

**High Speed Infrared Emitting Diodes, 850 nm, GaAlAs, DH**

VSMG285011RG



VSMG285011G

**DESCRIPTION**

VSMG28511 series are infrared, 850 nm emitting diodes in GaAlAs (DH) technology with high radiant power and high speed, molded in clear, untinted plastic packages (with lens) for surface mounting (SMD).

**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:  $\lambda_p = 850$  nm
- High reliability
- High radiant power
- High radiant intensity
- Angle of half intensity:  $\phi = \pm 12^\circ$
- Low forward voltage
- Suitable for high pulse current operation
- Terminal configurations: Gullwing or reserve 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](http://www.vishay.com/doc?99912)

**APPLICATIONS**

- Data transmission
- IR-illumination (CCTV)
- Miniature light barrier
- Photointerrupters
- Optical switch
- Shaft encoders
- IR emitter source for proximity applications
- Smoke detectors

**PRODUCT SUMMARY**

| COMPONENT    | $I_e$ (mW/sr) | $\phi$ (deg) | $\lambda_p$ (nm) | $t_r$ (ns) |
|--------------|---------------|--------------|------------------|------------|
| VSMG285011RG | 40            | $\pm 12$     | 850              | 20         |
| VSMG285011G  | 40            | $\pm 12$     | 850              | 20         |

**Note**

- Test conditions see table "Basic Characteristics"

**ORDERING INFORMATION**

| ORDERING CODE | PACKAGING     | REMARKS                      | PACKAGE FORM     |
|---------------|---------------|------------------------------|------------------|
| VSMG285011RG  | Tape and reel | MOQ: 6000 pcs, 6000 pcs/reel | Reverse gullwing |
| VSMG285011G   | Tape and reel | MOQ: 6000 pcs, 6000 pcs/reel | Gullwing         |

**Note**

- MOQ: minimum order quantity



| ABSOLUTE MAXIMUM RATINGS (T <sub>amb</sub> = 25 °C, unless otherwise specified) |  |                   |             |      |
|---|--|-------------------|-------------|------|
| PARAMETER   | TEST CONDITION                         | SYMBOL            | VALUE       | UNIT |
| Reverse voltage   |  | V <sub>R</sub>    | 5           | V    |
| Forward current   |  | I <sub>F</sub>    | 100         | mA   |
| Surge forward current   | t <sub>p</sub> = 100 μs                | I <sub>FSM</sub>  | 1           | A    |
| Power dissipation   |  | P <sub>V</sub>    | 180         | mW   |
| Junction temperature  |  | T <sub>j</sub>    | 100         | °C   |
| Operating temperature range   |  | T <sub>amb</sub>  | -40 to +85  | °C   |
| Storage temperature range   |  | T <sub>stg</sub>  | -40 to +100 | °C   |
| Soldering temperature   | Acc. figure 9, J-STD-020               | T <sub>sd</sub>   | 260         | °C   |
| Thermal resistance junction/ambient   | J-STD-051, leads 7 mm, soldered on PCB | R <sub>thJA</sub> | 250         | K/W  |

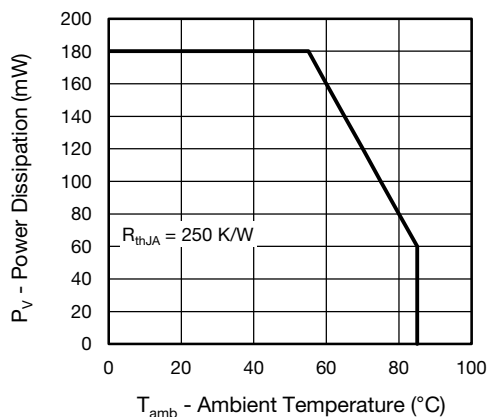


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

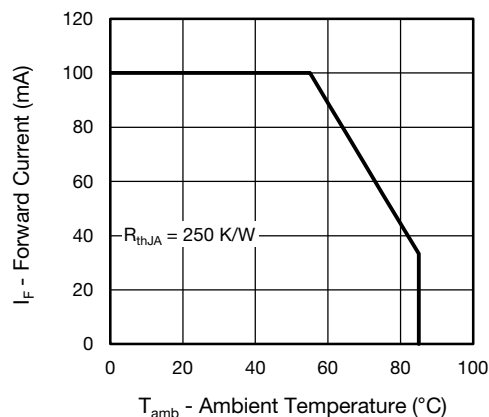


Fig. 2 - Forward Current Limit vs. Ambient Temperature

| BASIC CHARACTERISTICS (T <sub>amb</sub> = 25 °C, unless otherwise specified) |   |                             |      |       |      |       |
|--|---|-----------------------------|------|-------|------|-------|
| PARAMETER  | TEST CONDITION  | SYMBOL                      | MIN. | TYP.  | MAX. | UNIT  |
| Forward voltage  | I <sub>F</sub> = 100 mA, t <sub>p</sub> = 100 μs          | V <sub>F</sub>              | 1.25 | 1.5   | 1.8  | V     |
|  | I <sub>F</sub> = 1 A, t <sub>p</sub> = 100 μs             | V <sub>F</sub>              |      | 2.9   |      | V     |
| Temperature coefficient of V <sub>F</sub>                                    | I <sub>F</sub> = 1 mA                                     | TK <sub>V<sub>F</sub></sub> |      | -1.8  |      | mV/K  |
| Reverse current  | V <sub>R</sub> = 5 V                                      | I <sub>R</sub>              |      |       | 10   | μA    |
| Junction capacitance   | V <sub>R</sub> = 0 V, f = 1 MHz, E = 0 mW/cm <sup>2</sup> | C <sub>J</sub>              |      | 45    |      | pF    |
| Radiant intensity  | I <sub>F</sub> = 100 mA, t <sub>p</sub> = 100 μs          | I <sub>e</sub>              | 20   | 40    | 60   | mW/sr |
|  | I <sub>F</sub> = 1 A, t <sub>p</sub> = 100 μs             | I <sub>e</sub>              |      | 320   |      | mW/sr |
| Radiant power  | I <sub>F</sub> = 100 mA, t <sub>p</sub> = 100 μs          | φ <sub>e</sub>              |      | 40    |      | mW    |
| Temperature coefficient of φ <sub>e</sub>                                    | I <sub>F</sub> = 100 mA                                   | TKφ <sub>e</sub>            |      | -0.35 |      | %/K   |
| Angle of half intensity  |   | φ                           |      | ± 12  |      | deg   |
| Peak wavelength  | I <sub>F</sub> = 30 mA                                    | λ <sub>p</sub>              | 830  | 850   | 870  | nm    |
| Spectral bandwidth   | I <sub>F</sub> = 30 mA                                    | Δλ                          |      | 35    |      | nm    |
| Temperature coefficient of λ <sub>p</sub>                                    | I <sub>F</sub> = 30 mA                                    | TKλ <sub>p</sub>            |      | 0.25  |      | nm/K  |
| Rise time  | I <sub>F</sub> = 100 mA, 20 % to 80 %                     | t <sub>r</sub>              |      | 20    |      | ns    |
| Fall time  | I <sub>F</sub> = 100 mA, 20 % to 80 %                     | t <sub>f</sub>              |      | 20    |      | ns    |
| Cut-off frequency  | I <sub>DC</sub> = 70 mA, I <sub>AC</sub> = 30 mA pp       | f <sub>c</sub>              |      | 23    |      | MHz   |



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

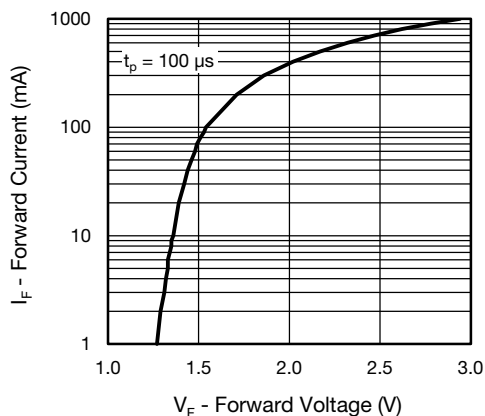


Fig. 3 - Forward Current vs. Forward Voltage

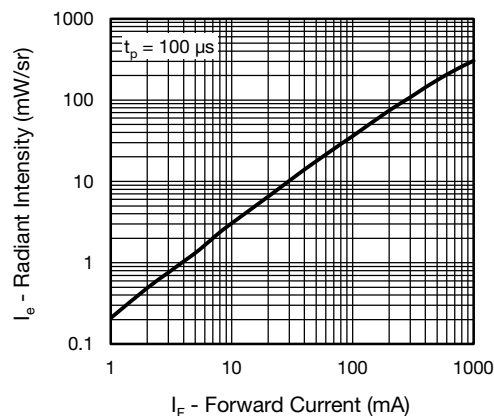


Fig. 6 - Radiant Intensity vs. Forward Current

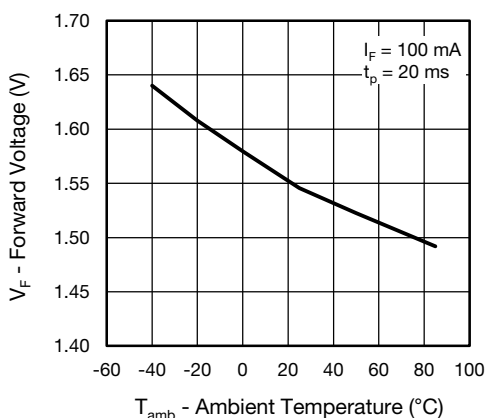


Fig. 4 - Forward Voltage vs. Ambient Temperature

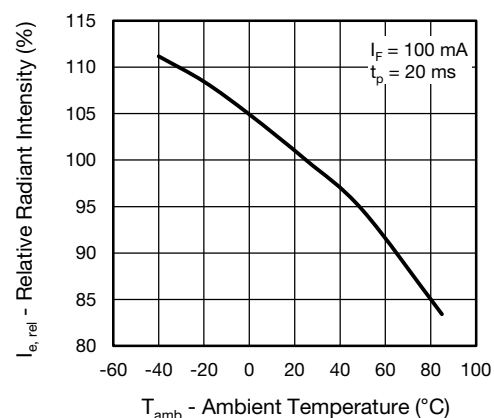


Fig. 7 - Relative Radiant Intensity vs. Ambient Temperature

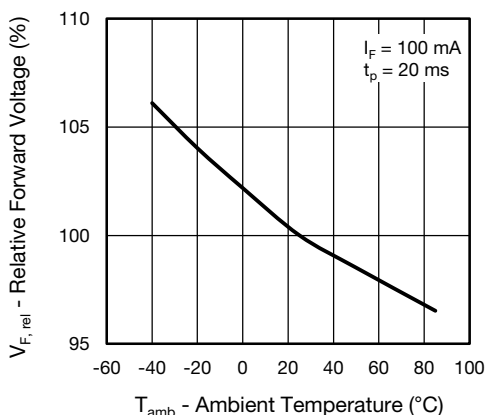


Fig. 5 - Relative Forward Voltage vs. Ambient Temperature

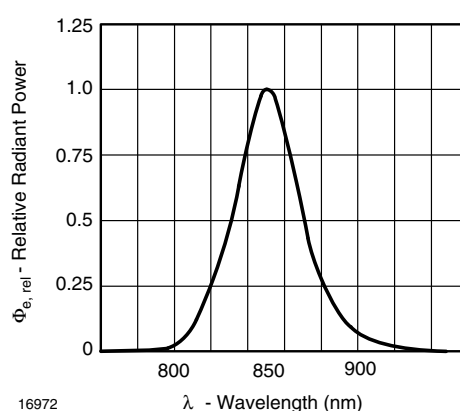


Fig. 8 - Relative Radiant Power vs. Wavelength

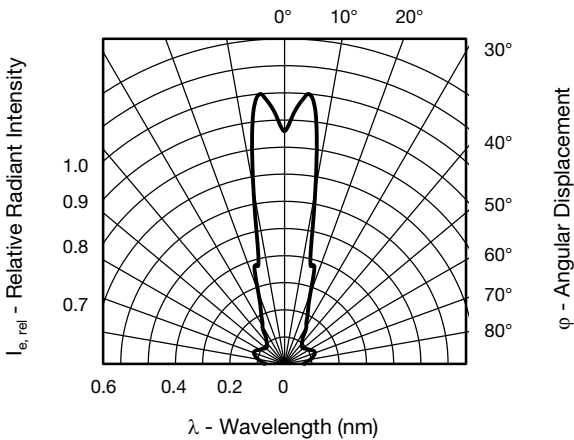


Fig. 9 - Relative Radiant Intensity vs. Angular Displacement

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

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  $40\text{ }^{\circ}\text{C} (+ 5\text{ }^{\circ}\text{C})$ ,  $\text{RH} < 5\%$ .

**SOLDER PROFILE**

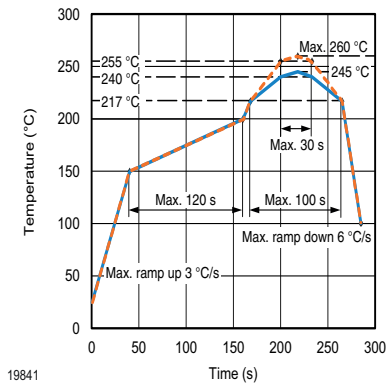
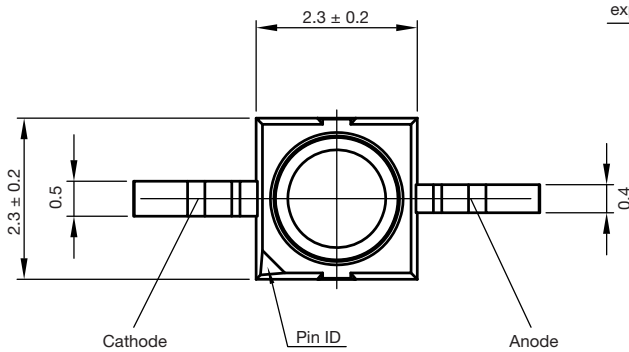
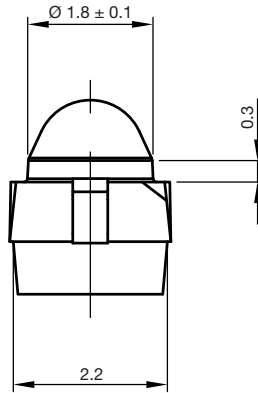
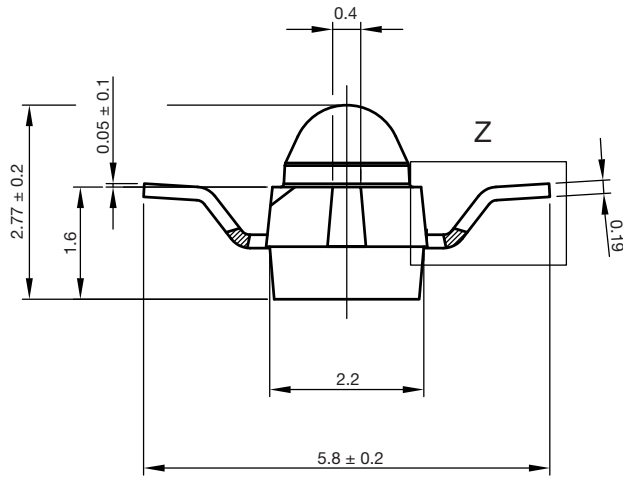


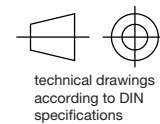
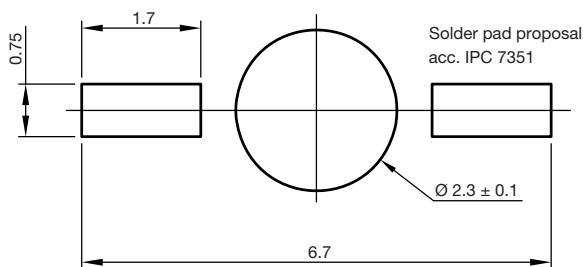
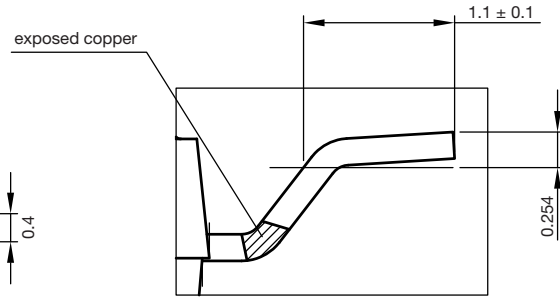
Fig. 10 - Lead (Pb)-free Reflow Solder Profile acc. J-STD-020



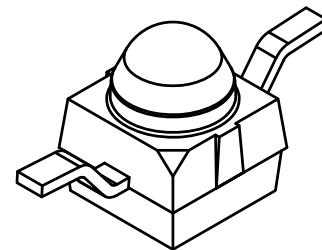
**PACKAGE DIMENSIONS** in millimeters: **VSMG285011RG**



Z 20:1



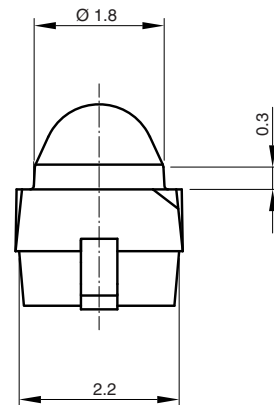
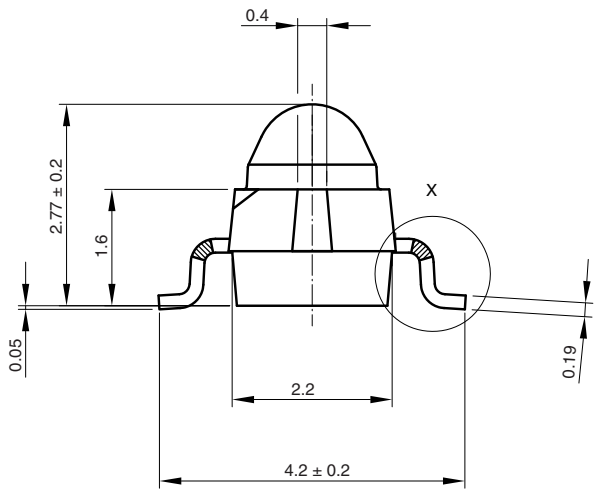
Not indicated tolerances ± 0.1



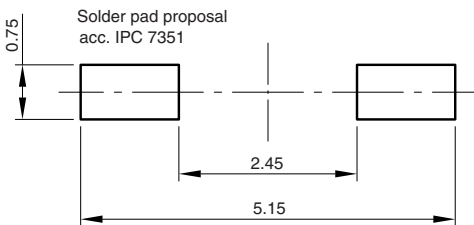
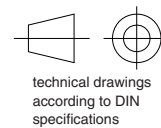
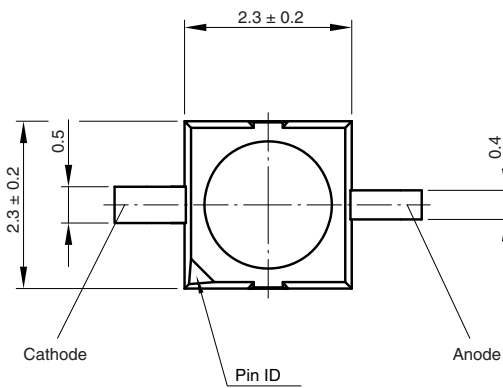
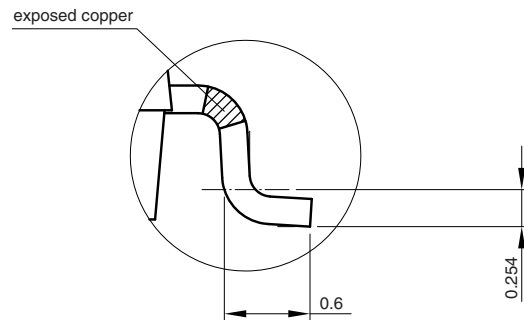
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Issue: 2; 18.03.10  
21517



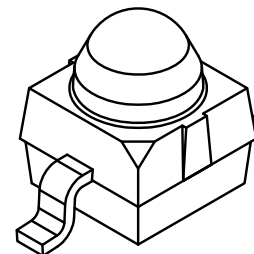
**PACKAGE DIMENSIONS** in millimeters: **VSMG285011G**



X 20:1



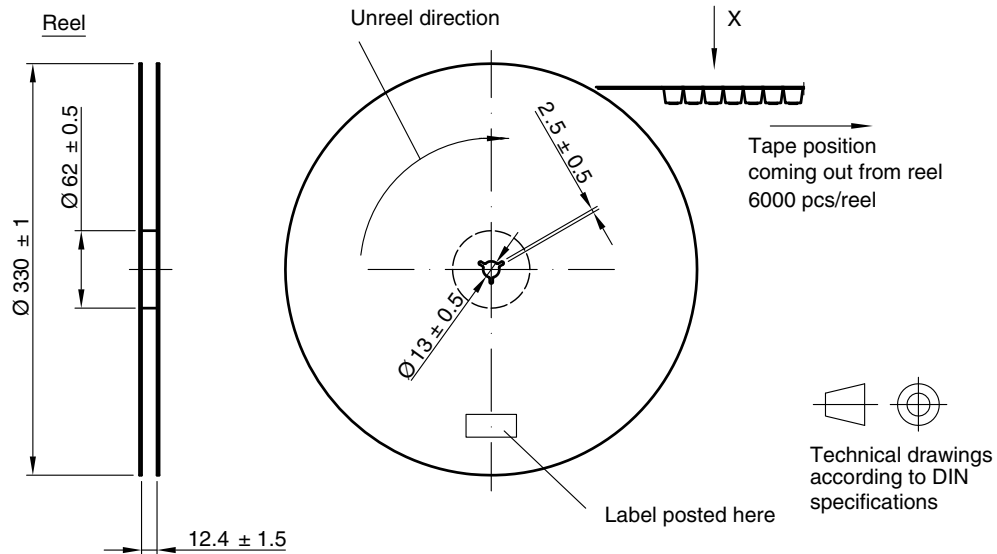
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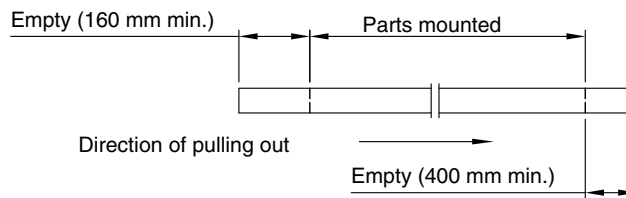
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Issue: 4; 18.03.10  
21488



**TAPING AND REEL DIMENSIONS** in millimeters: **VSMG285011RG**

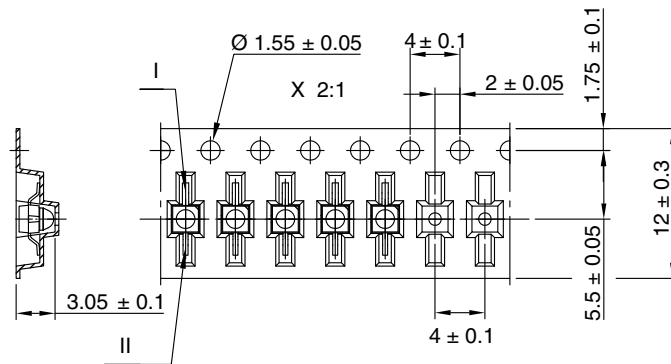


Leader and trailer tape:



Terminal position in tape

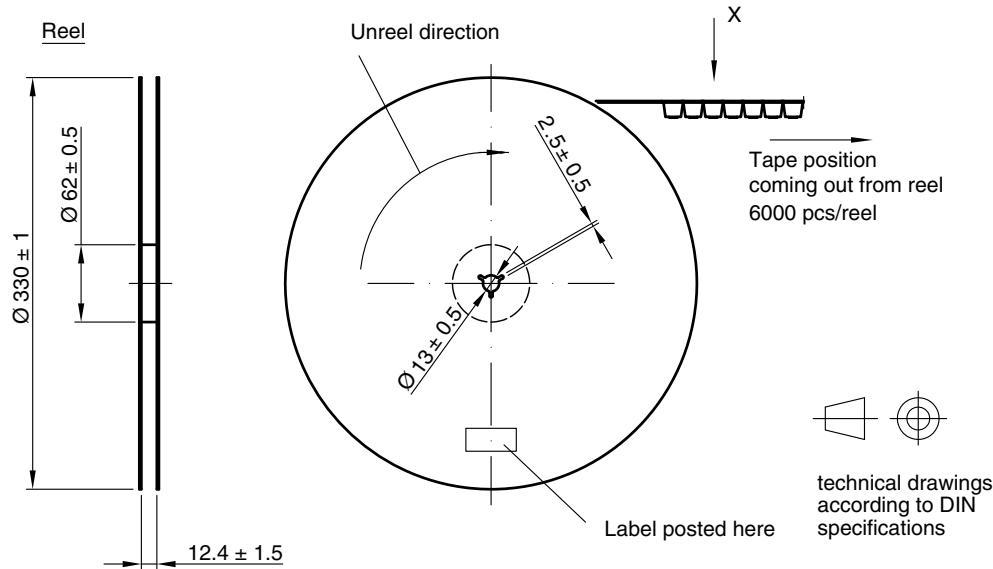
| Device     | Lead I    | Lead II |
|------------|-----------|---------|
| VEMT2000   | Collector | Emitter |
| VEMT2500   |           |         |
| VEMD2000   | Cathode   | Anode   |
| VEMD2500   |           |         |
| VSMB2000   |           |         |
| VSMG2000   |           |         |
| VSMY2850RG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



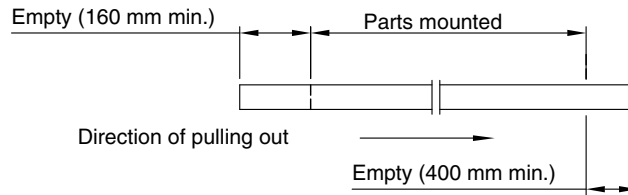
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 Issue: 2; 18.03.10  
 21572



**TAPING AND REEL DIMENSIONS** in millimeters: **VSMG285011G**

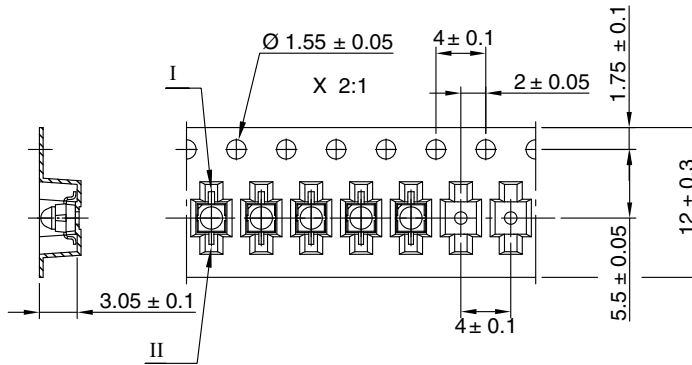


Leader and trailer tape:



Terminal position in tape

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



Drawing-No.: 9.800-5091.01-4

Issue: 3; 18.03.10

21571





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