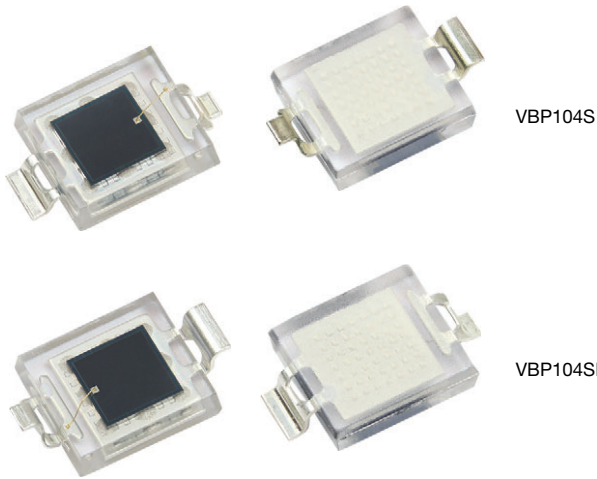


Silicon PIN Photodiode



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 mm²): 4.4
- High photo sensitivity
- High radiant sensitivity
- Suitable for visible and near infrared radiation
- Fast response times
- Angle of half sensitivity: $\varphi = \pm 65^\circ$
- 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



DESCRIPTION

VBP104S and VBP104SR are high speed and high sensitive PIN photodiodes. It is a surface mount device (SMD) including the chip with a 4.4 mm² sensitive area detecting visible and near infrared radiation.

APPLICATIONS

- High speed photo detector

| PRODUCT SUMMARY | | | |
|-----------------|----------------------|---------------|----------------------|
| COMPONENT | I_{ra} (μA) | φ (°) | $\lambda_{0.1}$ (nm) |
| VBP104S | 35 | ± 65 | 430 to 1100 |
| VBP104SR | 35 | ± 65 | 430 to 1100 |

Note

- Test conditions see table “Basic Characteristics”

| ORDERING INFORMATION | | | |
|----------------------|---------------|------------------------------|------------------|
| ORDERING CODE | PACKAGING | REMARKS | PACKAGE FORM |
| VBP104S | Tape and reel | MOQ: 1000 pcs, 1000 pcs/reel | Gullwing |
| VBP104SR | Tape and reel | MOQ: 1000 pcs, 1000 pcs/reel | Reverse gullwing |

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 | 60 | V |
| Power dissipation | $T_{amb} \leq 25^\circ C$ | P_V | 215 | mW |
| Junction temperature | | T_j | 100 | $^\circ C$ |
| Operating temperature range | | T_{amb} | -40 to +100 | $^\circ C$ |
| Storage temperature range | | T_{stg} | -40 to +100 | $^\circ C$ |
| Soldering temperature | According to reflow solder profile Fig. 8 | T_{sd} | 260 | $^\circ C$ |
| Thermal resistance junction to ambient | | R_{thJA} | 350 | K/W |



| BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, 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 | $I_R = 100\text{ }\mu\text{A}$, $E = 0$ | $V_{(BR)}$ | 60 | - | - | V |
| Reverse dark current | $V_R = 10\text{ V}$, $E = 0$ | I_{ro} | - | 2 | 30 | nA |
| Diode capacitance | $V_R = 0\text{ V}$, $f = 1\text{ MHz}$, $E = 0$ | C_D | - | 48 | - | pF |
| | $V_R = 3\text{ V}$, $f = 1\text{ MHz}$, $E = 0$ | C_D | - | 17 | 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 | - | 32 | - | μA |
| 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 | $E_e = 1\text{ mW/cm}^2$, $\lambda = 950\text{ nm}$, $V_R = 5\text{ V}$ | I_{ra} | 25 | 35 | - | μA |
| Angle of half sensitivity | | ϕ | - | ± 65 | - | $^{\circ}$ |
| Wavelength of peak sensitivity | | λ_p | - | 940 | - | nm |
| Range of spectral bandwidth | | $\lambda_{0.1}$ | - | 430 to 1100 | - | nm |
| Noise equivalent power | $V_R = 10\text{ V}$, $\lambda = 950\text{ nm}$ | NEP | - | 4×10^{-14} | - | $\text{W}/\sqrt{\text{Hz}}$ |
| Rise time | $V_R = 10\text{ V}$, $R_L = 1\text{ k}\Omega$, $\lambda = 820\text{ nm}$ | t_r | - | 100 | - | ns |
| Fall time | $V_R = 10\text{ V}$, $R_L = 1\text{ k}\Omega$, $\lambda = 820\text{ nm}$ | t_f | - | 100 | - | ns |

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

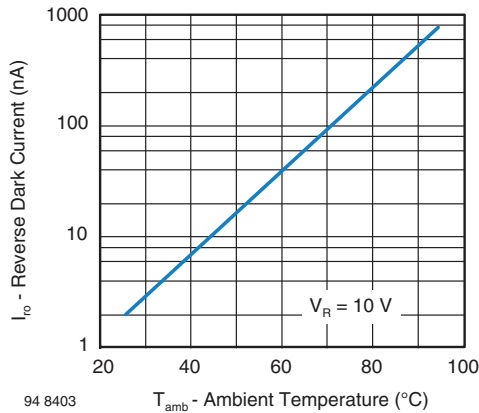


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

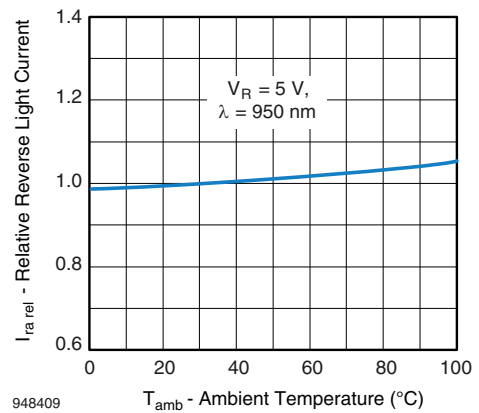


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

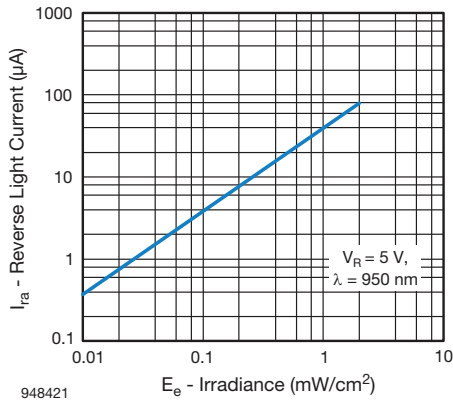


Fig. 3 - Reverse Light Current vs. Irradiance

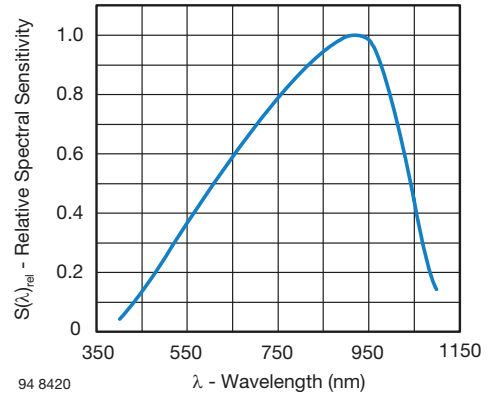


Fig. 6 - Relative Spectral Sensitivity vs. Wavelength

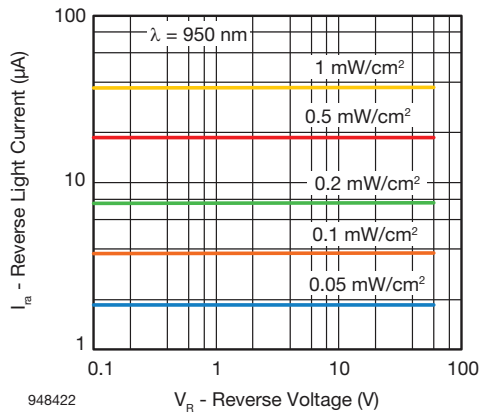


Fig. 4 - Reverse Light Current vs. Reverse Voltage

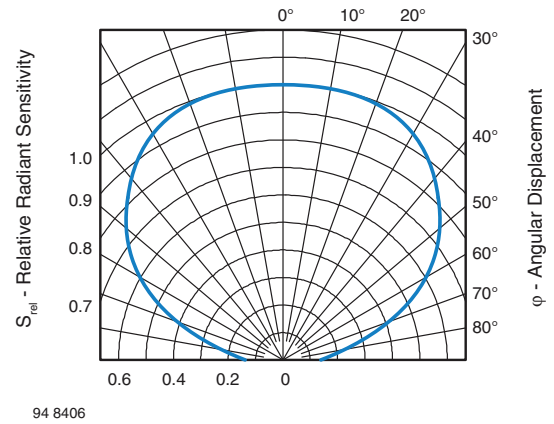


Fig. 7 - Relative Radiant Sensitivity vs. Angular Displacement

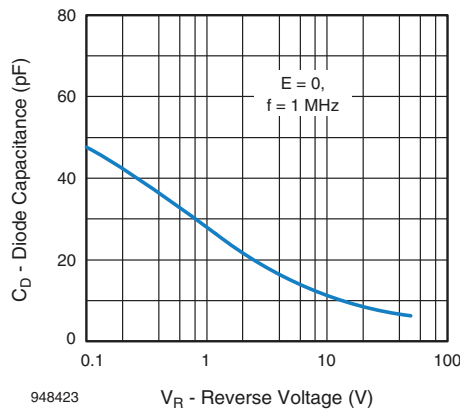
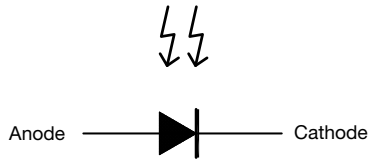
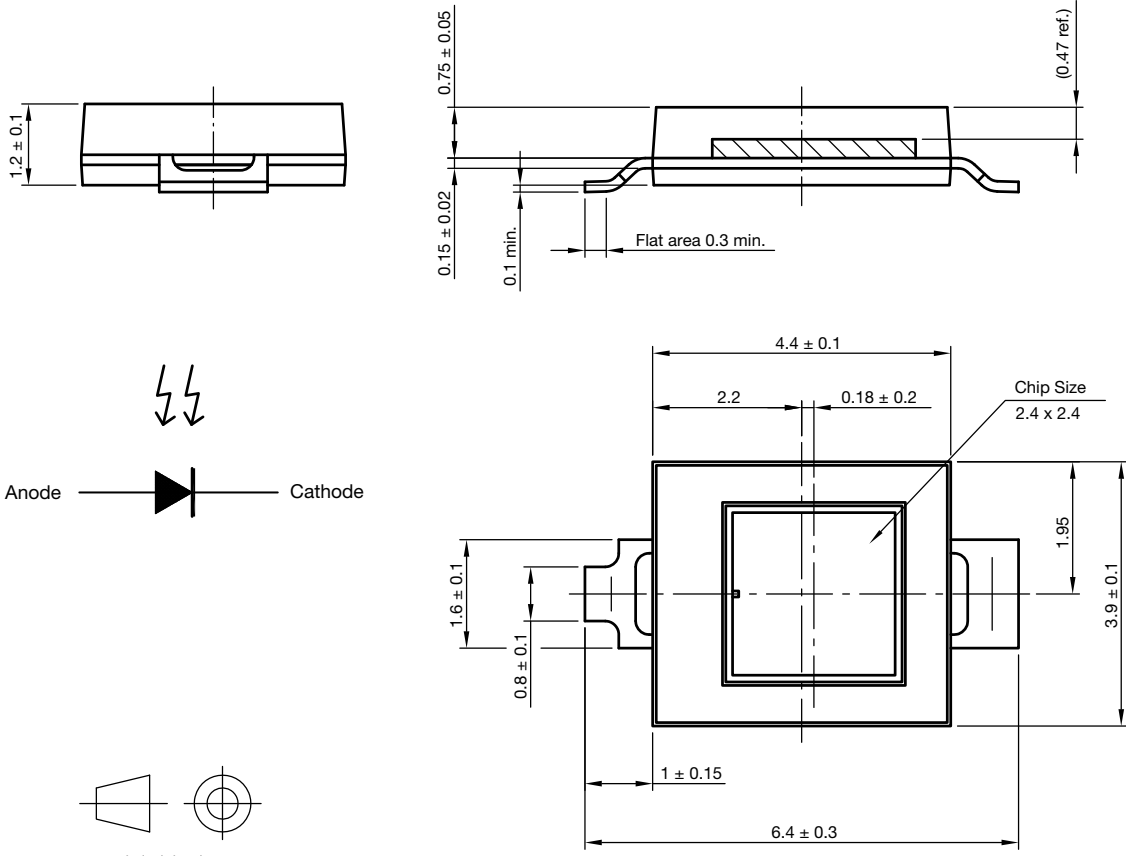


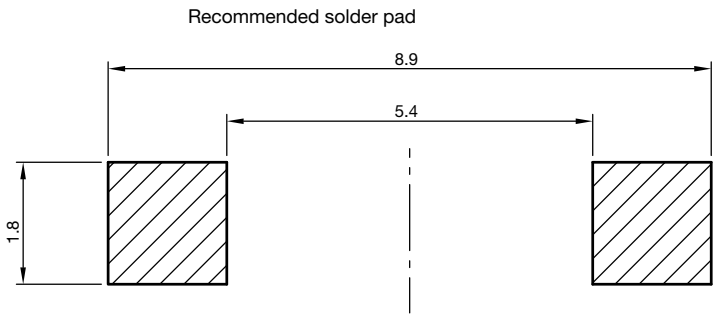
Fig. 5 - Diode Capacitance vs. Reverse Voltage



PACKAGE DIMENSIONS FOR VBP104S in millimeters



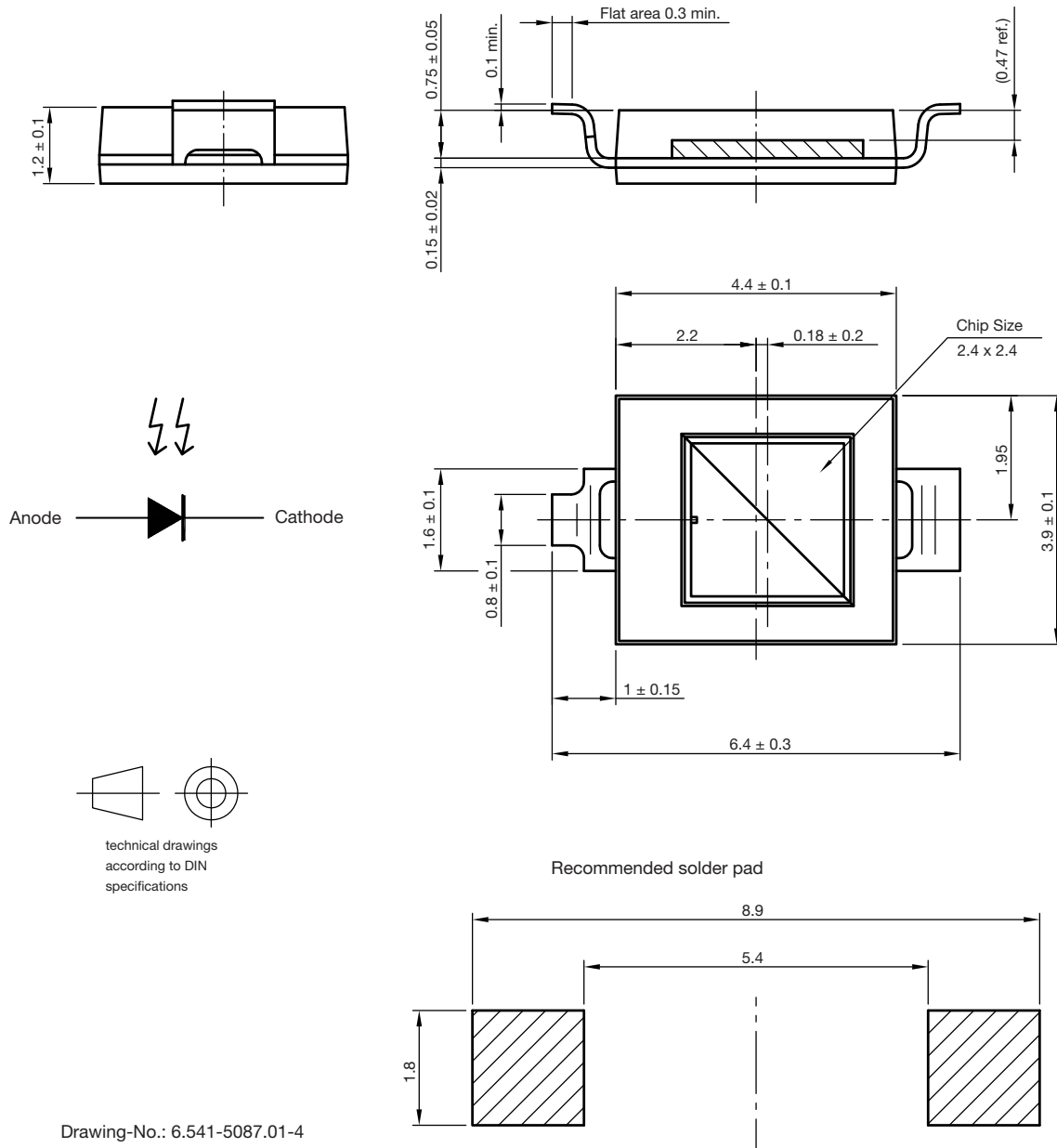
technical drawings according to DIN specifications



Drawing-No.: 6.541-5088.01-4
 Issue: 1; 15.04.10
 22107



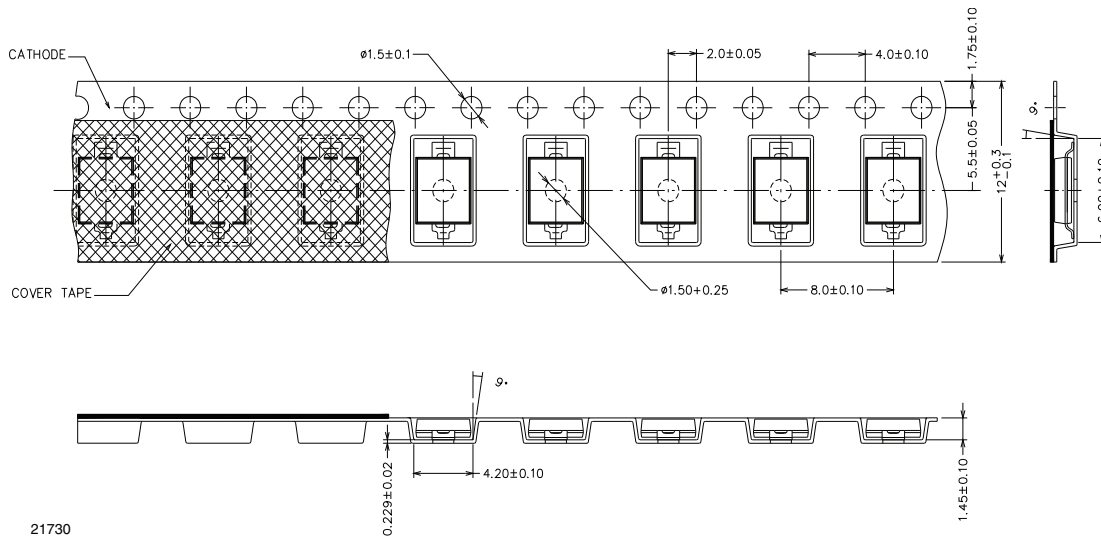
PACKAGE DIMENSIONS FOR VBP104SR in millimeters



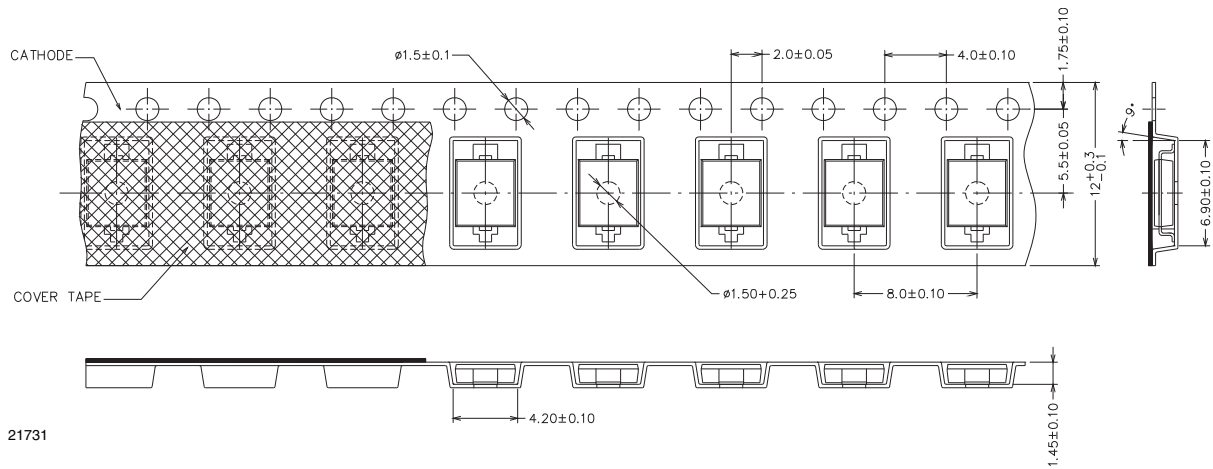
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 Issue: 1; 15.04.10
 22106



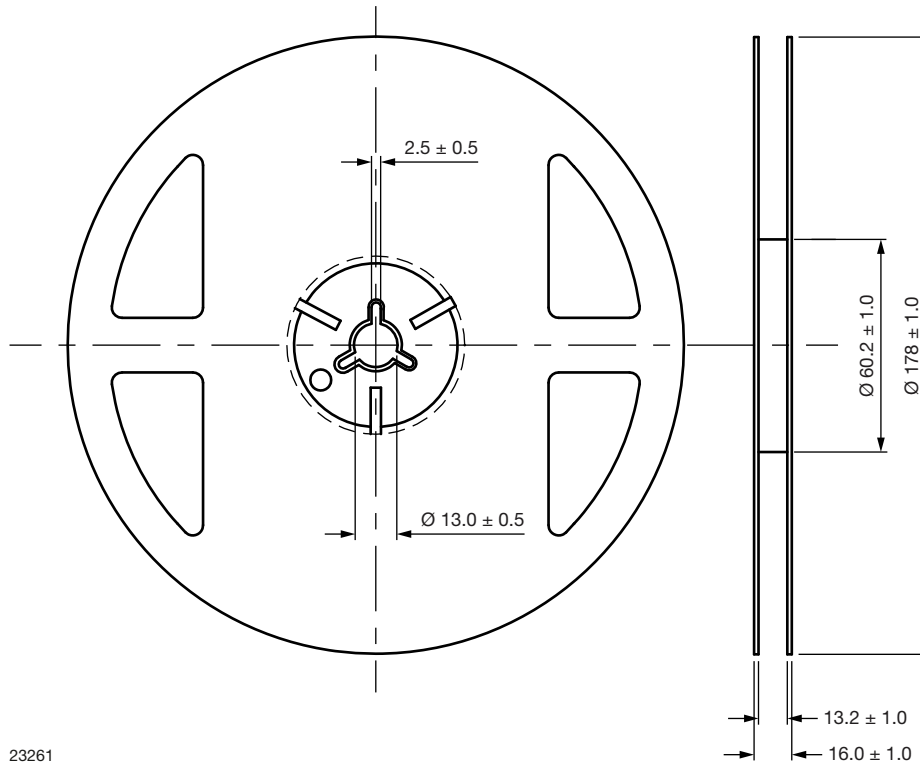
TAPING DIMENSIONS FOR VBP104S in millimeters



TAPING DIMENSIONS FOR VBP104SR in millimeters

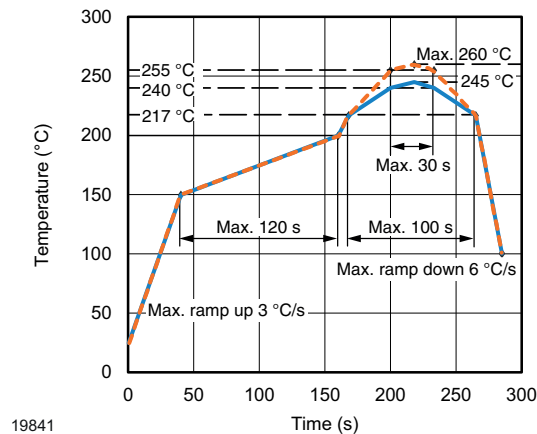


REEL DIMENSIONS FOR VBP104S AND VBP104SR in millimeters



23261

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

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

DRYING

In case of moisture absorption devices should be baked before soldering. Conditions see J-STD-020 or recommended conditions:

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

or

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



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