

# Ultra Miniature 1.6 x 1.2mm 32.768 kHz Crystal Oscillator



ASAKMP



ESD Sensitive

1.6 x 1.2 x 0.6mm  
RoHS/RoHS II Compliant  
MSL - N/A

## FEATURES

- 32.768 kHz crystal oscillator
- Excellent  $\pm 10$  ppm stability over temperature
- Excellent  $\pm 27$  ppm all inclusive stability
- Compact form factor 1.6 x 1.2 mm
- Output enable/disable function
- Available over industrial operating temperature range (-40°C to +85°C)
- Supply voltage options 3.3V, 2.5V, 1.8V

## APPLICATIONS

- Enhanced accuracy timekeeping
- RTC reference clock
- Medical devices
- Utility metering
- Wearables
- IoT
- Industrial timing
- Industrial wearables
- ULP input device

## Electrical Specifications

Parameters	Minimum	Typical	Maximum	Units	Notes
Frequency Range	32.768			kHz	
Operating Temperature Range (OTR)	-40		+85	°C	See options
Storage Temperature	-55		+125	°C	
Frequency Accuracy $\Delta f/f_0$ vs Tolerance (@+25 $\pm 3^\circ\text{C}$ )	-7		+7	ppm	See options
vs Post Reflow (@+25 $\pm 3^\circ\text{C}$ )	-2		+2		
vs Temperature (ref. to +25 $\pm 3^\circ\text{C}$ )	-15		+15		See options
vs Aging (Over 10 Years @+25 $\pm 3^\circ\text{C}$ )	-7		+7		
All Inclusive Stability Over 10-Year Product Life (-20°C to +70°C)	-27		+27		See options
Power Supply Voltage ( $V_{dd}$ )	2.97	3.3	3.63	V	Option 1
	2.25	2.5	2.75		Option 2
	1.62	1.8	1.98		Option 3
		1.60 ~ 3.63			Option 4
Supply Current ( $I_{DD}$ )		< 27.0	30.0	$\mu\text{A}$	$V_{dd} = 3.0\text{V}$ , No Load
Stand Current Consumption ( $I_{STBY}$ )			3.0	$\mu\text{A}$	
Output Load			15.0	pF	CMOS
Output Logic Levels	$V_{OH}$	$0.9 \cdot V_{dd}$		V	$I_{OH} = -1 \text{ mA}$
	$V_{OL}$		$0.1 \cdot V_{dd}$		$I_{OL} = +1 \text{ mA}$
Standby Logic Levels	$V_{IH}$	$0.7 \cdot V_{dd}$			Oscillation
	$V_{IL}$		$0.3 \cdot V_{dd}$		Hi Z
Symmetry @1/2 $V_{dd}$	45.0	50.0	55.0	%	$V_{TH} = 0.5 V_{dd}$
Start-up Time		< 2.25	7.0	ms	$V_{dd} = 3.3\text{V}$
		< 3.00	10.0		$V_{dd} = 1.8\text{V}$
Rise/Fall Time ( $T_r/T_f$ )			200.0	ns	10% $V_{dd}$ to 90% $V_{dd}$



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REVISED: 08.16.2018

ABRACON IS  
ISO9001-2015  
CERTIFIED

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## Options and Part Identification

ASAKMP [ ] [ ] - 32.768KHz [ ]

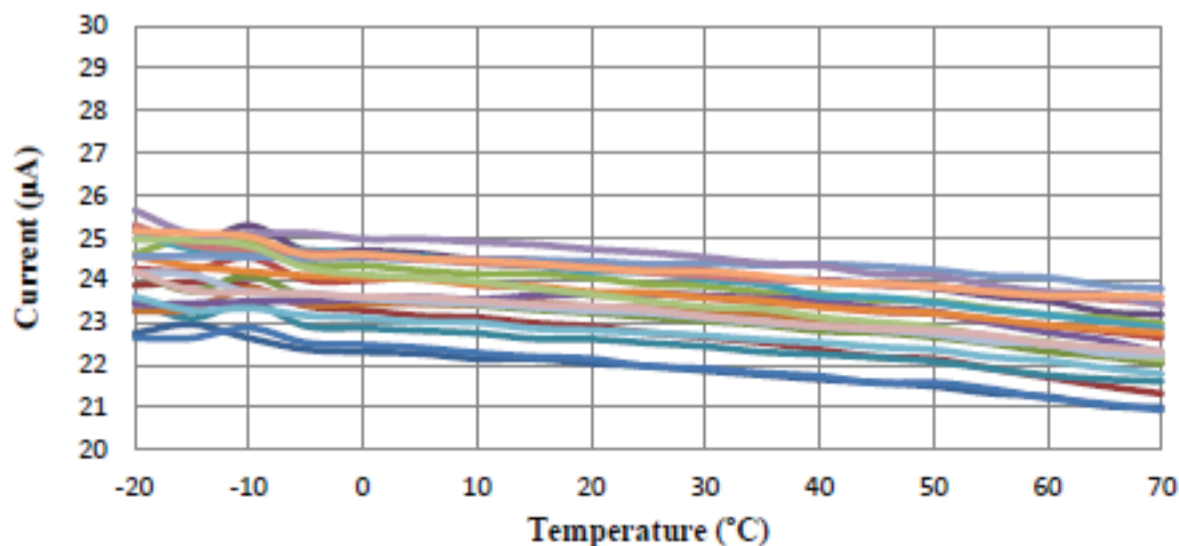
Supply Voltage	Option*	Set Tolerance	Operating Temp.	Stability Over Temperature	All Inclusive Stability Over 10-Year Product Life**	Packaging
A: 3.3V	1	±7 ppm	-20°C to +70°C	±10 ppm	±27 ppm Maximum	Blank: Bulk T3: 3K pcs/reel
B: 2.5V	2	±10 ppm	-20°C to +70°C	±10 ppm	±30 ppm Maximum	
C: 1.8V	3	±7 ppm	-20°C to +70°C	±15 ppm	±32 ppm Maximum	
D: 1.60 ~ 3.63V	4	±10 ppm	-20°C to +70°C	±15 ppm	±35 ppm Maximum	
	5	±7 ppm	-40°C to +85°C	±15 ppm	±32 ppm Maximum	
	6	±10 ppm	-40°C to +85°C	±15 ppm	±35 ppm Maximum	
	7	±7 ppm	-40°C to +85°C	±20 ppm	±37 ppm Maximum	
	8	±10 ppm	-40°C to +85°C	±20 ppm	±40 ppm Maximum	

\* For custom tolerance, operating temperature and stability, please contact Abracon.

\*\* All-Inclusive Stability: Set-tolerance, shift through reflow, stability over temperature and aging over 10-year product life.

## Typical Current Consumption

Current Consumption Over Temperature @  $V_{dd} = 3.3V, 25 \pm 3^\circ C$



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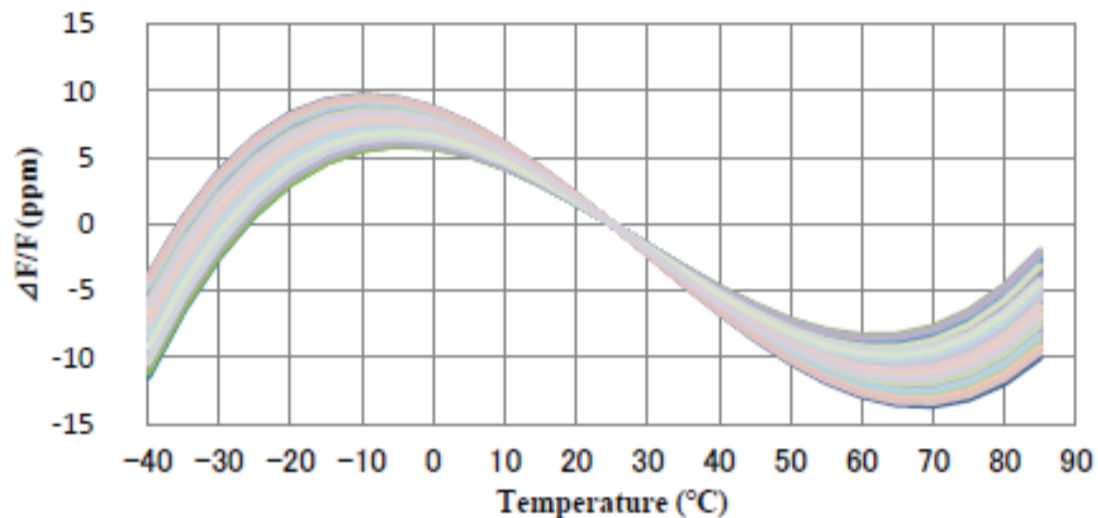
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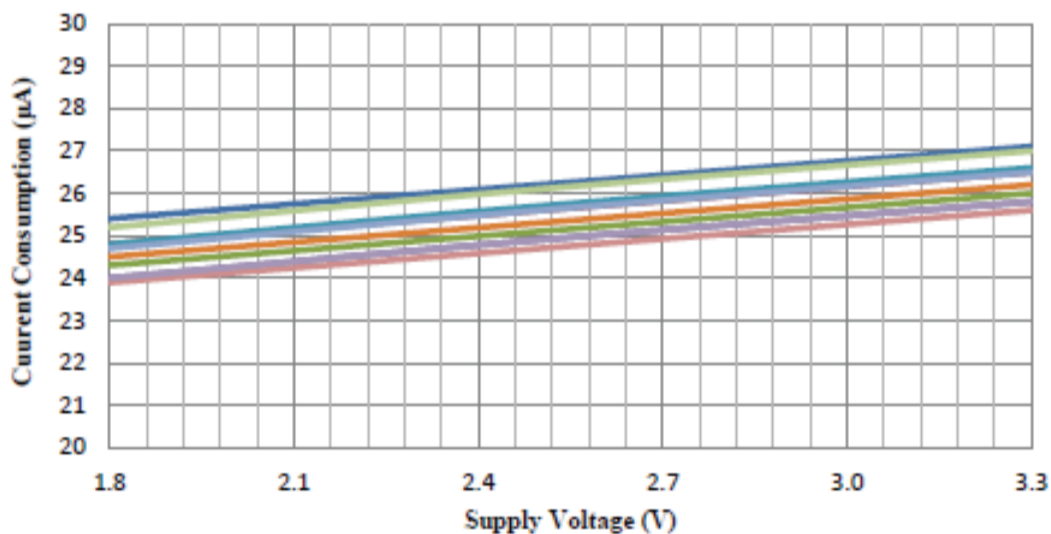
## Typical Frequency Stability Over Temperature:

Frequency Stability Over Operating Temperature  
Normalized to measured frequency @ 25°C

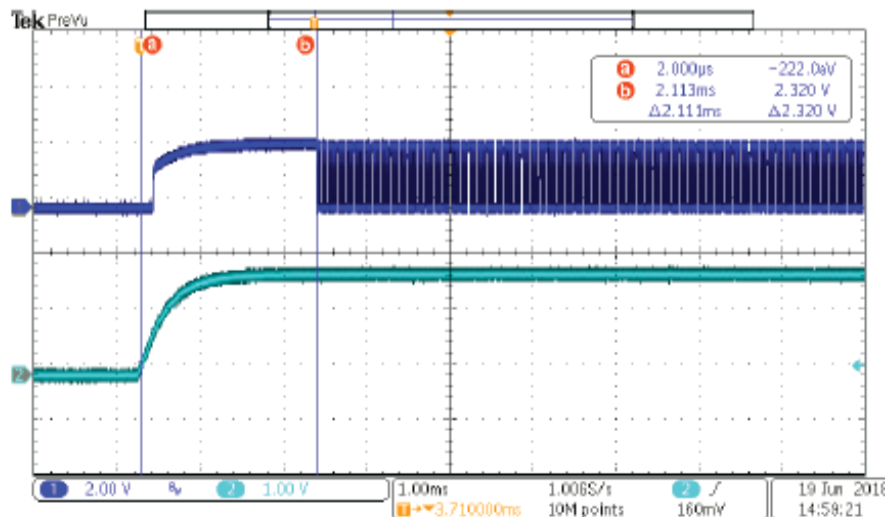


## Typical Current Consumption (I<sub>dd</sub>)

Current Consumption vs. Supply Voltage @ 25 ±3°C



## Typical Start-Up Time @ V<sub>dd</sub> = 1.8V, 25 ±3°C



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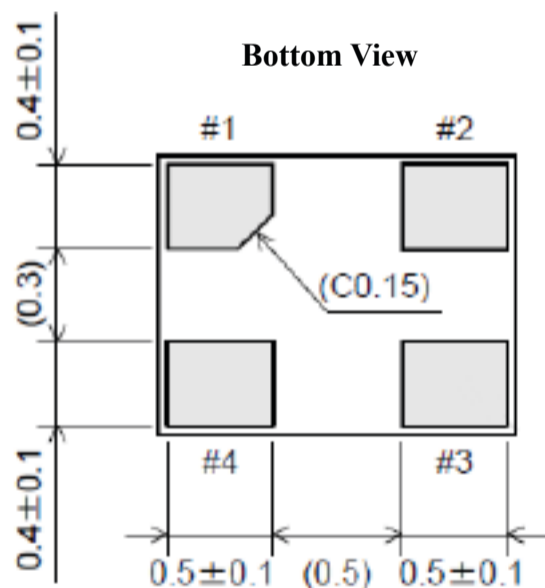
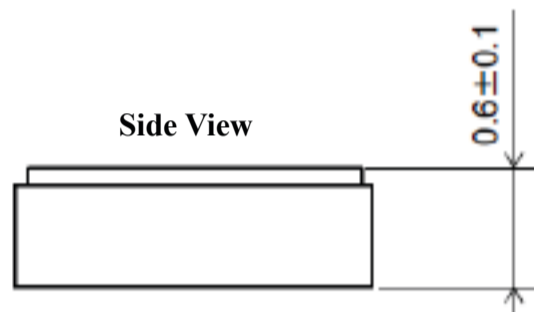
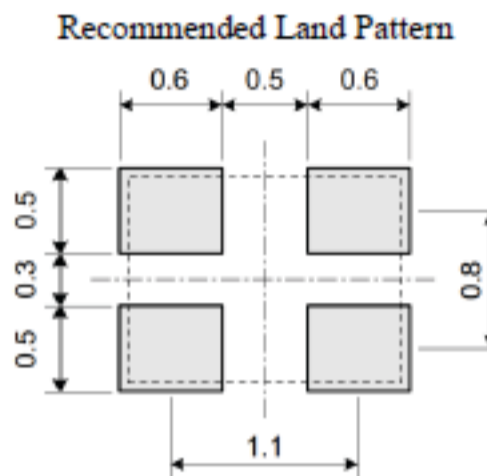
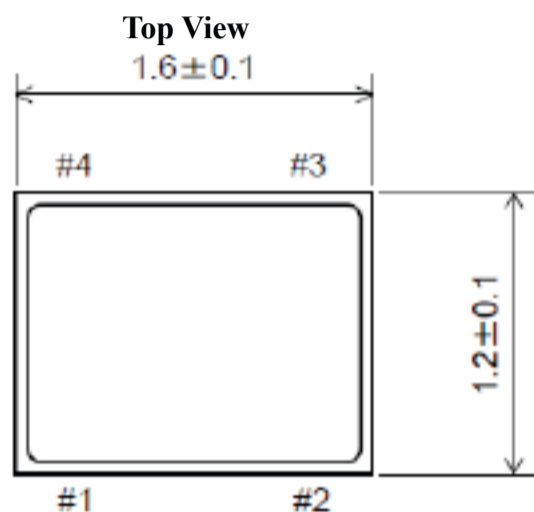


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## Mechanical Dimensions



Dimensions: mm

PIN #	Function
1	Enable/Disable
2	GND
3	Output
4	V <sub>dd</sub>

Note: Recommend using a 0.01µF bypass capacitor between PIN 2 and 4.



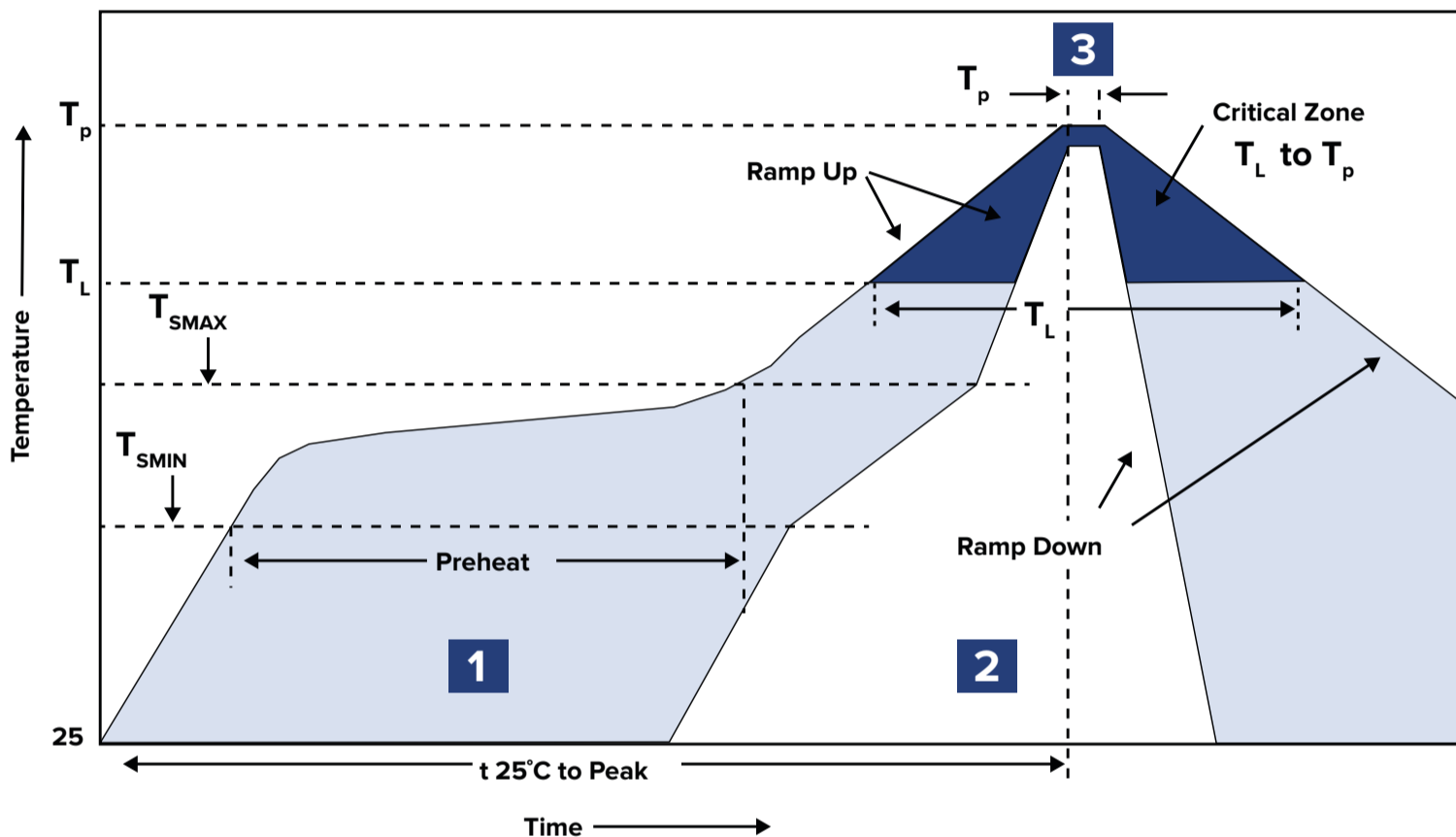
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## Reflow Profile



Zone	Description	Temperature	Time
1	Preheat / Soak	$T_{SMIN}$ to $T_{SMAX}$ 150°C to 170°C	80 to 100 sec.
2	Reflow	$T_L$ 220°C	50 to 70 sec.
3	Peak heat	$T_P$ 260°C±5°C	5 sec. Maximum

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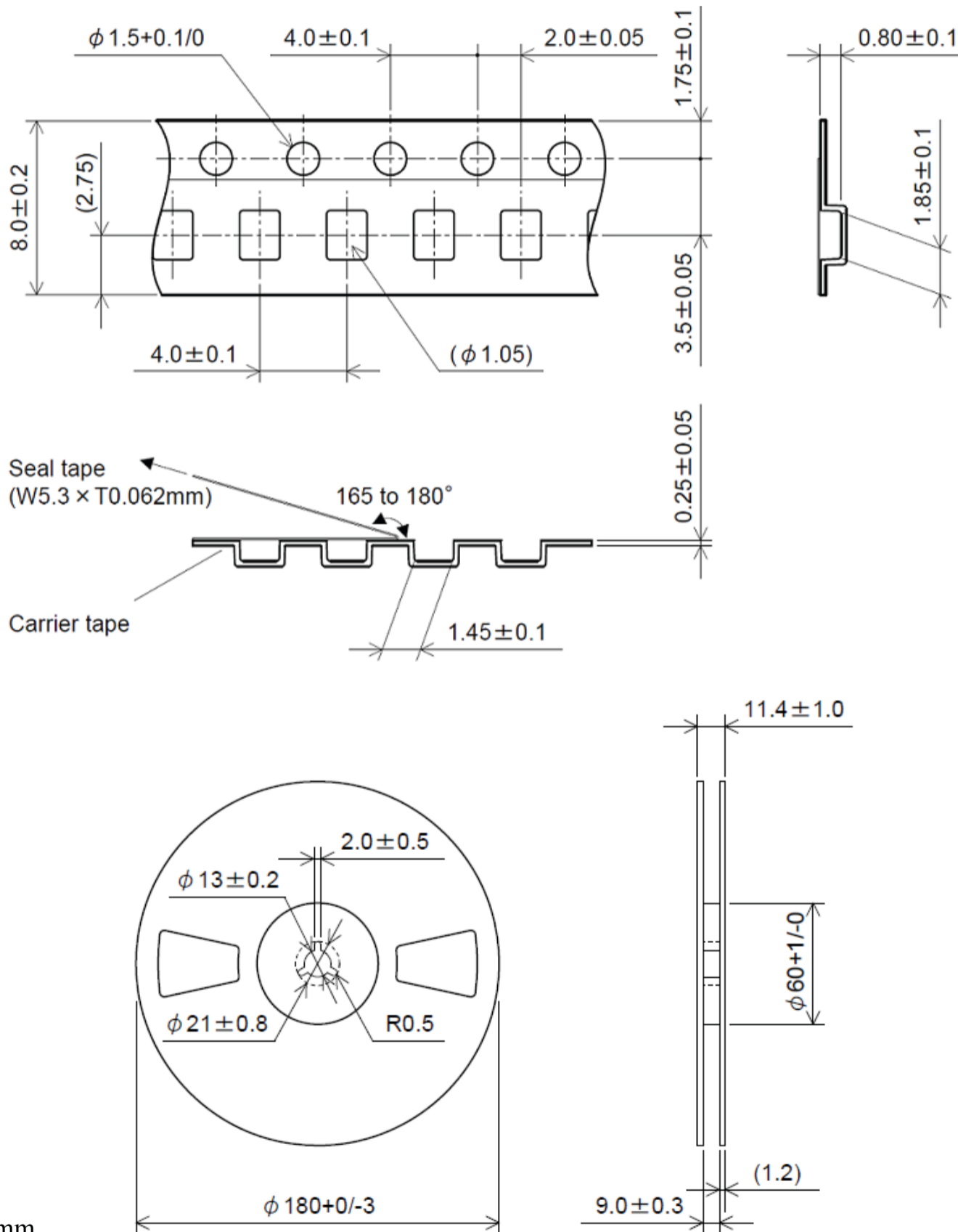
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## Packaging

T3= Tape and reel (3,000pcs/reel)



Dimensions: mm



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