

### Positive ECL (PECL) HA-A870 Series

### Description

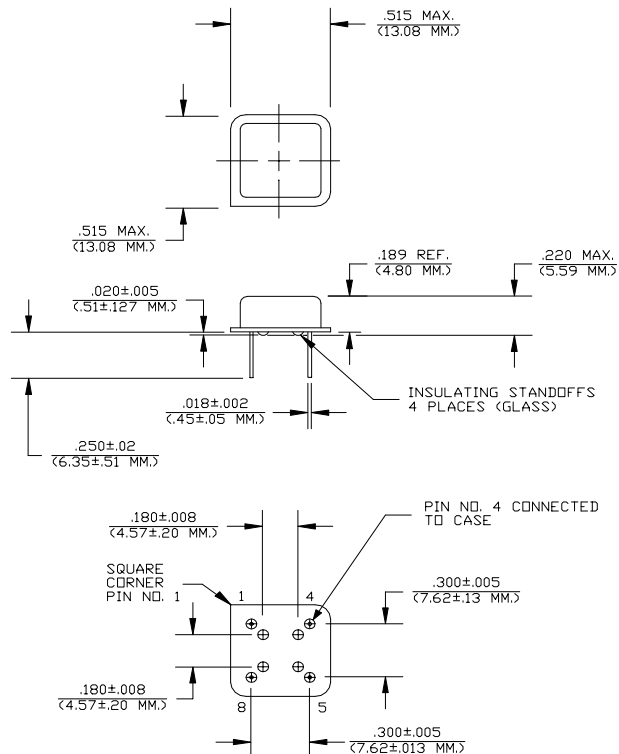
The **HA-A870 Series** of quartz crystal oscillators provide MECL 10K and 10KH series compatible signals in industry standard four pin DIP hermetic package. Systems designers may now specify space-saving, cost-effective packaged PECL oscillators to meet their timing requirements.

### Features

- Wide frequency range—18.0MHz to 250.0MHz
- 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
- 3.3Volt operation
- All metal, resistance weld, hermetically sealed package
- Low Jitter
- MECL 10K and 10KH series compatible output on Pin 5, complement on Pin 1
- High Q Crystal actively tuned oscillator circuit
- 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

### Electrical Connection

Pin	Connection
1	Output Complement
4	V <sub>EE</sub> /Ground
5	Output
8	V <sub>CC</sub>



Dimensions are in inches and (MM)

**HA-A870 Series** Continued  
Positive ECL (PECL)

**Rev. L**

## Operating Conditions and Output Characteristics

### Electrical Characteristics

Parameter	Symbol	Conditions	Min	Typical	Max
Frequency	----	----	18.0MHz	----	250.0MHz
Duty Cycle	----	@ $V_{CC}-1.29V$	45/55%	----	55/45%
Logic 0 <sup>(2)</sup>	$V_{OL}$	----	$V_{CC}-1.95V$	----	$V_{CC}-1.60V$
Logic 1 <sup>(2)</sup>	$V_{OH}$	----	$V_{CC}-1.02V$	----	$V_{CC}-0.74V$
Rise & Fall Time	$t_{r,f}$	20-80% $V_O$ with 50 ohm load to $V_{CC}-2V$	----	1.0 ns	----
Jitter, RMS <sup>(3)</sup>	----	----	----	----	5 psec
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	$V_{CC}$	----	3.15V	3.3V	3.45V
Supply Current	$I_{CC}$	50 ohm termination To 2.00V below $V_{CC}$	0.0 mA	----	80 mA
Output current	$I_O$	Low level Output Current	0.0 mA	----	±50.0 mA
Operating temperature	$T_A$	----	0°C	----	70°C
Storage temperature	$T_S$	----	-55°C	----	125°C
Power Dissipation	$P_D$	----	----	----	276 mW
Lead temperature	$T_L$	Soldering, 10 sec.	----	----	300°C
Load	50 Ohm to $V_{CC}-2V$ or Thevenin Equivalent, Bias Required	----	----	----	----
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
ESD Sensitivity	Human Body Model per ON Semiconductor 10kH series ECL: 500V min.

#### Footnotes:

- 1) Standard frequency stability ( $\pm 20, \pm 25, \pm 50$ ppm & others available)
- 2)  $V_{OL}, V_{OH}$ , referenced to ground ( $V_{EE}$ ) with  $V_{CC} = 3.3V$
- 3) Jitter performance is frequency dependent. Please contact factory for full characterization.

#### Creating a Part Number

**HA - A87X - FREQ**

#### Package Code

HA 4 Pin (8 Pin)  
SA 4 Pin (8 Pin) SMD Gull Wing

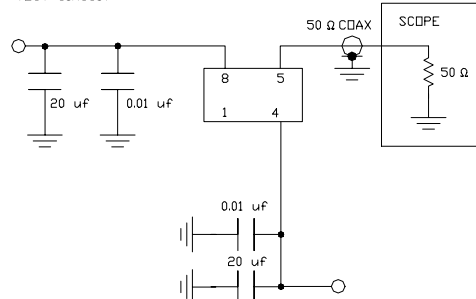
#### Input Voltage

Code Specification  
A 3.3V  
5V

#### Tolerance/Performance

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

TEST CIRCUIT



TEST CIRCUIT USES A SPLIT SUPPLY OF +2V AND -1.3V FOR EASE OF TESTING.