Silicon NPN Phototransistor

VEMT2003X01

VEMT2023X01

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
- High radiant sensitivity
- Daylight blocking filter matched with 830 nm to 950 nm IR emitters
- Fast response times
- Angle of half sensitivity: $\varphi = \pm 35°$
- Package matched with IR emitter series VSMB2943RGX01 and VSMB2943GX01
- Floor life: 4 weeks, MSL 2a, acc. J-STD-020
- Lead (Pb)-free reflow soldering
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

AUTOMOTIVE GRADE

Pb-free

e3

RoHS COMPLIANT

HALOGEN FREE GREEN (5-2008)

DESCRIPTION

VEMT2003X01 series are silicon NPN epitaxial planar phototransistors with daylight blocking filter in a miniature, black dome lens package for surface mounting. Filter bandwidth is matched with 830 nm to 950 nm IR emitters.

APPLICATIONS

- Detector in automotive applications
- Photo interrupters
- Miniature switches
- Counters
- Encoders
- Position sensors

PRODUCT SUMMARY			
COMPONENT	I_{ca} (mA)	φ (deg)	$\lambda_{0.5}$ (nm)
VEMT2003X01	2.7	± 35	790 to 970
VEMT2023X01	2.7	± 35	790 to 970

Note

- Test condition see table “Basic Characteristics”

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
VEMT2003X01	Tape and reel	MOQ: 6000 pcs, 6000 pcs/reel	Reverse gullwing
VEMT2023X01	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**
Collector emitter voltage		V_{CEO}	20	V
Emitter collector voltage		V_{ECO}	7	V
Collector current		I_C	50	mA
Power power dissipation	$T_{amb} \leq 75$ °C	P_V	100	mW
Junction temperature		T_j	100	°C
Operating temperature range		T_{amb}	- 40 to + 100	°C
Storage temperature range		T_{stg}	- 40 to + 100	°C
Soldering temperature	Acc. reflow profile fig. 8	T_{sd}	260	°C
Thermal resistance junction/ambient	Acc. J-STD-051	R_{thJA}	250	K/W

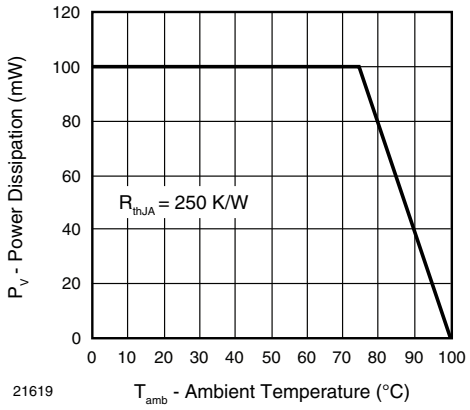


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Collector emitter breakdown voltage	I_C = 0.1 mA	V_{CEO}	20			V
Collector dark current	V_{CE} = 5 V, E = 0	I_{CEO}		1	100	nA
Collector emitter capacitance	V_{CE} = 0 V, f = 1 MHz, E = 0	C_{CEO}		25		pF
Collector light current	E_e = 1 mW/cm², λ = 950 nm, V_{CE} = 5 V	I_{ca}	1.3	2.7	4.1	mA
Angle of half sensitivity		φ		± 35		deg
Wavelength of peak sensitivity		λ_p		860		nm
Range of spectral bandwidth		$\lambda_{0.5}$		790 to 970		nm
Collector emitter saturation voltage	I_C = 0.05 mA	V_{CEsat}			0.4	V
Temperature coefficient of Ica	E_e = 1 mW/cm², λ = 950 nm, V_{CE} = 5 V	Tk_{Ica}		1.1		%/K

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

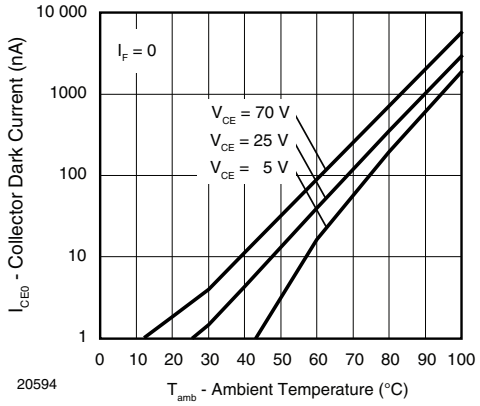


Fig. 2 - Collector Dark Current vs. Ambient Temperature

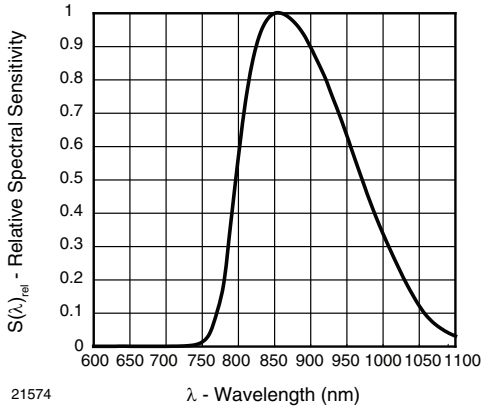


Fig. 5 - Relative Spectral Sensitivity vs. Wavelength

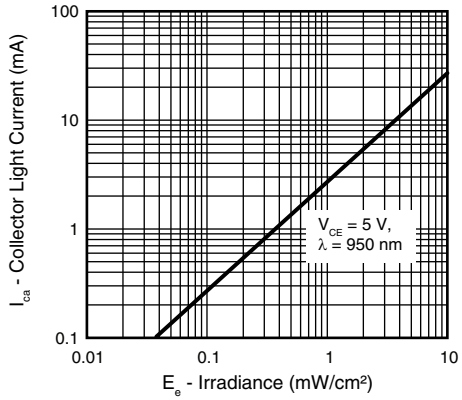


Fig. 3 - Collector Light Current vs. Irradiance

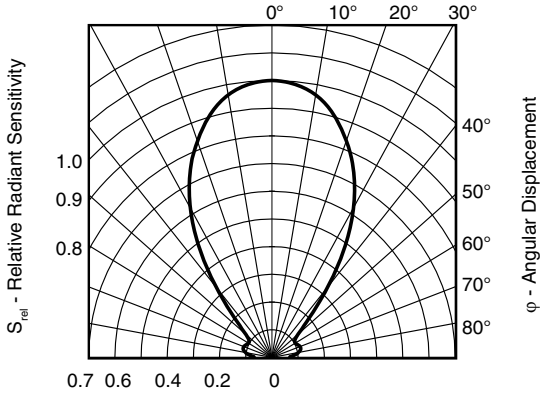


Fig. 6 - Relative Radiant Sensitivity vs. Angular Displacement

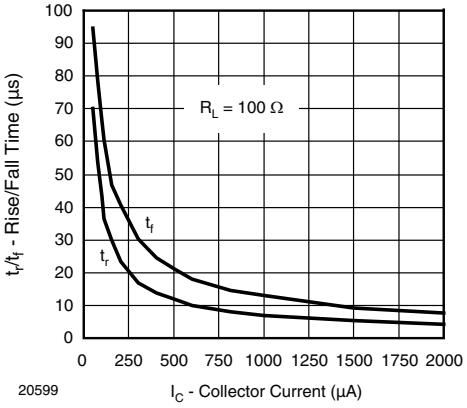


Fig. 4 - Rise/Fall Time vs. Collector Current

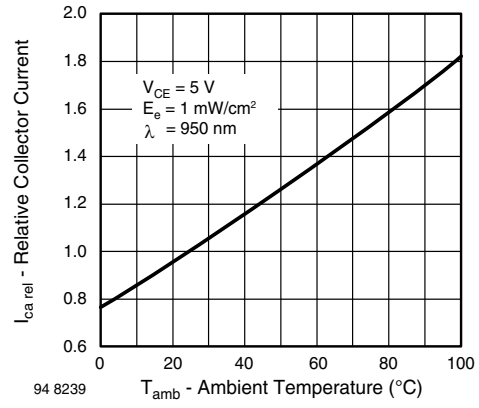


Fig. 7 - Relative Collector Current vs. Ambient Temperature

REFLOW SOLDER PROFILE

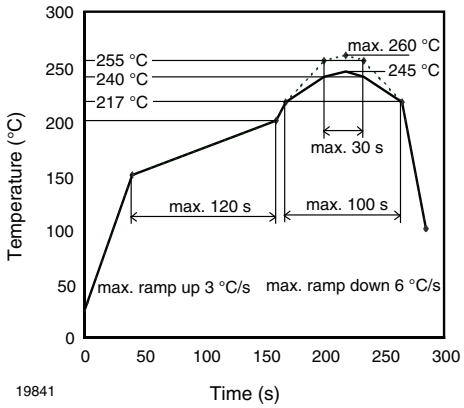


Fig. 8 - Lead (Pb)-free Reflow Solder Profile acc. J-STD-020

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.

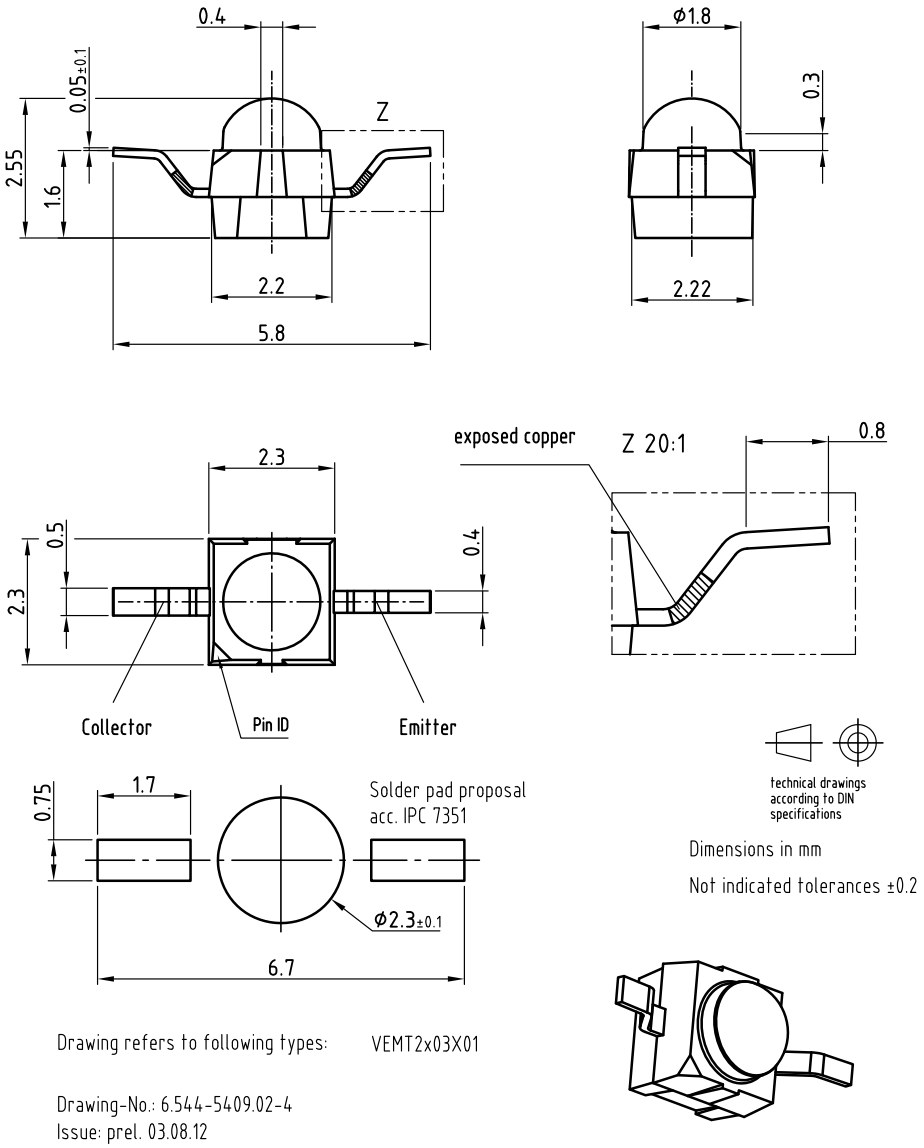
FLOOR LIFE

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 °C, RH < 60 %
Moisture sensitivity level 2a, acc. to J-STD-020.

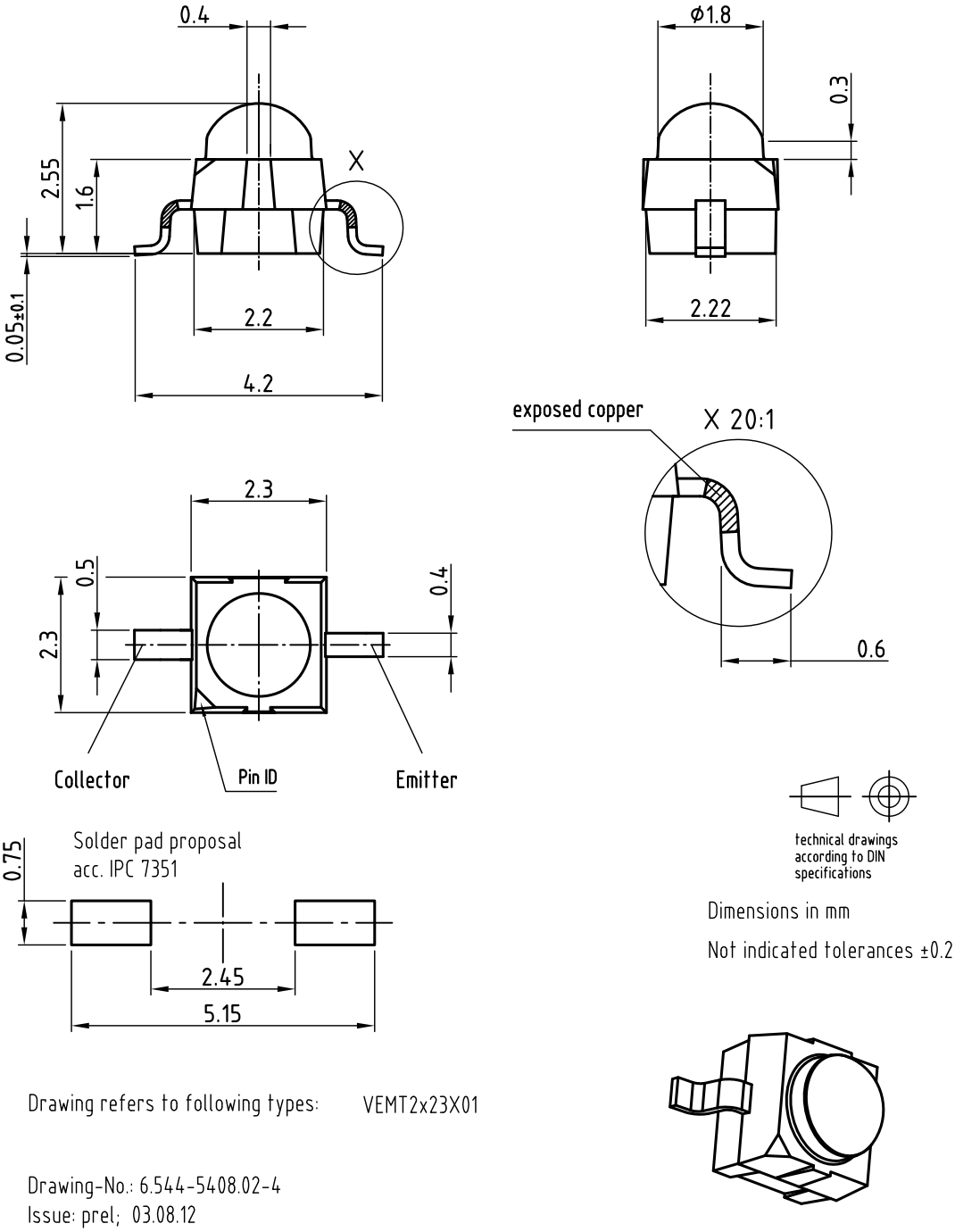
DRYING

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 VEMT2003X01 in millimeters



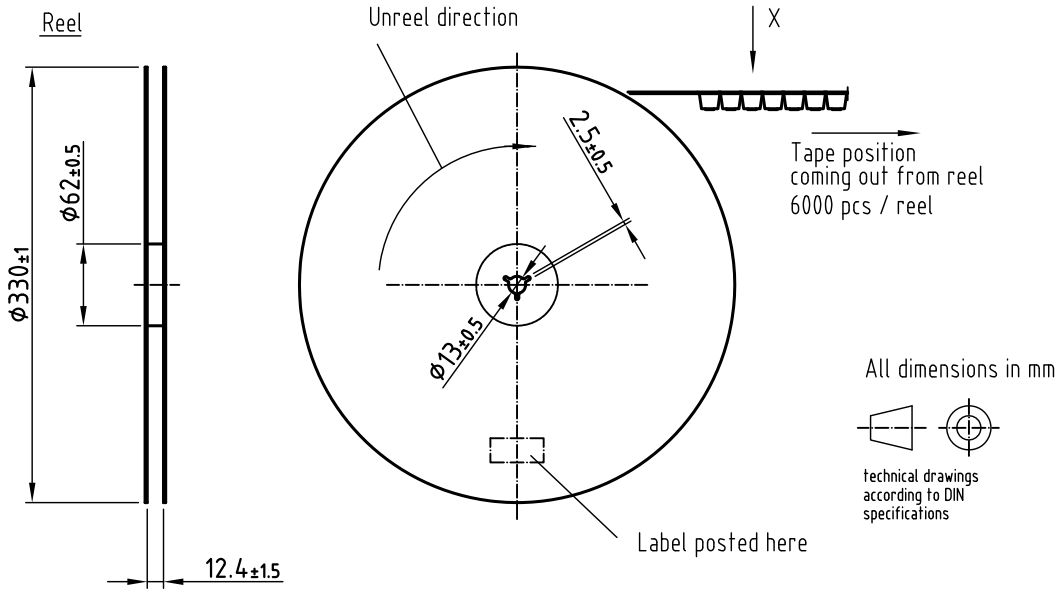
PACKAGE DIMENSIONS VEMT2023X01 in millimeters



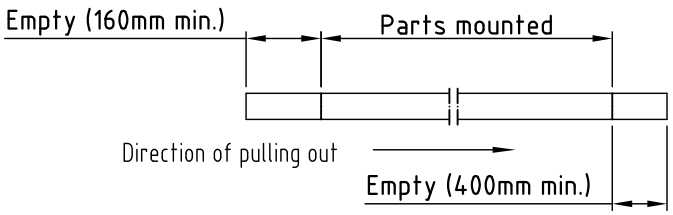
Drawing refers to following types: VEMT2x23X01

Drawing-No.: 6.544-5408.02-4
Issue: prel; 03.08.12

TAPE AND REEL DIMENSIONS VEMT2003X01 in millimeters

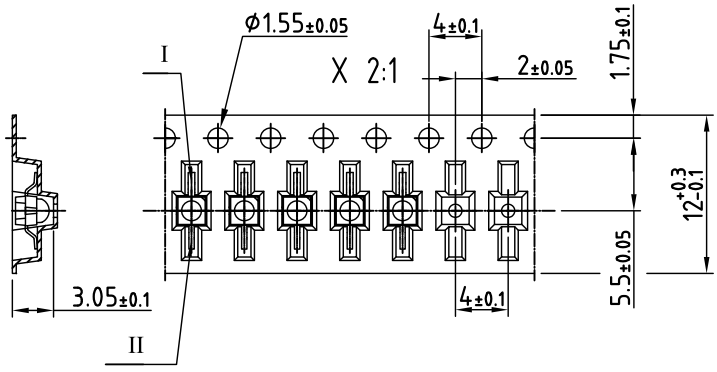


Leader and trailer tape:



Terminal position in tape

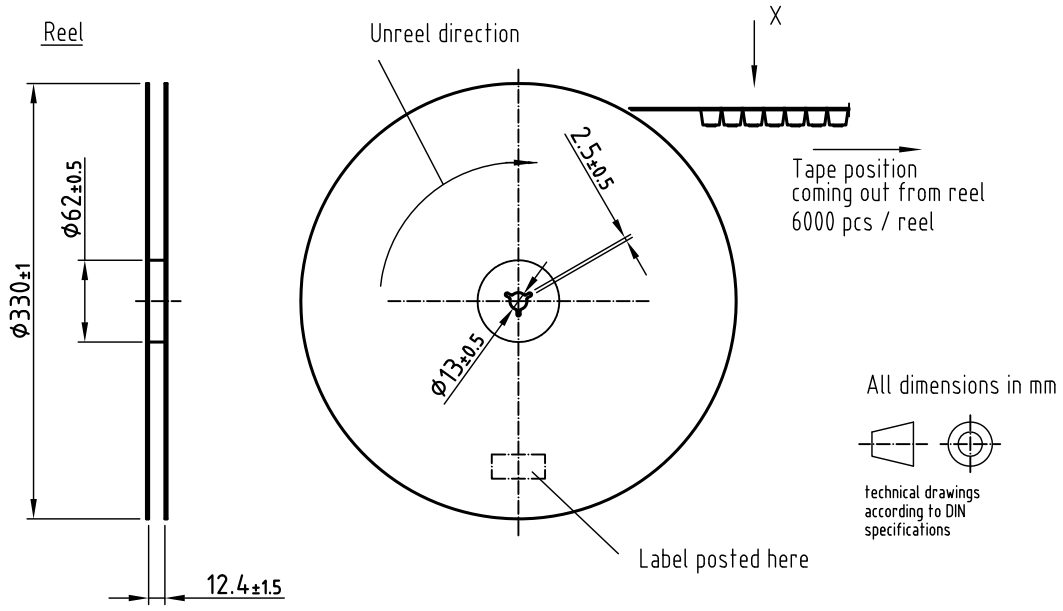
Device	Lead I	Lead II
VSMB2943RGX01	Cathode	Anode
VSMF2893RGX01		
VEMD2x03X01		
VEMT2x03X01	Collector	Emitter
VSMY2853RG	Anode	Cathode



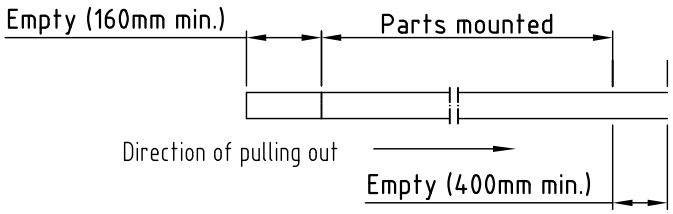
Drawing refers to following types: see table
Reel dimensions and tape

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

TAPE AND REEL DIMENSIONS VEMT2023X01 in millimeters

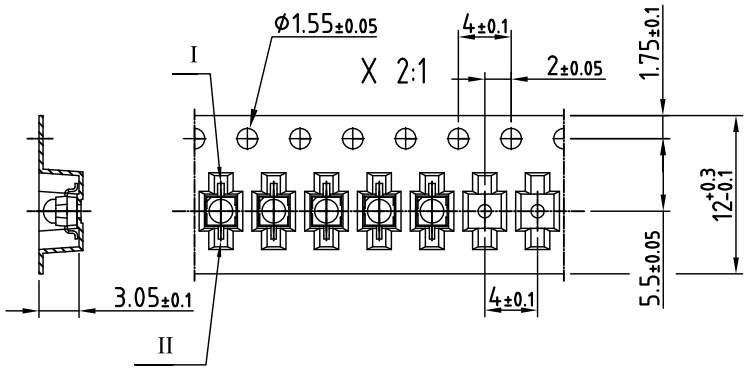


Leader and trailer tape:



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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