

### Differential Positive ECL (DPECL) HA-2870 Series

#### Description

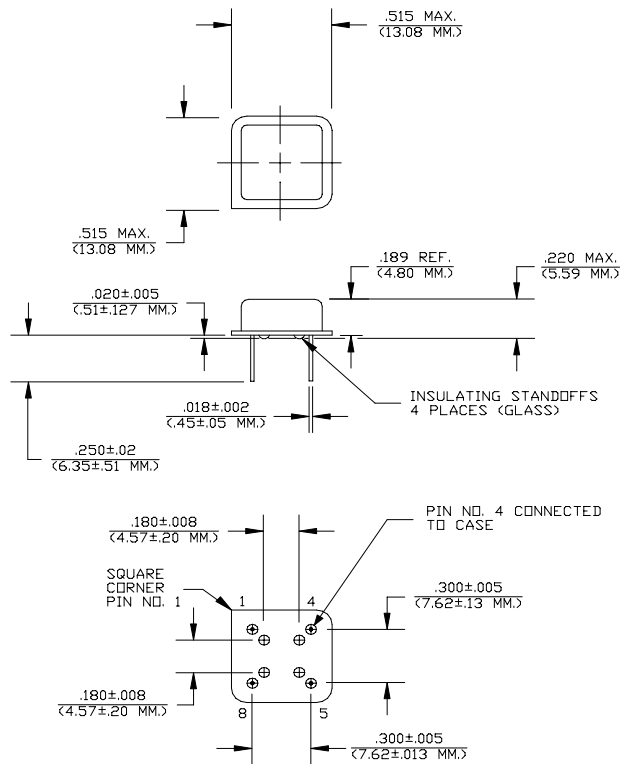
The **HA-2870 Series** of quartz crystal oscillators provide MECL 10K and 10KH series compatible signals in industry standard four pin DIP hermetic package. Systems designers may now specify space-saving, cost-effective packaged PECL oscillators to meet their timing requirements.

#### 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
- 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
- RoHS Compliant, Lead Free Construction (unless solder dipped leads are supplied)
- COTS/Dual use

#### 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-2870 Series Continued Differential Positive ECL (DPECL)

### 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	tr,tf	20-80% $V_O$ with 50 ohm load to $V_{CC}-2V$	-----	1.0 ns	1.5 ns
Tpd <sup>(4)</sup>	-----	-----	-0.5 ns	-----	+0.5 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	$V_{CC}$	-----	4.75V	5.0V	5.25V
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	$P_D$	-----	-----	-----	420 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

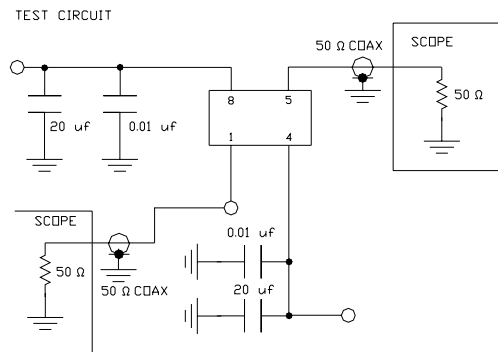
#### Environmental and Mechanical Characteristics

Mechanical Shock	Per MIL-STD-202, Method 213, Condition E
Thermal Shock	Per MIL-STD-883, 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  $V_{CC} = 5.0V$
- 3) Jitter performance is frequency dependent. Please contact factory for full characterization.  
RMS jitter bandwidth of 12kHz to 20MHz.
- 4) Tpd is phase shift between the falling edge of pin 5 at  $V_{CC}-1.29V$  and rising edge of pin 1 at  $V_{CC}-1.29V$ .

Creating a Part Number	
<b>HA - A287X - FREQ</b>	
<b>Package Code</b>	<b>Tolerance/Performance</b>
HA 4 Pin (8 Pin)	0 ±100ppm 0-70°C
SA 4 Pin (8 Pin) SMD Gull Wing	1 ±50ppm 0-70°C
	7 ±25ppm 0-70°C
	9 Customer Specific
<b>Input Voltage</b>	A ±20ppm 0-70°C
Code Specification	B ±50ppm -40 to +85°C
A 3.3V	C ±100ppm -40 to +85°C
5V	



TEST CIRCUIT USES A SPLIT SUPPLY OF +2V AND -3V FOR EASE OF TESTING.