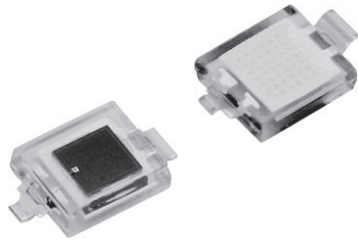
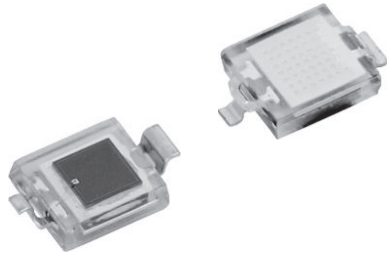


## Silicon PIN Photodiode



VBP104S



VBP104SR

### 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>): 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, 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



### 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 mm<sup>2</sup> sensitive area detecting visible and near infrared radiation.

### APPLICATIONS

- High speed photo detector

| PRODUCT SUMMARY |                      |                 |                      |
|-----------------|----------------------|-----------------|----------------------|
| COMPONENT       | $I_{ra}$ ( $\mu A$ ) | $\varphi$ (deg) | $\lambda_{0.1}$ (nm) |
| VBP104S         | 35                   | $\pm 65$        | 430 to 1100          |
| VBP104SR        | 35                   | $\pm 65$        | 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   | Acc. reflow solder profile fig. 8 | $T_{sd}$   | 260           | $^\circ C$ |
| 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   | $I_R = 100\text{ }\mu\text{A}$ , $E = 0$                                      | $V_{(BR)}$      | 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                  |      | $\mu\text{A}$               |
| 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   | $E_e = 1\text{ mW/cm}^2$ , $\lambda = 950\text{ nm}$ ,<br>$V_R = 5\text{ V}$  | $I_{ra}$        | 25   | 35                  |      | $\mu\text{A}$               |
| Angle of half sensitivity   |   | $\phi$          |      | $\pm 65$            |      | deg                         |
| Wavelength of peak sensitivity  |   | $\lambda_p$     |      | 940                 |      | nm                          |
| Range of spectral bandwidth   |   | $\lambda_{0.1}$ |      | 430 to 1100         |      | nm                          |
| Noise equivalent power  | $V_R = 10\text{ V}$ , $\lambda = 950\text{ nm}$                               | NEP             |      | $4 \times 10^{-14}$ |      | $\text{W}/\sqrt{\text{Hz}}$ |
| Rise time   | $V_R = 10\text{ V}$ , $R_L = 1\text{ k}\Omega$ ,<br>$\lambda = 820\text{ nm}$ | $t_r$           |      | 100                 |      | ns                          |
| Fall time   | $V_R = 10\text{ V}$ , $R_L = 1\text{ k}\Omega$ ,<br>$\lambda = 820\text{ nm}$ | $t_f$           |      | 100                 |      | ns                          |

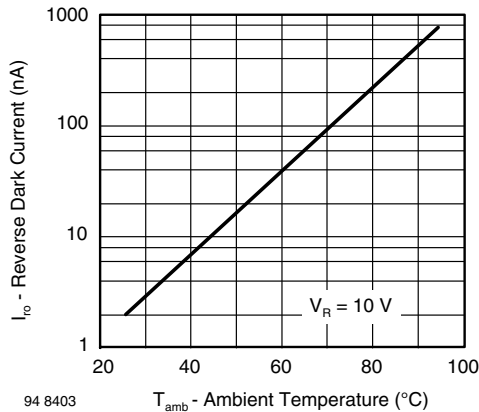
**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

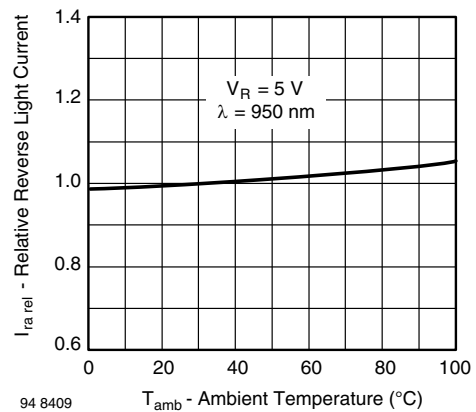


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

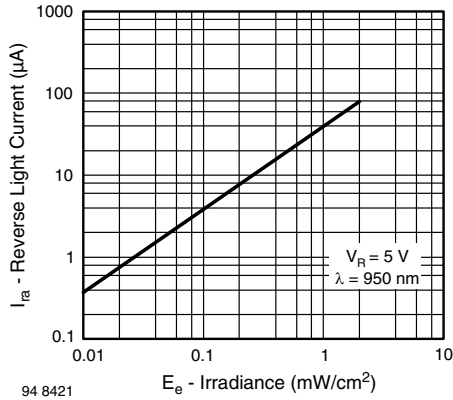


Fig. 3 - Reverse Light Current vs. Irradiance

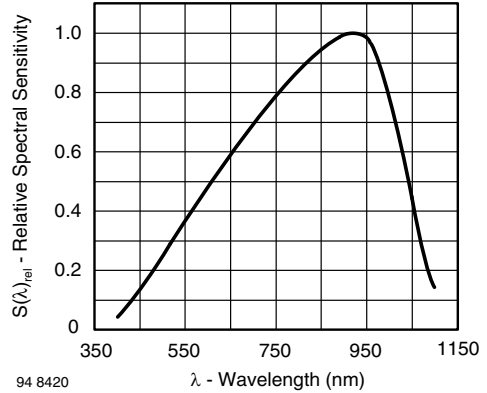


Fig. 6 - Relative Spectral Sensitivity vs. Wavelength

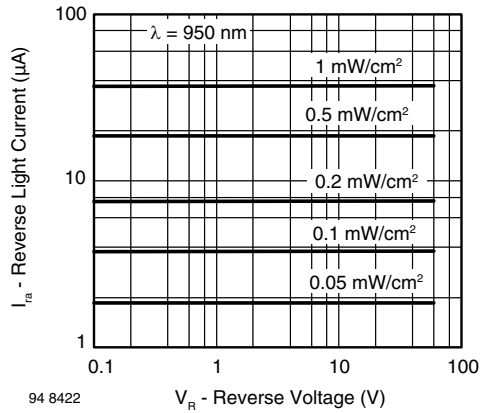


Fig. 4 - Reverse Light Current vs. Reverse Voltage

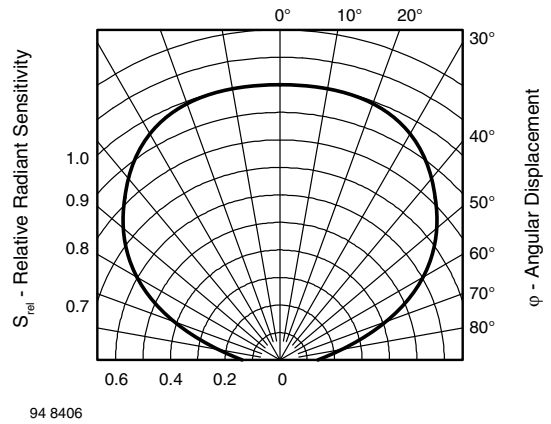


Fig. 7 - Relative Radiant Sensitivity vs. Angular Displacement

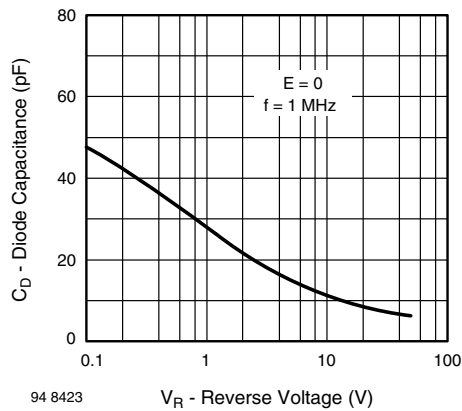
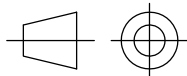
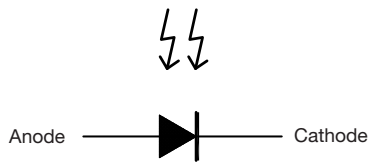
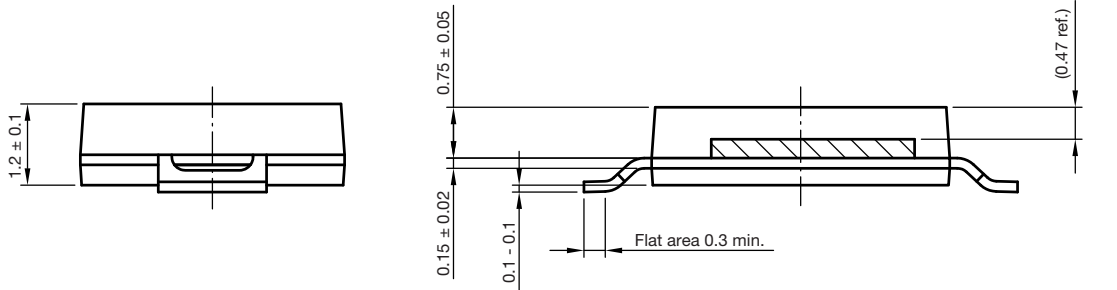


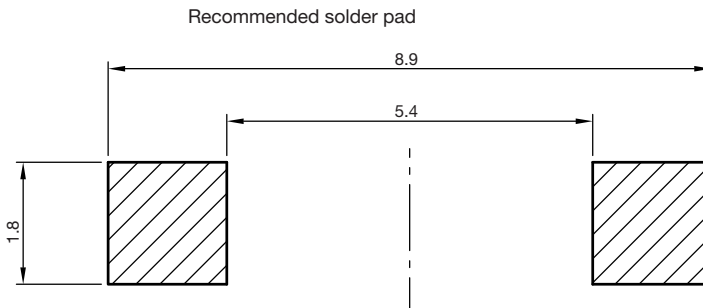
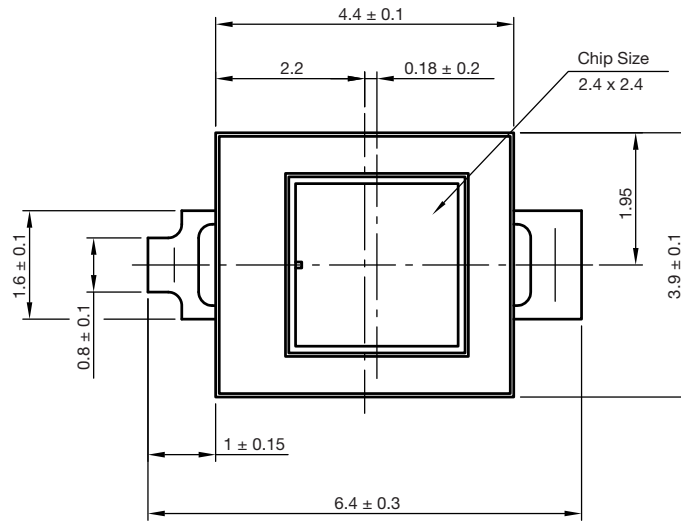
Fig. 5 - Diode Capacitance vs. Reverse Voltage



## PACKAGE DIMENSIONS FOR VBP104S in millimeters



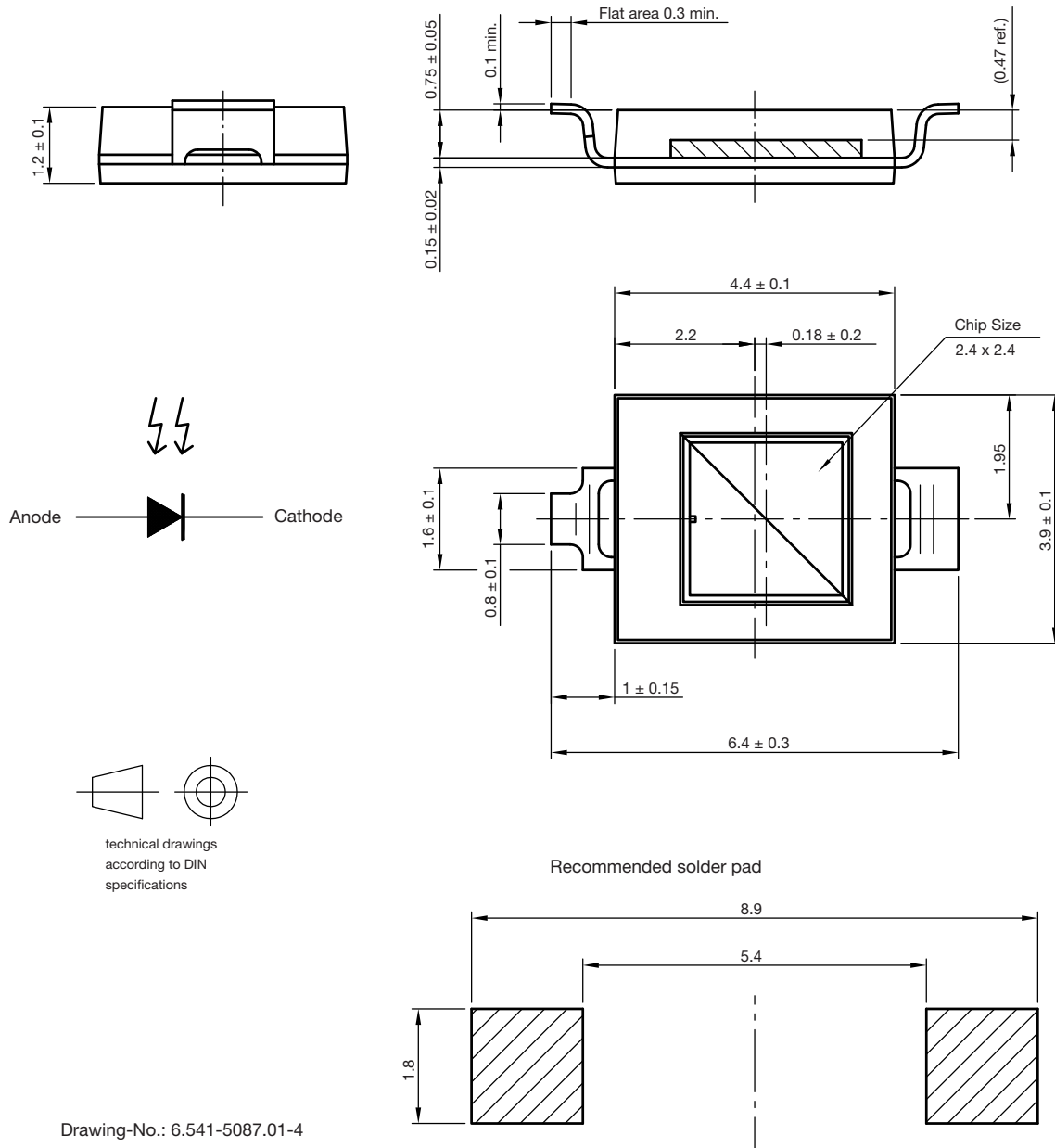
technical drawings according to DIN specifications



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



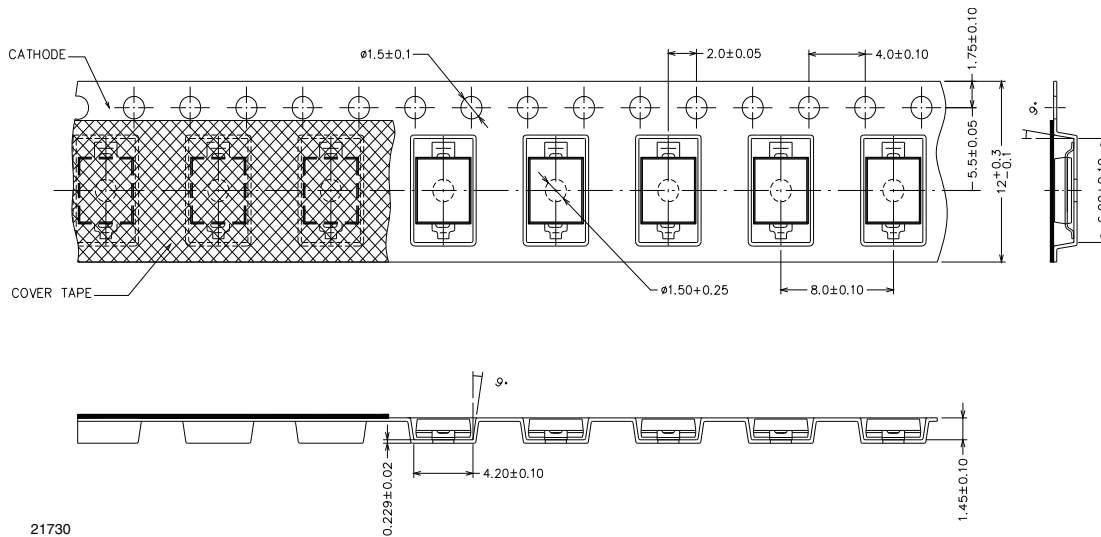
## PACKAGE DIMENSIONS FOR VBP104SR in millimeters



Drawing-No.: 6.541-5087.01-4  
 Issue: 1; 15.04.10  
 22106

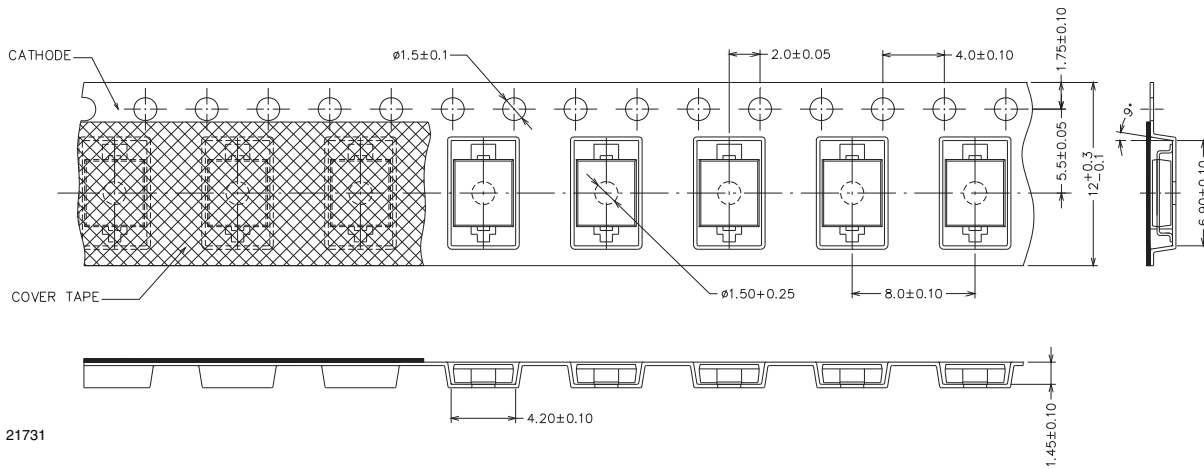


## TAPING DIMENSIONS FOR VBP104S in millimeters



21730

## TAPING DIMENSIONS FOR VBP104SR in millimeters



21731

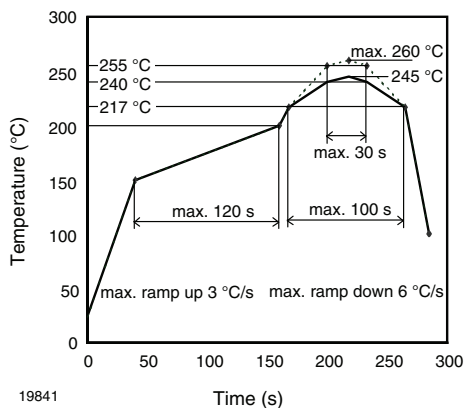


## REEL DIMENSIONS FOR VBP104S AND VBP104SR in millimeters



21732

## SOLDER PROFILE



19841

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