



## 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, according to J-STD-020
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

**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)	$\phi$ (deg)	$\lambda_p$ (nm)	$t_r$ (ns)
VSMF2893RGX01	20	$\pm 25$	890	30
VSMF2893GX01	20	$\pm 25$	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	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

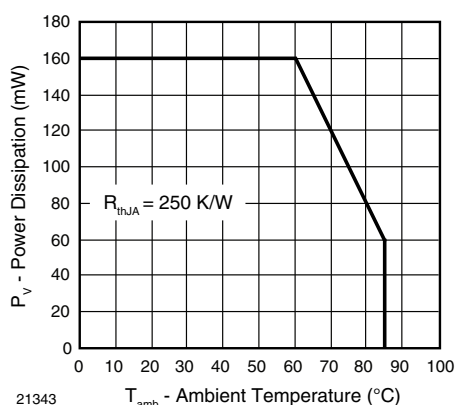


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

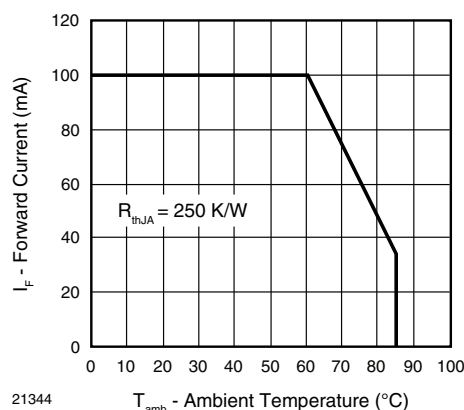


Fig. 2 - Forward Current Limit vs. Ambient Temperature

**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	$\mu\text{A}$
Junction capacitance	$V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0\text{ mW/cm}^2$	$C_J$		125		pF
Radiant intensity	$I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$	$I_e$	10	20	30	mW/sr
	$I_F = 1\text{ A}$ , $t_p = 100\text{ }\mu\text{s}$	$I_e$		180		mW/sr
Radiant power	$I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$	$\phi_e$		40		mW
Temperature coefficient of $\phi_e$	$I_F = 100\text{ mA}$	$TK_{\phi_e}$		-0.35		%/K
Angle of half intensity		$\varphi$		$\pm 25$		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 % 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

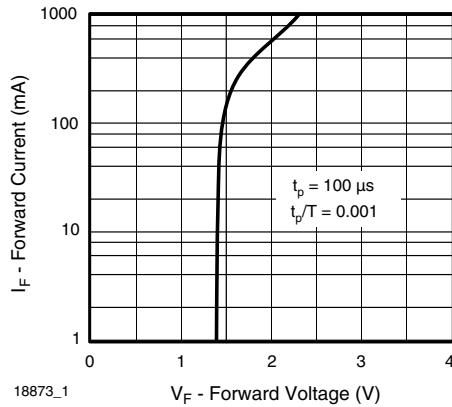
**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

Fig. 3 - Forward Current vs. Forward Voltage

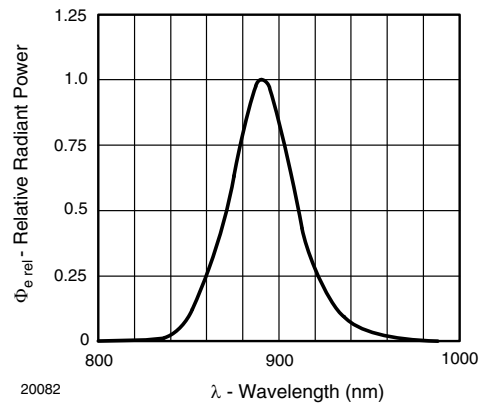


Fig. 6 - Relative Radiant Power vs. Wavelength

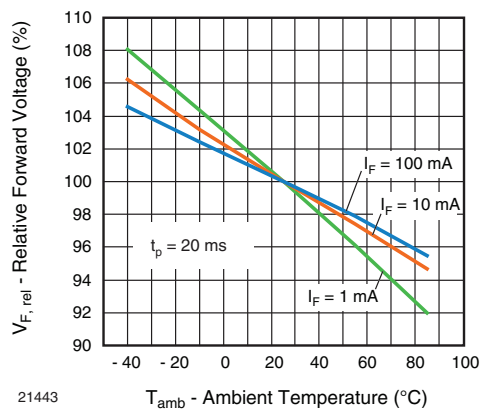


Fig. 4 - Relative Forward Voltage vs. Ambient Temperature

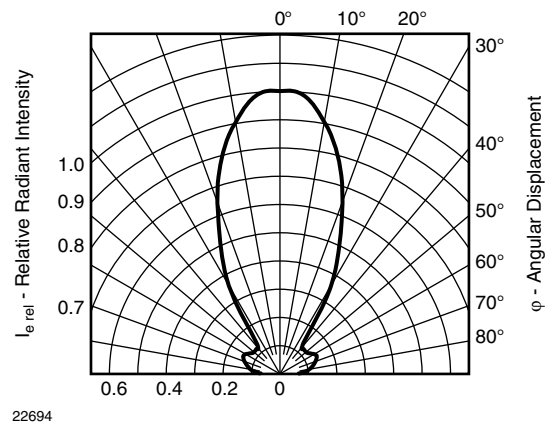


Fig. 7 - Relative Radiant Intensity vs. Angular Displacement

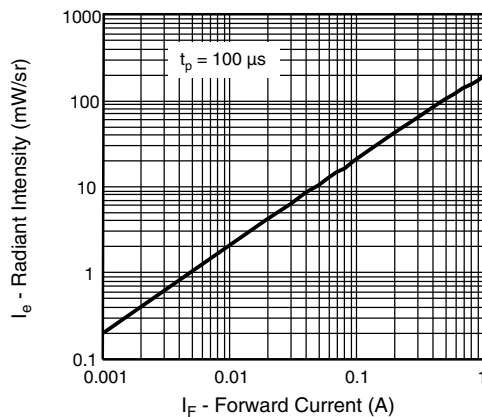


Fig. 5 - Radiant Intensity vs. Forward Current

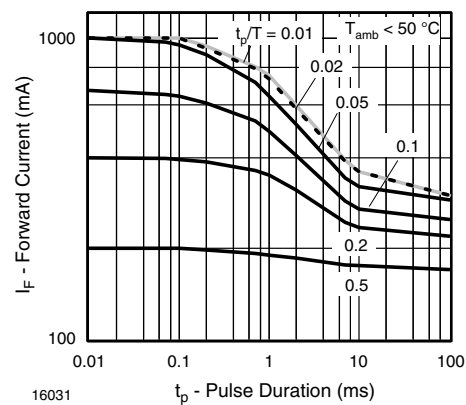


Fig. 8 - Pulse Forward Current vs. Pulse Duration

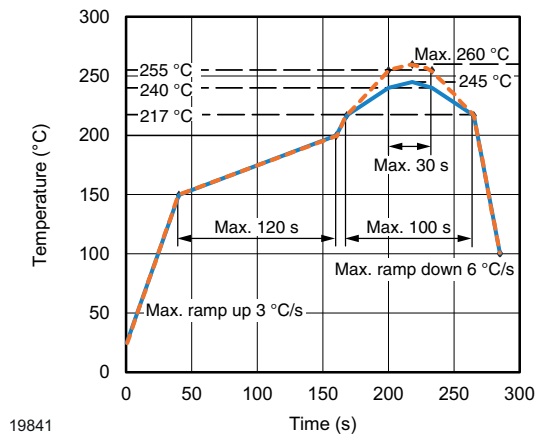
**SOLDER PROFILE**

Fig. 9 - Lead (Pb)-free Reflow Solder Profile according to 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:  $T_{amb} < 30\text{ °C}$ ,  $RH < 60\%$

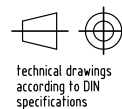
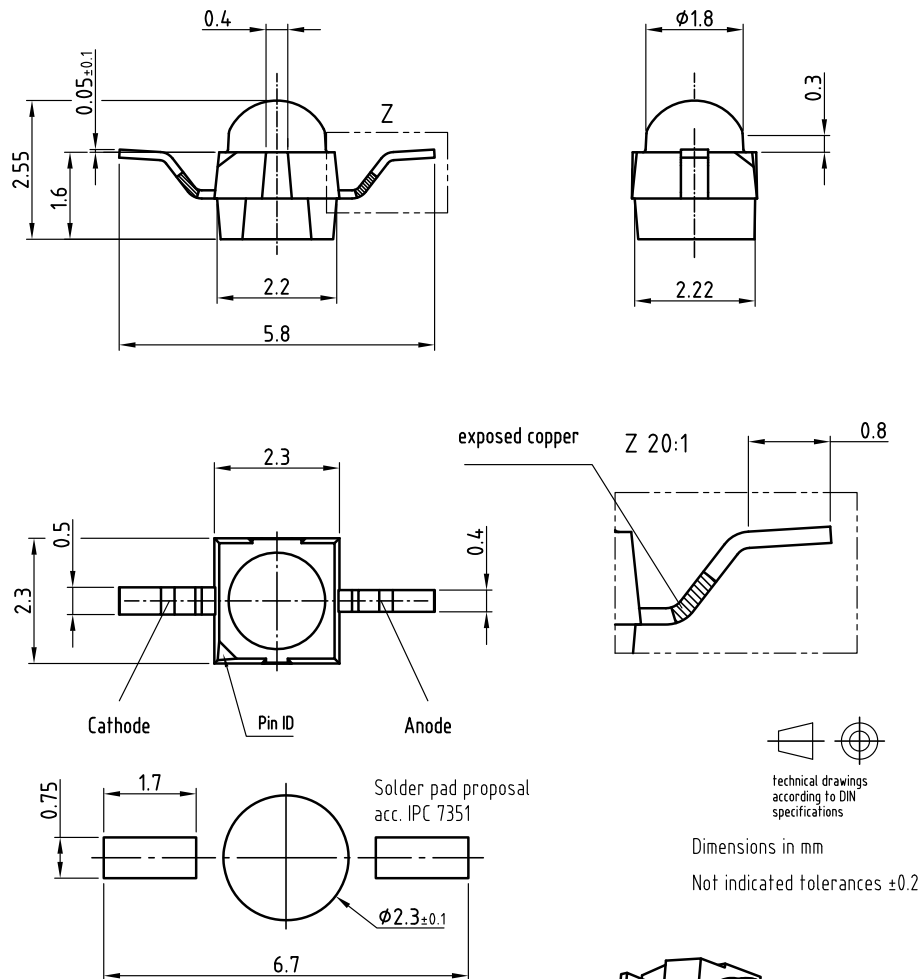
Moisture sensitivity level 2a, according to J-STD-020.

**DRYING**

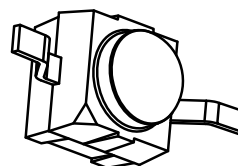
In case of moisture absorption devices should be baked before soldering. Conditions see J-STD-020 or label. Devices taped on reel dry using recommended conditions 192 h at  $40\text{ °C}$  (+  $5\text{ °C}$ ),  $RH < 5\%$ .



**PACKAGE DIMENSIONS** in millimeters: **VSMF2893RGX01**



Dimensions in mm  
Not indicated tolerances  $\pm 0.2$

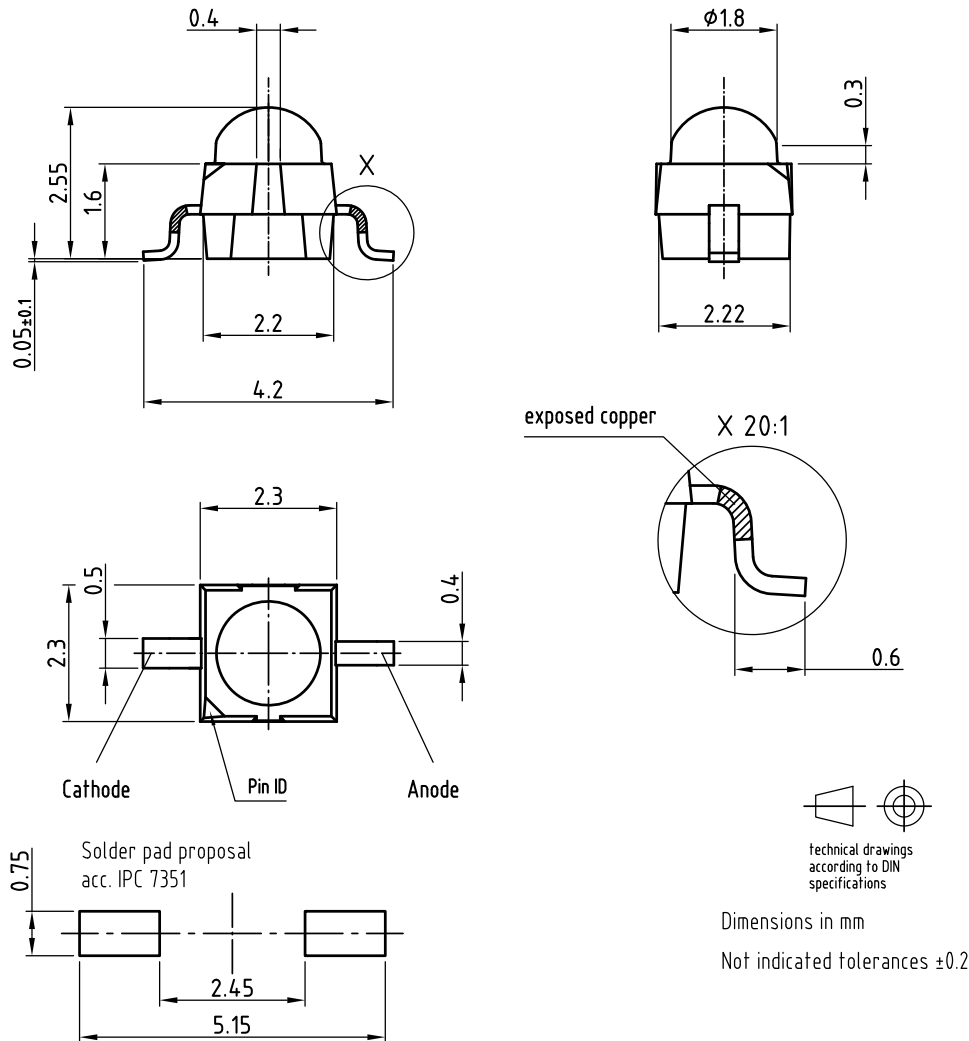


Drawing refers to following types: VSMB2943RGX01  
VSMF2893RGX01  
VEMD2x23X01

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

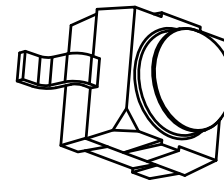


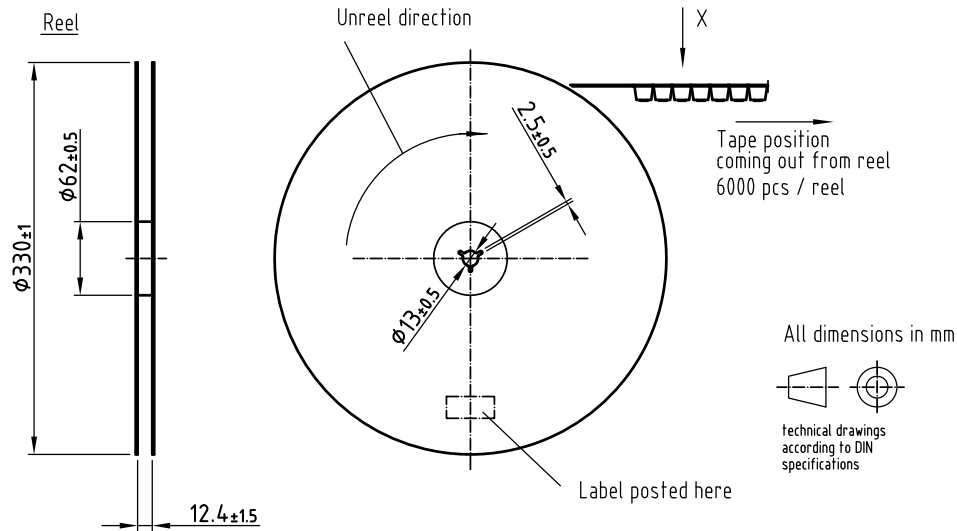
**PACKAGE DIMENSIONS** in millimeters: **VSMF2893GX01**



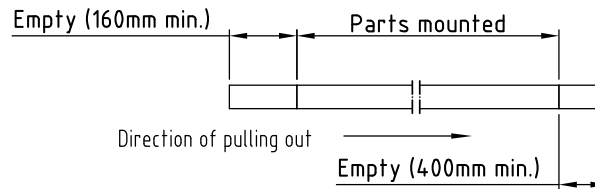
Drawing refers to following types: VSMB2943GX01  
VSMF2893GX01  
VEMD2x23X01

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



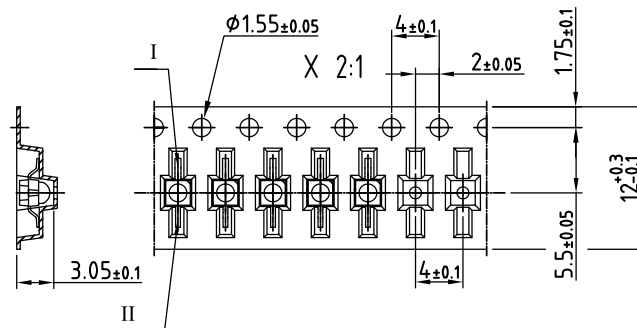
**TAPING AND REEL DIMENSIONS in millimeters: VSMF2893RGX01**

Leader and trailer tape:



Terminal position in tape

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

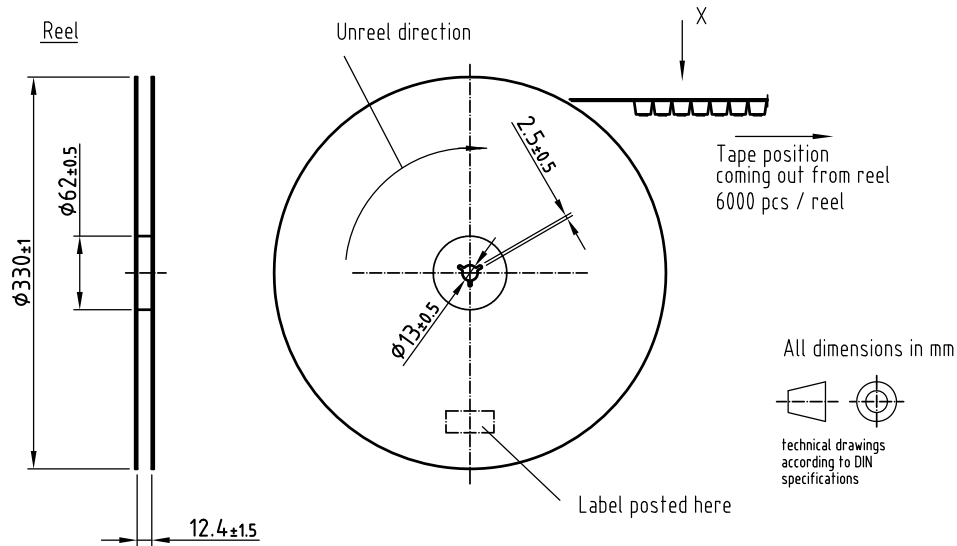


Drawing refers to following types: see table

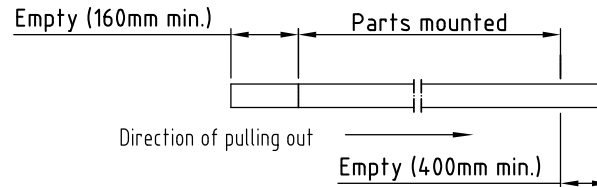
Reel dimensions and tape

Drawing-No.: 9.800-5100.02-4

Issue: prel; 03.08.12

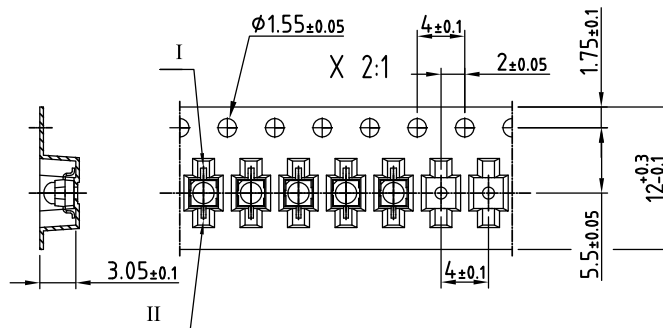
**TAPING AND REEL DIMENSIONS in millimeters: VSMF2893GX01**

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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