

# SMD CMOS PROGRAMMABLE CRYSTAL OSCILLATOR

AP3S

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



RoHS  
Compliant



3.2 x 2.5 x 1.2mm

## 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                      | 1MHz $\leq$ F $<$ 30MHz                                                                                            |    |    |                         |
|                              |                        | -----                           | -----                  | 15      |                         | 30MHz $\leq$ F $<$ 75MHz                                                                                           |    |    |                         |
|                              |                        | -----                           | -----                  | 20      |                         | 75MHz $\leq$ F $<$ 133MHz                                                                                          |    |    |                         |
|                              |                        | -----                           | -----                  | 22      |                         | 133MHz $\leq$ F $<$ 166MHz                                                                                         |    |    |                         |
|                              |                        | -----                           | -----                  | 25      |                         | 166MHz $\leq$ F $<$ 200MHz                                                                                         |    |    |                         |
|                              | V <sub>dd</sub> = 2.5V | -----                           | -----                  | 8       |                         | 1MHz $\leq$ F $<$ 30MHz                                                                                            |    |    |                         |
|                              |                        | -----                           | -----                  | 10      |                         | 30MHz $\leq$ F $<$ 75MHz                                                                                           |    |    |                         |
|                              |                        | -----                           | -----                  | 15      |                         | 75MHz $\leq$ F $<$ 133MHz                                                                                          |    |    |                         |
|                              |                        | -----                           | -----                  | 15      |                         | 133MHz $\leq$ F $<$ 166MHz                                                                                         |    |    |                         |
|                              | V <sub>dd</sub> = 1.8V | -----                           | -----                  | 6       |                         | 1MHz $\leq$ F $<$ 30MHz                                                                                            |    |    |                         |
|                              |                        | -----                           | -----                  | 8       |                         | 30MHz $\leq$ F $<$ 75MHz                                                                                           |    |    |                         |
|                              |                        | -----                           | -----                  | 2       |                         | 75MHz $\leq$ F $<$ 133MHz                                                                                          |    |    |                         |
|                              |                        | Symmetry****                    |                        | 45      |                         | 50                                                                                                                 | 55 | %  | @ 1/2Vdd                |
|                              |                        | Rise and Fall Time<br>(Tr/Tf)** | V <sub>dd</sub> = 3.3V | -----   |                         | -----                                                                                                              | 3  | ns | 1MHz $\leq$ F $<$ 10MHz |
| -----                        | -----                  |                                 |                        | 2       | 10MHz $\leq$ F          |                                                                                                                    |    |    |                         |
| V <sub>dd</sub> = 2.5V       | -----                  |                                 | -----                  | 4       | 1MHz $\leq$ F $<$ 10MHz |                                                                                                                    |    |    |                         |
|                              | -----                  |                                 | -----                  | 3       | 10MHz $\leq$ F          |                                                                                                                    |    |    |                         |
| V <sub>dd</sub> = 1.8V       | -----                  |                                 | -----                  | 5       | 1MHz $\leq$ F $<$ 10MHz |                                                                                                                    |    |    |                         |
|                              | -----                  |                                 | -----                  | 4       | 10MHz $\leq$ F          |                                                                                                                    |    |    |                         |
| Output Load:                 |                        | -----                           | -----                  | 15      | pF                      | CMOS                                                                                                               |    |    |                         |



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3.2 x 2.5 x 1.2mm

## 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.

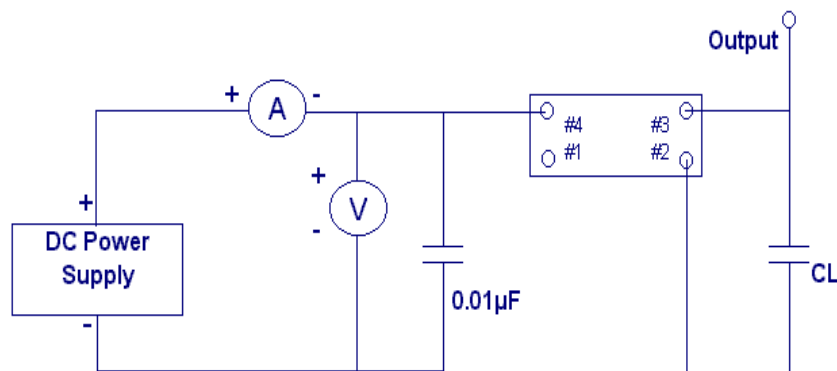
For  $\pm 20$ ppm, inclusive of calibration @25°C, operating temperature range, load variation, shock, and vibration.

\*\* 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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3.2 x 2.5 x 1.2mm

## OPTIONS & PART IDENTIFICATION:

AP3S  -  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

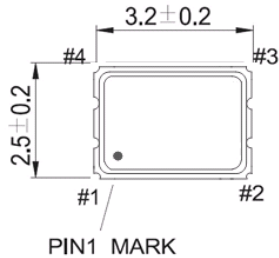
\*\* OE: Tri-state the output buffer

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

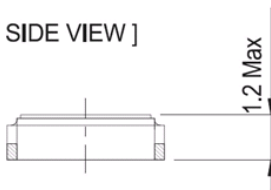
\*\*\*\* Available for -10 to +60°C, I, or E temp options only. Contact ABRACON for EJ or LR options. (Availability limited)

## OUTLINE DRAWING:

[ TOP VIEW ]

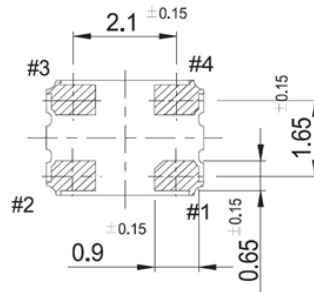


[ SIDE VIEW ]



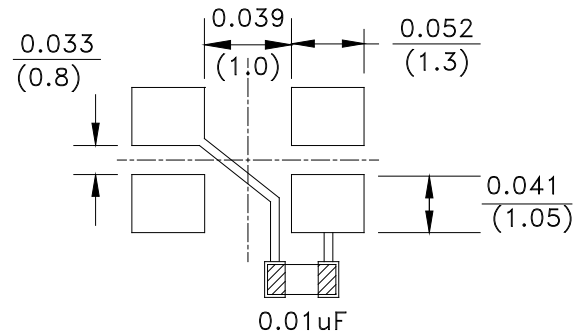
UNIT : mm

[ BOTTOM VIEW ]



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

Recommended land pattern



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

Dimensions: inches (mm)

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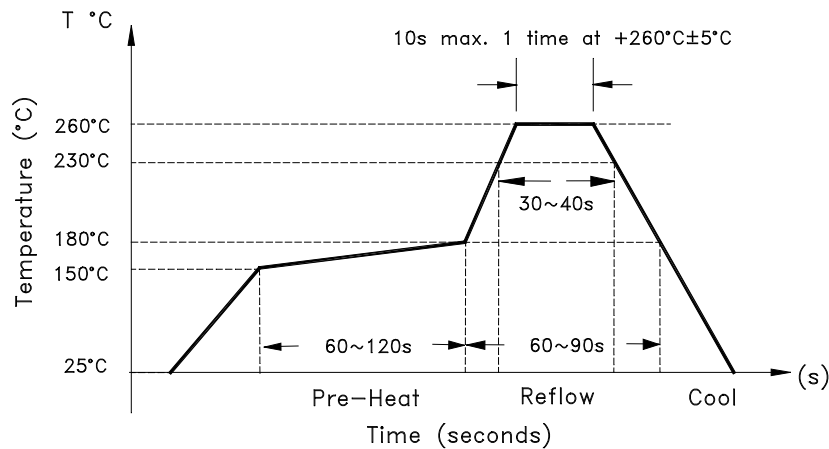


RoHS  
Compliant



3.2 x 2.5 x 1.2mm

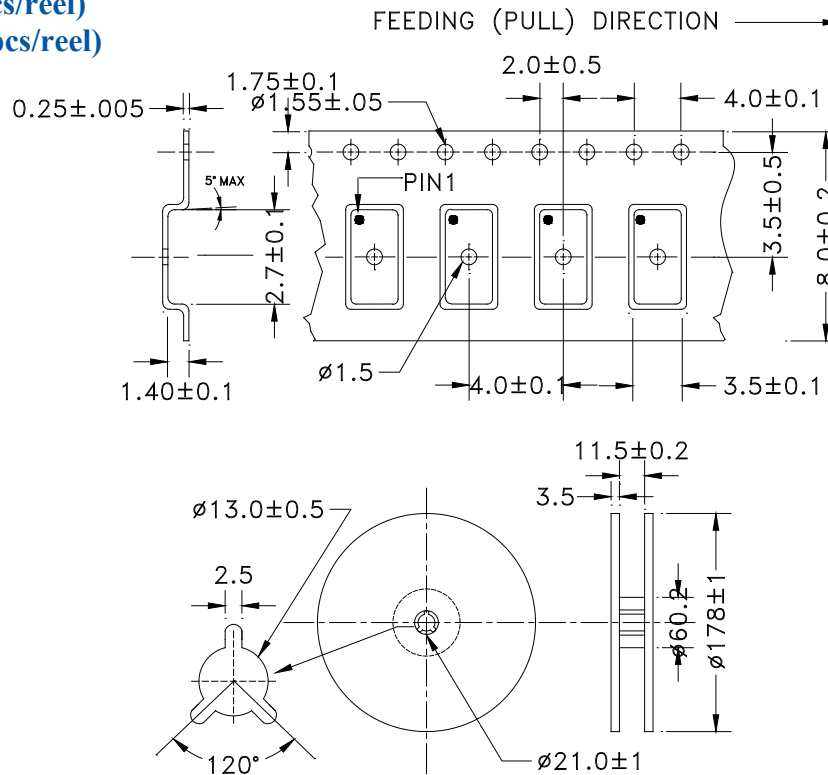
## REFLOW PROFILE



## TAPE & REEL:

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

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



Dimensions: mm

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Электрон  
Связь**

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