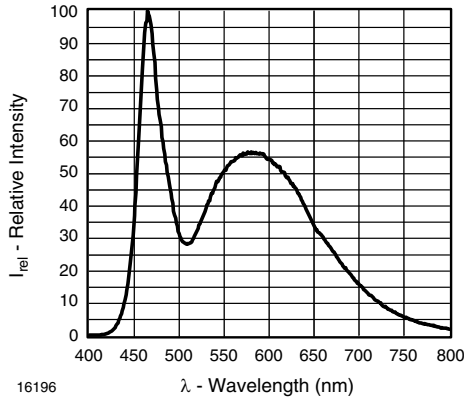


Fig. 8 - Relative Spectrale Emission for Cool White

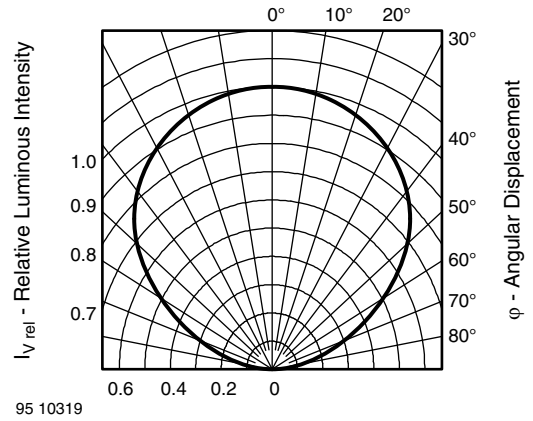


Fig. 11 - Relative Luminous Intensity vs. Angular Displacement

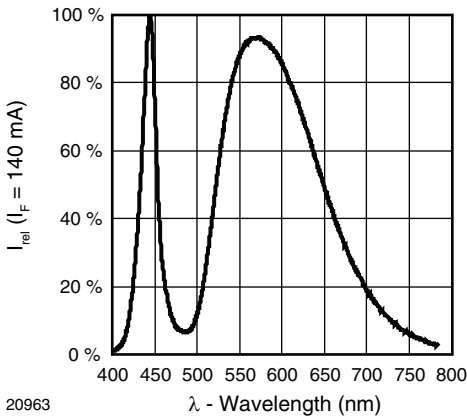


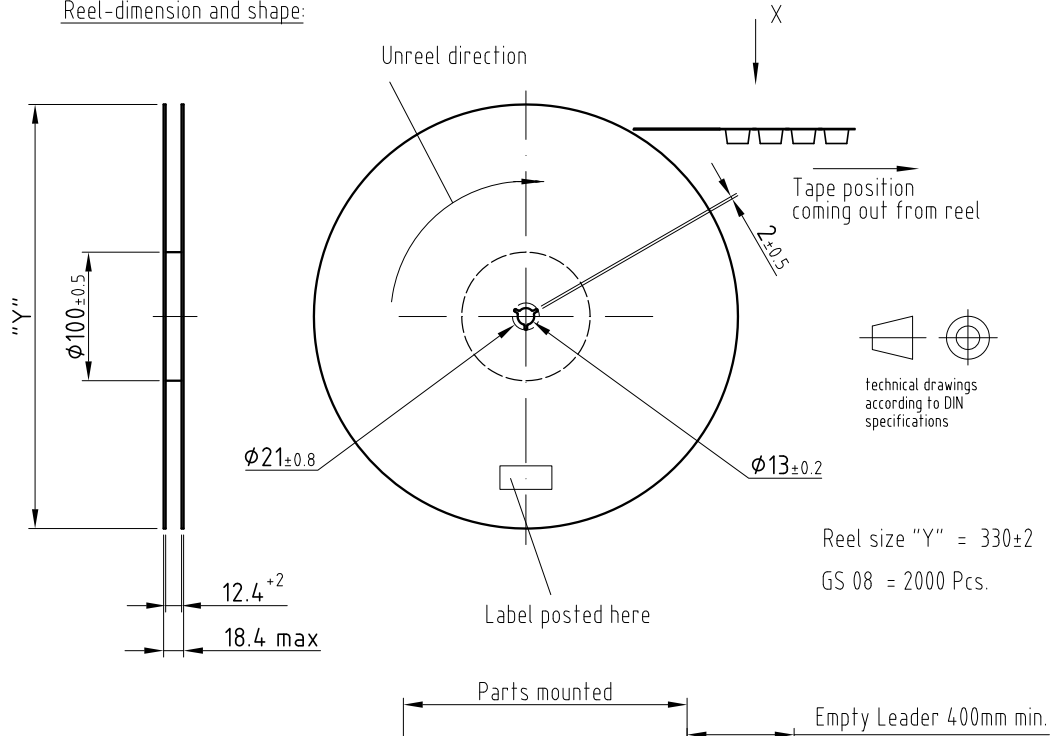
Fig. 9 - Relative Spectrale Emission for Natural White



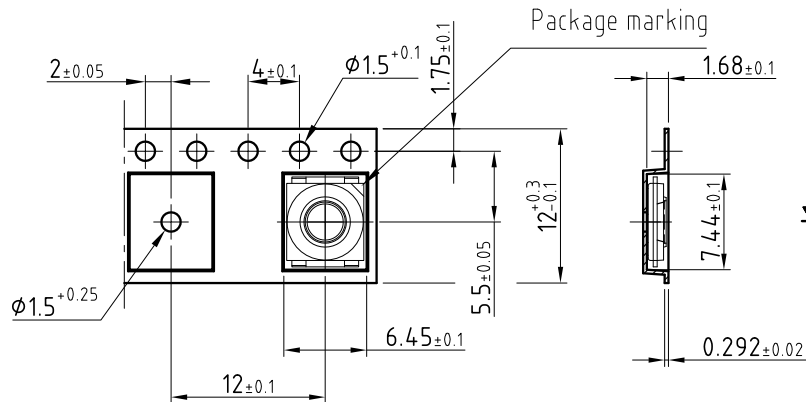
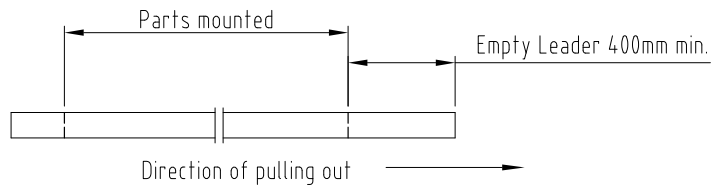


**TAPING DIMENSIONS** in millimeters

Reel-dimension and shape:



Leader and trailer tape:



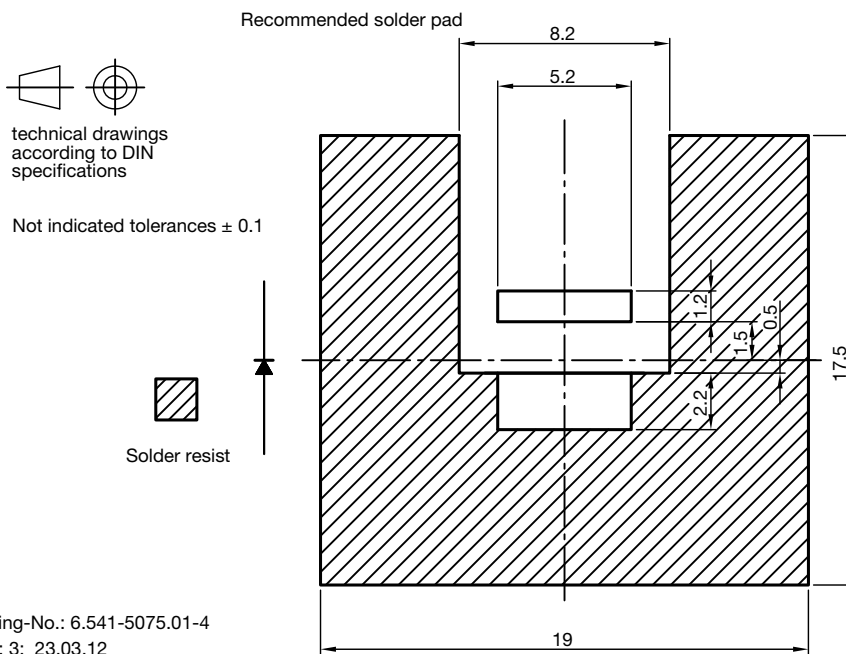
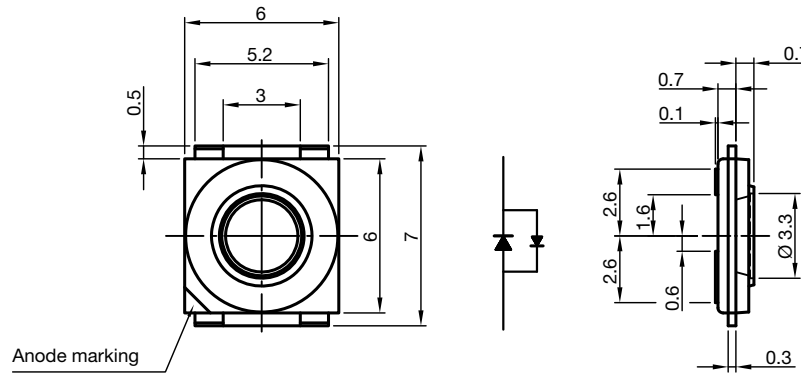
Drawing-No.: 9.800-5094.01-4

Issue: 3; 22.01.08

20846



PACKAGE DIMENSIONS / SOLDERING PADS DIMENSIONS in millimeters



SOLDERING PROFILE

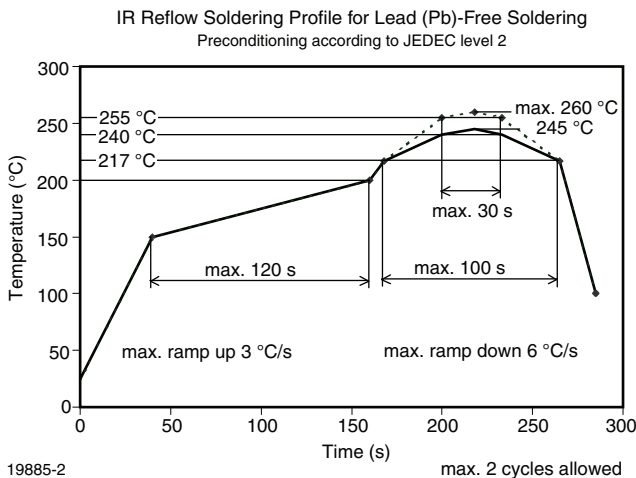
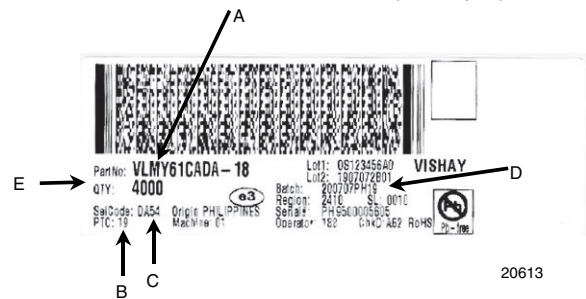


Fig. 12 - Vishay Lead (Pb)-free Reflow Soldering Profile (according to J-STD-020C)

BAR CODE PRODUCT LABEL (example)

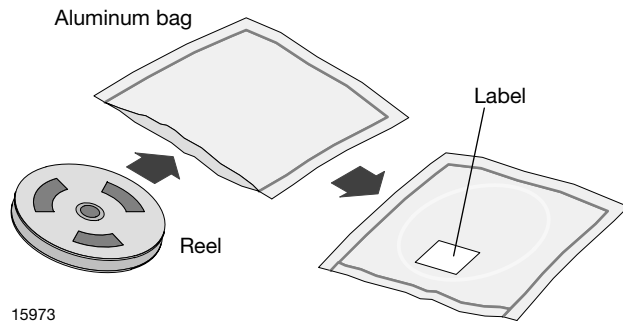


- A. Type of component
- B. Manufacturing plant
- C. SEL - selection code (bin):  
e.g.: DA = code for luminous intensity group  
5 = code for color group
- D. Batch no.  
20070 = year 2007, week 07  
PH19 = plant code
- E. Total quantity



## DRY PACKING

If humidity is absorbed by the SMD package, it may vaporize and expand during soldering process, which could cause a (pre-) damaging of the SMD device. Therefore the reels are packed in moisture barrier bags (MBB) to prevent the device from moisture absorption during transportation and storage. Each MBB contains a desiccant and a humidity indicator.



## FINAL PACKING

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

## RECOMMENDED METHOD OF STORAGE

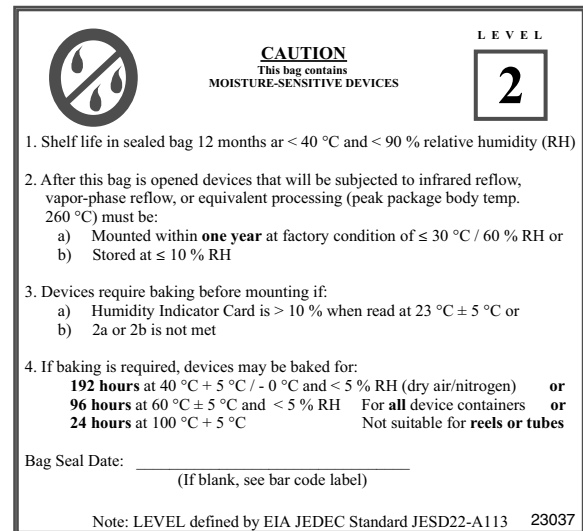
Dry box storage is recommended as soon as the aluminum bag has been opened to prevent moisture absorption. The following conditions should be observed, if dry boxes are not available:

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

Moisture sensitivity level MSL 2 according to J-STD-020B:  
After more than one 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 dry bags.



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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