

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

VSMF2890RGX01



VSMF2890GX01

**DESCRIPTION**

VSMF2890RG(G)X01 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 2.8
- AEC-Q101 qualified
- Peak wavelength:  $\lambda_p = 890$  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, according to J-STD-020
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

AUTOMOTIVE  
GRADERoHS  
COMPLIANT  
HALOGEN  
**FREE**  
**GREEN**  
(5-2008)**APPLICATIONS**

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

**PRODUCT SUMMARY**

COMPONENT	$I_e$ (mW/sr)	$\phi$ (deg)	$\lambda_p$ (nm)	$t_r$ (ns)
VSMF2890RGX01	40	$\pm 12$	890	30
VSMF2890GX01	40	$\pm 12$	890	30

**Note**

- Test conditions see table "Basic Characteristics"

**ORDERING INFORMATION**

ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
VSMF2890RGX01	Tape and reel	MOQ: 6000 pcs, 6000 pcs/reel	Reverse gullwing
VSMF2890GX01	Tape and reel	MOQ: 6000 pcs, 6000 pcs/reel	Gullwing

**Note**

- MOQ: minimum order quantity



<b>ABSOLUTE MAXIMUM RATINGS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , 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	According to Fig. 9, J-STD-020	$T_{sd}$	260	$^{\circ}\text{C}$
Thermal resistance junction-to-ambient	J-STD-051, leads 7 mm, soldered on PCB	$R_{thJA}$	250	K/W

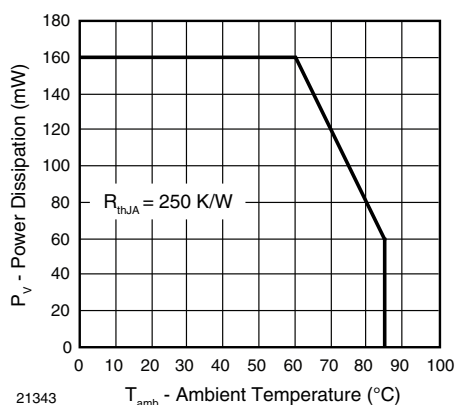


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

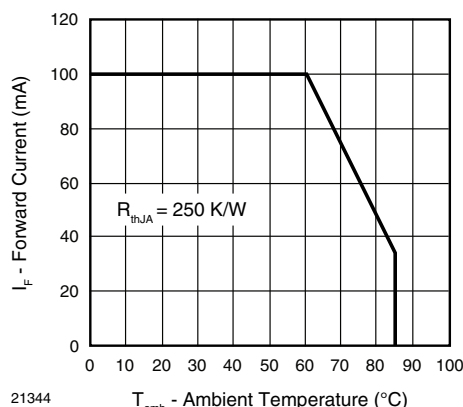


Fig. 2 - Forward Current Limit vs. Ambient Temperature

<b>BASIC CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , 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 $V_F$	$I_F = 1\text{ mA}$	$TK_{V_F}$	-	-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	$\mu\text{A}$
Junction capacitance	$V_R = 0\text{ V}, f = 1\text{ MHz}, E = 0\text{ mW/cm}^2$	$C_J$	-	125	-	pF
Radiant intensity	$I_F = 100\text{ mA}, t_p = 20\text{ ms}$	$I_e$	20	40	60	mW/sr
	$I_F = 1\text{ A}, t_p = 100\text{ }\mu\text{s}$	$I_e$	-	350	-	mW/sr
Radiant power	$I_F = 100\text{ mA}, t_p = 20\text{ ms}$	$\phi_e$	-	40	-	mW
Temperature coefficient of $\phi_e$	$I_F = 100\text{ mA}$	$TK_{\phi_e}$	-	-0.35	-	%/K
Angle of half intensity		$\phi$	-	$\pm 12$	-	deg
Peak wavelength	$I_F = 30\text{ mA}$	$\lambda_p$	870	890	910	nm
Spectral bandwidth	$I_F = 30\text{ mA}$	$\Delta\lambda$	-	40	-	nm
Temperature coefficient of $\lambda_p$	$I_F = 30\text{ mA}$	$TK_{\lambda_p}$	-	0.25	-	nm/K
Rise time	$I_F = 100\text{ mA}, 20\% \text{ to } 80\%$	$t_r$	-	30	-	ns
Fall time	$I_F = 100\text{ mA}, 20\% \text{ to } 80\%$	$t_f$	-	30	-	ns
Cut-off frequency	$I_{DC} = 70\text{ mA}, I_{AC} = 30\text{ mA pp}$	$f_c$	-	12	-	MHz
Virtual source diameter		$d$	-	1.5	-	mm



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

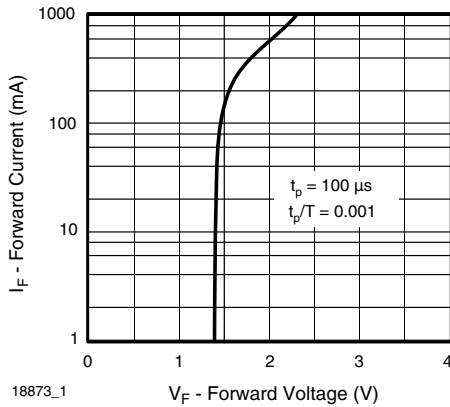


Fig. 3 - Forward Current vs. Forward Voltage

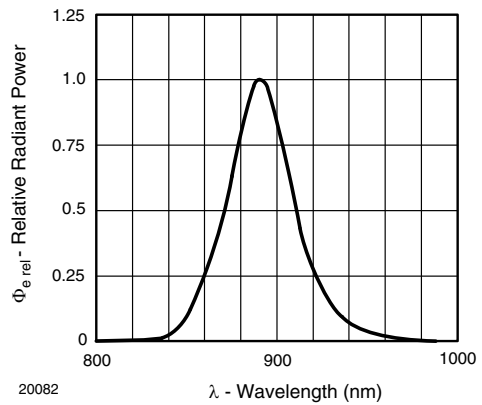


Fig. 6 - Relative Radiant Power vs. Wavelength

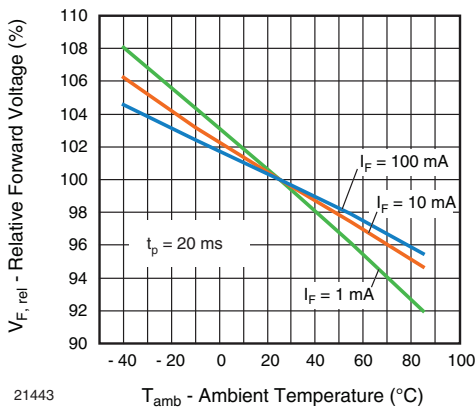


Fig. 4 - Relative Forward Voltage vs. Ambient Temperature

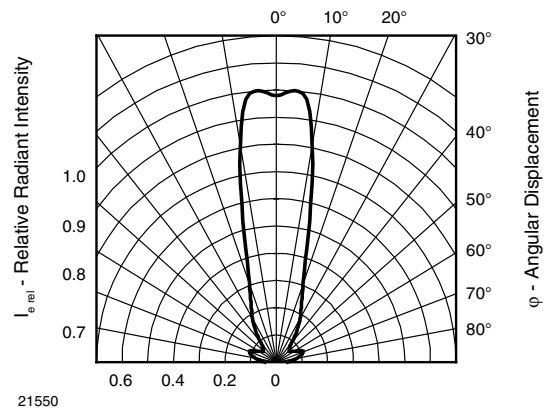


Fig. 7 - Relative Radiant Intensity vs. Angular Displacement

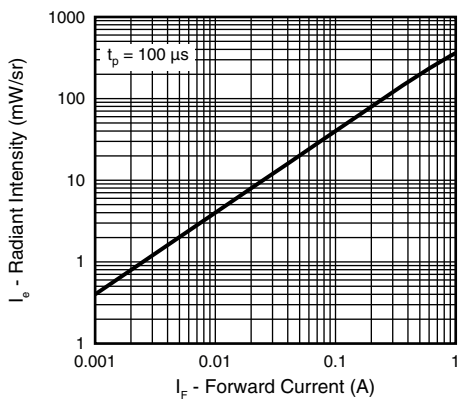


Fig. 5 - Radiant Intensity vs. Forward Current

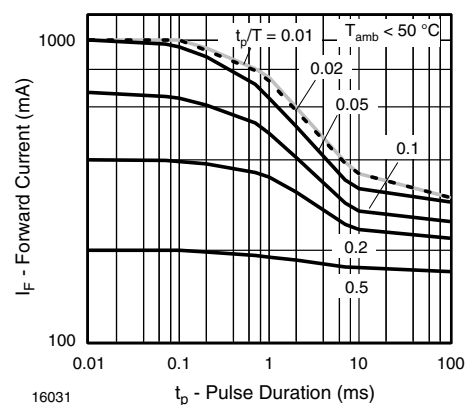
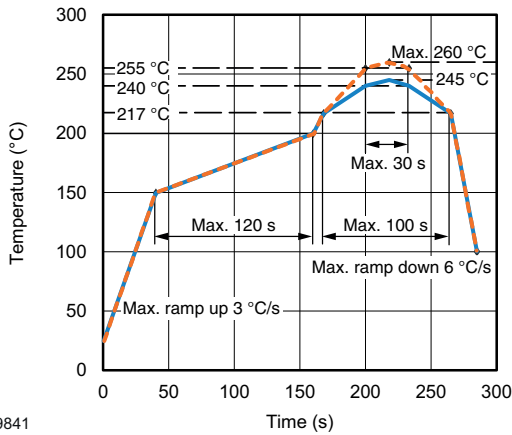


Fig. 8 - Pulse Forward Current vs. Pulse Duration



**SOLDER PROFILE**



19841

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

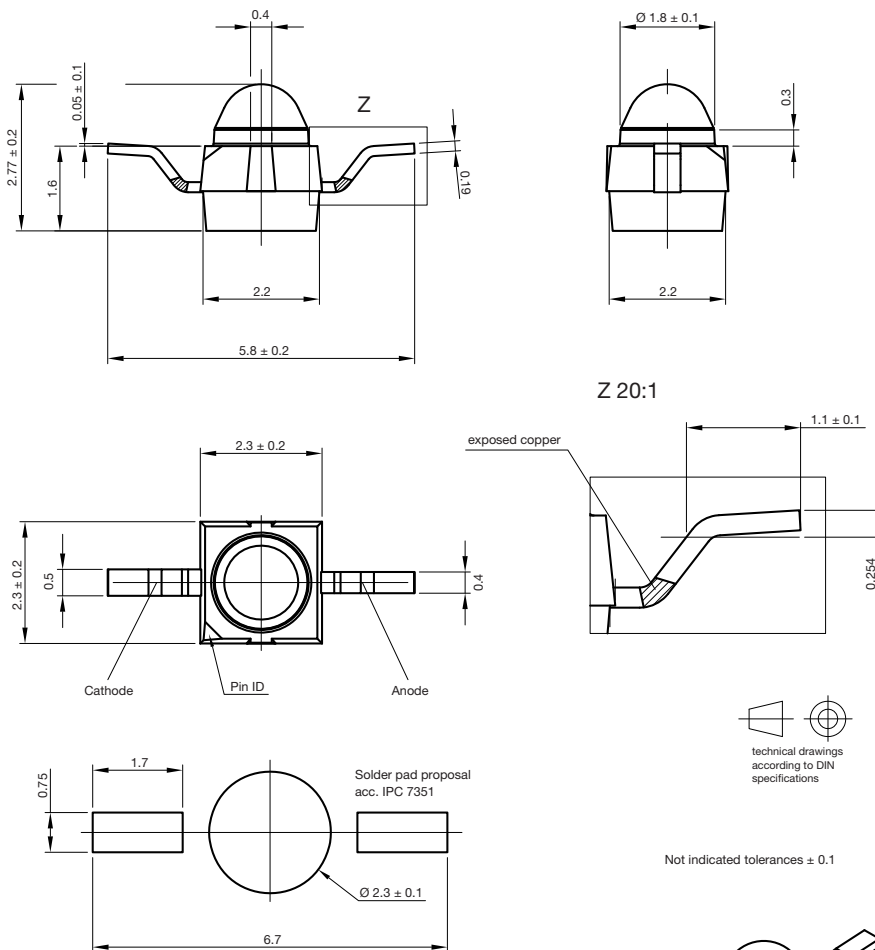
Conditions:  $T_{amb} < 30\text{ }^{\circ}\text{C}$ , RH < 60 %

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

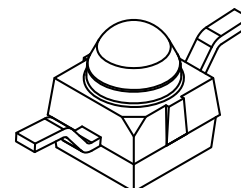
**DRYING**

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: **VSMF2890RGX01**

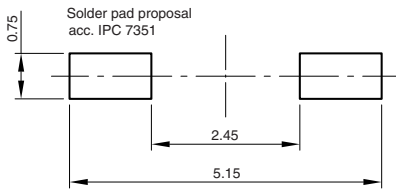
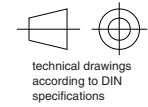
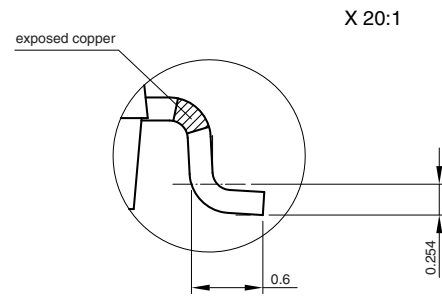
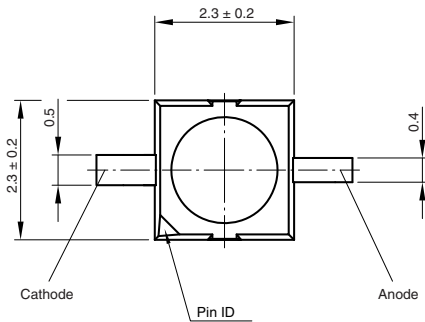
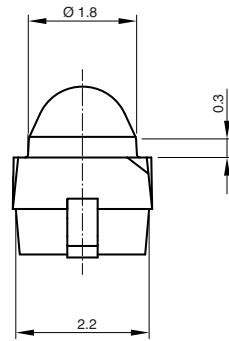
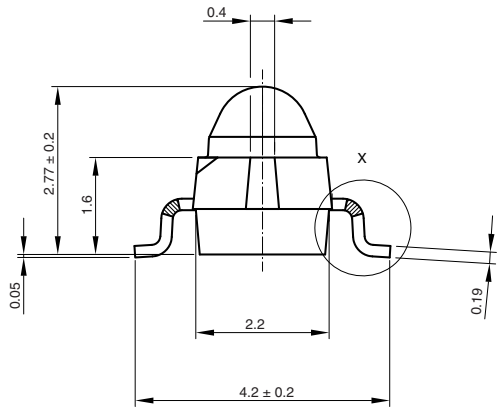


Drawing-No.: 6.544-5391.02-4  
Issue: 2; 18.03.10  
21517

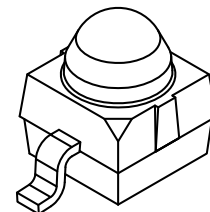




**PACKAGE DIMENSIONS** in millimeters: **VSMF2890GX01**



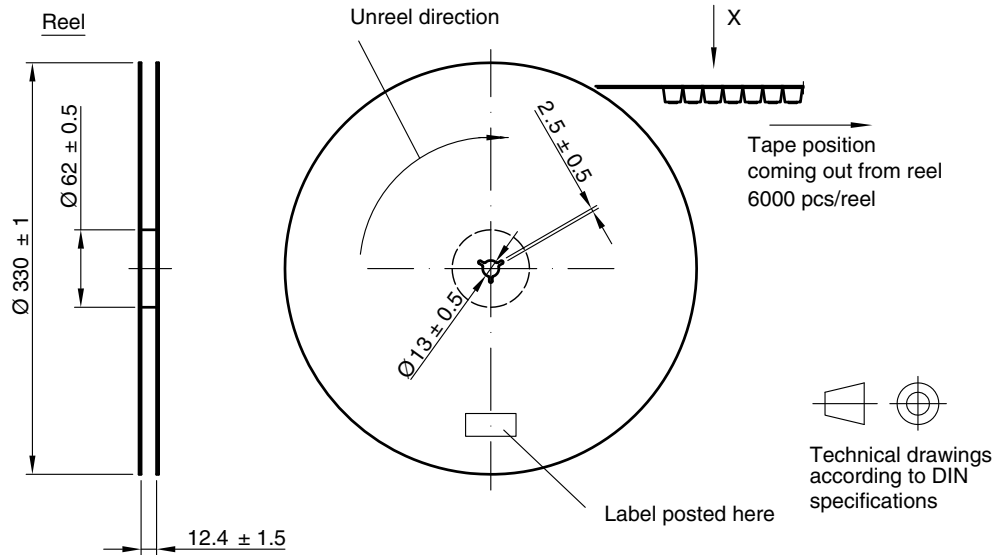
Not indicated tolerances ± 0.1



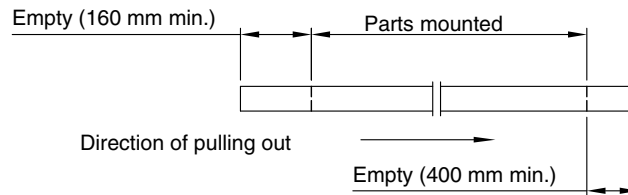
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Issue: 4; 18.03.10  
21488



**TAPING AND REEL DIMENSIONS** in millimeters: **VSMF2890RGX01**

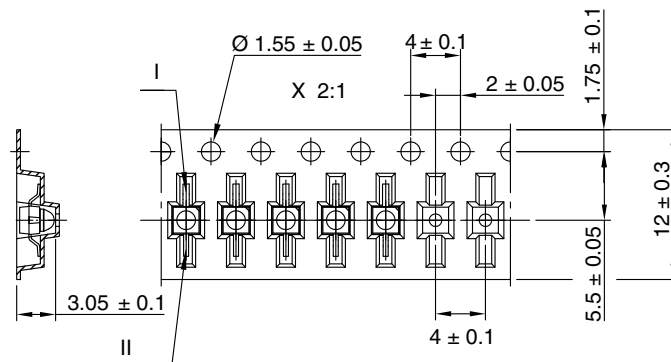


Leader and trailer tape:



Terminal position in tape

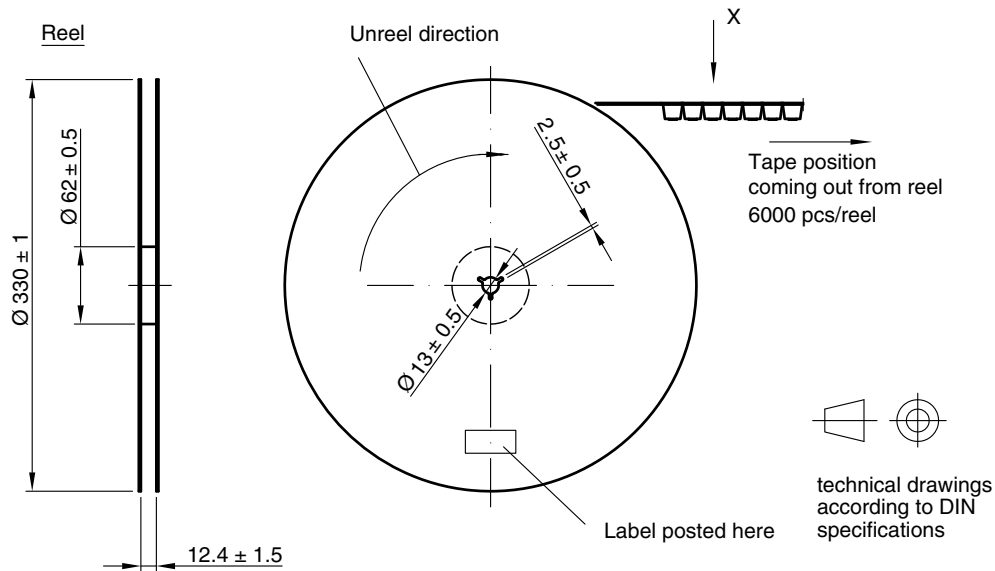
Device	Lead I	Lead II
VEMT2000	Collector	Emitter
VEMT2500		Emitter
VEMD2000	Cathode	Anode
VEMD2500		
VSMB2000		
VSMG2000	Anode	Cathode
VSMY2850RG		



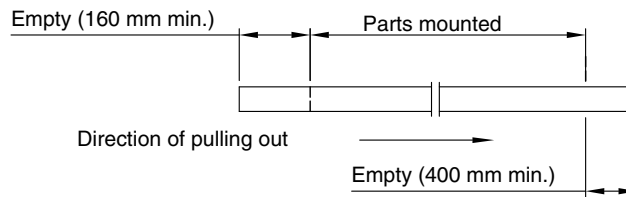
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 Issue: 2; 18.03.10  
 21572



**TAPING AND REEL DIMENSIONS** in millimeters: **VSMF2890GX01**

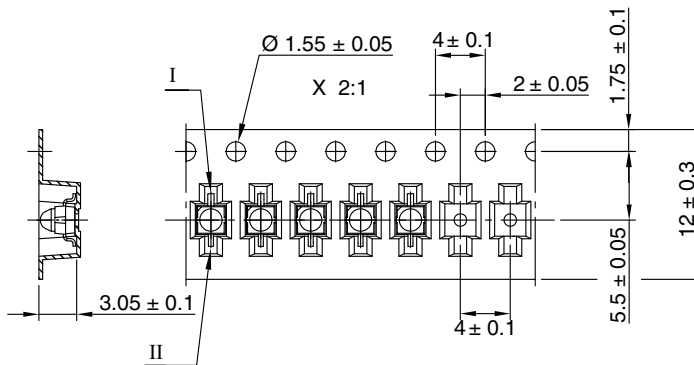


Leader and trailer tape:



Terminal position in tape

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



Drawing-No.: 9.800-5091.01-4

Issue: 3; 18.03.10

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