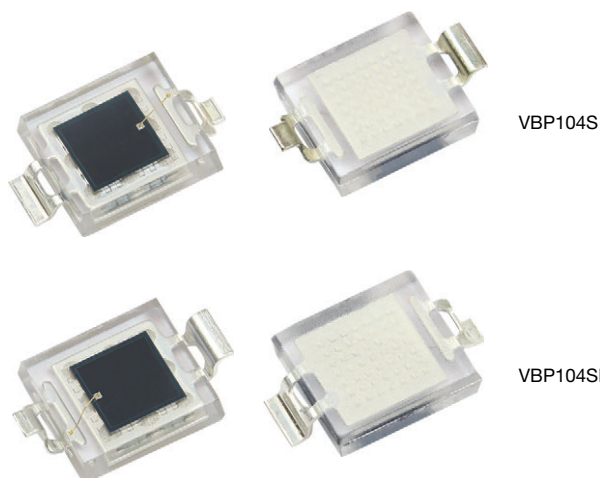


Silicon PIN Photodiode



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: $\phi = \pm 65^\circ$
- 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



RoHS
COMPLIANT
HALOGEN
FREE

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 ($T_{amb} = 25^\circ\text{C}$, 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	According to reflow solder profile Fig. 8	T_{sd}	260	°C
Thermal resistance junction to ambient		R_{thJA}	350	K/W



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

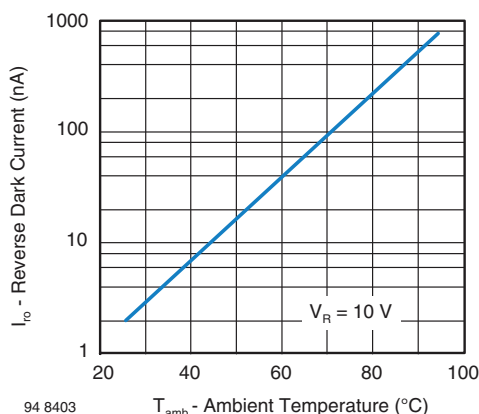


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

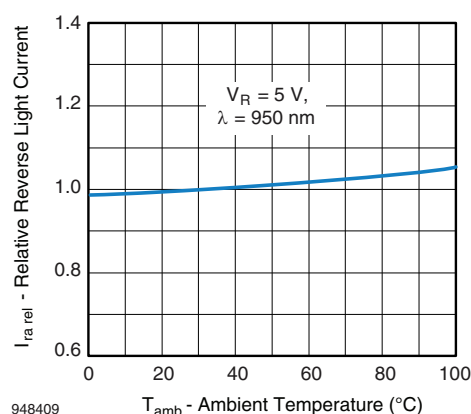


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

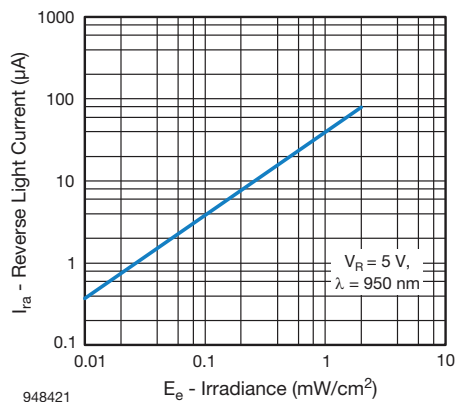


Fig. 3 - Reverse Light Current vs. Irradiance

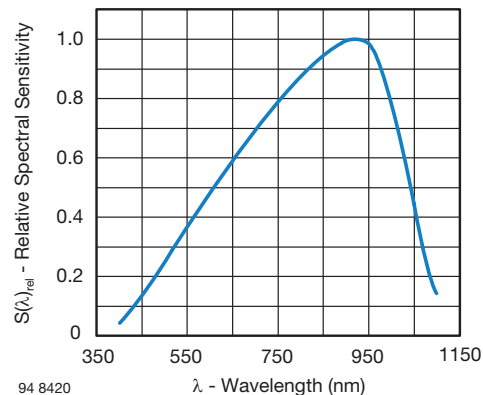


Fig. 6 - Relative Spectral Sensitivity vs. Wavelength

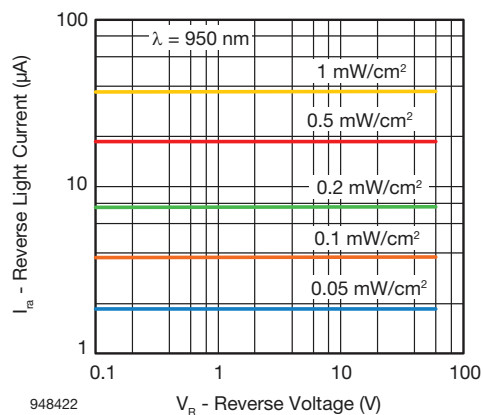


Fig. 4 - Reverse Light Current vs. Reverse Voltage

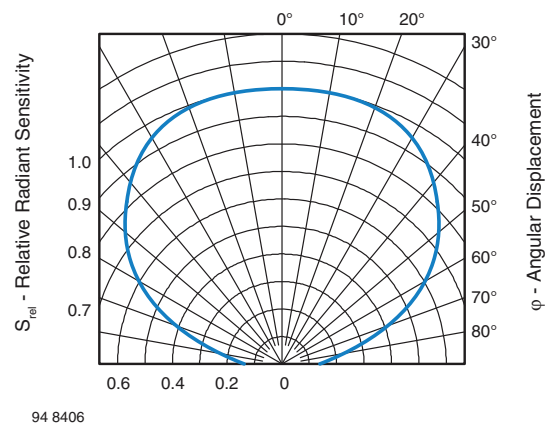


Fig. 7 - Relative Radiant Sensitivity vs. Angular Displacement

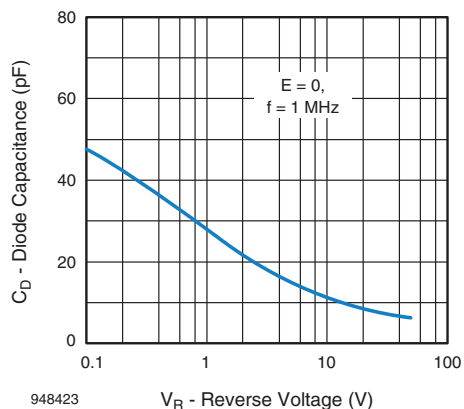
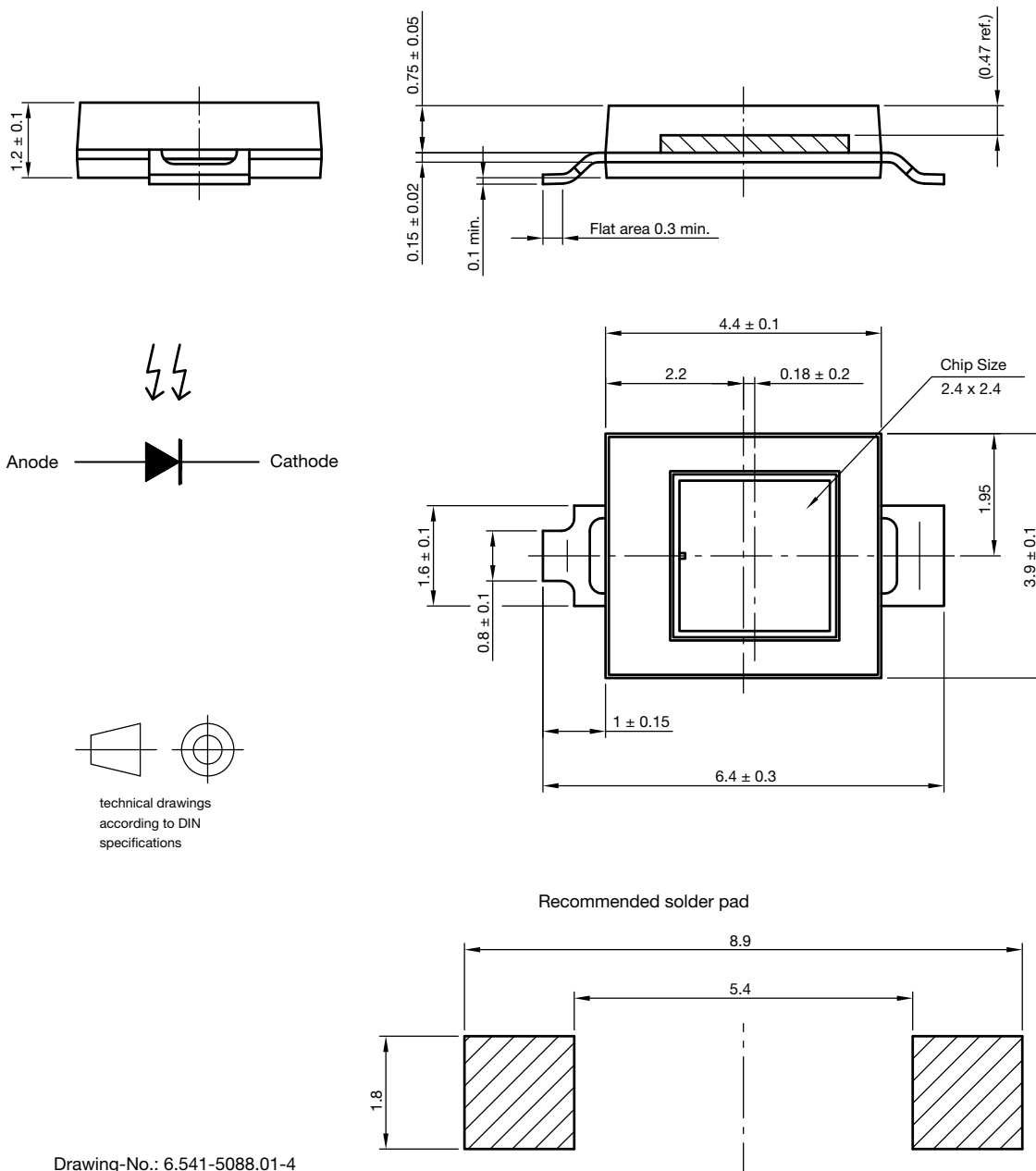


Fig. 5 - Diode Capacitance vs. Reverse Voltage



PACKAGE DIMENSIONS FOR VBP104S in millimeters



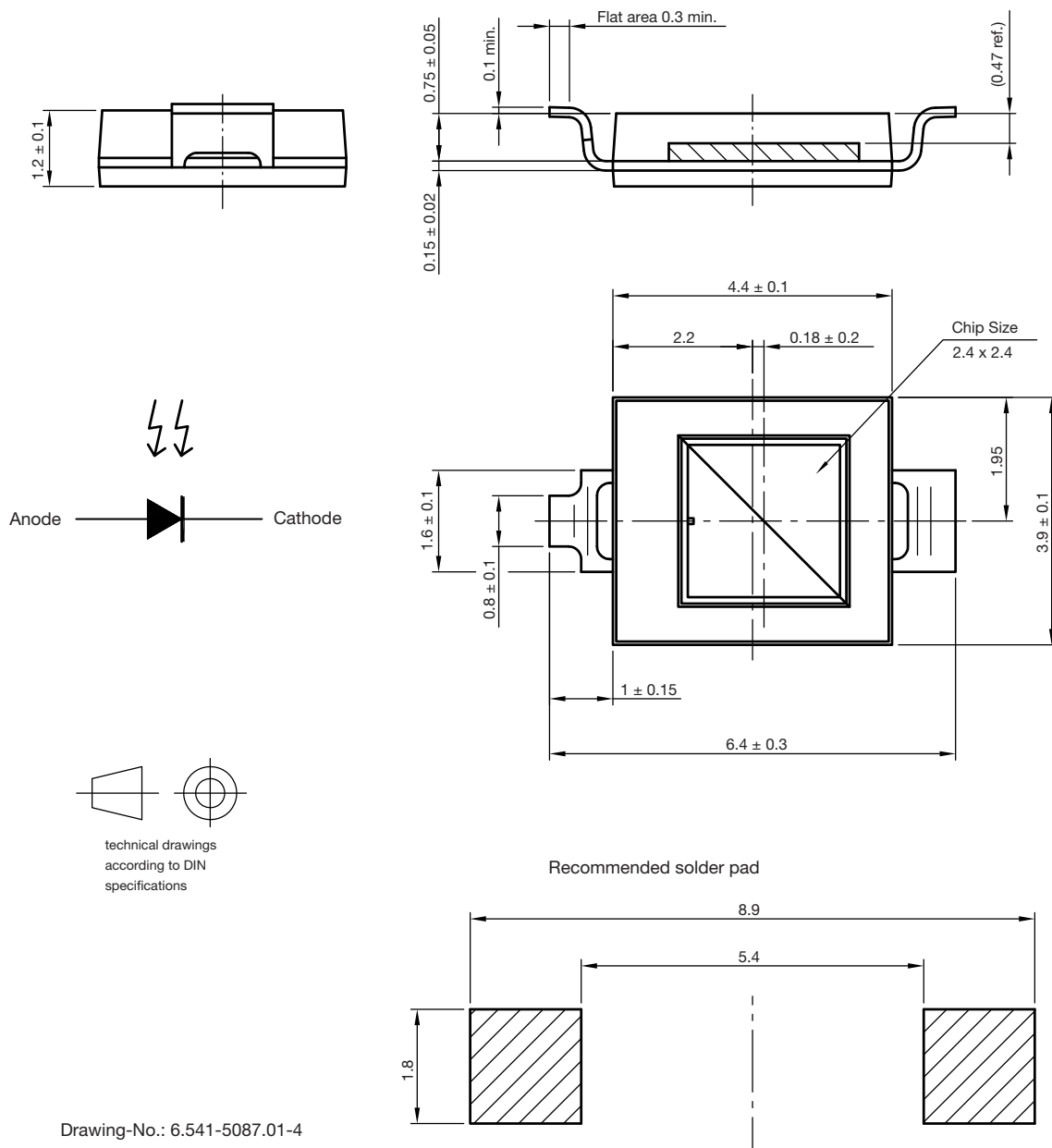
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Issue: 1; 15.04.10

22107



PACKAGE DIMENSIONS FOR VBP104SR in millimeters



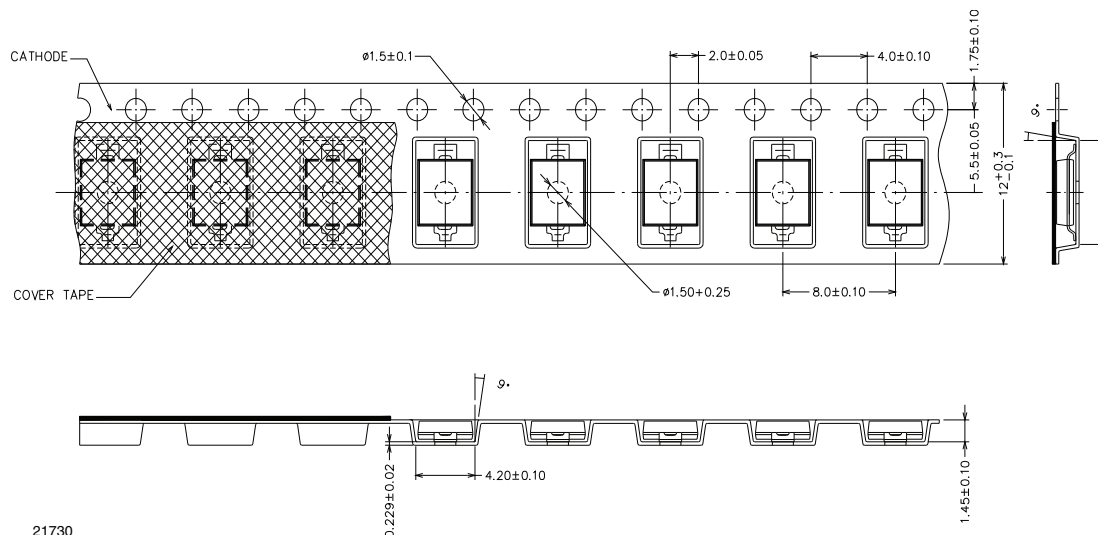
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Issue: 1; 15.04.10

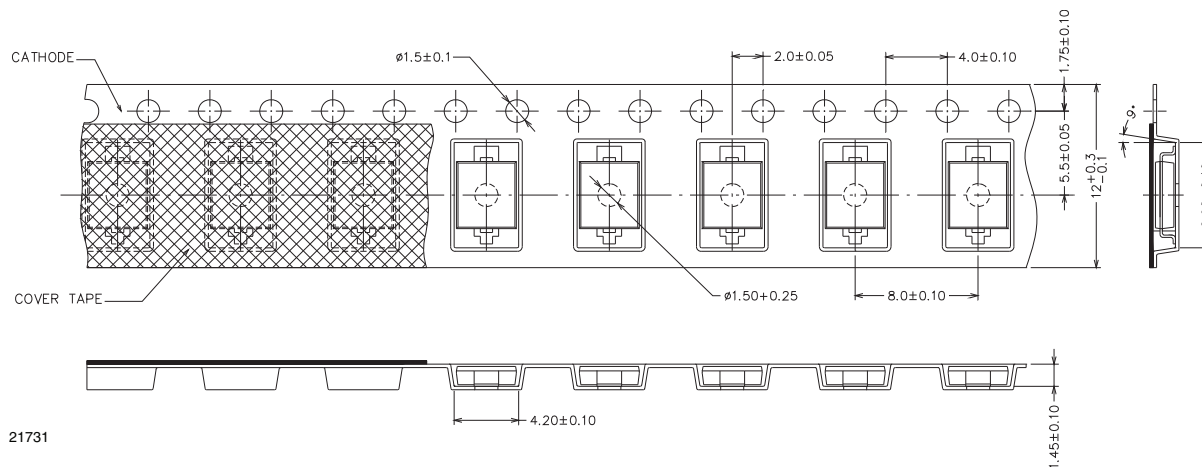
22106

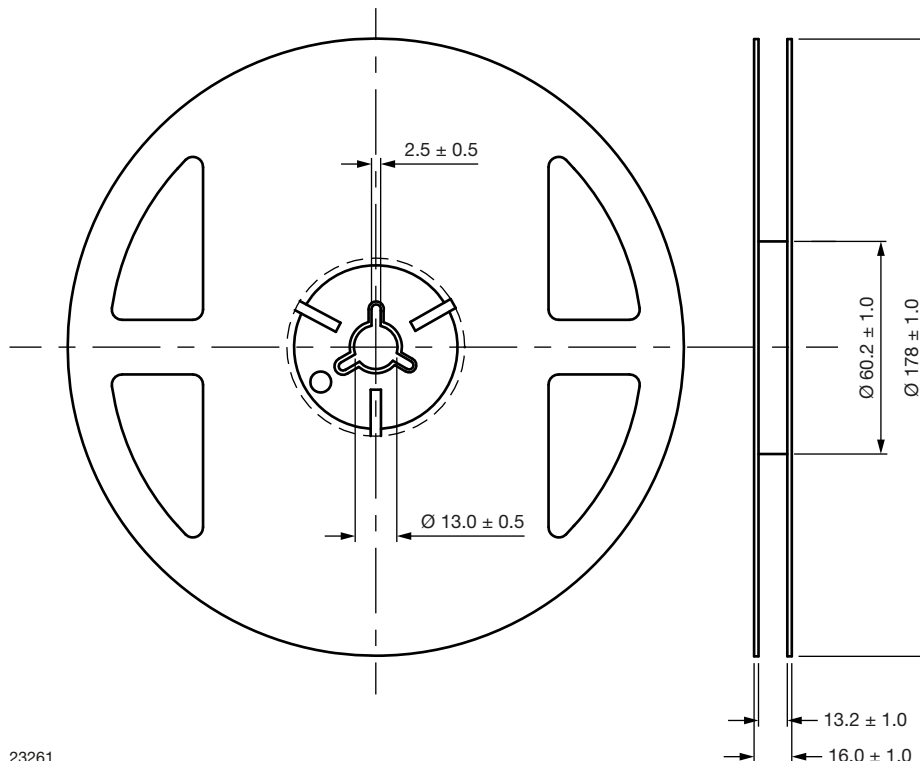


TAPING DIMENSIONS FOR VBP104S in millimeters

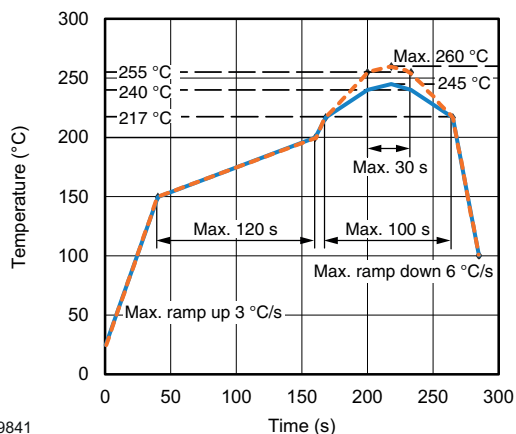


TAPING DIMENSIONS FOR VBP104SR in millimeters



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