

## Silicon NPN Phototransistor



### DESCRIPTION

VENT2023SLX01 is a silicon NPN epitaxial planar phototransistor in a miniature side looking, surface mount package (SMD) with dome lens and daylight blocking filter. Filter bandwidth is matched with 830 nm to 950 nm IR emitters.

### FEATURES

- Package type: surface mount
- Package form: side view
- Dimensions (L x W x H in mm): 2.3 x 2.55 x 2.3
- AEC-Q101 qualified
- High radiant sensitivity
- Daylight blocking filter matched with 830 nm to 950 nm IR emitters
- Fast response times
- Angle of half sensitivity:  $\phi = \pm 35^\circ$
- Package matched with IR emitter series VSMB2943SLX01
- Floor life: 4 weeks, MSL 2a, acc. J-STD-020
- Lead (Pb)-free reflow soldering
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



### APPLICATIONS

- Detector in automotive applications
- Photo interrupters
- Miniature switches
- Counters
- Encoders
- Position sensors

### PRODUCT SUMMARY

COMPONENT	$I_{ca}$ (mA)	$\phi$ (deg)	$\lambda_{0.5}$ (nm)
VENT2023SLX01	2.7	$\pm 35$	790 to 970

#### Note

- Test condition see table "Basic Characteristics"

### ORDERING INFORMATION

ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
VENT2023SLX01	Tape and reel	MOQ: 3000 pcs, 3000 pcs/reel	Side view

#### Note

- MOQ: minimum order quantity

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

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Collector emitter voltage		$V_{CEO}$	20	V
Emitter collector voltage		$V_{ECO}$	7	V
Collector current		$I_C$	50	mA
Power power dissipation	$T_{amb} \leq 75\text{ }^{\circ}\text{C}$	$P_V$	100	mW
Junction temperature		$T_j$	100	$^{\circ}\text{C}$
Operating temperature range		$T_{amb}$	- 40 to + 100	$^{\circ}\text{C}$
Storage temperature range		$T_{stg}$	- 40 to + 100	$^{\circ}\text{C}$
Soldering temperature	Acc. reflow profile fig. 8	$T_{sd}$	260	$^{\circ}\text{C}$
Thermal resistance junction/ambient	Acc. J-STD-051	$R_{thJA}$	250	K/W

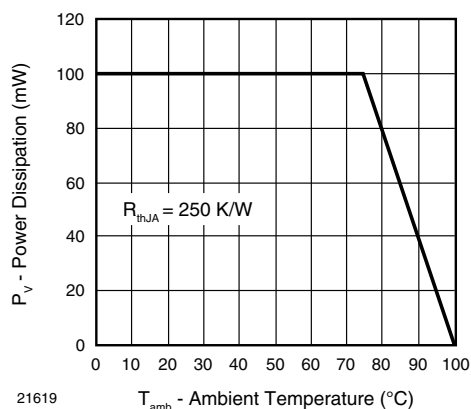


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

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

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Collector emitter breakdown voltage	$I_C = 0.1\text{ mA}$	$V_{CEO}$	20			V
Collector dark current	$V_{CE} = 5\text{ V}$ , $E = 0$	$I_{CEO}$		1	100	nA
Collector emitter capacitance	$V_{CE} = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$	$C_{CEO}$		25		pF
Collector light current	$E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$ , $V_{CE} = 5\text{ V}$	$I_{ca}$	1.3	2.7	4.1	mA
Angle of half sensitivity		$\phi$		$\pm 35$		deg
Wavelength of peak sensitivity		$\lambda_p$		860		nm
Range of spectral bandwidth		$\lambda_{0.5}$		790 to 970		nm
Collector emitter saturation voltage	$I_C = 0.05\text{ mA}$	$V_{CEsat}$			0.4	V
Temperature coefficient of $I_{ca}$	$E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$ , $V_{CE} = 5\text{ V}$	$Tk_{Ica}$		1.1		%/K

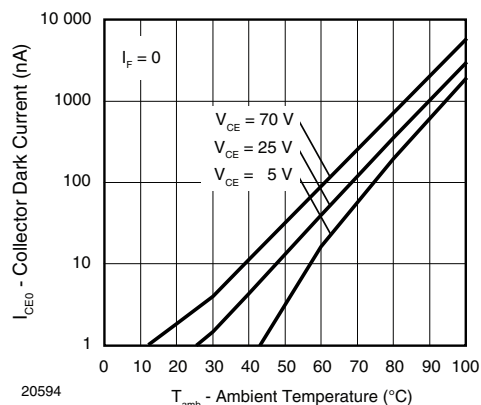
**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 2 - Collector Dark Current vs. Ambient Temperature

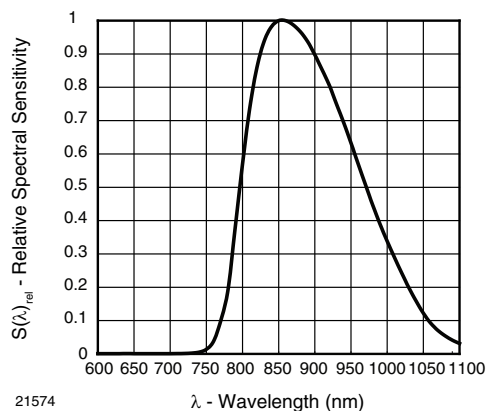


Fig. 5 - Relative Spectral Sensitivity vs. Wavelength

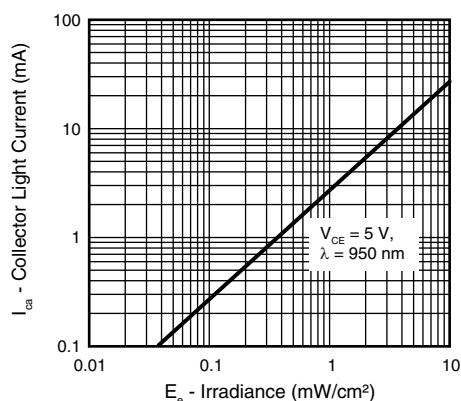


Fig. 3 - Collector Light Current vs. Irradiance

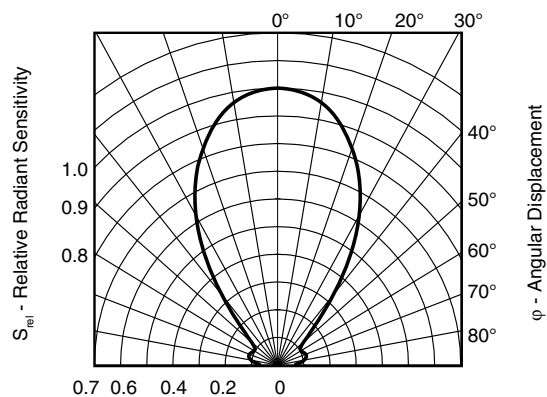


Fig. 6 - Relative Radiant Sensitivity vs. Angular Displacement

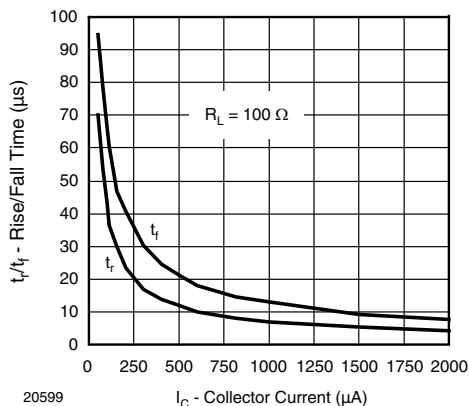


Fig. 4 - Rise/Fall Time vs. Collector Current

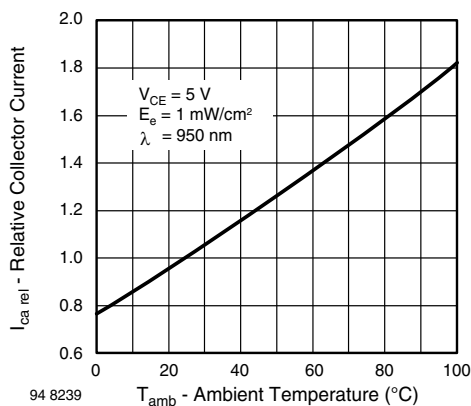


Fig. 7 - Relative Collector Current vs. Ambient Temperature

## REFLOW SOLDER PROFILE

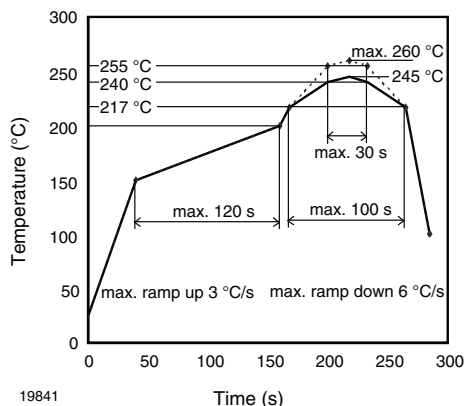


Fig. 8 - Lead (Pb)-free Reflow Solder Profile acc. J-STD-020

## DRYPACK

Devices are packed in moisture barrier bags (MBB) to prevent the products from moisture absorption during transportation and storage. Each bag contains a desiccant.

## FLOOR LIFE

Floor life (time between soldering and removing from MBB) must not exceed the time indicated on MBB label:

Floor life: 4 weeks

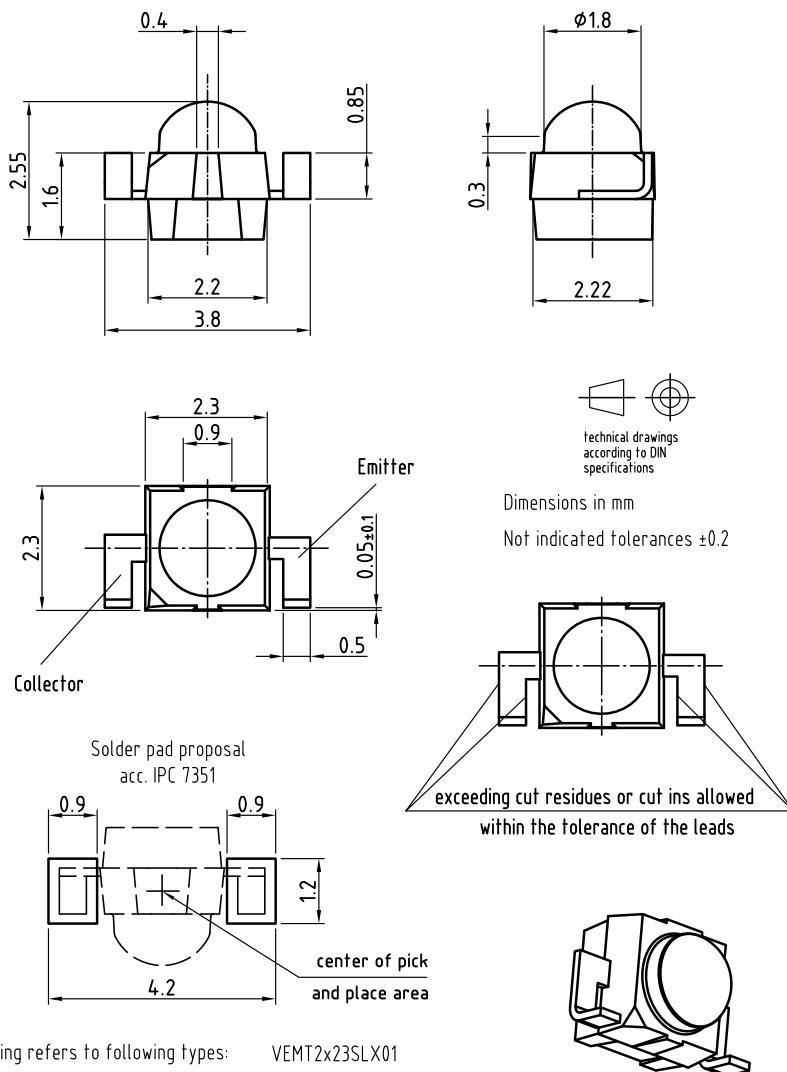
Conditions:  $T_{amb} < 30^{\circ}\text{C}$ ,  $RH < 60\%$

Moisture sensitivity level 2a, acc. to J-STD-020.

## DRYING

In case of moisture absorption devices should be baked before soldering. Conditions see J-STD-020 or label. Devices taped on reel dry using recommended conditions 192 h at  $40^{\circ}\text{C}$  ( $+5^{\circ}\text{C}$ ),  $RH < 5\%$ .

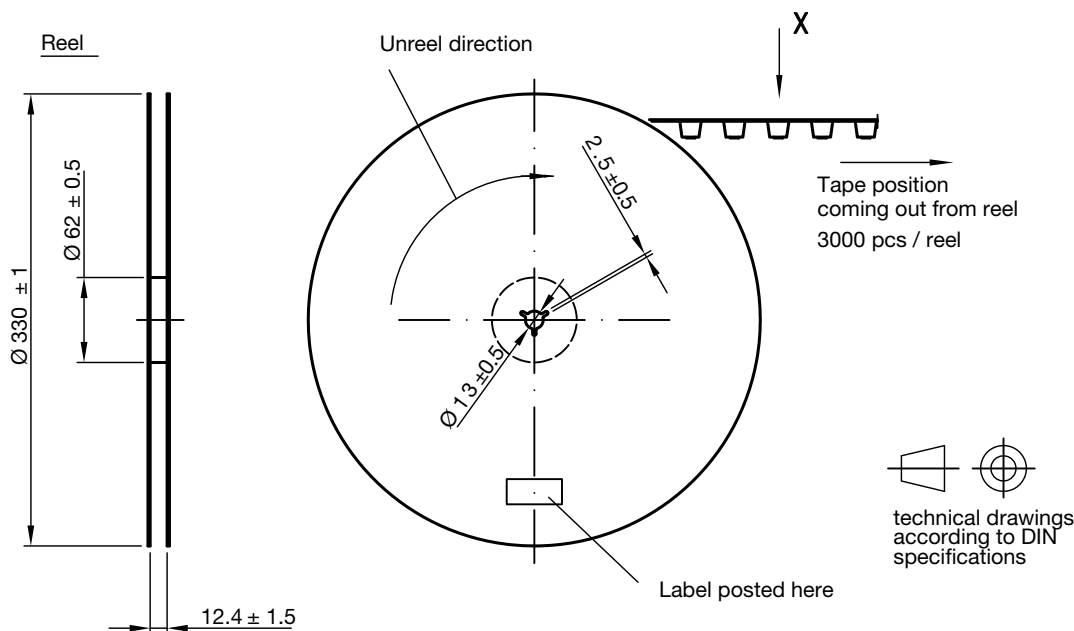
## PACKAGE DIMENSIONS VENT2023SLX01 in millimeters



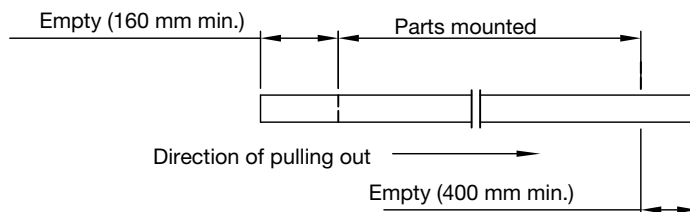
Drawing refers to following types: VENT2x23SLX01

Drawing-No.: 6.544-5410.01-4

Issue: prel. 03.08.12

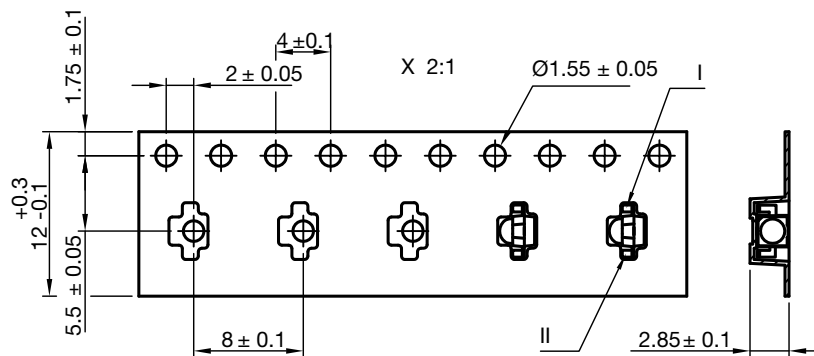
**TAPE AND REEL DIMENSIONS VENT2023SLX01** in millimeters


Leader and tailer tape:



Terminal position in tape

Device	Lead I	Lead II
VSMB2943SLX01	Cathode	Anode
VSMF2893SLX01		
VSMB2948SL		
VEMD2023SLX01		
VEMD2523SLX01	Collector	Emitter
VENT2023SLX01		
VENT2523SLX01	Anode	Cathode
VSMY2853SL		



Drawing refers to following types: see table  
Reel dimensions and tape

Drawing-No.: 9.800-5123.01-4  
Issue: 2; 19.02.13



## Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Vishay products are not designed for use in life-saving or life-sustaining applications or any application in which the failure of the Vishay product could result in personal injury or death unless specifically qualified in writing by Vishay. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.