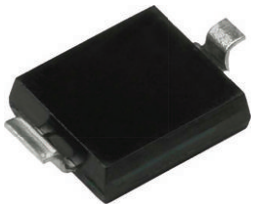
Silicon PIN Photodiode

VBP104FAS



VBP104FASR

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): 4.4
- High radiant sensitivity
- Daylight blocking filter matched with 870 nm to 950 nm emitters
- Fast response times
- Angle of half sensitivity: φ = ± 65°
- Floor life: 168 h, MSL 3, acc. J-STD-020
- Lead (Pb)-free reflow soldering
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e3

RoHS COMPLIANT

HALOGEN FREE

DESCRIPTION

VBP104FAS and VBP104FASR are high speed and high sensitive PIN photodiodes. It is a surface mount device (SMD) including the chip with a 4.4 mm^2 sensitive area and a daylight blocking filter matched with IR emitters operating at wavelength 870 nm or 950 nm.

APPLICATIONS

- High speed detector for infrared radiation
- Infrared remote control and free air data transmission systems, e.g. in combination with TSFFxxxx series IR emitters

PRODUCT SUMMARY			
COMPONENT	I_{ra} (µA)	φ (deg)	$\lambda_{0.5}$ (nm)
VBP104FAS	35	± 65	780 to 1050
VBP104FASR	35	± 65	780 to 1050

Note

- Test conditions see table “Basic Characteristics”

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
VBP104FAS	Tape and reel	MOQ: 1000 pcs, 1000 pcs/reel	Gullwing
VBP104FASR	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	Acc. reflow sloder profile fig. 8	T_{sd}	260	°C
Thermal resistance junction/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		48		pF
	V_R = 3 V, f = 1 MHz, E = 0	C_D		17	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		32		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}	25	35		µA
Angle of half sensitivity		φ		± 65		deg
Wavelength of peak sensitivity		λ_p		950		nm
Range of spectral bandwidth		$\lambda_{0.5}$		780 to 1050		nm
Noise equivalent power	V_R = 10 V, λ = 950 nm	NEP		4×10^{-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)

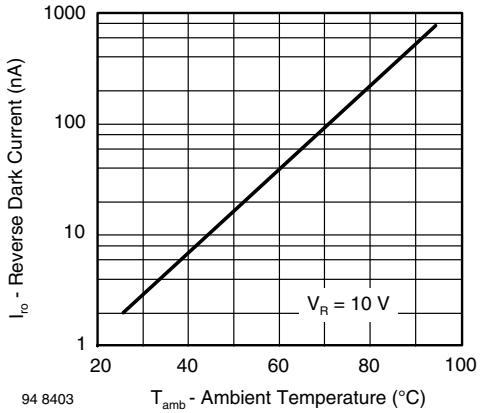


Fig. 1 - Reverse Dark Current vs. Ambient Temperature

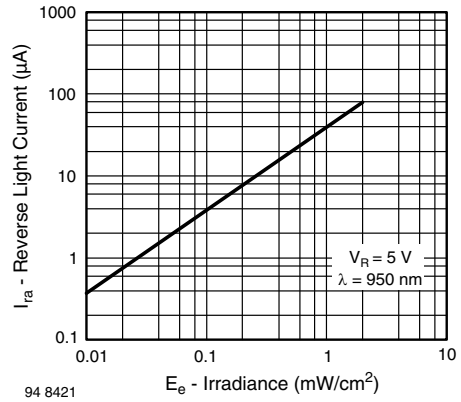


Fig. 3 - Reverse Light Current vs. Irradiance

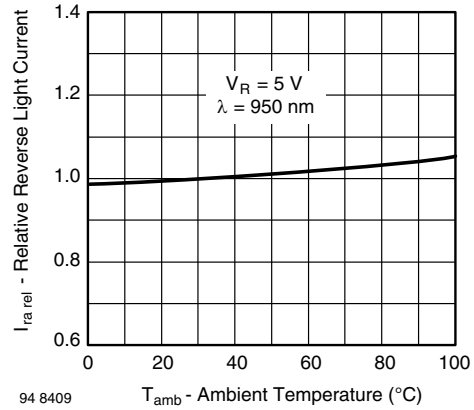


Fig. 2 - Relative Reverse Light Current vs. Ambient Temperature

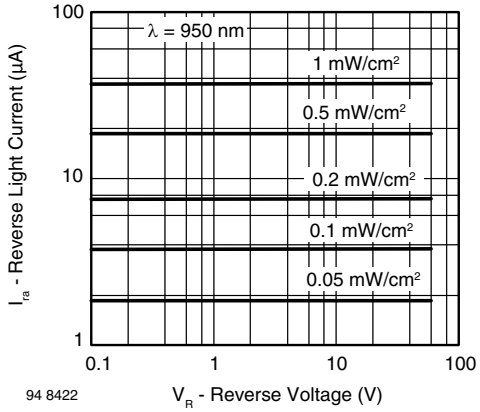


Fig. 4 - Reverse Light Current vs. Reverse Voltage

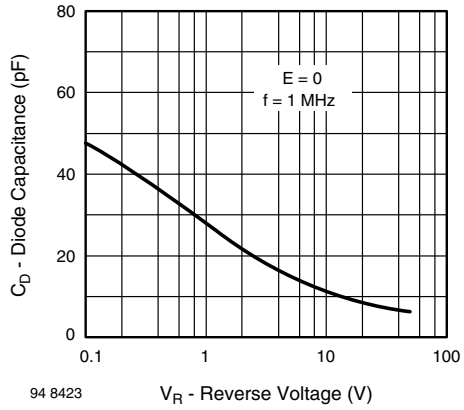


Fig. 5 - Diode Capacitance vs. Reverse Voltage

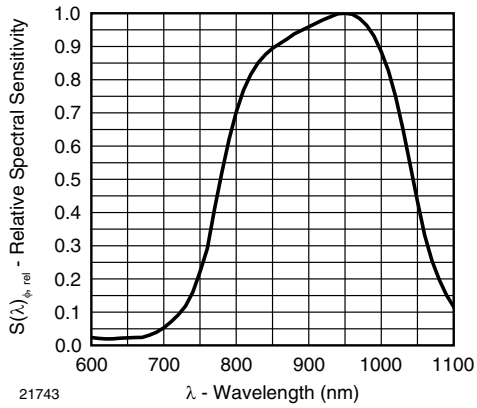


Fig. 6 - Relative Spectral Sensitivity vs. Wavelength

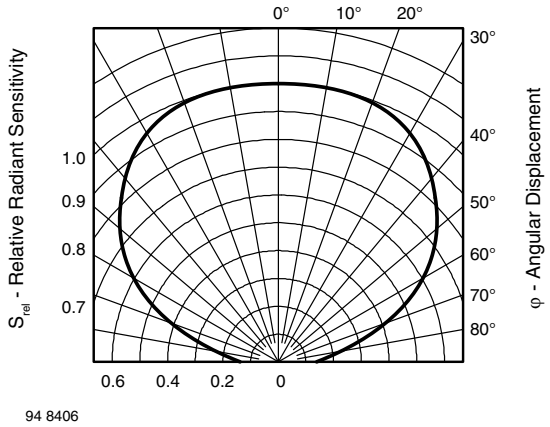
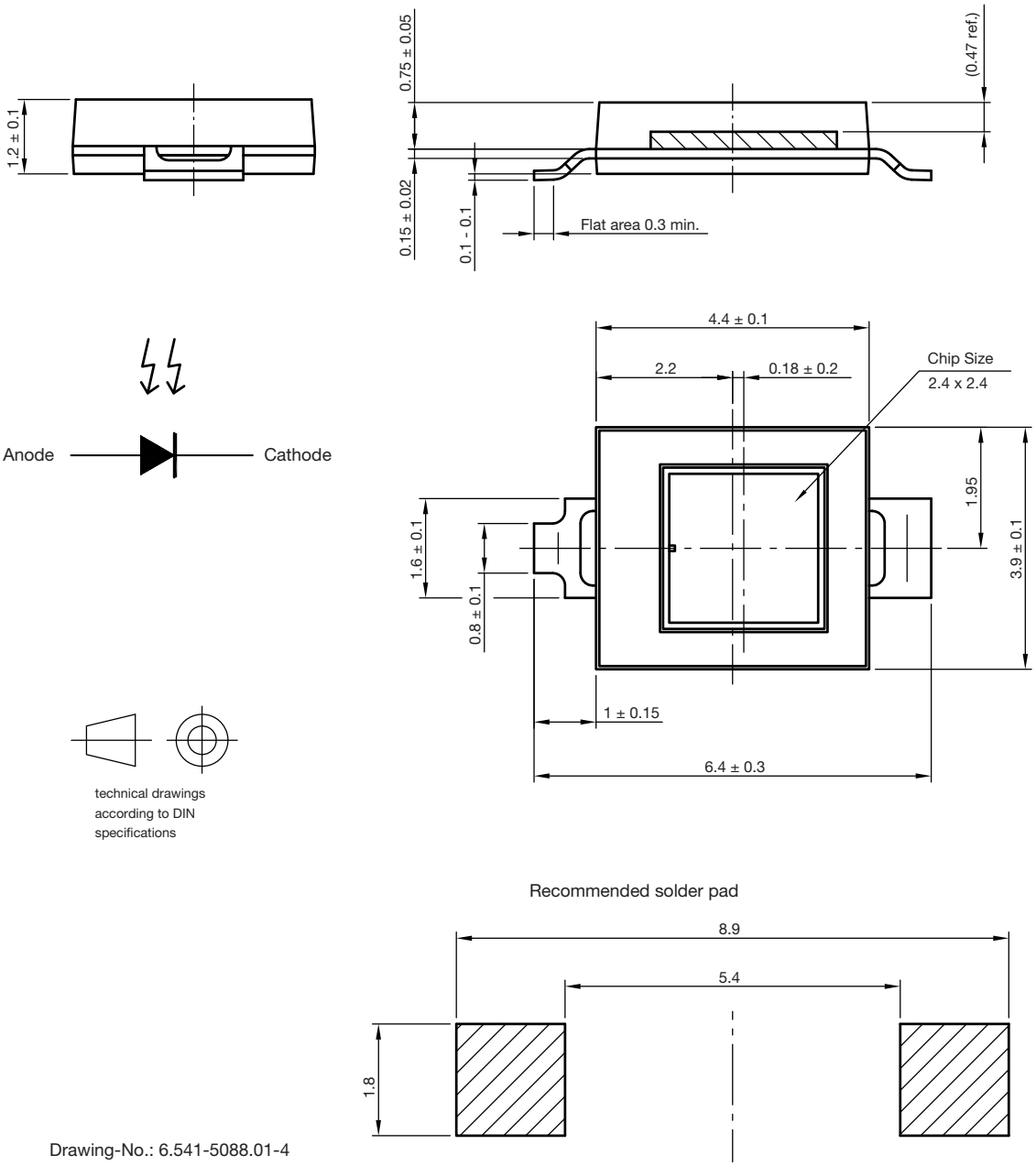


Fig. 7 - Relative Radiant Sensitivity vs. Angular Displacement

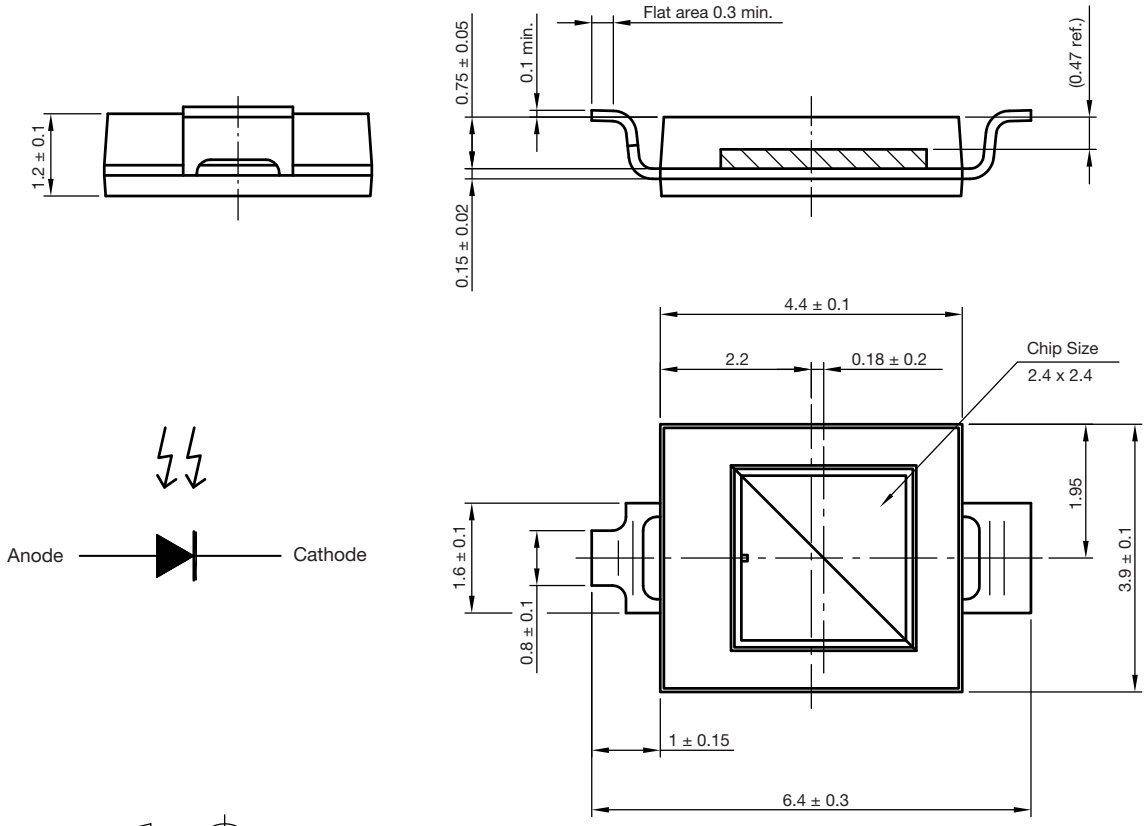
PACKAGE DIMENSIONS FOR VBP104FAS in millimeters



Recommended solder pad

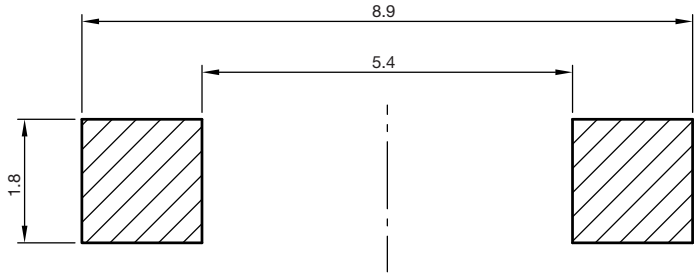
Drawing-No.: 6.541-5088.01-4
Issue: 1; 15.04.10
22107

PACKAGE DIMENSIONS FOR VBP104FASR in millimeters



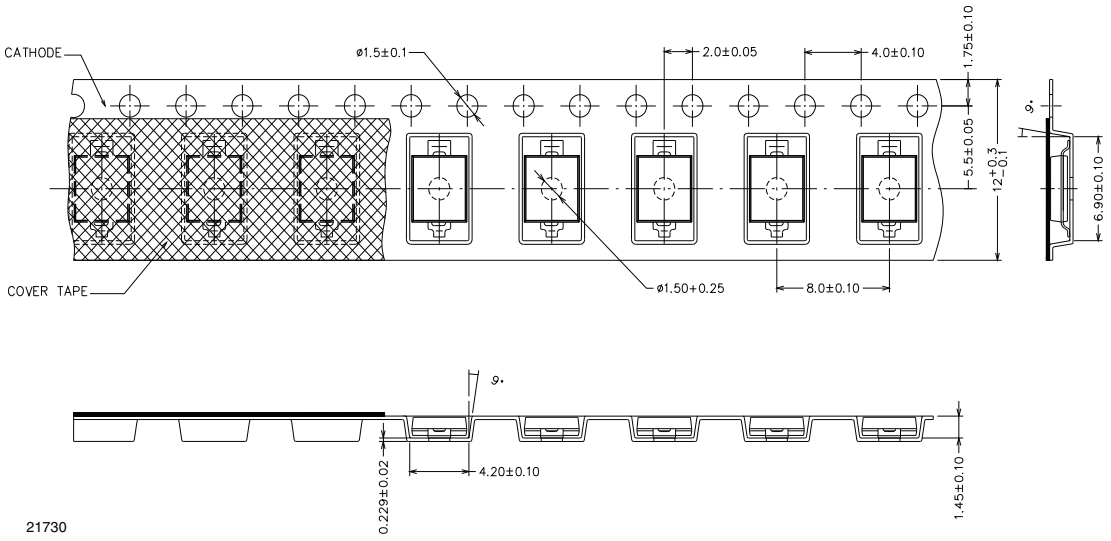
technical drawings
according to DIN
specifications

Recommended solder pad

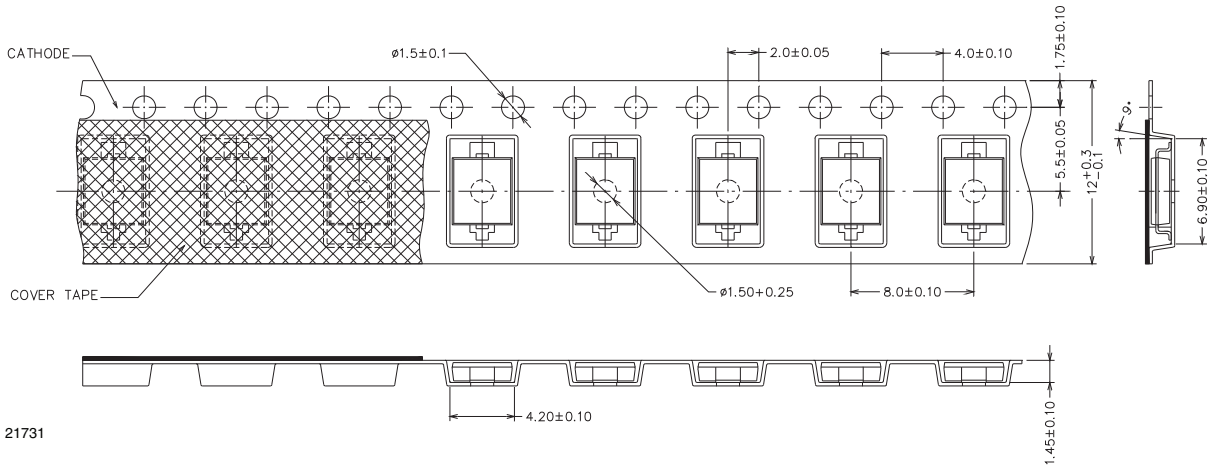


Drawing-No.: 6.541-5087.01-4
Issue: 1; 15.04.10
22106

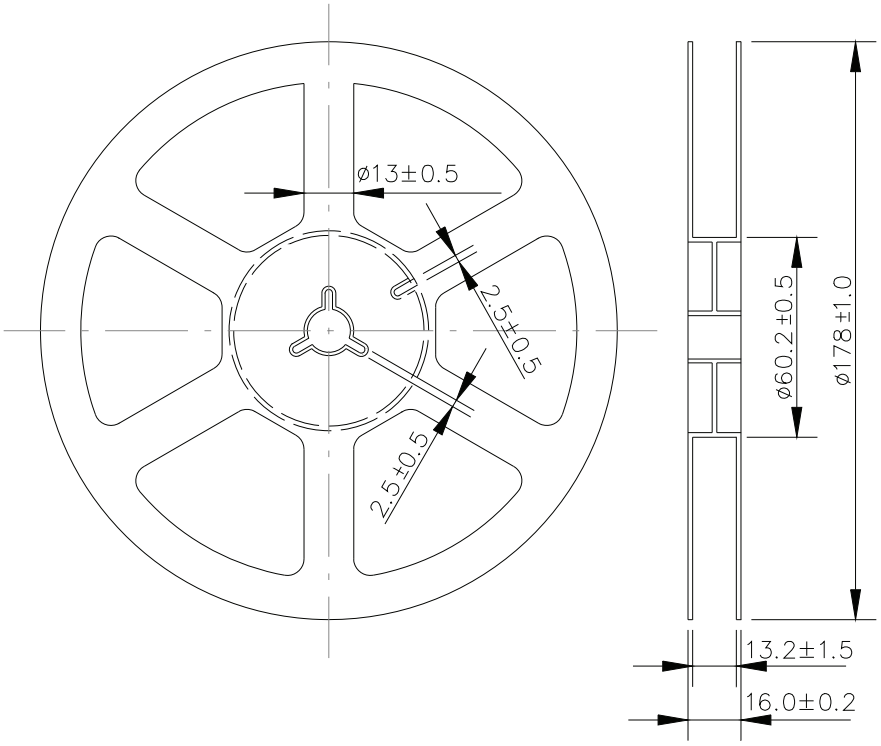
TAPING DIMENSIONS FOR VBP104FAS in millimeters



TAPING DIMENSIONS FOR VBP104FASR in millimeters



REEL DIMENSIONS FOR VBP104FAS AND VBP104FASR in millimeters



SOLDER PROFILE

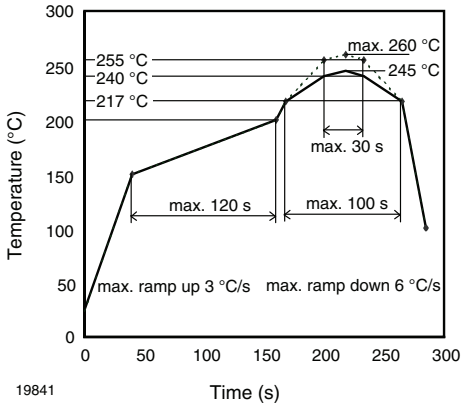


Fig. 8 - Lead (Pb)-free Reflow Solder Profile acc. J-STD-020

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 °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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