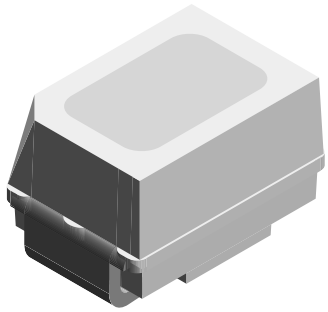
Power Mini SMD LED



19226

FEATURES

- SMD LEDs with exceptional brightness
- Luminous intensity categorized
- Compatible with automatic placement equipment
- IR reflow soldering
- Available in 8 mm tape
- Low profile package
- Non-diffused lens: Excellent for coupling to light pipes and backlighting
- Low power consumption
- Luminous intensity ratio in one packing unit $I_{Vmax.}/I_{Vmin.} \leq 1.6$
- AEC-Q101 qualified
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

AUTOMOTIVE GRADE

Pb-free

e3

RoHS COMPLIANT

HALOGEN FREE

GREEN (5-2008)

DESCRIPTION

The new MiniLED series has been designed in a small white SMT package. The feature of the device is the very small package 2.3 mm x 1.3 mm x 1.4 mm. The MiniLED is an obvious solution for small-scale, high-power products that are expected to work reliability in an arduous environment. This is often the case in automotive and industrial application.

PRODUCT GROUP AND PACKAGE DATA

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

APPLICATIONS

- Automotive: Backlighting in dashboards, and switches
- Telecommunication: Indicator and backlighting in telephone and fax
- Indicator and backlight for audio and video equipment
- Indicator and backlight in office equipment
- Flat backlight for LCDs, switches, and symbols

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.		
VLMK23P2R1-GS08	Red	56	-	140	20	-	630	-	20	-	1.9	2.6	20	AlInGaP on GaAs
VLMK23Q2S1-GS08	Red	90	-	224	20	-	630	-	20	-	1.9	2.6	20	AlInGaP on GaAs
VLMK23P2S1-GS08	Red	56	-	224	20	-	630	-	20	-	1.9	2.6	20	AlInGaP on GaAs
VLMK23R1S1-GS08	Red	112	-	224	20	-	630	-	20	-	1.9	2.6	20	AlInGaP on GaAs
VLMF23Q2S1-GS08	Soft orange	90	-	224	20	598	605	611	20	-	2	2.6	20	AlInGaP on GaAs
VLMF23R2T1-GS08	Soft orange	140	-	355	20	598	605	611	20	-	2	2.6	20	AlInGaP on GaAs
VLMF23Q2T1-GS08	Soft orange	90	-	355	20	598	605	611	20	-	2	2.6	20	AlInGaP on GaAs
VLME23Q2S1-GS08	Yellow	90	-	224	20	581	588	594	20	-	2	2.6	20	AlInGaP on GaAs
VLME23R2T1-GS08	Yellow	140	-	355	20	581	588	594	20	-	2	2.6	20	AlInGaP on GaAs
VLME23Q2T1-GS08	Yellow	90	-	355	20	581	588	594	20	-	2	2.6	20	AlInGaP on GaAs

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified) **VLMK23.., VLMF23.., VLME23..**				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
Reverse voltage (1)		V_R	5	V
DC Forward current	$T_{amb} \leq 80$ °C	I_F	30	mA
Surge forward current	$t_p \leq 10$ µs	I_{FSM}	0.1	A
Power dissipation		P_V	80	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/ambient	mounted on PC board (pad size > 5 mm_2)	R_{thJA}	580	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) **VLMK23.., RED**							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Luminous intensity (1)	I_F = 20 mA	VLMK23P2R1	I_V	56	-	140	mcd
		VLMK23Q2S1	I_V	90	-	224	mcd
		VLMK23P2S1	I_V	56	-	224	mcd
		VLMK23R1S1	I_V	112	-	224	mcd
Dominant wavelength	I_F = 20 mA		λ_d	-	630	-	nm
Peak wavelength	I_F = 20 mA		λ_p	-	643	-	nm
Angle of half intensity	I_F = 20 mA		φ	-	± 60	-	deg
Forward voltage	I_F = 20 mA		V_F	-	1.9	2.6	V
Reverse voltage	I_R = 10 µA		V_R	5	-	-	V
Junction capacitance	V_R = 0 V, f = 1 MHz		C_j	-	15	-	pF

Note

(1) In one packing unit $I_{Vmax.}/I_{Vmin.} \leq 1.6$

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified) **VLMF23.., SOFT ORANGE**							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Luminous intensity (1)	I_F = 20 mA	VLMF23Q2S1	I_V	90	-	224	mcd
		VLMF23R2T1	I_V	140	-	355	mcd
		VLMF23Q2T1	I_V	90	-	355	mcd
Dominant wavelength	I_F = 20 mA		λ_d	598	605	611	nm
Peak wavelength	I_F = 20 mA		λ_p	-	610	-	nm
Angle of half intensity	I_F = 20 mA		φ	-	± 60	-	deg
Forward voltage	I_F = 20 mA		V_F	-	2	2.6	V
Reverse voltage	I_R = 10 µA		V_R	5	-	-	V
Junction capacitance	V_R = 0 V, f = 1 MHz		C_j	-	15	-	pF

Note

(1) In one packing unit $I_{Vmax.}/I_{Vmin.} \leq 1.6$

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)
VLME23.., YELLOW

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity (1)	I_F = 20 mA	VLME23Q2S1	I_V	90	-	224	mcd
		VLME23R2T1	I_V	140	-	355	mcd
		VLME23Q2T1	I_V	90	-	355	mcd
Dominant wavelength	I_F = 20 mA		λ_d	581	588	594	nm
Peak wavelength	I_F = 20 mA		λ_p	-	590	-	nm
Angle of half intensity	I_F = 20 mA		φ	-	± 60	-	deg
Forward voltage	I_F = 20 mA		V_F	-	2	2.6	V
Reverse voltage	I_R = 10 µA		V_R	5	-	-	V
Junction capacitance	V_R = 0 V, f = 1 MHz		C_j		15	-	pF

Note

(1) In one packing unit $I_{Vmax.}/I_{Vmin.} \leq 1.6$

LUMINOUS INTENSITY CLASSIFICATION

GROUP	LIGHT INTENSITY (mcd)		
STANDARD	OPTIONAL	MIN.	MAX.
P	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

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.

COLOR CLASSIFICATION

GROUP	DOMINANT WAVELENGTH (nm)			
	SOFT ORANGE		YELLOW	
	MIN.	MAX.	MIN.	MAX.
1	598	601	581	584
2	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.

CROSSING TABLE

VISHAY	OSRAM
VLME23Q2S1	LYM676Q2S1
VLME23R2T1	LYM676R2T1
VLME23Q2T1	LYM676Q2T1
VLMF23Q2S1	LOM676Q2S1
VLMF23R2T1	LOM676R2T1
VLMF23Q2T1	LOM676Q2T1
VLMK23P2R1	LSM676P2R1
VLMK23Q2S1	LSM676Q2S1
VLMK23P2S1	LSM676P2S1

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

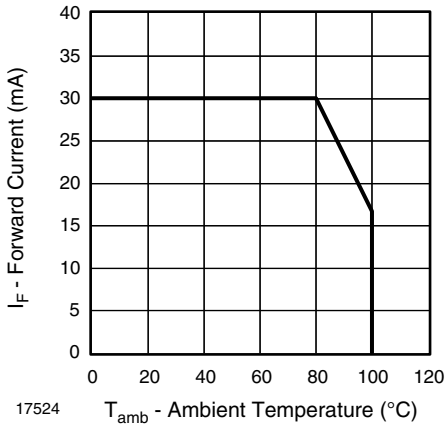


Fig. 1 - Forward Current vs. Ambient Temperature

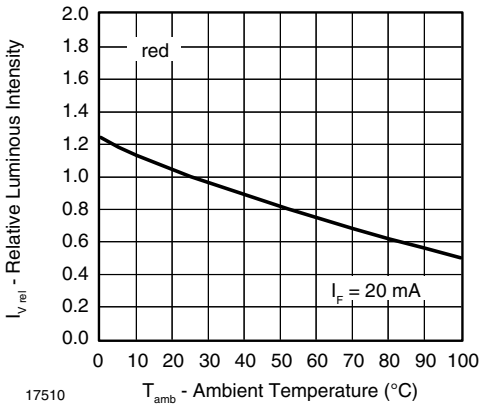


Fig. 4 - Relative Luminous Intensity vs. Ambient Temperature

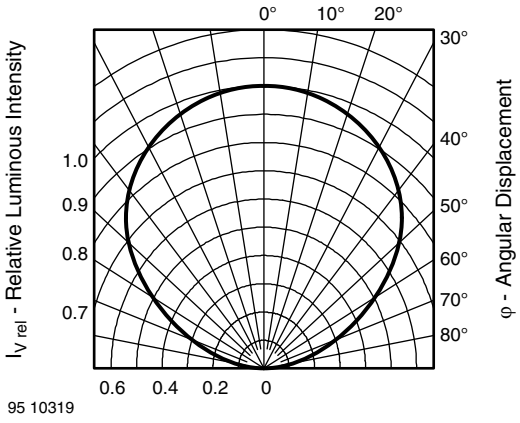


Fig. 2 - Relative Luminous Intensity vs. Angular Displacement

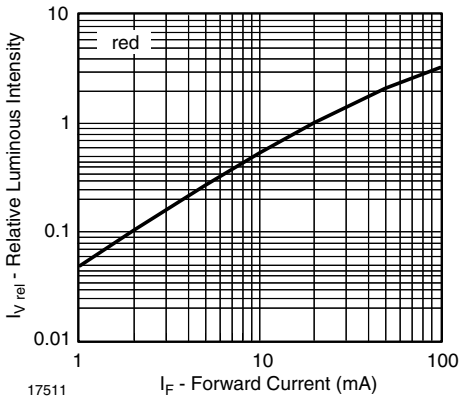


Fig. 5 - Relative Luminous Intensity vs. Forward Current

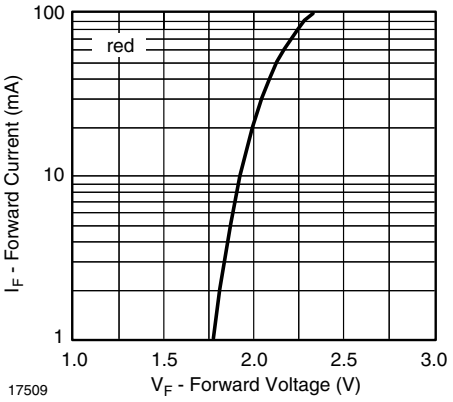


Fig. 3 - Forward Current vs. Forward Voltage

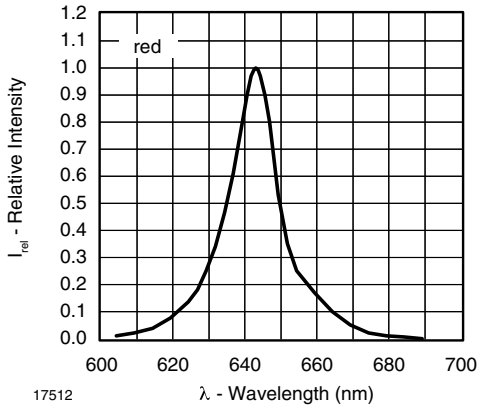


Fig. 6 - Relative Intensity vs. Wavelength

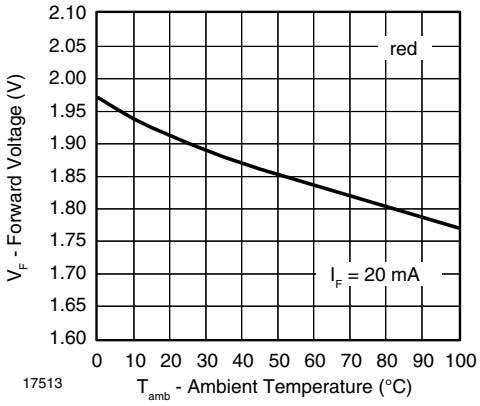


Fig. 7 - Relative Intensity vs. Wavelength

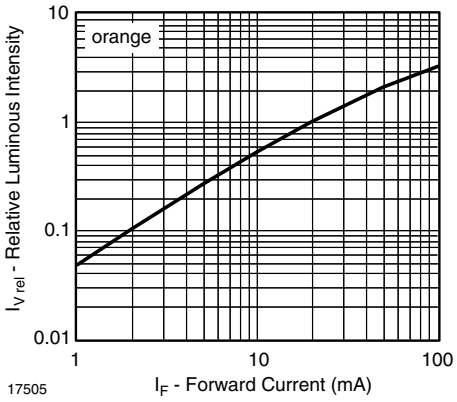


Fig. 10 - Relative Luminous Intensity vs. Forward Current

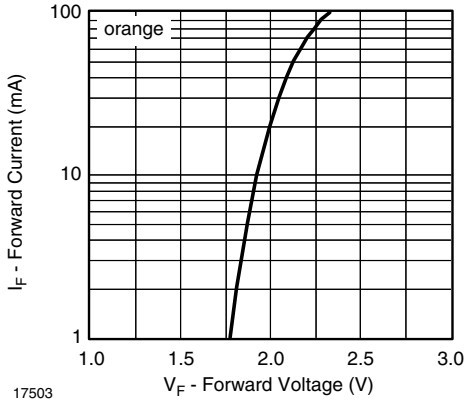


Fig. 8 - Forward Current vs. Forward Voltage

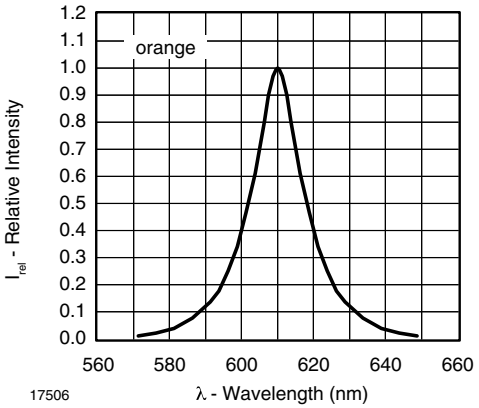


Fig. 11 - Relative Intensity vs. Wavelength

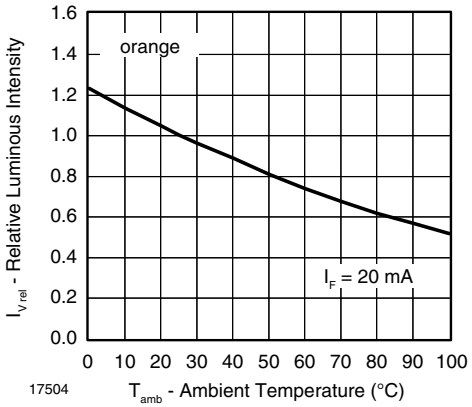


Fig. 9 - Relative Luminous Intensity vs. Ambient Temperature

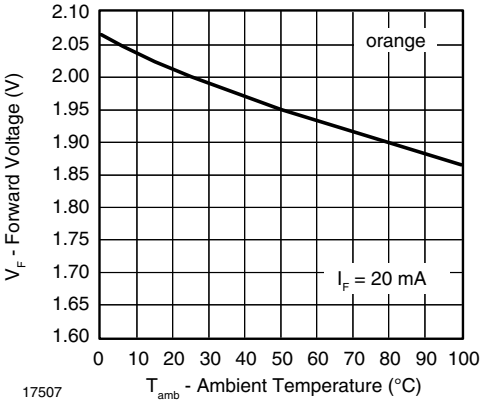


Fig. 12 - Forward Voltage vs. Ambient Temperature

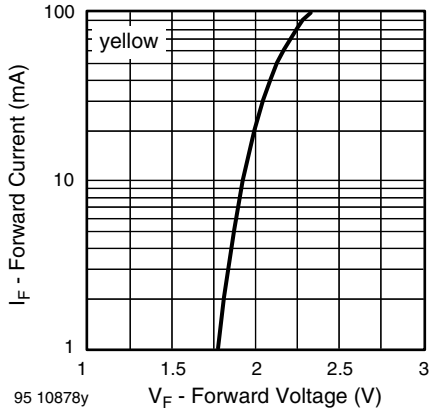


Fig. 13 - Forward Current vs. Forward Voltage

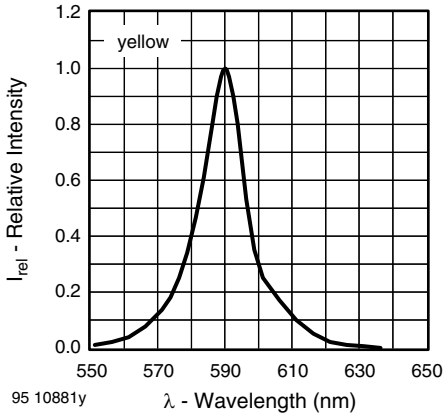


Fig. 16 - Relative Intensity vs. Wavelength

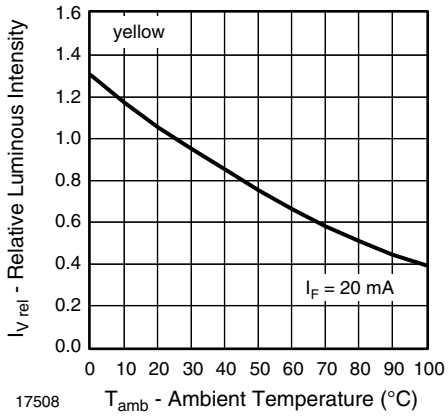


Fig. 14 - Relative Luminous Intensity vs. Ambient Temperature

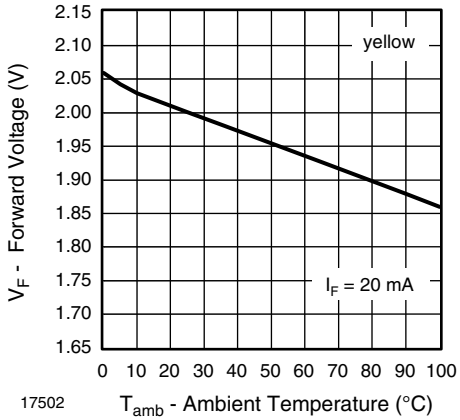


Fig. 17 - Forward Voltage vs. Ambient Temperature

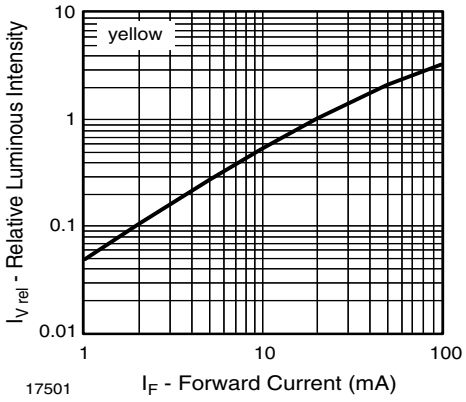
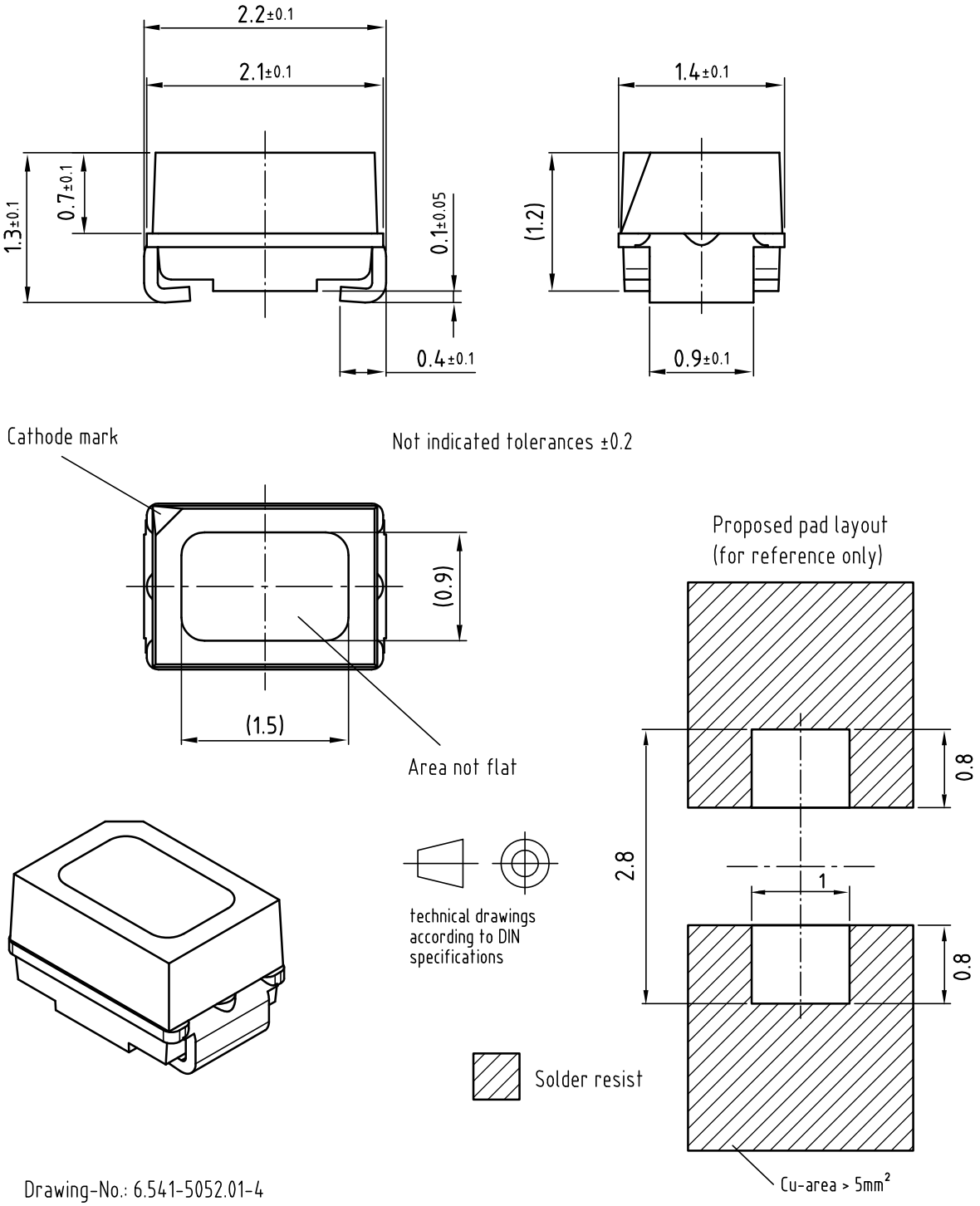


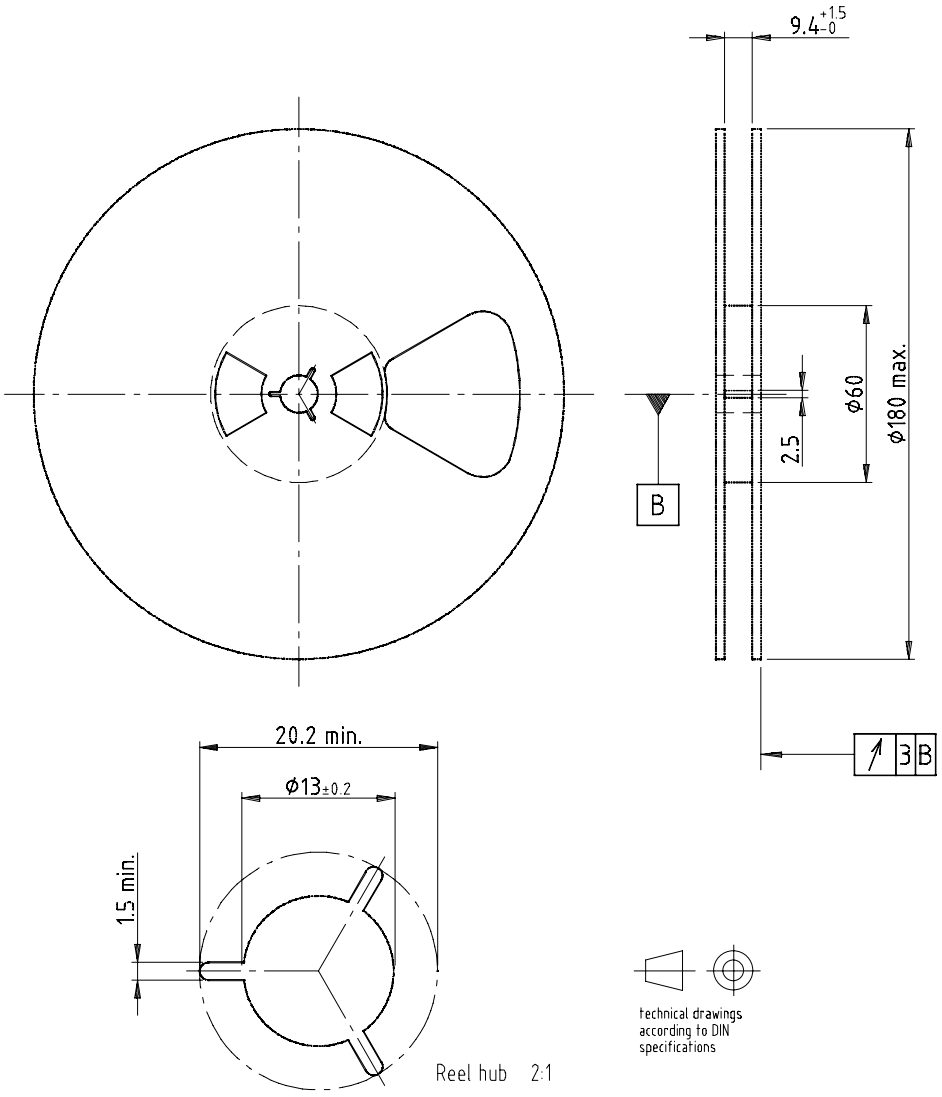
Fig. 15 - Relative Luminous Intensity vs. Forward Current

PACKAGE DIMENSIONS in millimeters



Drawing-No.: 6.541-5052.01-4
Issue: 3; 22.04.03
16892

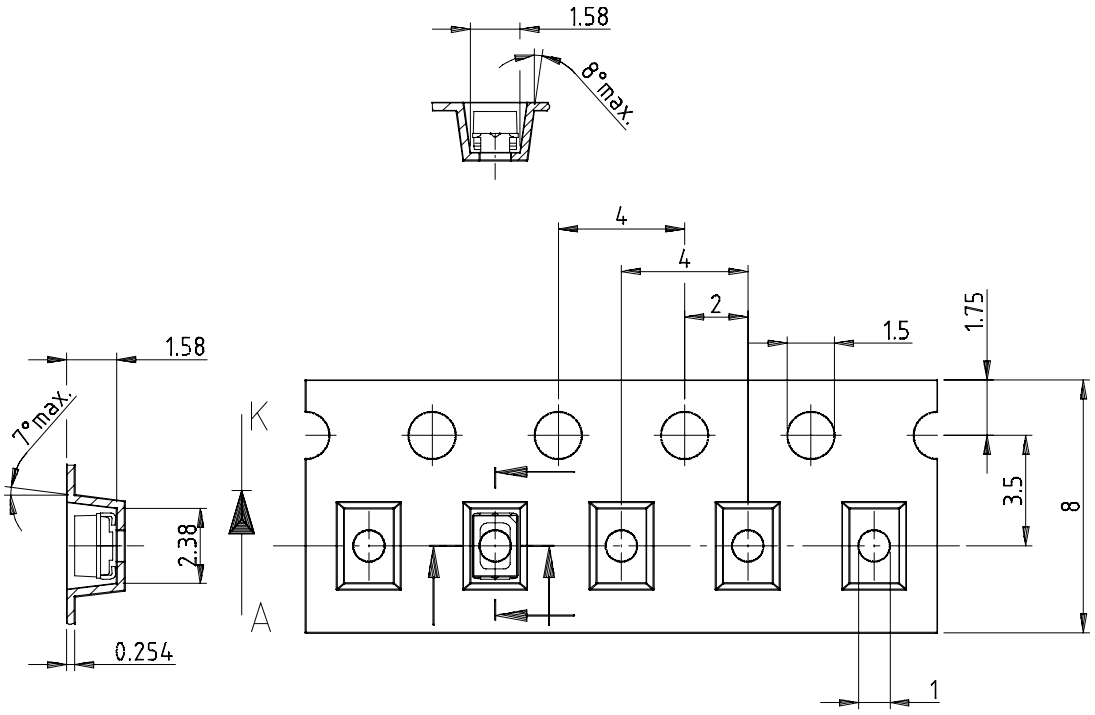
REEL DIMENSIONS in millimeters



Drawing-No.: 9.800-5051.V5-4
Issue: 1; 25.07.02

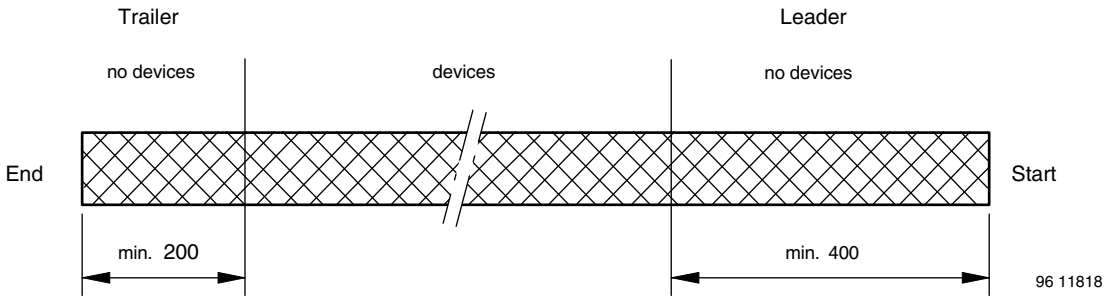
16938

TAPE DIMENSIONS in millimeters



Drawing-No.: 9.700-5266.01-4
Issue: 1; 05.06.02
16939

LEADER AND TRAILER DIMENSIONS in millimeters



GS08 = 3000 pcs

COVER TAPE PEEL STRENGTH

According to DIN EN 60286-3

0.1 N to 1.3 N

300 mm/min ± 10 mm/min

165° to 180° peel angle

LABEL

Standard bar code labels for finished goods

The standard bar code labels are product labels and used for identification of goods. The finished goods are packed in final packing area. The standard packing units are labeled with standard bar code labels before transported as finished goods to warehouses. The labels are on each packing unit and contain Vishay Semiconductor GmbH specific data.

VISHAY SEMICONDUCTOR GMBH STANDARD BAR CODE PRODUCT LABEL (finished goods)		
PLAIN WRITING	**ABBREVIATION**	**LENGTH**
Item-description	-	18
Item-number	INO	8
Selection-code	SEL	3
LOT-/serial-number	BATCH	10
Data-code	COD	3 (YWW)
Plant-code	PTC	2
Quantity	QTY	8
Accepted by:	ACC	-
Packed by:	PCK	-
Mixed code indicator	MIXED CODE	-
Origin	xxxxxxx+	Company logo
LONG BAR CODE TOP	**TYPE**	**LENGTH**
Item-number	N	8
Plant-code	N	2
Sequence-number	X	3
Quantity	N	8
Total length	-	21
SHORT BAR CODE BOTTOM	**TYPE**	**LENGTH**
Data-code	N	3
Selection-code	X	3
Batch-number	X	10
Filter	-	1
Total length	-	17

SOLDERING PROFILE

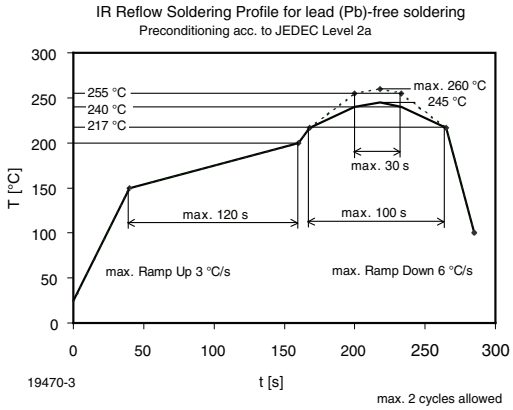
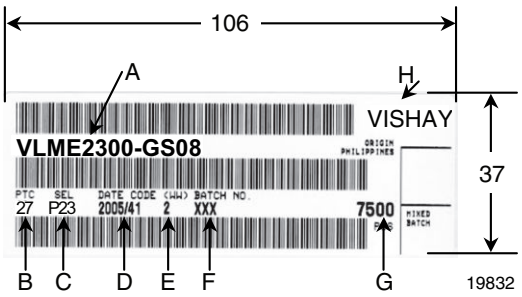


Fig. 18 - Vishay Lead (Pb)-free Reflow Soldering Profile (acc. to J-STD-020)

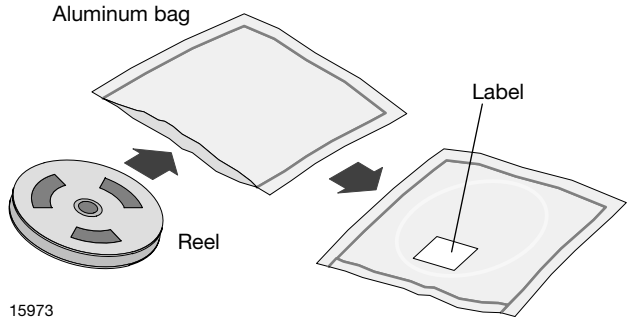
BAR CODE PRODUCT LABEL (example)



A. Type of component
B. Manufacturing plant
C. SEL - selection code (bin):
e.g.: P2 = code for luminous intensity group
3 = code for color group
D. Date code year/week
E. Day code (e.g. 2: Tuesday)
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:

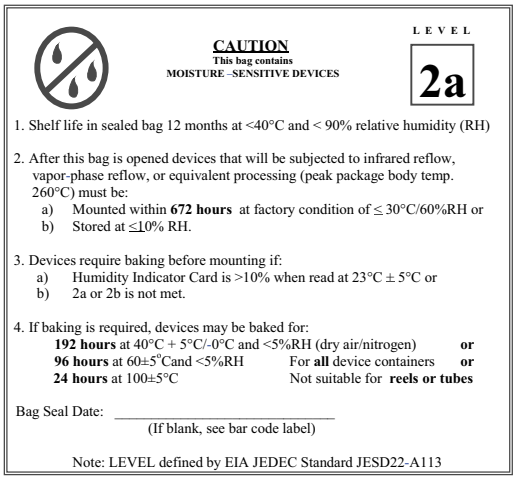
- Storage temperature 10 °C to 30 °C
- Storage humidity ≤ 60 % RH max.

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.

VISHAY SEMICONDUCTORS STANDARD BAR CODE LABEL

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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Material Category Policy

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.

Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.