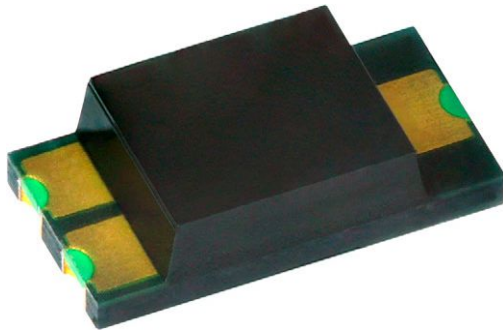




# Silicon PIN Photodiode



## DESCRIPTION

VEMD6160X01 is a high speed and high sensitive PIN photodiode with excellent  $I_{ra}$  linearity. It is a small surface mount device (SMD) including the chip with a 0.85 mm<sup>2</sup> sensitive area and a daylight blocking filter.

## FEATURES

- Package type: surface mount
- Package form: 1206
- Dimensions (L x W x H in mm): 4 x 2 x 1.05
- Radiant sensitive area (in mm<sup>2</sup>): 0.85
- Daylight blocking filter
- High photo sensitivity
- High radiant sensitivity
- Excellent  $I_{ra}$  linearity
- Fast response times
- Angle of half sensitivity:  $\phi = \pm 70^\circ$
- Floor life: 72 h, MSL 4, according to J-STD-020
- Lead (Pb)-free reflow soldering
- AEC-Q101 qualified
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



## APPLICATIONS

- High speed photo detector
- Small signal detection
- Proximity sensors

PRODUCT SUMMARY			
COMPONENT	$I_{ra}$ ( $\mu A$ )	$\phi$ (deg)	$\lambda_{0.1}$ (nm)
VEMD6160X01	5	$\pm 70$	700 to 1070

### Note

- Test conditions see table "Basic Characteristics"

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
VEMD6160X01	Tape and reel	MOQ: 3000 pcs, 3000 pcs/reel	1206

### Note

- MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25^\circ C$ , unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		$V_R$	20	V
Power dissipation	$T_{amb} \leq 25^\circ C$	$P_V$	215	mW
Junction temperature		$T_j$	110	$^\circ C$
Operating temperature range		$T_{amb}$	-40 to +110	$^\circ C$
Storage temperature range		$T_{stg}$	-40 to +110	$^\circ C$
Soldering temperature	According to reflow solder profile fig. 8	$T_{sd}$	260	$^\circ C$
Thermal resistance junction / ambient	According to EIA / JESD51	$R_{thJA}$	270	K/W

<b>BASIC CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Forward voltage	$I_F = 50\text{ mA}$	$V_F$	-	0.85	1.1	V
Breakdown voltage	$I_R = 100\text{ }\mu\text{A}$ , $E = 0$	$V_{(BR)}$	20	-	-	V
Reverse dark current	$V_R = 10\text{ V}$ , $E = 0$	$I_{ro}$	-	0.03	5	nA
Diode capacitance	$V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$	$C_D$	-	11	-	pF
	$V_R = 5\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$	$C_D$	-	4.6	-	pF
Open circuit voltage	$E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$	$V_o$	-	360	-	mV
Temperature coefficient of $V_o$	$E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$	$TK_{V_o}$	-	-3.1	-	mV/K
Short circuit current	$E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$	$I_k$	-	5	-	$\mu\text{A}$
Temperature coefficient of $I_k$	$E_e = 1\text{ mW/cm}^2$ , $\lambda = 835\text{ nm}$	$TK_{I_k}$	-	0.1	-	%/K
Reverse light current	$E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$ , $V_R = 5\text{ V}$	$I_{ra}$	3.5	5	6.5	$\mu\text{A}$
	$E_e = 1\text{ mW/cm}^2$ , $\lambda = 890\text{ nm}$ , $V_R = 5\text{ V}$	$I_{ra}$	-	7	-	$\mu\text{A}$
Angle of half sensitivity		$\phi$	-	$\pm 70$	-	deg
Wavelength of peak sensitivity		$\lambda_p$	-	840	-	nm
Range of spectral bandwidth		$\lambda_{0.1}$	-	700 to 1070	-	nm
Rise time	$V_R = 10\text{ V}$ , $R_L = 50\text{ }\Omega$ , $\lambda = 830\text{ nm}$	$t_r$	-	60	-	ns
Fall time	$V_R = 10\text{ V}$ , $R_L = 50\text{ }\Omega$ , $\lambda = 830\text{ nm}$	$t_f$	-	50	-	ns

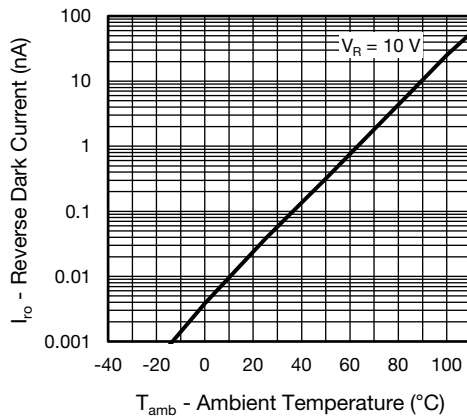
**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

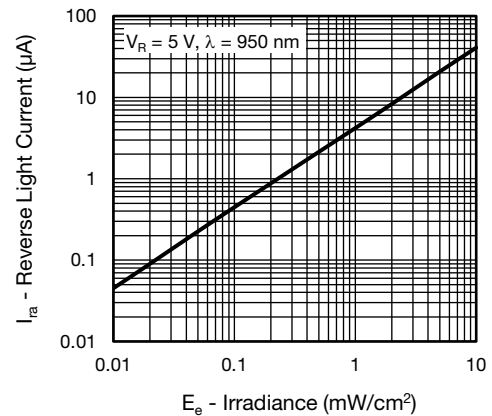


Fig. 3 - Reverse Light Current vs. Irradiance

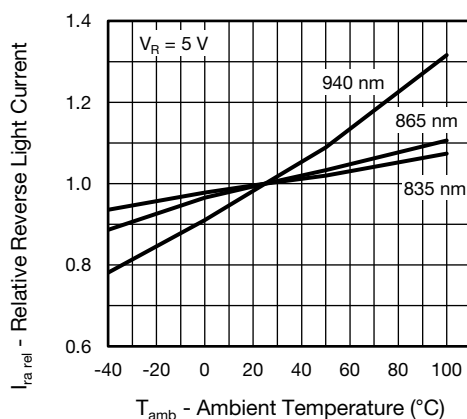


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

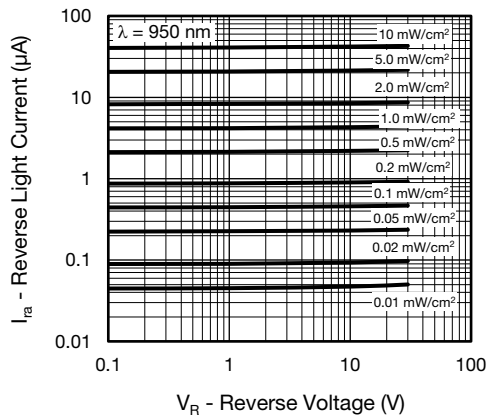


Fig. 4 - Reverse Light Current vs. Reverse Voltage

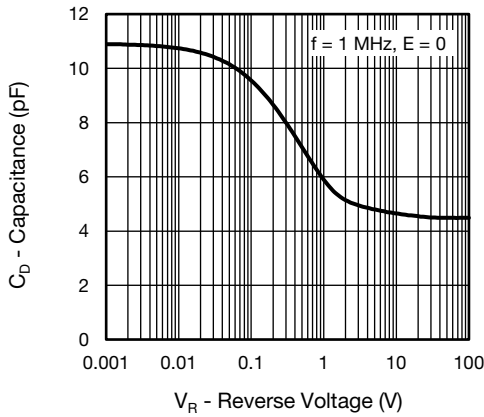


Fig. 5 - Diode Capacitance vs. Reverse Voltage

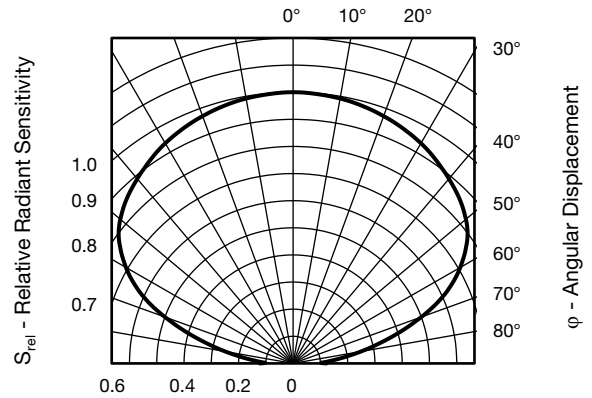


Fig. 7 - Relative Radiant Sensitivity vs. Angular Displacement

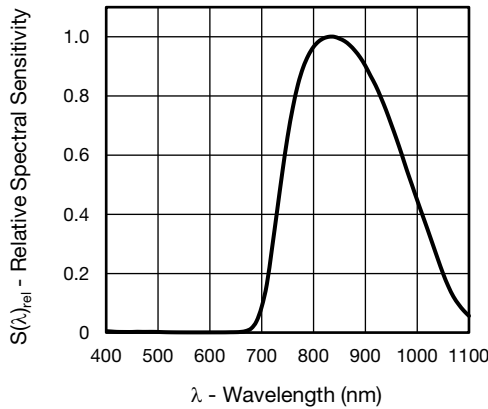
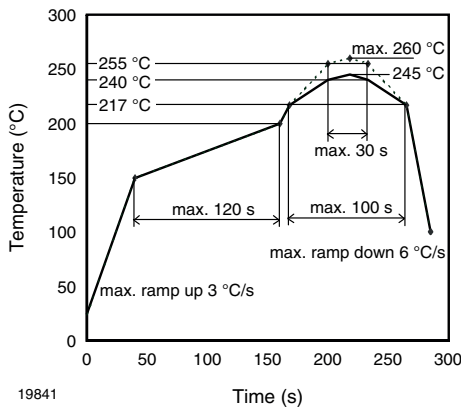


Fig. 6 - Relative Spectral Sensitivity vs. Wavelength

**REFLOW SOLDER PROFILE**



19841

Fig. 8 - 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: 72 h

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

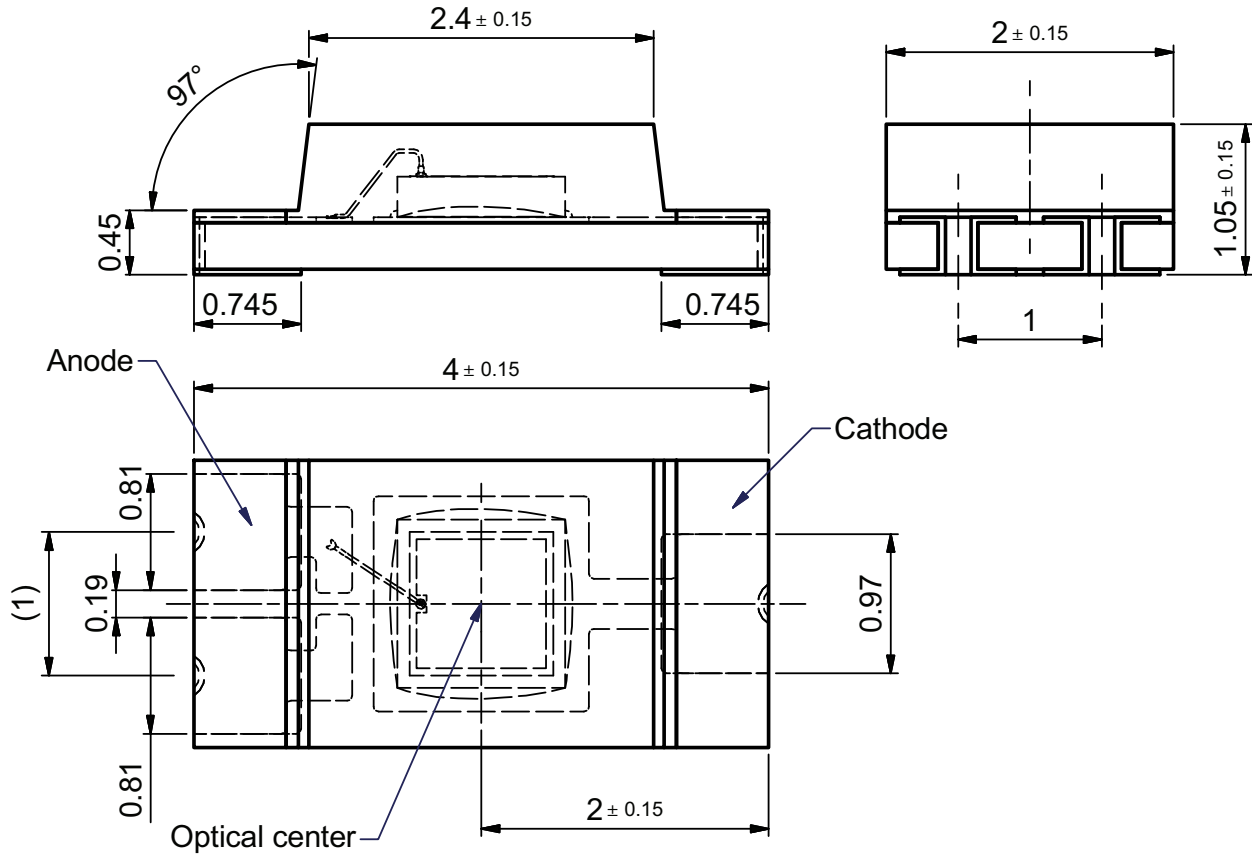
Moisture sensitivity level 4, according to J-STD-020.

**DRYING**

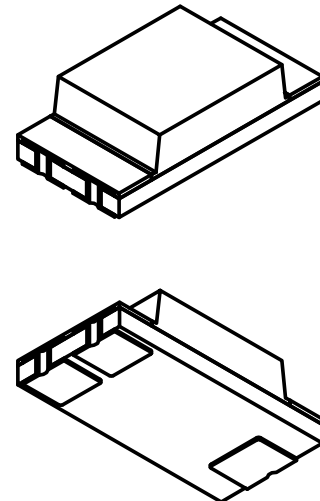
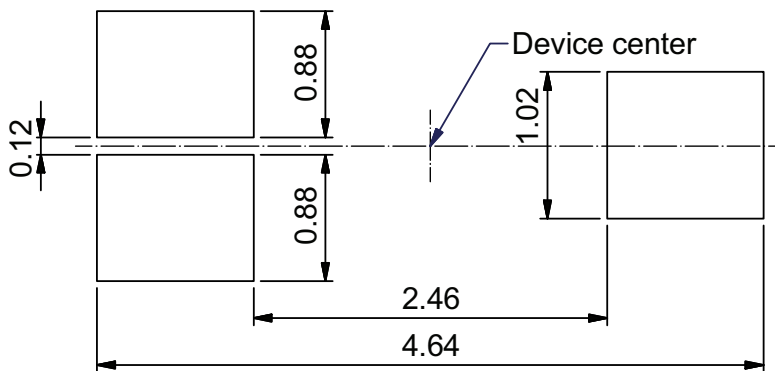
In case of moisture absorption devices should be baked before soldering. Conditions see J-STD-020 or label. Devices taped on reel dry using recommended conditions 192 h at  $40\text{ }^{\circ}\text{C} (+ 5\text{ }^{\circ}\text{C})$ ,  $RH < 5\%$ .



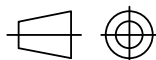
PACKAGE DIMENSIONS in millimeters



Recommended solder pad footprint



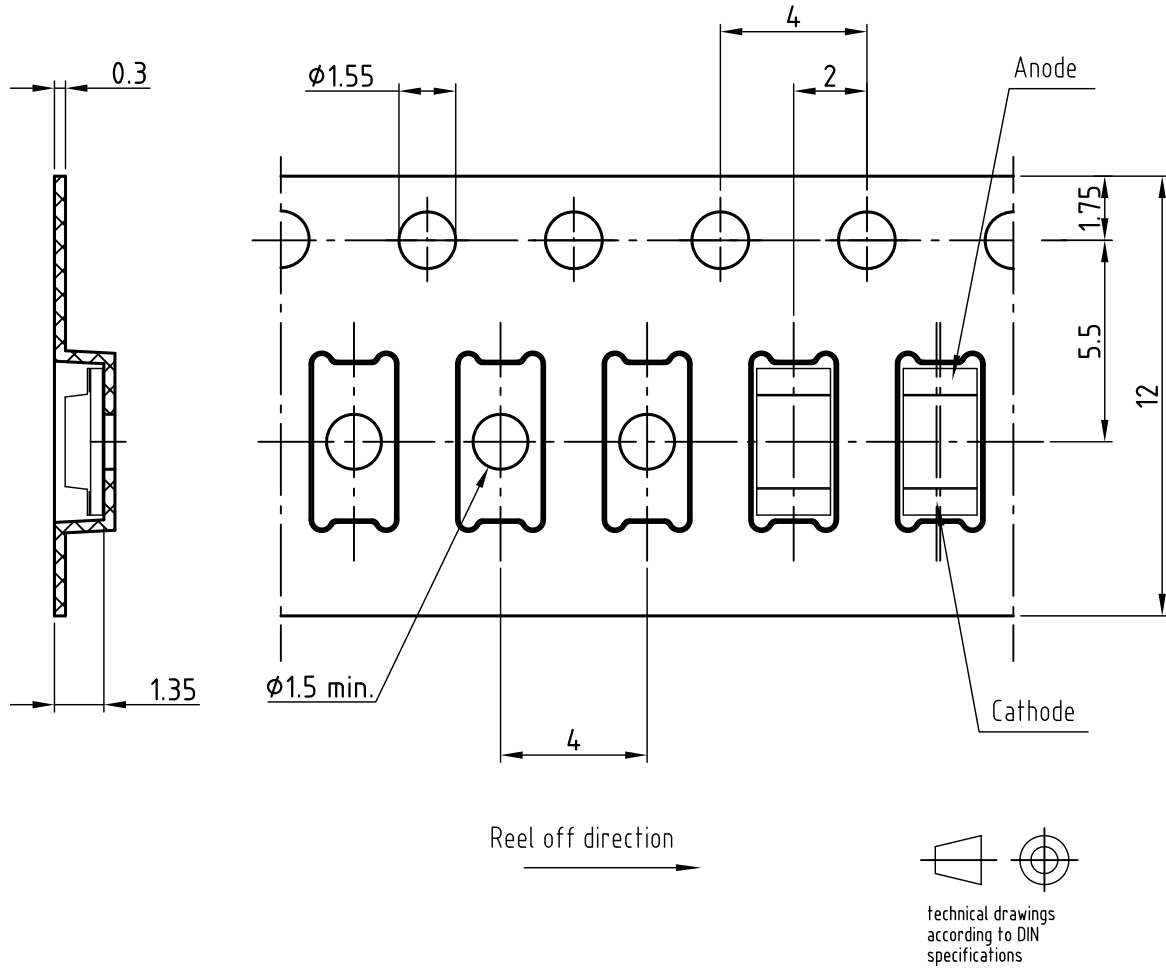
Drawing-No. 6.541-5100.01-4  
Preliminary issue 04.07.2013



Technical drawings according to DIN specification.

Not indicated tolerances  $\pm 0.1$ mm

**BLISTER TAPE DIMENSIONS** in millimeters



Not indicated tolerances  $\pm 0.1$

All dimensions in mm

Drawing refers to following Types: TEMD6010FX01

VEMD6x10X01

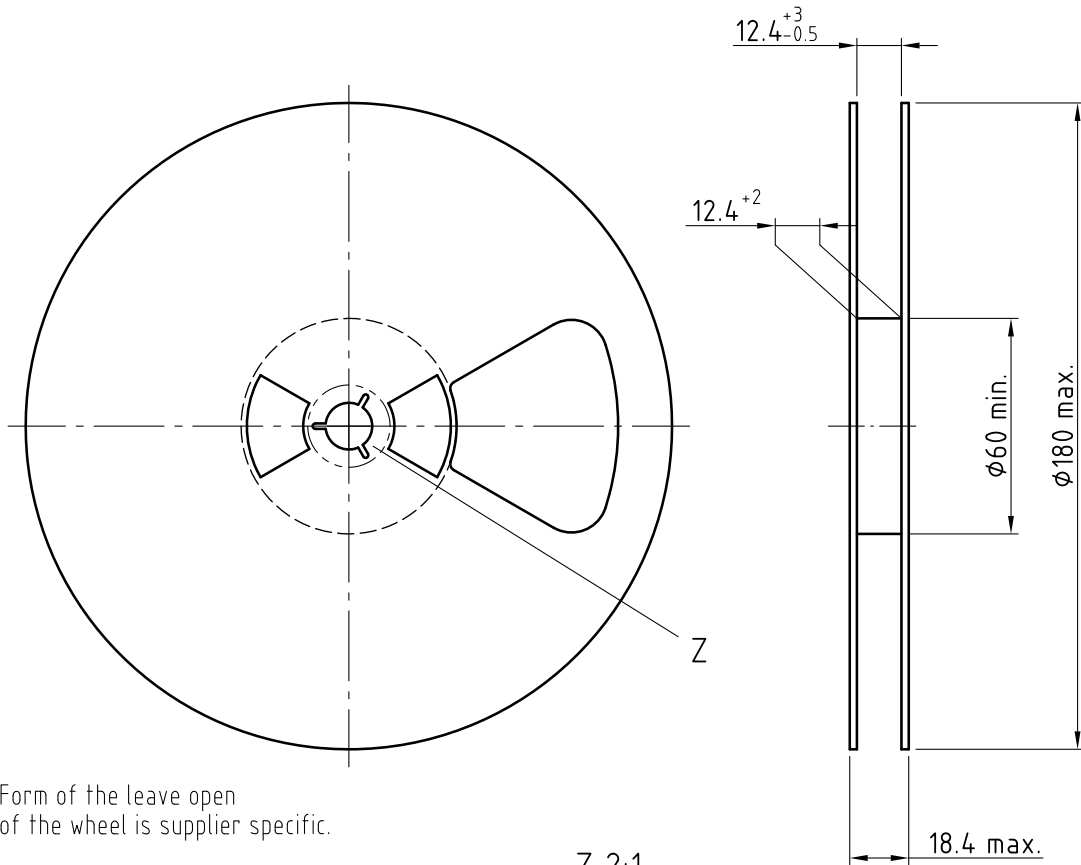
Drawing-No.: 9.700-5329.02-4

VEMD6x15X01

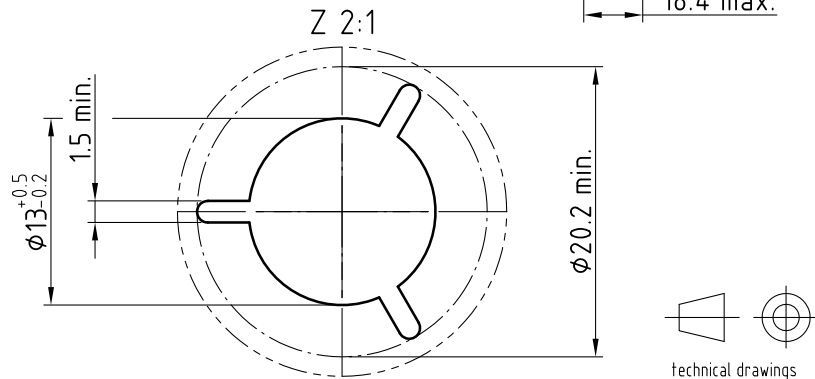
Prel Issue: 16.07.2013



REEL DIMENSIONS in millimeters



Form of the leave open of the wheel is supplier specific.



technical drawings according to DIN specifications

Drawing-No.: 9.800-5097.01-4

Issue: 1; 05.05.08

20874



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