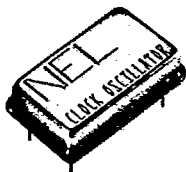


# NEL Crystal Clock Oscillators

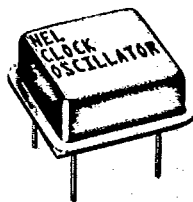
## TTL COMPATIBLE

**HS-100 Series**  
7.80 kHz-63.0 MHz

**HS-500 Series**  
63 + MHz-70.0 MHz



HS-100/500 Series



HA-100 Series  
(See Options)

## Description

The HS-100/HS-500 Series of quartz crystal clock oscillators are general purpose, TTL and STTL compatible oscillators. The HS-100 features a custom integrated circuit for improved reliability (MTTF).

All units 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.

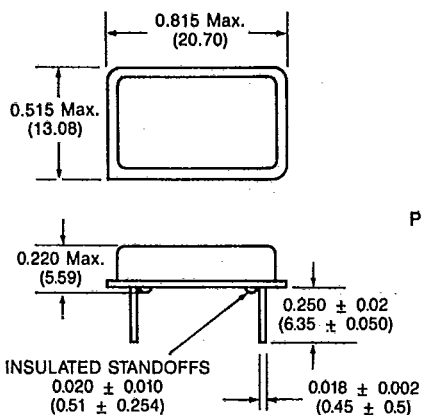
## Suggested Applications

HS-100 and HS-500 Series oscillators are ideally suited for microprocessor timing control and use in instrument controllers.

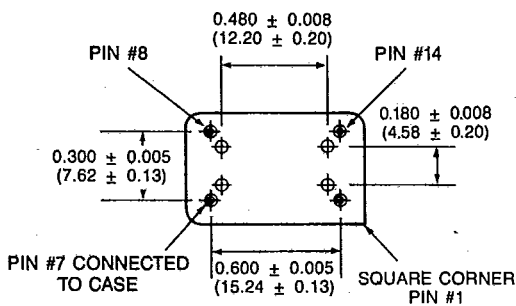
## Features

- Wide frequency range—7.80 kHz to 70.0 MHz
- User specified tolerance, from  $\pm 0.0025\%$
- Case at electrical ground
- Low power consumption
- High reliability
- All metal, resistance weld, hermetically sealed package
- High shock resistance, to 3,000 G's

## Dimensions



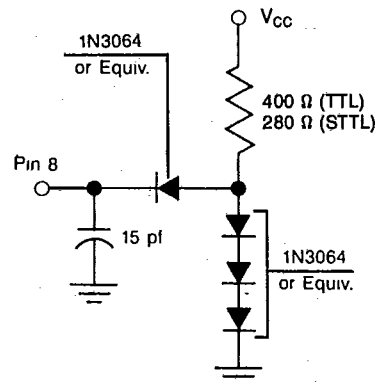
Dimensions are for reference only, inches (mm).



| Pin | Connection      |
|-----|-----------------|
| 1   | NC              |
| 7   | grd and case    |
| 8   | Output          |
| 14  | V <sub>CC</sub> |

## Equivalent Loads

### TTL, STTL



(Cont. on next page)

# Crystal Clock Oscillators



## Specifications

| PARAMETER                       | CONDITIONS          | MINIMUM   | MAXIMUM                            |
|---------------------------------|---------------------|-----------|------------------------------------|
| <b>General Characteristics</b>  |                     |           |                                    |
| Supply voltage ( $V_{CC}$ )     | < 25 MHz            | 4.5 V     | 5.5 V                              |
|                                 | ≥ 25 MHz            | 4.75 V    | 5.25 V                             |
|                                 | Breakdown           | -0.5 V    | 7.0 V                              |
| Supply current ( $I_{CC}$ )     | ≤ 625 kHz           | —         | 50 mA                              |
|                                 | > 625 kHz to 25 MHz | —         | 30 mA                              |
|                                 | > 25 MHz            | —         | 60 mA                              |
| Output current ( $I_O$ )        | High or low level   | 0.0 mA    | ±25.0 mA                           |
| Tolerance                       | User specified      | ± 0.0025% | —                                  |
| Operating temperature ( $T_A$ ) | —                   | 0° C      | 70° C                              |
| Storage temperature ( $T_S$ )   | —                   | -55° C    | +125° C                            |
| Power dissipation ( $P_D$ )     | —                   | —         | 275 mW (HS-100)<br>500 mW (HS-500) |
| Lead temperature ( $T_L$ )      | Soldering, 10 s     | —         | 300° C                             |

## TTL COMPATIBLE

HS-100 Series  
7.80 kHz-63.0 MHz

HS-500 Series  
63 + MHz-70.0 MHz

(Continued)

### Output Characteristics — TTL, HS-100

|                                 |                           |          |          |
|---------------------------------|---------------------------|----------|----------|
| Frequency                       | —                         | 7.80 kHz | 25.0 MHz |
| Symmetry                        | @ 1.4 V                   | 40/60%   | 60/40%   |
|                                 | Optional, ≤ 20 MHz        | 45/55%   | 55/45%   |
| Logic 0 ( $V_{OL}$ )            | Driving equiv. load       | —        | 0.4 V    |
| Logic 1 ( $V_{OH}$ )            | Driving equiv. load       | 2.4 V    | —        |
| Logic 0 ( $I_{OL}$ sink)        | Driving equiv. load       | —        | 16.0 mA  |
| Logic 1 ( $I_{OH}$ source)      | Driving equiv. load       | —        | 0.4 mA   |
| Rise & fall time ( $t_r, t_f$ ) | ≤ 20 MHz (0.4 V to 2.4 V) | —        | 10 ns    |
|                                 | > 20 MHz (0.4 V to 2.4 V) | —        | 5 ns     |
| Start time ( $t_{ON}$ )         | —                         | —        | 2 ms     |

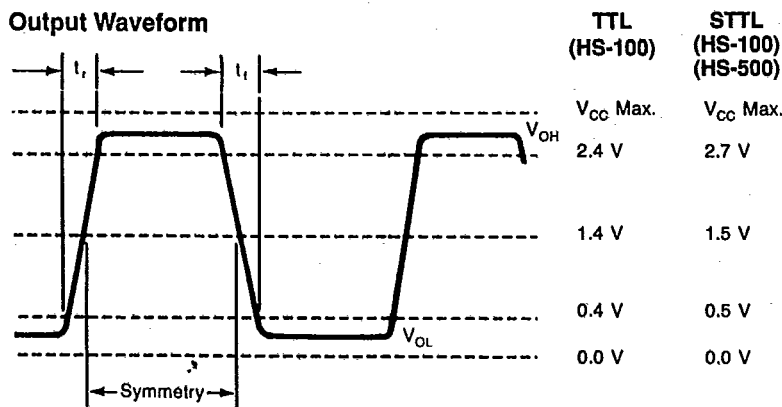
### Output Characteristics — STTL, HS-100/HS-500

|                                 |                     |          |                                  |
|---------------------------------|---------------------|----------|----------------------------------|
| Frequency                       | —                   | 25.0 MHz | 70.0 MHz                         |
| Symmetry                        | @ 1.5 V             | 40/60%   | 60/40%                           |
| Logic 0 ( $V_{OL}$ )            | Driving equiv. load | —        | 0.5 V                            |
| Logic 1 ( $V_{OH}$ )            | Driving equiv. load | 2.7 V    | —                                |
| Logic 0 ( $I_{OL}$ sink)        | Driving equiv. load | —        | 20.0 mA                          |
| Logic 1 ( $I_{OH}$ source)      | Driving equiv. load | —        | 1.0 mA                           |
| Rise & fall time ( $t_r, t_f$ ) | 0.5 V to 2.7 V      | —        | 5 ns                             |
| Start time ( $t_{ON}$ )         | —                   | —        | 20 ms (HS-100)<br>25 ms (HS-500) |

### Options

- 3-State Enable/Disable  
HS-1200/1210 Series  
500 kHz to 36.0 MHz  
(See page 28 this catalog)
- Dual Output  
HS-2250 Series  
62.500 kHz to 20.00 MHz  
(See page 30 this catalog)
- Dual Output  
Independent Frequencies  
HS-2400 Series  
500 kHz to 36.0 MHz  
(See page 30 this catalog)
- Metal Half Pack HA/SA Series  
500 kHz to 56.0 MHz  
(Dimensions - see page 35)
- Gull wing surface mount package  
available for all TTL compatible  
oscillators. (Dimensions - see  
page 35)

### Output Waveform





### NEW PRODUCTS

In our continued effort to provide quality products to meet the needs of the changing electronics market, NEL is in the process of developing several new products.

Among these are:

#### TTL/CMOS Oscillator

Frequency range 70 to 100 MHz. User tolerance available from  $\pm .005\%$ .

#### 3-State CMOS/TTL

Frequency range extended to 80MHz. User tolerance available from  $\pm .005\%$ .

#### Z80/8000/80A/80B Oscillator

Frequency range on HS-380/2890 Series extended to 40.0MHz. User tolerance available from  $\pm .0025\%$ .

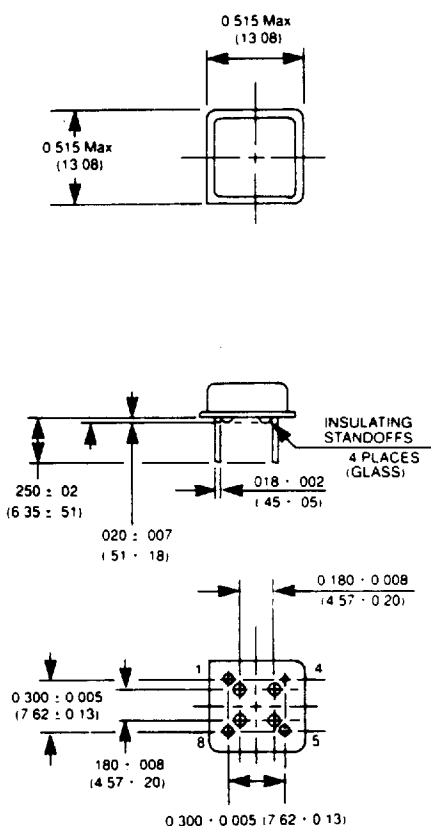
#### Programmable Video Clock Generator

For use in the computer graphics, disk drive (zone locator) and fiber optics markets.

This product simplifies operations by using phase-locked loop techniques to generate, from the crystal oscillator, all the necessary clocks used in a typical graphics system.

## OSCILLATOR METAL HALF PACK AND SURFACE MOUNT DIMENSIONS

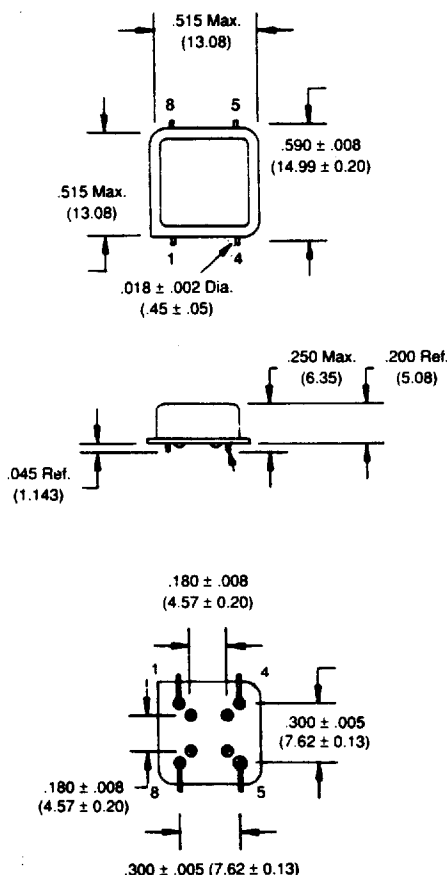
### HA Series



Pin number 4 connected to case.

The metal half pack oscillator is available in TTL, CMOS, and Z80 logics. See options on pages 17, 20, 29, and 33 for details.

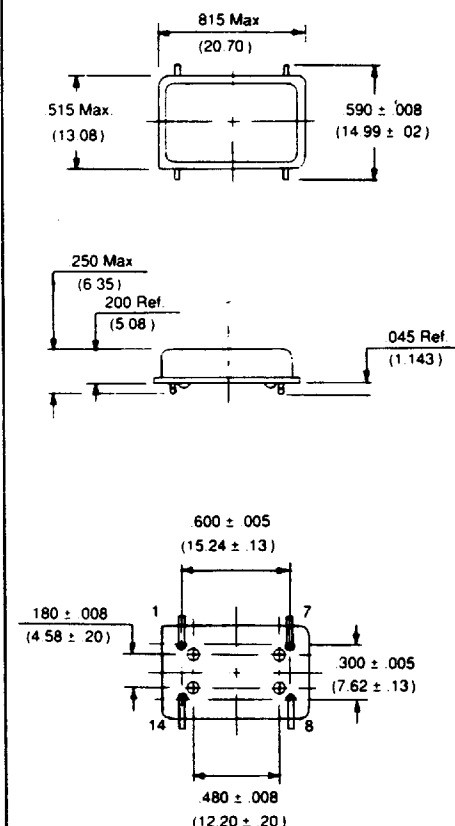
### SA Series



Pin number 4 connected to case.

Seating plane = .005 Max. (.127)  
Wire leads to be formed to a 90° angle.

### SM Series



Pin number 7 connected to case.

Seating plane = .005 Max. (.127)  
Wire leads to be formed to a 90° angle.

Dimensions are for reference only, inches (mm).