

## Silicon PIN Photodiode



21726

### DESCRIPTION

VBPW34FAS and VBPW34FASR are high speed and high sensitive PIN photodiodes. It is a surface mount device (SMD) including the chip with a 7.5 mm<sup>2</sup> sensitive area and a daylight blocking filter matched with IR emitters operating at wavelength 870 nm or 950 nm.

### FEATURES

- Package type: surface mount
- Package form: GW, RGW
- Dimensions (L x W x H in mm): 6.4 x 3.9 x 1.2
- Radiant sensitive area (in mm<sup>2</sup>): 7.5
- High radiant sensitivity
- Daylight blocking filter matched with 870 nm to 950 nm emitters
- Fast response times
- Angle of half sensitivity:  $\phi = \pm 65^\circ$
- Floor life: 168 h, MSL 3, acc. J-STD-020
- Lead (Pb)-free reflow soldering
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21 definition



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

### APPLICATIONS

- High speed detector for infrared radiation
- Infrared remote control and free air data transmissionsystems, e.g. in combination with TSFFxxxx

### PRODUCT SUMMARY

| COMPONENT  | $I_{ra}$ (μA) | $\phi$ (deg) | $\lambda_{0.5}$ (nm) |
|------------|---------------|--------------|----------------------|
| VBPW34FAS  | 55            | $\pm 65$     | 780 to 1050          |
| VBPW34FASR | 55            | $\pm 65$     | 780 to 1050          |

#### Note

- Test conditions see table "Basic Characteristics"

### ORDERING INFORMATION

| ORDERING CODE | PACKAGING     | REMARKS                      | PACKAGE FORM     |
|---------------|---------------|------------------------------|------------------|
| VBPW34FAS     | Tape and reel | MOQ: 1000 pcs, 1000 pcs/reel | Gullwing         |
| VBPW34FASR    | Tape and reel | MOQ: 1000 pcs, 1000 pcs/reel | Reverse gullwing |

#### Note

- MOQ: minimum order quantity

### ABSOLUTE MAXIMUM RATINGS (T<sub>amb</sub> = 25 °C, unless otherwise specified)

| PARAMETER                           | TEST CONDITION                    | SYMBOL     | VALUE         | UNIT |
|-------------------------------------|-----------------------------------|------------|---------------|------|
| Reverse voltage                     |                                   | $V_R$      | 60            | V    |
| Power dissipation                   | $T_{amb} \leq 25^\circ\text{C}$   | $P_V$      | 215           | 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 solder profile fig. 8 | $T_{sd}$   | 260           | °C   |
| Thermal resistance junction/ambient |                                   | $R_{thJA}$ | 350           | K/W  |



| BASIC CHARACTERISTICS (T <sub>amb</sub> = 25 °C, unless otherwise specified) |                                                                             |                             |      |                       |      |       |
|------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-----------------------------|------|-----------------------|------|-------|
| PARAMETER                                                                    | TEST CONDITION                                                              | SYMBOL                      | MIN. | TYP.                  | MAX. | UNIT  |
| Forward voltage                                                              | I <sub>F</sub> = 50 mA                                                      | V <sub>F</sub>              |      | 1                     | 1.3  | V     |
| Breakdown voltage                                                            | I <sub>R</sub> = 100 μA, E = 0                                              | V <sub>(BR)</sub>           | 60   |                       |      | V     |
| Reverse dark current                                                         | V <sub>R</sub> = 10 V, E = 0                                                | I <sub>ro</sub>             |      | 2                     | 30   | nA    |
| Diode capacitance                                                            | V <sub>R</sub> = 0 V, f = 1 MHz, E = 0                                      | C <sub>D</sub>              |      | 70                    |      | pF    |
|                                                                              | V <sub>R</sub> = 3 V, f = 1 MHz, E = 0                                      | C <sub>D</sub>              |      | 25                    | 40   | pF    |
| Open circuit voltage                                                         | E <sub>e</sub> = 1 mW/cm <sup>2</sup> , λ = 950 nm                          | V <sub>o</sub>              |      | 350                   |      | mV    |
| Temperature coefficient of V <sub>o</sub>                                    | E <sub>e</sub> = 1 mW/cm <sup>2</sup> , λ = 950 nm                          | TK <sub>V<sub>o</sub></sub> |      | - 2.6                 |      | mV/K  |
| Short circuit current                                                        | E <sub>e</sub> = 1 mW/cm <sup>2</sup> , λ = 950 nm                          | I <sub>k</sub>              |      | 50                    |      | μA    |
| Temperature coefficient of I <sub>k</sub>                                    | E <sub>e</sub> = 1 mW/cm <sup>2</sup> , λ = 950 nm                          | TK <sub>I<sub>k</sub></sub> |      | 0.1                   |      | %/K   |
| Reverse light current                                                        | E <sub>e</sub> = 1 mW/cm <sup>2</sup> , λ = 950 nm,<br>V <sub>R</sub> = 5 V | I <sub>ra</sub>             | 45   | 55                    |      | μA    |
| Angle of half sensitivity                                                    |                                                                             | φ                           |      | ± 65                  |      | deg   |
| Wavelength of peak sensitivity                                               |                                                                             | λ <sub>p</sub>              |      | 950                   |      | nm    |
| Range of spectral bandwidth                                                  |                                                                             | λ <sub>0.5</sub>            |      | 780 to 1050           |      | nm    |
| Noise equivalent power                                                       | V <sub>R</sub> = 10 V, λ = 950 nm                                           | NEP                         |      | 4 × 10 <sup>-14</sup> |      | W/√Hz |
| Rise time                                                                    | V <sub>R</sub> = 10 V, R <sub>L</sub> = 1 kΩ,<br>λ = 820 nm                 | t <sub>r</sub>              |      | 100                   |      | ns    |
| Fall time                                                                    | V <sub>R</sub> = 10 V, R <sub>L</sub> = 1 kΩ,<br>λ = 820 nm                 | t <sub>f</sub>              |      | 100                   |      | ns    |

#### BASIC CHARACTERISTICS (T<sub>amb</sub> = 25 °C, unless otherwise specified)

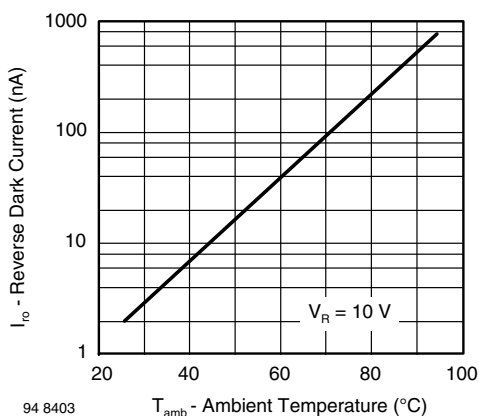


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

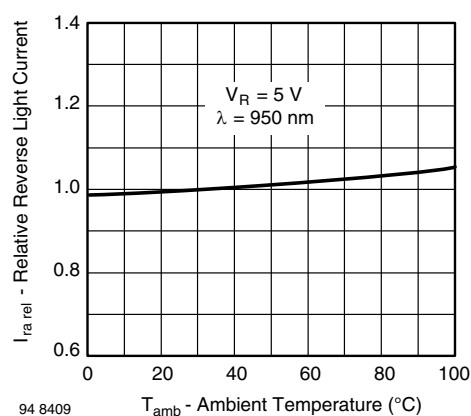


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

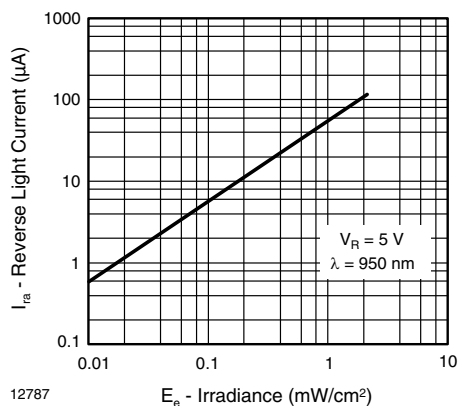


Fig. 3 - Reverse Light Current vs. Irradiance

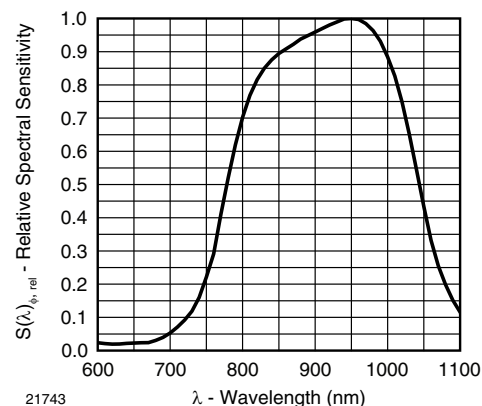


Fig. 6 - Relative Spectral Sensitivity vs. Wavelength

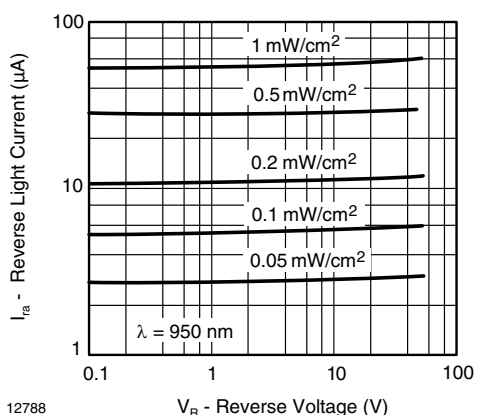


Fig. 4 - Reverse Light Current vs. Reverse Voltage

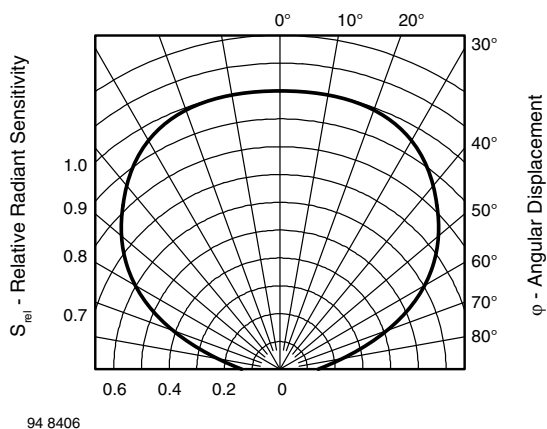


Fig. 7 - Relative Radiant Sensitivity vs. Angular Displacement

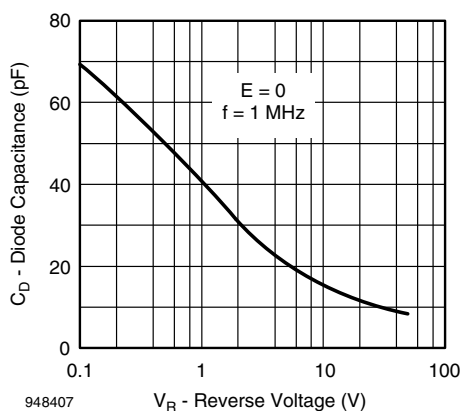
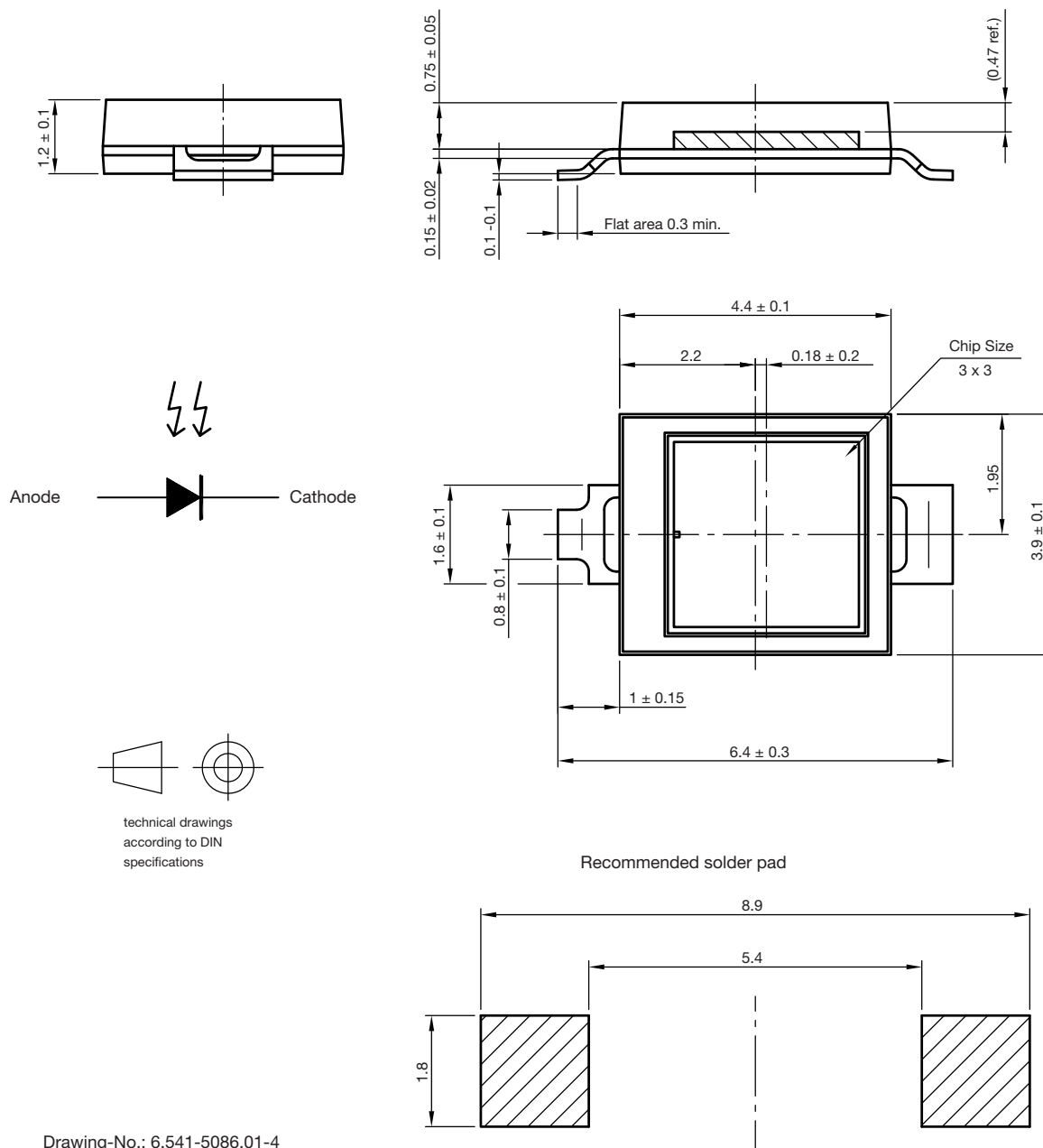


Fig. 5 - Diode Capacitance vs. Reverse Voltage



## PACKAGE DIMENSIONS FOR VBPW34FAS in millimeters



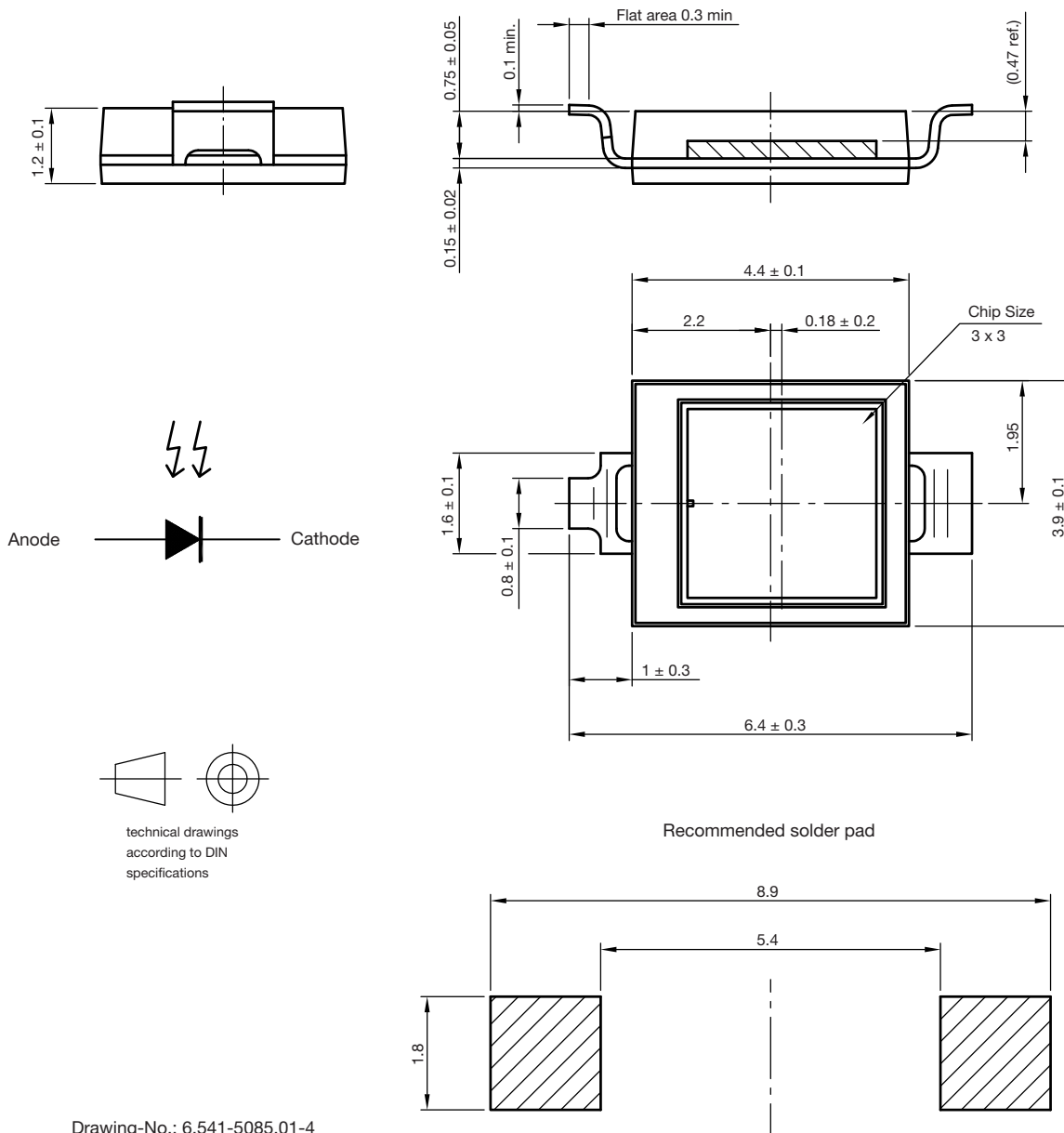
Drawing-No.: 6.541-5086.01-4

Issue: 1; 15.04.10

22105



## PACKAGE DIMENSIONS FOR VBPW34FASR in millimeters



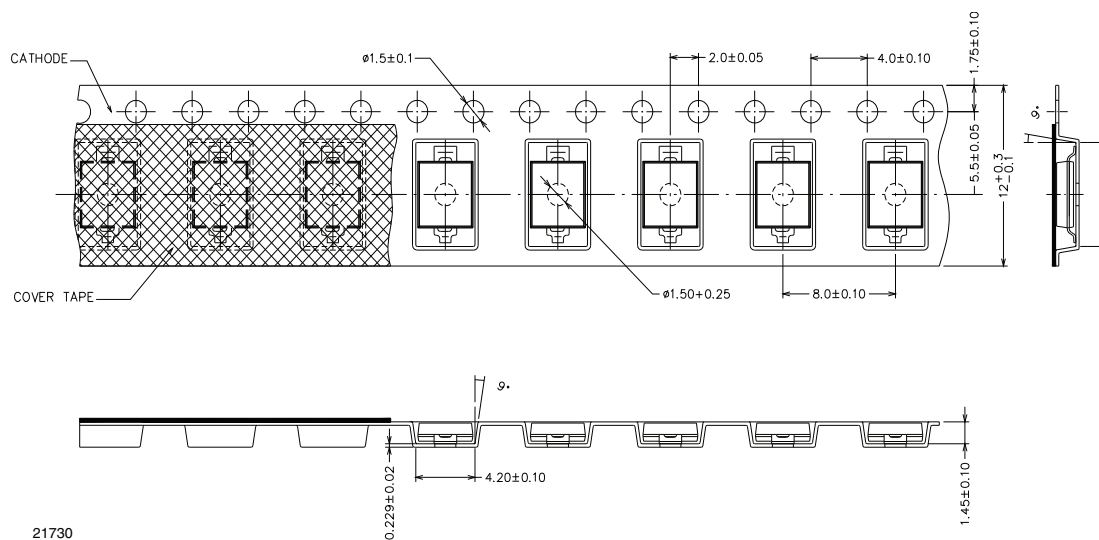
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Issue: 1; 15.04.10

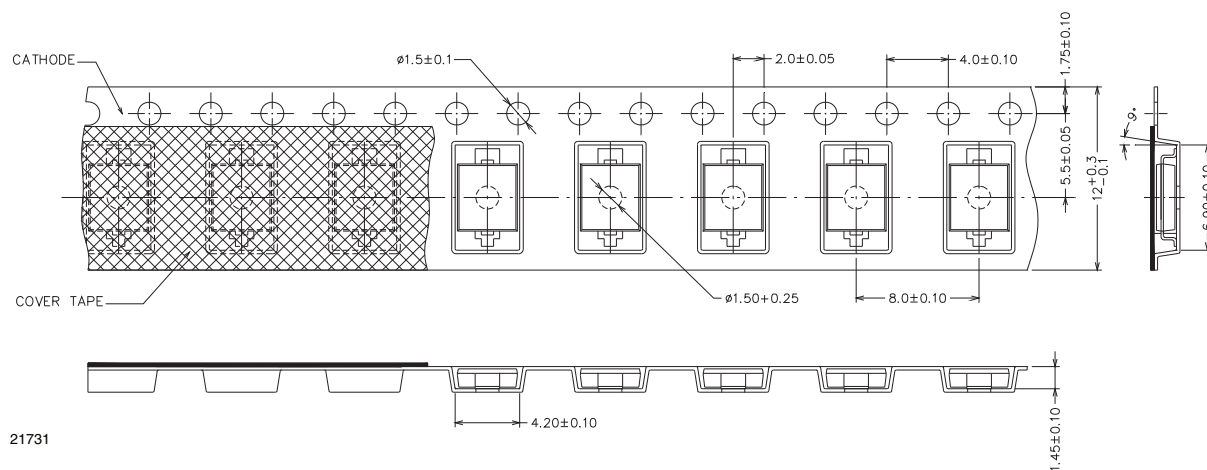
22104

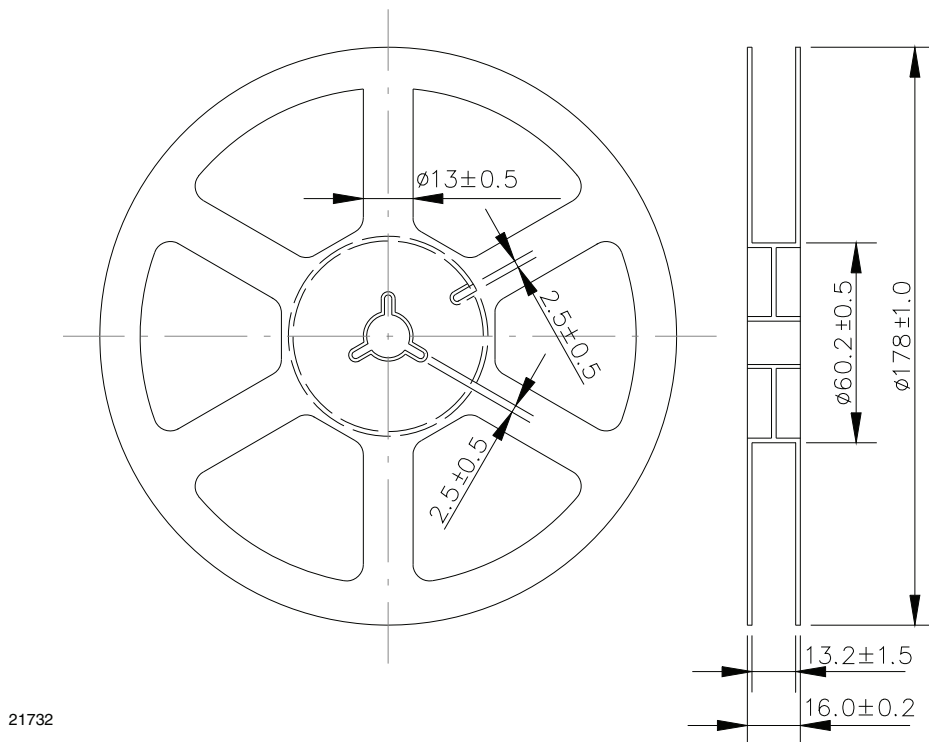


## TAPING DIMENSIONS FOR VBPW34FAS in millimeters



## TAPING DIMENSIONS FOR VBPW34FASR in millimeters



**REEL DIMENSIONS FOR VBPW34FAS AND VBPW34FASR** in millimeters


21732

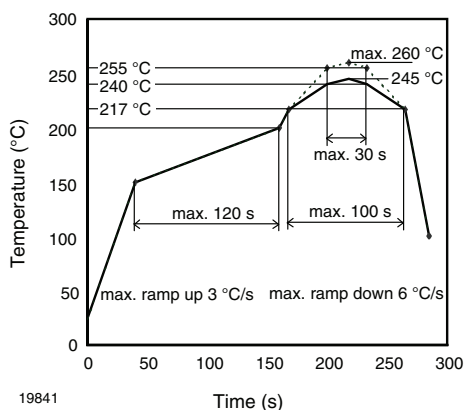
**SOLDER PROFILE**


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**

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 recommended conditions:

192 h at  $40\text{ °C} (+ 5\text{ °C})$ ,  $RH < 5\%$

or

96 h at  $60\text{ °C} (+ 5\text{ °C})$ ,  $RH < 5\%$ .



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