

ECN/PCN No.: **4462**

For Manufacturer			
<b>Product Description:</b> Ceramic SMD Crystal Oscillator	<b>Abrakon Part Number / Part Series:</b> EH36 Series	<input type="checkbox"/> Documentation only <input checked="" type="checkbox"/> ECN <input checked="" type="checkbox"/> EOL	<input checked="" type="checkbox"/> Series <input type="checkbox"/> Part Number
<b>Affected Revision:</b> Rev. F 02/27/2015	<b>New Revision:</b> EOL	<b>Application:</b>	<input type="checkbox"/> Safety <input checked="" type="checkbox"/> Non-Safety
<b>Prior to Change:</b> ACTIVE			
<b>After Change:</b> EOL			
<b>Cause/Reason for Change:</b> Discontinuation of manufacturing capability			
Change Plan			
<b>Effective Date:</b> 11/15/2022	<b>Additional Remarks:</b> N/A		
<b>Change Declaration:</b> N/A			
<b>Issued Date:</b> 11/15/22	<b>Issued By:</b> Conor Healey	<b>Issued Department:</b> Engineering	
<b>Approval:</b> Thomas Culhane Engineering Director	<b>Approval:</b> Reuben Quintanilla Quality Director	<b>Approval:</b> Ying Huang Purchasing Director	
For Abracon EOL only			
<b>Last Time Buy (if applicable):</b> 02-15-2023 Based upon material availability, contact Abracon for details		<b>Alternate Part Number / Part Series:</b> ASFLDV, ASFL1	
<b>Additional Approval:</b>	<b>Additional Approval:</b>	<b>Additional Approval:</b>	
Customer Approval (If Applicable)			
<b>Qualification Status:</b> <input type="checkbox"/> Approved <input type="checkbox"/> Not accepted <i>Note: It is considered approved if there is no feedback from the customer 1 month after ECN/PCN is released.</i>			
<b>Customer Part Number:</b>		<b>Customer Project:</b>	
<b>Company Name:</b>	<b>Company Representative:</b>	<b>Representative Signature:</b>	
<b>Customer Remarks:</b>			

## REGULATORY COMPLIANCE



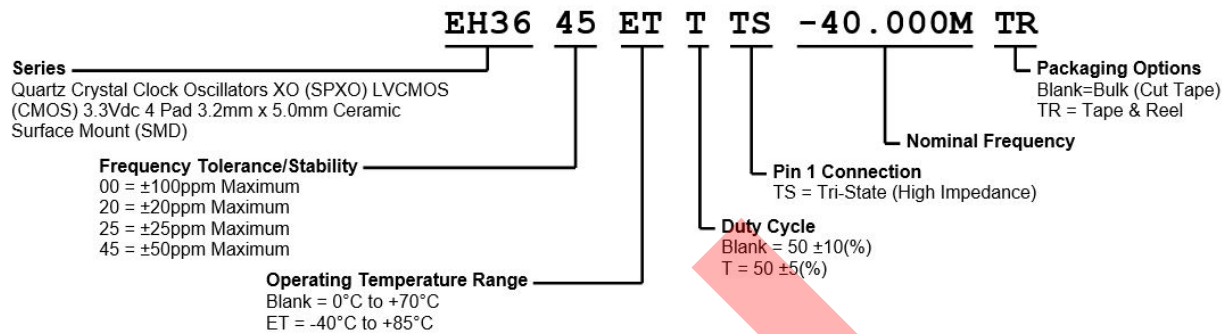
## ITEM DESCRIPTION

Quartz Crystal Clock Oscillators XO (SPXO) LVCMOS (CMOS) 3.3Vdc 4 Pad 3.2mm x 5.0mm Ceramic Surface Mount (SMD)

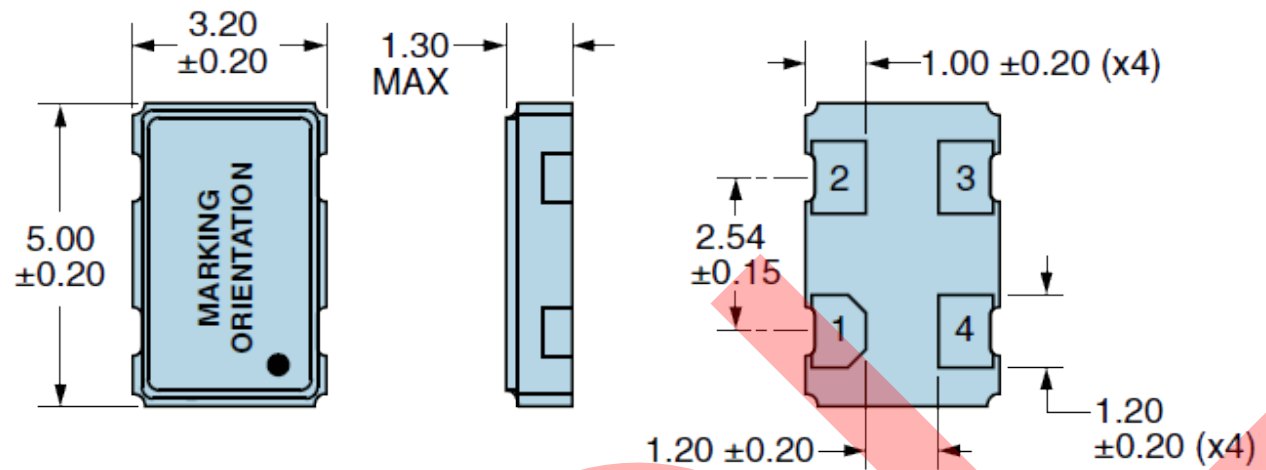
## ELECTRICAL SPECIFICATIONS

Nominal Frequency	1MHz to 155.52MHz
Frequency Tolerance/Stability	Inclusive of all conditions: Calibration Tolerance at 25°C, Frequency Stability over the Operating Temperature Range, Supply Voltage Change, Output Load Change, 1st Year Aging at 25°C, Shock, and Vibration ±100ppm Maximum ±20ppm Maximum ±25ppm Maximum ±50ppm Maximum
Aging at 25°C	±5ppm/year Maximum
Operating Temperature Range	0°C to +70°C -40°C to +85°C
Supply Voltage	3.3Vdc ±10%
Input Current	No Load 35mA Maximum
Output Voltage Logic High (V <sub>OH</sub> )	I <sub>OH</sub> = -8mA 2.7Vdc Minimum
Output Voltage Logic Low (V <sub>OL</sub> )	I <sub>OL</sub> = +8mA 0.5Vdc Maximum
Rise/Fall Time	Measured at 20% to 80% of waveform 6nSec Maximum over Nominal Frequency of 1MHz to 70MHz 4nSec Maximum over Nominal Frequency of 70.000001MHz to 155.52MHz
Duty Cycle	Measured at 50% of waveform 50 ±10(%) 50 ±5(%)
Load Drive Capability	30pF Maximum over Nominal Frequency of 1MHz to 70MHz 15pF Maximum over Nominal Frequency of 70.000001MHz to 155.52MHz
Output Logic Type	CMOS
Pin 1 Connection	Tri-State (High Impedance)
Tri-State Input Voltage (V <sub>IH</sub> and V <sub>IL</sub> )	70% of V <sub>DD</sub> Minimum to enable output, 20% of V <sub>DD</sub> Maximum to disable output, No Connect to enable output.
Absolute Clock Jitter	±250pSec Maximum, ±100pSec Typical
One Sigma Clock Period Jitter	±50pSec Maximum, ±40pSec Typical
Start Up Time	10mSec Maximum
Storage Temperature Range	-55°C to +125°C

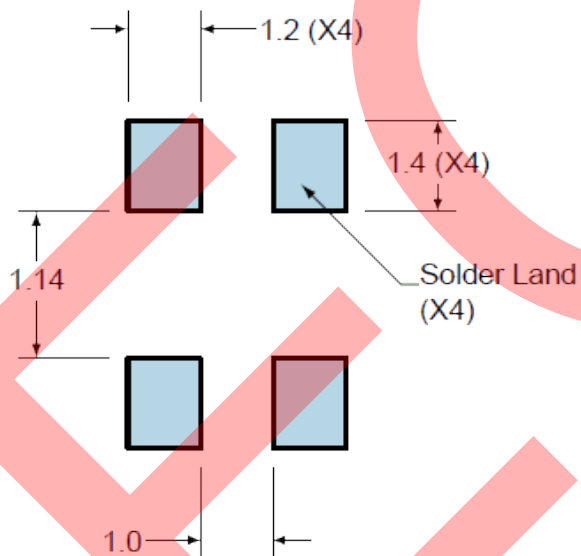
## PART NUMBERING GUIDE



## MECHANICAL DIMENSIONS



## SUGGESTED SOLDER PAD LAYOUT

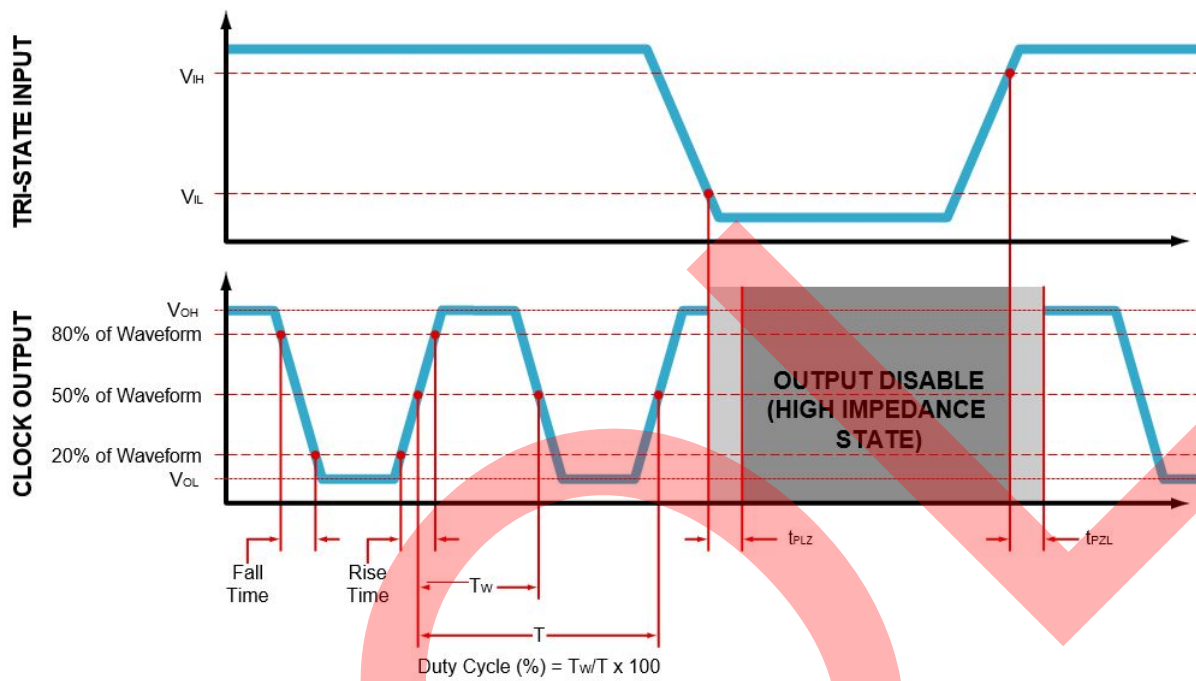


PIN	CONNECTION
1	Tri-State
2	Ground/Case Ground
3	Output
4	Supply Voltage

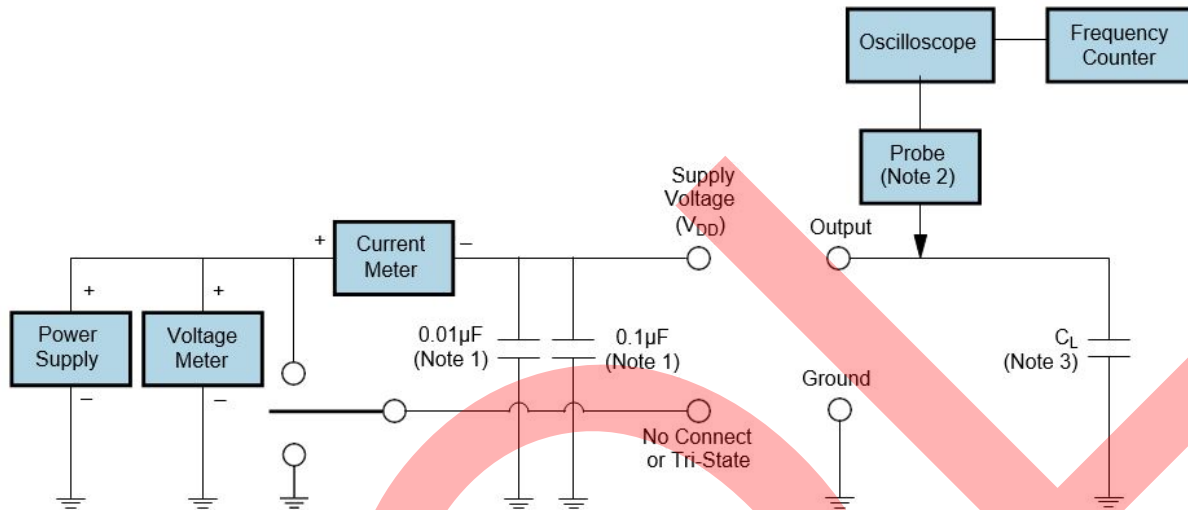
All Tolerances are  $\pm 0.1$ 

All Dimensions in Millimeters

## OUTPUT WAVEFORM &amp; TIMING DIAGRAM



## TEST CIRCUIT FOR CMOS OUTPUT



**Note 1:** An external 0.1µF low frequency tantalum bypass capacitor in parallel with a 0.01µF high frequency ceramic bypass Capacitor close to the package ground and VDD pin is required.

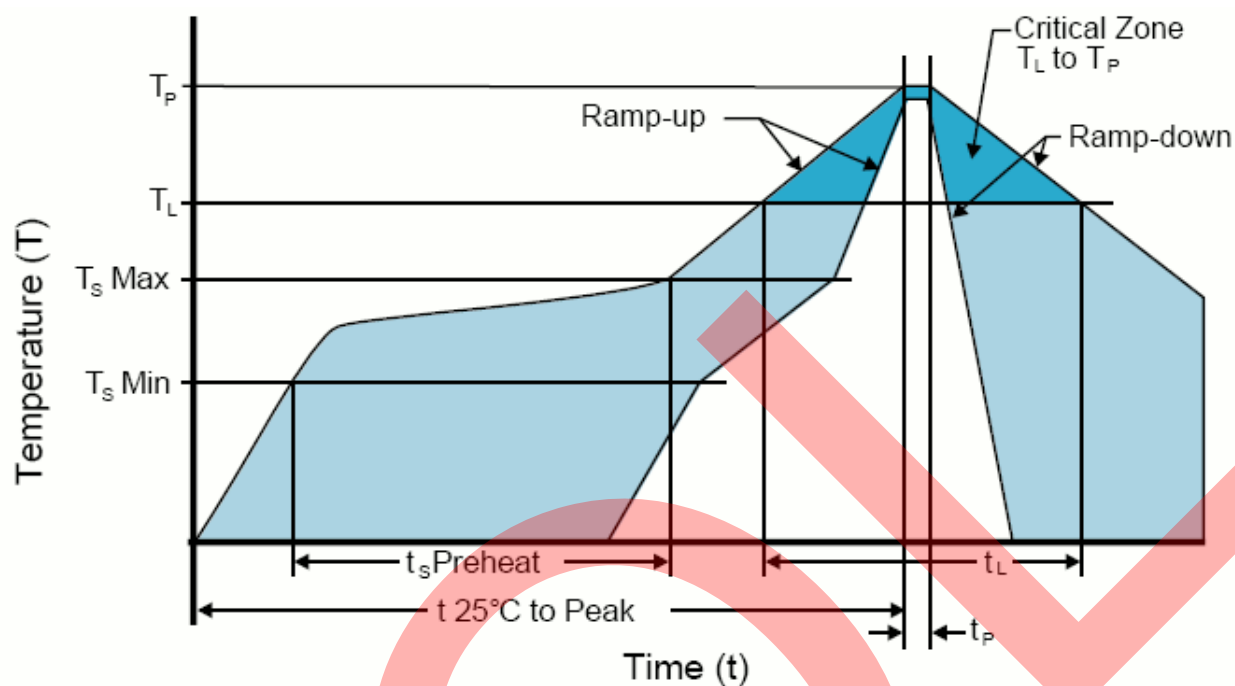
**Note 2:** A low capacitance (<12pF), 10X attenuation factor, high impedance (>10Mohms), and high bandwidth (>300MHz) passive probe is recommended.

**Note 3:** Capacitance value  $C_L$  includes sum of all probe and fixture capacitance.

Compliant to EIA-481



## RECOMMENDED SOLDER REFLOW METHOD



## HIGH TEMPERATURE INFRARED/CONVECTION

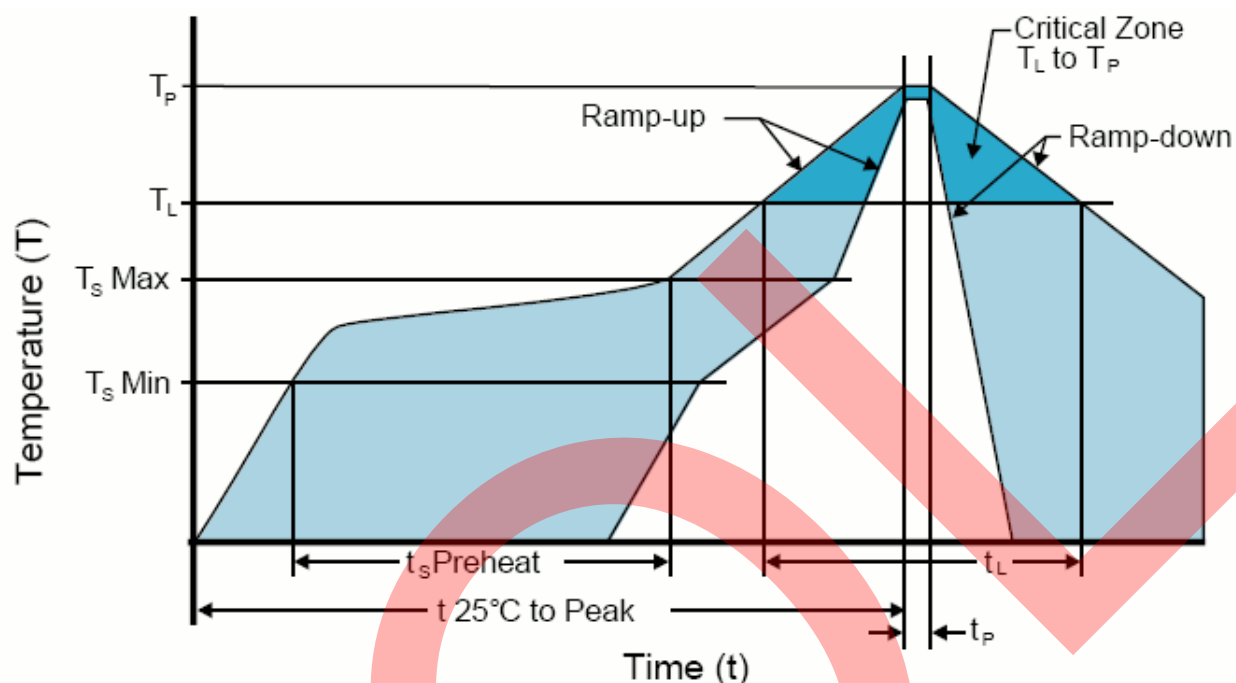
<b><math>T_S</math> MAX to <math>T_L</math> (Ramp-up Rate)</b>	3°C/Second Maximum
<b>Preheat</b>	
- Temperature Minimum ( $T_S$ MIN)	150°C
- Temperature Typical ( $T_S$ TYP)	175°C
- Temperature Maximum ( $T_S$ MAX)	200°C
- Time ( $t_s$ )	60 - 180 Seconds
<b>Ramp-up Rate (<math>T_L</math> to <math>T_P</math>)</b>	3°C/Second Maximum
<b>Time Maintained Above:</b>	
- Temperature ( $T_L$ )	217°C
- Time ( $t_L$ )	60 - 150 Seconds
<b>Peak Temperature (<math>T_P</math>)</b>	260°C Maximum for 10 Seconds Maximum
<b>Target Peak Temperature (<math>T_P</math> Target)</b>	250°C +0/-5°C
<b>Time within 5°C of actual peak (<math>t_P</math>)</b>	20 - 40 Seconds
<b>Ramp-down Rate</b>	6°C/Second Maximum
<b>Time 25°C to Peak Temperature (t)</b>	8 Minutes Maximum
<b>Moisture Sensitivity Level</b>	Level 1
<b>Additional Notes</b>	Temperatures shown are applied to body of device.

## High Temperature Manual Soldering

260°C Maximum for 5 Seconds Maximum, 2 times Maximum. (Temperatures shown are applied to body of device.)



## RECOMMENDED SOLDER REFLOW METHOD



## LOW TEMPERATURE INFRARED/CONVECTION

<b><math>T_S</math> MAX to <math>T_L</math> (Ramp-up Rate)</b>	5°C/Second Maximum
<b>Preheat</b>	
- Temperature Minimum ( $T_S$ MIN)	N/A
- Temperature Typical ( $T_S$ TYP)	150°C
- Temperature Maximum ( $T_S$ MAX)	N/A
- Time ( $t_s$ )	60 - 120 Seconds
<b>Ramp-up Rate (<math>T_L</math> to <math>T_P</math>)</b>	5°C/Second Maximum
<b>Time Maintained Above:</b>	
- Temperature ( $T_L$ )	150°C
- Time ( $t_L$ )	200 Seconds Maximum
<b>Peak Temperature (<math>T_P</math>)</b>	240°C Maximum
<b>Target Peak Temperature (<math>T_P</math> Target)</b>	240°C Maximum 2 Times / 230°C Maximum 1 Time
<b>Time within 5°C of actual peak (<math>t_P</math>)</b>	10 Seconds Maximum 2 Times / 80 Seconds Maximum 1 Time
<b>Ramp-down Rate</b>	5°C/Second Maximum
<b>Time 25°C to Peak Temperature (t)</b>	N/A
<b>Moisture Sensitivity Level</b>	Level 1
<b>Additional Notes</b>	Temperatures shown are applied to body of device.

## Low Temperature Manual Soldering

185°C Maximum for 10 Seconds Maximum, 2 times Maximum. (Temperatures shown are applied to body of device.)