# Silicon PIN Photodiode

VBPW34S

VBPW34SR

## 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 $mm^2$): 7.5
- High photo sensitivity
- High radiant sensitivity
- Suitable for visible and near infrared radiation
- Fast response times
- Angle of half sensitivity: φ = ± 65°
- 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

Pb-free

e4

RoHS COMPLIANT

HALOGEN FREE

## DESCRIPTION

VBPW34S and VBPW34SR are high speed and high sensitive PIN photodiodes. It is a surface mount device (SMD) including the chip with a 7.5 $mm^2$ sensitive area detecting visible and near infrared radiation.

## APPLICATIONS

- High speed photo detector

| PRODUCT SUMMARY | | | |
|---|---|---|---|
| **COMPONENT** | **$I_{ra}$ (µA)** | **φ (°)** | **$\lambda_{0.1}$ (nm)** |
| VBPW34S | 55 | ± 65 | 430 to 1100 |
| VBPW34SR | 55 | ± 65 | 430 to 1100 |

**Note**

- Test conditions see table “Basic Characteristics”

| ORDERING INFORMATION | | | |
|---|---|---|---|
| **ORDERING CODE** | **PACKAGING** | **REMARKS** | **PACKAGE FORM** |
| VBPW34S | Tape and reel | MOQ: 1000 pcs, 1000 pcs/reel | Gullwing |
| VBPW34SR | Tape and reel | MOQ: 1000 pcs, 1000 pcs/reel | Reverse gullwing |

**Note**

- MOQ: minimum order quantity

| ABSOLUTE MAXIMUM RATINGS ($T_{amb}$ = 25 °C, unless otherwise specified) | | | | |
|---|---|---|---|---|
| **PARAMETER** | **TEST CONDITION** | **SYMBOL** | **VALUE** | **UNIT** |
| Reverse voltage | | $V_R$ | 60 | V |
| Power dissipation | $T_{amb} \leq 25$ °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 | According to reflow solder profile Fig. 8 | $T_{sd}$ | 260 | °C |
| Thermal resistance junction to ambient | | $R_{thJA}$ | 350 | K/W |

| **BASIC CHARACTERISTICS** ($T_{amb}$ = 25 °C, unless otherwise specified) | | | | | | |
|---|---|---|---|---|---|---|
| **PARAMETER** | **TEST CONDITION** | **SYMBOL** | **MIN.** | **TYP.** | **MAX.** | **UNIT** |
| Forward voltage | $I_F$ = 50 mA | $V_F$ | | 1 | 1.3 | V |
| Breakdown voltage | $I_R$ = 100 µA, E = 0 | $V_{(BR)}$ | 60 | - | - | V |
| Reverse dark current | $V_R$ = 10 V, E = 0 | $I_{ro}$ | - | 2 | 30 | nA |
| Diode capacitance | $V_R$ = 0 V, f = 1 MHz, E = 0 | $C_D$ | - | 70 | - | pF |
| | $V_R$ = 3 V, f = 1 MHz, E = 0 | $C_D$ | - | 25 | 40 | pF |
| Open circuit voltage | $E_e$ = 1 mW/cm², λ = 950 nm | $V_o$ | - | 350 | - | mV |
| Temperature coefficient of $V_o$ | $E_e$ = 1 mW/cm², λ = 950 nm | $TK_{Vo}$ | - | -2.6 | - | mV/K |
| Short circuit current | $E_e$ = 1 mW/cm², λ = 950 nm | $I_k$ | - | 50 | - | µA |
| Temperature coefficient of $I_k$ | $E_e$ = 1 mW/cm², λ = 950 nm | $TK_{Ik}$ | - | 0.1 | - | %/K |
| Reverse light current | $E_e$ = 1 mW/cm², λ = 950 nm, $V_R$ = 5 V | $I_{ra}$ | 45 | 55 | - | µA |
| Angle of half sensitivity | | φ | - | ± 65 | - | ° |
| Wavelength of peak sensitivity | | $\lambda_p$ | - | 940 | - | nm |
| Range of spectral bandwidth | | $\lambda_{0.1}$ | - | 430 to 1100 | - | nm |
| Noise equivalent power | $V_R$ = 10 V, λ = 950 nm | NEP | - | 4 x $10^{-14}$ | - | W/√Hz |
| Rise time | $V_R$ = 10 V, $R_L$ = 1 kΩ, λ = 820 nm | $t_r$ | - | 100 | - | ns |
| Fall time | $V_R$ = 10 V, $R_L$ = 1 kΩ, λ = 820 nm | $t_f$ | - | 100 | - | ns |

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

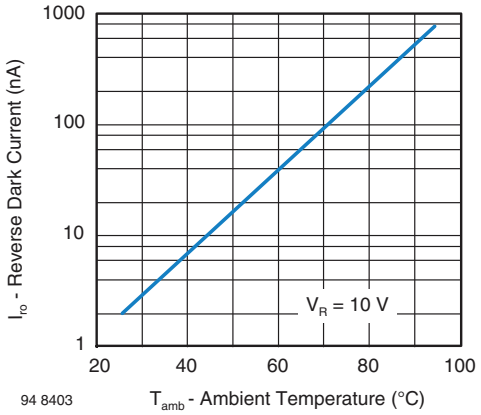



Fig. 1 - Reverse Dark Current vs. Ambient Temperature

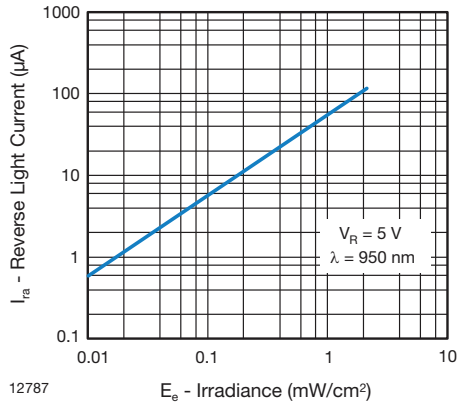



Fig. 3 - Reverse Light Current vs. Irradiance

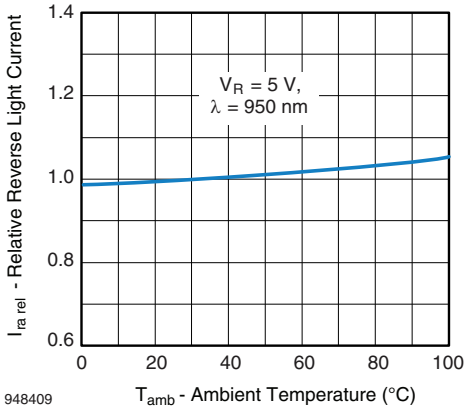



Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

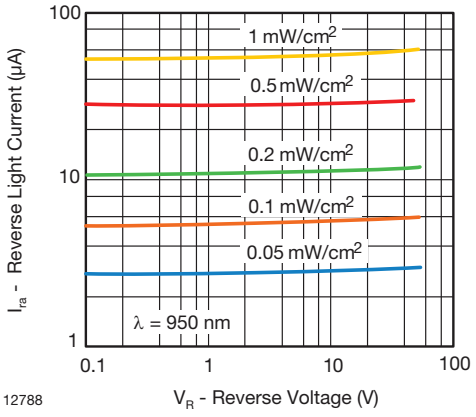



Fig. 4 - Reverse Light Current vs. Reverse Voltage

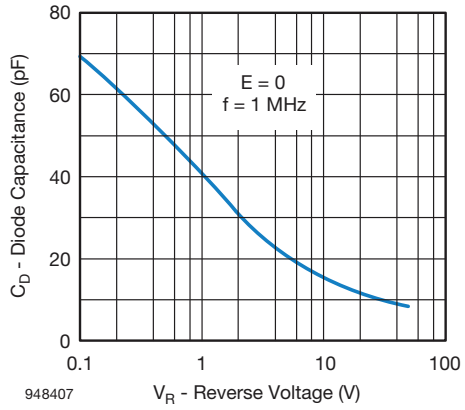



Fig. 5 - Diode Capacitance vs. Reverse Voltage

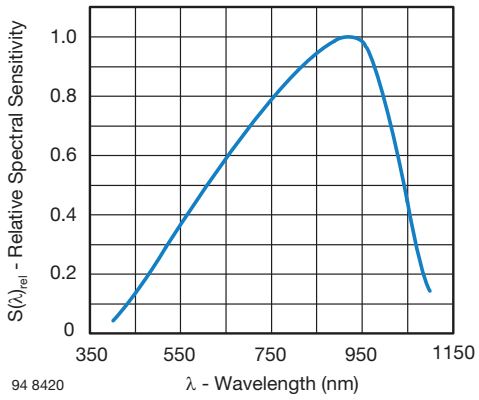



Fig. 6 - Relative Spectral Sensitivity vs. Wavelength

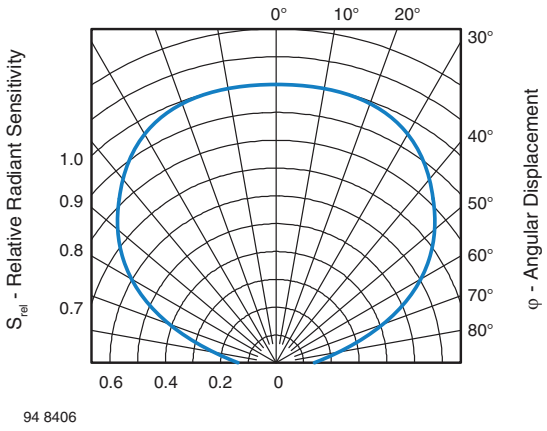
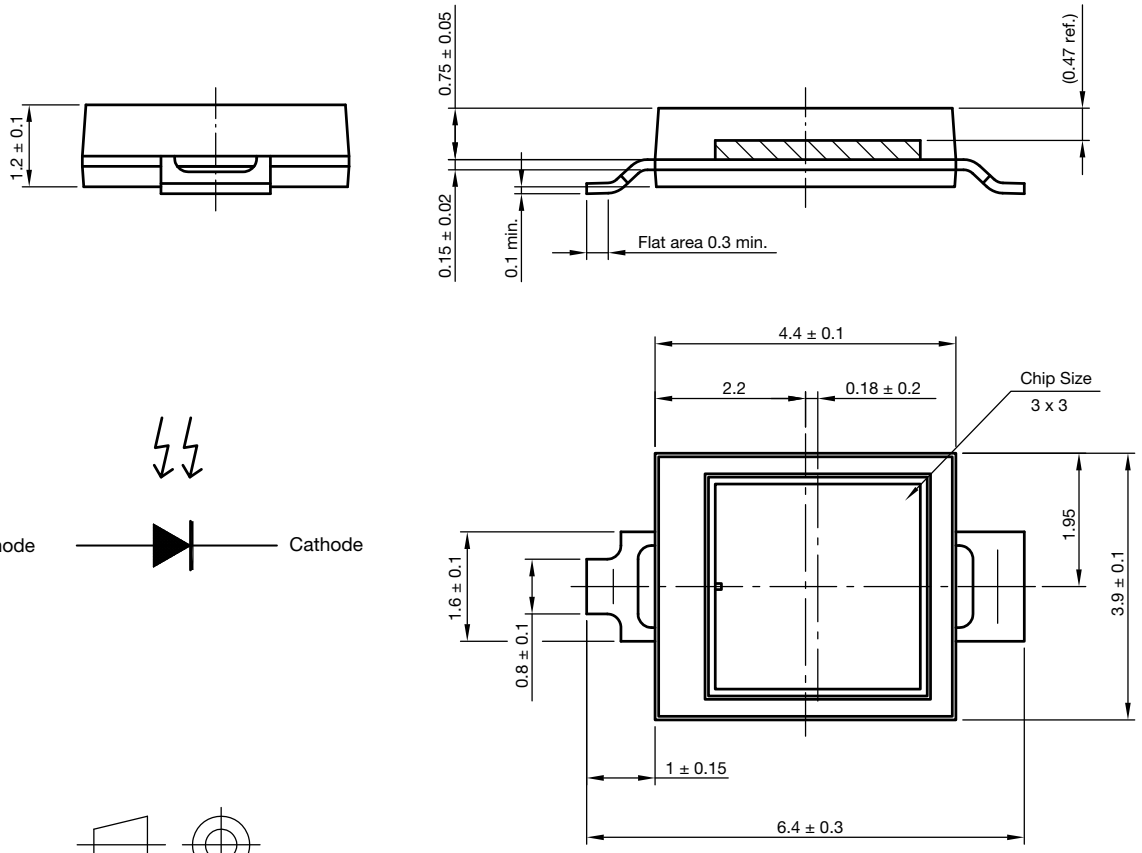
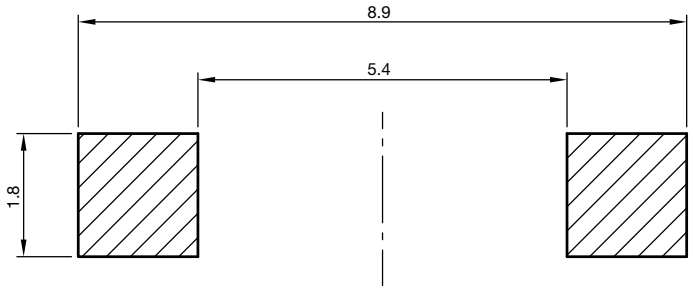



Fig. 7 - Relative Radiant Sensitivity vs. Angular Displacement

**PACKAGE DIMENSIONS FOR VBPW34S** in millimeters



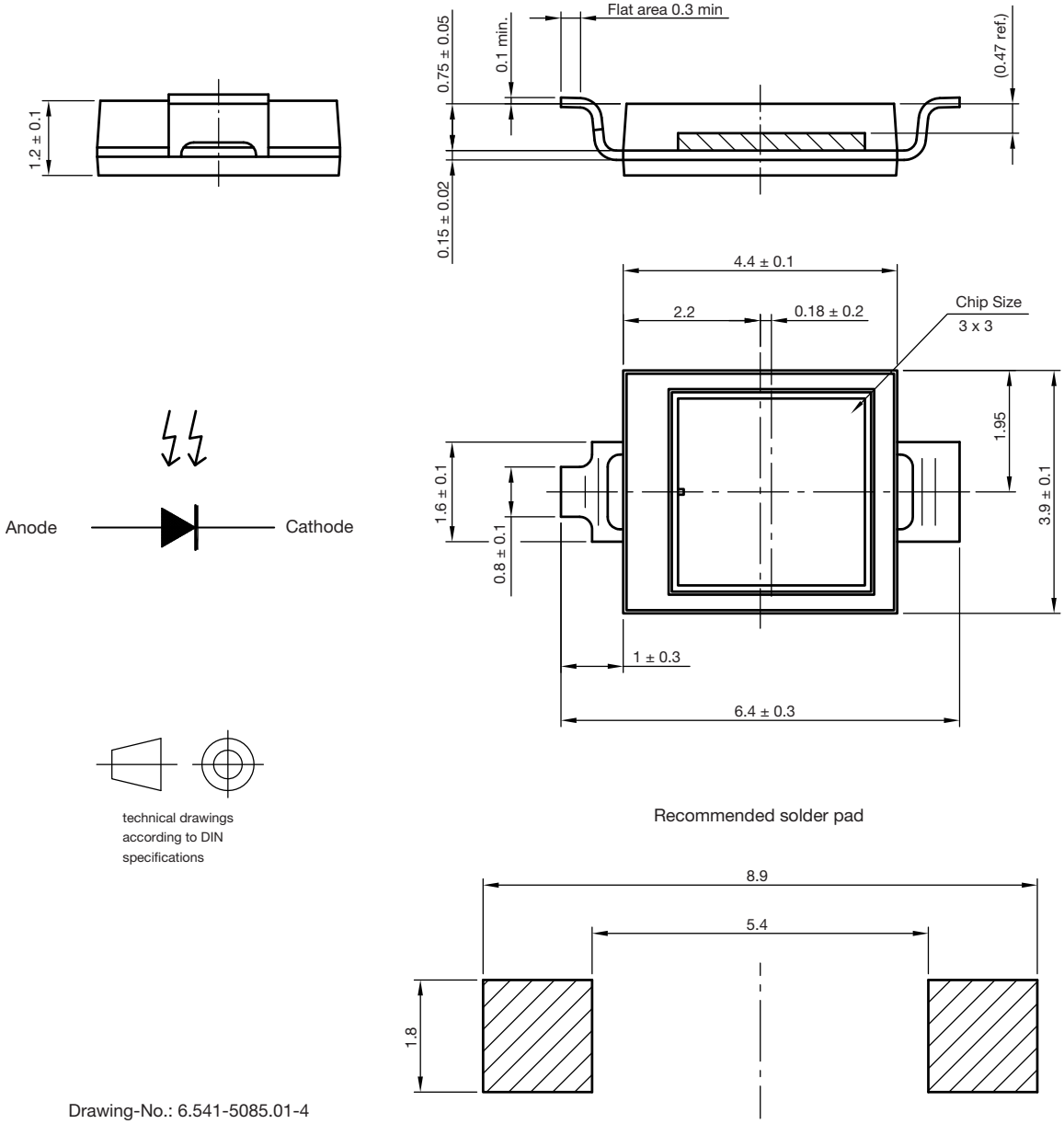

Recommended solder pad




Drawing-No.: 6.541-5086.01-4
Issue: 1; 15.04.10

22105

**PACKAGE DIMENSIONS FOR VBPW34SR** in millimeters




Drawing-No.: 6.541-5085.01-4

Issue: 1; 15.04.10

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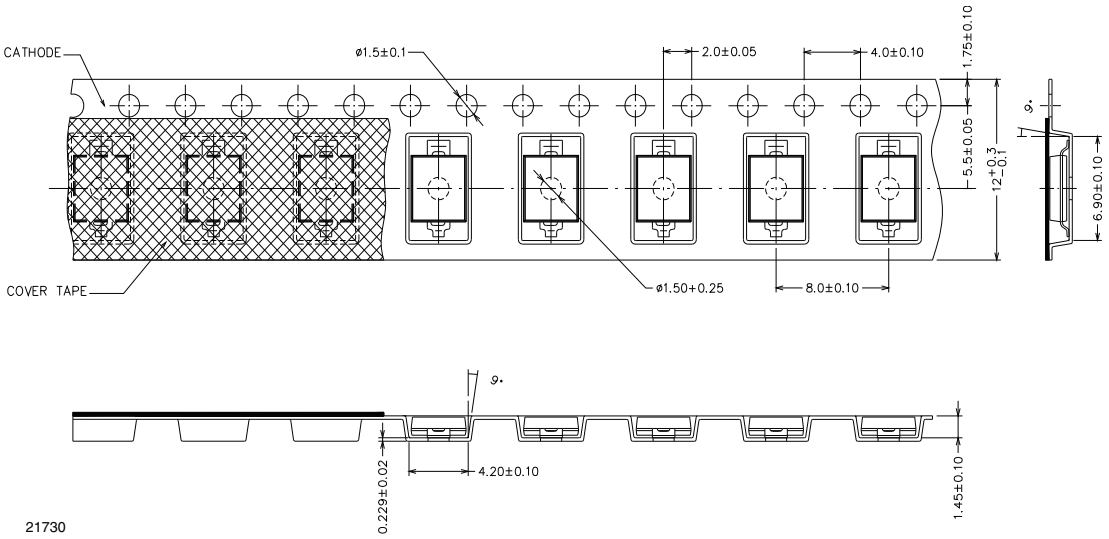
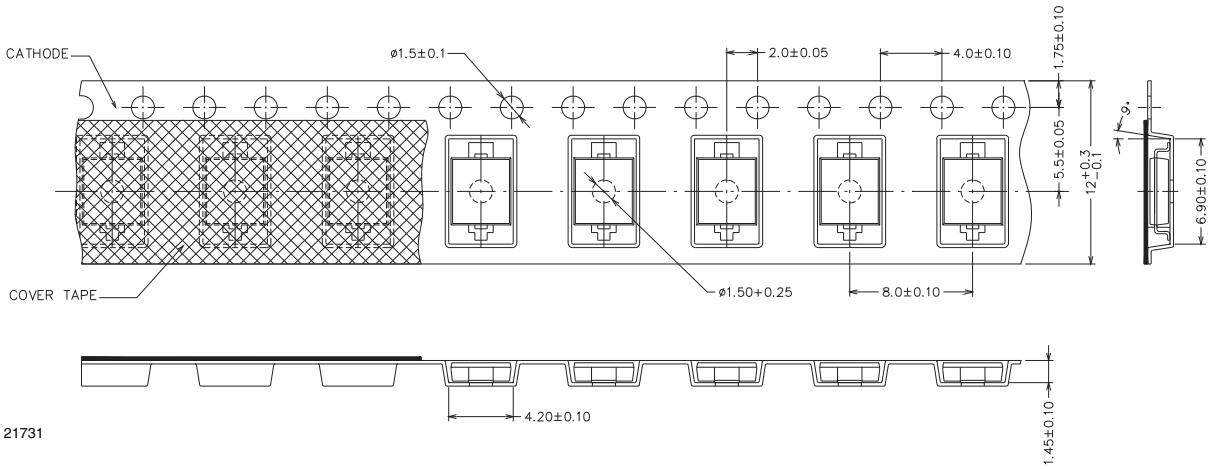
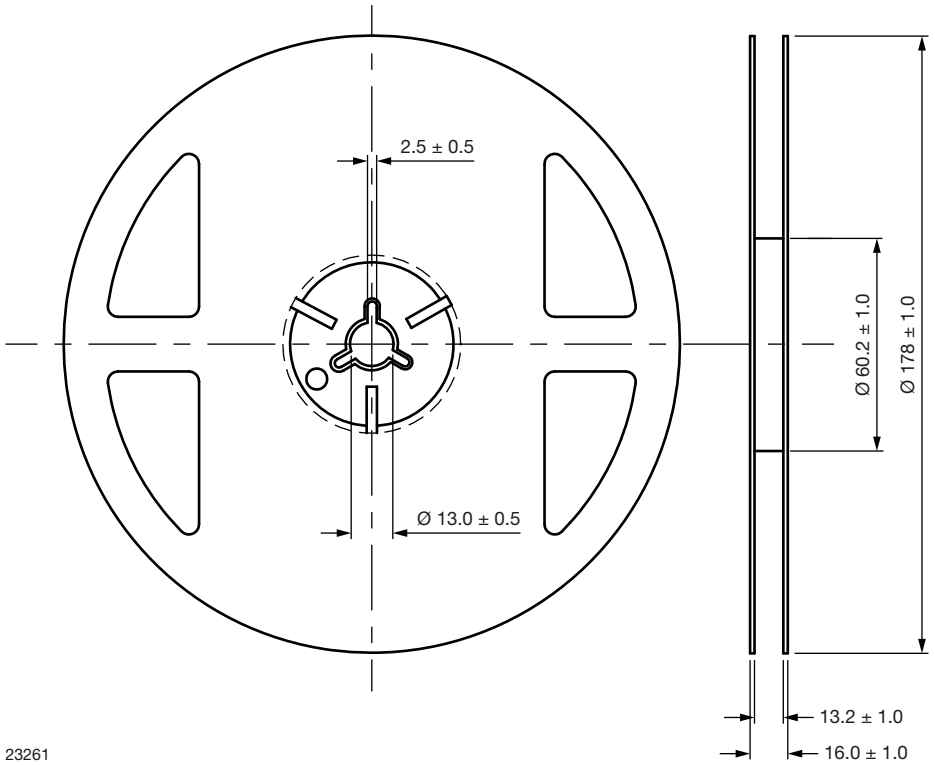
**TAPING DIMENSIONS FOR VBPW34S** in millimeters




**TAPING DIMENSIONS FOR VBPW34SR** in millimeters



## REEL DIMENSIONS FOR VBPW34S AND VBPW34SR in millimeters




## SOLDER PROFILE

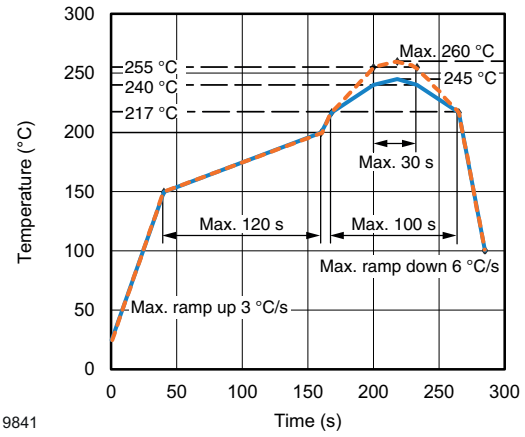



Fig. 8 - Lead (Pb)-free Reflow Solder Profile According to J-STD-020

## 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

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 °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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