



High Speed Infrared Emitting Diodes, 940 nm, GaAlAs, MQW

VSMB294008RG



VSMB294008G



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: $\lambda_p = 940 \text{ nm}$
- High reliability
- High radiant power
- High radiant intensity
- Angle of half intensity: $\phi = \pm 7^\circ$
- 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



DESCRIPTION

VSMB294008 series are infrared, 940 nm emitting diodes in GaAlAs multi quantum well (MQW) technology with high radiant power and high speed, molded in clear, untinted plastic packages (with lens) for surface mounting (SMD).

APPLICATIONS

- Data transmission
- Miniature light barrier
- Photointerrupters
- Optical switch
- Control and drive circuits
- Shaft encoders

| PRODUCT SUMMARY | | | | |
|-----------------|---------------|--------------|------------------|------------|
| COMPONENT | I_e (mW/sr) | ϕ (deg) | λ_p (nm) | t_r (ns) |
| VSMB294008RG | 70 | ± 7 | 940 | 15 |
| VSMB294008G | 70 | ± 7 | 940 | 15 |

Note

- Test conditions see table "Basic Characteristics"

| ORDERING INFORMATION | | | |
|----------------------|---------------|------------------------------|------------------|
| ORDERING CODE | PACKAGING | REMARKS | PACKAGE FORM |
| VSMB294008RG | Tape and reel | MOQ: 6000 pcs, 6000 pcs/reel | Reverse gullwing |
| VSMB294008G | 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 |
| Reverse voltage | | V_R | 5 | V |
| Forward current | | I_F | 100 | mA |
| Surge forward current | $t_p = 100 \text{ } \mu\text{s}$ | I_{FSM} | 500 | mA |
| Power dissipation | | P_V | 160 | mW |
| Junction temperature | | T_j | 100 | $^\circ\text{C}$ |
| Operating temperature range | | T_{amb} | -40 to +85 | $^\circ\text{C}$ |
| Storage temperature range | | T_{stg} | -40 to +100 | $^\circ\text{C}$ |
| Soldering temperature | according to fig. 10, J-STD-020 | T_{sd} | 260 | $^\circ\text{C}$ |
| Thermal resistance junction/ambient | J-STD-051, leads 7 mm, soldered on PCB | R_{thJA} | 250 | K/W |

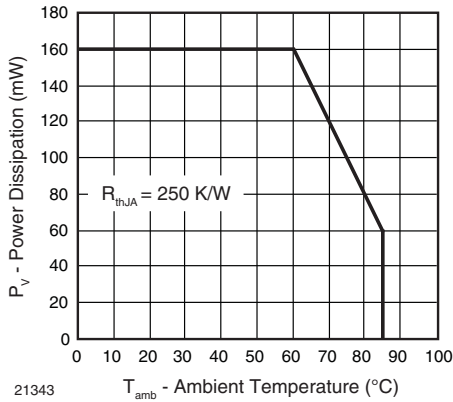


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

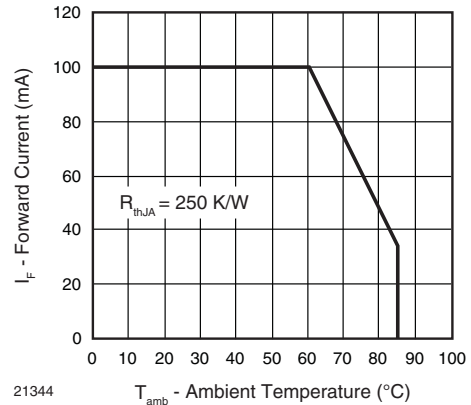


Fig. 2 - Forward Current Limit vs. Ambient Temperature

| 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 | 1.15 | 1.45 | 1.75 | V |
| | I _F = 500 mA, t _p = 100 μs | V _F | - | 1.8 | - | V |
| Temperature coefficient of V _F | I _F = 100 mA | TK _{V_F} | - | -0.64 | - | mV/K |
| Reverse current | V _R = 5 V | I _R | - | - | 10 | μA |
| Junction capacitance | V _R = 0 V, f = 1 MHz, E = 0 mW/cm ² | C _J | - | 38 | - | pF |
| Radiant intensity | I _F = 100 mA, t _p = 100 μs | I _e | 30 | 70 | 115 | mW/sr |
| | I _F = 500 mA, t _p = 100 μs | I _e | - | 260 | - | mW/sr |
| Radiant power | I _F = 100 mA, t _p = 100 μs | φ _e | - | 40 | - | mW |
| Temperature coefficient of radiant power | I _F = 100 mA | TKφ _e | - | -0.43 | - | %/K |
| Angle of half intensity | | φ | - | ± 7 | - | deg |
| Peak wavelength | I _F = 30 mA | λ _p | 920 | 940 | 960 | nm |
| Spectral bandwidth | I _F = 30 mA | Δλ | - | 25 | - | nm |
| Temperature coefficient of λ _p | I _F = 30 mA | TKλ _p | - | 0.25 | - | nm/K |
| Rise time | I _F = 100 mA, 20 % to 80 % | t _r | - | 15 | - | ns |
| Fall time | I _F = 100 mA, 20 % to 80 % | t _f | - | 15 | - | ns |
| Cut-off frequency | I _{DC} = 70 mA, I _{AC} = 30 mA pp | f _c | - | 23 | - | MHz |

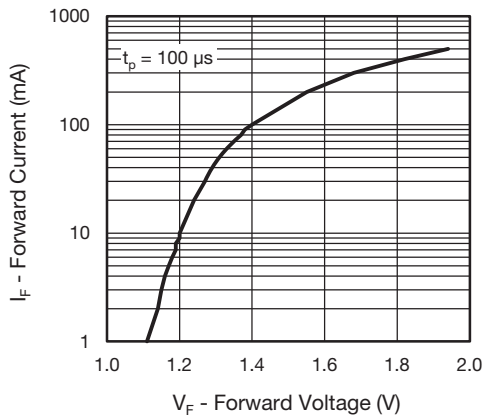
TYPICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)


Fig. 3 - Forward Current vs. Forward Voltage

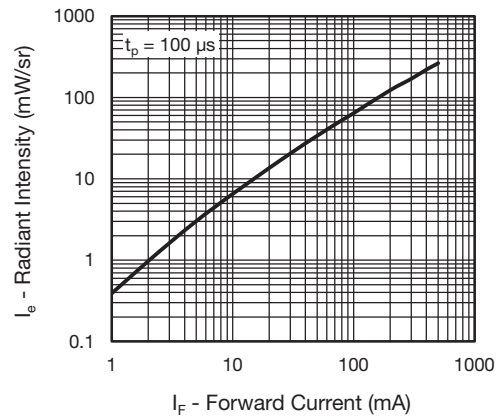


Fig. 6 - Radiant Intensity vs. Forward Current

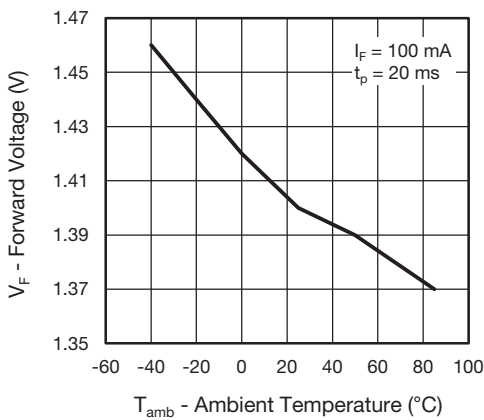


Fig. 4 - Forward Voltage vs. Ambient Temperature

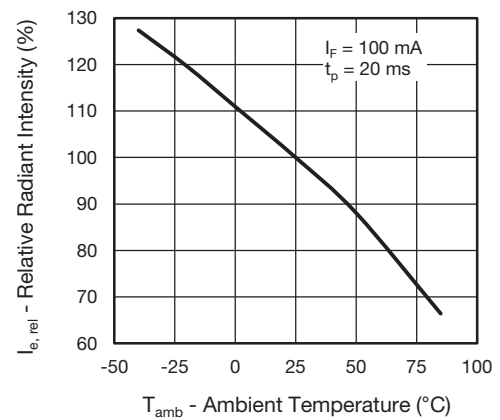


Fig. 7 - Radiant Intensity vs. Ambient Temperature

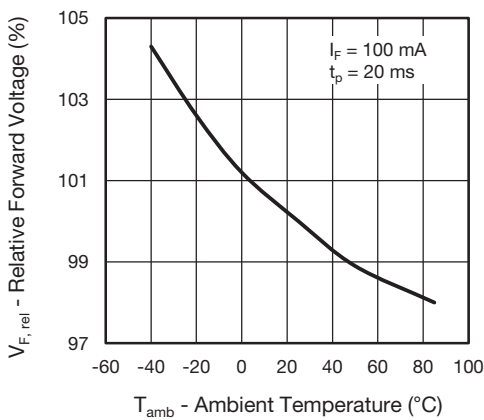


Fig. 5 - Relative Forward Voltage vs. Ambient Temperature

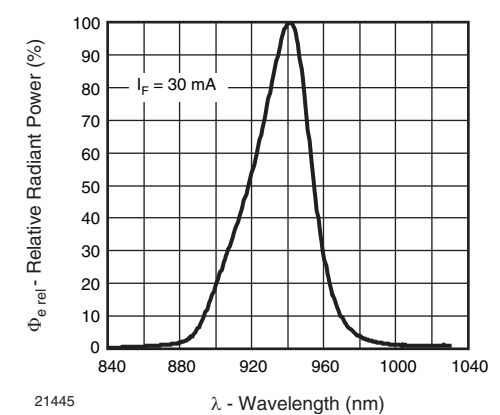


Fig. 8 - Relative Radiant Power vs. Wavelength

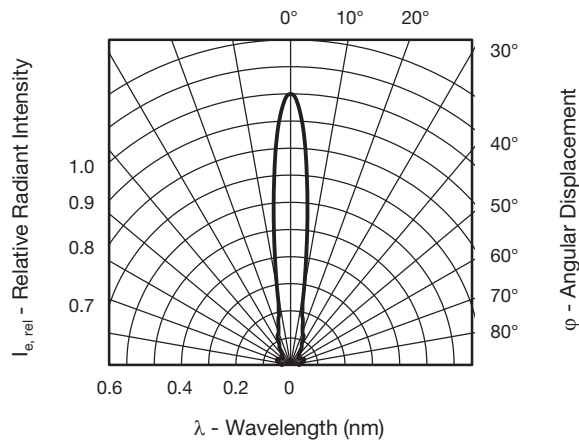


Fig. 9 - Relative Radiant Intensity vs. Angular Displacement

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

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

SOLDER PROFILE

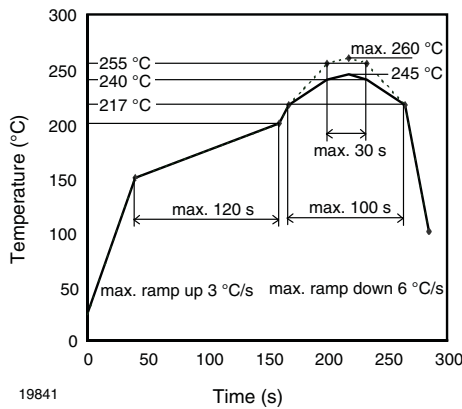
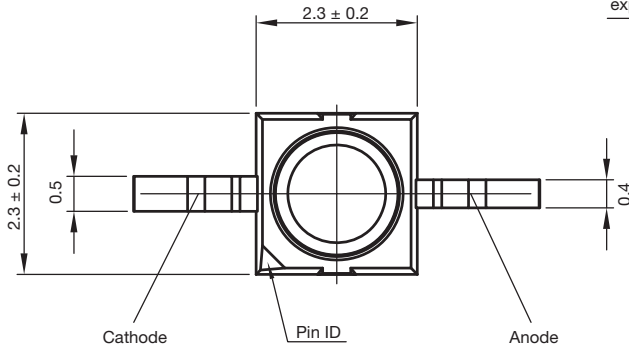
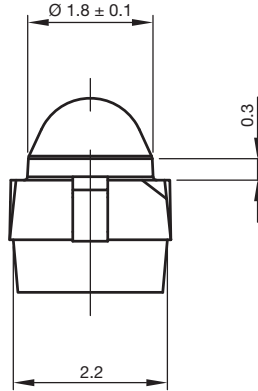
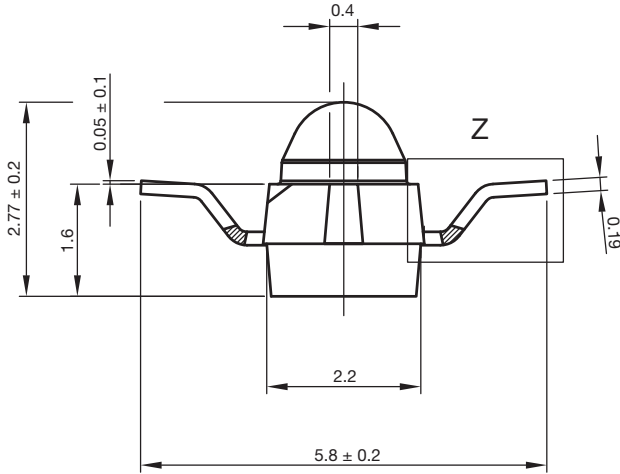


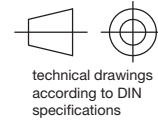
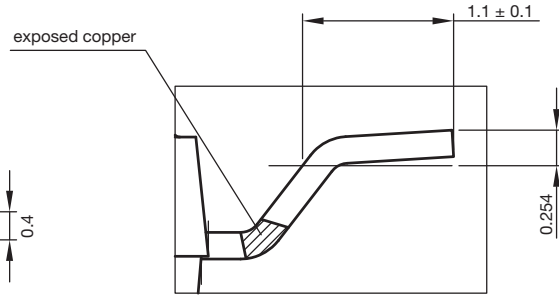
Fig. 10 - Lead (Pb)-free Reflow Solder Profile acc. J-STD-020



PACKAGE DIMENSIONS in millimeters: VSMB294008RG

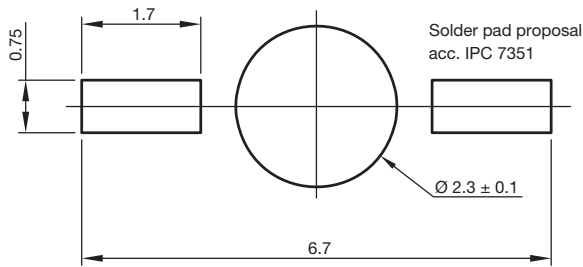


Z 20:1

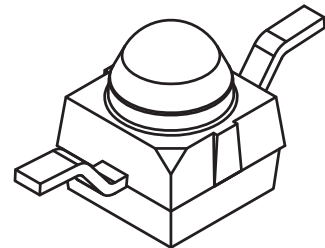


technical drawings according to DIN specifications

Not indicated tolerances ± 0.1

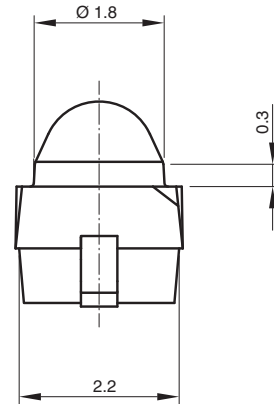
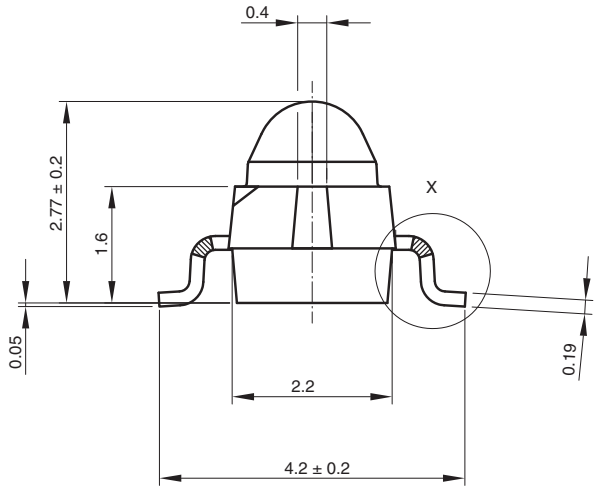


Drawing-No.: 6.544-5391.02-4
Issue: 2; 18.03.10
21517

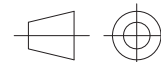
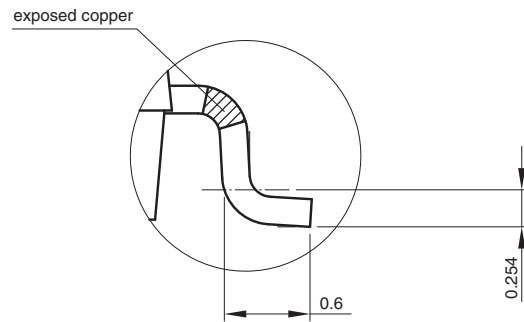
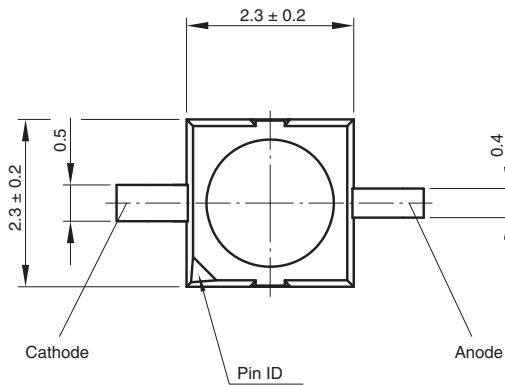




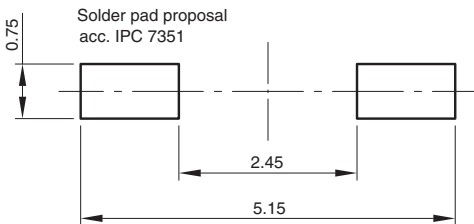
PACKAGE DIMENSIONS in millimeters: VSMB294008G



X 20:1

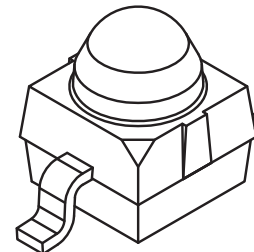


technical drawings according to DIN specifications



Solder pad proposal acc. IPC 7351

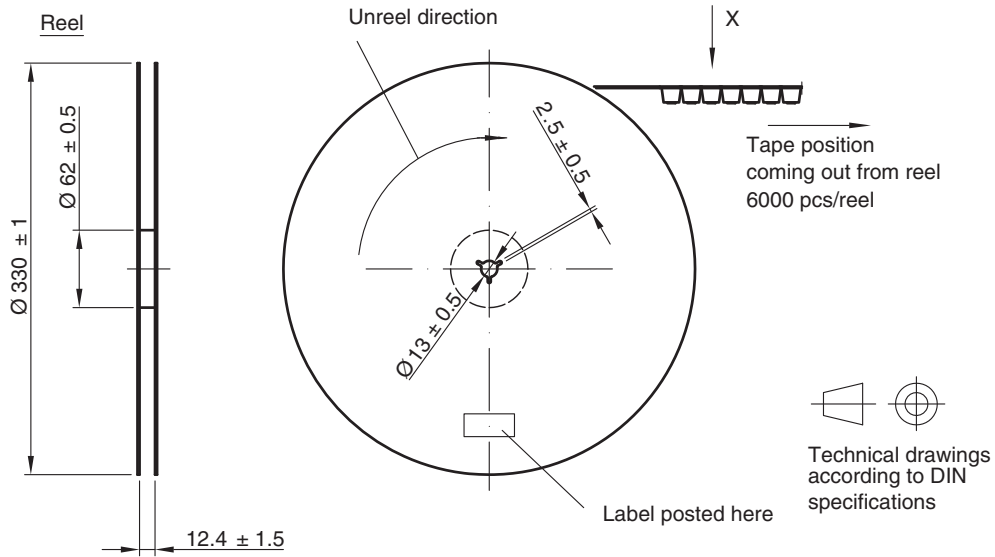
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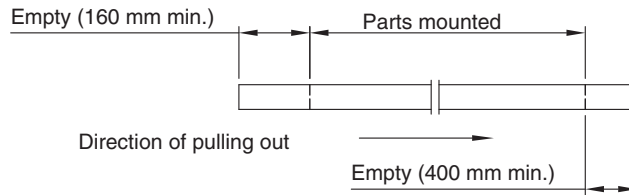
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Issue: 4; 18.03.10
21488



TAPING AND REEL DIMENSIONS in millimeters: **VSMB294008RG**

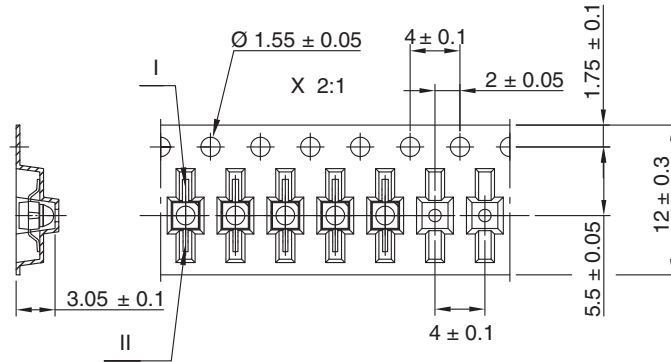


Leader and trailer tape:



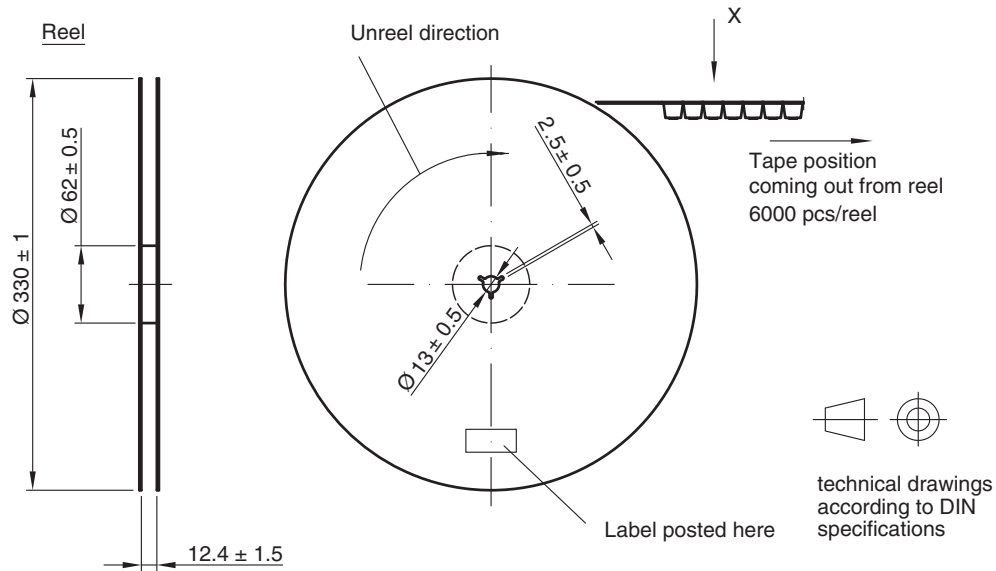
Terminal position in tape

| Device | Lead I | Lead II |
|------------|-----------|---------|
| VENT2000 | Collector | Emitter |
| VENT2500 | | |
| VEMD2000 | Cathode | Anode |
| VEMD2500 | | |
| VSMB2000 | | |
| VSMG2000 | | |
| VSMY2850RG | Anode | Cathode |

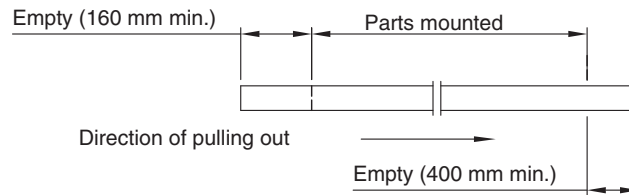


Drawing-No.: 9.800-5100.01-4
 Issue: 2; 18.03.10
 21572

TAPING AND REEL DIMENSIONS in millimeters: VSMB294008G

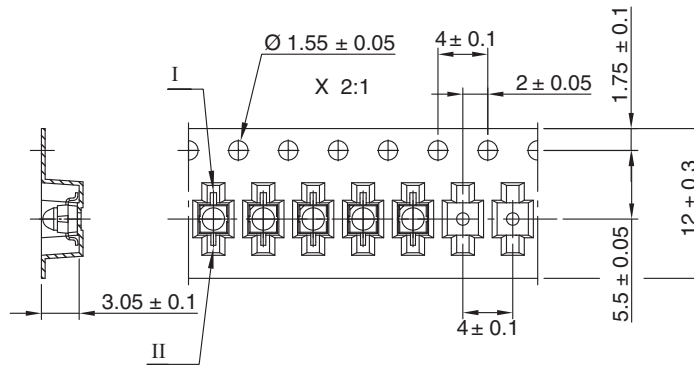


Leader and trailer tape:



Terminal position in tape

| Device | Lead I | Lead II |
|-----------|-----------|---------|
| VENT2020 | Collector | Emitter |
| VENT2520 | | Emitter |
| VSMB2020 | Cathode | Anode |
| VSMG2020 | | |
| VEMD2020 | | |
| VEMD2520 | | |
| VSMY2850G | Anode | Cathode |



Drawing-No.: 9.800-5091.01-4

Issue: 3; 18.03.10

21571



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