



### Differential Positive ECL (DPECL) HS-A2870 Series

#### Description

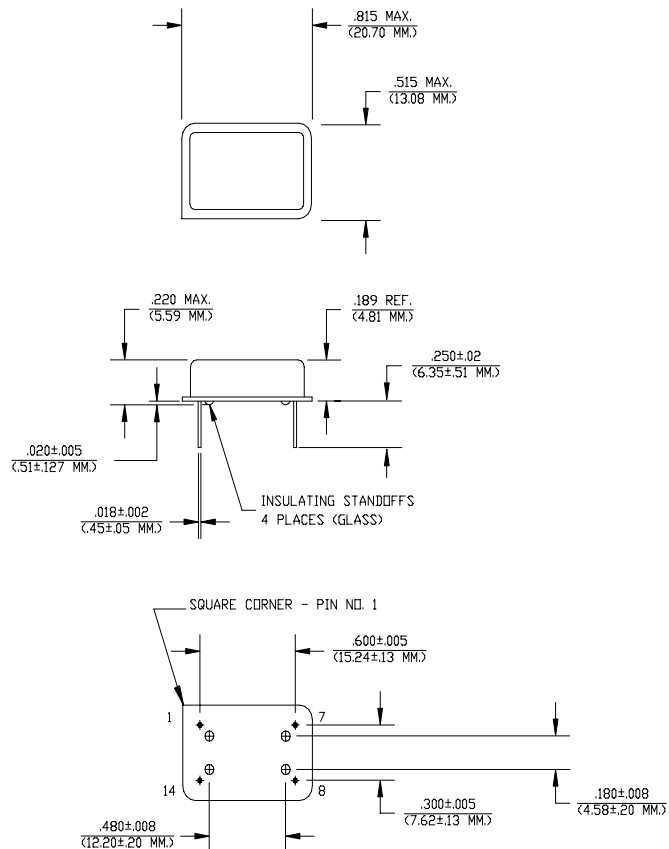
The **HS-A2870 Series** of quartz crystal oscillators provide MECL 10K and 10KH series compatible signals in industry standard four-pin DIP hermetic package. Systems designers may now specify space-saving, cost-effective packaged PECL oscillators to meet their timing requirements. This device is intended to operate on positive voltage for PECL applications.

#### Features

- Wide frequency range—15.0MHz 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
- 3.3 Volt operation
- Metal lid electrically connected to ground to reduce EMI
- Low Jitter
- MECL 10K and 10KH series compatible output on Pin 8, 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       |
| 7   | V <sub>EE</sub> /Ground |
| 8   | Output                  |
| 14  | V <sub>CC</sub>         |



Dimensions are in inches and (MM)

### HS-A2870 Series Continued Differential Positive ECL (DPECL)

### Operating Conditions and Output Characteristics

#### Electrical Characteristics

| Parameter                          | Symbol          | Conditions   | Min                    | Typical | Max                    |
|------------------------------------|-----------------|--|------------------------|---------|------------------------|
| Frequency                          | -----           | -----  | 15.0MHz                | -----   | 250.0MHz               |
| Duty Cycle                         | -----           | @V <sub>CC</sub> -1.29V  | 45/55%                 | -----   | 55/45%                 |
| Logic 0 <sup>(2)</sup>             | V <sub>OL</sub> | -----  | V <sub>CC</sub> -1.95V | -----   | V <sub>CC</sub> -1.60V |
| Logic 1 <sup>(2)</sup>             | V <sub>OH</sub> | -----  | V <sub>CC</sub> -1.02V | -----   | V <sub>CC</sub> -0.74V |
| Rise & Fall Time                   | tr,tf           | 20-80%V <sub>O</sub> with 50 ohm load to V <sub>CC</sub> -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:<br>voltage, calibration, temp.,<br>10 yr aging, shock, vibration | -100ppm                | -----   | +100ppm                |

#### General Characteristics

| Parameter             | Symbol  | Conditions   | Min    | Typical | Max      |
|-----------------------|---|--|--------|---------|----------|
| Supply Voltage        | V <sub>CC</sub>   | -----  | 3.15V  | 3.3V    | 3.45V    |
| Supply Current        | I <sub>CC</sub>   | 50 ohm termination<br>To 2.00V below V <sub>CC</sub> | 0.0 mA | -----   | 80 mA    |
| Output current        | I <sub>O</sub>  | Low level Output Current                             | 0.0 mA | -----   | ±50.0 mA |
| Operating temperature | T <sub>A</sub>  | -----  | 0°C    | -----   | 70°C     |
| Storage temperature   | T <sub>S</sub>  | -----  | -55°C  | -----   | 125°C    |
| Power Dissipation     | P <sub>D</sub>  | -----  | -----  | -----   | 276 mW   |
| Lead temperature      | T <sub>L</sub>  | Soldering, 10 sec.                                   | -----  | -----   | 300°C    |
| Load                  | 50 Ohm to V <sub>CC</sub> -2V or Thevenin Equivalent, Bias Required | -----  | -----  | -----   | -----    |
| Start-up time         | t <sub>s</sub>  | -----  | -----  | 2 ms    | 10 ms    |

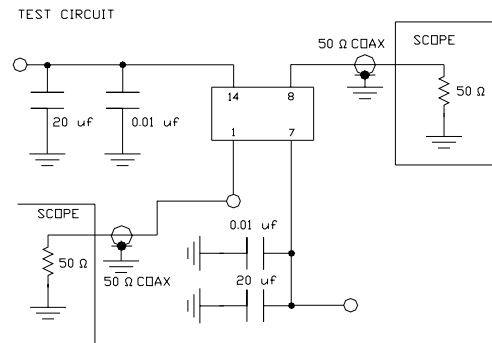
#### Environmental and Mechanical Characteristics

|                     |  |
|---------------------|--|
| 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 x 10 <sup>-8</sup> atm.cc/sec of helium    |
| ESD Sensitivity     | Human Body Model per ON Semiconductor 10kH series ECL: 500V min. |

#### Footnotes:

- 1) Standard frequency stability (±20,±25,±50ppm & others available)
- 2) V<sub>OL</sub>, V<sub>OH</sub>, referenced to ground (V<sub>EE</sub>) with V<sub>CC</sub> = 3.3V
- 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 8 at V<sub>CC</sub>-1.29V and rising edge of pin 1 at V<sub>CC</sub>-1.29V.

| Creating a Part Number       |                              |
|------------------------------|------------------------------|
| <b>HS - A287X - FREQ</b>     |                              |
| <b>Package Code</b>          | <b>Tolerance/Performance</b> |
| HS Ledged 4 pin (14 pin)     | 0 ±100ppm 0-70°C             |
| SM Ledged 4 pin (14 pin) SMD | 1 ±50ppm 0-70°C              |
| Gull Wing                    | 7 ±25ppm 0-70°C              |
| <b>Input Voltage</b>         | 9 Customer Specific          |
| Code Specification           | A ±20ppm 0-70°C              |
| A 3.3V                       | B ±50ppm -40 to +85°C        |
| 5V                           | C ±100ppm -40 to +85°C       |



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