

# 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	In-house programming small quantity only (< 1,000pcs) Contact Abracon for mass 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 (V <sub>dd</sub> )	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		V <sub>dd</sub> option 1
	V <sub>dd</sub> = 1.8V	1.62	1.80	1.98		V <sub>dd</sub> 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
		-----	-----	8		1MHz ≤ F < 30MHz
	V <sub>dd</sub> = 2.5V	-----	-----	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 (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	

ABRACON IS  
ISO 9001:2008  
CERTIFIED



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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 "0" ( $V_{IH} < 0.3 * V_{dd}$ ) : Disable			-----		
Standby current	-----	-----	15	$\mu A$		
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.

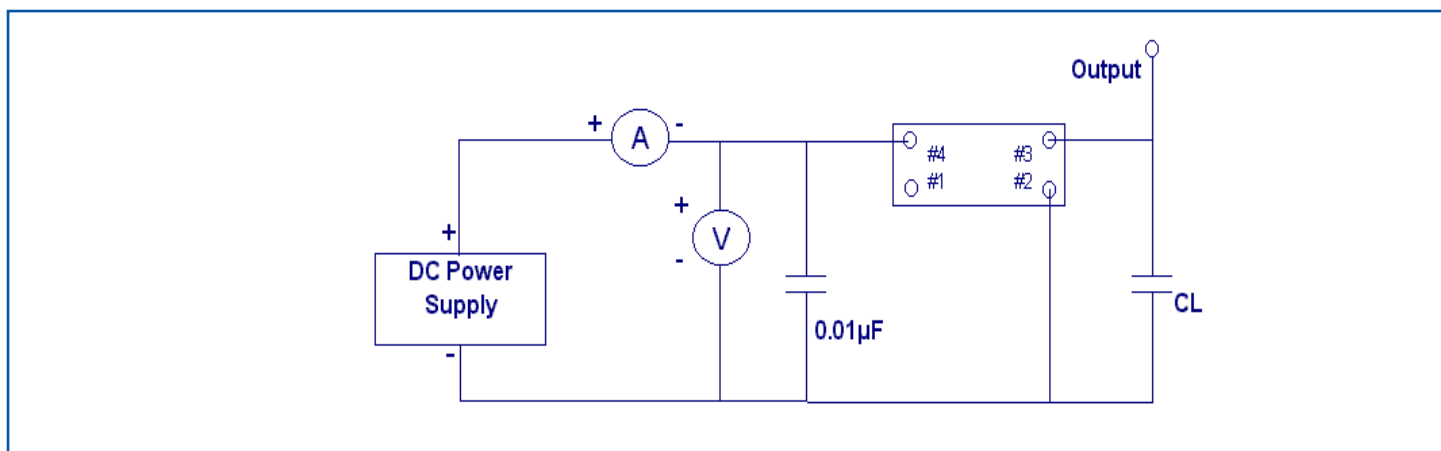
For  $\pm 20$ ppm, inclusive of calibration @25°C, operating temperature range, load variation, shock, and vibration.

\*\* 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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## 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. 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			

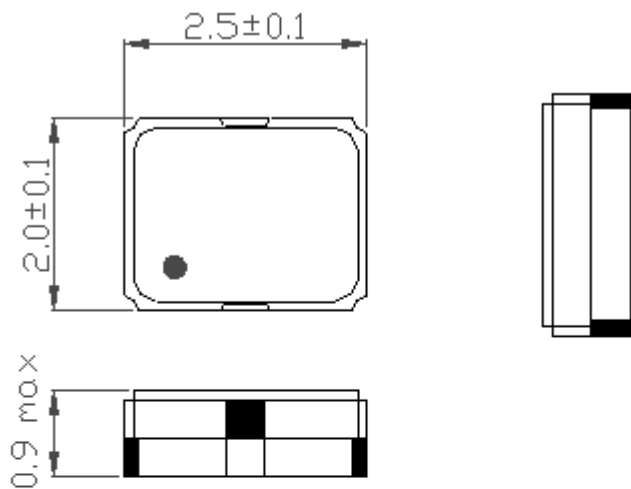
\* 3.3V is standard

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

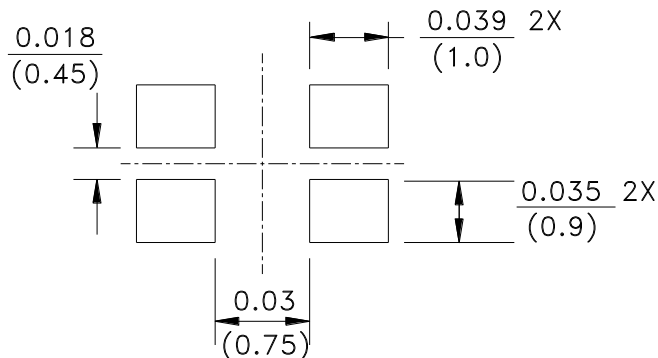
\*\*\* PDB: Tri-state the output buffer and shut off the oscillator, <10µA when PDB enabled.

\*\*\*\* 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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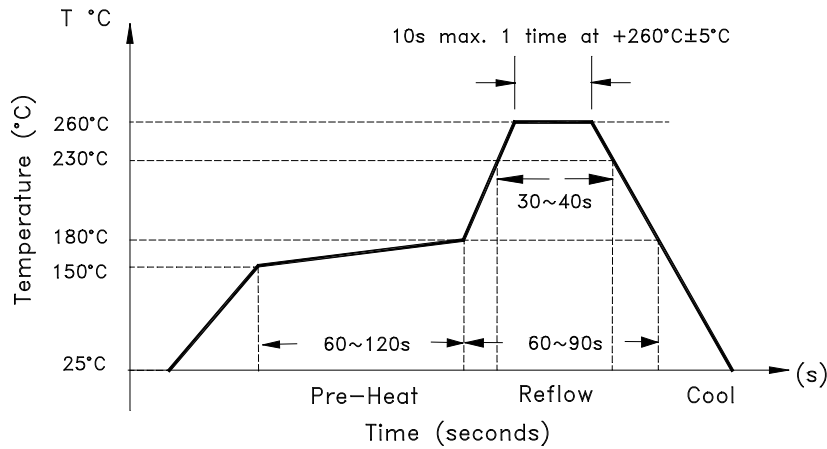
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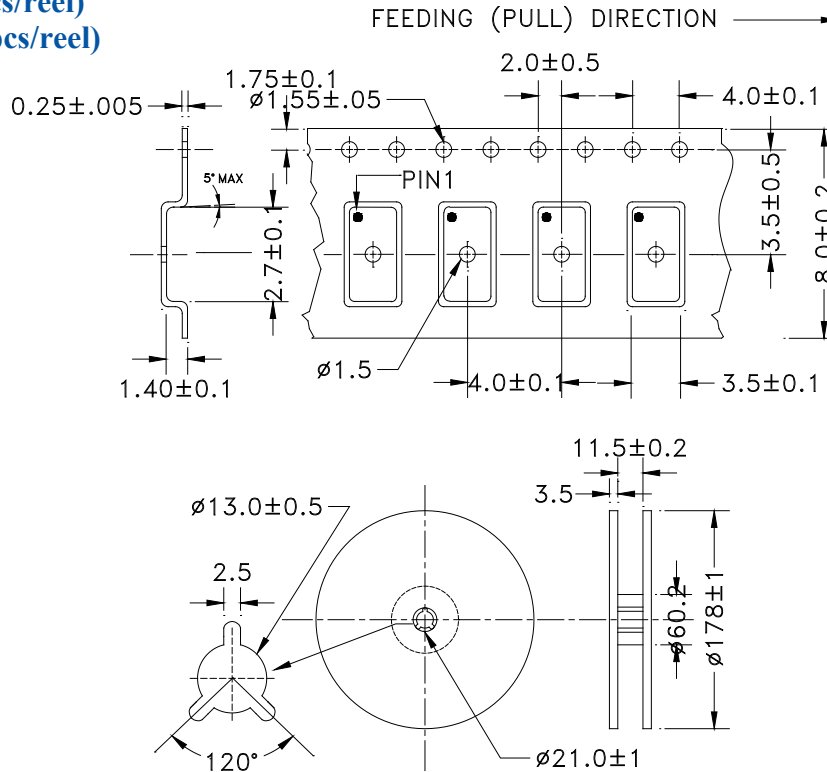


## REFLOW PROFILE



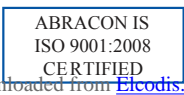
## TAPE & REEL:

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



Dimensions: mm

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