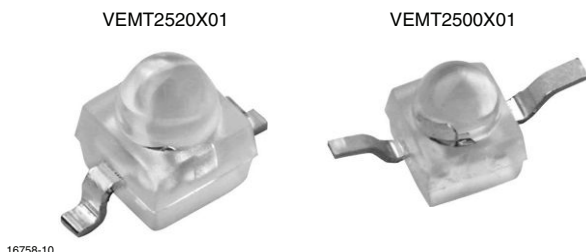


## Silicon NPN Phototransistor



16758-10

### DESCRIPTION

VENT2500X01 series are silicon NPN epitaxial planar phototransistors in a miniature dome lens, clear epoxy package for surface mounting. The device is sensitive to visible and near infrared radiation.

### 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
- Suitable for visible and near infrared radiation
- 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
- Halogen-free according to IEC 61249-2-21 definition

AUTOMOTIVE  
GRADE



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

### APPLICATIONS

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

### PRODUCT SUMMARY

| COMPONENT   | $I_{ca}$ (mA) | $\phi$ (deg) | $\lambda_{0.1}$ (nm) |
|-------------|---------------|--------------|----------------------|
| VENT2500X01 | 6             | $\pm 15$     | 470 to 1090          |
| VENT2520X01 | 6             | $\pm 15$     | 470 to 1090          |

#### Note

- Test condition see table "Basic Characteristics"

### ORDERING INFORMATION

| ORDERING CODE | PACKAGING     | REMARKS                      | PACKAGE FORM     |
|---------------|---------------|------------------------------|------------------|
| VENT2500X01   | Tape and reel | MOQ: 6000 pcs, 6000 pcs/reel | Reverse gullwing |
| VENT2520X01   | Tape and reel | MOQ: 6000 pcs, 6000 pcs/reel | Gullwing         |

#### Note

- MOQ: minimum order quantity

### ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25^\circ\text{C}$ , 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     | $T_{amb} \leq 75^\circ\text{C}$ | $P_V$     | 100           | mW               |
| Junction temperature        |                                 | $T_j$     | 100           | $^\circ\text{C}$ |
| Operating temperature range |                                 | $T_{amb}$ | - 40 to + 100 | $^\circ\text{C}$ |

## ABSOLUTE MAXIMUM RATINGS (T<sub>amb</sub> = 25 °C, unless otherwise specified)

| PARAMETER                           | TEST CONDITION             | SYMBOL            | VALUE         | UNIT |
|-------------------------------------|----------------------------|-------------------|---------------|------|
| Storage temperature range           |                            | T <sub>stg</sub>  | - 40 to + 100 | °C   |
| Soldering temperature               | Acc. reflow profile fig. 8 | T <sub>sd</sub>   | 260           | °C   |
| Thermal resistance junction/ambient | Acc. J-STD-051             | R <sub>thJA</sub> | 250           | K/W  |

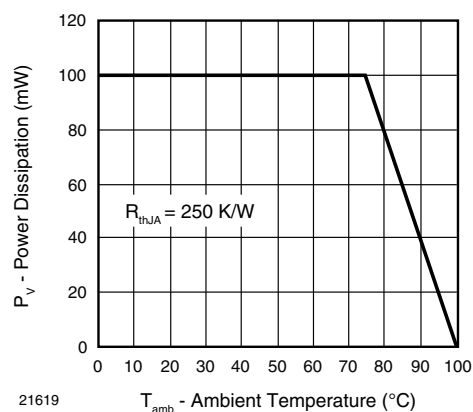


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

## BASIC CHARACTERISTICS (T<sub>amb</sub> = 25 °C, unless otherwise specified)

| PARAMETER                                  | TEST CONDITION                                                            | SYMBOL             | MIN. | TYP.        | MAX. | UNIT |
|--------------------------------------------|---------------------------------------------------------------------------|--------------------|------|-------------|------|------|
| Collector emitter breakdown voltage        | I <sub>C</sub> = 0.1 mA                                                   | V <sub>CEO</sub>   | 20   |             |      | V    |
| Collector dark current                     | V <sub>CE</sub> = 5 V, E = 0                                              | I <sub>CEO</sub>   |      | 1           | 100  | nA   |
| Collector emitter capacitance              | V <sub>CE</sub> = 0 V, f = 1 MHz, E = 0                                   | C <sub>CEO</sub>   |      | 25          |      | pF   |
| Collector light current                    | E <sub>e</sub> = 1 mW/cm <sup>2</sup> , λ = 950 nm, V <sub>CE</sub> = 5 V | I <sub>CA</sub>    | 3    | 6           | 9    | mA   |
| Angle of half sensitivity                  |                                                                           | φ                  |      | ± 15        |      | deg  |
| Wavelength of peak sensitivity             |                                                                           | λ <sub>p</sub>     |      | 850         |      | nm   |
| Range of spectral bandwidth                |                                                                           | λ <sub>0.1</sub>   |      | 470 to 1090 |      | nm   |
| Collector emitter saturation voltage       | I <sub>C</sub> = 0.05 mA                                                  | V <sub>CEsat</sub> |      |             | 0.4  | V    |
| Temperature coefficient of I <sub>ca</sub> | E <sub>e</sub> = 1 mW/cm <sup>2</sup> , λ = 950 nm, V <sub>CE</sub> = 5 V | Tk <sub>Ica</sub>  |      | 1.1         |      | %/K  |

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

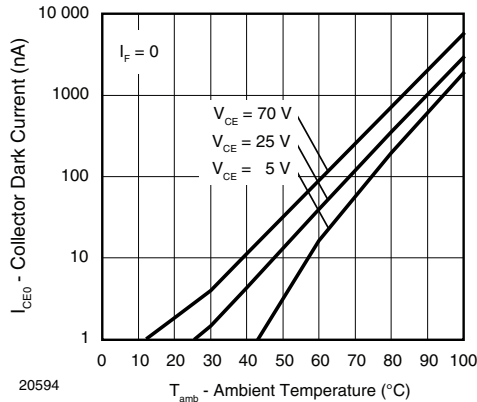


Fig. 2 - Collector Dark Current vs. Ambient Temperature

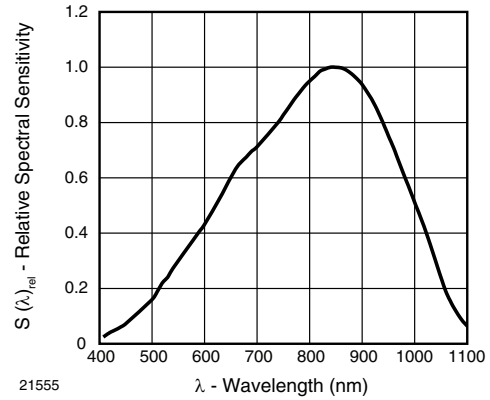


Fig. 5 - Relative Spectral Sensitivity vs. Wavelength

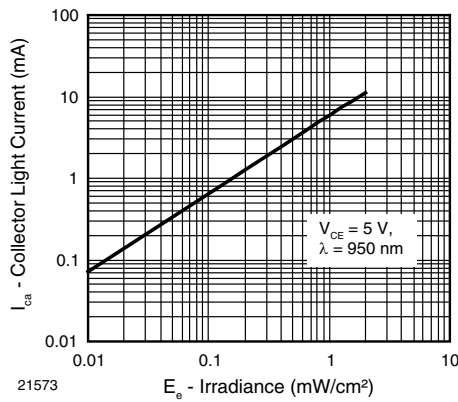


Fig. 3 - Collector Light Current vs. Irradiance

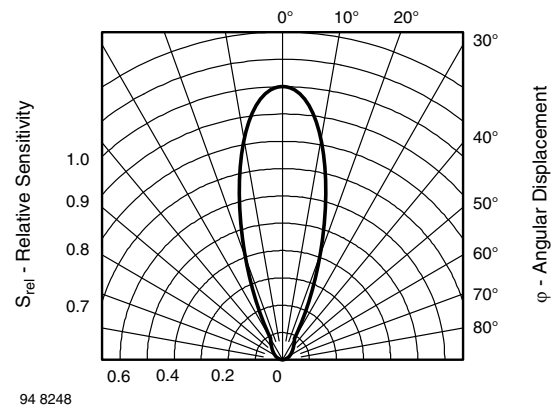


Fig. 6 - Relative Radiant Sensitivity vs. Angular Displacement

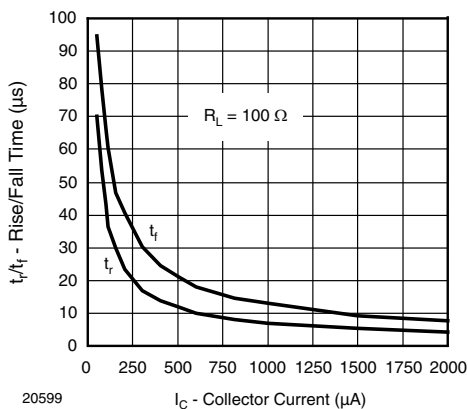


Fig. 4 - Rise/Fall Time vs. Collector Current

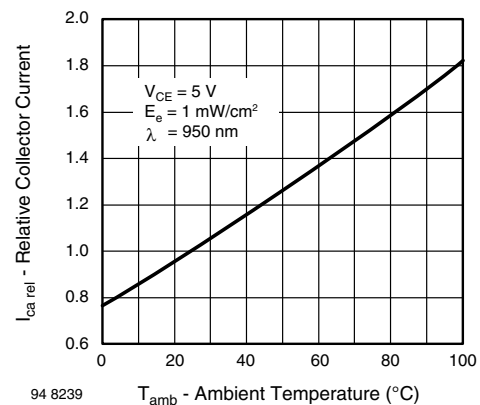


Fig. 7 - Relative Collector Current vs. Ambient Temperature

## REFLOW SOLDER PROFILE

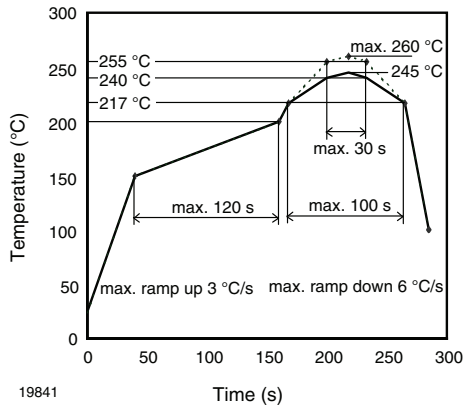


Fig. 8 - Lead (Pb)-free Reflow Solder Profile acc. J-STD-020

## 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

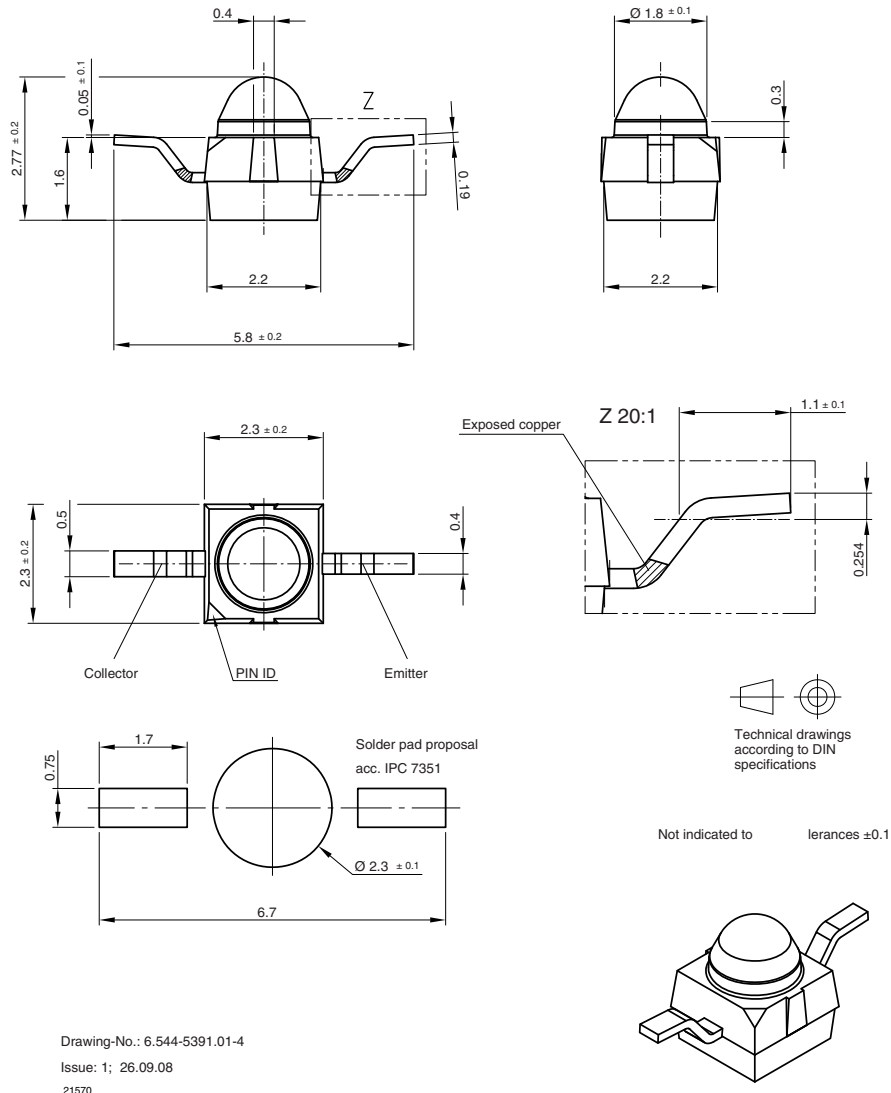
Conditions:  $T_{amb} < 30\text{ °C}$ , RH < 60 %

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 VENT2500X01 in millimeters



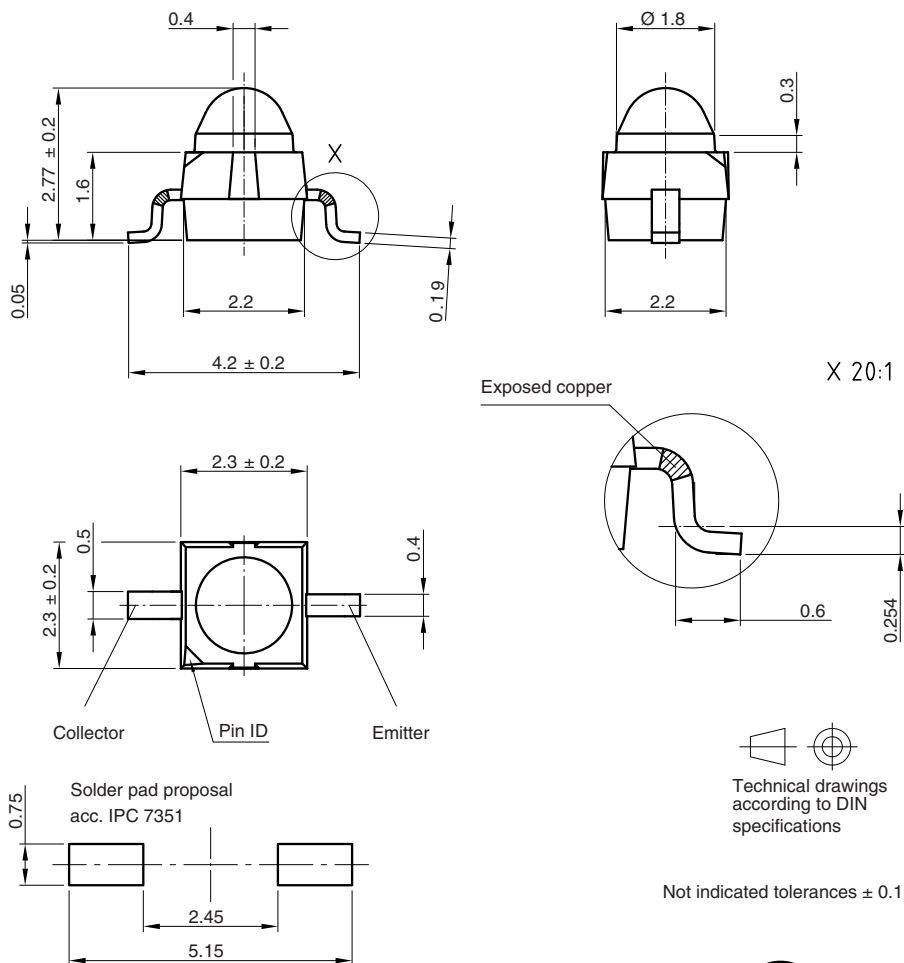


# VENT2500X01, VENT2520X01

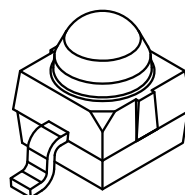
Silicon NPN Phototransistor

Vishay Semiconductors

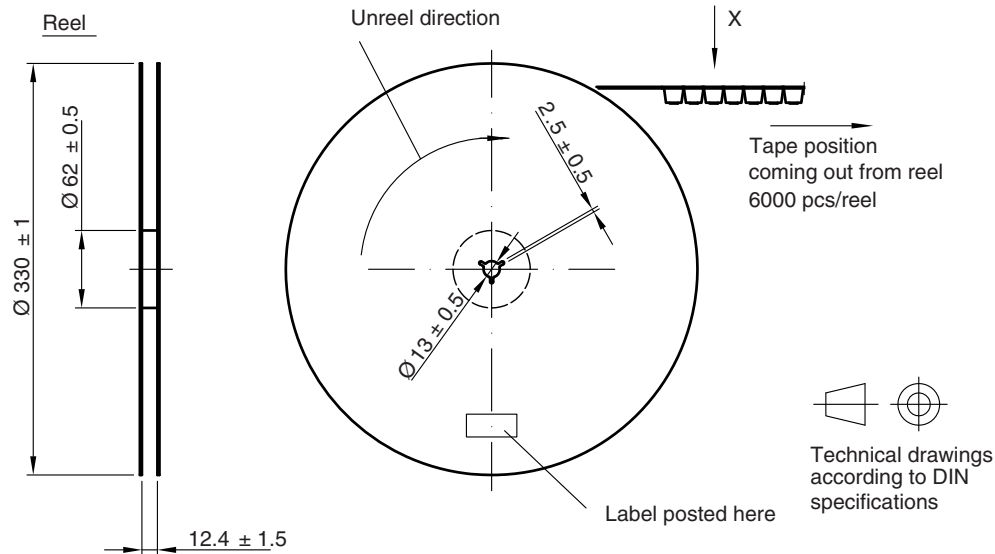
## PACKAGE DIMENSIONS VENT2520X01 in millimeters



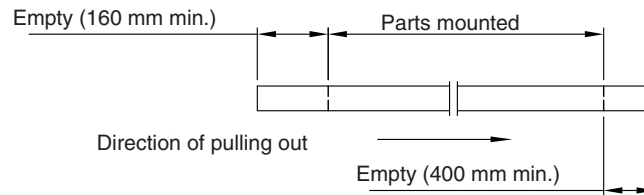
Drawing-No.: 6.544-5383.01-4  
Issue: 4; 28.01.09  
21569



## TAPE AND REEL DIMENSIONS VEMT2500X01 in millimeters

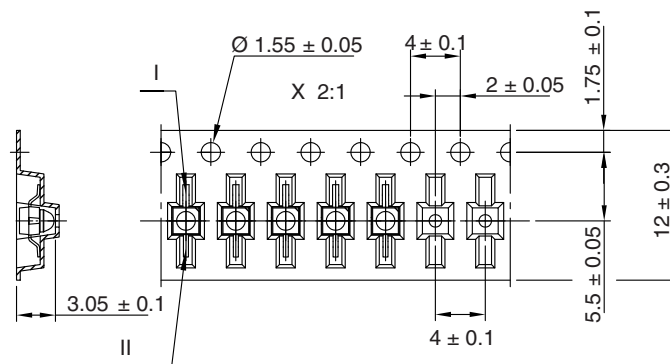


### Leader and trailer tape:



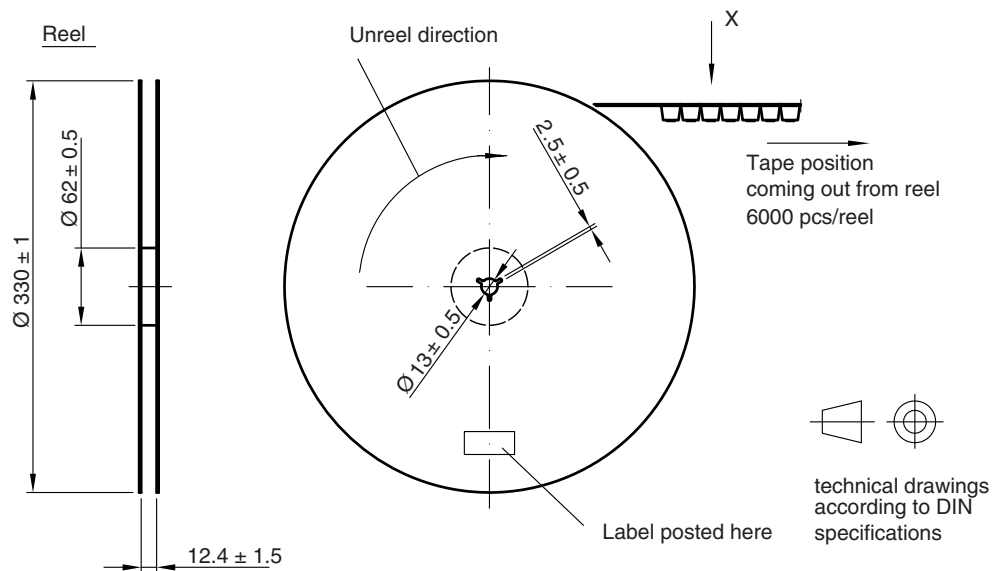
### Terminal position in tape

| Device     | Lead I    | Lead II |
|------------|-----------|---------|
| VENT2000   | Collector | Emitter |
| VEMT2500   |           |         |
| VEMD2000   | Cathode   | Anode   |
| VEMD2500   |           |         |
| VSMB2000   |           |         |
| VSMG2000   | Anode     | Cathode |
| VSMY2850RG |           |         |

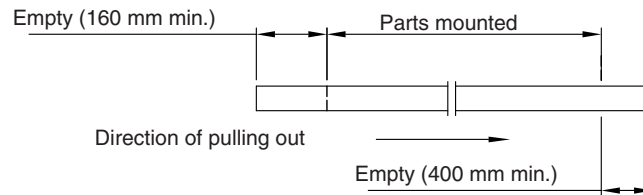


Drawing-No.: 9.800-5100.01-4  
Issue: 2; 18.03.10  
21572

## TAPE AND REEL DIMENSIONS VENT2520X01 in millimeters

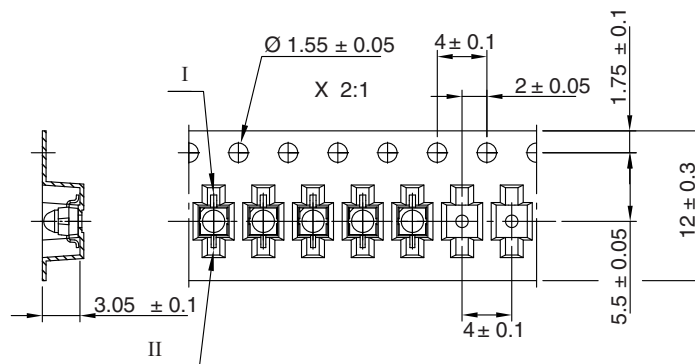


### Leader and trailer tape:



### Terminal position in tape

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



Drawing-No.: 9.800-5091.01-4

Issue: 3; 18.03.09

21571



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