



## CMOS HA-A1450 Series

### Description

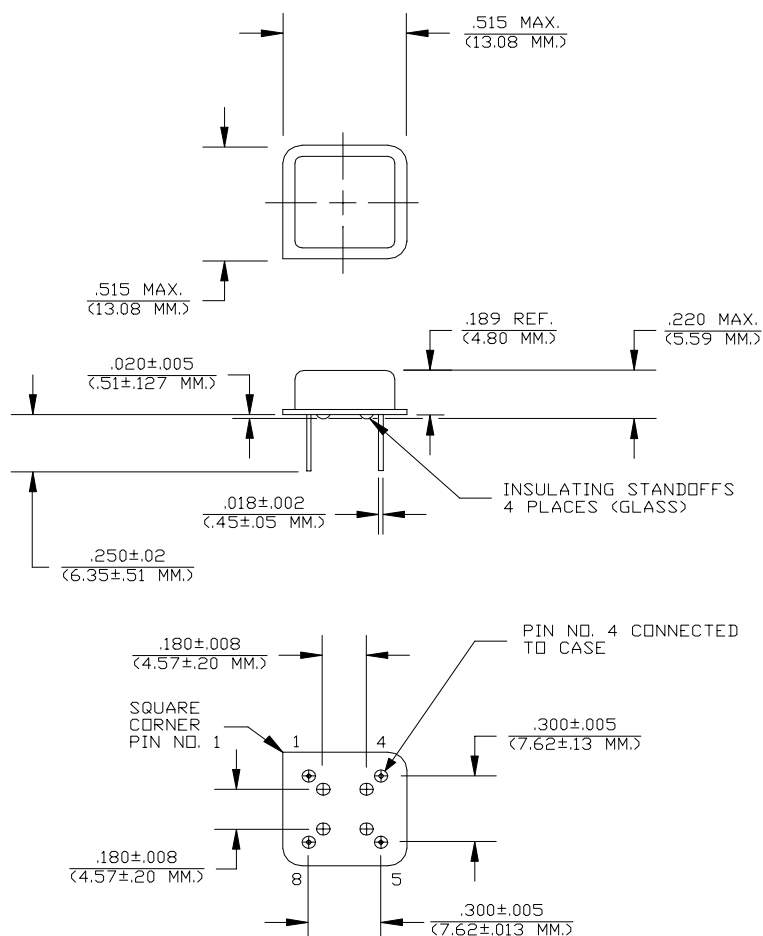
The **HA-A1450 Series** of quartz crystal oscillators provide enable/disable 3-state CMOS compatible signals for bus connected systems. Supplying Pin 1 of the HA-A1450 units with a logic "1" or open enables its pin 8 output. In the disabled mode, pin 8 presents a high impedance to the load. All units are designed to survive wave soldering operations without damage.

### Features

- Wide frequency range— 0.5MHz to 30.0MHz
- User specified tolerance available
- Will withstand vapor phase temperatures of 253°C for 4 minutes maximum
- Space-saving alternative to discrete component oscillators
- High shock resistance, to 3000g
- All metal, resistance weld, hermetically sealed package
- 3.3 volt operation
- Low Jitter
- High Q Crystal actively tuned oscillator circuit
- Power supply decoupling internal
- No internal PLL avoids cascading PLL problems
- Low power consumption
- Gold plated leads - Solder dipped leads available upon request
- CMOS and LVTTTL output levels

### Electrical Connection

Pin	Connection
1	Enable Input
4	Grd & Case
5	Output
8	V <sub>DD</sub>



Dimensions are in inches and (MM)



**FREQUENCY  
CONTROLS, INC.**

HA-A1450 Series Continued  
CMOS

Rev. C

## Operating Conditions and Output Characteristics

### Electrical Characteristics

Parameter	Symbol	Conditions	Min	Typical	Max
Frequency	-----	-----	0.5MHz	-----	30.0MHz
Duty Cycle	-----	@ $V_{DD}/2$	45/55%	-----	55/45%
Logic 0	$V_{OL}$	@ 600 $\mu$ A	-----	-----	0.2V
Logic 1	$V_{OH}$	@ 600 $\mu$ A	$V_{DD}-0.2V$	-----	-----
Rise & Fall Time	$t_{r,tf}$	10-90%	-----	-----	3 ns
$T_{pz}$	-----	-----	-----	-----	25 ns
Jitter, RMS <sup>(2)</sup>	-----	-----	-----	-----	8 psec
Enable/Disable					
Logic High Voltage	-----	-----	$V_{DD}-1.5V$	-----	-----
Logic Low Voltage	-----	-----	-----	-----	1.5V
Frequency Stability <sup>(1)</sup>	dF/F	Overall conditions including: voltage, calibration, temp., 10 yr aging, shock, vibration	-100ppm	-----	+100ppm

### General Characteristics

Parameter	Symbol	Conditions	Min	Typical	Max
Supply Voltage	$V_{DD}$	-----	3.135V	3.3V	3.465V
Supply Current	$I_{DD}$	No Load	0.0 mA	-----	40mA
Output current	$I_O$	-----	0.0 mA	-----	$\pm 16.0$ mA
Operating temperature	$T_A$	-----	0°C	-----	70°C
Storage temperature	$T_S$	-----	-55°C	-----	125°C
Power Dissipation	$P_D$	-----	-----	-----	138 mW
Lead temperature	$T_L$	Soldering, 10 sec.	-----	-----	300°C
Load	-----	-----	-----	-----	15pf
Start-up time	$t_s$	-----	-----	2 ms	10 ms

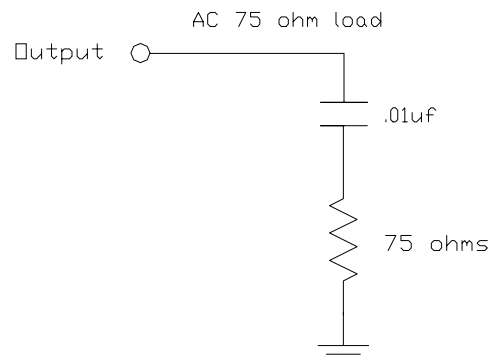
### Environmental and Mechanical Characteristics

Mechanical Shock Per MIL-STD-202, Method 213, Condition E  
 Thermal Shock Per MIL-STD-833, Method 1011, Condition A  
 Vibration 0.060" double amplitude 10 Hz to 55 Hz, 35g's 55Hz to 2000 Hz  
 Soldering Condition 300°C for 10 seconds  
 Hermetic Seal Leak rate less than  $1 \times 10^{-8}$  atm.cc/sec of helium

#### Footnotes:

- 1) Standard frequency stability ( $\pm 20, \pm 25, \pm 50$ ppm & others available)
- 2) Jitter performance is frequency dependent. Please contact factory for full characterization.

#### Test Load:



#### Creating a Part Number

HA - A145X - FREQ

#### Package Code

HA Leaded 4 pin (8 pin)  
 SA Leaded 4 pin (8 pin) SMD  
 Gull Wing

#### Input Voltage

Code Specification  
 A 3.3V  
 5V

#### Tolerance/Performance

0  $\pm 100$ ppm 0-70°C  
 1  $\pm 50$ ppm 0-70°C  
 7  $\pm 25$ ppm 0-70°C  
 9 Customer Specific  
 A  $\pm 20$ ppm 0-70°C  
 B  $\pm 50$ ppm -40 to +85°C  
 C  $\pm 100$ ppm -40 to +85°C



**FREQUENCY  
CONTROLS, INC.**