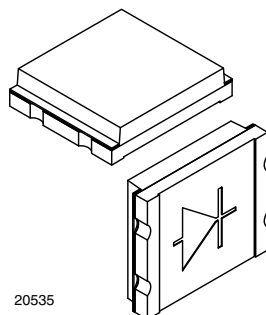


## Silicon PIN Photodiode



### FEATURES

- Package type: surface mount
- Package form: top view
- Dimensions (L x W x H in mm): 5 x 4.24 x 1.12
- Radiant sensitive area (in mm<sup>2</sup>): 7.7
- AEC-Q101 qualified
- Enhanced blue photo sensitivity: S (400 nm) rel > 30 %
- Peak sensitivity at 940 nm
- Suitable for visible and near infrared radiation
- Low junction capacitance
- Fast response times
- Angle of half sensitivity:  $\phi = \pm 65^\circ$
- Floor life: 72 h, MSL 4, acc. J-STD-020
- Lead (Pb)-free reflow soldering
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC

### Note

\*\* Please see document "Vishay Material Category Policy":  
[www.vishay.com/doc?99902](http://www.vishay.com/doc?99902)

### APPLICATIONS

- High speed photo detector

### PRODUCT SUMMARY

| COMPONENT   | $I_{ra}$ (μA) | $\phi$ (deg) | $\lambda_{0.1}$ (nm) |
|-------------|---------------|--------------|----------------------|
| TEMD5080X01 | 60            | $\pm 65$     | 350 to 1100          |

### Note

- Test conditions see table "Basic Characteristics"

### ORDERING INFORMATION

| ORDERING CODE | PACKAGING     | REMARKS                      | PACKAGE FORM |
|---------------|---------------|------------------------------|--------------|
| TEMD5080X01   | Tape and reel | MOQ: 1500 pcs, 1500 pcs/reel | Top view     |

### Note

- MOQ: minimum order quantity

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

| PARAMETER                           | TEST CONDITION                    | SYMBOL     | VALUE         | UNIT             |
|-------------------------------------|-----------------------------------|------------|---------------|------------------|
| Reverse voltage                     |                                   | $V_R$      | 25            | V                |
| Power dissipation                   | $T_{amb} \leq 25^\circ\text{C}$   | $P_V$      | 215           | mW               |
| Junction temperature                |                                   | $T_j$      | 100           | $^\circ\text{C}$ |
| Operating temperature range         |                                   | $T_{amb}$  | - 40 to + 100 | $^\circ\text{C}$ |
| Storage temperature range           |                                   | $T_{stg}$  | - 40 to + 110 | $^\circ\text{C}$ |
| Soldering temperature               | Acc. reflow solder profile fig. 8 | $T_{sd}$   | 260           | $^\circ\text{C}$ |
| Thermal resistance junction/ambient |                                   | $R_{thJA}$ | 350           | 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                                                                                     | $I_F = 50\text{ mA}$                                                         | $V_F$           |      | 1                     | 1.3  | V                           |
| Breakdown voltage                                                                                   | $I_R = 100\text{ }\mu\text{A}$ , $E = 0$                                     | $V_{(BR)}$      | 25   |                       |      | V                           |
| Reverse dark current                                                                                | $V_R = 10\text{ V}$ , $E = 0$                                                | $I_{ro}$        |      | 2                     | 10   | nA                          |
| Diode capacitance                                                                                   | $V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$                            | $C_D$           |      | 90                    |      | pF                          |
|                                                                                                     | $V_R = 3\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$                            | $C_D$           |      | 30                    | 40   | pF                          |
| Open circuit voltage                                                                                | $E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$                         | $V_o$           |      | 350                   |      | mV                          |
| Temperature coefficient of $V_o$                                                                    | $E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$                         | $TK_{V_o}$      |      | - 2.6                 |      | mV/K                        |
| Short circuit current                                                                               | $E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$                         | $I_k$           |      | 50                    |      | $\mu\text{A}$               |
| Temperature coefficient of $I_k$                                                                    | $E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$                         | $TK_{I_k}$      |      | 0.1                   |      | %/K                         |
| Reverse light current                                                                               | $E_e = 1\text{ mW/cm}^2$ , $\lambda = 400\text{ nm}$ ,<br>$V_R = 5\text{ V}$ | $I_{ra}$        |      | 18                    |      | $\mu\text{A}$               |
|                                                                                                     | $E_v = 100\text{ lx}$ , CIE illuminant A,<br>$V_R = 5\text{ V}$              | $I_{ra}$        |      | 8.5                   |      | $\mu\text{A}$               |
|                                                                                                     | $E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$ ,<br>$V_R = 5\text{ V}$ | $I_{ra}$        |      | 60                    |      | $\mu\text{A}$               |
| Temperature coefficient of $I_{ra}$                                                                 | CIE illuminant A                                                             | $TK_{I_{ra}}$   |      | 0.15                  |      | %/K                         |
|                                                                                                     | $\lambda = 950\text{ nm}$                                                    | $TK_{I_{ra}}$   |      | 0.1                   |      | %/K                         |
| Angle of half sensitivity                                                                           |                                                                              | $\phi$          |      | $\pm 65$              |      | deg                         |
| Wavelength of peak sensitivity                                                                      |                                                                              | $\lambda_p$     |      | 940                   |      | nm                          |
| Range of spectral bandwidth                                                                         |                                                                              | $\lambda_{0.1}$ |      | 350 to 1100           |      | nm                          |
| Noise equivalent power                                                                              | $V_R = 10\text{ V}$ , $\lambda = 400\text{ nm}$                              | NEP             |      | $1.1 \times 10^{-13}$ |      | $\text{W}/\sqrt{\text{Hz}}$ |
| Rise time                                                                                           | $V_R = 5\text{ V}$ , $R_L = 50\text{ }\Omega$ ,<br>$\lambda = 850\text{ nm}$ | $t_r$           |      | 40                    |      | ns                          |
| Fall time                                                                                           | $V_R = 5\text{ V}$ , $R_L = 50\text{ }\Omega$ ,<br>$\lambda = 850\text{ nm}$ | $t_f$           |      | 40                    |      | ns                          |

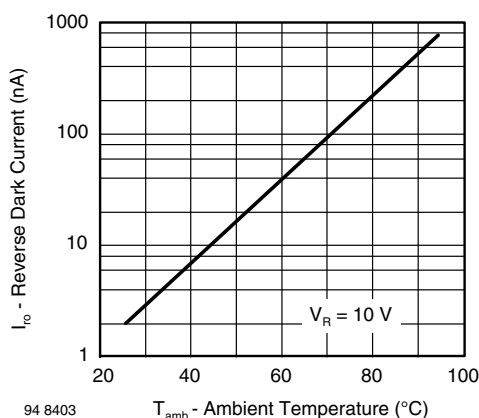
**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

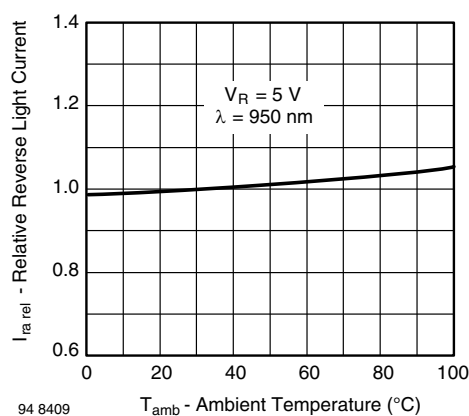


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

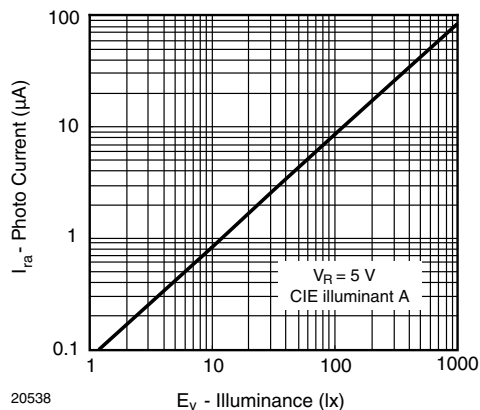


Fig. 3 - Reverse Light Current vs. Irradiance

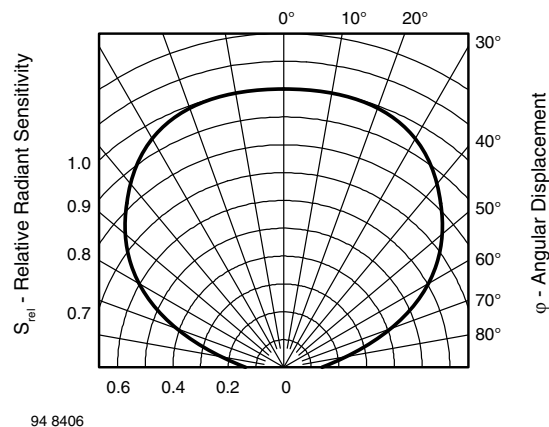


Fig. 6 - Relative Radiant Sensitivity vs. Angular Displacement

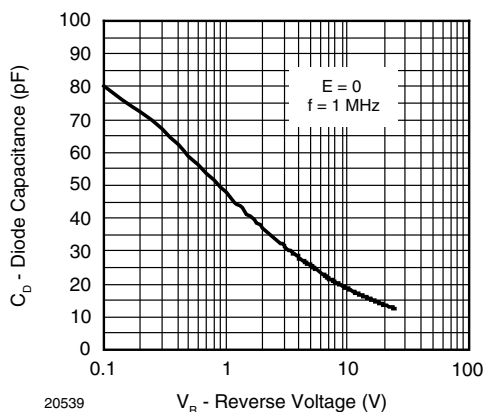


Fig. 4 - Diode Capacitance vs. Reverse Voltage

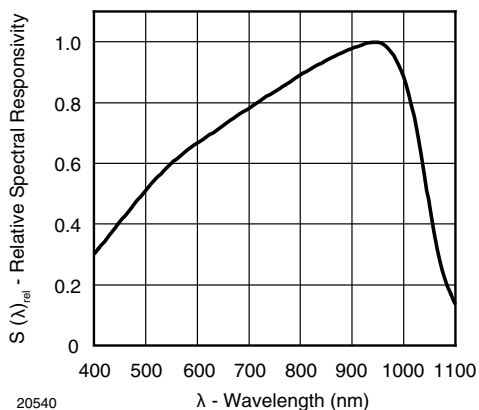
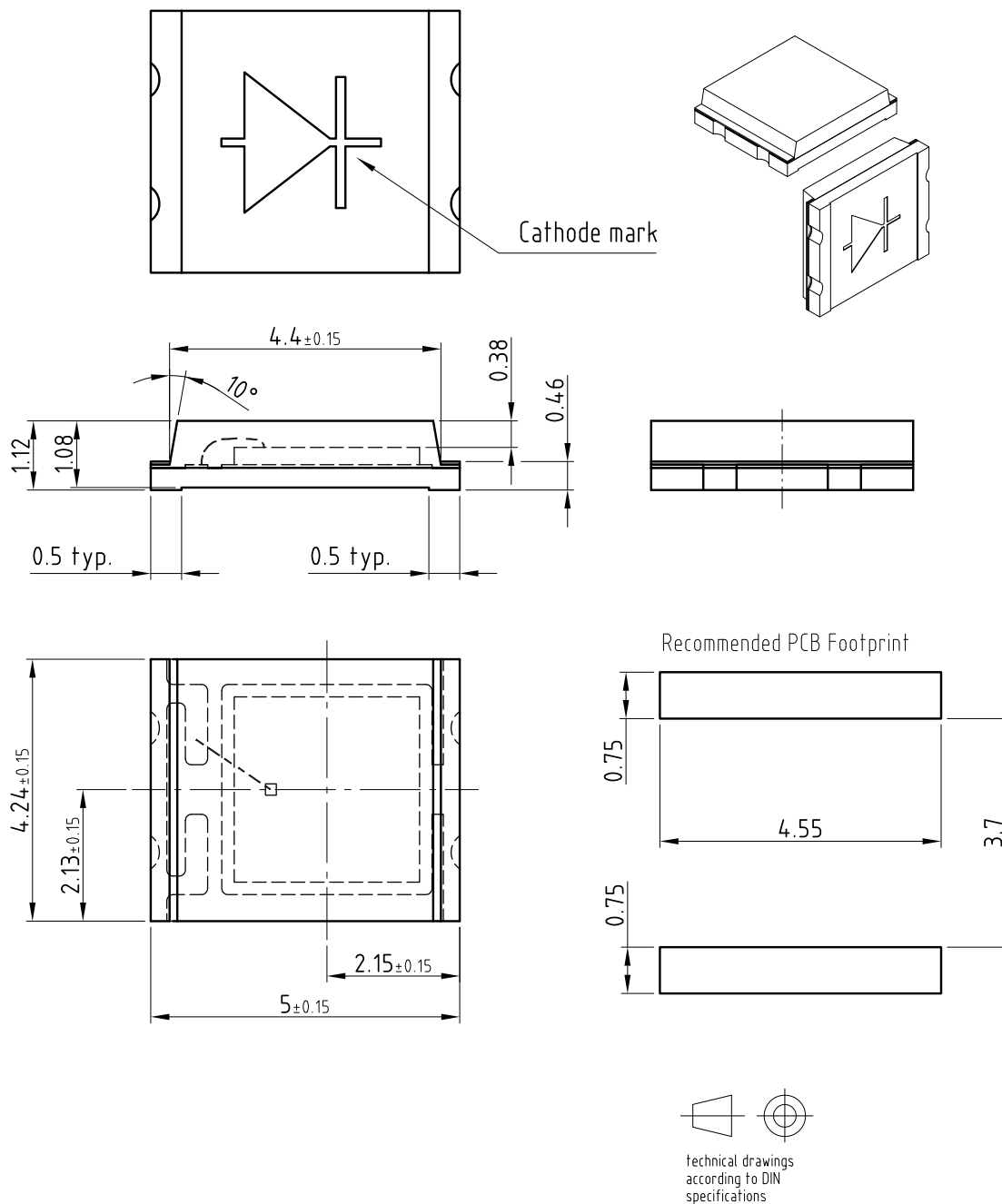


Fig. 5 - Relative Spectral Sensitivity vs. Wavelength



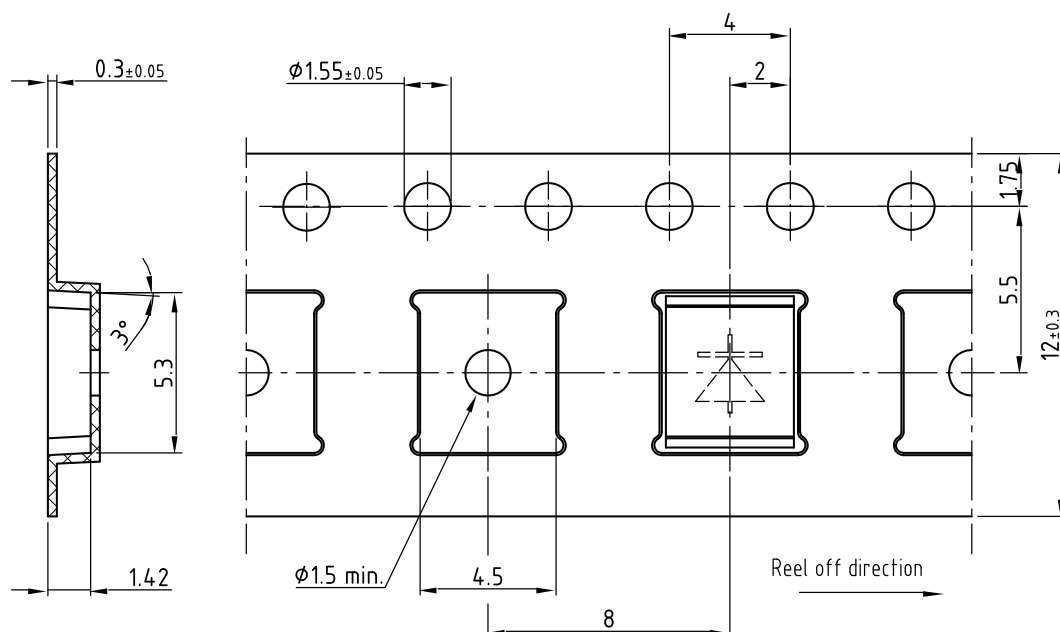
**PACKAGE DIMENSIONS** in millimeters



Drawing-No.: 6.541-5060.01-4  
Issue: 3; 05.02.08  
20536

Not indicated tolerances  $\pm 0.1$

### TAPING DIMENSIONS in millimeters



Drawing-No.: 9.700-5293.01-4

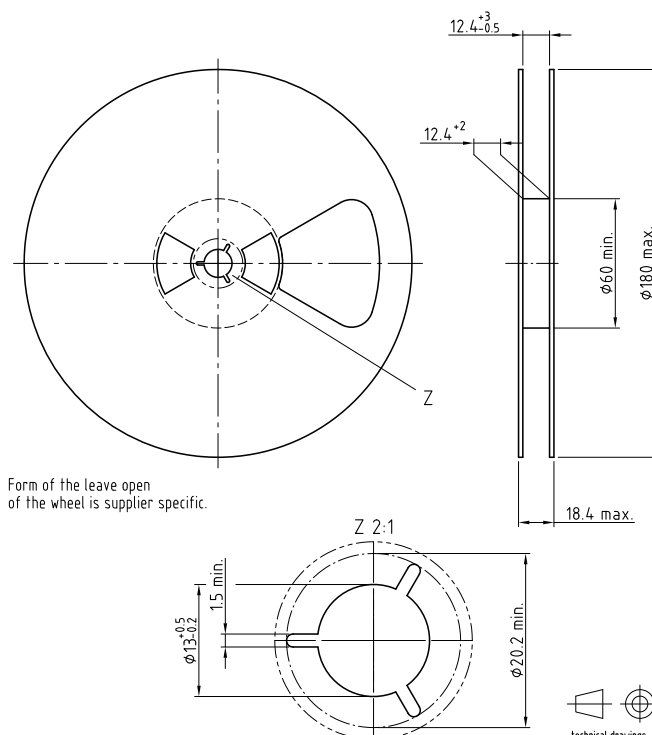
Issue: 1; 03.12.04

20537

Not indicated tolerances  $\pm 0.1$

technical drawings  
according to DIN  
specifications

### REEL DIMENSIONS in millimeters



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

Drawing-No.: 9.800-5097.01-4

Issue: 1; 05.05.08

20874

technical drawings  
according to DIN  
specifications



## SOLDER PROFILE

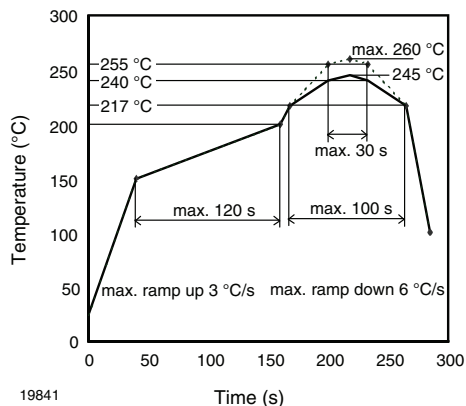


Fig. 7 - Lead (Pb)-free Reflow Solder Profile  
acc. J-STD-020D

## 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 4

Floor life: 72 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 recommended conditions:

192 h at 40 °C (+ 5 °C), RH < 5 %

or

96 h at 60 °C (+ 5 °C), RH < 5 %.



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