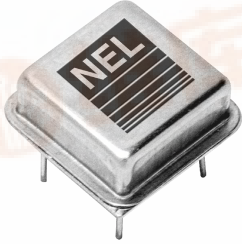


CRYSTAL CLOCK OSCILLATORS

Data Sheet 0021D

Rev. C



CMOS (TTL Compatible) HA-460 Series

Description

The **HA-460 Series** of quartz crystal oscillators are resistance welded in an all metal package, offering RFI shielding, and are designed to survive standard wave soldering operations without damage. Insulated standoffs to enhance board cleaning are standard.

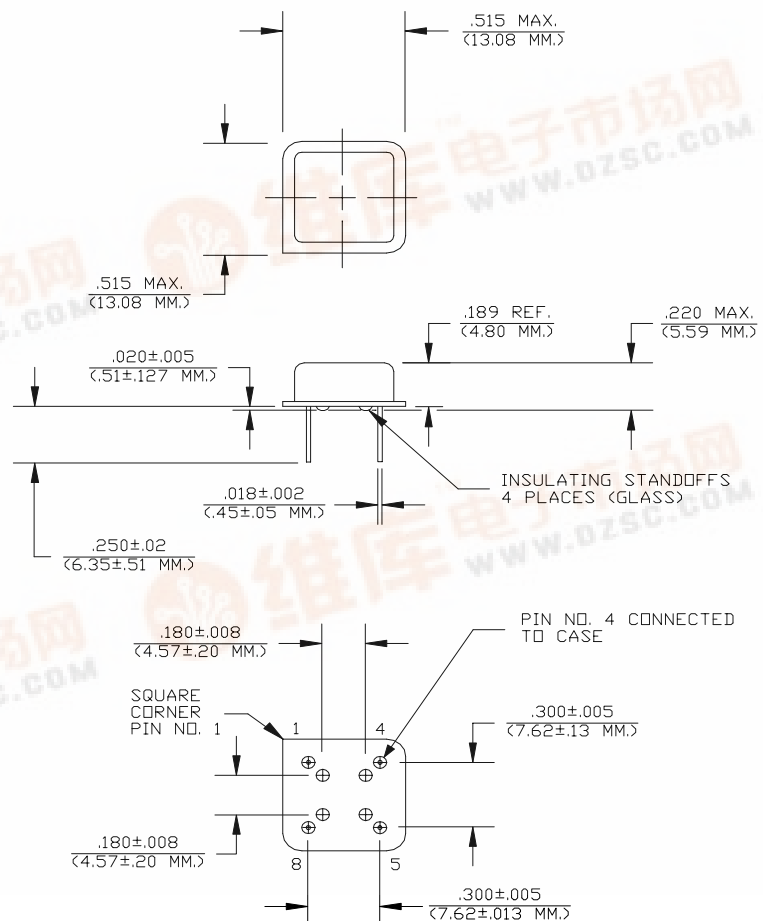
Features

- 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
- Low Jitter
- High Q Crystal actively tuned oscillator circuit
- Low power consumption
- Power supply decoupling internal
- No internal PLL avoids cascading PLL problems
- High frequencies due to proprietary design
- Gold plated leads - Solder dipped leads available upon request
- CMOS and TTL output levels

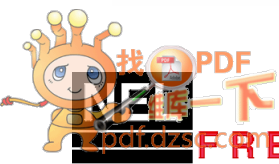
Electrical Connection

Pin Connection

1	N.C.
4	Grd & Case
5	Output
8	V _{DD}



Dimensions are in inches and MM.



HA-460 Series Continued
CMOS (TTL Compatible)

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 μ A @ 16mA	-----	-----	0.2V 0.4V
Logic 1	V_{OH}	@ 600 μ A @ 16mA	$V_{DD}-0.2V$ $V_{DD}-0.4V$	-----	-----
Rise & Fall Time	tr,tf	10-90% V_O	-----	-----	3 ns
Jitter, RMS ⁽²⁾	-----	-----	-----	-----	8.0 psec
Frequency Stability ⁽¹⁾	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}	-----	4.5V	5.0V	5.5V
Supply Current	I_{DD}	No Load	0.0 mA	-----	30 mA
Output current	I_O	-----	0.0 mA	-----	± 16.0 mA
Operating temperature	T_A	-----	0°C	-----	70°C
Storage temperature	T_S	-----	-55°C	-----	125°C
Power Dissipation	P_D	-----	-----	-----	210 mW
Lead temperature	T_L	Soldering, 10 sec.	-----	-----	300°C
Load	-----	-----	-----	-----	15pf
Start-up Time	t_s	<20MHz 20MHz or greater	-----	-----	2 ms 10 ms

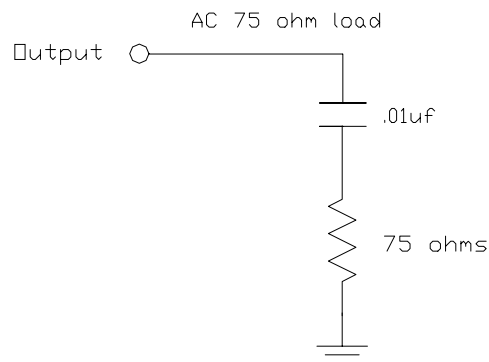
Environmental and Mechanical Characteristics

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 1×10^{-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 - A46X - FREQ

Package Code

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

Input Voltage

Code Specification
A 3.3V
5V

Tolerance/Performance

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