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

VSMY2940RG

VSMY2940G

## DESCRIPTION

As part of the SurfLight™ portfolio, the VSMY2940 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

- IrDA compatible data transmission
- Miniature light barrier
- Photointerrupters
- Optical switch
- Emitter source for proximity sensors
- IR touch panels

## 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
- Peak wavelength: $\lambda_p$ = 940 nm
- High reliability
- High radiant power
- Very high radiant intensity
- Angle of half intensity: φ = ± 10°
- Suitable for high pulse current operation
- Terminal configurations: gullwing or reverse gullwing
- Package matches with detector VEMD2000X01 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)

## PRODUCT SUMMARY

| COMPONENT | $I_e$ (mW/sr) | φ (deg) | $\lambda_P$ (nm) | $t_r$ (ns) |
|---|---|---|---|---|
| VSMY2940RG | 120 | ± 10 | 940 | 10 |
| VSMY2940G | 120 | ± 10 | 940 | 10 |

**Note**

- Test conditions see table “Basic Characteristics“

## ORDERING INFORMATION

| ORDERING CODE | PACKAGING | REMARKS | PACKAGE FORM |
|---|---|---|---|
| VSMY2940RG | Tape and reel | MOQ: 6000 pcs, 6000 pcs/reel | Reverse gullwing |
| VSMY2940G | 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 | | $V_R$ | 5 | V |
| Forward current | | $I_F$ | 100 | mA |
| Peak forward current | $t_p/T$ = 0.5, $t_p$ = 100 µs | $I_{FM}$ | 200 | mA |
| Surge forward current | $t_p$ = 100 µs | $I_{FSM}$ | 1 | A |
| Power dissipation | | $P_V$ | 190 | 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 10, J-STD-020 | $T_{sd}$ | 260 | °C |
| Thermal resistance junction/ambient | J-STD-051, soldered on PCB | $R_{thJA}$ | 250 | K/W |

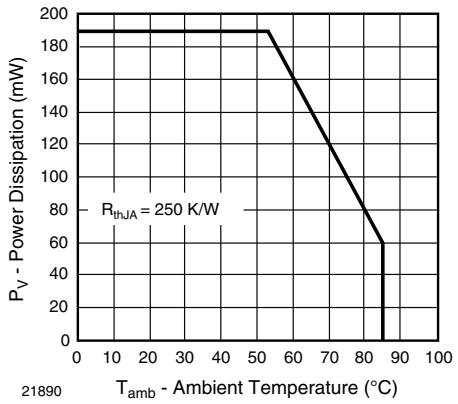



Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

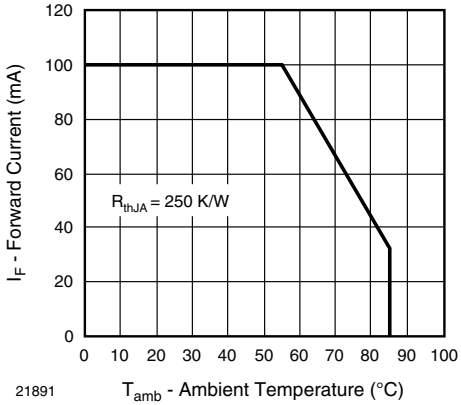



Fig. 2 - Forward Current Limit vs. Ambient Temperature

| **BASIC CHARACTERISTICS** ($T_{amb}$ = 25 °C, unless otherwise specified) | | | | | | |
|---|---|---|---|---|---|---|
| **PARAMETER** | **TEST CONDITION** | **SYMBOL** | **MIN.** | **TYP.** | **MAX.** | **UNIT** |
| Forward voltage | $I_F$ = 100 mA, $t_p$ = 20 ms | $V_F$ | | 1.55 | 1.9 | V |
| | $I_F$ = 1 A, $t_p$ = 100 µs | $V_F$ | | 2.65 | | V |
| Temperature coefficient of $V_F$ | $I_F$ = 100 mA | $TK_{VF}$ | | -2.1 | | 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 | $C_J$ | | 125 | | pF |
| Radiant intensity | $I_F$ = 100 mA, $t_p$ = 20 ms | $I_e$ | 65 | 120 | 195 | mW/sr |
| | $I_F$ = 1 A, $t_p$ = 100 µs | $I_e$ | | 880 | | mW/sr |
| Radiant power | $I_F$ = 100 mA, $t_p$ = 20 ms | $\phi_e$ | | 55 | | mW |
| Temperature coefficient of radiant power | $I_F$ = 100 mA | $TK\phi_e$ | | -0.2 | | %/K |
| Angle of half intensity | | $\varphi$ | | ± 10 | | deg |
| Peak wavelength | $I_F$ = 100 mA | $\lambda_p$ | 920 | 940 | 960 | nm |
| Spectral bandwidth | $I_F$ = 30 mA | $\Delta\lambda$ | | 40 | | nm |
| Temperature coefficient of $\lambda_p$ | $I_F$ = 30 mA | $TK\lambda_p$ | | 0.25 | | nm/K |
| Rise time | $I_F$ = 100 mA, 20 % to 80 % | $t_r$ | | 10 | | ns |
| Fall time | $I_F$ = 100 mA, 20 % to 80 % | $t_f$ | | 10 | | ns |

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

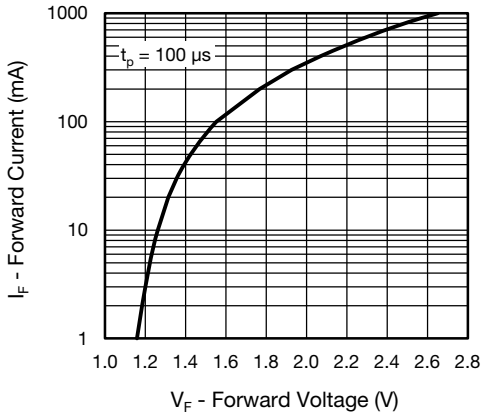



Fig. 3 - Forward Current vs. Forward Voltage

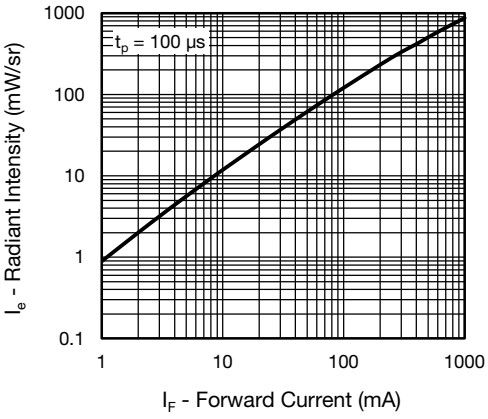



Fig. 6 - Radiant Intensity vs. Forward Current

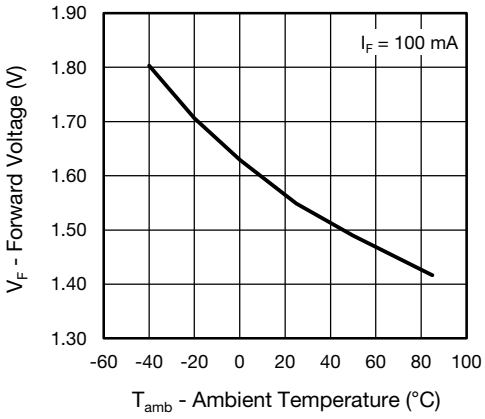



Fig. 4 - Forward Voltage vs. Ambient Temperature

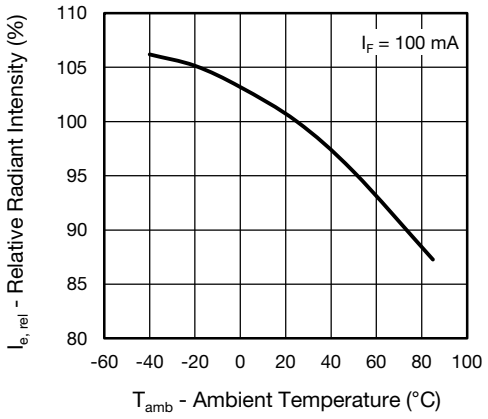



Fig. 7 - Relative Radiant Intensity vs. Ambient Temperature

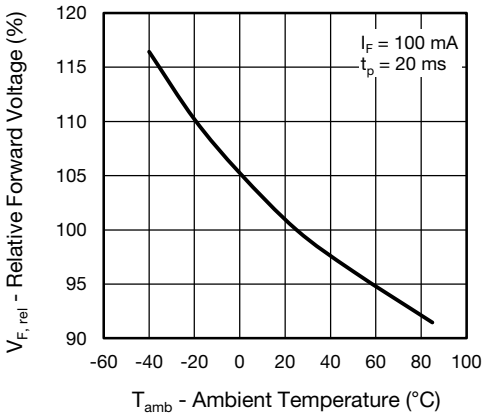



Fig. 5 - Relative Forward Voltage vs. Ambient Temperature

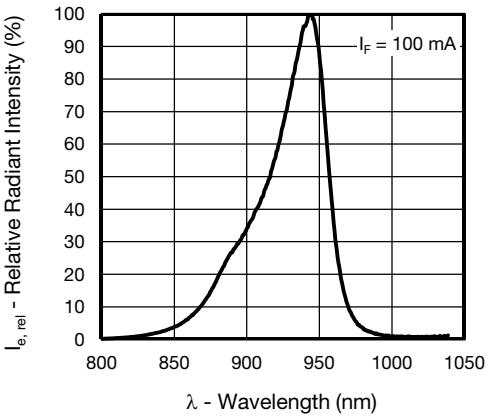



Fig. 8 - Relative Radiant Intensity vs. Wavelength

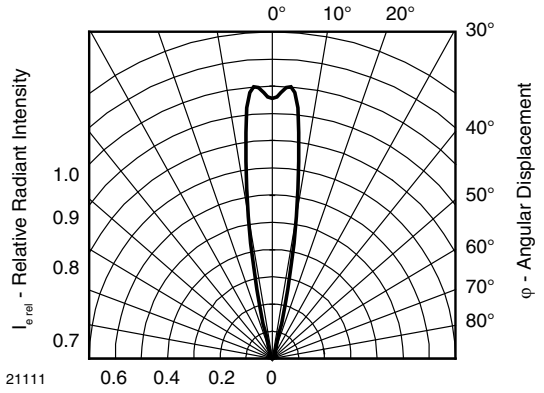



Fig. 9 - Relative Radiant Intensity vs. Angular Displacement

## SOLDER PROFILE

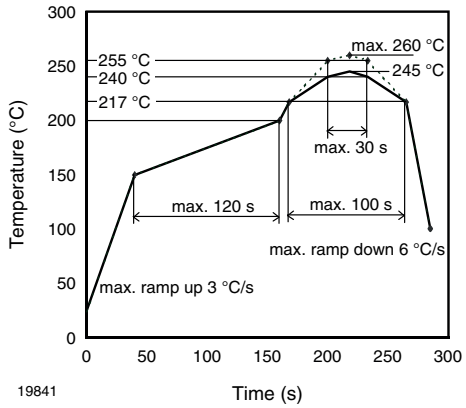



Fig. 10 - Lead (Pb)-free Reflow Solder Profile acc. J-STD-020

## 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.

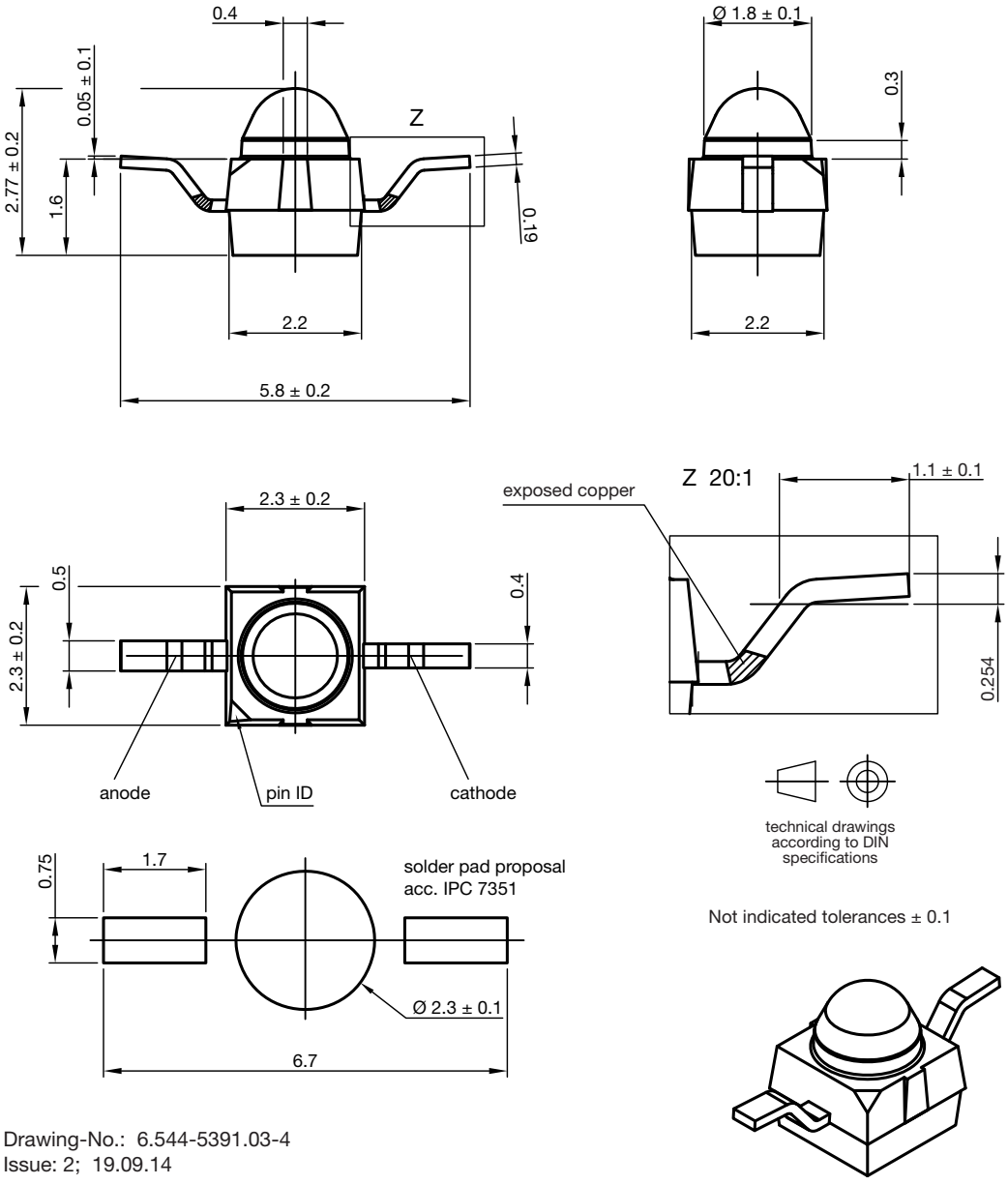
## FLOOR LIFE

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

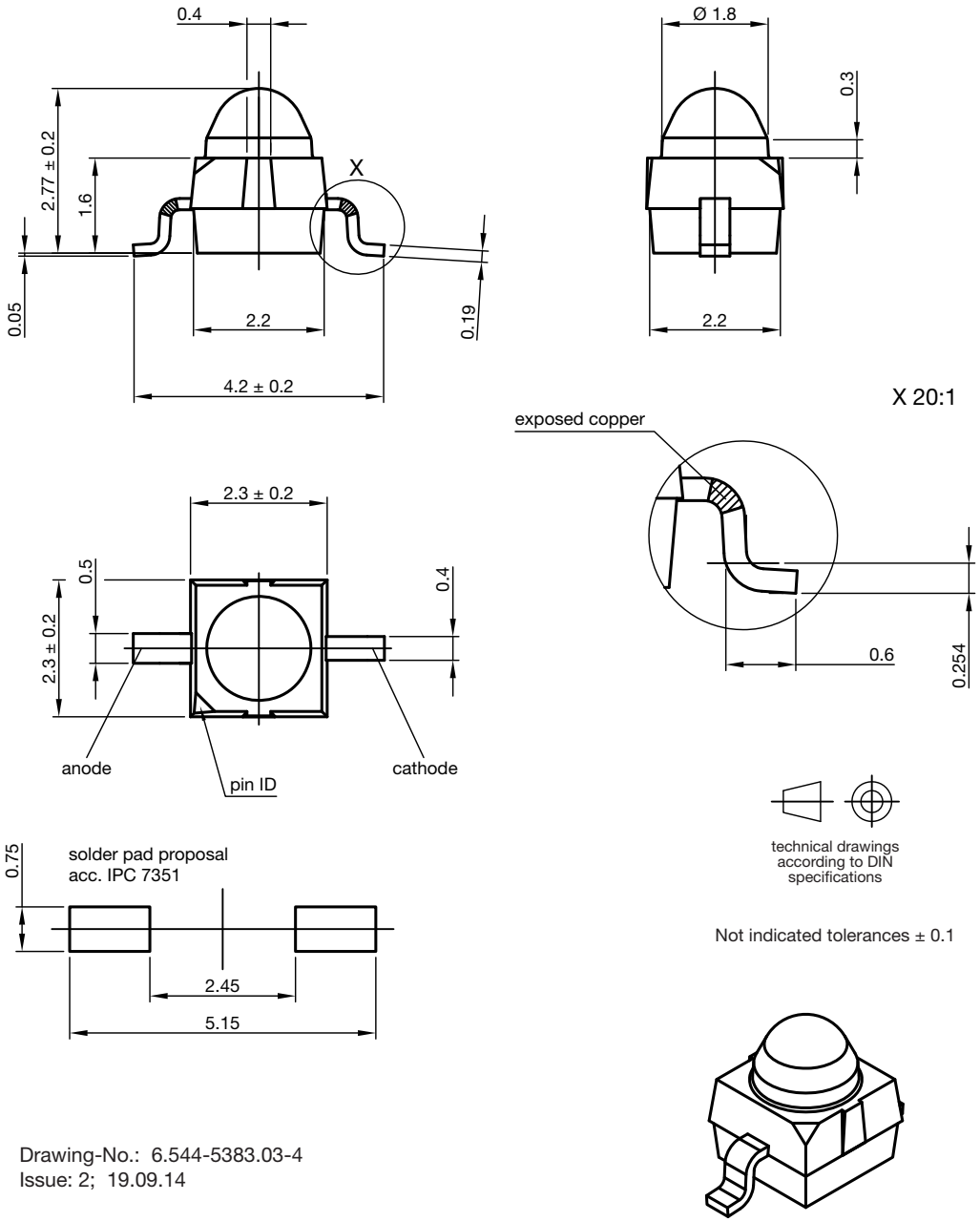
In case of moisture absorption devices should be baked before soldering. Conditions see J-STD-020 or label. Devices taped on reel dry using recommended conditions 192 h at 40 °C (+ 5 °C), RH < 5 %.

**PACKAGE DIMENISONS** in millimeters: **VSMY2940RG**




Drawing-No.: 6.544-5391.03-4
Issue: 2; 19.09.14

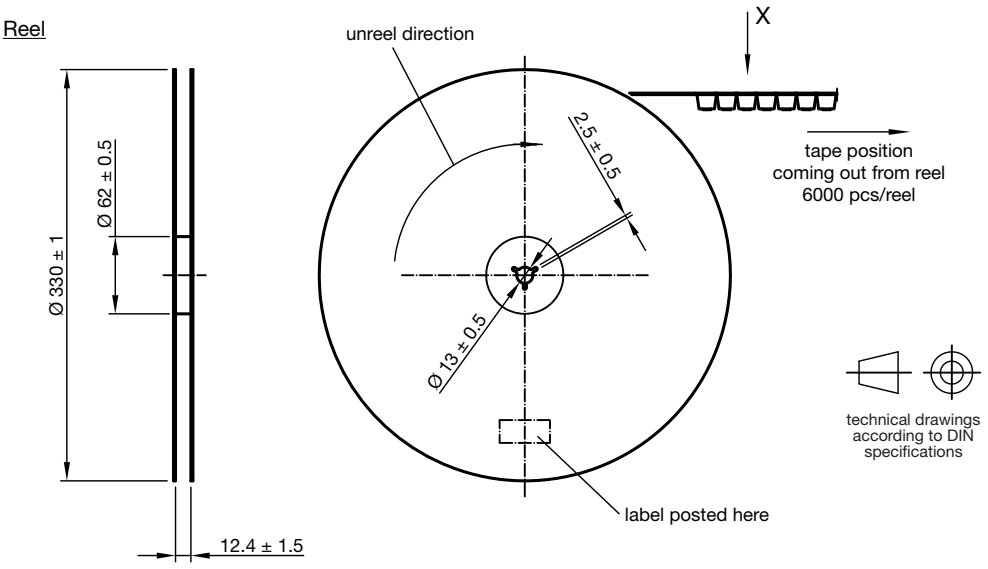
**PACKAGE DIMENSIONS** in millimeters: **VSMY2940G**



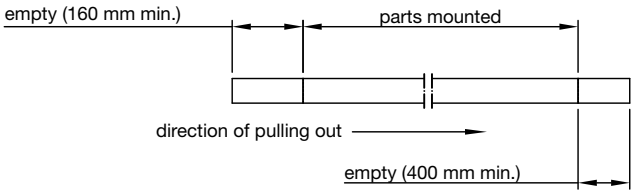

Drawing-No.: 6.544-5383.03-4
Issue: 2; 19.09.14

## **TAPING AND REEL DIMENSIONS** in millimeters: **VSMY2940RG**

Reel

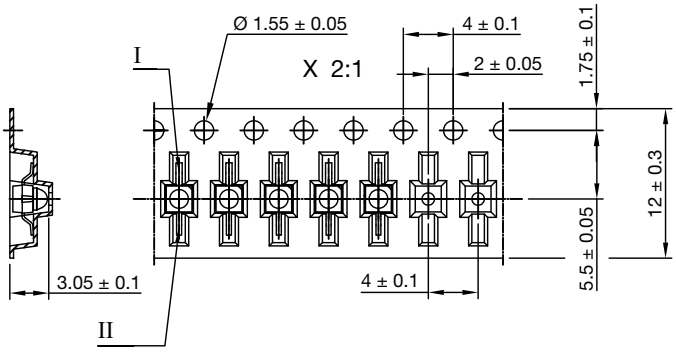



Leader and trailer tape




Terminal position in tape

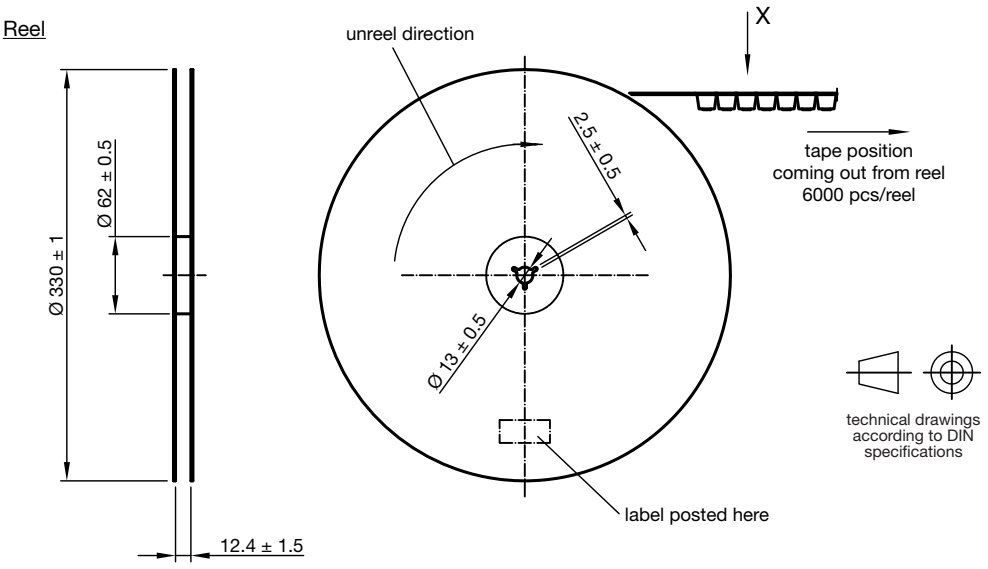
| Device | Lead I | Lead II |
|---|---|---|
| VEMT2000 | Collector | Emitter |
| VEMT2500 | | |
| VEMD2000 | Cathode | Anode |
| VEMD2500 | | |
| VSMB2000 | | |
| VSMG2000 | | |
| VSMF2890RG | | |
| VSMY2850RG | Anode | Cathode |
| VSMY2940RG | | |



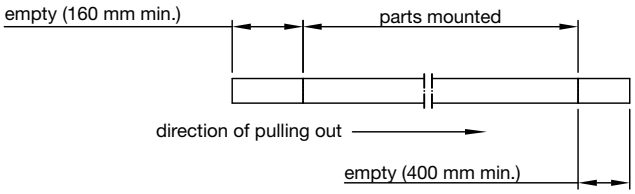

Drawing-No.: 9.800-5100.01-4
Issue: 4; 19.09.14

## **TAPING AND REEL DIMENSIONS** in millimeters: **VSMY2940G**

Reel

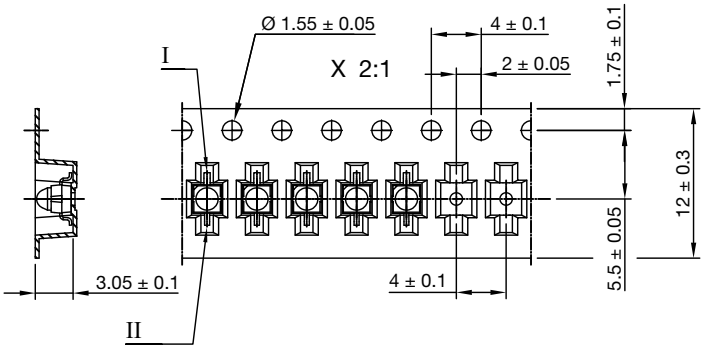



Leader and trailer tape




Terminal position in tape

| Device | Lead I | Lead II |
|---|---|---|
| VSMB2020 | Cathode | Anode |
| VSMG2020 | | |
| VEMD2020 | | |
| VEMD2520 | | |
| VSMF2890G | | |
| VEMT2020 | Collector | Emitter |
| VEMT2520 | | |
| VSMY2850G | Anode | Cathode |
| VSMY2940G | | |




Drawing-No.: 9.800-5091.01-4
Issue: 5; 19.09.14

# Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, “Vishay”), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay’s knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer’s responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer’s technical experts. Product specifications do not expand or otherwise modify Vishay’s terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

# Material Category Policy

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.**

**Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.**

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.**