



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

VSMB2000X01



21725-4

VSMB2020X01



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
- AEC-Q101 qualified
- Peak wavelength: $\lambda_p = 940$ 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
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC



DESCRIPTION

VSMB2000X01 series are infrared, 940 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).

APPLICATIONS

- IrDA compatible data transmission
- Miniature light barrier
- Photointerrupters
- Optical switch
- Control and drive circuits
- Shaft encoders

Note

** Please see document "Vishay Material Category Policy": www.vishay.com/doc?99902

| PRODUCT SUMMARY | | | | |
|-----------------|------------------------|---------|---------------------|---------------------|
| COMPONENT | I _e (mW/sr) | φ (deg) | λ _p (nm) | t _r (ns) |
| VSMB2000X01 | 40 | ± 12 | 940 | 15 |
| VSMB2020X01 | 40 | ± 12 | 940 | 15 |

Note

- Test conditions see table "Basic Characteristics"

| ORDERING INFORMATION | | | |
|----------------------|---------------|------------------------------|------------------|
| ORDERING CODE | PACKAGING | REMARKS | PACKAGE FORM |
| VSMB2000X01 | Tape and reel | MOQ: 6000 pcs, 6000 pcs/reel | Reverse gullwing |
| VSMB2020X01 | 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 | 160 | 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 | t ≤ 5 s | T _{sd} | 260 | °C |
| Thermal resistance junction/ambient | J-STD-051, leads 7 mm, soldered on PCB | R _{thJA} | 250 | K/W |

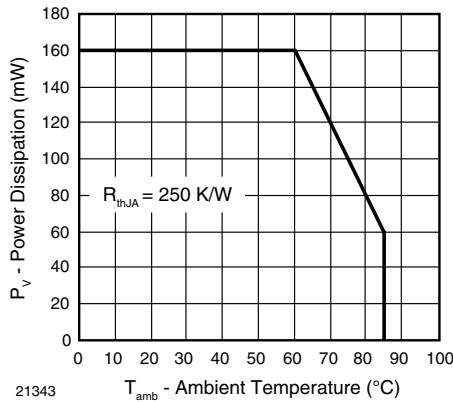


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature



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 | 1.35 | 1.6 | V |
| | I _F = 1 A, t _p = 100 μs | V _F | | 2.2 | | V |
| Temperature coefficient of V _F | I _F = 1 mA | TK _{V_F} | | - 1.8 | | mV/K |
| | I _F = 100 mA | TK _{V_F} | | - 1.1 | | 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 | | 70 | | pF |
| Radiant intensity | I _F = 100 mA, t _p = 20 ms | I _e | 20 | 40 | 60 | mW/sr |
| | I _F = 1 A, t _p = 100 μs | I _e | | 330 | | mW/sr |
| Radiant power | I _F = 100 mA, t _p = 20 ms | φ _e | | 40 | | mW |
| Temperature coefficient of radiant power | I _F = 1 mA | TK _{φ_e} | | - 1.1 | | %/K |
| | I _F = 100 mA | TK _{φ_e} | | - 0.51 | | %/K |
| Angle of half intensity | | φ | | ± 12 | | 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 | TK _{λ_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 |
| Virtual source diameter | | d | | 1.5 | | mm |

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

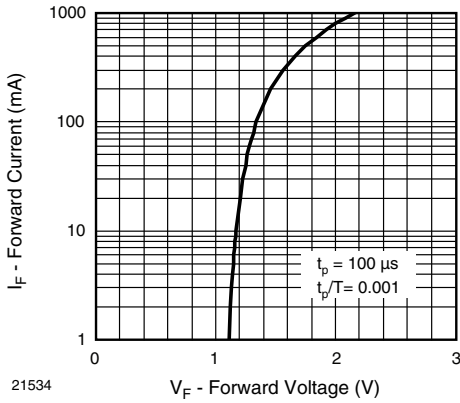


Fig. 3 - Forward Current vs. Forward Voltage

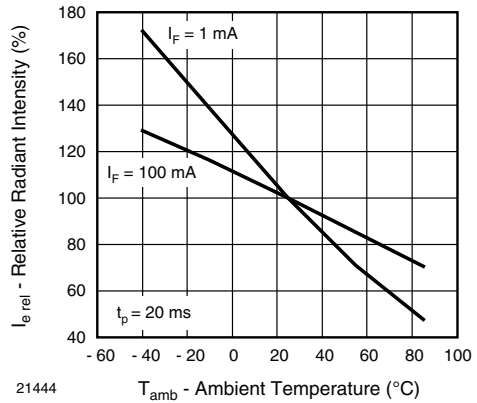


Fig. 6 - Relative Radiant Intensity vs. Ambient Temperature

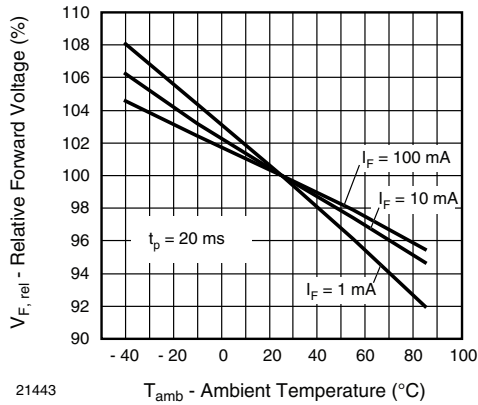


Fig. 4 - Relative Forward Voltage vs. Ambient Temperature

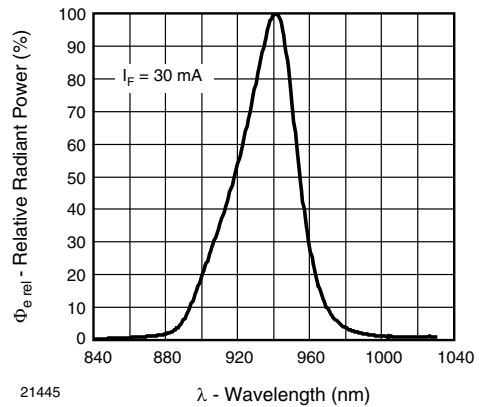


Fig. 7 - Relative Radiant Power vs. Wavelength

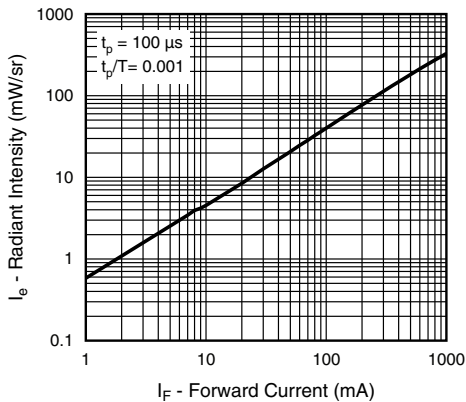


Fig. 5 - Radiant Intensity vs. Forward Current

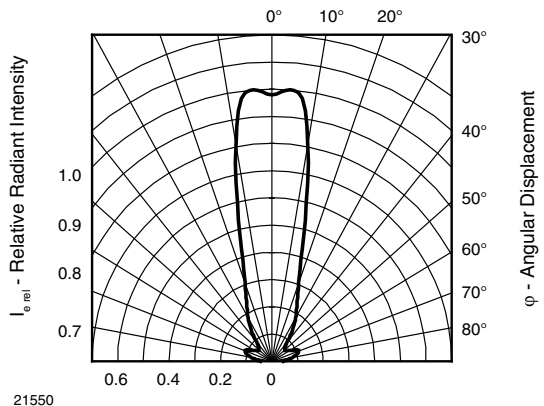


Fig. 8 - Relative Radiant Intensity vs. Angular Displacement

SOLDER PROFILE

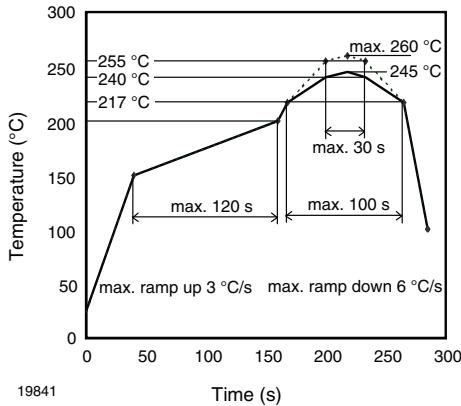


Fig. 9 - Lead (Pb)-free Reflow Solder Profile acc. J-STD-020

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

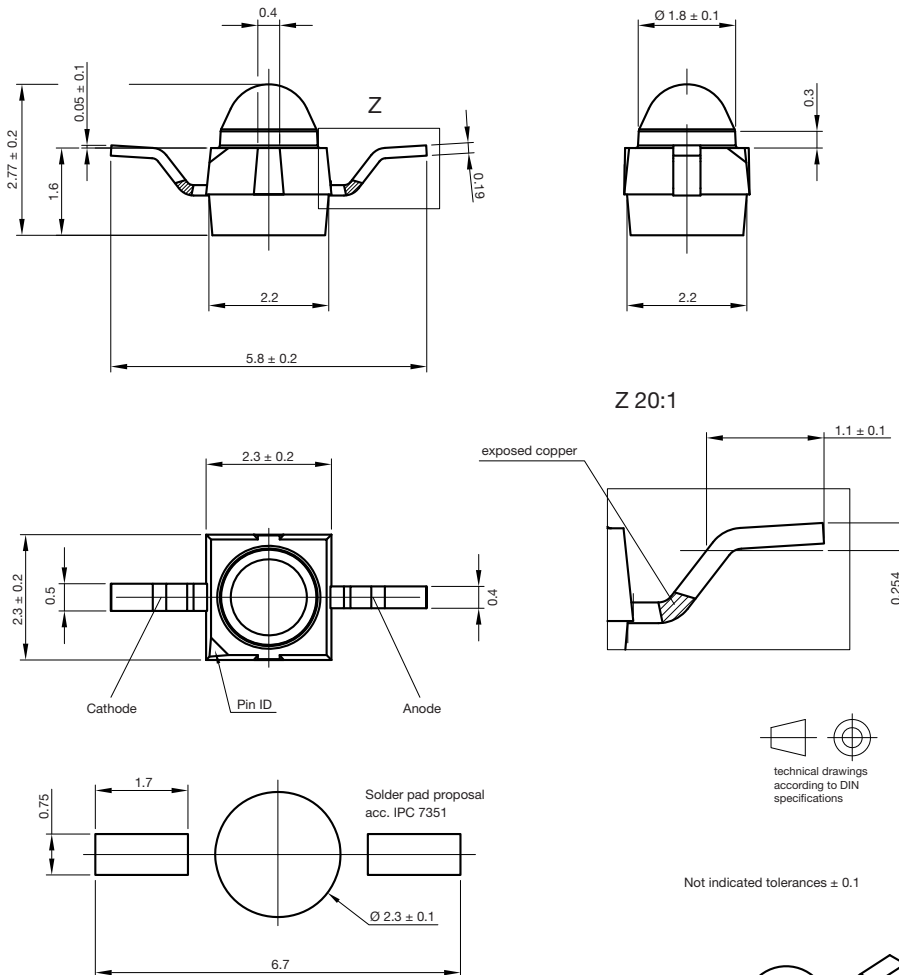
Conditions: $T_{amb} < 30\text{ °C}$, RH < 60 %

Moisture sensitivity level 2a, acc. to J-STD-020.

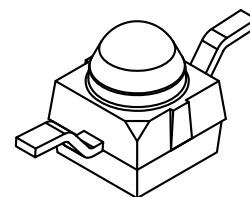
DRYING

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: VSMB2000

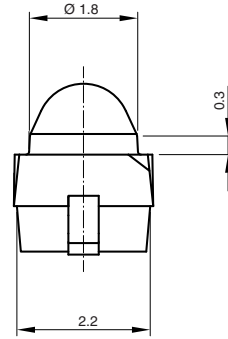


Drawing-No.: 6.544-5391.02-4
Issue: 2; 18.03.10
21517

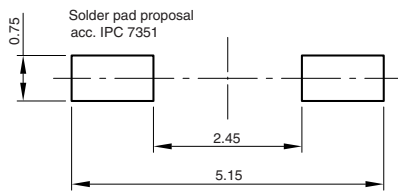
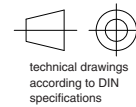
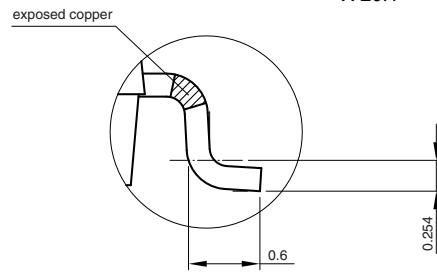
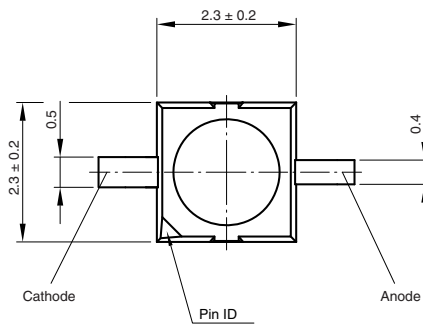




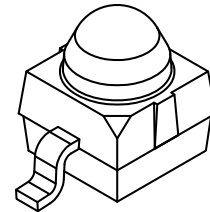
PACKAGE DIMENSIONS in millimeters: VSMB2020



X 20:1



Not indicated tolerances ± 0.1



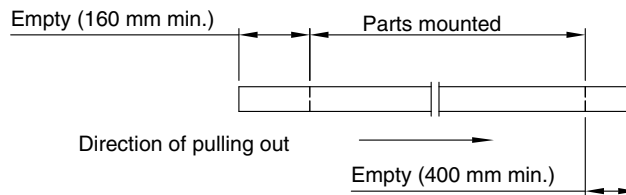
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 Issue: 4; 18.03.10
 21488



TAPING AND REEL DIMENSIONS in millimeters: **VSMB2000**



Leader and trailer tape:



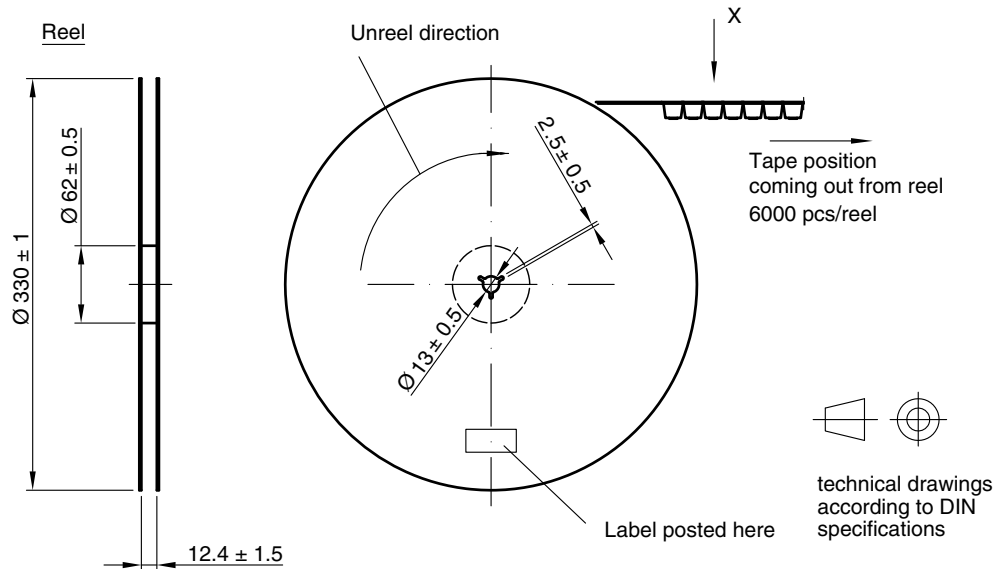
Terminal position in tape

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

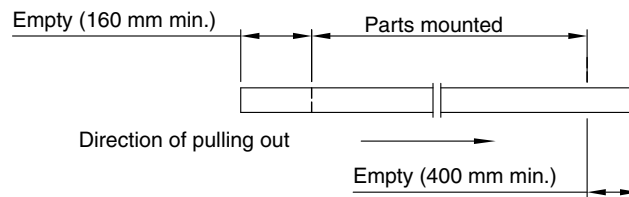


Drawing-No.: 9.800-5100.01-4
 Issue: 2; 18.03.10
 21572

TAPING AND REEL DIMENSIONS in millimeters: VSMB2020

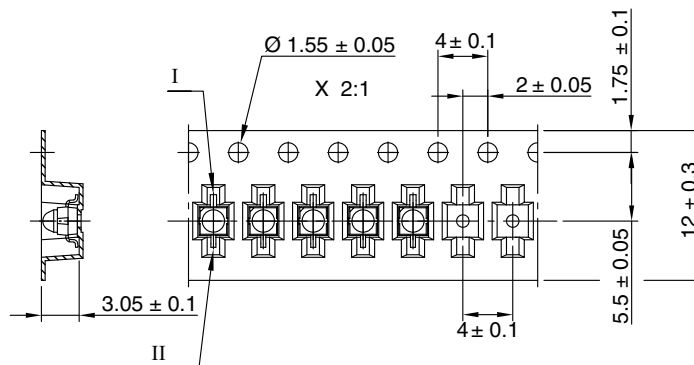


Leader and trailer tape:



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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