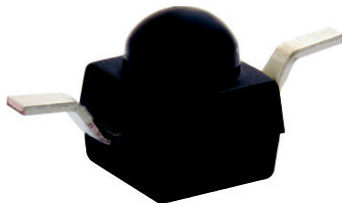




Silicon NPN Phototransistor



VENT2003X01



VENT2023X01

DESCRIPTION

VENT2003X01 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 2.55
- 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 VSMB2943RGX01 and VSMB2943GX01
- 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



APPLICATIONS

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

| PRODUCT SUMMARY | | | |
|-----------------|----------------------|--------------|----------------------|
| COMPONENT | I _{ca} (mA) | ϕ (deg) | $\lambda_{0.5}$ (nm) |
| VENT2003X01 | 2.7 | ± 35 | 790 to 970 |
| VENT2023X01 | 2.7 | ± 35 | 790 to 970 |

Note

- Test condition see table "Basic Characteristics"

| ORDERING INFORMATION | | | |
|----------------------|---------------|------------------------------|------------------|
| ORDERING CODE | PACKAGING | REMARKS | PACKAGE FORM |
| VENT2003X01 | Tape and reel | MOQ: 6000 pcs, 6000 pcs/reel | Reverse gullwing |
| VENT2023X01 | Tape and reel | MOQ: 6000 pcs, 6000 pcs/reel | Gullwing |

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 |

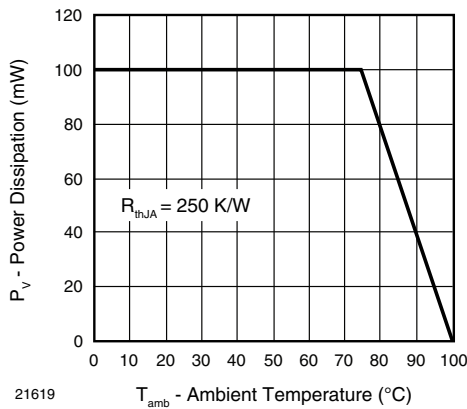


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

| 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 | | ϕ | | ± 35 | | deg |
| Wavelength of peak sensitivity | | λ_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

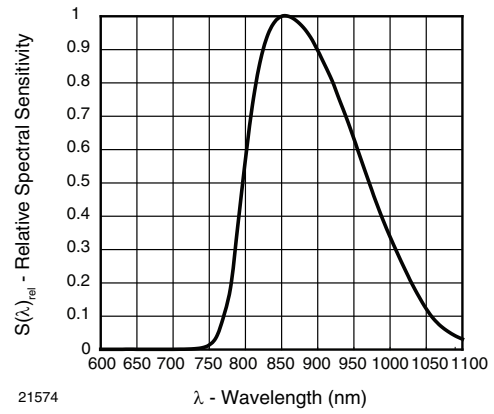


Fig. 5 - Relative Spectral Sensitivity vs. Wavelength

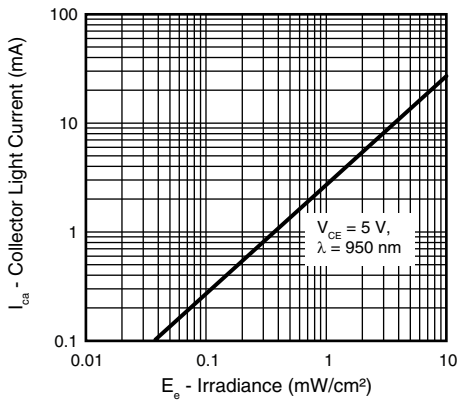


Fig. 3 - Collector Light Current vs. Irradiance

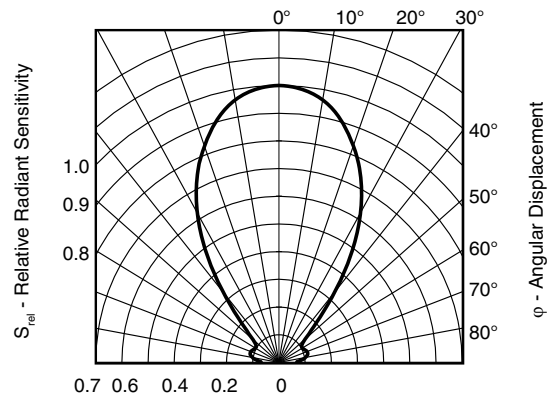


Fig. 6 - Relative Radiant Sensitivity vs. Angular Displacement



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

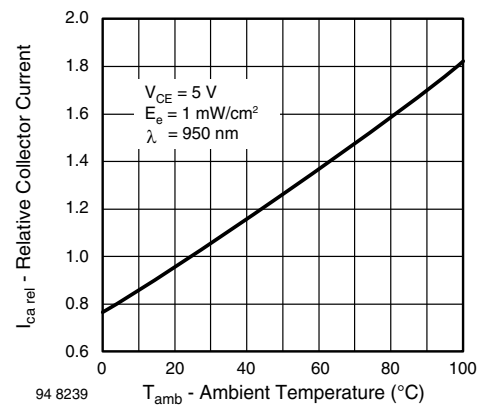


Fig. 7 - Relative Collector Current vs. Ambient Temperature

REFLOW SOLDER PROFILE

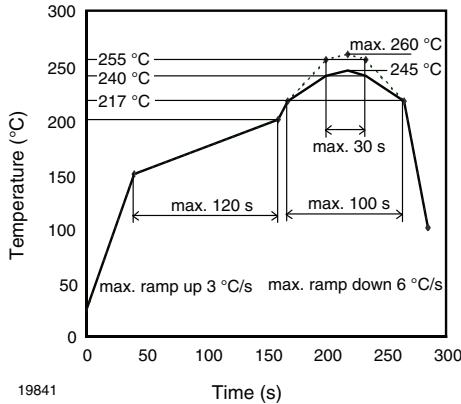


Fig. 8 - Lead (Pb)-free Reflow Solder Profile acc. J-STD-020

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

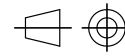
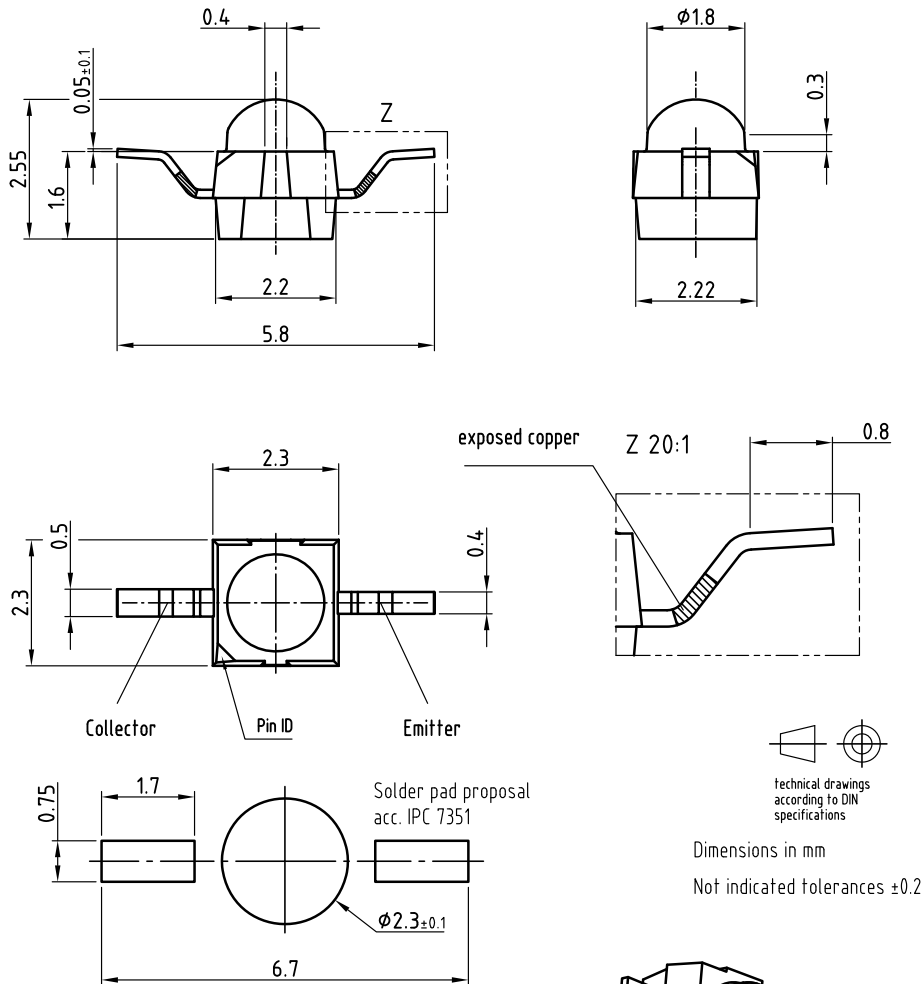
Conditions: $T_{amb} < 30\text{ }^{\circ}\text{C}$, RH < 60 %

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 °C (+ 5 °C), RH < 5 %.

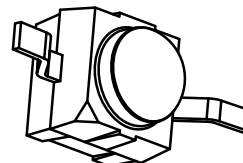
PACKAGE DIMENSIONS VEMT2003X01 in millimeters



technical drawings according to DIN specifications

Dimensions in mm

Not indicated tolerances ±0.2



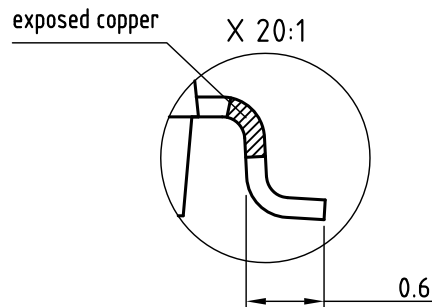
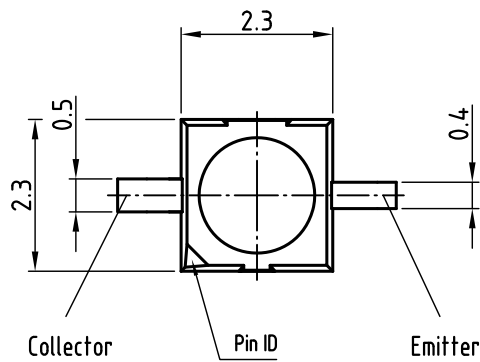
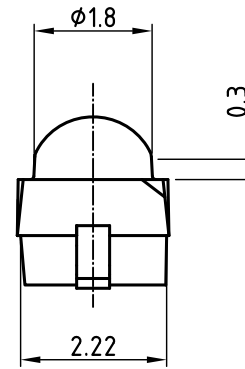
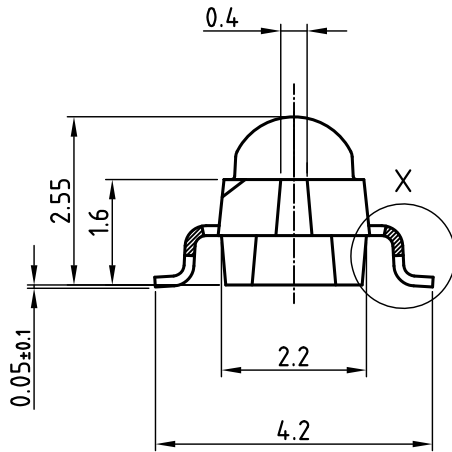
Drawing refers to following types: VEMT2x03X01

Drawing-No.: 6.544-5409.02-4

Issue: prel. 03.08.12



PACKAGE DIMENSIONS VEMT2023X01 in millimeters



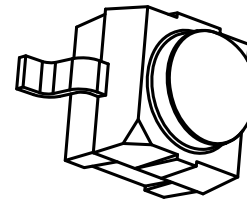
technical drawings according to DIN specifications

Dimensions in mm

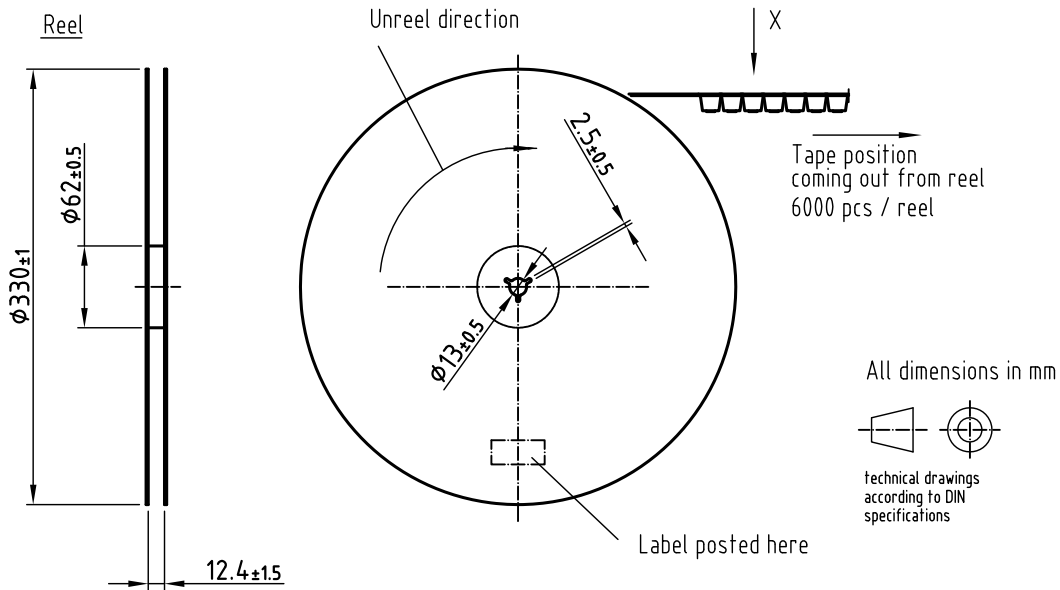
Not indicated tolerances ±0.2

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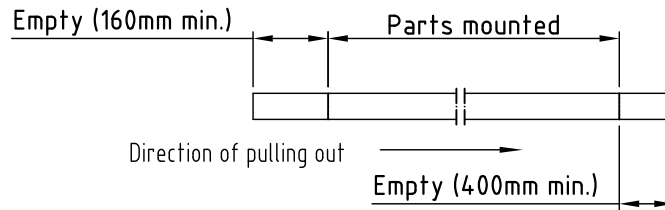
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Issue: prel; 03.08.12



TAPE AND REEL DIMENSIONS VENT2003X01 in millimeters

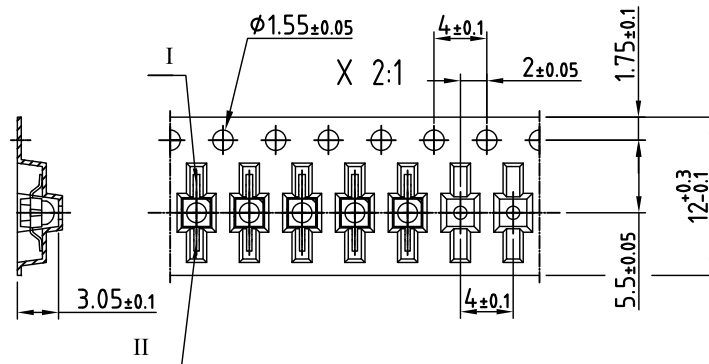


Leader and trailer tape:



Terminal position in tape

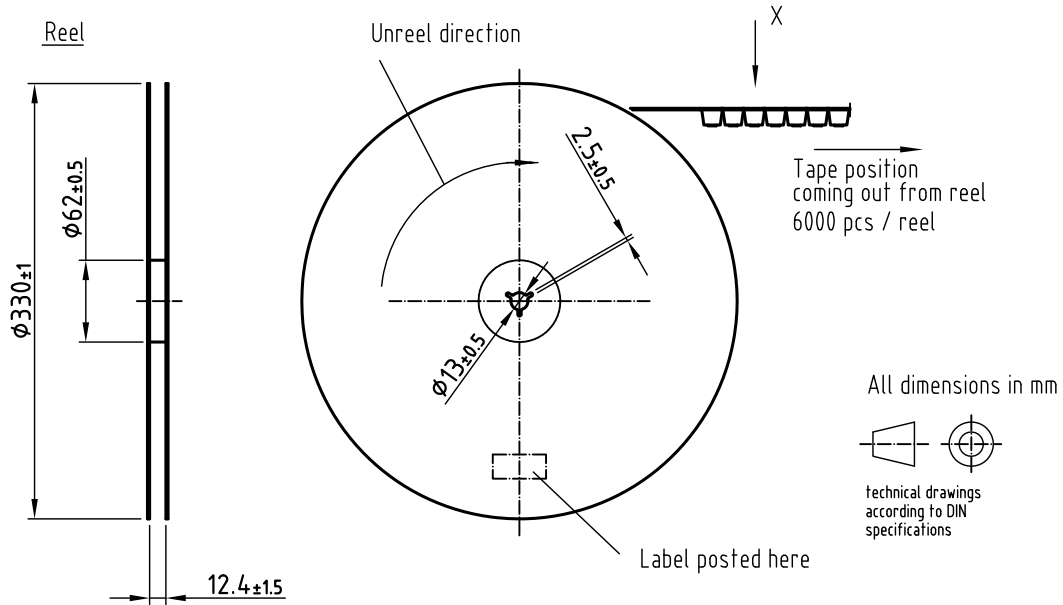
| Device | Lead I | Lead II |
|----------------|-----------|---------|
| V SMB2943RGX01 | Cathode | Anode |
| V SMF2893RGX01 | | |
| V EMD2x03X01 | | |
| V ENT2x03X01 | Collector | Emitter |
| V SMY2853RG | Anode | Cathode |



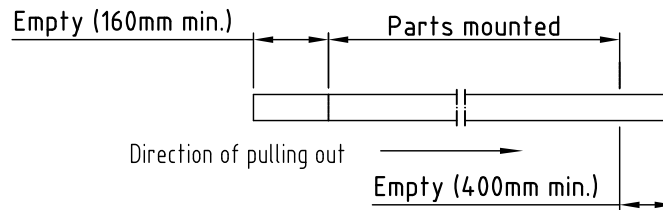
Drawing refers to following types: see table
Reel dimensions and tape

Drawing-No.: 9.800-5100.02-4
Issue: prel; 03.08.12

TAPE AND REEL DIMENSIONS VEMT2023X01 in millimeters

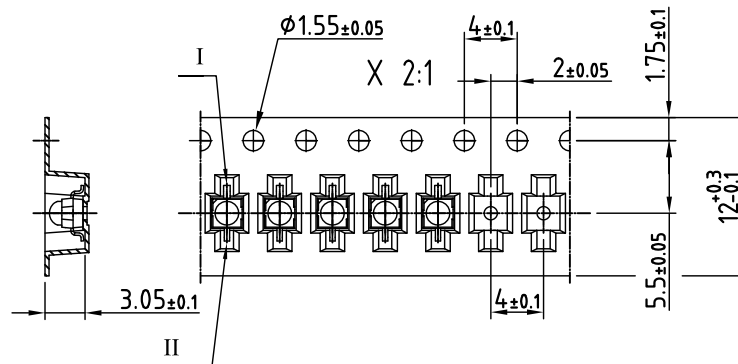


Leader and trailer tape:



Terminal position in tape

| Device | Lead I | Lead II |
|--------------|-----------|---------|
| VSMB2943GX01 | Cathode | Anode |
| VSMF2893GX01 | | |
| VEMD2x23X01 | | |
| VEMT2x23X01 | Collector | Emitter |
| VSMY2853G | Anode | Cathode |



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

Drawing-No.: 9.800-5091.21-4
Issue: prel; 03.08.12



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