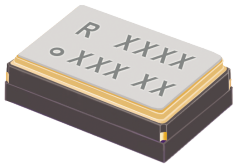
# SMD TCXO/VCTCXO

ASTXR-12

ESD Sensitive

RoHS / RoHS II Compliant




2.5 x 2.0 x 0.9mm

**Moisture Sensitivity Level (MSL) – 1**

## OVERVIEW:

Abracon's ASTXR series of Temperature Compensated Crystal Oscillators are based on an Advanced-Analog Temperature Compensation Integrated Circuit, incorporated with Rakon's Precision TCXO processing techniques.
This composite enables exceptional frequency stability over temperature (≤±0.50 ppm over -40°C to +85°C). Additionally, high-resolution screening algorithms are employed during the production verification process, ensuring that 100% of these devices are fully compliant to the stringent frequency stability specifications.
For Power Sensitive applications, the ASTXR series provides the ability to preserve consumed power by placing the device in shut-down mode; when not used. This series of devices are ideally suited for GPS and other mobile applications where performance, size, cost and power management are of critical importance

## FEATURES:

- Excellent phase noise performance
- Low power consumption
- Miniature size: 2.5 x 2.0 x 0.9mm
- RoHS compliant
- Temperature stability choices are ±0.5ppm to ±2.5ppm depending on operating temperature range

## APPLICATIONS:

- GPS
- Smartphone
- PND
- Communications
- Consumer electronics
- Wi-Fi
- WiMAX/W-LAN

## STANDARD SPECIFICATIONS:

| Parameters | Minimum | Typical | Maximum | Units | Notes |
|---|---|---|---|---|---|
| Frequency Range | 10 | | 52 | MHz | |
| Supply Voltage (Vdd) | 1.8 | | 3.3 | V | |
| Current Consumption (@Vdd max) | | | 2 | mA | See Note 2 |
| Operable Temperature Range | -40 | | +85 | ° C | |
| Storage Temperature Range | -40 | | +85 | ° C | |
| Initial Frequency Tolerance @+25℃±2℃ at time of shipment | | | ±1 | ppm | |
| Reflow Drift | | | ±1 | ppm | After 2 consecutive reflows and 1hr recovery@+25℃ |
| Frequency Stability over Operating Temperature Range | ±0.5 | | ±2.5 | ppm | Ref. to $(F_{MAX}+F_{MIN})/2$. Vc is set to midpoint of control voltage range See Note 1 |
| Frequency Slope (tested to a minimum of 1 freq. reading every 2℃ over operating temperature range) | 0.1 | | 1 | ppm/℃ | See Note 1 |
| Static Temperature Hysteresis (Frequency change after reciprocal temperature ramped over the operating range. Frequency measured before and after at +25℃) | | | 0.6 | ppm | |
| Sensitivity vs. Supply Voltage Variations (Vdd±5% @ +25℃) | | | ±0.1 | ppm | |
| Sensitivity vs. Load Variations (±10% load change @ +25℃) | | | ±0.2 | ppm | See Note 2 |
| Long Term Stability (frequency drift over 1 year @ +25℃) | | | ±1 | ppm | |
| Output Type | DC Coupled Clipped Sine-wave | | | | See Note 3 |
| Output Voltage Level (@ minimum Vdd) | 0.8 | | | V | See Note 2 |
| Output Load Resistance | 9 | 10 | 11 | kΩ | |
| Output Load Capacitance | 9 | 10 | 11 | pF | |
| Startup Time (amplitude) | | | 0.5 | ms | Within 90% of specified output level |
| Startup Time (frequency) | | | 2 | ms | Within ±0.5ppm of steady state frequency |

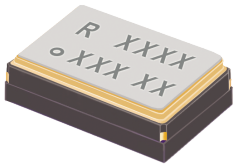


30332 Esperanza, Rancho Santa Margarita, California 92688
tel 949-546-8000 | fax 949-546-8001 | www.abracon.com

# SMD TCXO/VCTCXO

## ASTXR-12

RoHS / RoHS II Compliant




2.5 x 2.0 x 0.9mm

| Parameters | | Minimum | Typical | Maximum | Units | Notes |
|---|---|---|---|---|---|---|
| Enable/Disable Function | | | | | | |
| Input Voltage High (VIH) | | 80%*Vdd | | Vdd | V | Normal operating Mode |
| Input Voltage Low (VIL) | | GND | | 20%*Vdd | V | Power Down Mode |
| Stand-by Current | | | <0.01 | 1 | µA | |
| Enable Time (amplitude) | | | | 0.5 | ms | Within 90% of specified output level |
| Enable Time (frequency) | | | | 2 | ms | Within ±0.5ppm of steady state frequency |
| Control Voltage Range (Vc) | Vdd ≤ 2.3V | 0.3 | | 1.5 | V | The nominal Vc value is midway between the min and max. Vc should not exceed Vdd+0.2V or GND |
| | Vdd > 2.3V | 0.4 | | 2.4 | V | |
| Frequency Tuning | | ±10 | | | ppm | Freq. shift from min to max of control voltages |
| Control Voltage Input Port Impedance | | | 500 | | kΩ | |
| Phase Noise @ 26MHz Carrier (@+25°C) | | | | | | |
| @ 1 | Hz offset | | -65 | | dBc / Hz | |
| @ 10 | Hz offset | | -93 | | dBc / Hz | |
| @ 100 | Hz offset | | -117 | | dBc / Hz | |
| @ 1,000 | Hz offset | | -137 | | dBc / Hz | |
| @ 10,000 | Hz offset | | -149 | | dBc / Hz | |
| @ 100,000 | Hz offset | | -151 | | dBc / Hz | |

Note:

1. Parts should be shielded from drafts causing unexpected thermal gradients. Temperature changes due to ambient air currents on the oscillator can lead to short term frequency drift
2. Specified for load stated in the Oscillator Output section at +25°C
3. External AC-Coupling capacitor required. ≥ 1nF is recommended
4. Frequency shift ≤1ppm after reliability test conditions (see section 7.0)

## PART IDENTIFICATIONS:

ASTXR - 12 - [ ] MHz - [ ] - [ ]

| Frequency | Configuration Code | Packaging |
|---|---|---|
| See Table below for available frequencies | See Table below for available configurations | Blank = Bulk<br>T = Tape & Reel(3k/reel) |

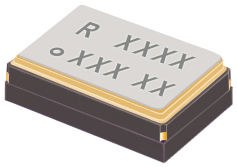


30332 Esperanza, Rancho Santa Margarita, California 92688
tel 949-546-8000 | fax 949-546-8001 | www.abracon.com

# SMD TCXO/VCTCXO

## ASTXR-12

RoHS / RoHS II Compliant



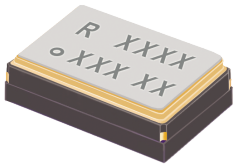

2.5 x 2.0 x 0.9mm

### Table of Available Configurations

| Abracon P/N | Freq. Stability Over Temperature (ppm) | Slope (ppm/°C) | Operating Temperature (°C) | Supply Voltage (V) | Enable/ Disable | Temp. Sensor | Voltage Control |
|---|---|---|---|---|---|---|---|
| ASTXR-12-26.000MHz-508892 | ± 0.5 | ± 0.1 | -30 to +85 | 1.8 V | no | no | no |
| ASTXR-12-26.000MHz-512883 | ± 0.5 | ± 0.1 | -30 to +85 | 1.8 V | no | no | no |
| ASTXR-12-16.369MHz-508303 | ± 0.5 | ± 0.1 | -40 to +85 | 1.8 V | Pin 1 | no | no |
| ASTXR-12-16.369MHz-508314 | ± 0.5 | ± 0.1 | -30 to +85 | 1.8 V | Pin 2 | no | no |
| ASTXR-12-16.369MHz-511743 | ± 0.5 | ± 0.1 | -40 to +85 | 1.8 V | Pin 1 | no | no |
| ASTXR-12-16.369MHz-512543 | ± 0.5 | ± 0.1 | -40 to +85 | 1.8 V | Pin 2 | Pin 5 | no |
| ASTXR-12-19.200MHz-512544 | ± 0.5 | ± 0.1 | -40 to +85 | 1.8 V | Pin 2 | Pin 5 | no |
| ASTXR-12-26.000MHz-508139 | ± 0.5 | ± 0.1 | -40 to +85 | 1.8 V | Pin 1 | no | no |
| ASTXR-12-26.000MHz-508313 | ± 0.5 | ± 0.1 | -40 to +85 | 1.8 V | Pin 2 | no | no |
| ASTXR-12-26.000MHz-509161 | ± 0.5 | ± 0.1 | -40 to +85 | 1.8 V | Pin 2 | Pin 1 | no |
| ASTXR-12-26.000MHz-511741 | ± 0.5 | ± 0.1 | -40 to +85 | 1.8 V | Pin 1 | no | no |



30332 Esperanza, Rancho Santa Margarita, California 92688
tel 949-546-8000 | fax 949-546-8001 | www.abracon.com




2.5 x 2.0 x 0.9mm

## Table of Available Configurations (continued)

| Abracon P/N | Freq. Stability Over Temperature (ppm) | Slope (ppm/°C) | Operating Temperature (°C) | Supply Voltage (V) | Enable/ Disable | Temp. Sensor | Voltage Control |
|---|---|---|---|---|---|---|---|
| ASTXR-12-26.000MHz-512545 | ± 0.5 | ± 0.1 | -40 to +85 | 1.8 V | Pin 2 | Pin 5 | no |
| ASTXR-12-19.200MHz-508072 | ± 0.5 | ± 0.1 | -30 to +85 | 1.8 V | no | no | no |
| ASTXR-12-19.200MHz-508207 | ± 0.5 | ± 0.1 | -30 to +85 | 2.85 V | no | no | no |
| ASTXR-12-19.200MHz-512242 | ± 0.5 | ± 0.1 | -30 to +85 | 1.8 V | no | no | no |
| ASTXR-12-19.200MHz-508221 | ± 0.5 | ± 0.1 | -30 to +85 | 1.8 V | no | no | yes |
| ASTXR-12-19.200MHz-508220 | ± 0.5 | ± 0.1 | -30 to +85 | 2.85 V | no | no | yes |
| ASTXR-12-19.200MHz-503461 | ± 0.5 | ± 0.1 | -30 to +85 | 2.85 V | no | no | yes |
| ASTXR-12-19.200MHz-512222 | ± 0.5 | ± 0.1 | -30 to +85 | 2.85 V | no | no | yes |
| ASTXR-12-19.200MHz-512240 | ± 0.5 | ± 0.1 | -30 to +85 | 1.8 V | no | no | yes |
| ASTXR-12-19.200MHz-511890 | ± 0.5 | ± 0.1 | -30 to +85 | 2.85 V | no | no | no |
| ASTXR-12-26.000MHz-504670 | ± 0.5 | ± 0.1 | -30 to +85 | 3.0 V | no | no | no |
| ASTXR-12-26.000MHz-511911 | ± 0.5 | ± 0.1 | -30 to +85 | 1.88 V | Pin 1 | no | no |
| ASTXR-12-26.000MHz-503820 | ± 0.5 | ± 0.1 | -30 to +85 | 1.9 V | Pin 2 | no | no |
| ASTXR-12-16.369MHz-505160 | ± 0.5 | ± 0.1 | -30 to +85 | 2.85 V | no | no | no |
| ASTXR-12-16.369MHz-506439 | ± 0.5 | ± 0.1 | -30 to +85 | 1.8 V | Pin 2 | no | no |
| ASTXR-12-26.000MHz-513028 | ± 0.5 | ± 0.1 | -30 to +85 | 1.8 V | no | no | yes |

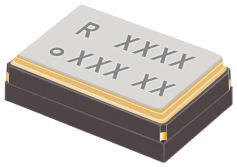


30332 Esperanza, Rancho Santa Margarita, California 92688
tel 949-546-8000 | fax 949-546-8001 | www.abracon.com

# SMD TCXO/VCTCXO

## ASTXR-12

RoHS / RoHS II Compliant




2.5 x 2.0 x 0.9mm

## REFERENCE DESIGN INFORMATION:

| Abracon P/N | Equivalent Rakon P/N | Recommended Alternative | Chipset | Reference Design Chipset P/N |
|---|---|---|---|---|
| ASTXR-12-26.000MHz-508892 | 508892 | 512883 | Broadcom | BCM2075, BCM2076, BCM4750, BCM4751, BCM47511, BCM4752, BCM47521, BCM4760 |
| ASTXR-12-26.000MHz-512883 | 512883 | | Broadcom | BCM2075, BCM2076, BCM4750, BCM4751, BCM47511, BCM4752, BCM47521, BCM4760 |
| ASTXR-12-16.369MHz-508303 | 508303 | 511743 | CSR | SirfStar 3 (SS3), SirfStar 4 (SS4), SirfStar 5 (SS5) |
| ASTXR-12-16.369MHz-508314 | 508314 | 511743 | CSR | SirfStar 3 (SS3), SirfStar 4 (SS4), SirfStar 5 (SS5) |
| ASTXR-12-16.369MHz-511743 | 511743 | | CSR | SirfStar 3 (SS3), SirfStar 4 (SS4), SirfStar 5 (SS5) |
| ASTXR-12-16.369MHz-512543 | 512543 | | CSR | SirfStar 5 (SS5) |
| ASTXR-12-19.200MHz-512544 | 512544 | | CSR | SirfStar 5 (SS5) |
| ASTXR-12-26.000MHz-508139 | 508139 | 511741 | CSR | SirfStar 3 (SS3), SirfStar 4 (SS4), SirfStar 5 (SS5) |
| ASTXR-12-26.000MHz-508313 | 508313 | 511741 | CSR | SirfStar 3 (SS3), SirfStar 4 (SS4), SirfStar 5 (SS5) |
| ASTXR-12-26.000MHz-509161 | 509161 | 512545 | CSR | SirfStar 5 (SS5) |
| ASTXR-12-26.000MHz-511741 | 511741 | | CSR | SirfStar 3 (SS3), SirfStar 4 (SS4), SirfStar 5 (SS5) |
| ASTXR-12-26.000MHz-512545 | 512545 | | CSR | SirfStar 5 (SS5) |
| ASTXR-12-19.200MHz-508072 | 508072 | 512242 | Qualcomm | APQ Family, APQ8064 |
| ASTXR-12-19.200MHz-508207 | 508207 | 511890 | Qualcomm | APQ Family, APQ8064 |
| ASTXR-12-19.200MHz-512242 | 512242 | | Qualcomm | APQ Family, APQ8064 |

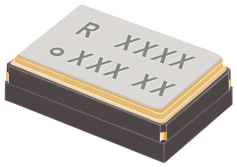


30332 Esperanza, Rancho Santa Margarita, California 92688
tel 949-546-8000 | fax 949-546-8001 | www.abracon.com

# SMD TCXO/VCTCXO

## ASTXR-12

RoHS / RoHS II Compliant




2.5 x 2.0 x 0.9mm

## REFERENCE DESIGN INFORMATION CONTD:

| Abracon P/N | Equivalent Rakon P/N | Recommended Alternative | Chipset | Reference Design Chipset P/N |
|---|---|---|---|---|
| **ASTXR-12-19.200MHz-508221** | **508221** | **512240** | Qualcomm | MDM Family, MDM6xxx, MDM7xxx, MDM8xxx, MDM6085, MDM6270,MDM6200, MDM6600, MDM8200A, MDM8220, MDM8215, MDM8229 |
| **ASTXR-12-19.200MHz-508220** | **508220** | **512222** | Qualcomm | MDM Family, MDM6xxx, MDM7xxx, MDM8xxx, MDM6085, MDM6270,MDM6200, MDM6600, MDM8200A, MDM8220, MDM8215, MDM8230 |
| **ASTXR-12-19.200MHz-503461** | **503461** | **512222** | Qualcomm | MDM Family, MDM6xxx, MDM7xxx, MDM8xxx, MDM6085, MDM6270,MDM6200, MDM6600, MDM8200A, MDM8220, MDM8215, MDM8231 |
| **ASTXR-12-19.200MHz-512222** | **512222** | | Qualcomm | MDM Family, MDM6xxx, MDM7xxx, MDM8xxx, MDM6085, MDM6270,MDM6200, MDM6600, MDM8200A, MDM8220, MDM8215, MDM8225 |
| **ASTXR-12-19.200MHz-512240** | **512240** | | Qualcomm | MDM Family, MDM6xxx, MDM7xxx, MDM8xxx, MDM6085, MDM6270,MDM6200, MDM6600, MDM8200A, MDM8220, MDM8215, MDM8226 |
| **ASTXR-12-19.200MHz-511890** | **511890** | | Qualcomm | APQ Family, APQ8064 |
| **ASTXR-12-26.000MHz-504670** | **504670** | **511911** | uBlox | u-blox 6 (UBX-M6000, UBX-M6010), u-blox 7 (UBX-M7020), u-blox 8 (UBX-M8030) |
| **ASTXR-12-26.000MHz-511911** | **511911** | | uBlox | u-blox 6 (UBX-M6000, UBX-M6010), u-blox 7 (UBX-M7020), u-blox 8 (UBX-M8030) |
| **ASTXR-12-26.000MHz-503820** | **503820** | **511911** | uBlox | u-blox 6 (UBX-M6000, UBX-M6010), u-blox 7 (UBX-M7020), u-blox 8 (UBX-M8030) |
| **ASTXR-12-16.369MHz-505160** | **505160** | **511743** | | |
| **ASTXR-12-16.369MHz-506439** | **506439** | **511743** | | |
| **ASTXR-12-26.000MHz-513028** | **513028** | | | |

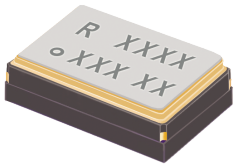


30332 Esperanza, Rancho Santa Margarita, California 92688
tel 949-546-8000 | fax 949-546-8001 | www.abracon.com

# SMD TCXO/VCTCXO

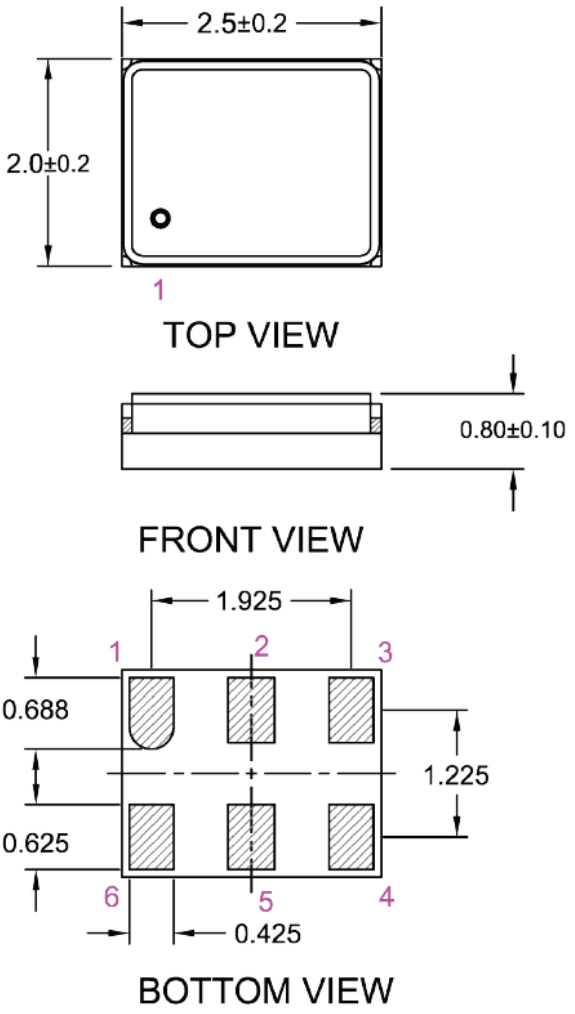
## ASTXR-12

Pb RoHS / RoHS II Compliant

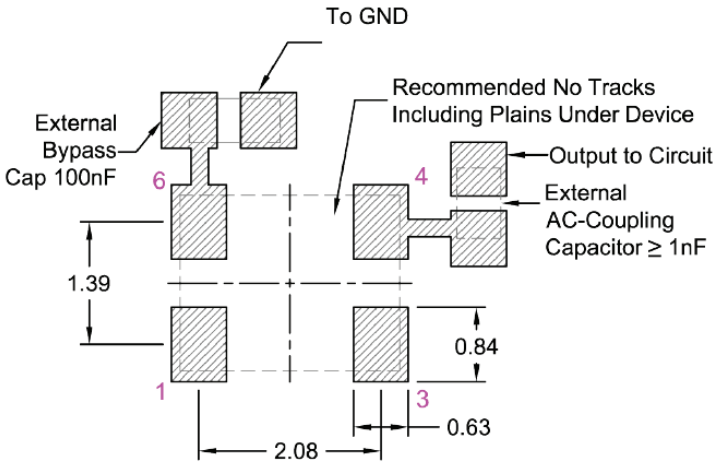



2.5 x 2.0 x 0.9mm

## OUTLINE DIMENSION:



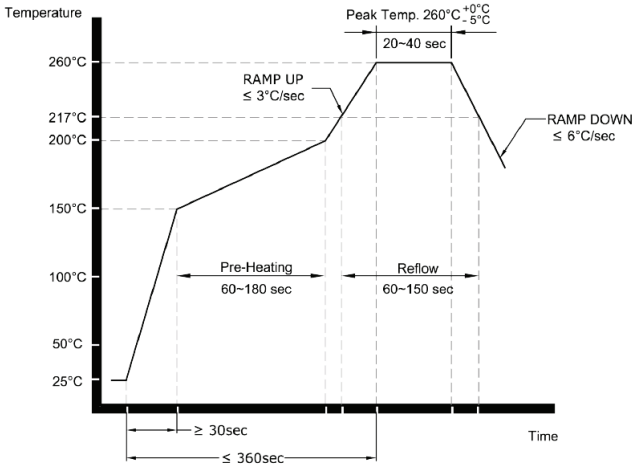

Recommended Land Pattern




| Pin | Function | | |
|---|---|---|---|
| 1 | NC/GND | Enable/Disable | Vc |
| 2 | NC/GND | | |
| 3 | GND | | |
| 4 | Output | | |
| 5 | NC/GND | | |
| 6 | Vdd | | |

**Dimensions: mm**

## REFLOW PROFILE:





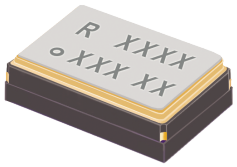


30332 Esperanza, Rancho Santa Margarita, California 92688
tel 949-546-8000 | fax 949-546-8001 | www.abracon.com

# SMD TCXO/VCTCXO

## ASTXR-12

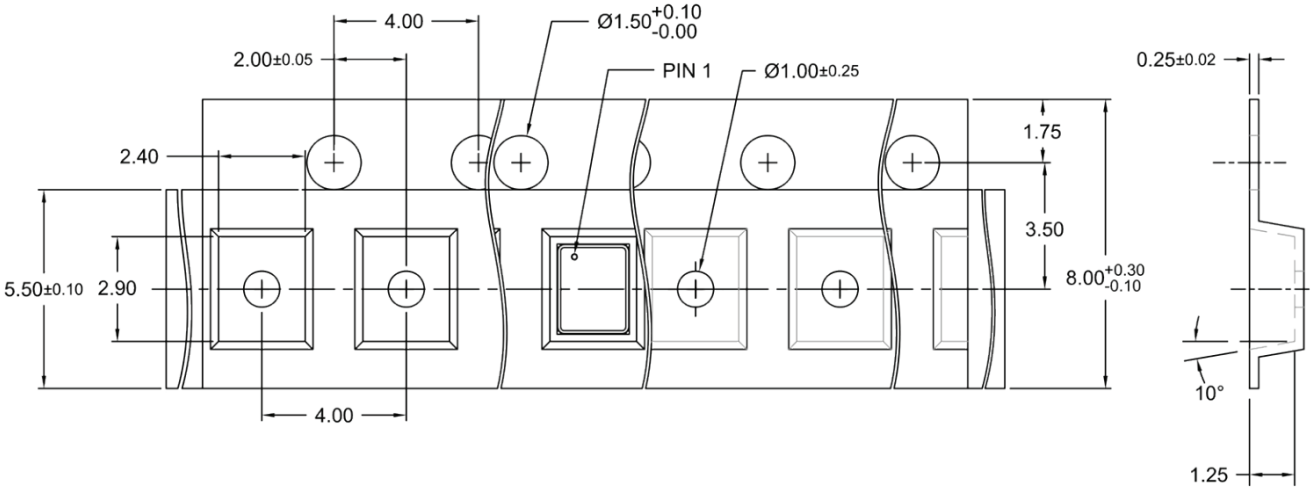
RoHS / RoHS II Compliant

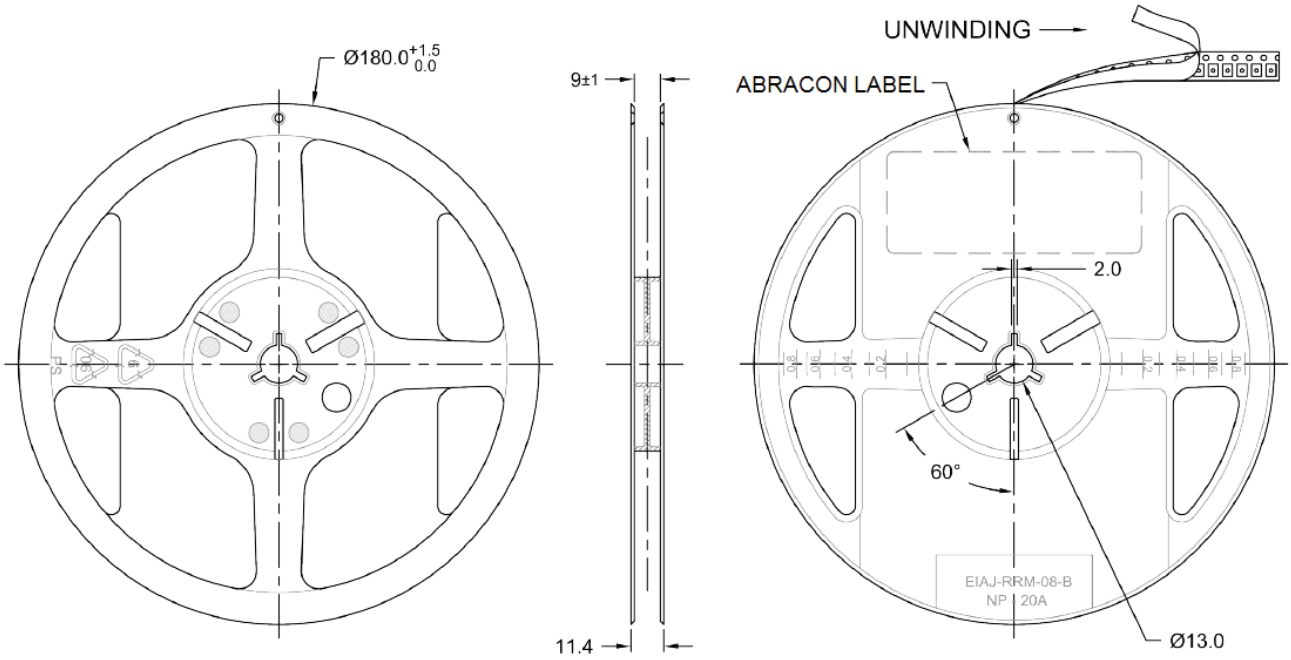



2.5 x 2.0 x 0.9mm

## TAPE & REEL:

**3000pcs/reel**




**Dimensions: mm**

ATTENTION: Abracon Corporation's products are COTS – Commercial-Off-The-Shelf products; suitable for Commercial, Industrial and, where designated, Automotive Applications. Abracon's products are not specifically designed for Military, Aviation, Aerospace, Life-dependant Medical applications or any application requiring high reliability where component failure could result in loss of life and/or property. For applications requiring high reliability and/or presenting an extreme operating environment, written consent and authorization from Abracon Corporation is required. Please contact Abracon Corporation for more information.



30332 Esperanza, Rancho Santa Margarita, California 92688
tel 949-546-8000 | fax 949-546-8001 | www.abracon.com