



## Silicon NPN Phototransistor



21568

VENT2020X01



VENT2000X01

### DESCRIPTION

VENT2000X01 series are silicon NPN epitaxial planar phototransistors with daylight blocking filter in a miniature, black dome lens package for surface mounting. Filter bandwidth is matched with 830 nm to 950 nm IR emitters.

### FEATURES

- Package type: surface mount
- Package form: GW, RGW
- Dimensions (L x W x H in mm): 2.3 x 2.3 x 2.8
- 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:  $\phi = \pm 15^\circ$
- Package matched with IR emitter series VSMB2000X01
- Floor life: 4 weeks, MSL 2a, acc. J-STD-020
- Lead (Pb)-free reflow soldering
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC



### Note

\*\* Please see document "Vishay Material Category Policy": [www.vishay.com/doc?99902](http://www.vishay.com/doc?99902)

### APPLICATIONS

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

PRODUCT SUMMARY			
COMPONENT	I <sub>ca</sub> (mA)	φ (deg)	λ <sub>0.5</sub> (nm)
VENT2000X01	6	± 15	790 to 970
VENT2020X01	6	± 15	790 to 970

### Note

- Test condition see table "Basic Characteristics"

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
VENT2000X01	Tape and reel	MOQ: 6000 pcs, 6000 pcs/reel	Reverse gullwing
VENT2020X01	Tape and reel	MOQ: 6000 pcs, 6000 pcs/reel	Gullwing

### Note

- MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS (T <sub>amb</sub> = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Collector emitter voltage		V <sub>CEO</sub>	20	V
Emitter collector voltage		V <sub>ECO</sub>	7	V
Collector current		I <sub>C</sub>	50	mA



<b>ABSOLUTE MAXIMUM RATINGS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
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	$E_e = 1\text{ mW/cm}^2, \lambda = 950\text{ nm}, V_{CE} = 5\text{ V}$	$I_{ca}$	3	6	9	mA
Angle of half sensitivity		$\phi$		$\pm 15$		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

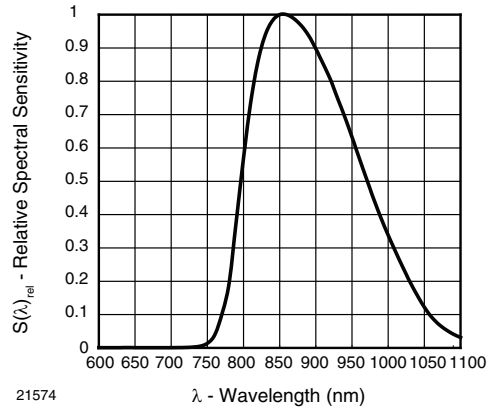


Fig. 5 - Relative Spectral Sensitivity vs. Wavelength



Fig. 3 - Collector Light Current vs. Irradiance

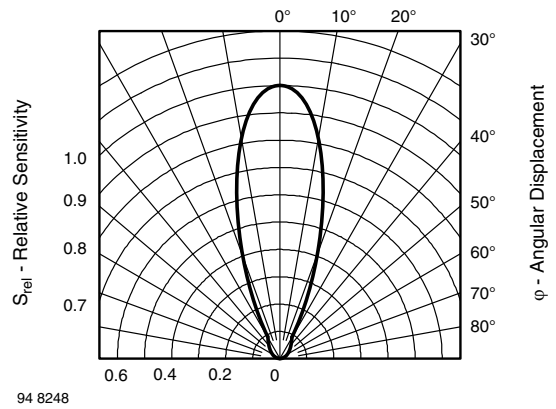


Fig. 6 - Relative Radiant Sensitivity vs. Angular Displacement

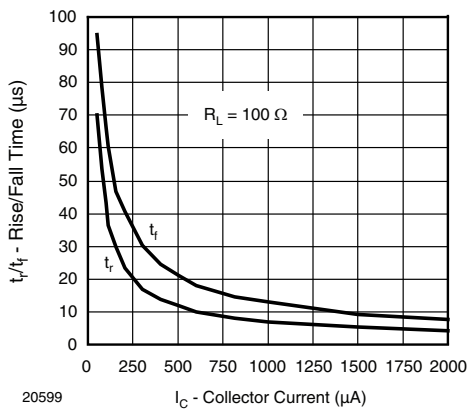


Fig. 4 - Rise/Fall Time vs. Collector Current

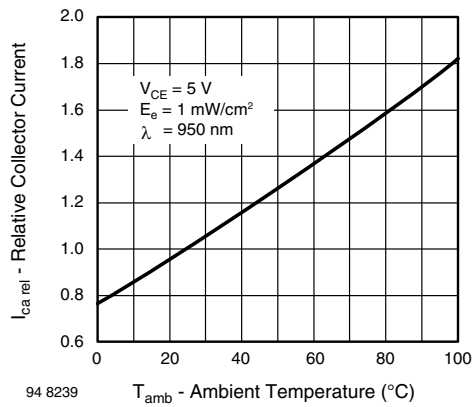


Fig. 7 - Relative Collector Current vs. Ambient Temperature



### 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:  $T_{amb} < 30\text{ °C}$ ,  $RH < 60\%$

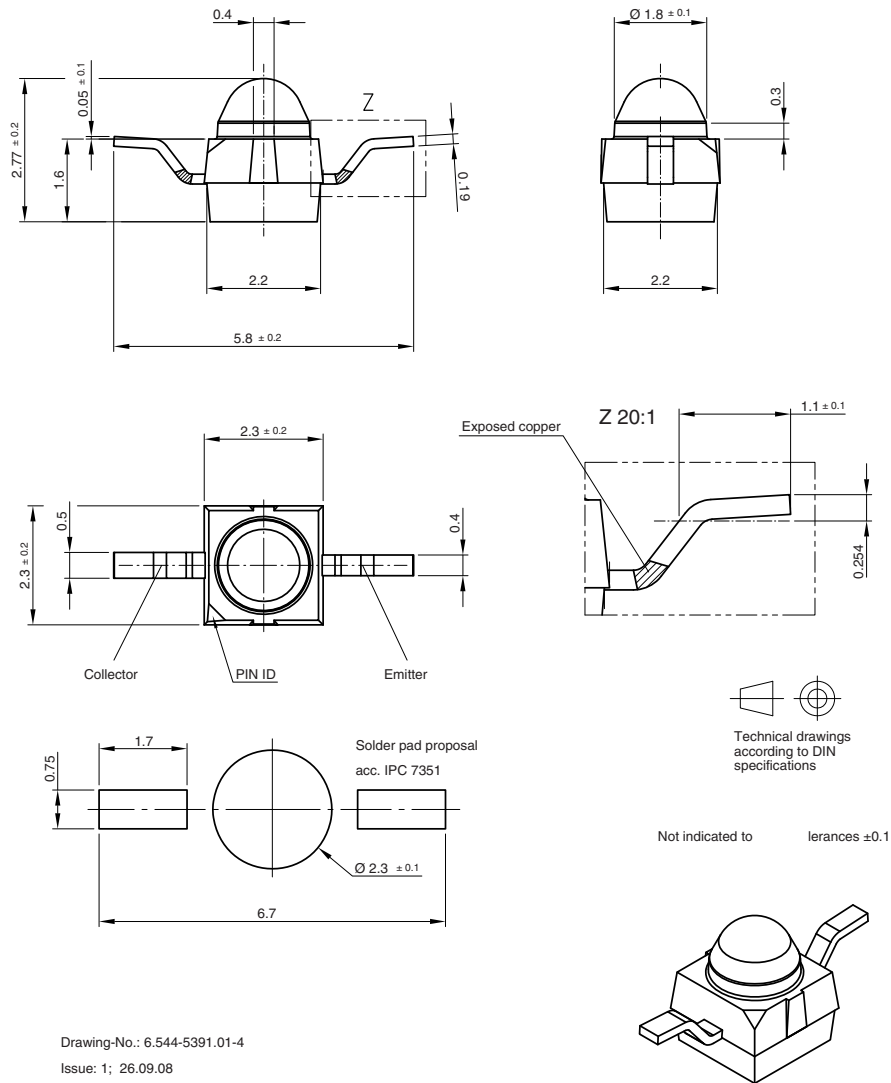
Moisture sensitivity level 2a, acc. to J-STD-020.

### DRYING

In case of moisture absorption devices should be baked before soldering. Conditions see J-STD-020 or label.

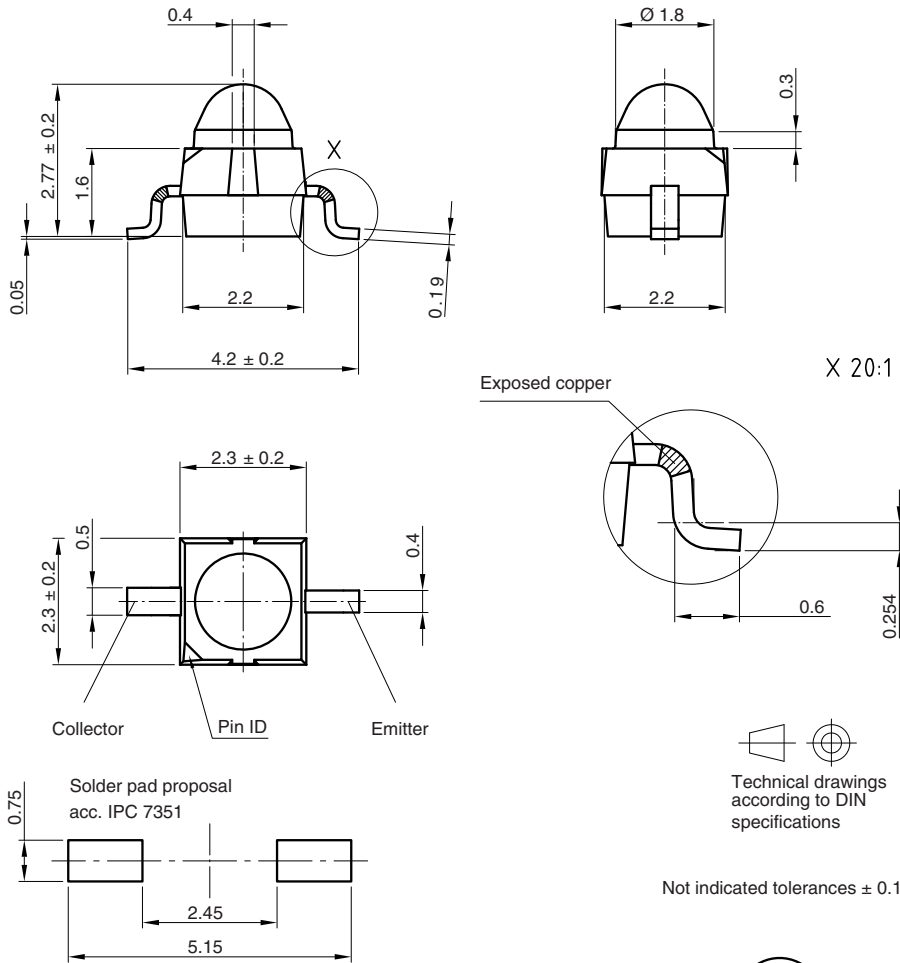
Devices taped on reel dry using recommended conditions 192 h at 40 °C (+ 5 °C),  $RH < 5\%$ .

### PACKAGE DIMENSIONS VENT2000X01 in millimeters

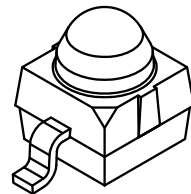




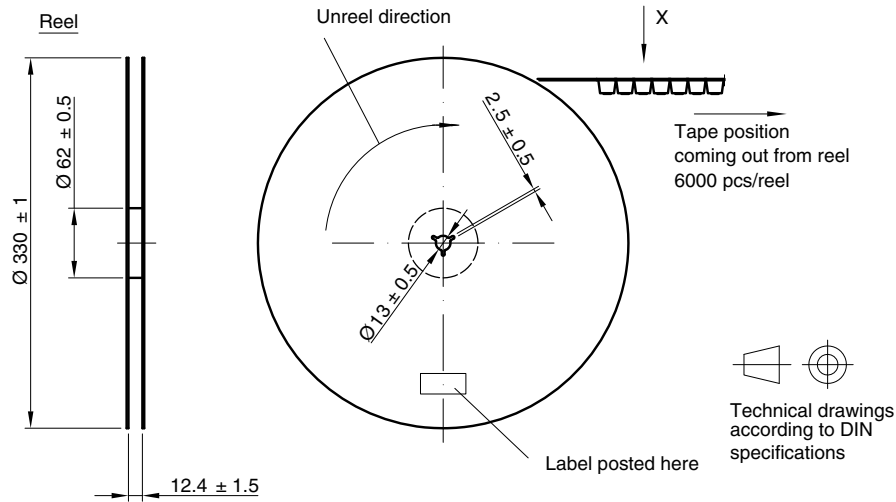
## PACKAGE DIMENSIONS VENT2020X01 in millimeters



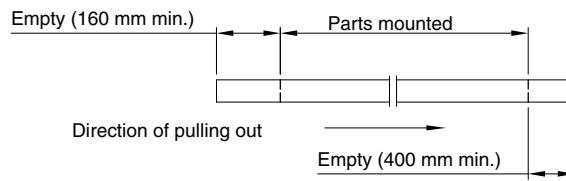
Drawing-No.: 6.544-5383.01-4  
Issue: 4; 28.01.09  
21569



## TAPE AND REEL DIMENSIONS VEMT2000X01 in millimeters

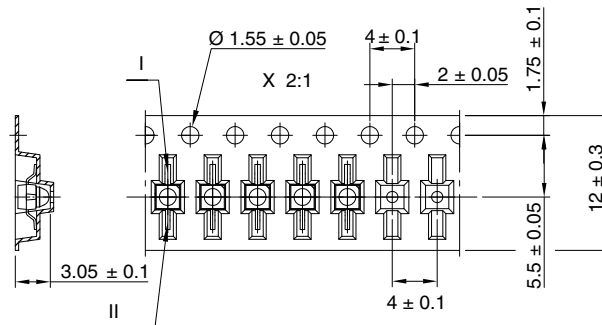


### Leader and trailer tape:



### Terminal position in tape

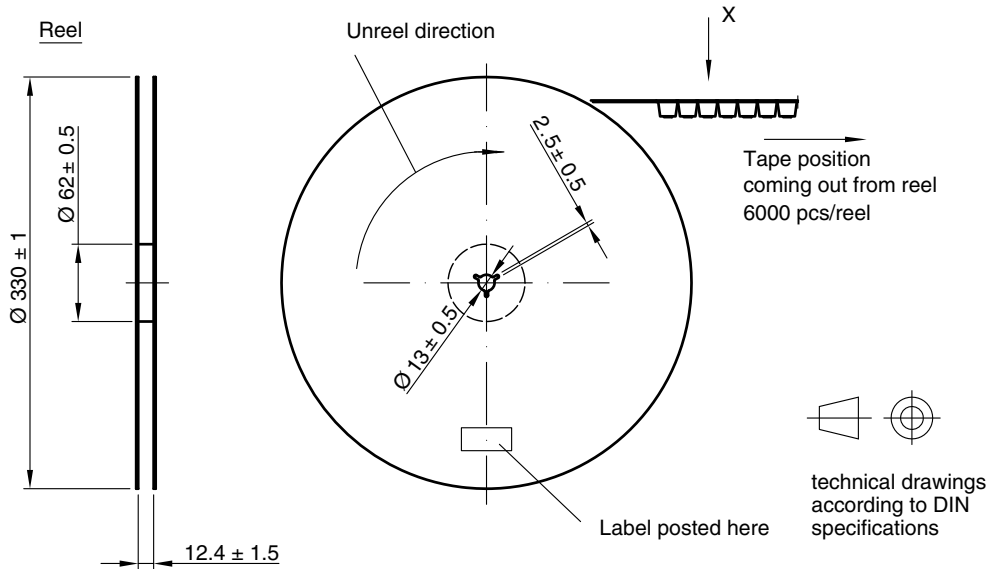
Device	Lead I	Lead II
VEMT2000	Collector	Emitter
VEMD2000	Cathode	Anode
VEMD2500		
VSMB2000		
VSMG2000	Anode	Cathode
VSMY2850RG	Anode	Cathode



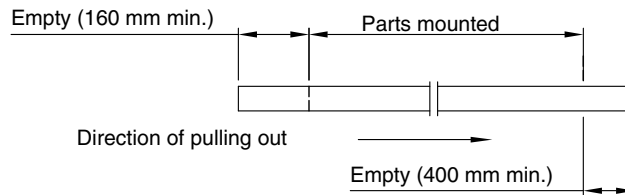
Drawing-No.: 9.800-5100.01-4  
 Issue: 2; 18.03.10  
 21572



**TAPE AND REEL DIMENSIONS VEMT2020X01** in millimeters

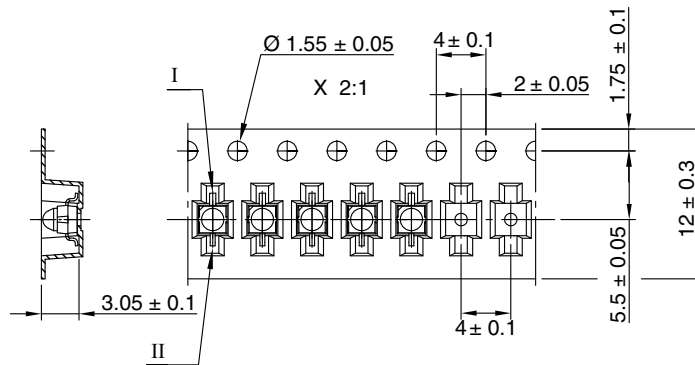


Leader and trailer tape:



Terminal position in tape

Device	Lead I	Lead II
VENT2020		
VENT2520	Collector	Emitter
VSMB2020		
VSMG2020	Cathode	Anode
VEMD2020		
VEMD2520		
VSMY2850G	Anode	Cathode



Drawing-No.: 9.800-5091.01-4

Issue: 3; 18.03.10

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