

SMD CMOS PROGRAMMABLE CRYSTAL OSCILLATOR



AP2S

2.5 x 2.0 x 0.81mm

AP2S

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
- Low RMS phase jitter
- Short lead time
- Suitable for mass production

ELECTRICAL SPECIFICATIONS:

Parameters		Minimum	Typical	Maximum	Units	Notes
Frequency Range	V _{dd} = 3.3V	1		200	MHz	
	V _{dd} = 2.5V	1		200		
	V _{dd} = 1.8V	1		125		
Operating Temperature		-10		+60	°C	See options
Storage Temperature		-55		+125	°C	
Overall Frequency Stability*		-100		+100	ppm	See options
Supply Voltage (V _{dd})	V _{dd} = 3.3V	3.125	3.30	3.465	V	Standard
	V _{dd} = 2.5V	2.375	2.50	2.625		V _{dd} option 1
	V _{dd} = 1.8V	1.71	1.80	1.89		V _{dd} option 2
Input Current	V _{dd} = 3.3V			35	mA	
	V _{dd} = 2.5V			30		
	V _{dd} = 1.8V			20		
Symmetry***		45	50	55	%	@ 1/2V _{dd}
Rise and Fall Time (Tr/Tf)**	V _{dd} = 3.3V			2	ns	
	V _{dd} = 2.5V			3		
	V _{dd} = 1.8V			4		
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			8	ms	
Tri-state function	"1" (V _{IH} > 0.7*V _{dd}) or Open: Oscillation "0" (V _{IH} < 0.3*V _{dd}): No Oscillation (High Impedance)				
Standby current (Power Down option)			400	uA	V _{dd} = 1.8, 2.5, 3.3V
RMS Phase Jitter		1	2	ps	V _{dd} = 3.3V
		1.1	2	ps	V _{dd} = 2.5V
		1.5	2	ps	V _{dd} = 1.8V
Aging:	-3.0		+3.0	ppm	@+25°C First year

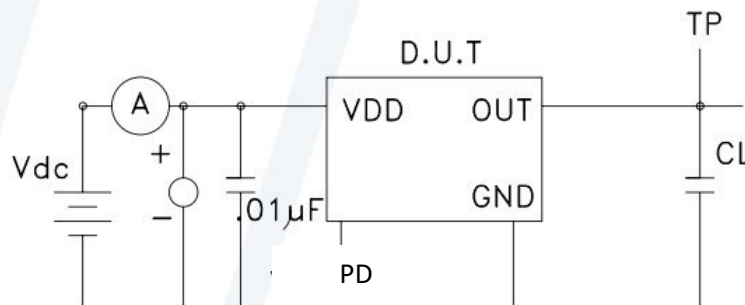
* Inclusive of calibration @25°C, operating temperature range, input voltage variation, load variation, and first year aging.

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

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

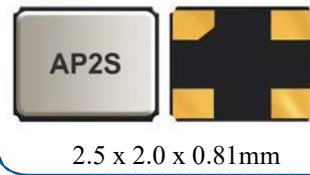
*** Only 40/60% is available for certain frequencies. Please contact Abracon when ordering.

TEST CIRCUIT:



CL = 15pF (including probe capacitance)

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OPTIONS & PART IDENTIFICATION:

AP2S [] - [] MHz - [] [] [] - []

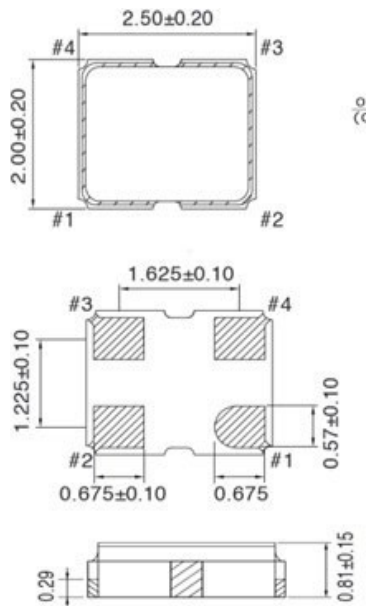
Supply Voltage	Frequency in MHz	Operating Temp.	Overall Freq. Stability	Tri-state pin	Packaging
Blank: 3.3V(*)	Please specify the frequency in MHz. e.g. 14.31818MHz	Blank: -10°C ~ +60°C	Blank: ±100ppm	B: Power Down (**)	Blank: Bulk
1: 2.5V		I: 0°C ~ +50°C	J: ±20ppm (***)		T: Tape & Reel (1k/reel)
2: 1.8V		E: -20°C ~ +70°C	R: ±25ppm		T3: Tape & Reel (3k/reel)
		F: -30°C ~ +70°C	K: ±30ppm		
		N: -30°C ~ +85°C	C: ±50ppm		
	L: -40°C ~ +85°C				

* 3.3V is standard

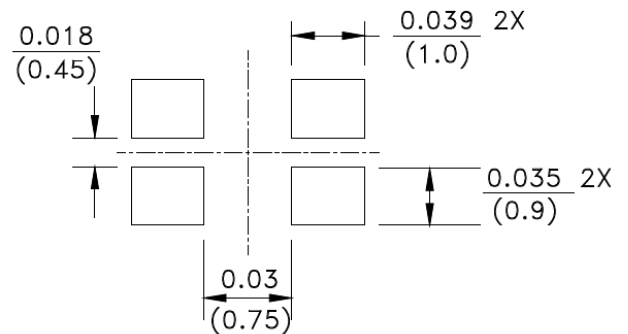
** PDB: Tri-state the output buffer and shut off the oscillator, <400µA when PDB enabled.

*** Contact ABRACON for availability

OUTLINE DRAWING:



Recommended land pattern



Note 2

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

Pin	Function
1	Tri-State
2	GND/Case
3	Output
4	V _{dd}

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 V_{dd} (logic 1)

Dimensions: inches (mm)



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REFLOW PROFILE:

Reflow Profile [JEDEC J-STD-020]

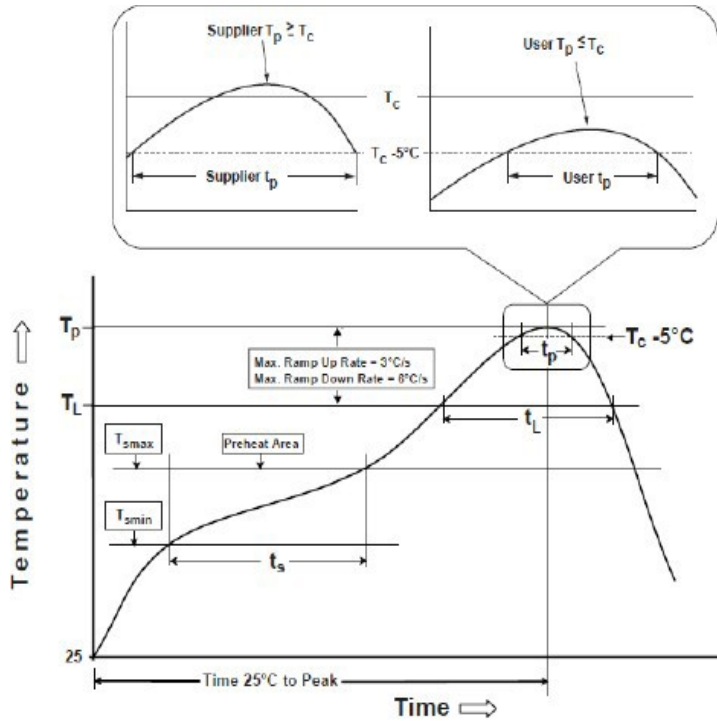


Table 1

SnPb Eutectic Process Classification Temperatures (T_c)		
Package Thickness	Volume mm^3 <350	Volume mm^3 \geq 350
<2.5 mm	235 °C	220 °C
\geq 2.5 mm	220 °C	220 °C

Table 2

Pb-Free Process Classification Temperatures (T_c)			
Package Thickness	Volume mm^3 <350	Volume mm^3 350-2000	Volume mm^3 >2000
<1.6 mm	260 °C	260 °C	260 °C
1.6 mm - 2.5 mm	260 °C	250 °C	245 °C
>2.5 mm	250 °C	245 °C	245 °C

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat / soak		
Temperature minimum (T_{smin})	100 °C	150 °C
Temperature maximum (T_{smax})	150 °C	200 °C
Time (T_{smin} to T_{smax}) (t_s)	60 - 120 sec.	60 - 120 sec.
Average ramp-up rate (T_{smax} to T_p)	3 °C/sec. max	3 °C/sec. max
Liquidous temperature (T_L)	183 °C	217 °C
Time at liquidous (t_L)	60 - 150 sec.	60 - 150 sec.
Peak package body temperature (T_p)*	see Table 1	see Table 2
Time (t_p)** within 5 °C of the specified classification temperature (T_c)	20 sec.	30 sec.
Ramp-down rate (T_p to T_{smax})	6 °C/sec. max	6 °C/sec. max
Time 25 °C to peak temperature	6 min. max	8 min. max
Reflow cycles	2 max	2 max

*Tolerance for peak profile temperature (T_p) is defined as a supplier minimum and a user maximum.

**Tolerance for time at peak profile temperature (t_p) is defined as supplier minimum and a user maximum.

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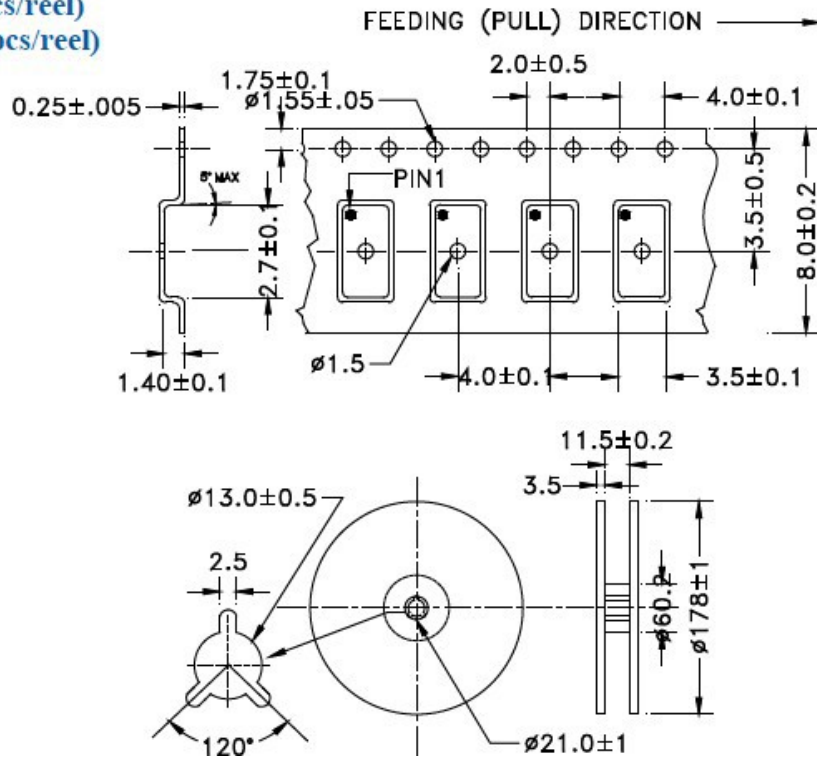


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TAPE & REEL:

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



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