

SMD CMOS PROGRAMMABLE CRYSTAL OSCILLATOR



3.2 x 2.5 x 1.2mm

AP3S

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



RoHS
Compliant

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 _{dd} = 3.3V | 2.048 | ----- | 200 | MHz | In-house programming small quantity only (< 1,000pcs) Contact Abracon for mass production quantity |
| | V _{dd} = 2.5V | 2.048 | ----- | 166 | | |
| | V _{dd} = 1.8V | 11 | ----- | 110 | | |
| | V _{dd} = 1.8V | 2.048 | ----- | 10,999 | | |
| Operating Temperature | | -10 | ----- | +60 | °C | See options |
| Storage Temperature | | -55 | ----- | +150 | °C | |
| Overall Frequency Stability* | | -100 | ----- | +100 | ppm | See options |
| Supply Voltage (V _{dd}) | V _{dd} = 3.3V | 2.97 | 3.30 | 3.63 | V | Standard |
| | V _{dd} = 2.5V | 2.25 | 2.50 | 2.75 | | V _{dd} option 1 |
| | V _{dd} = 1.8V | 1.62 | 1.80 | 1.98 | | V _{dd} option 2 |
| Input Current | V _{dd} = 3.3V | ----- | ----- | 10 | mA | 2.048 MHz ≤ F < 30MHz |
| | | ----- | ----- | 15 | | 30MHz ≤ F < 75MHz |
| | | ----- | ----- | 20 | | 75MHz ≤ F < 133MHz |
| | | ----- | ----- | 22 | | 133MHz ≤ F < 166MHz |
| | | ----- | ----- | 25 | | 166MHz ≤ F < 200MHz |
| | V _{dd} = 2.5V | ----- | ----- | 8 | | 2.048 MHz ≤ F < 30MHz |
| | | ----- | ----- | 10 | | 30MHz ≤ F < 75MHz |
| | | ----- | ----- | 15 | | 75MHz ≤ F < 133MHz |
| | | ----- | ----- | 15 | | 133MHz ≤ F < 166MHz |
| | V _{dd} = 1.8V | ----- | ----- | 6 | | 2.048 MHz ≤ F < 30MHz |
| | | ----- | ----- | 8 | | 30MHz ≤ F < 75MHz |
| | | ----- | ----- | 2 | | 75MHz ≤ F < 133MHz |
| Symmetry**** | | 45 | 50 | 55 | % | @ 1/2 V _{dd} |
| Rise and Fall Time (Tr/Tf)** | V _{dd} = 3.3V | ----- | ----- | 3 | ns | 2.048 MHz ≤ F < 10 MHz |
| | | ----- | ----- | 2 | | 10 MHz ≤ F |
| | V _{dd} = 2.5V | ----- | ----- | 4 | | 2.048 MHz ≤ F < 10 MHz |
| | | ----- | ----- | 3 | | 10 MHz ≤ F |
| | V _{dd} = 1.8V | ----- | ----- | 5 | | 2.048 MHz ≤ F < 10 MHz |
| | | ----- | ----- | 4 | | 10 MHz ≤ 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 | ----- | ----- | 8.0 | ms | | |
| Tri-state function (Stand-by) | "1" ($V_{IH} > 0.7 * V_{dd}$) or Open: Oscillation "0" ($V_{IH} < 0.3 * V_{dd}$): Disable | | | ----- | | |
| Standby current | ----- | ----- | 15 | μA | | |
| Period jitter Peak to Peak (Reference only. Please contact Abracon for each frequencies.): | ----- | ----- | 40 | ps | Standard frequencies*** | |
| | ----- | ----- | 200 | ps | Other frequencies Reference only 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.

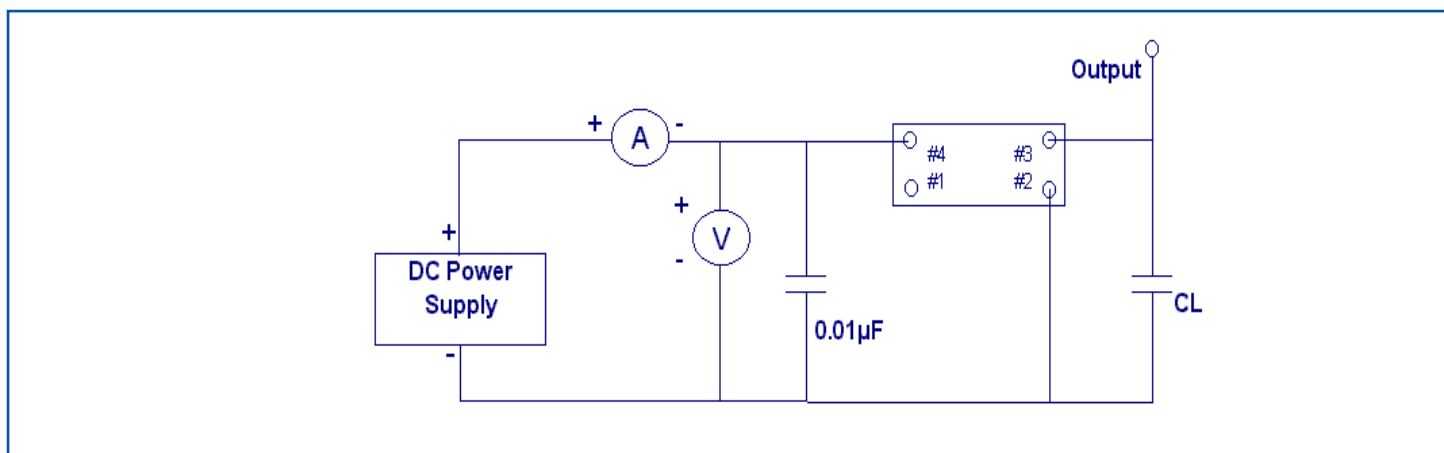
For ± 20 ppm, inclusive of calibration @25°C, operating temperature range, load variation, shock, and vibration.

** 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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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) |

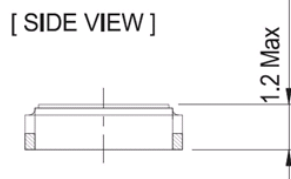
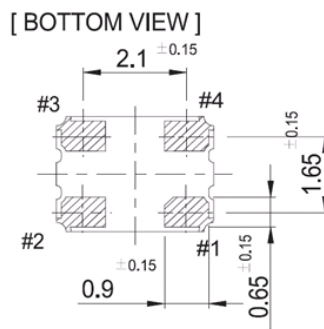
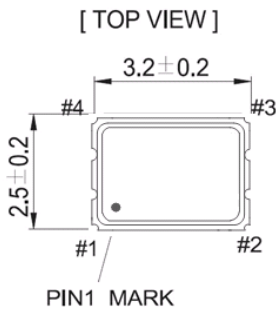
* 3.3V is standard

** 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:



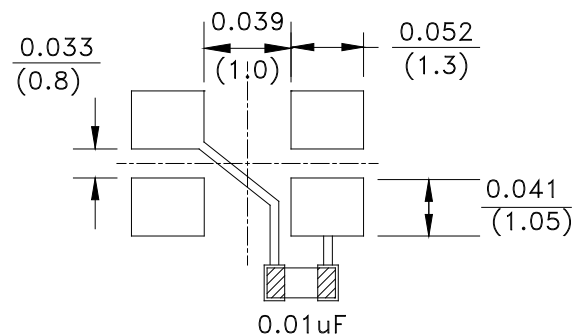
UNIT : mm

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

*Note 1

- Do not leave Pin 1 (Tri-State) floating
- If Pin 1 (Tri-State) is not utilized for toggling, it must be tied to Vdd (logic 1)

Recommended land pattern



*Note 2

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

Dimensions: inches (mm)

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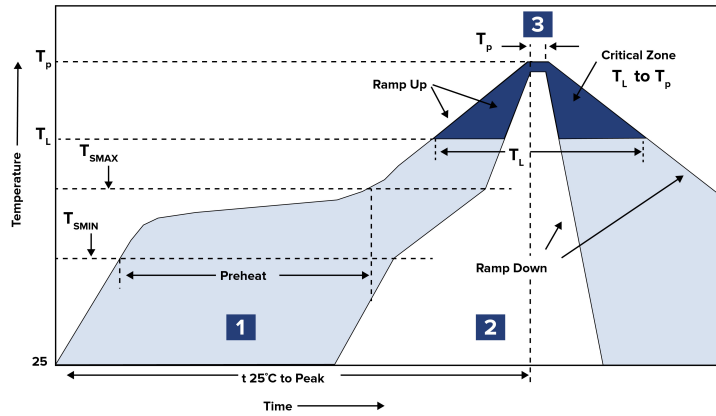


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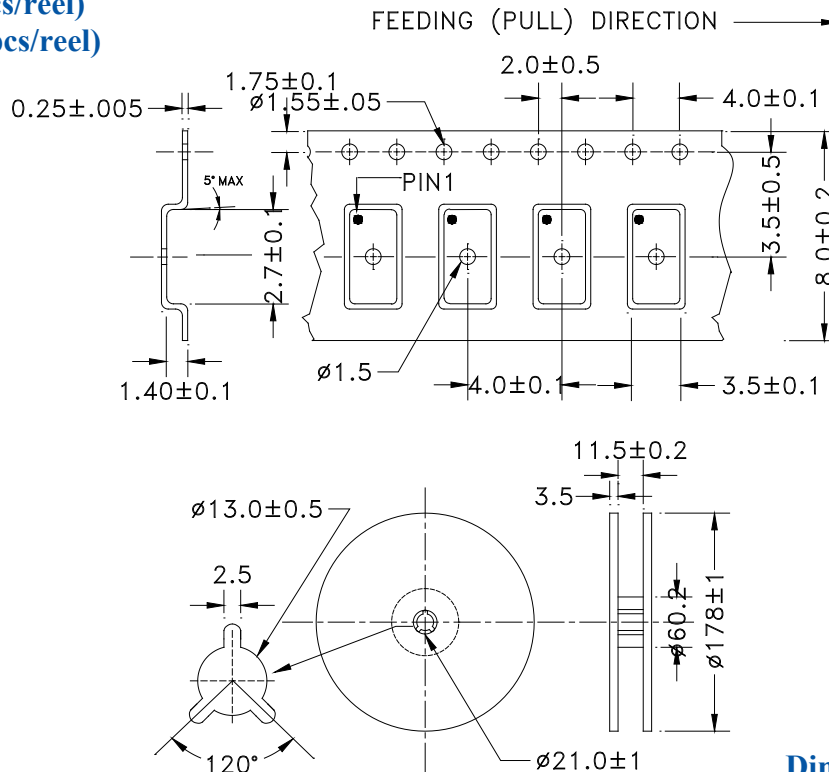
REFLOW PROFILE



| Zone | Description | Temperature | Times |
|------|-------------|--|---------------|
| 1 | Preheat | T _{SMIN} ~ T _{SMAX} 150°C ~ 180°C | 60 ~ 120 sec. |
| 2 | Reflow | T _L 230°C | 30 ~ 40 sec. |
| 3 | Peak Heat | T _P 260±5°C | 10 sec. MAX |

TAPE & REEL:

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



Dimensions: mm



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REVISED: 12.18.2018

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