

Silicon PIN Photodiode

VEMD2503X01

VEMD2523X01


DESCRIPTION

VEMD2503X01 and VEMD2523X01 are high speed and high sensitive PIN photodiodes in a miniature surface mount package (SMD) with dome lens. The clear epoxy allows light detection of a wide wavelength range from 350 nm to 1120 nm. The photo sensitive area of the chip is 0.23 mm².

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
- Suitable for visible and neat infrared radiation
- Fast response times
- Angle of half sensitivity: $\varphi = \pm 35^\circ$
- Package matched with IR emitter series VSMB2943X01
- 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

AUTOMOTIVE GRADE

e3
RoHS COMPLIANT
HALOGEN FREE
GREEN
(5-2008)

APPLICATIONS

- High speed photo detector
- Light curtain
- Detector for optical switch

PRODUCT SUMMARY

| COMPONENT | I _{ra} (μA) | φ (deg) | λ _{0.1} (nm) |
|-------------|----------------------|---------|-----------------------|
| VEMD2503X01 | 10 | ± 35 | 350 to 1120 |
| VEMD2523X01 | 10 | ± 35 | 350 to 1120 |

Note

- Test conditions see table "Basic Characteristics"

ORDERING INFORMATION

| ORDERING CODE | PACKAGING | REMARKS | PACKAGE FORM |
|---------------|---------------|------------------------------|------------------|
| VEMD2503X01 | Tape and reel | MOQ: 6000 pcs, 6000 pcs/reel | Reverse gullwing |
| VEMD2523X01 | Tape and reel | MOQ: 6000 pcs, 6000 pcs/reel | Gullwing |

Note

- MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)

| PARAMETER | TEST CONDITION | SYMBOL | VALUE | UNIT |
|-------------------------------------|-----------------------------------|-------------------|---------------|------|
| Reverse voltage | | V _R | 60 | V |
| Power dissipation | T _{amb} ≤ 25 °C | P _V | 215 | mW |
| Junction temperature | | T _j | 100 | °C |
| Operating temperature range | | T _{amb} | - 40 to + 100 | °C |
| Storage temperature range | | T _{stg} | - 40 to + 100 | °C |
| Soldering temperature | Acc. reflow solder profile fig. 7 | T _{sd} | 260 | °C |
| Thermal resistance junction/ambient | Acc. J-STD-051 | R _{thJA} | 250 | K/W |

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

| PARAMETER | TEST CONDITION | SYMBOL | MIN. | TYP. | MAX. | UNIT |
|----------------------------------|---|-----------------|------|-------------|------|------|
| Forward voltage | $I_F = 50 \text{ mA}$ | V_F | | 1 | | V |
| Breakdown voltage | $I_R = 100 \mu\text{A}, E = 0$ | $V_{(BR)}$ | 32 | | | V |
| Reverse dark current | $V_R = 10 \text{ V}, E = 0$ | I_{ro} | | 1 | 10 | nA |
| Diode capacitance | $V_R = 0 \text{ V}, f = 1 \text{ MHz}, E = 0$ | C_D | | 4 | | pF |
| | $V_R = 5 \text{ V}, f = 1 \text{ MHz}, E = 0$ | C_D | | 1.3 | | pF |
| Open circuit voltage | $E_e = 1 \text{ mW/cm}^2, \lambda = 950 \text{ nm}$ | V_o | | 350 | | mV |
| Temperature coefficient of V_o | $E_e = 1 \text{ mW/cm}^2, \lambda = 950 \text{ nm}$ | TK_{Vo} | | - 2.6 | | mV/K |
| Short circuit current | $E_e = 1 \text{ mW/cm}^2, \lambda = 950 \text{ nm}$ | I_k | | 10 | | µA |
| Temperature coefficient of I_k | $E_e = 1 \text{ mW/cm}^2, \lambda = 950 \text{ nm}$ | TK_{Ik} | | 0.1 | | %/K |
| Reverse light current | $E_e = 1 \text{ mW/cm}^2, \lambda = 950 \text{ nm}, V_R = 5 \text{ V}$ | I_{ra} | 7 | 10 | 14 | µA |
| Angle of half sensitivity | | φ | | ± 35 | | deg |
| Wavelength of peak sensitivity | | λ_p | | 900 | | nm |
| Range of spectral bandwidth | | $\lambda_{0.1}$ | | 350 to 1120 | | nm |
| Rise time | $V_R = 10 \text{ V}, R_L = 1 \text{ k}\Omega, \lambda = 820 \text{ nm}$ | t_r | | 100 | | ns |
| Fall time | $V_R = 10 \text{ V}, R_L = 1 \text{ k}\Omega, \lambda = 820 \text{ nm}$ | t_f | | 100 | | ns |

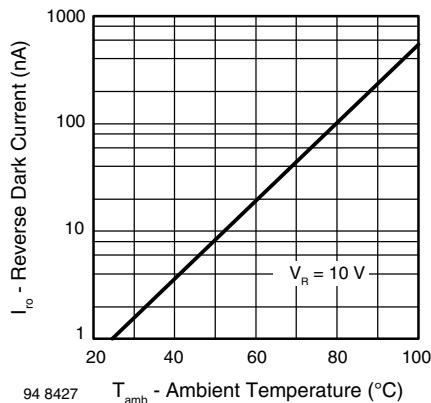
BASIC CHARACTERISTICS ($T_{amb} = 25^\circ\text{C}$, unless otherwise specified)


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

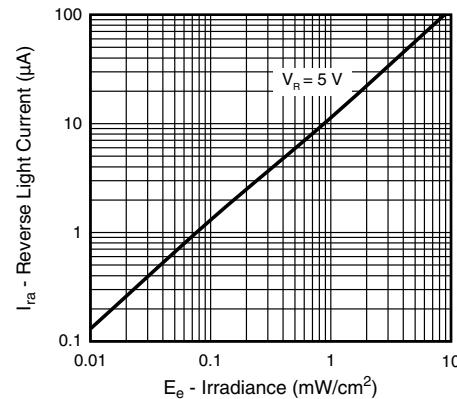


Fig. 3 - Reverse Light Current vs. Irradiance

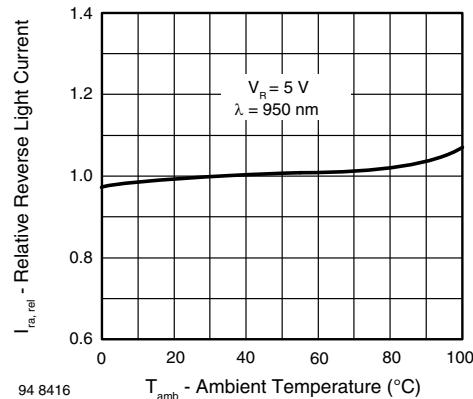


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

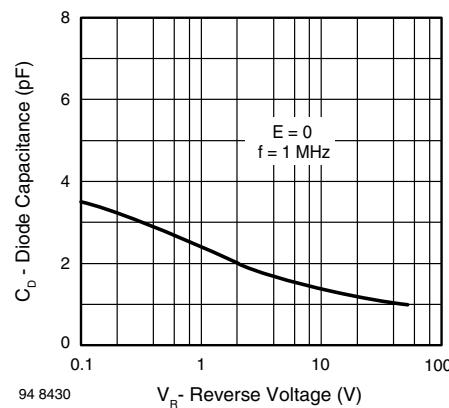


Fig. 4 - Diode Capacitance vs. Reverse Voltage

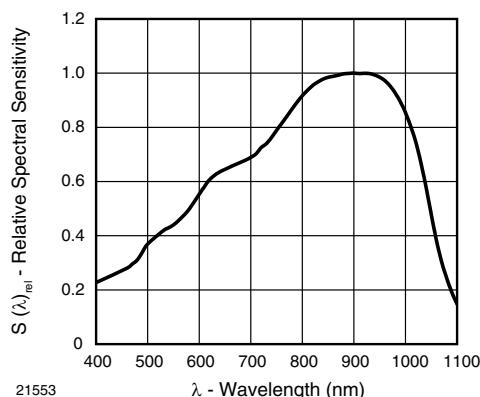


Fig. 5 - Relative Spectral Sensitivity vs. Wavelength

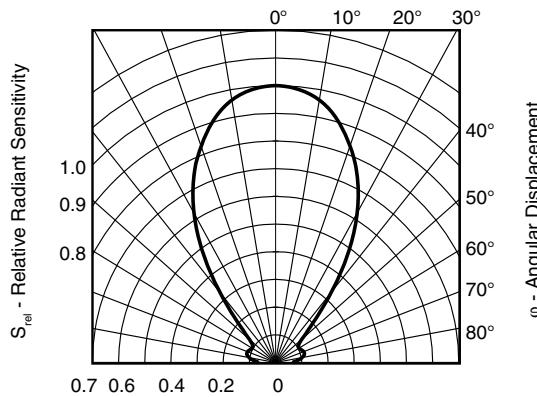


Fig. 6 - Relative Radiant Intensity vs. Angular Displacement

REFLOW SOLDER PROFILE

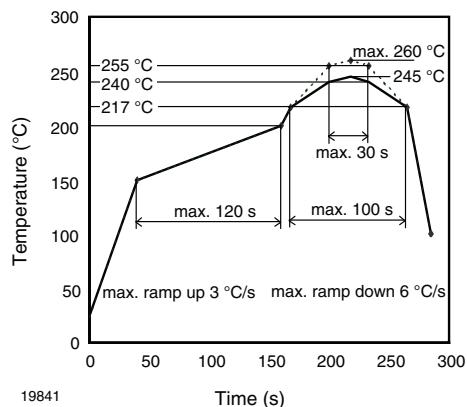


Fig. 7 - Lead (Pb)-free Reflow Solder Profile acc. J-STD-020D

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:

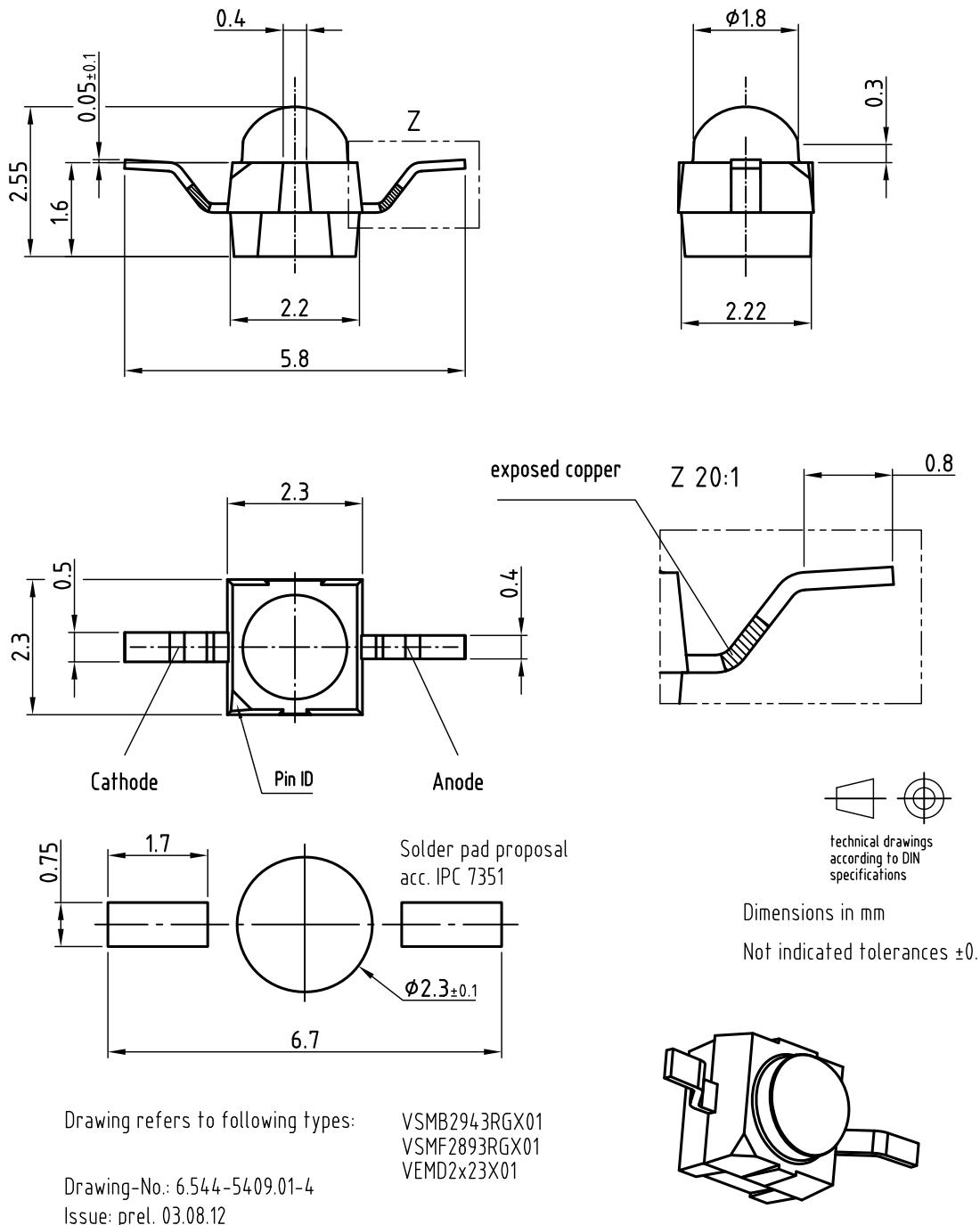
Floor life: 4 weeks

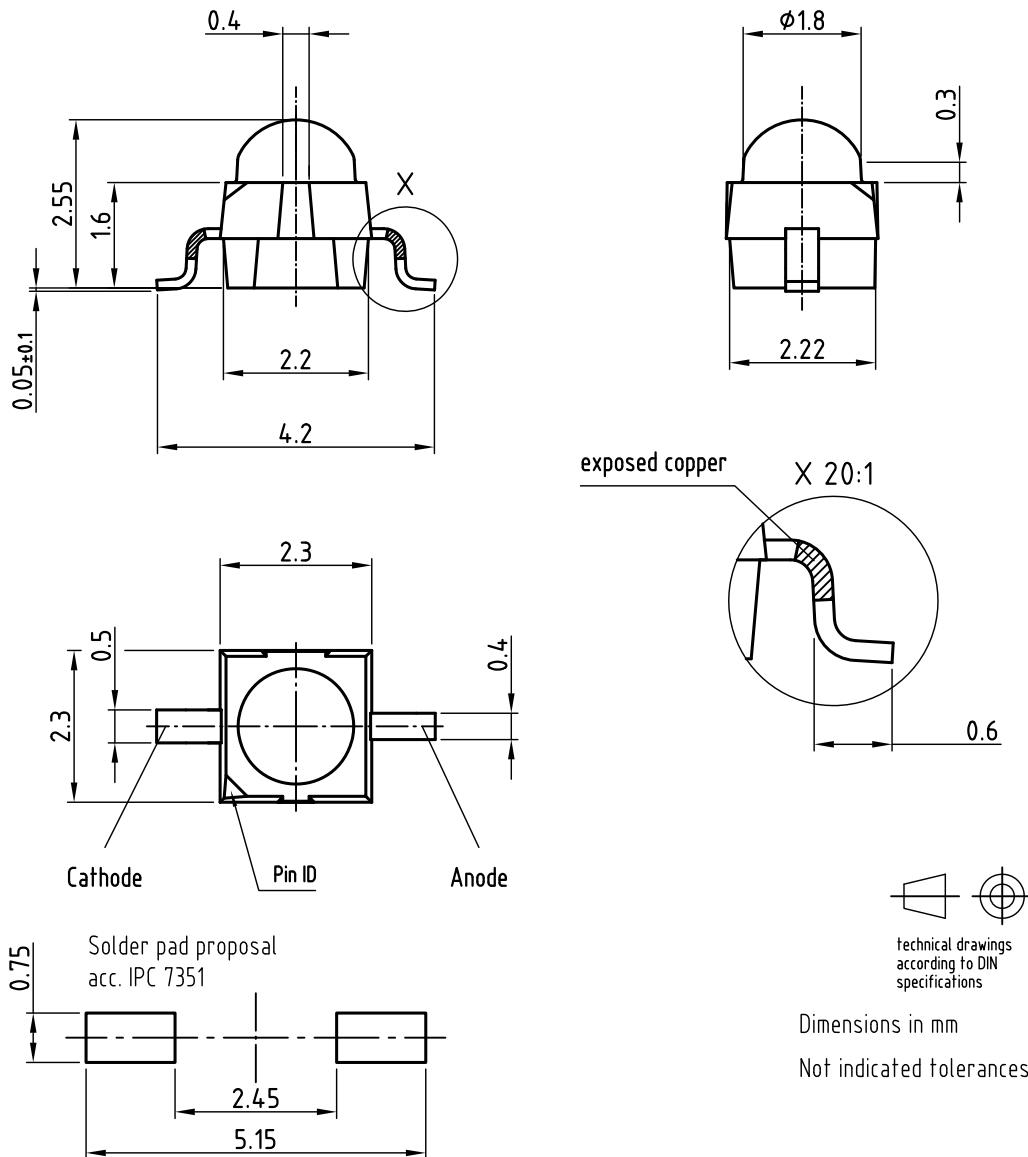
Conditions: $T_{amb} < 30^{\circ}\text{C}$, RH < 60 %

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 °C (+ 5 °C), RH < 5 %.

PACKAGE DIMENSIONS in millimeters: **VEMD2503**


PACKAGE DIMENSIONS in millimeters: **VEMD2523**


Drawing refers to following types:

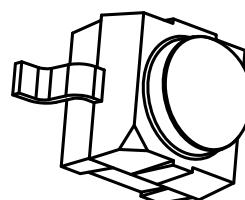
VSMB2943GX01

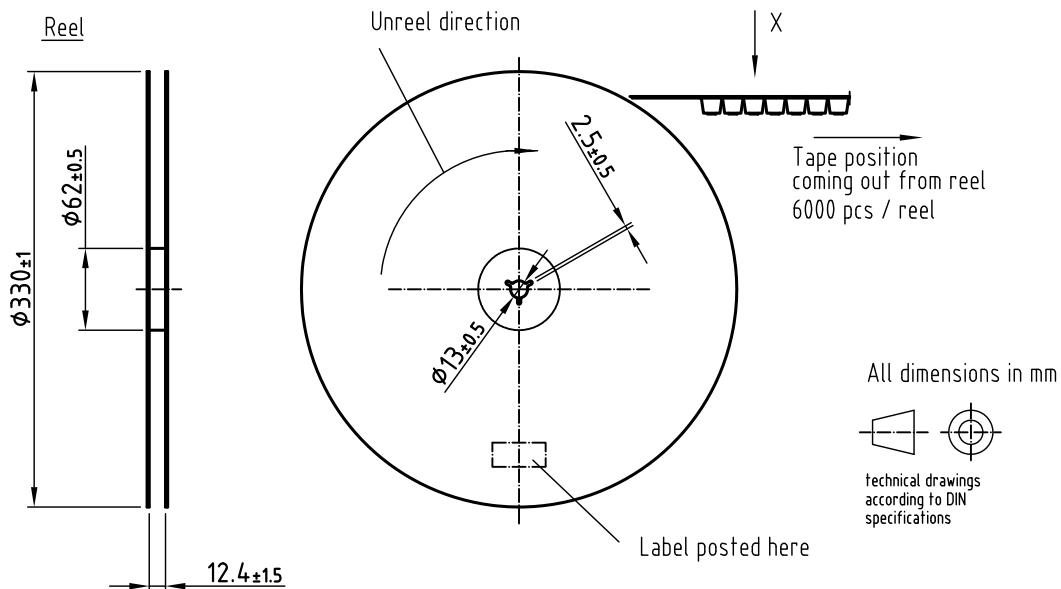
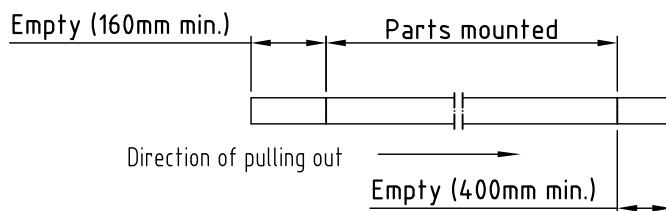
VSMF2893GX01

VEMD2x23X01

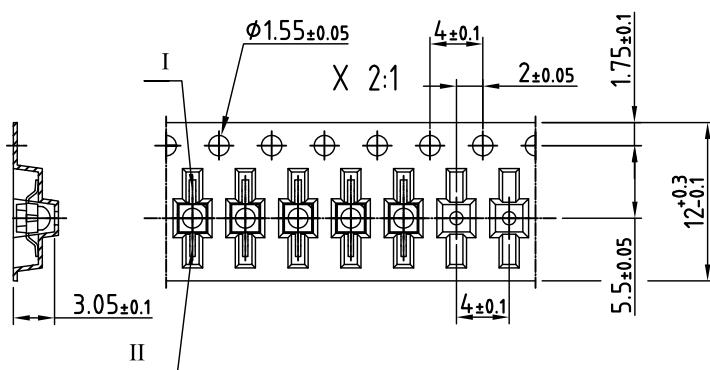
Drawing-No.: 6.544-5408.01-4

Issue: prel; 03.08.12



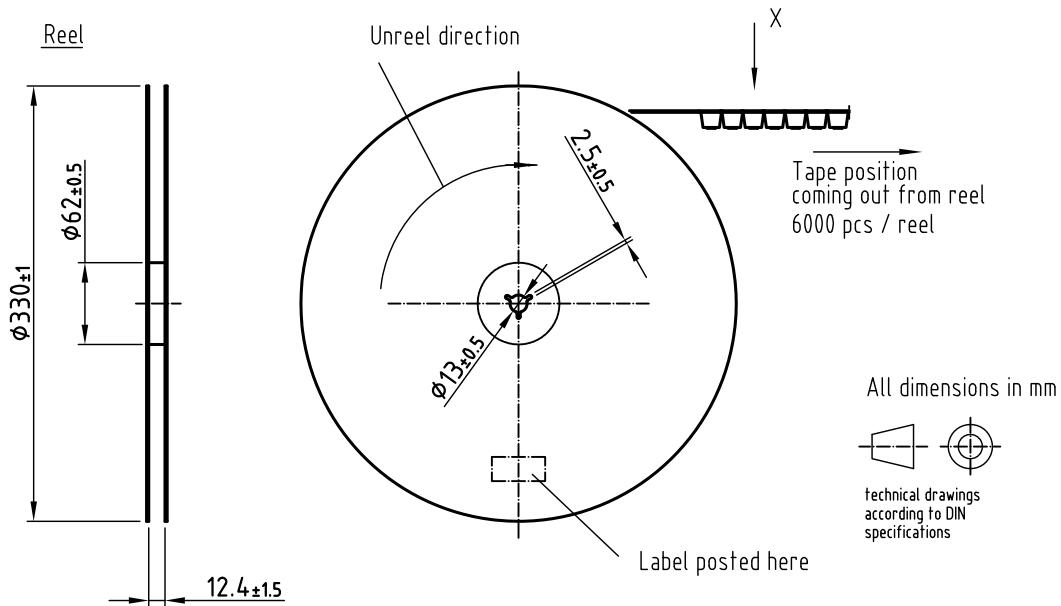
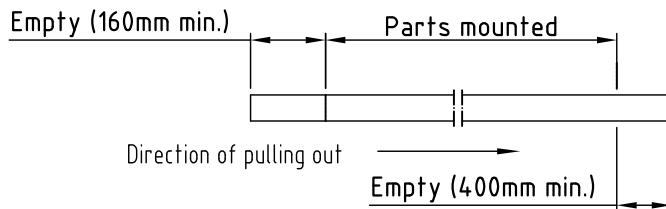
TAPING AND REEL DIMENSIONS in millimeters: **VEMD2503**

Leader and trailer tape:

Terminal position in tape

| Device | Lead I | Lead II |
|---------------|-----------|---------|
| VSMB2943RGX01 | | |
| VSMF2893RGX01 | Cathode | Anode |
| VEMD2x03X01 | | |
| VEMT2x03X01 | Collector | Emitter |
| VSMY2853RG | Anode | Cathode |

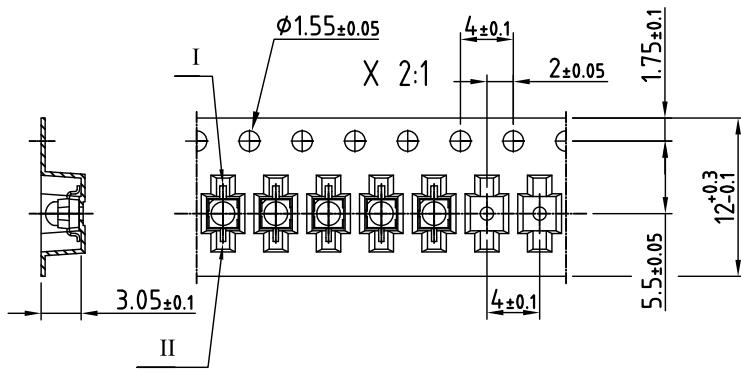


Drawing refers to following types: see table
Reel dimensions and tape

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

TAPING AND REEL DIMENSIONS in millimeters: **VEMD2523**

Leader and trailer tape:

Terminal position in tape

| Device | Lead I | Lead II |
|--------------|-----------|---------|
| VSMB2943GX01 | | |
| VSMF2893GX01 | Cathode | Anode |
| 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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