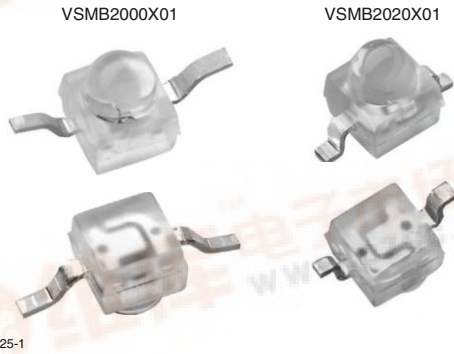


## High Speed Infrared Emitting Diodes, 940 nm, GaAlAs, DH



### 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).

### 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:  $\varphi = \pm 12^\circ$
- 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
- Halogen-free according to IEC 61249-2-21 definition
- Find out more about Vishay's Automotive Grade Product requirements at: [www.vishay.com/applications](http://www.vishay.com/applications)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**



### APPLICATIONS

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

### PRODUCT SUMMARY

COMPONENT	$I_e$ (mW/sr)	$\varphi$ (deg)	$\lambda_p$ (nm)	$t_r$ (ns)
VSMB2000X01	40	$\pm 12$	940	15
VSMB2020X01	40	$\pm 12$	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

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		$V_R$	5	V
Forward current		$I_F$	100	mA
Peak forward current	$t_p/T = 0.5, t_p = 100 \mu s$	$I_{FM}$	200	mA



ABSOLUTE MAXIMUM RATINGS				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Surge forward current	$t_p = 100 \mu s$	$I_{FSM}$	1	A
Power dissipation		$P_V$	160	mW
Junction temperature		$T_j$	100	$^{\circ}C$
Operating temperature range		$T_{amb}$	- 40 to + 85	$^{\circ}C$
Storage temperature range		$T_{stg}$	- 40 to + 100	$^{\circ}C$
Soldering temperature	$t \leq 5 s$	$T_{sd}$	260	$^{\circ}C$
Thermal resistance junction/ambient	J-STD-051, leads 7 mm, soldered on PCB	$R_{thJA}$	250	K/W

**Note**

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

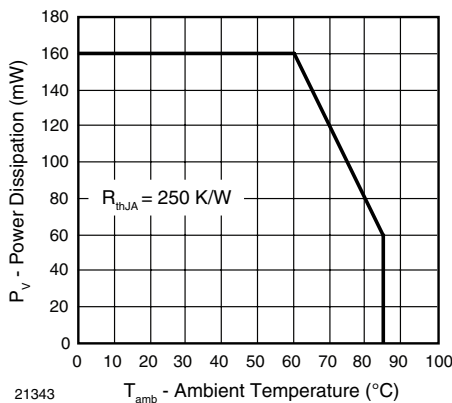


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

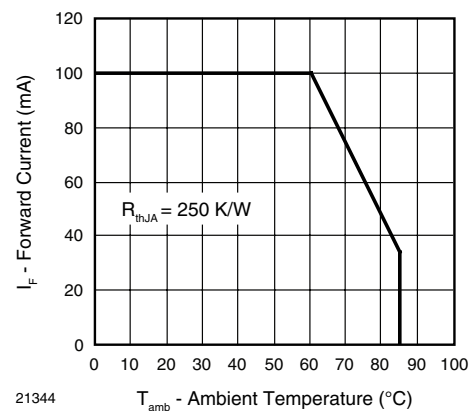


Fig. 2 - Forward Current Limit vs. Ambient Temperature

BASIC CHARACTERISTICS						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Forward voltage	$I_F = 100 \text{ mA}$ , $t_p = 20 \text{ ms}$	$V_F$	1.15	1.35	1.6	V
	$I_F = 1 \text{ A}$ , $t_p = 100 \mu s$	$V_F$		2.2		V
Temperature coefficient of $V_F$	$I_F = 1 \text{ mA}$	$TK_{V_F}$		- 1.8		mV/K
	$I_F = 100 \text{ mA}$	$TK_{V_F}$		- 1.1		mV/K
Reverse current	$V_R = 5 \text{ V}$	$I_R$			10	$\mu A$
Junction capacitance	$V_R = 0 \text{ V}$ , $f = 1 \text{ MHz}$ , $E = 0 \text{ mW/cm}^2$	$C_J$		70		pF
Radiant intensity	$I_F = 100 \text{ mA}$ , $t_p = 20 \text{ ms}$	$I_e$	20	40	60	mW/sr
	$I_F = 1 \text{ A}$ , $t_p = 100 \mu s$	$I_e$		400		mW/sr
Radiant power	$I_F = 100 \text{ mA}$ , $t_p = 20 \text{ ms}$	$\phi_e$		40		mW
Temperature coefficient of radiant power	$I_F = 1 \text{ mA}$	$TK_{\phi_e}$		- 1.1		%/K
	$I_F = 100 \text{ mA}$	$TK_{\phi_e}$		- 0.51		%/K
Angle of half intensity		$\varphi$		$\pm 12$		deg
Peak wavelength	$I_F = 30 \text{ mA}$	$\lambda_p$	920	940	960	nm
Spectral bandwidth	$I_F = 30 \text{ mA}$	$\Delta\lambda$		25		nm
Temperature coefficient of $\lambda_p$	$I_F = 30 \text{ mA}$	$TK_{\lambda_p}$		0.25		nm/K
Rise time	$I_F = 100 \text{ mA}$ , 20 % to 80 %	$t_r$		15		ns
Fall time	$I_F = 100 \text{ mA}$ , 20 % to 80 %	$t_f$		15		ns
Cut-off frequency	$I_{DC} = 70 \text{ mA}$ , $I_{AC} = 30 \text{ mA pp}$	$f_c$		23		MHz
Virtual source diameter		$d$		1.5		mm

**Note**

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

**BASIC CHARACTERISTICS**

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

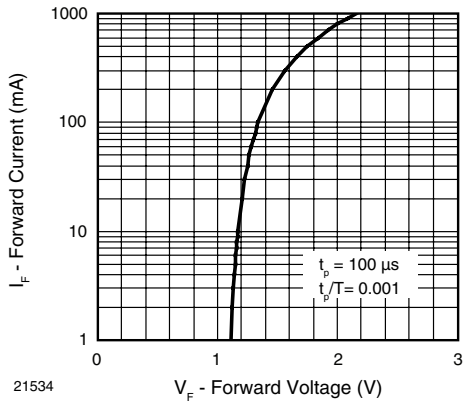


Fig. 3 - Forward Current vs. Forward Voltage

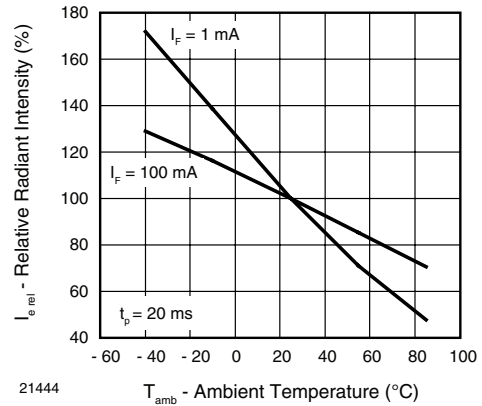


Fig. 6 - Relative Radiant Intensity vs. Ambient Temperature

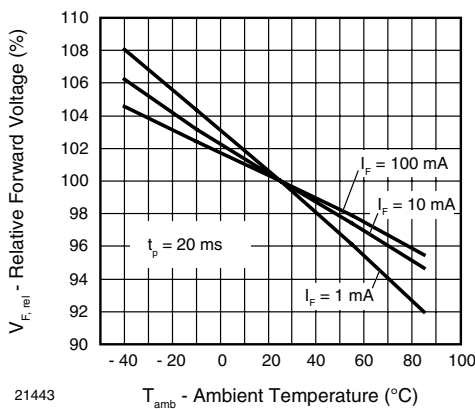


Fig. 4 - Relative Forward Voltage vs. Ambient Temperature

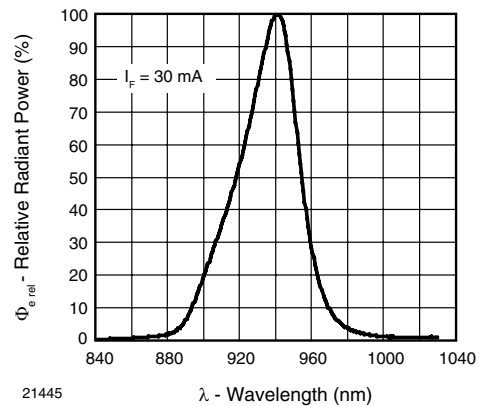


Fig. 7 - Relative Radiant Power vs. Wavelength

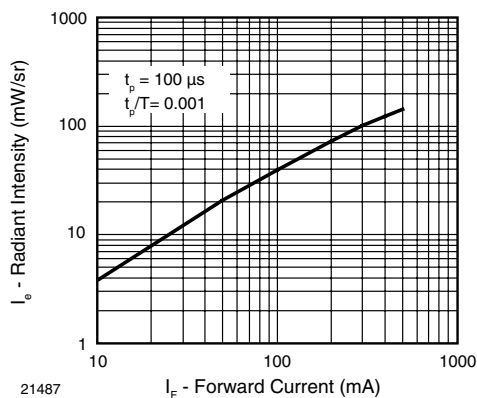


Fig. 5 - Radiant Intensity vs. Forward Current

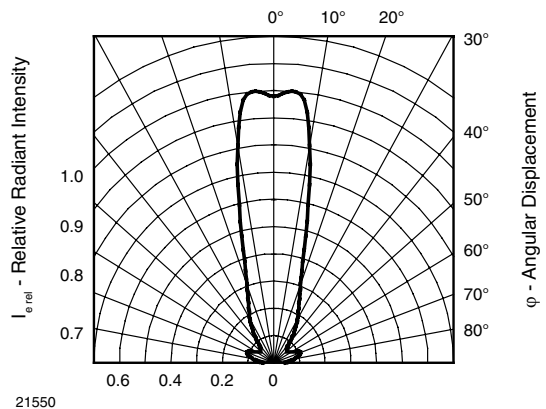


Fig. 8 - Relative Radiant Intensity vs. Angular Displacement

# VSMB2000X01, VSMB2020X01



Vishay Semiconductor 高速度红外发射二极管, 940 nm, GaAlAs, DH

## SOLDER PROFILE

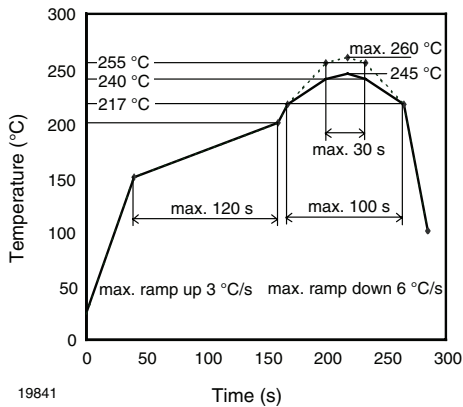


Fig. 9 - Lead (Pb)-free Reflow Solder Profile acc. J-STD-020

## 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

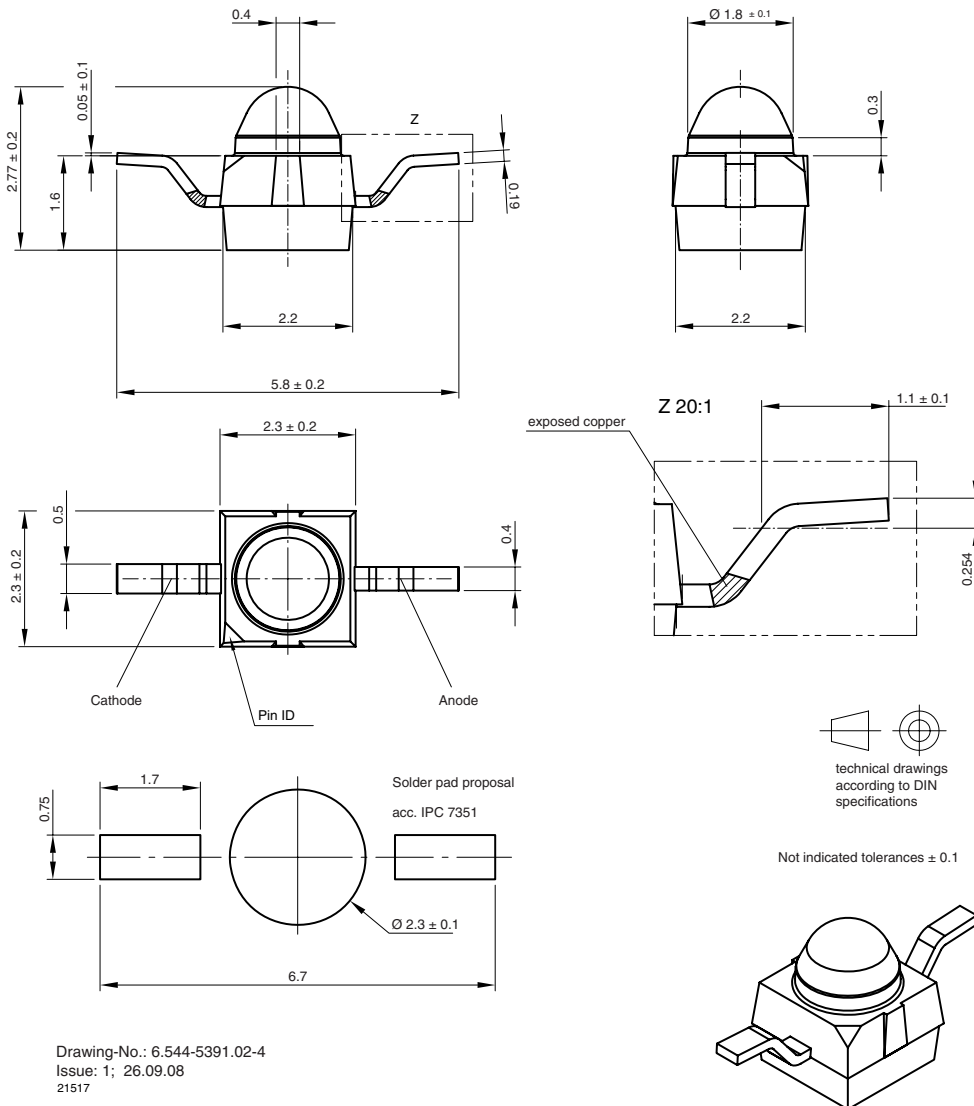
Conditions:  $T_{amb} < 30\text{ °C}$ , RH < 60 %

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

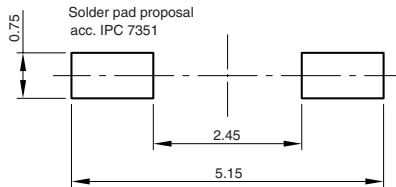
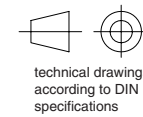
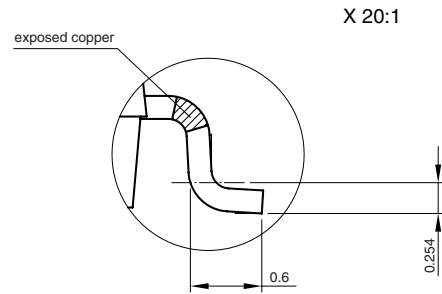
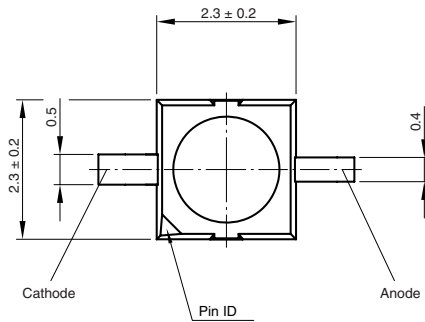
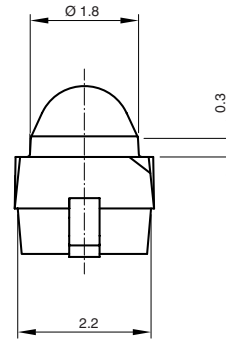
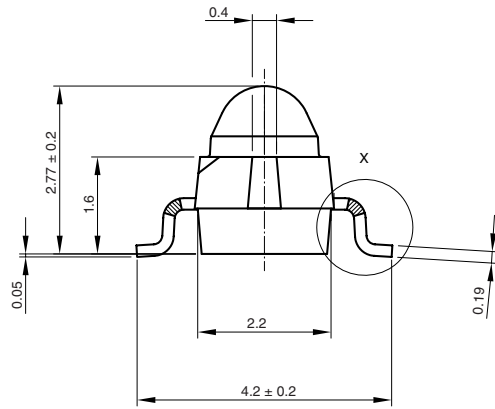
## DRYING

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 %.

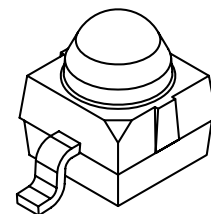
## PACKAGE DIMENSIONS in millimeters: VSMB2000



**PACKAGE DIMENSIONS** in millimeters: **VSMB2020**



Not indicated tolerances ± 0.1



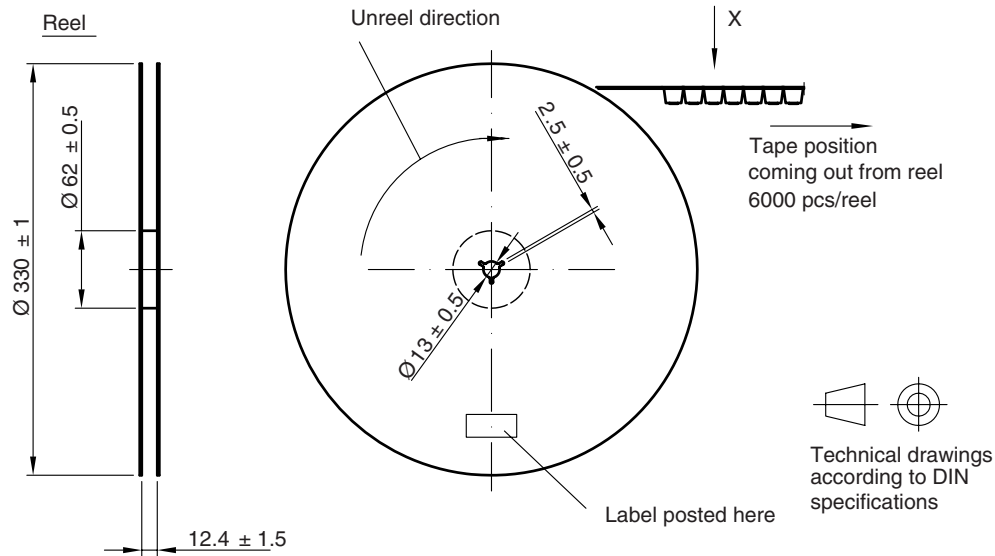
Drawing-No.: 6.544-5383.02-4  
 Issue: 3; 26.09.08  
 21488

# VSMB2000X01, VSMB2020X01

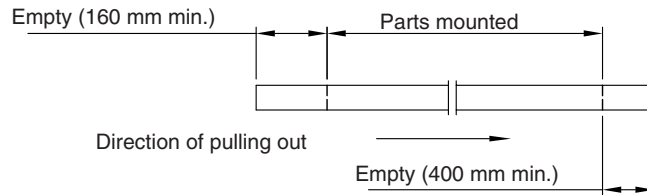


Vishay Semiconductor 高速度红外发射二极管, 940 nm, GaAlAs, DH

## TAPING AND REEL DIMENSIONS in millimeters: VSMB2000

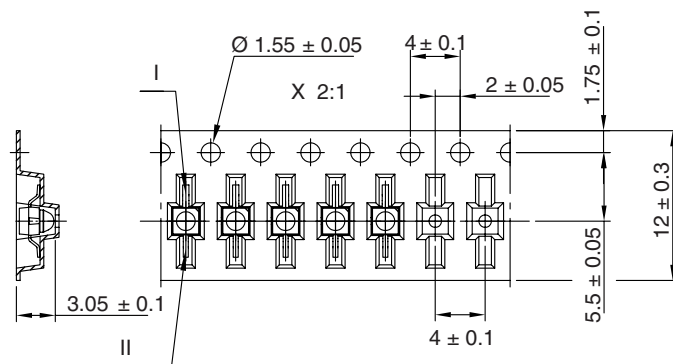


Leader and trailer tape:



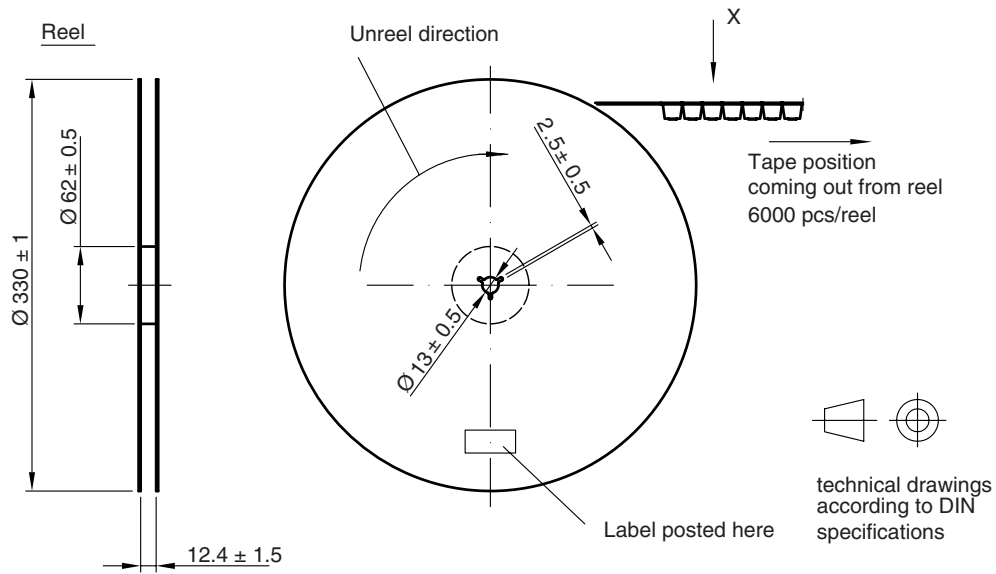
Terminal position in tape

Device	Lead I	Lead II
VEMT2000	Collector	Emitter
VEMT2500		
VEMD2000	Cathode	Anode
VSMB2000		

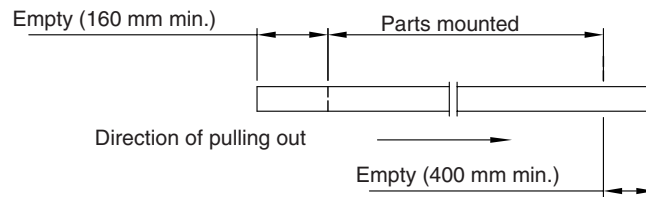


Drawing-No.: 9.800-5100.01-4  
Issue: X; 29.04.09  
21572

**TAPING AND REEL DIMENSIONS in millimeters: VSMB2020**

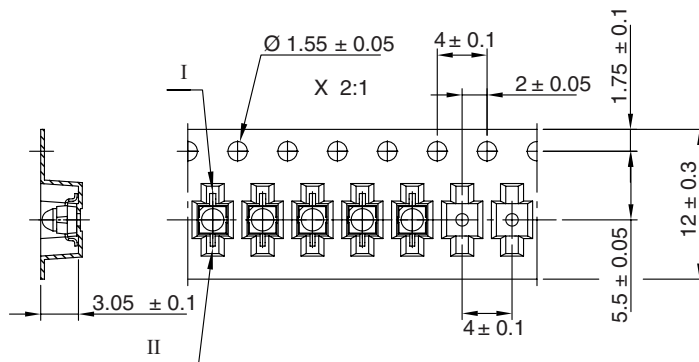


Leader and trailer tape:



Terminal position in tape

Device	Lead I	Lead II
VENT2020	Collector	Emitter
VENT2520	Collector	Emitter
VSMB2020	Cathode	Anode
VEMD2020	Cathode	Anode



Drawing-No.: 9.800-5091.01-4

Issue: X; 29.04.09

21571

## Disclaimer

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