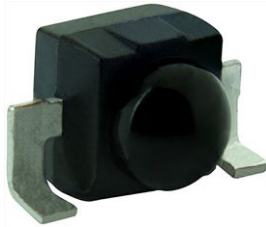




# Silicon NPN Phototransistor



## 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:  $\varphi = \pm 35^\circ$
- 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 <sub>ca</sub> (mA)	$\varphi$ (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



<b>ABSOLUTE MAXIMUM RATINGS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , 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

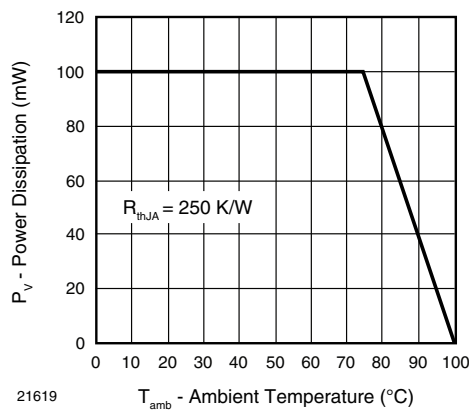


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

<b>BASIC CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , 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

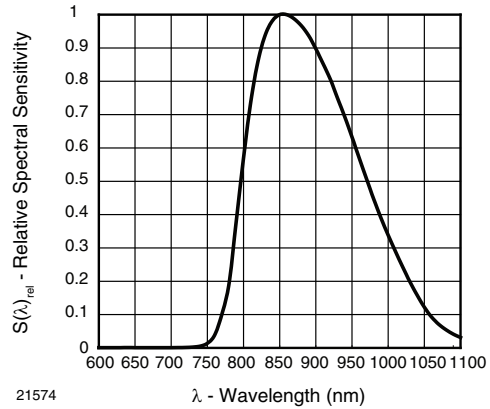


Fig. 5 - Relative Spectral Sensitivity vs. Wavelength

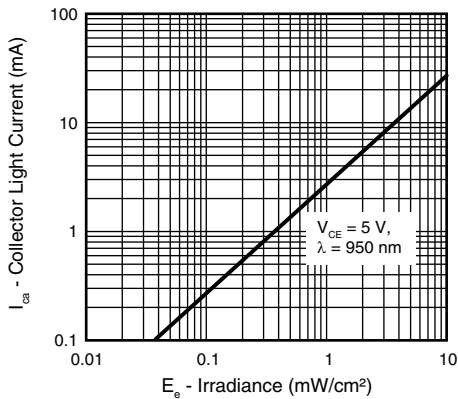


Fig. 3 - Collector Light Current vs. Irradiance

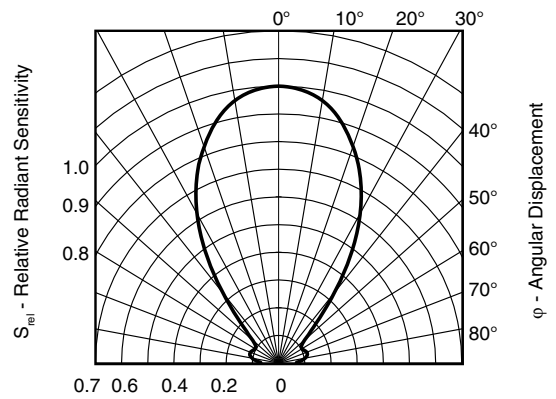


Fig. 6 - Relative Radiant Sensitivity vs. Angular Displacement

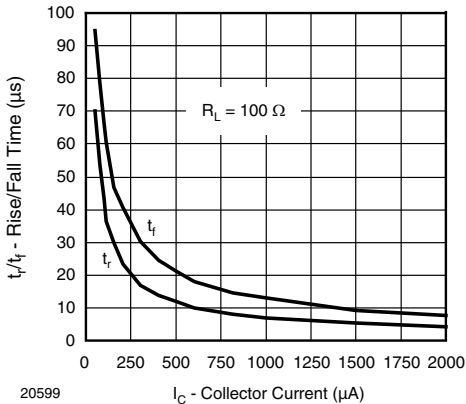


Fig. 4 - Rise/Fall Time vs. Collector Current

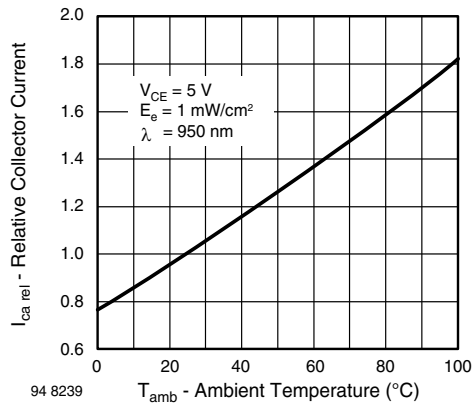


Fig. 7 - Relative Collector Current vs. Ambient Temperature

**REFLOW SOLDER PROFILE**

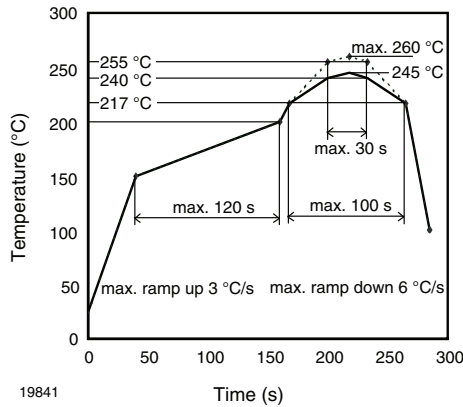


Fig. 8 - Lead (Pb)-free Reflow Solder Profile acc. J-STD-020

**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.

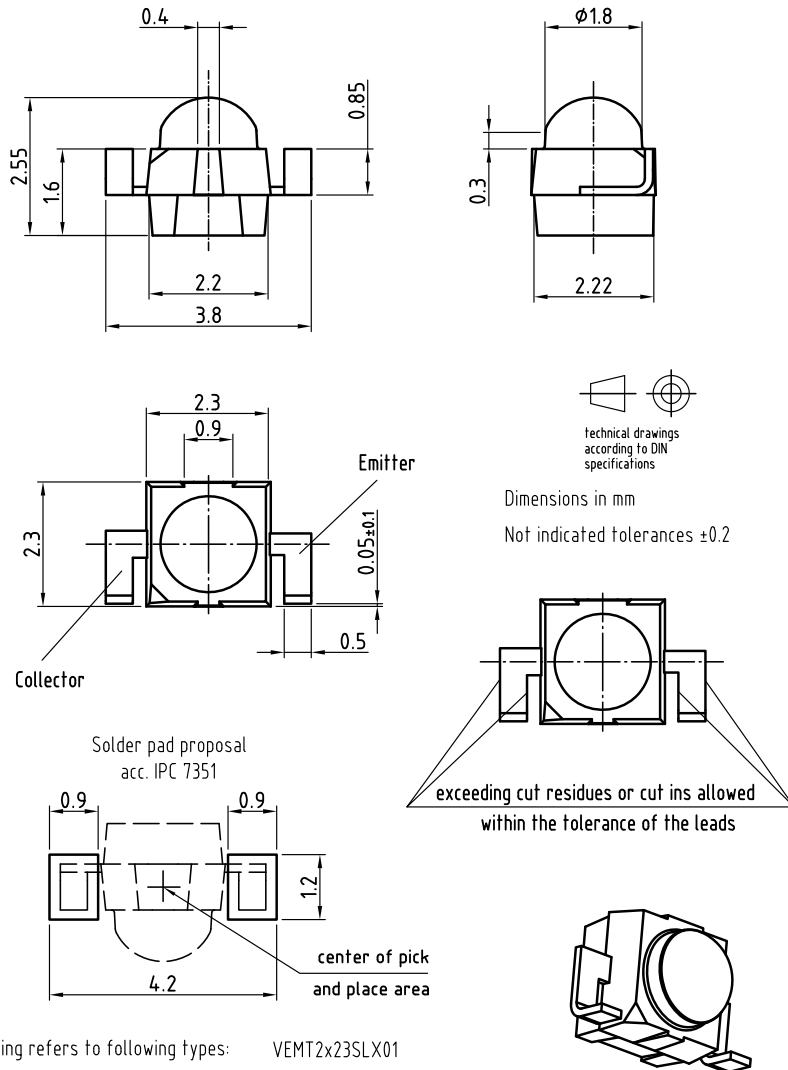
**FLOOR LIFE**

Floor life (time between soldering and removing from MBB) must not exceed the time indicated on MBB label:  
Floor life: 4 weeks  
Conditions:  $T_{amb} < 30\text{ }^{\circ}\text{C}$ ,  $RH < 60\%$   
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  $40\text{ }^{\circ}\text{C}$  ( $+ 5\text{ }^{\circ}\text{C}$ ),  $RH < 5\%$ .

**PACKAGE DIMENSIONS VEMT2023SLX01** in millimeters



Drawing refers to following types: VEMT2x23SLX01

Drawing-No.: 6.544-5410.01-4  
Issue: prel. 03.08.12

**TAPE AND REEL DIMENSIONS VENT2023SLX01** in millimeters

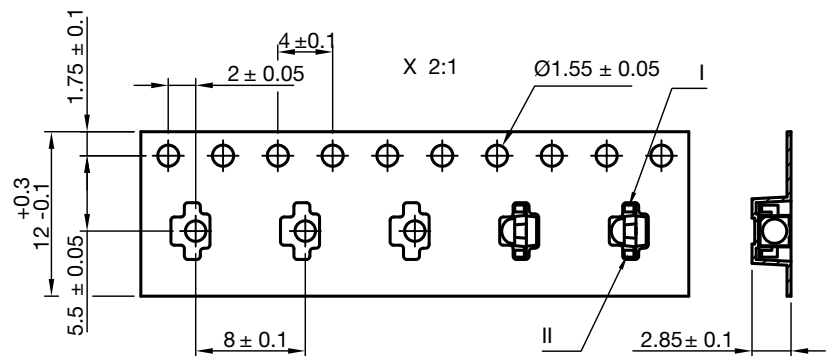


Leader and tailer tape:



Terminal position in tape

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



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

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



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