# High Speed Infrared Emitting Diodes, 940 nm, Surface Emitter Technology

VSMY294310RG VSMY294310G



## 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
- Peak wavelength: $\lambda_p$ = 940 nm
- High reliability
- High radiant power
- Very high radiant intensity
- Angle of half intensity: φ = ± 25°
- Suitable for high pulse current operation
- Terminal configurations: gullwing or reverse gullwing
- Package matches with detector VEMD2503X01 series
- Floor life: 4 weeks, MSL 2a, acc. J-STD-020
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free
e3
RoHS COMPLIANT
HALOGEN FREE
GREEN (5-2008)

## DESCRIPTION

As part of the SurfLight™ portfolio, the VSMY294310 series are infrared, 940 nm emitting diodes based on GaAlAs surface emitter chip technology with extreme high radiant intensities, high optical power and high speed, molded in clear, untinted plastic packages (with lens) for surface mounting (SMD).

## APPLICATIONS

- Miniature light barrier
- Photointerrupters
- Optical switch
- Emitter source for proximity sensors
- IR illumination

**PRODUCT SUMMARY**

| COMPONENT | $I_e$ (mW/sr) | φ (deg) | $\lambda_p$ (nm) | $t_r$ (ns) |
|---|---|---|---|---|
| VSMY294310RG | 25 | ± 25 | 940 | 10 |
| VSMY294310G | 25 | ± 25 | 940 | 10 |

**Note**

- Test conditions see table “Basic Characteristics“

**ORDERING INFORMATION**

| ORDERING CODE | PACKAGING | REMARKS | PACKAGE FORM |
|---|---|---|---|
| VSMY294310RG | Tape and reel | MOQ: 6000 pcs, 6000 pcs/reel | Reverse gullwing |
| VSMY294310G | Tape and reel | MOQ: 6000 pcs, 6000 pcs/reel | Gullwing |

**Note**

- MOQ: minimum order quantity


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| **ABSOLUTE MAXIMUM RATINGS** ($T_{amb}$ = 25 °C, unless otherwise specified) | | | | |
|---|---|---|---|---|
| **PARAMETER** | **TEST CONDITION** | **SYMBOL** | **VALUE** | **UNIT** |
| Reverse voltage | | $V_R$ | 5 | V |
| Forward current | | $I_F$ | 70 | mA |
| Surge forward current | $t_p$ = 100 µs | $I_{FSM}$ | 1 | A |
| Power dissipation | | $P_V$ | 140 | mW |
| Junction temperature | | $T_j$ | 100 | °C |
| Operating temperature range | | $T_{amb}$ | -40 to +85 | °C |
| Storage temperature range | | $T_{stg}$ | -40 to +100 | °C |
| Soldering temperature | Acc. figure 7, J-STD-020 | $T_{sd}$ | 260 | °C |
| Thermal resistance junction/ambient | J-STD-051, soldered on PCB | $R_{thJA}$ | 250 | K/W |

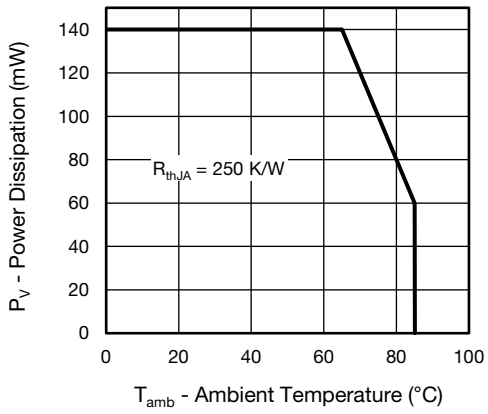


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

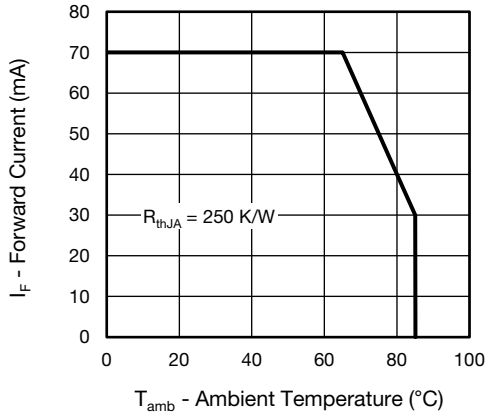


Fig. 2 - Forward Current Limit vs. Ambient Temperature

| **BASIC CHARACTERISTICS** ($T_{amb}$ = 25 °C, unless otherwise specified) | | | | | | |
|---|---|---|---|---|---|---|
| **PARAMETER** | **TEST CONDITION** | **SYMBOL** | **MIN.** | **TYP.** | **MAX.** | **UNIT** |
| Forward voltage | $I_F$ = 70 mA, $t_p$ = 20 ms | $V_F$ | - | 1.5 | 2.0 | V |
| | $I_F$ = 1 A, $t_p$ = 100 µs | $V_F$ | - | 2.5 | - | V |
| Temperature coefficient of $V_F$ | $I_F$ = 20 mA | $TK_{VF}$ | - | -1.7 | - | mV/K |
| Reverse current | | $I_R$ | not designed for reverse operation | | | µA |
| Junction capacitance | $V_R$ = 0 V, f = 1 MHz, E = 0 mW/cm² | $C_J$ | - | 5 | - | pF |
| Radiant intensity | $I_F$ = 70 mA, $t_p$ = 20 ms | $I_e$ | 12 | 25 | 45 | mW/sr |
| | $I_F$ = 1 A, $t_p$ = 100 µs | $I_e$ | - | 260 | - | mW/sr |
| Radiant power | $I_F$ = 70 mA, $t_p$ = 20 ms | $\phi_e$ | - | 40 | - | mW |
| Temperature coefficient of radiant power | $I_F$ = 70 mA | $TK\phi_e$ | - | -0.2 | - | %/K |
| Angle of half intensity | | $\varphi$ | - | ± 25 | - | deg |
| Peak wavelength | $I_F$ = 20 mA | $\lambda_p$ | 920 | 940 | 960 | nm |
| Spectral bandwidth | $I_F$ = 20 mA | $\Delta\lambda$ | - | 35 | - | nm |
| Temperature coefficient of $\lambda_p$ | $I_F$ = 20 mA | $TK\lambda_p$ | - | 0.25 | - | nm/K |
| Rise time | $I_F$ = 70 mA, 20 % to 80 % | $t_r$ | - | 10 | - | ns |
| Fall time | $I_F$ = 70 mA, 20 % to 80 % | $t_f$ | - | 10 | - | ns |



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**BASIC CHARACTERISTICS** ($T_{amb}$ = 25 °C, unless otherwise specified)

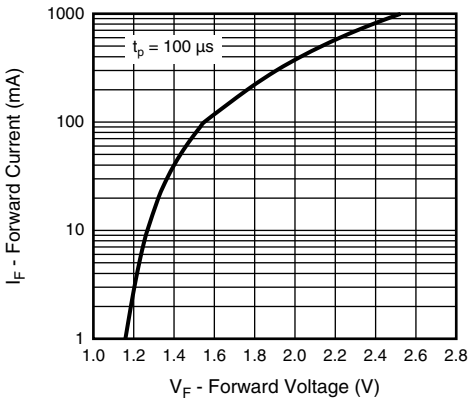


Fig. 3 - Forward Current vs. Forward Voltage

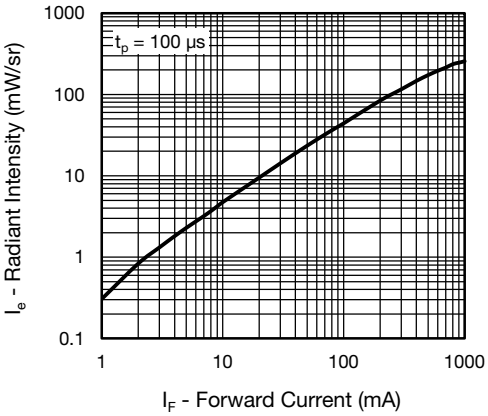


Fig. 6 - Radiant Intensity vs. Forward Current

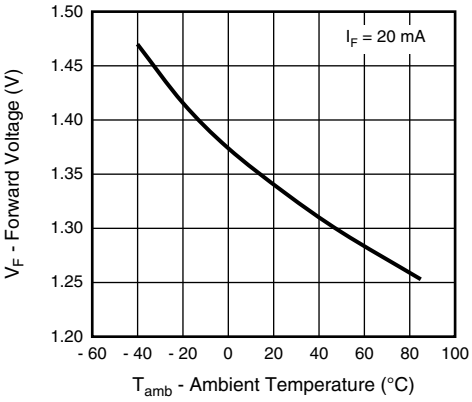


Fig. 4 - Forward Voltage vs. Ambient Temperature

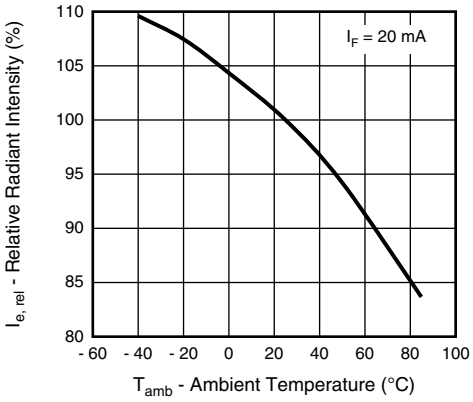


Fig. 7 - Relative Radiant Intensity vs. Ambient Temperature

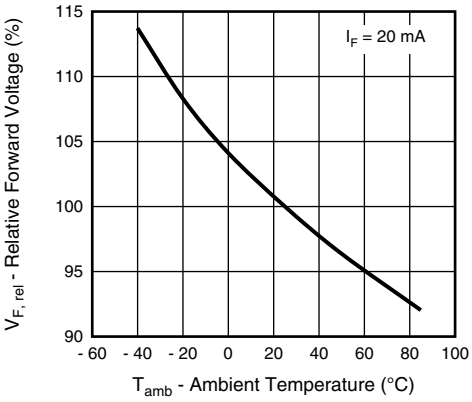


Fig. 5 - Relative Forward Voltage vs. Ambient Temperature

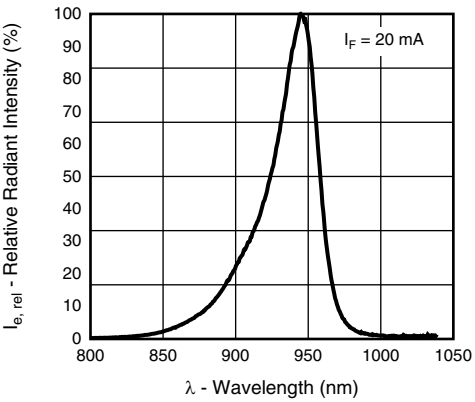


Fig. 8 - Relative Radiant Intensity vs. Wavelength


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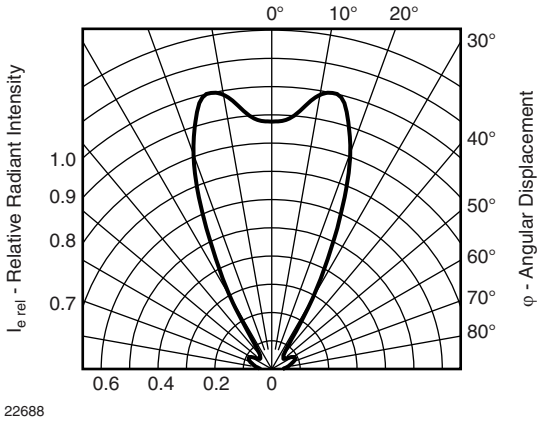


Fig. 9 - Relative Radiant Intensity vs. Angular Displacement

## SOLDER PROFILE

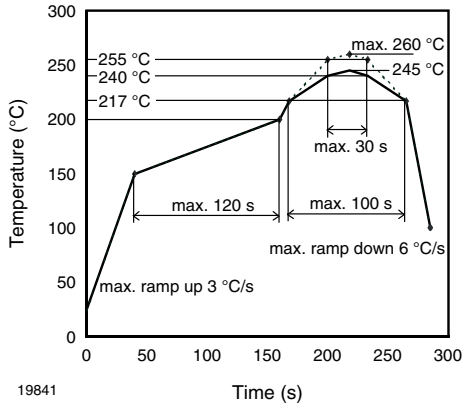


Fig. 10 - Lead (Pb)-free Reflow Solder Profile acc. J-STD-020

## 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 °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 %.


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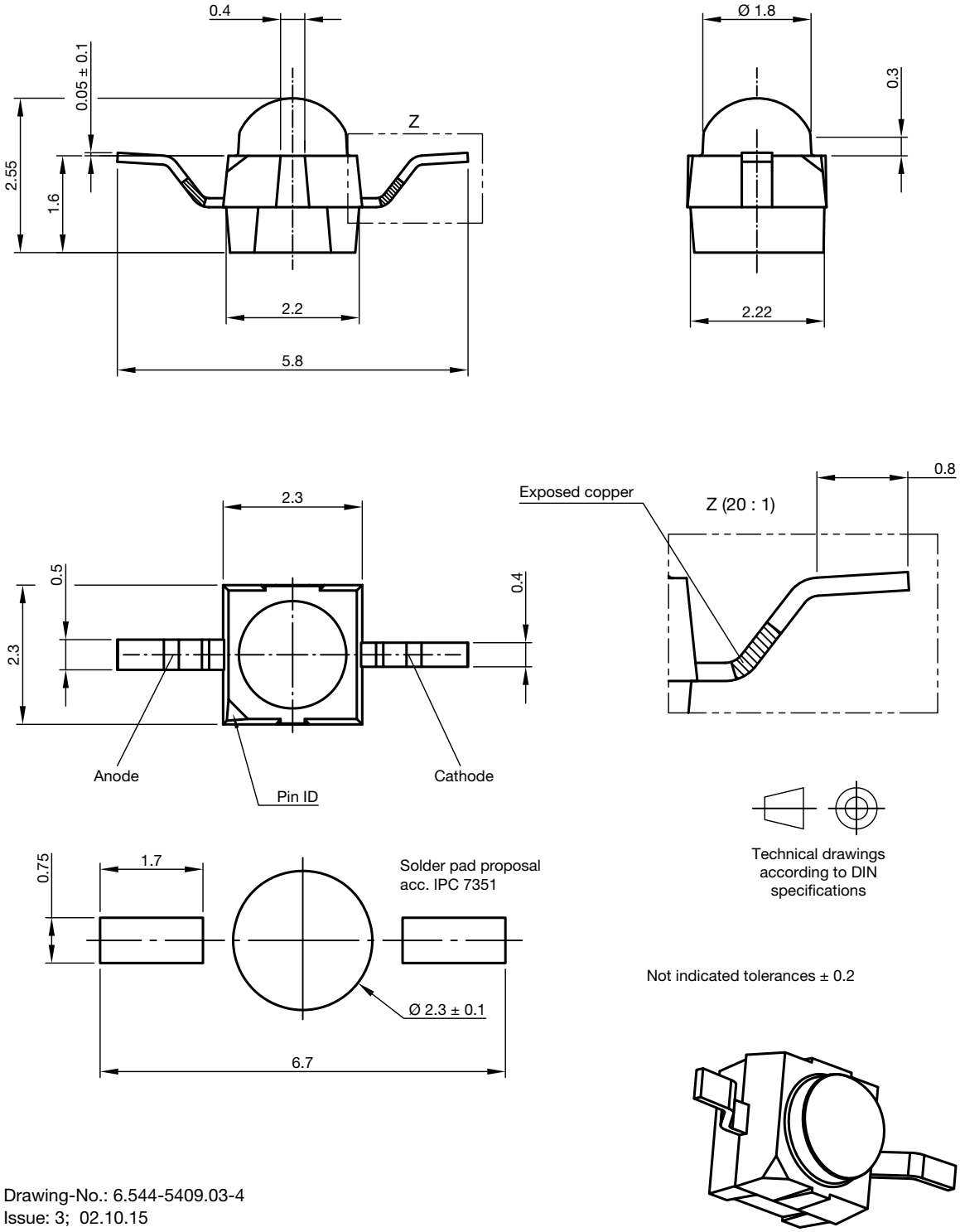
**PACKAGE DIMENSIONS** in millimeters: **VSMY294310RG**

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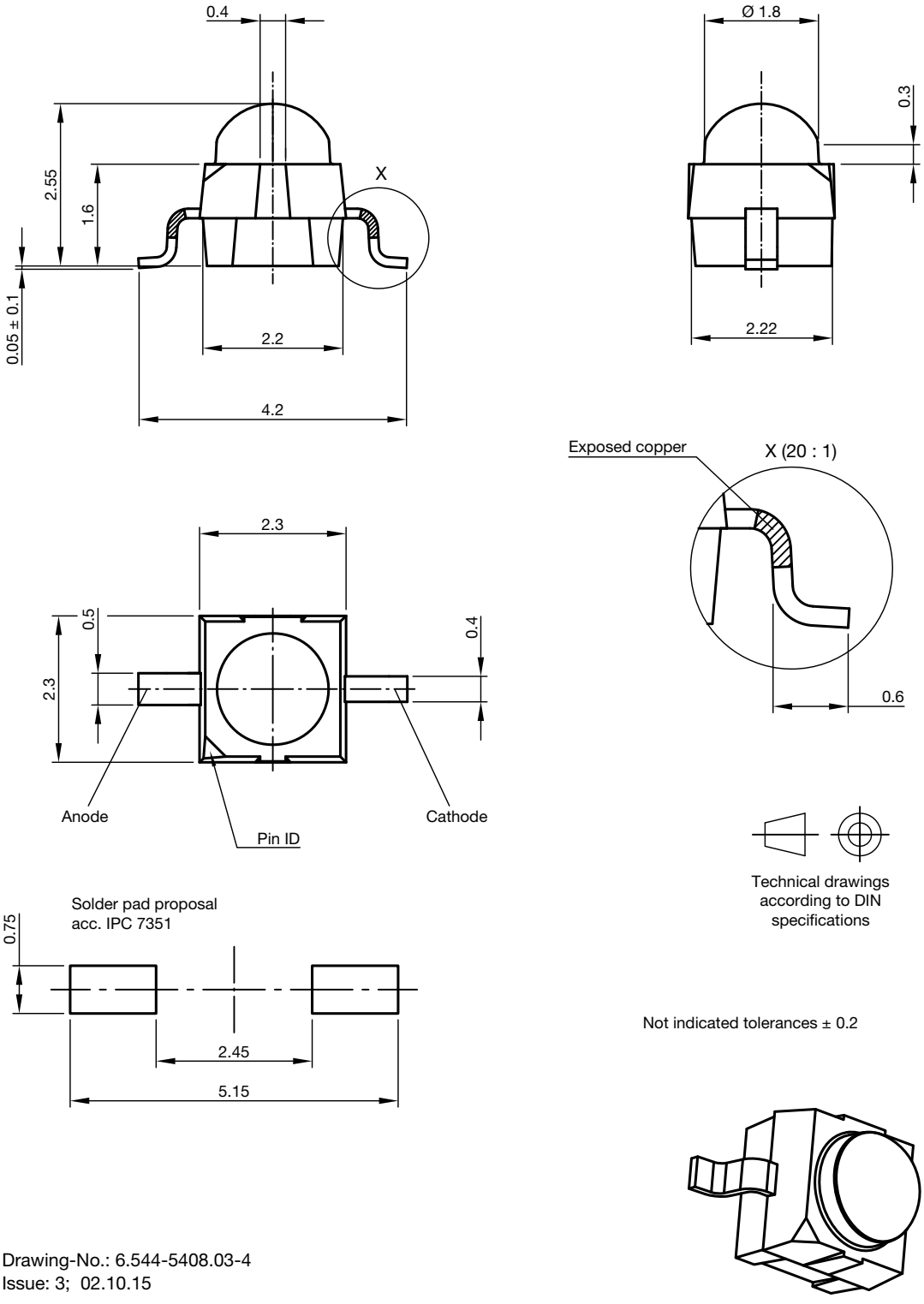
**PACKAGE DIMENSIONS** in millimeters: **VSMY294310G**

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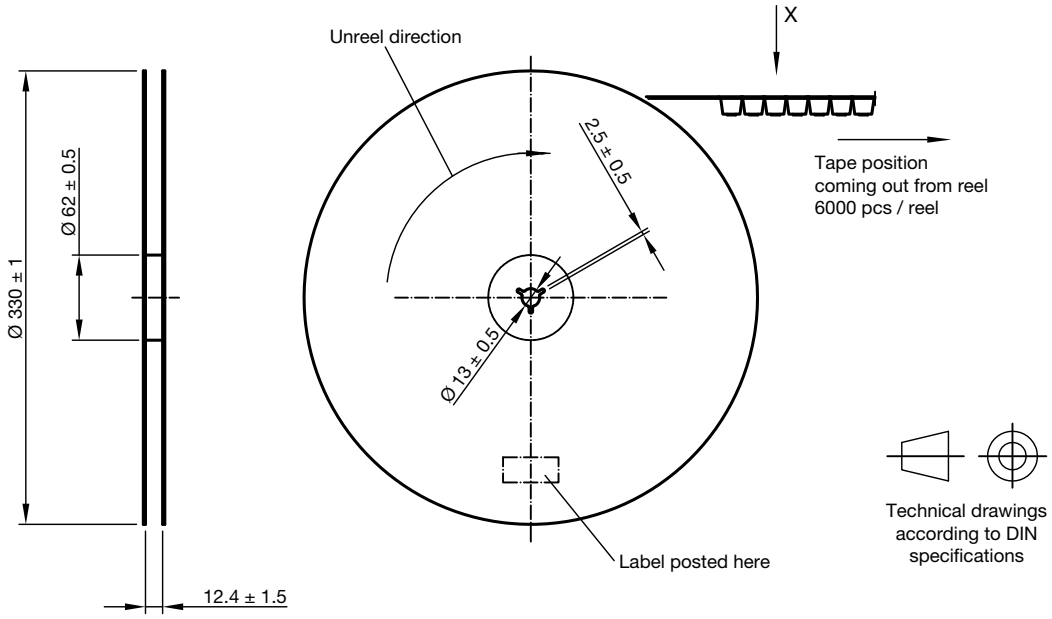
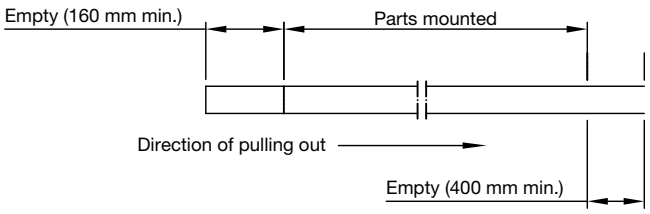
## **TAPING AND REEL DIMENSIONS** in millimeters: **VSMY294310RG**

**Reel**

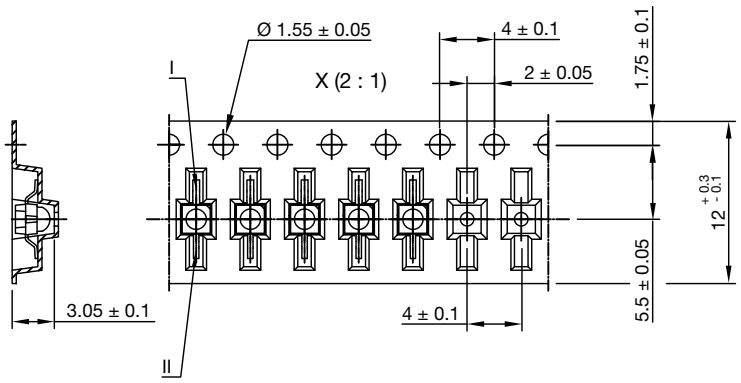



**Leader and trailer tape**




**Terminal position in tape**

| Device | Lead I | Lead II |
|---|---|---|
| VSMB2943RGX01 | Cathode | Anode |
| VSMF2893RGX01 | | |
| VEMD2x03X01 | | |
| VEMT2x03X01 | Collector | Emitter |
| VSMY2853RG | Anode | Cathode |
| VSMY2943RG | | |
| VSMY294310RG | | |

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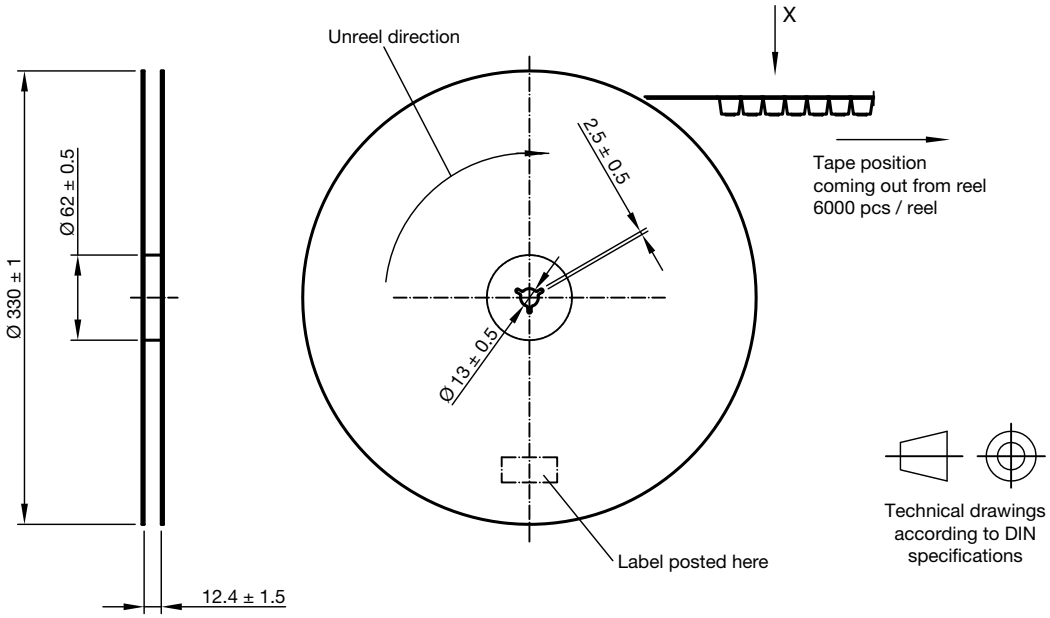
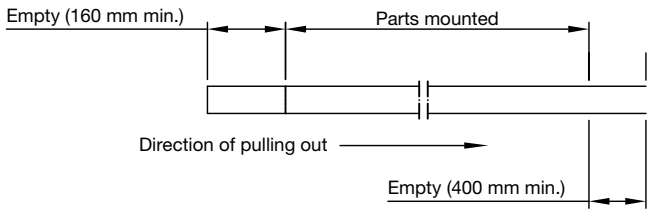
## **TAPING AND REEL DIMENSIONS** in millimeters: **VSMY294310G**

**Reel**




**Leader and trailer tape**

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|---|---|---|
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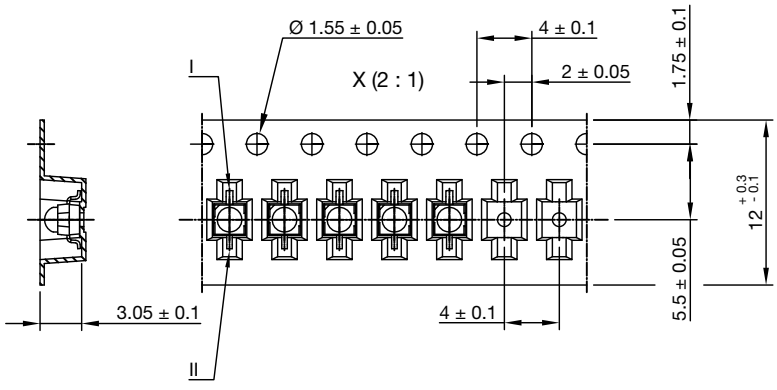
| VSMF2893GX01 | | |
| VEMD2x23X01 | | |
| VEMT2x23X01 | Collector | Emitter |
| VSMY2853G | Anode | Cathode |
| VSMY2943G | | |
| VSMY294310G | | |

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