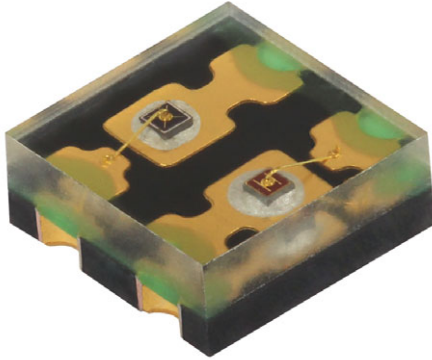


## Dual Color Emitting Diodes, 660 nm and 940 nm



### FEATURES

- Package type: surface-mount
- Package form: square PCB
- Dimensions (L x W x H in mm): 2 x 2 x 0.87
- Peak wavelength:  $\lambda_p = 660 \text{ nm}$  and  $940 \text{ nm}$
- High reliability
- High radiant power
- Angle of half intensity:  $\phi = \pm 60^\circ$
- Floor life: 168 h, MSL 3, according to J-STD-020
- Lead (Pb)-free reflow soldering
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
**GREEN**  
(5-2008)

### DESCRIPTION

VSMD66694 is a dual color emitting device with 660 nm and 940 nm peak wavelength. The emitters are based on the [SurfLight™](#) technology, providing high radiant power.

### APPLICATIONS

- Wearables
- Health monitoring
- Pulse oximetry

### PRODUCT SUMMARY

| COMPONENT | COLOR | $I_e$ (mW/sr) | $\phi$ (°) | $\lambda_p$ (nm) | $t_r$ (ns) |
|-----------|-------|---------------|------------|------------------|------------|
| VSMD66694 | Red   | 2.3           | $\pm 60$   | 660              | 10         |
|           | IR    | 1.5           |            | 940              |            |

#### Note

- Test conditions see table “Basic Characteristics”

### ORDERING INFORMATION

| ORDERING CODE | PACKAGING     | REMARKS                      | PACKAGE FORM |
|---------------|---------------|------------------------------|--------------|
| VSMD66694     | Tape and reel | MOQ: 3000 pcs, 3000 pcs/reel | square PCB   |

#### Note

- MOQ: minimum order quantity

### ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25^\circ\text{C}$ , unless otherwise specified)

| PARAMETER                              | TEST CONDITION                       | SYMBOL     | COLOR | VALUE      | UNIT             |
|--|--------------------------------------|------------|-------|------------|------------------|
| Reverse voltage                        |                                      | $V_R$      |       | 5          | V                |
| Forward current                        |                                      | $I_F$      | Red   | 70         | mA               |
|  |                                      |            | IR    | 70         |                  |
| Peak forward current                   | $t_p/T = 0.1, t_p = 100 \mu\text{s}$ | $I_{FM}$   | Red   | 140        | mA               |
|  |                                      |            | IR    | 140        |                  |
| Surge forward current                  | $t_p = 100 \mu\text{s}$              | $I_{FSM}$  | Red   | 1          | A                |
|  |                                      |            | IR    | 1          |                  |
| Power dissipation                      |                                      | $P_V$      | Red   | 161        | mW               |
|  |                                      |            | IR    | 119        |                  |
| Junction temperature                   |                                      | $T_J$      |       | 100        | $^\circ\text{C}$ |
| Operating temperature range            |                                      | $T_{amb}$  |       | -25 to +85 | $^\circ\text{C}$ |
| Storage temperature range              |                                      | $T_{stg}$  |       | -25 to +85 | $^\circ\text{C}$ |
| Soldering temperature                  | According fig. 10, J-STD-020         | $T_{sd}$   |       | 260        | $^\circ\text{C}$ |
| Thermal resistance junction to ambient | J-STD-051                            | $R_{thJA}$ |       | 390        | K/W              |

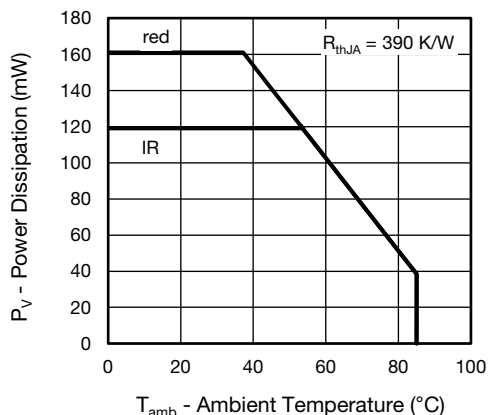


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

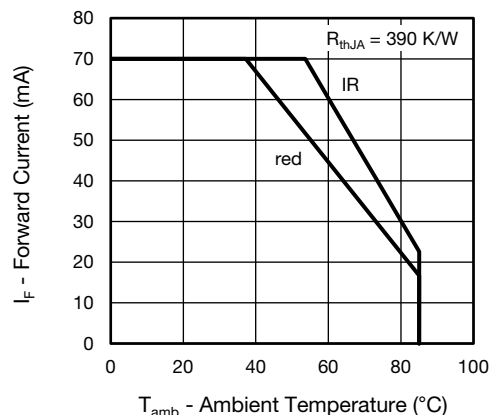
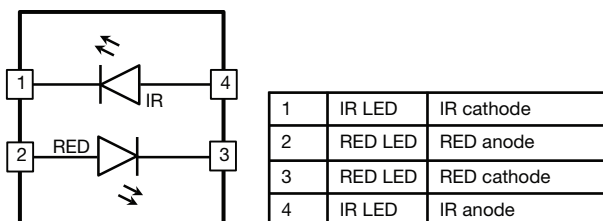


Fig. 2 - Forward Current Limit vs. Ambient Temperature

| <b>BASIC CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) |   |                  |                                    |      |          |      |               |
|---|---|------------------|------------------------------------|------|----------|------|---------------|
| PARAMETER   | TEST CONDITION  | SYMBOL           | COLOR                              | MIN. | TYP.     | MAX. | UNIT          |
| Forward voltage   | $I_F = 20\text{ mA}$ , $t_p = 20\text{ ms}$                         | $V_F$            | Red                                | -    | 2.0      | 2.3  | V             |
|   |   |                  | IR                                 | -    | 1.4      | 1.7  |               |
| Temperature coefficient   | $I_F = 20\text{ mA}$  | $TK_{VF}$        | Red                                | -    | -2.3     | -    | mV/K          |
|   |   |                  | IR                                 | -    | -2.3     | -    |               |
| Reverse current   |   | $I_R$            | not designed for reverse operation |      |          |      | $\mu\text{A}$ |
| Junction capacitance  | $V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ ,<br>$E = 0\text{ mW/cm}^2$ | $C_J$            | Red                                | -    | 7        | -    | pF            |
|   |   |                  | IR                                 | -    | 5        | -    |               |
| Radiant intensity   | $I_F = 20\text{ mA}$  | $I_e$            | Red                                | 1.9  | 2.3      | -    | mW/sr         |
|   |   |                  | IR                                 | 0.8  | 1.5      | -    |               |
| Radiant power   | $I_F = 20\text{ mA}$  | $\phi_e$         | Red                                | -    | 9.5      | -    | mW            |
|   |   |                  | IR                                 | -    | 8.5      | -    |               |
| Angle of half intensity   | $I_F = 20\text{ mA}$  | $\phi$           |                                    | -    | $\pm 60$ | -    | $^{\circ}$    |
| Peak wavelength   | $I_F = 20\text{ mA}$  | $\lambda_p$      | Red                                | 650  | 660      | 670  | nm            |
|   |   |                  | IR                                 | 920  | 940      | 960  |               |
| Spectral bandwidth  | $I_F = 20\text{ mA}$  | $\Delta\lambda$  | Red                                | -    | 20       | -    | nm            |
|   |   |                  | IR                                 | -    | 40       | -    |               |
| Temperature coefficient of $\lambda_p$  | $I_F = 20\text{ mA}$  | $TK_{\lambda_p}$ | Red                                | -    | 0.2      | -    | nm/K          |
|   |   |                  | IR                                 | -    | 0.3      | -    |               |
| Rise time   | $I_F = 20\text{ mA}$  | $t_r$            | Red                                | -    | 10       | -    | ns            |
|   |   |                  | IR                                 | -    | 10       | -    |               |
| Fall time   | $I_F = 20\text{ mA}$  | $t_f$            | Red                                | -    | 10       | -    | ns            |
|   |   |                  | IR                                 | -    | 10       | -    |               |

## CIRCUIT BLOCK DIAGRAM



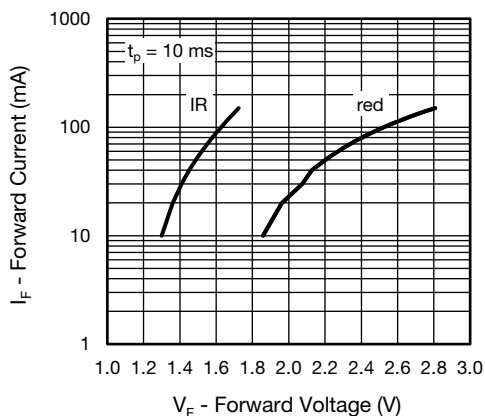
**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 3 - Forward Current vs. Forward Voltage

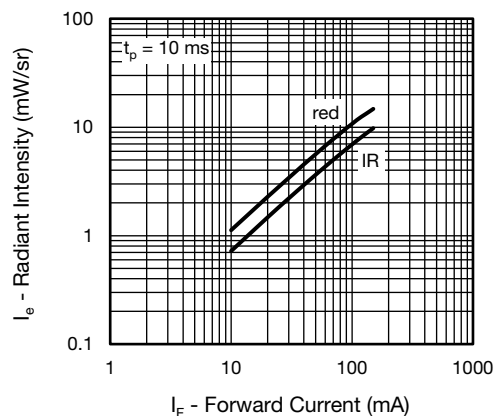


Fig. 6 - Radiant Intensity vs. Forward Current

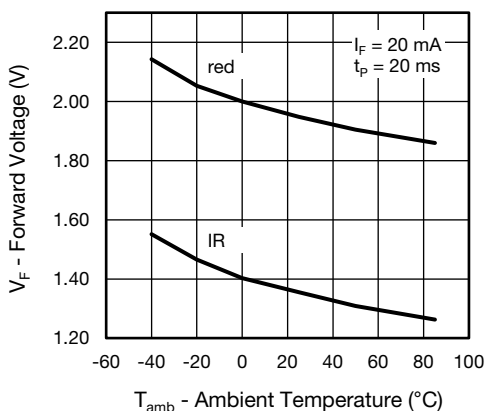


Fig. 4 - Forward Voltage vs. Ambient Temperature

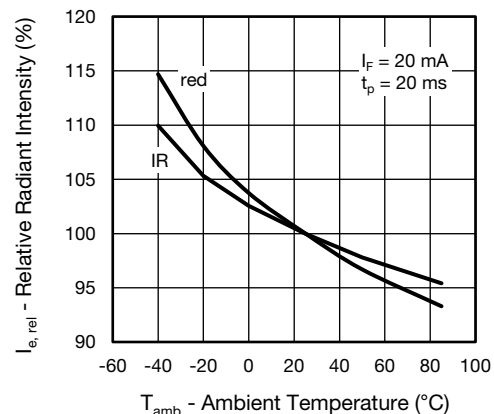


Fig. 7 - Relative Radiant Intensity vs. Ambient Temperature

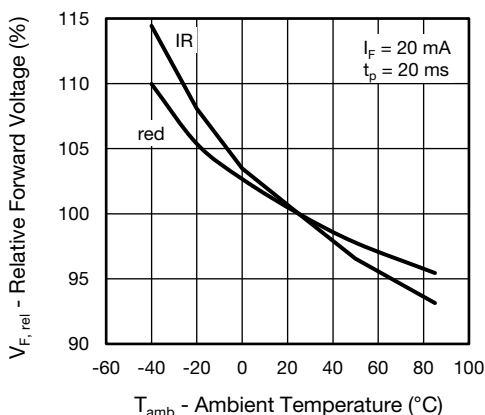


Fig. 5 - Relative Forward Voltage vs. Ambient Temperature

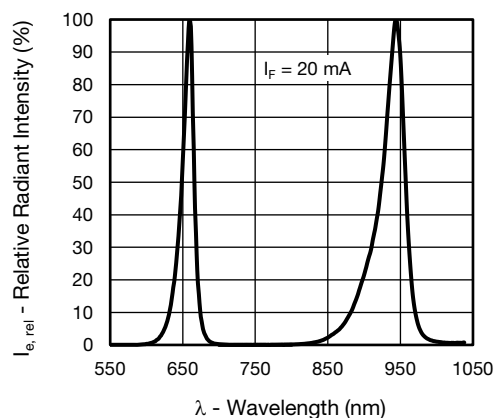


Fig. 8 - Relative Radiant Intensity vs. Wavelength

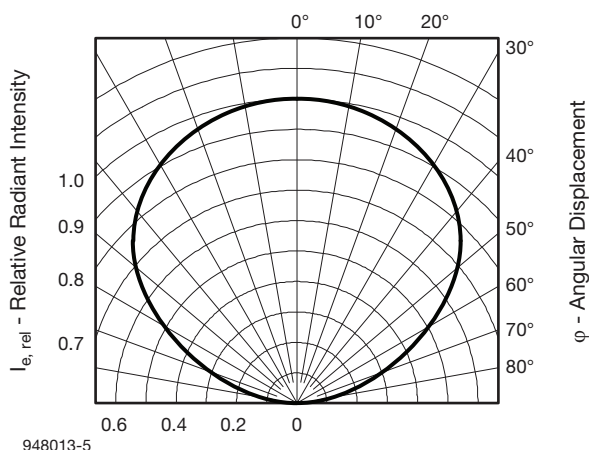


Fig. 9 - Relative Radiant Intensity vs. Angular Displacement

## REFLOW SOLDER PROFILE

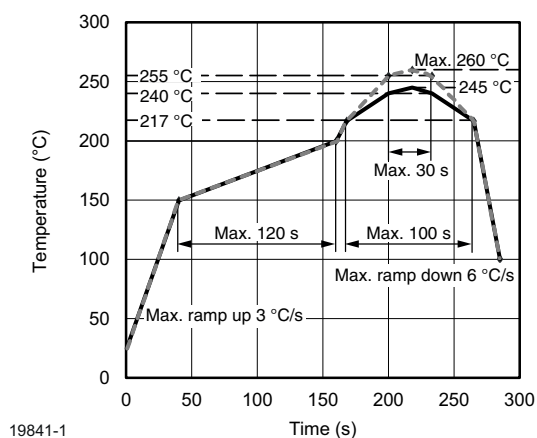


Fig. 10 - Lead (Pb)-free Reflow Solder Profile acc. J-STD-020

## 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

Time between soldering and removing from MBB must not exceed the time indicated in J-STD-020:

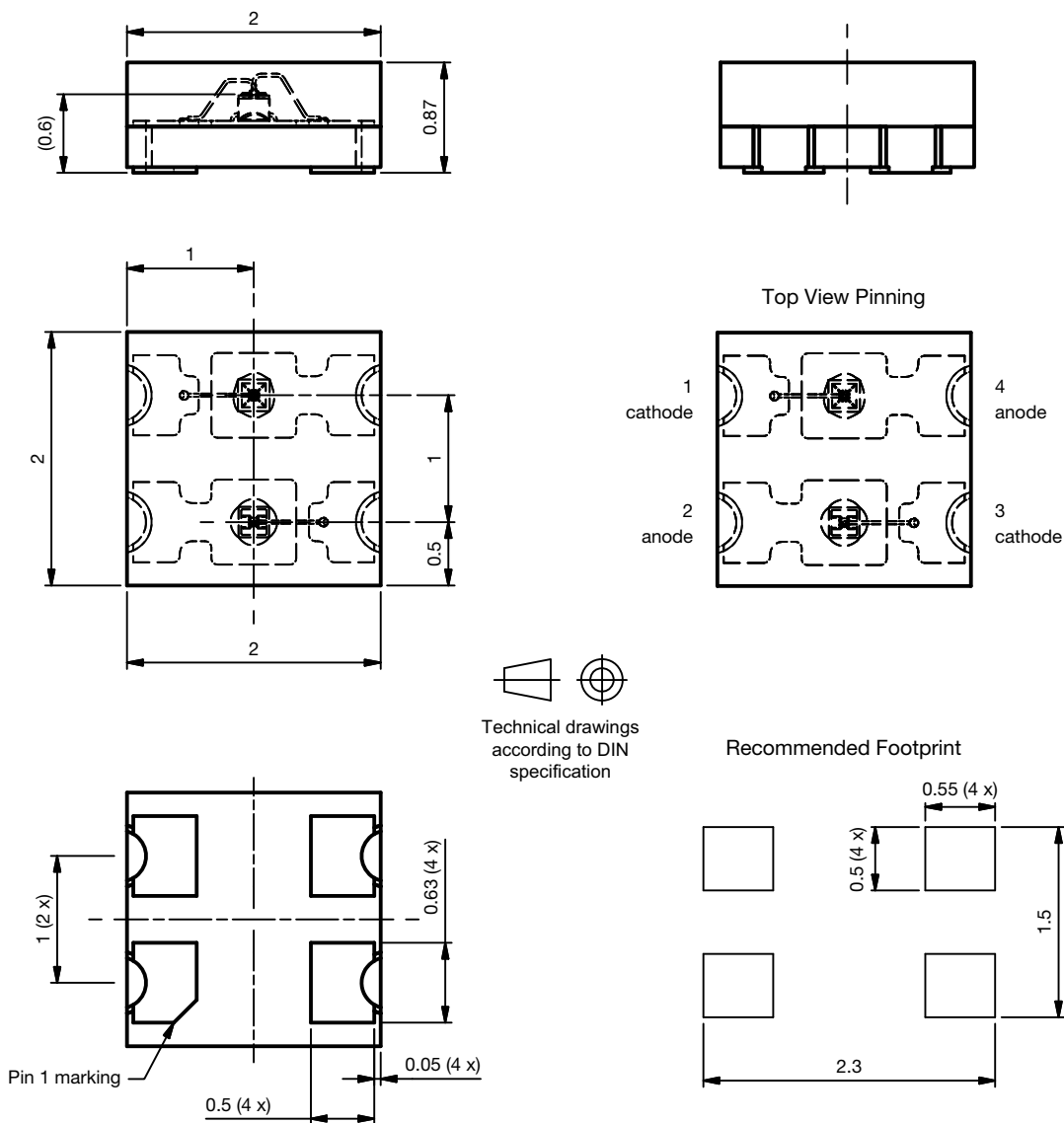
Moisture sensitivity: level 3

Floor life: 168 h

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

## 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


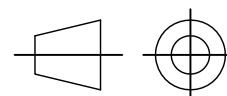
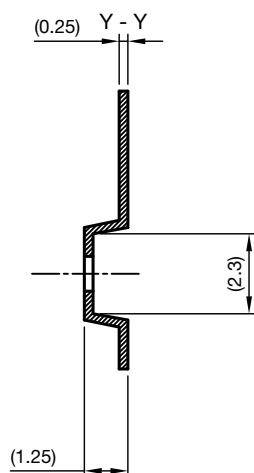
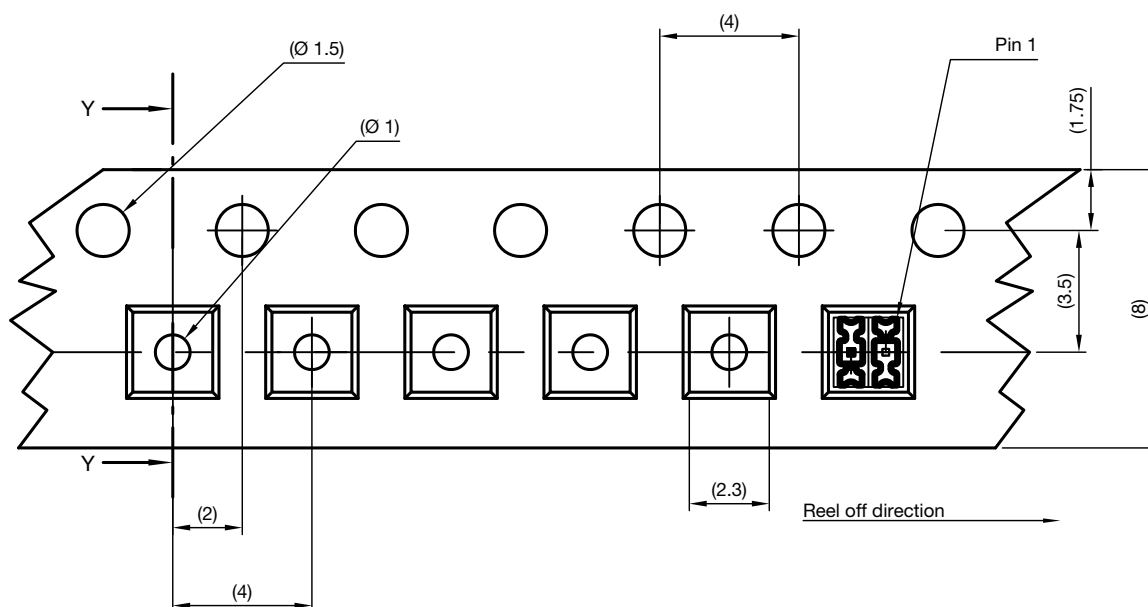
Drawing No.: 6.550-5347.01-4

Issue: 1; 19.02.16

Not indicated tolerances  $\pm 0.1$

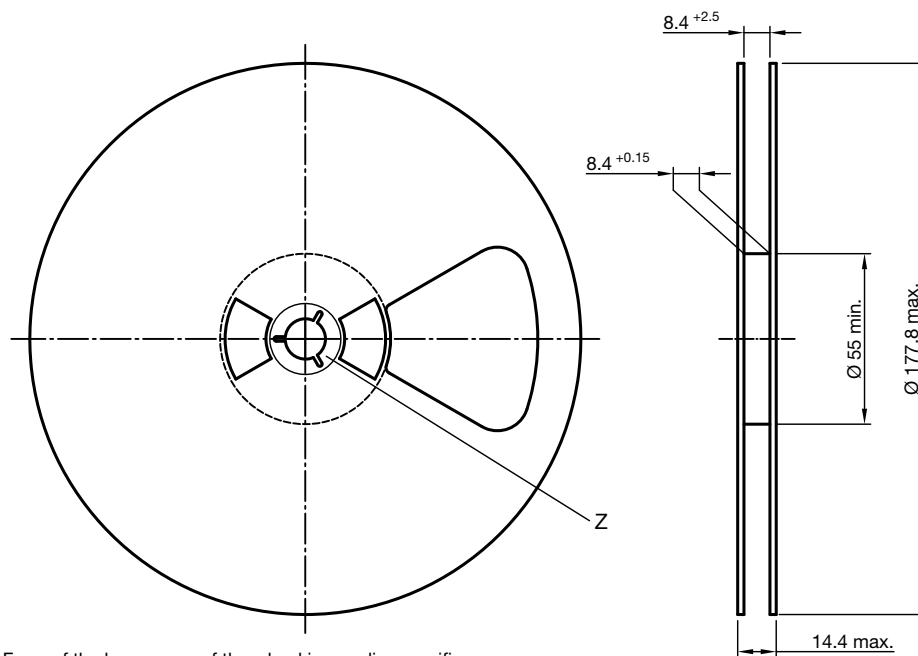


**TAPE DIMENSIONS** in millimeters

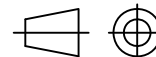
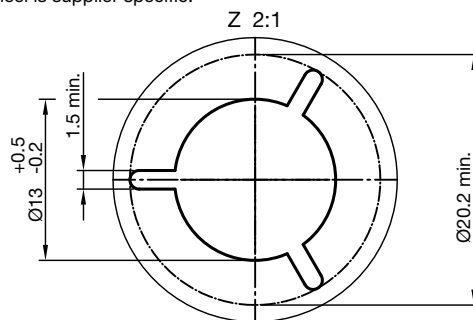


Technical drawings  
according to DIN  
specifications

Drawing-No.: 9.700-5397.02-4  
Issue: 1; 19.02.16

**REEL DIMENSIONS** in millimeters


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



Technical drawings  
according to DIN  
specification.

Drawing-No.: 9.800-5096.01-4  
Issue: 6; 20.03.2019



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