

# SMD CMOS PROGRAMMABLE CRYSTAL OSCILLATOR



AP2S

2.5 x 2.0 x 0.9mm

AP2S

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



RoHS  
Compliant

For Small  
Quantities,  
Delivery Time  
is 1-5 days

## 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

## ELECTRICAL SPECIFICATIONS:

| Parameters                      |                        | Minimum | Typical | Maximum | Units | Notes  |
|---------------------------------|------------------------|---------|---------|---------|-------|--|
| Frequency Range                 | V <sub>dd</sub> = 3.3V | 1       | -----   | 200     | MHz   | In-house programming<br>small quantity only<br>(< 1,000pcs)<br>Contact Abracon for mass<br>production quantity |
|                                 | 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  |       |  |
| 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    | 1MHz ≤ F < 30MHz   |
|                                 |                        | -----   | -----   | 15      |       | 30MHz ≤ F < 75MHz  |
|                                 |                        | -----   | -----   | 20      |       | 75MHz ≤ F < 133MHz   |
|                                 |                        | -----   | -----   | 22      |       | 133MHz ≤ F < 166MHz  |
|                                 |                        | -----   | -----   | 25      |       | 166MHz ≤ F < 200MHz  |
|                                 | V <sub>dd</sub> = 2.5V | -----   | -----   | 8       |       | 1MHz ≤ F < 30MHz   |
|                                 |                        | -----   | -----   | 10      |       | 30MHz ≤ F < 75MHz  |
|                                 |                        | -----   | -----   | 15      |       | 75MHz ≤ F < 133MHz   |
|                                 |                        | -----   | -----   | 15      |       | 133MHz ≤ F < 166MHz  |
|                                 | V <sub>dd</sub> = 1.8V | -----   | -----   | 6       |       | 1MHz ≤ F < 30MHz   |
|                                 |                        | -----   | -----   | 8       |       | 30MHz ≤ F < 75MHz  |
|                                 |                        | -----   | -----   | 2       |       | 75MHz ≤ F < 133MHz   |
| Symmetry****                    |                        | 45      | 50      | 55      | %     | @ 1/2V <sub>dd</sub>   |
| Rise and Fall Time<br>(Tr/Tf)** | V <sub>dd</sub> = 3.3V | -----   | -----   | 3       | ns    | 1MHz ≤ F < 10MHz   |
|                                 |                        | -----   | -----   | 2       |       | 10MHz ≤ F  |
|                                 | V <sub>dd</sub> = 2.5V | -----   | -----   | 4       |       | 1MHz ≤ F < 10MHz   |
|                                 |                        | -----   | -----   | 3       |       | 10MHz ≤ F  |
|                                 | V <sub>dd</sub> = 1.8V | -----   | -----   | 5       |       | 1MHz ≤ F < 10MHz   |
|                                 |                        | -----   | -----   | 4       |       | 10MHz ≤ 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   | $V_{dd} = 2.5V$ |
|   | $V_{OH}$   | 2.25    | -----   | -----   |   |                 |
|   | $V_{OL}$   | -----   | -----   | 0.18    | V   | $V_{dd} = 1.8V$ |
|   | $V_{OH}$   | 1.62    | -----   | -----   |   |                 |
| Start-up Time   | -----  | -----   | 2.0     | ms      |   |                 |
| Tri-state function (Stand-by)   | "1" ( $V_{IH} > 0.7 * V_{dd}$ ) or Open: Oscillation<br>"0" ( $V_{IH} < 0.3 * V_{dd}$ ): 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.

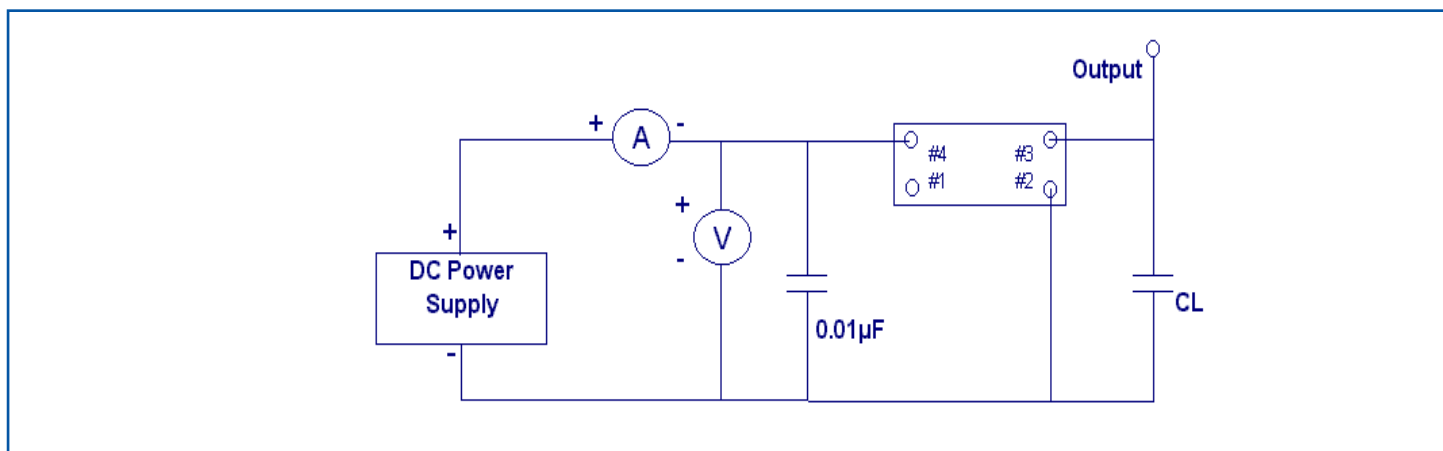
For  $\pm 20$ ppm, inclusive of calibration @25°C, operating temperature range, load variation, aging, shock, and vibration.

\*\* 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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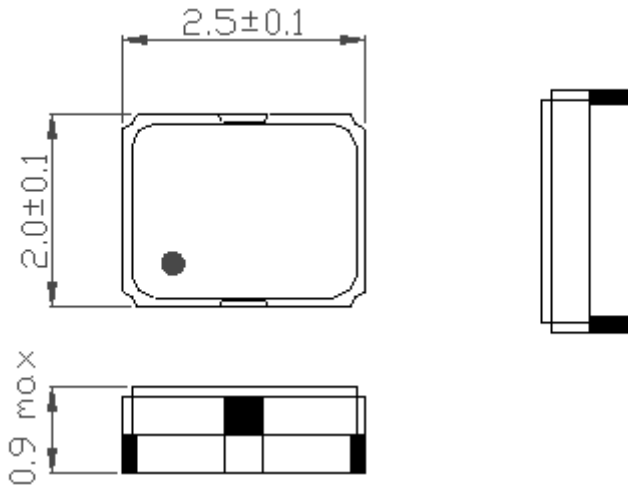
## OPTIONS & PART IDENTIFICATION:

AP2S  -  MHz -   -

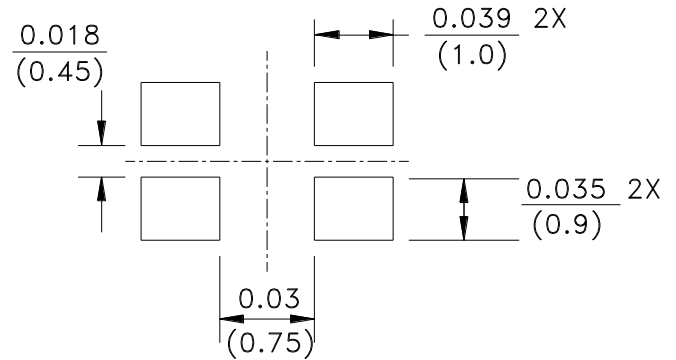
| Supply Voltage | Frequency in MHz   | Operating Temp.  | Overall Freq. Stability | Tri-state pin    | Packaging                 |
|----------------|--|------------------|-------------------------|------------------|---------------------------|
| *Blank: 3.3V   | Please specify the frequency in MHz.<br>e.g. 14.31818MHz | I: 0°C ~ +50°C   | J(****): ±20ppm         | **Blank: OE      | Blank: Bulk               |
| 1: 2.5V        |  | E: -20°C ~ +70°C | R: ±25ppm               | ***B: Power Down | T: Tape & Reel (1k/reel)  |
| 2: 1.8V        |  | F: -30°C ~ +70°C | K: ±30ppm               |                  | T3: Tape & Reel (3k/reel) |
|                |  | N: -30°C ~ +85°C | C: ±50ppm               |                  |                           |
|                |  | L: -40°C ~ +85°C |                         |                  |                           |

- \* 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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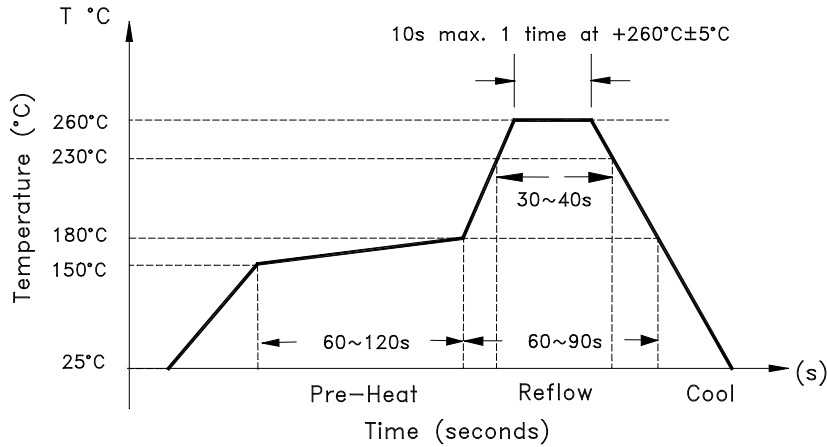
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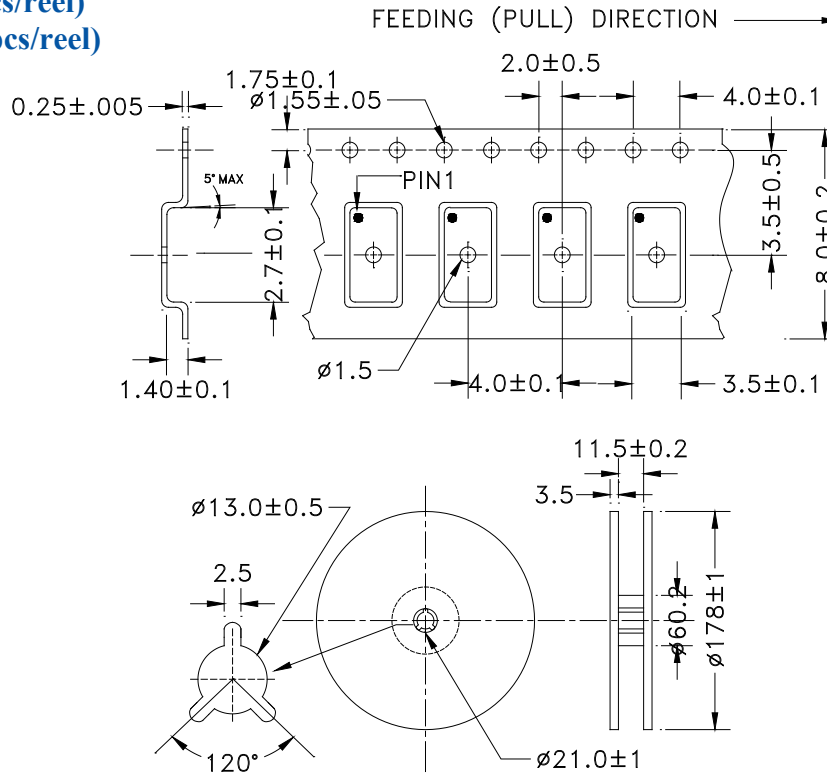


## REFLOW PROFILE



## TAPE & REEL:

T= Tape and reel (1,000pcs/reel)  
T3= Tape and reel (3,000pcs/reel)



Dimensions: mm

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- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
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- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
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- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

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