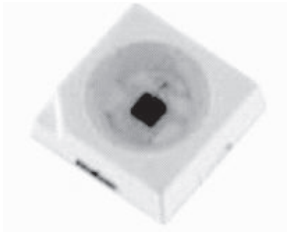
Power SMD LED PLCC2 Plus



22068

FEATURES

- High efficient AlInGaP technology
- Compact package outline 3.5 mm x 3.5 mm x 1.2 mm
- Angle of half intensity $\varphi = \pm 60°$
- Luminous intensity and color categorized per packing unit
- Luminous intensity ratio per packing unit $\Phi_{min.}/\Phi_{max.} < 1.6$
- ESD-withstand voltage: up to 2 kV (HBM) according to JESD22-A114-B
- Preconditioning: according to JEDEC level 2a
- Compatible with IR-reflow soldering profiles according to J-STD-020
- AEC-Q101 qualified
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC
- Find out more about Vishay's Automotive Grade Product requirements at: www.vishay.com/applications

DESCRIPTION

The VLMR51.., VLMK51.., and VLMY51.. LED series in PLCC2 plus package are an advanced product in terms of high luminous flux and low thermal resistance. In combination with the small package outline (3.5 mm x 3.5 mm x 1.2 mm) the PLCC2 plus is an ideal choice for backlighting, signage, exterior and interior automotive lighting as well as decorative lighting.

PRODUCT GROUP AND PACKAGE DATA

- Product group: LED
- Package: PLCC2 plus
- Product series: SMD power
- Angle of half intensity: ± 60°

APPLICATIONS

- Interior and exterior automotive lighting: dashboard, brake lights, turn lights, backlightin
- Signal and symbol luminaire
- Decorative lighting
- Architectural lighting
- Backlighting: LCDs, switches, keys, illuminated advertising
- Marker lights
- Traffic lights

PARTS TABLE

PART	COLOR, LUMINOUS FLUX	TECHNOLOGY WAVELENGTH
VLMR51Y1Z1-GS08	Red, I_V = (2850 to 5600) mcd	AlInGaP on Si
VLMK51Y1Z1-GS08	Amber, I_V = (2850 to 5600) mcd	AlInGaP on Si
VLMY51Y2Z2-GS08	Yellow, I_V = (3550 to 7150) mcd	AlInGaP on Si

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified) **VLMR51.., VLMK51.., VLMY51..,**				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
Reverse voltage	I_R = 10 µA	V_R	12	V
DC forward current		I_F	200	mA
Surge forward current	$t_p \leq$ 10 µs	I_{FSM}	1000	mA
Power dissipation		PV	530	mW
Junction temperature		$T_{jmax.}$	125	°C
Operating temperature range		T_{amb}	- 40 to + 100	°C
Storage temperature range		T_{stg}	- 40 to + 100	°C
Thermal resistance junction/ solder point		R_{thJS}	50	K/W
Thermal resistance junction/ ambient	Mounted on PC board total Cu area > 900 mm²	R_{thJA}	100	K/W

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified) **VLMR51.., RED**							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Luminous intensity	I_F = 140 mA	VLMR51Y1Z1	I_V	2850		5600	mcd
Luminous flux	I_F = 140 mA	VLMR51Y1Z1	Φ_V		10.6		lm
Dominant wavelength	I_F = 140 mA		λ_{dom}	620		630	nm
Angle of half intensity	I_F = 140 mA		φ		± 60		deg
Forward voltage	I_F = 140 mA		V_F	1.9	2.2	2.65	V
Temperature coefficient I_V	I_F = 140 mA, 0 °C ≤ T ≤ 100 °C		TC_{IV}		- 26.8		mcd/K
Temperature coefficient V_F	I_F = 140 mA, 0 °C ≤ T ≤ 100 °C		TC_V		- 3.5		mV/K
Temperature coefficient $\lambda_{dom.}$	I_F = 140 mA, 0 °C ≤ T ≤ 100 °C		$TC_{\lambda dom.}$		0.06		nm/K

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified) **VLMK51.., AMBER**							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Luminous intensity	I_F = 140 mA	VLMK51Y1Z1	I_V	2850	4500	5600	mcd
Luminous flux	I_F = 140 mA	VLMK51Y1Z1	Φ_V		11.9		lm
Dominant wavelength	I_F = 140 mA		λ_{dom}	610		621	nm
Angle of half intensity	I_F = 140 mA		φ		± 60		deg
Forward voltage	I_F = 140 mA		V_F	1.9	2.2	2.65	V
Temperature coefficient I_V	I_F = 140 mA, 0 °C ≤ T ≤ 100 °C		TC_{IV}		- 35.3		mcd/K
Temperature coefficient V_F	I_F = 140 mA, 0 °C ≤ T ≤ 100 °C		TC_V		- 2.9		mV/K
Temperature coefficient $\lambda_{dom.}$	I_F = 140 mA, 0 °C ≤ T ≤ 100 °C		$TC_{\lambda dom.}$		0.07		nm/K

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)
VLMY51.., YELLOW

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity	I_F = 140 mA	VLMY51Y2Z2	I_V	3550	5000	7150	mcd
Luminous flux	I_F = 140 mA	VLMY51Y2Z2	Φ_V		13.2		lm
Dominant wavelength	I_F = 140 mA		λ_{dom}	585		594	nm
Angle of half intensity	I_F = 140 mA		φ		± 60		deg
Forward voltage	I_F = 140 mA		V_F	1.9	2.2	2.65	V
Temperature coefficient I_V	I_F = 140 mA, 0 °C ≤ T ≤ 100 °C		TC_{IV}		- 55.5		mcd/K
Temperature coefficient V_F	I_F = 140 mA, 0 °C ≤ T ≤ 100 °C		TC_V		- 2.9		mV/K
Temperature coefficient $\lambda_{dom.}$	I_F = 140 mA, 0 °C ≤ T ≤ 100 °C		$TC_{\lambda dom.}$		0.09		nm/K

LUMINOUS INTENSITY CLASSIFICATION

GROUP	LUMINOUS INTENSITY (mcd)	
STANDARD	MIN.	MAX.
Y1	2850	3550
Y2	3550	4500
Z1	4500	5600
Z2	5600	7150

Note:
Luminous flux 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.

COLOR CLASSIFICATION

GROUP	AMBER		YELLOW	
	DOM. WAVELENGTH (nm)			
	MIN.	MAX.	MIN.	MAX.
W	610	615		
X	615	621	585	588
Y			588	591
Z			591	594

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

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

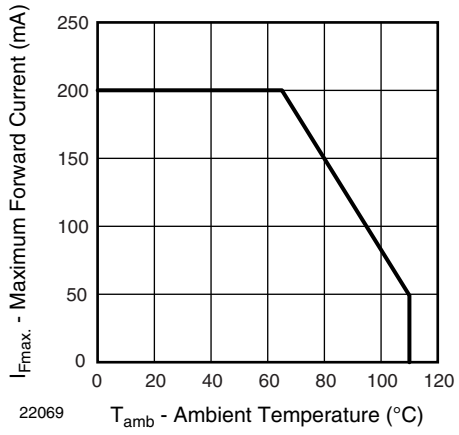


Figure 1. Forward Current vs. Ambient Temperature

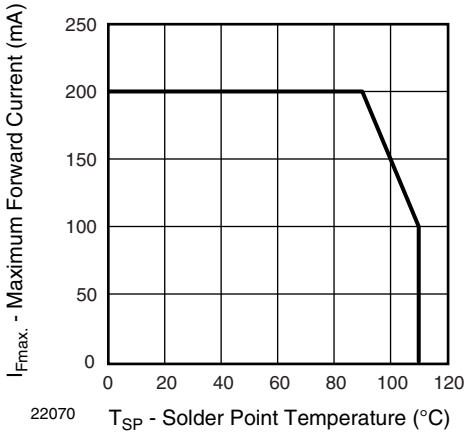


Figure 2. Max. Forward Current vs. Solder Point Temperature

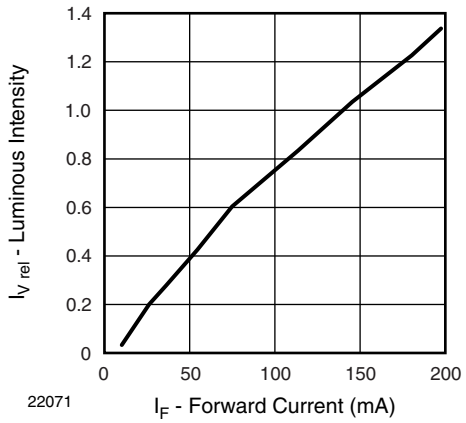


Figure 3. Rel. Luminous Intensity vs. Forward Current

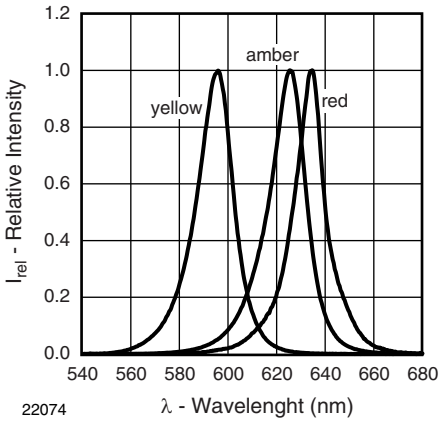


Figure 6. Relative Intensity vs. Wavelength

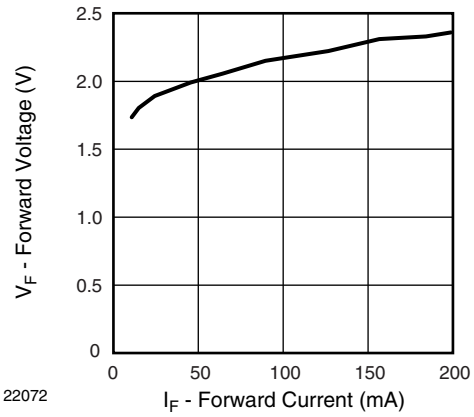


Figure 4. Rel. Forward Voltage vs. Forward Current

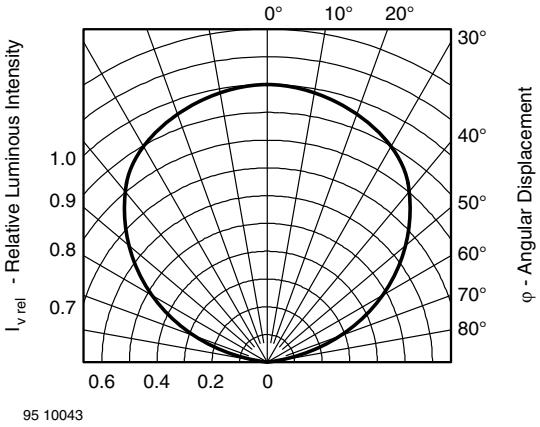


Figure 7. Rel. Luminous Intensity vs. Angular Displacement

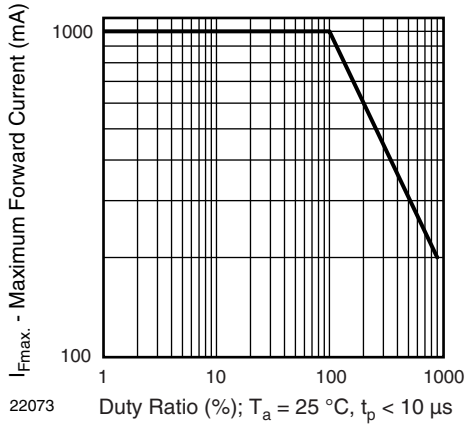
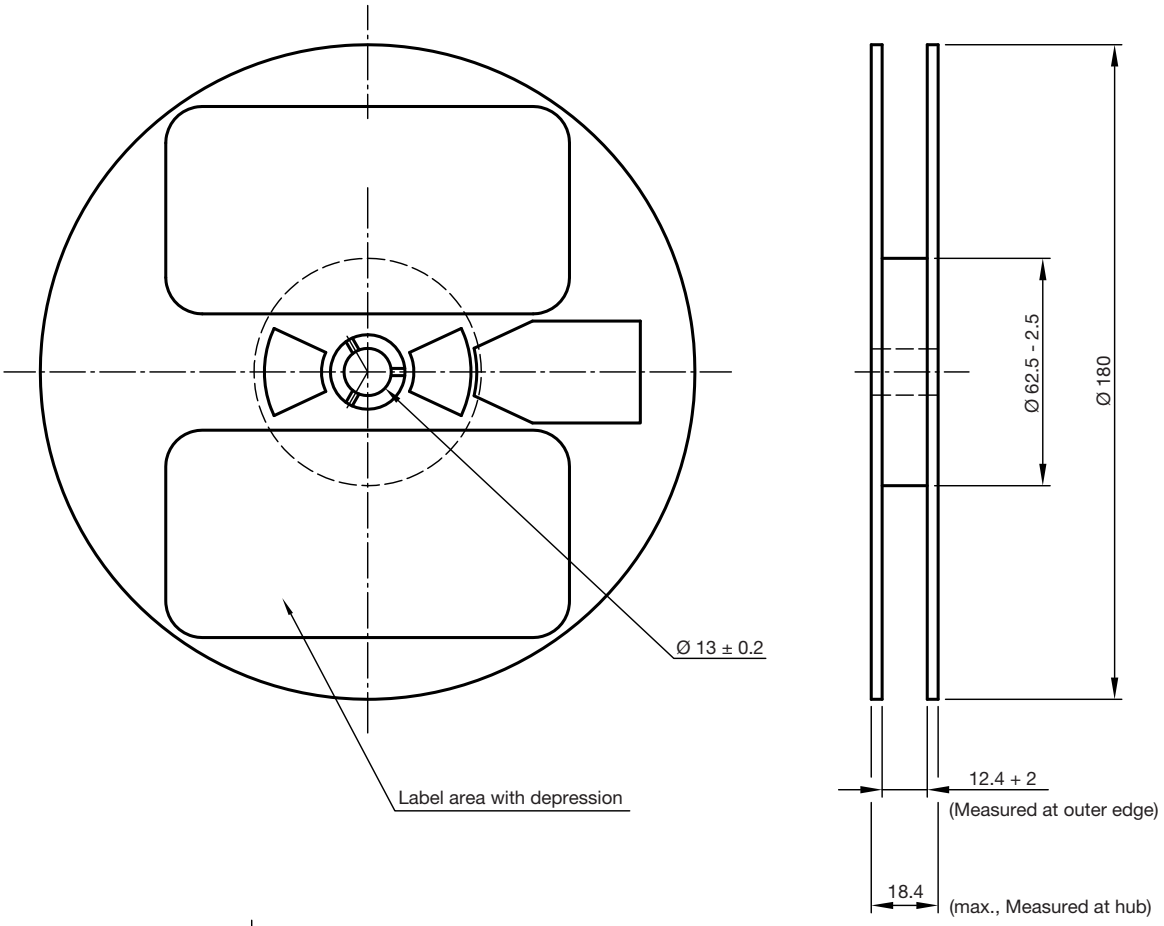


Figure 5. Forward Current vs. Duty Ratio

REEL DIMENSIONS in millimeters



technical drawings
according to DIN
specifications

Not indicated tolerances ± 0.5

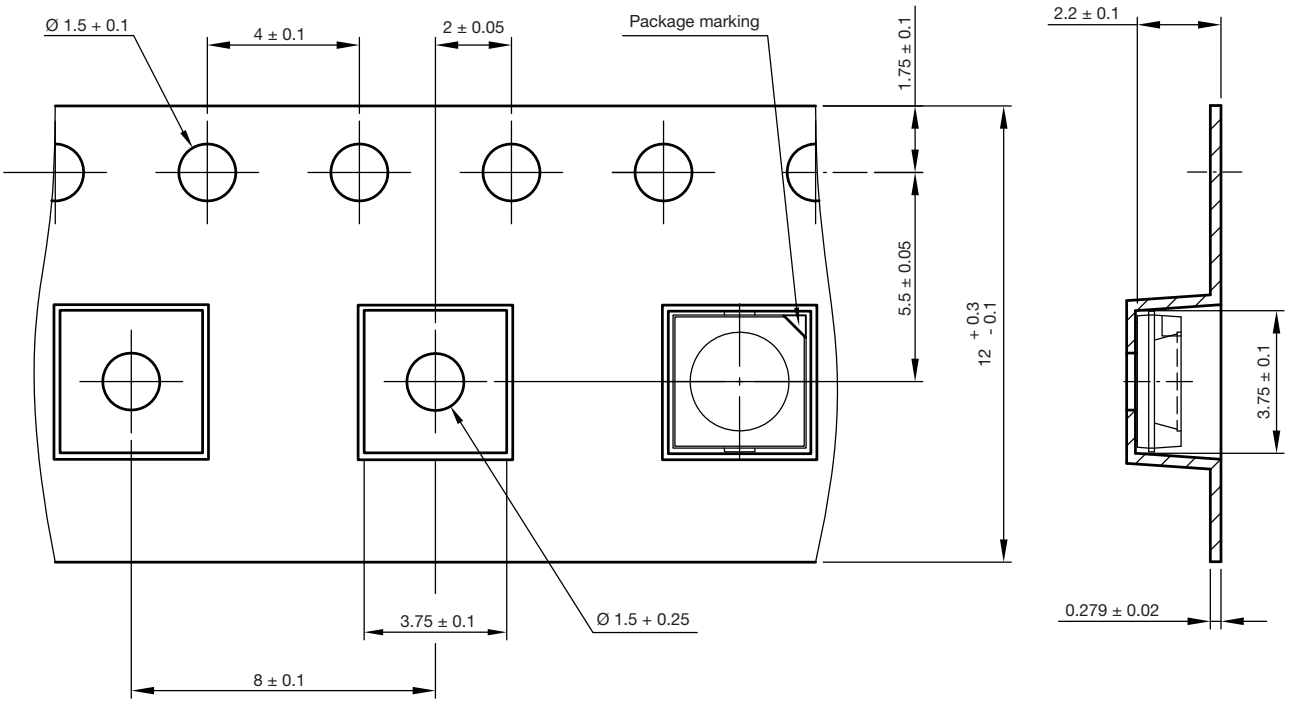
Material: black static dissipative

GS08 = 1000 pcs

Drawing-No.: 9.800-5104.01-4
Issue: 2; 19.03.10
22067

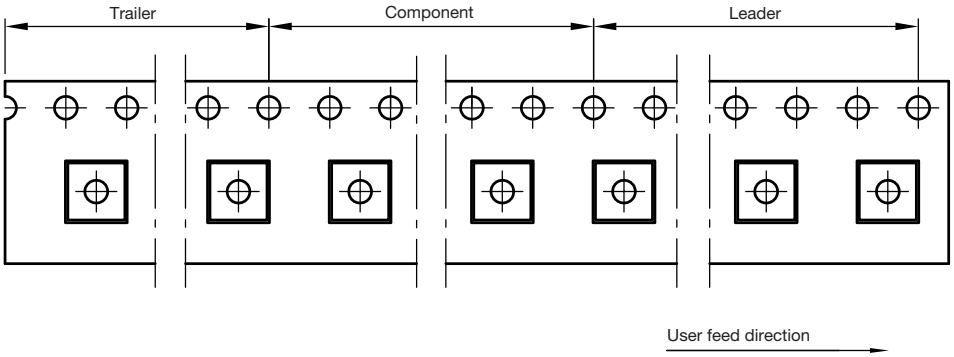
TAPING AND ORIENTATION DIMENSIONS in millimeters

Reels come in quantity of 1000 units.



200 mm min. for Ø 180 reel

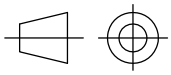
480 mm min. for Ø 180 reel



Drawing-No.: 9.700-5348.01-4

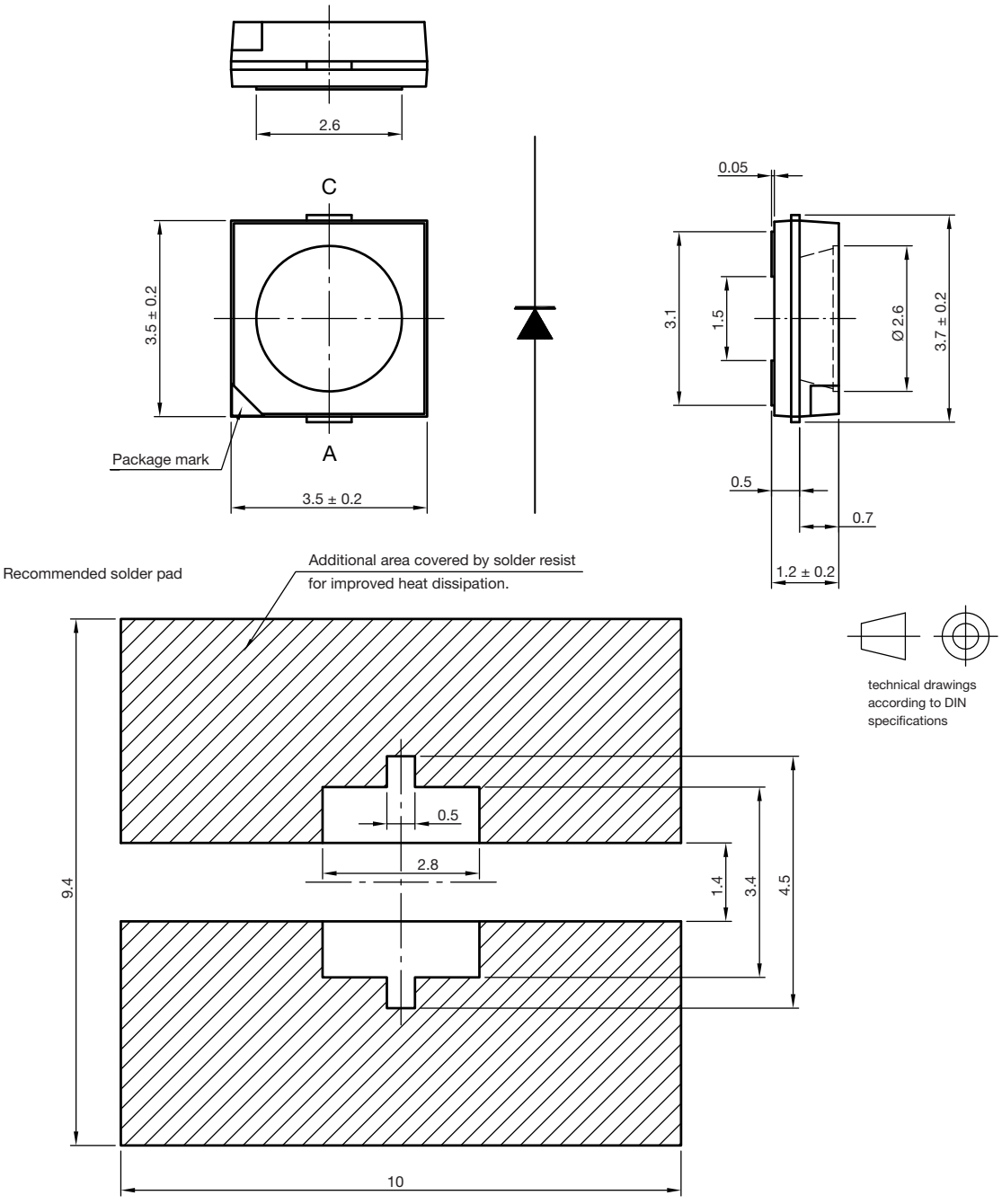
Issue: 1; 01.03.10

22066



technical drawings according to DIN specifications

RECOMMENDED PAD DESIGN DIMENSIONS in millimeters



Drawing-No.: 6.541-5084.01-4
Issue: 1 ; 13.04.10

22103

SOLDERING PROFILE

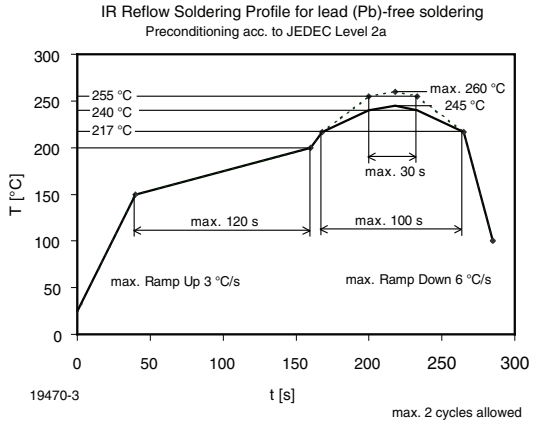
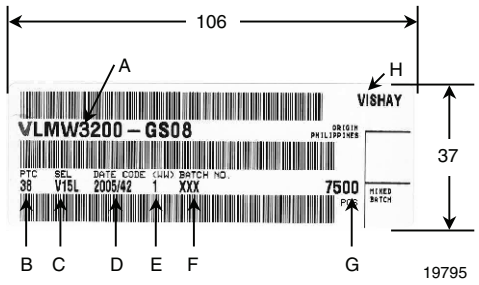


Figure 8. Vishay Lead (Pb)-free Reflow Soldering Profile (acc. to J-STD-020)

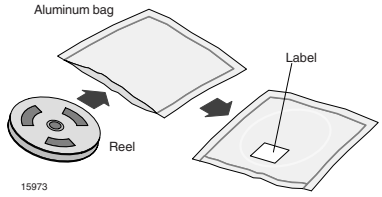
BARCODE-PRODUCT-LABEL EXAMPLE:



A) Type of component
B) Manufacturing plant
C) SEL - selection code (bin):
e.g.: V1 = code for luminous intensity group
5L = code for chrom. coordinate group
D) Date code year/week
E) Day 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.

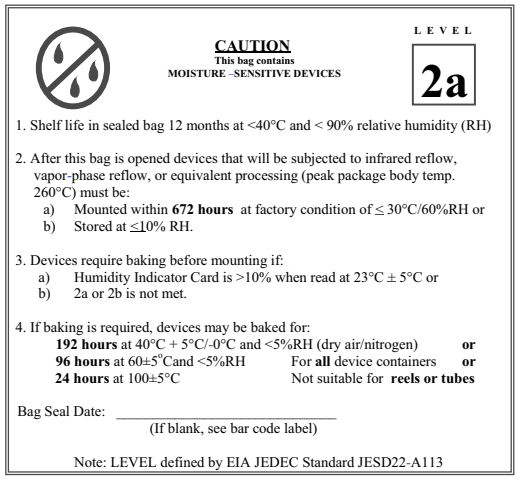
In case of moisture absorption, the devices will recover to the former condition by drying under the following condition:

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.



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. Electro-static sensitive devices warning labels are on the packaging.

Disclaimer

All product specifications and data are subject to change without notice.

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