

High Speed Infrared Emitting Diodes, 890 nm, GaAlAs, DH

VSMF2893RGX01

VSMF2893GX01



DESCRIPTION

VSMF2893X01 series are infrared, 890 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 2.55
- AEC-Q101 qualified
- Peak wavelength: $\lambda_p = 890$ nm
- High reliability
- High radiant power
- High radiant intensity
- Angle of half intensity: $\phi = \pm 25^\circ$
- Low forward voltage
- Suitable for high pulse current operation
- Terminal configurations: gullwing or reserve gullwing
- Package matches with detector VEMD2xx3X01 and VEMT2xx3X01 series
- Floor life: 4 weeks, MSL 2a, acc. J-STD-020
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

AUTOMOTIVE
GRADE

RoHS
COMPLIANT
GREEN
(5-2009)

APPLICATIONS

- IrDA compatible data transmission
- 3D TV
- IR touch panels
- Miniature light barrier
- Photointerrupters
- Optical switch
- Shaft encoders
- IR emitter source for proximity applications

PRODUCT SUMMARY

| COMPONENT | I_e (mW/sr) | ϕ (deg) | λ_p (nm) | t_r (ns) |
|---------------|---------------|--------------|------------------|------------|
| VSMF2893RGX01 | 20 | ± 25 | 890 | 30 |
| VSMF2893GX01 | 20 | ± 25 | 890 | 30 |

Note

- Test conditions see table "Basic Characteristics"

ORDERING INFORMATION

| ORDERING CODE | PACKAGING | REMARKS | PACKAGE FORM |
|---------------|---------------|------------------------------|------------------|
| VSMF2893RGX01 | Tape and reel | MOQ: 6000 pcs, 6000 pcs/reel | Reverse gullwing |
| VSMF2893GX01 | 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 |
| Peak forward current | $t_p/T = 0.5$, $t_p = 100\text{ }\mu\text{s}$ | I_{FM} | 200 | mA |
| Surge forward current | $t_p = 100\text{ }\mu\text{s}$ | I_{FSM} | 1 | A |
| 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 | Acc. figure 9, 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 |

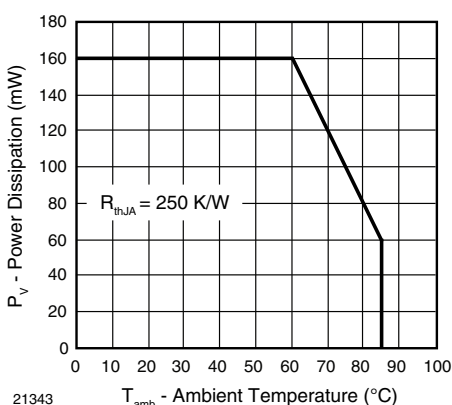


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

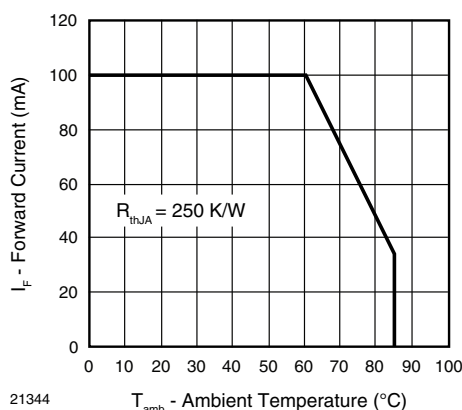


Fig. 2 - Forward Current Limit vs. Ambient Temperature

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

| PARAMETER | TEST CONDITION | SYMBOL | MIN. | TYP. | MAX. | UNIT |
|--|--|------------------|------|----------|------|---------------|
| Forward voltage | $I_F = 100\text{ mA}$, $t_p = 20\text{ ms}$ | V_F | 1.25 | 1.4 | 1.6 | V |
| | $I_F = 1\text{ A}$, $t_p = 100\text{ }\mu\text{s}$ | V_F | | 2.3 | | V |
| Temperature coefficient of V_F | $I_F = 1\text{ mA}$ | TK_{VF} | | - 1.8 | | mV/K |
| | $I_F = 100\text{ mA}$ | TK_{VF} | | - 1.1 | | mV/K |
| Reverse current | $V_R = 5\text{ V}$ | I_R | | | 10 | μA |
| Junction capacitance | $V_R = 0\text{ V}$, $f = 1\text{ MHz}$, $E = 0\text{ mW/cm}^2$ | C_J | | 125 | | pF |
| Radiant intensity | $I_F = 100\text{ mA}$, $t_p = 20\text{ ms}$ | I_e | 10 | 20 | 30 | mW/sr |
| | $I_F = 1\text{ A}$, $t_p = 100\text{ }\mu\text{s}$ | I_e | | 180 | | mW/sr |
| Radiant power | $I_F = 100\text{ mA}$, $t_p = 20\text{ ms}$ | ϕ_e | | 40 | | mW |
| Temperature coefficient of ϕ_e | $I_F = 100\text{ mA}$ | TK_{ϕ_e} | | - 0.35 | | %/K |
| Angle of half intensity | | φ | | ± 25 | | deg |
| Peak wavelength | $I_F = 30\text{ mA}$ | λ_p | 870 | 890 | 910 | nm |
| Spectral bandwidth | $I_F = 30\text{ mA}$ | $\Delta\lambda$ | | 40 | | nm |
| Temperature coefficient of λ_p | $I_F = 30\text{ mA}$ | TK_{λ_p} | | 0.25 | | nm/K |
| Rise time | $I_F = 100\text{ mA}$, 20 % to 80 % | t_r | | 30 | | ns |
| Fall time | $I_F = 100\text{ mA}$, 20 % to 80 % | t_f | | 30 | | ns |
| Cut-off frequency | $I_{DC} = 70\text{ mA}$, $I_{AC} = 30\text{ mA pp}$ | f_c | | 12 | | MHz |

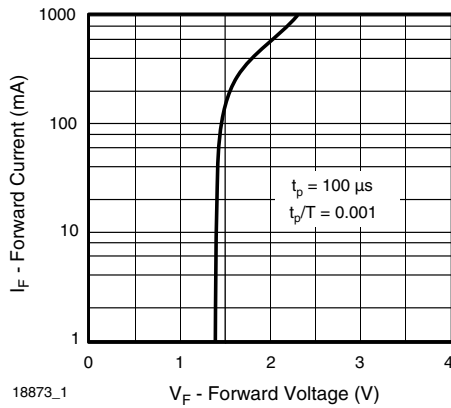
BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)


Fig. 3 - Forward Current vs. Forward Voltage

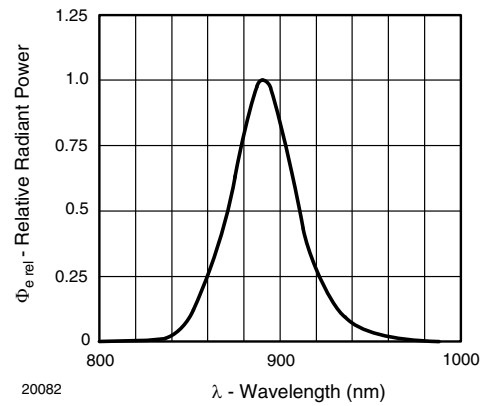


Fig. 6 - Relative Radiant Power vs. Wavelength

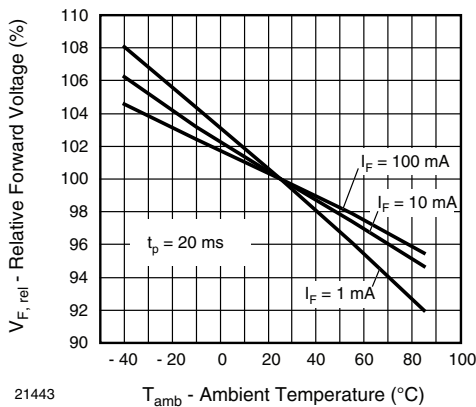


Fig. 4 - Relative Forward Voltage vs. Ambient Temperature

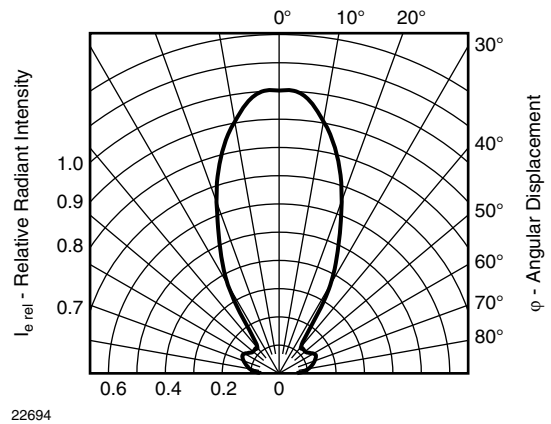


Fig. 7 - Relative Radiant Intensity vs. Angular Displacement

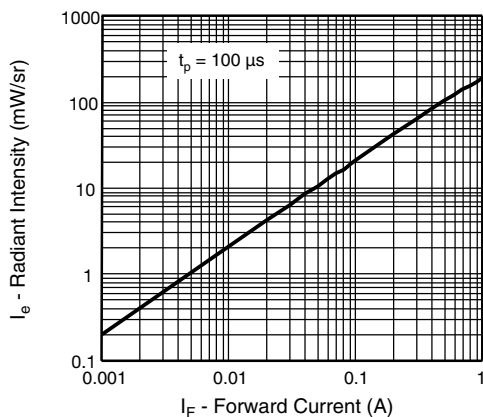


Fig. 5 - Radiant Intensity vs. Forward Current

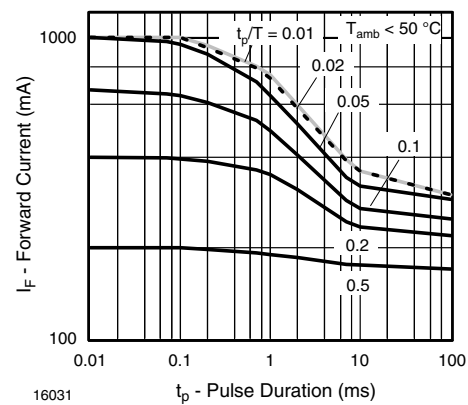


Fig. 8 - Pulse Forward Current vs. Pulse Duration

SOLDER PROFILE

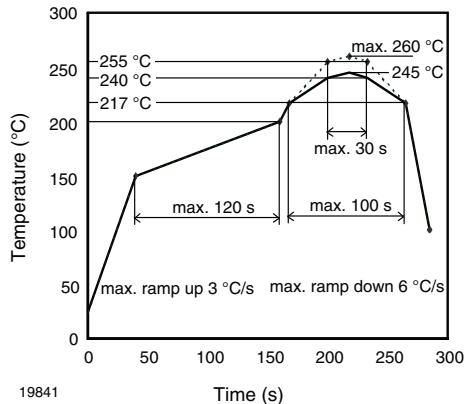


Fig. 9 - Lead (Pb)-free Reflow Solder Profile acc. J-STD-020

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

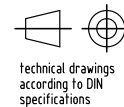
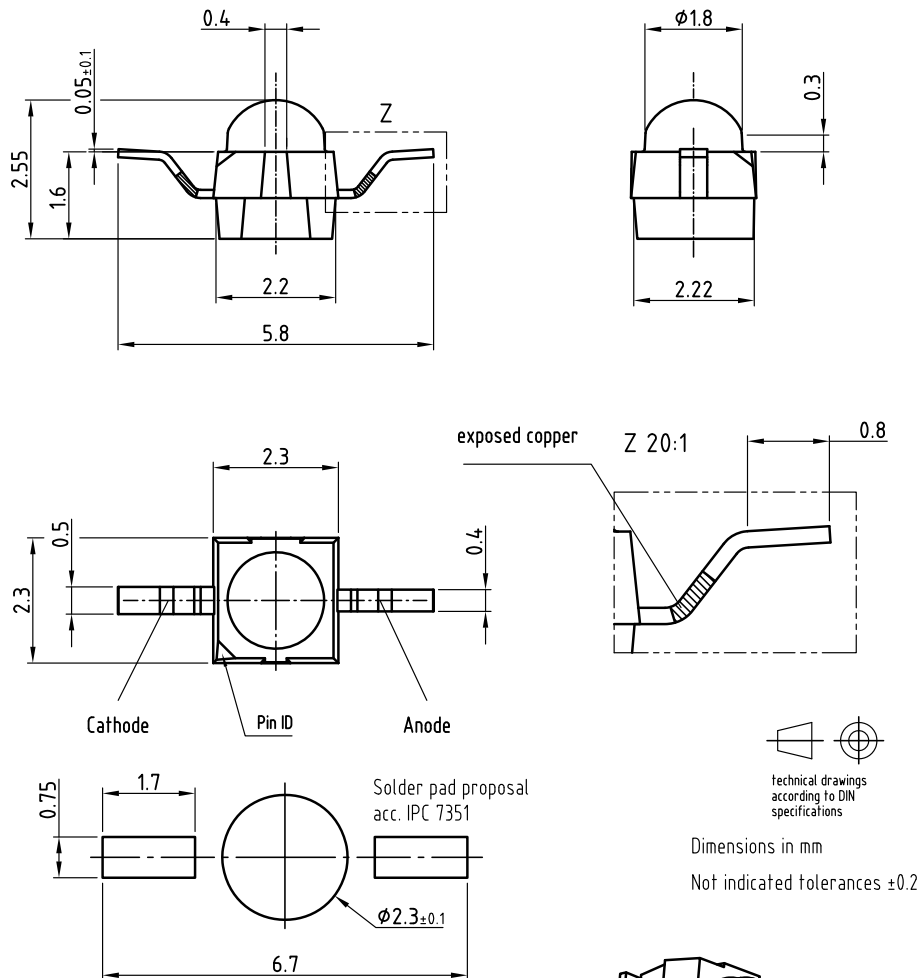
Conditions: $T_{amb} < 30^{\circ}\text{C}$, RH < 60 %

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: VSMF2893RGX01

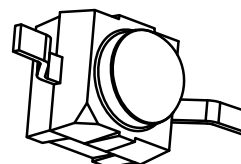


Dimensions in mm
Not indicated tolerances ± 0.2

Drawing refers to following types:

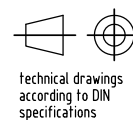
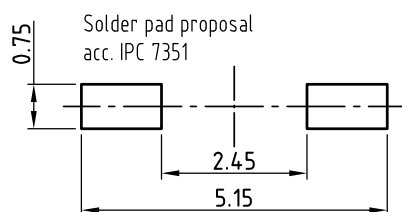
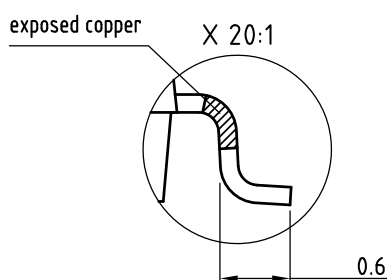
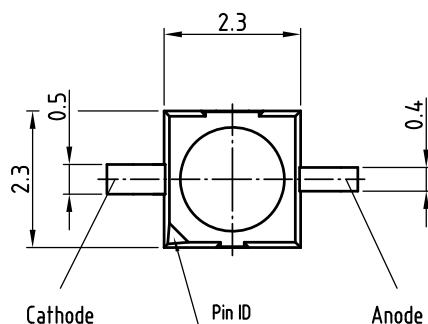
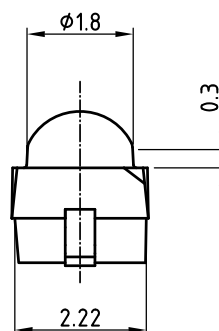
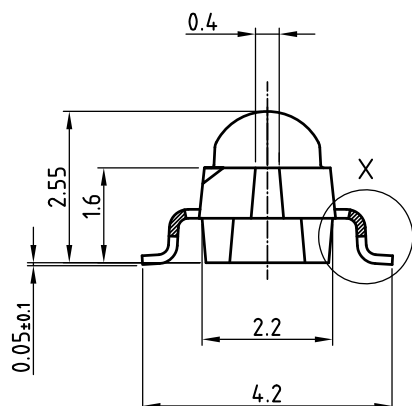
VSMB2943RGX01
VSMF2893RGX01
VEMD2x23X01

Drawing-No.: 6.544-5409.01-4
Issue: prel. 03.08.12





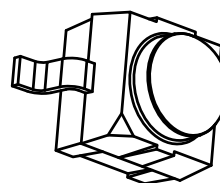
PACKAGE DIMENSIONS in millimeters: VSMF2893GX01

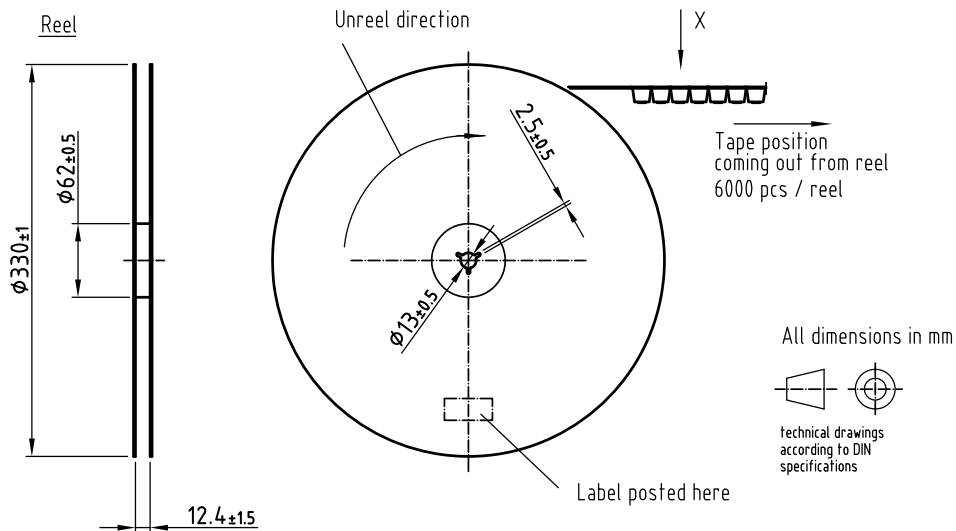
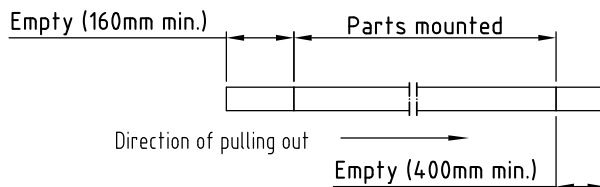


Dimensions in mm
Not indicated tolerances ± 0.2

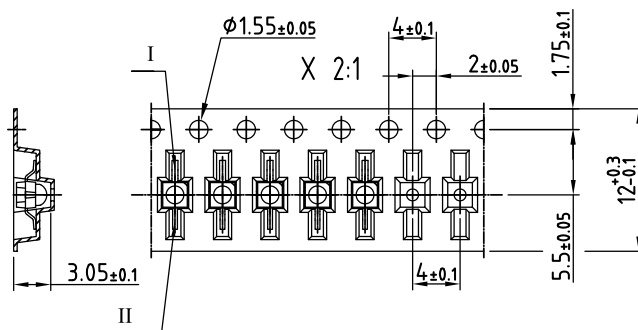
Drawing refers to following types: VSMB2943GX01
VSMF2893GX01
VEMD2x23X01

Drawing-No.: 6.544-5408.01-4
Issue: prel; 03.08.12



TAPING AND REEL DIMENSIONS in millimeters: VSMF2893RGX01

Leader and trailer tape:

Terminal position in tape

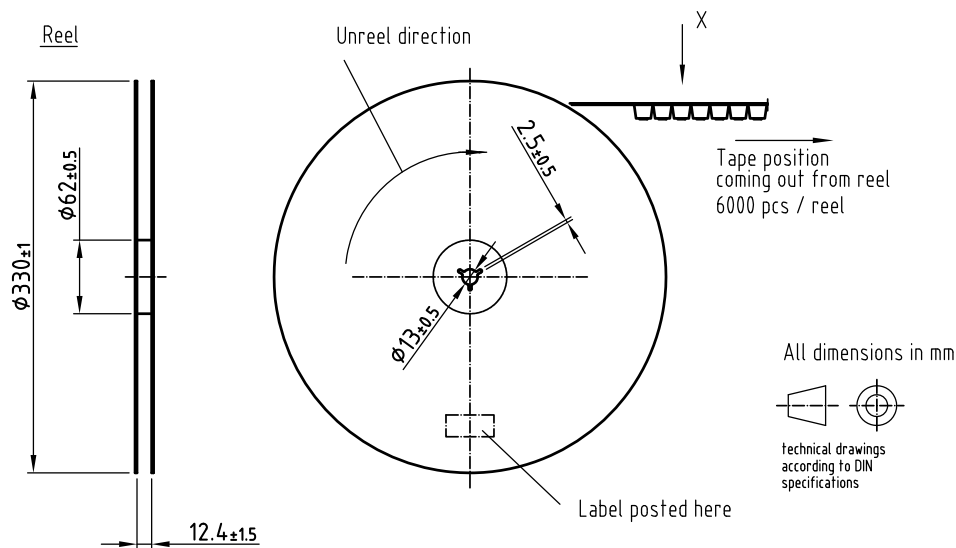
| Device | Lead I | Lead II |
|---------------|-----------|---------|
| VSMB2943RGX01 | Cathode | Anode |
| VSMF2893RGX01 | | |
| VEMD2x03X01 | | |
| VEMT2x03X01 | Collector | Emitter |
| VSMY2853RG | Anode | Cathode |



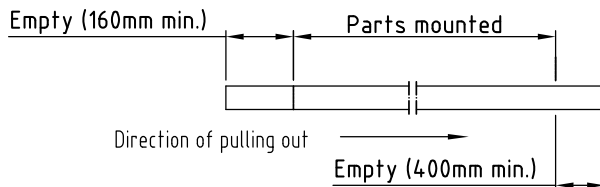
Drawing refers to following types: see table
Reel dimensions and tape

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

TAPING AND REEL DIMENSIONS in millimeters: VSMF2893GX01

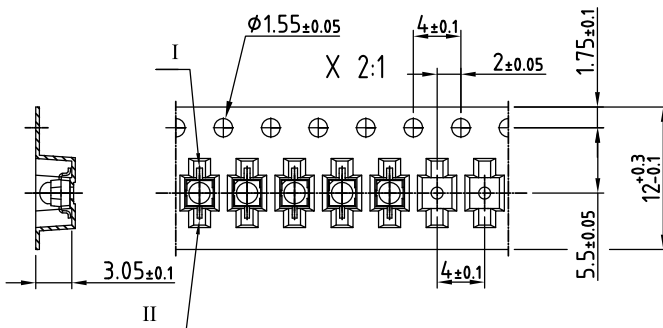


Leader and trailer tape:



Terminal position in tape

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