

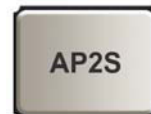
# SMD CMOS PROGRAMMABLE CRYSTAL OSCILLATOR

AP2S

Moisture Sensitivity Level (MSL) –  
This product is Hermetically Sealed and  
not Moisture Sensitive -MSL = N/A: Not Applicable



RoHS  
Compliant



2.5 x 2.0 x 0.9mm

## FEATURES:

- Performance comparable to fixed frequency oscillator
- Lowest peak-to-peak jitter
- Low supply current
- Short lead time
- Suitable for mass production
- Alternative to long lead-time XO's

For Small  
Quantities,  
Delivery Time  
is 1-5 days

## ELECTRICAL SPECIFICATIONS:

| Parameters                   |                                 | Minimum                | Typical | Maximum | Units                               | Notes                                                                                                              |    |                                     |
|------------------------------|---------------------------------|------------------------|---------|---------|-------------------------------------|--------------------------------------------------------------------------------------------------------------------|----|-------------------------------------|
| Frequency Range              | V <sub>dd</sub> = 3.3V          | 1                      | -----   | 200     | MHz                                 |                                                                                                                    |    |                                     |
|                              | V <sub>dd</sub> = 2.5V          | 1                      | -----   | 166     |                                     |                                                                                                                    |    |                                     |
|                              | V <sub>dd</sub> = 1.8V          | 11                     | -----   | 110     |                                     |                                                                                                                    |    |                                     |
|                              | V <sub>dd</sub> = 1.8V          | 1                      | -----   | 10.999  |                                     | In-house programming<br>small quantity only<br>( $< 1,000$ pcs)<br>Contact Abracon for mass<br>production quantity |    |                                     |
| Operating Temperature        |                                 | -10                    | -----   | +60     | °C                                  | See options                                                                                                        |    |                                     |
| Storage Temperature          |                                 | -55                    | -----   | +150    | °C                                  |                                                                                                                    |    |                                     |
| Overall Frequency Stability* |                                 | -100                   | -----   | +100    | ppm                                 | See options                                                                                                        |    |                                     |
| Supply Voltage (Vdd)         | V <sub>dd</sub> = 3.3V          | 2.97                   | 3.30    | 3.63    | V                                   | Standard                                                                                                           |    |                                     |
|                              | V <sub>dd</sub> = 2.5V          | 2.25                   | 2.50    | 2.75    |                                     | Vdd option 1                                                                                                       |    |                                     |
|                              | V <sub>dd</sub> = 1.8V          | 1.62                   | 1.80    | 1.98    |                                     | Vdd option 2                                                                                                       |    |                                     |
| Input Current                | V <sub>dd</sub> = 3.3V          | -----                  | -----   | 10      | mA                                  | $1\text{MHz} \leq F < 30\text{MHz}$                                                                                |    |                                     |
|                              |                                 | -----                  | -----   | 15      |                                     | $30\text{MHz} \leq F < 75\text{MHz}$                                                                               |    |                                     |
|                              |                                 | -----                  | -----   | 20      |                                     | $75\text{MHz} \leq F < 133\text{MHz}$                                                                              |    |                                     |
|                              |                                 | -----                  | -----   | 22      |                                     | $133\text{MHz} \leq F < 166\text{MHz}$                                                                             |    |                                     |
|                              |                                 | -----                  | -----   | 25      |                                     | $166\text{MHz} \leq F < 200\text{MHz}$                                                                             |    |                                     |
|                              | V <sub>dd</sub> = 2.5V          | -----                  | -----   | 8       |                                     | $1\text{MHz} \leq F < 30\text{MHz}$                                                                                |    |                                     |
|                              |                                 | -----                  | -----   | 10      |                                     | $30\text{MHz} \leq F < 75\text{MHz}$                                                                               |    |                                     |
|                              |                                 | -----                  | -----   | 15      |                                     | $75\text{MHz} \leq F < 133\text{MHz}$                                                                              |    |                                     |
|                              |                                 | -----                  | -----   | 15      |                                     | $133\text{MHz} \leq F < 166\text{MHz}$                                                                             |    |                                     |
|                              | V <sub>dd</sub> = 1.8V          | -----                  | -----   | 6       |                                     | $1\text{MHz} \leq F < 30\text{MHz}$                                                                                |    |                                     |
|                              |                                 | -----                  | -----   | 8       |                                     | $30\text{MHz} \leq F < 75\text{MHz}$                                                                               |    |                                     |
|                              |                                 | -----                  | -----   | 2       |                                     | $75\text{MHz} \leq F < 133\text{MHz}$                                                                              |    |                                     |
|                              |                                 | Symmetry****           |         | 45      |                                     | 50                                                                                                                 | 55 | %                                   |
|                              | Rise and Fall Time<br>(Tr/Tf)** | V <sub>dd</sub> = 3.3V | -----   | -----   |                                     | 3                                                                                                                  | ns | $1\text{MHz} \leq F < 10\text{MHz}$ |
| -----                        |                                 |                        | -----   | 2       | $10\text{MHz} \leq F$               |                                                                                                                    |    |                                     |
| V <sub>dd</sub> = 2.5V       |                                 | -----                  | -----   | 4       | $1\text{MHz} \leq F < 10\text{MHz}$ |                                                                                                                    |    |                                     |
|                              |                                 | -----                  | -----   | 3       | $10\text{MHz} \leq F$               |                                                                                                                    |    |                                     |
| V <sub>dd</sub> = 1.8V       |                                 | -----                  | -----   | 5       | $1\text{MHz} \leq F < 10\text{MHz}$ |                                                                                                                    |    |                                     |
|                              |                                 | -----                  | -----   | 4       | $10\text{MHz} \leq F$               |                                                                                                                    |    |                                     |
| Output Load:                 |                                 | -----                  | -----   | 15      | pF                                  | CMOS                                                                                                               |    |                                     |



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## ELECTRICAL SPECIFICATIONS:

| Parameters                                                                                    |          | Minimum                                                                                                  | Typical | Maximum | Units   | Notes                                                         |
|-----------------------------------------------------------------------------------------------|----------|----------------------------------------------------------------------------------------------------------|---------|---------|---------|---------------------------------------------------------------|
| Output Voltage                                                                                | $V_{OL}$ | -----                                                                                                    | -----   | 0.33    | V       | $V_{dd} = 3.3V$                                               |
|                                                                                               | $V_{OH}$ | 2.97                                                                                                     | -----   | -----   |         |                                                               |
|                                                                                               | $V_{OL}$ | -----                                                                                                    | -----   | 0.25    |         | $V_{dd} = 2.5V$                                               |
|                                                                                               | $V_{OH}$ | 2.25                                                                                                     | -----   | -----   |         |                                                               |
|                                                                                               | $V_{OL}$ | -----                                                                                                    | -----   | 0.18    |         | $V_{dd} = 1.8V$                                               |
|                                                                                               | $V_{OH}$ | 1.62                                                                                                     | -----   | -----   |         |                                                               |
| Start-up Time                                                                                 |          | -----                                                                                                    | -----   | 2.0     | ms      |                                                               |
| Tri-state function (Stand-by)                                                                 |          | "1" ( $V_{IH} > 0.7 \cdot V_{dd}$ ) or Open: Oscillation<br>"0" ( $V_{IH} < 0.3 \cdot V_{dd}$ ): Disable |         |         | -----   |                                                               |
| Standby current                                                                               |          | -----                                                                                                    | -----   | 15      | $\mu A$ |                                                               |
| Period jitter Peak to Peak<br>(Reference only. Please contact Abracon for each frequencies.): |          | -----                                                                                                    | -----   | 40      | ps      | Standard frequencies***                                       |
|                                                                                               |          | -----                                                                                                    | -----   | 200     | ps      | Other frequencies<br>Reference only<br>Please contact Abracon |
| Aging:                                                                                        |          | -3.0                                                                                                     | -----   | +3.0    | ppm     | @+25°C First year                                             |

\* Inclusive of calibration @25°C, operating temperature range, input voltage variation, load variation, aging, shock, and vibration.

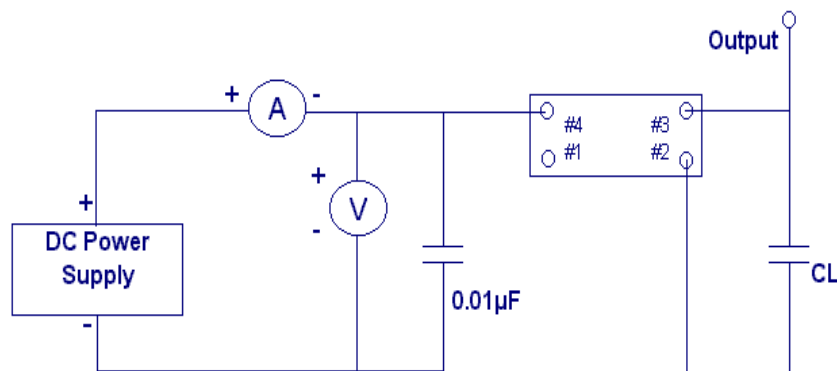
For  $\pm 20$ ppm, inclusive of calibration @25°C, operating temperature range, load variation, shock, and vibration.

\*\* Transition times are measured between 10% and 90% of  $V_{dd}$  with an output load of 15 pF.

\*\*\* 4.0, 6.0, 8.0, 12.0, 13.0, 16.0 19.2, 20.0, 24.0, 26.0, 32.0, 38.4, and 40.0MHz

\*\*\*\* Only 40/60% is available for certain frequencies. Please contact Abracon when ordering.

## TEST CIRCUIT:



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2.5 x 2.0 x 0.9mm

## OPTIONS & PART IDENTIFICATION:

AP2S  -  MHz -   -

### Supply Voltage

|              |
|--------------|
| *Blank: 3.3V |
| 1: 2.5V      |
| 2: 1.8V      |

### Frequency in MHz

Please specify the frequency in MHz.  
e.g. 14.31818MHz

### Operating Temp.

|                  |
|------------------|
| I: 0°C ~ +50°C   |
| E: -20°C ~ +70°C |
| F: -30°C ~ +70°C |
| N: -30°C ~ +85°C |
| L: -40°C ~ +85°C |

### Overall Freq. Stability

|                 |
|-----------------|
| J(****): ±20ppm |
| R: ±25ppm       |
| K: ±30ppm       |
| C: ±50ppm       |

### Tri-state pin

|                  |
|------------------|
| **Blank: OE      |
| ***B: Power Down |

### Packaging

|                           |
|---------------------------|
| Blank: Bulk               |
| T: Tape & Reel (1k/reel)  |
| T3: Tape & Reel (3k/reel) |

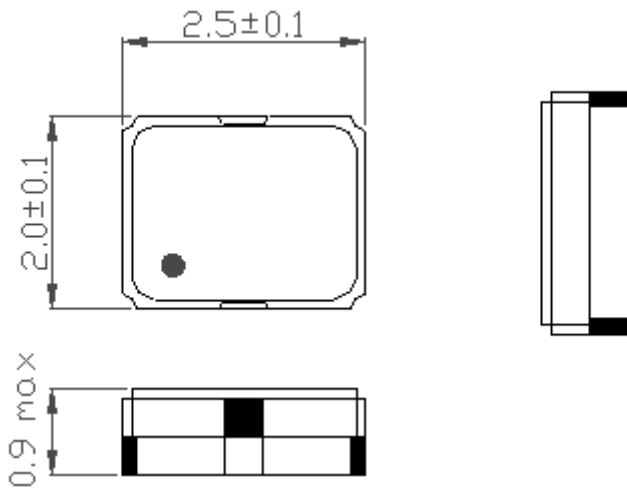
\* 3.3V is standard

\*\* OE: Tri-state the output buffer

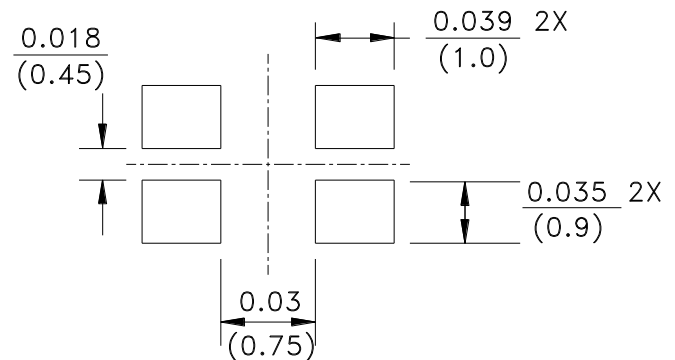
\*\*\* PDB: Tri-state the output buffer and shut off the oscillator, <10µA when PDB enabled.

\*\*\*\* Available for -10 to +60°C, I, or E temp options only. Contact ABRACON for EJ or LR options. (Availability limited)

## OUTLINE DRAWING:



### Recommended land pattern



| Pin | Function  |
|-----|-----------|
| 1   | Tri-State |
| 2   | GND/Case  |
| 3   | Output    |
| 4   | Vdd       |

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

Dimensions: inches (mm)



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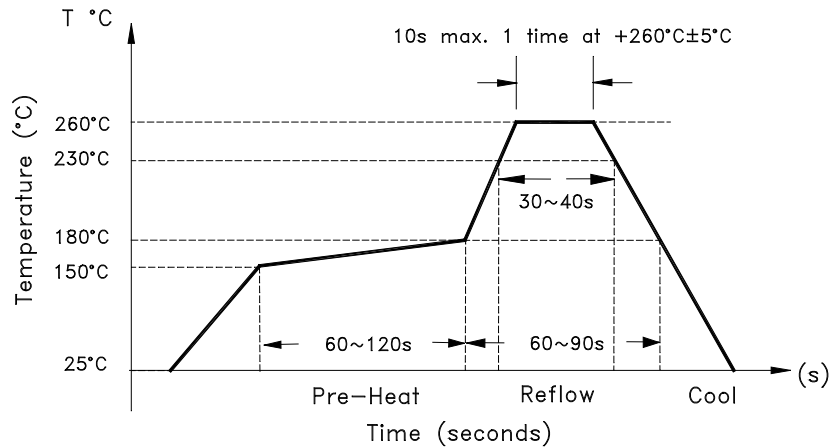


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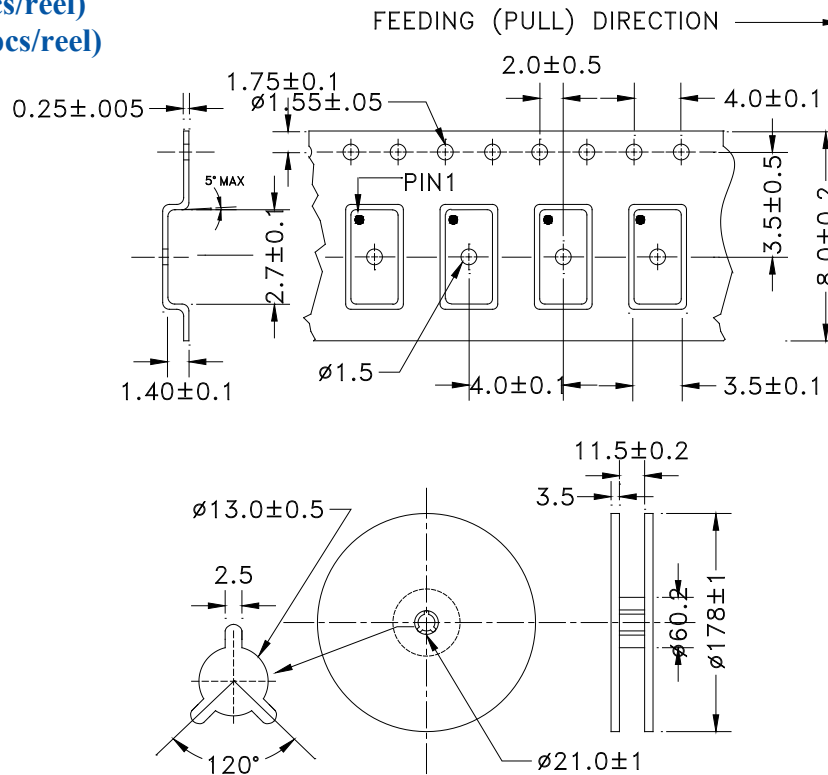
## REFLOW PROFILE



## TAPE & REEL:

T= Tape and reel (1,000pcs/reel)

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



Dimensions: mm

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### Офис по работе с юридическими лицами:

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