M5500 Series
Crystal Oscillators HCMOS 5V Thru-Hole
High Reliability 1 Hz to 125 MHz

Extended Temperature Hi-Rel Product Specification

Features
- Hermetically sealed half size or full size DIL package
- Crystal angle controlled to +/-1 minute for excellent temperature stability
- 168 hour Class B burn-in and extensive environmental testing for best performance in rugged field environments
- Start-up time less than 10 ms, typical
- Serialized test data available

Typical Applications
Thru-hole PCB projects requiring high reliability HCMOS clock waveforms

Description
These high reliability oscillators provide HCMOS clock waveforms for applications subjected to the most stringent environmental conditions. They are through-hole mechanically robust oscillators. The “M-2” package has 14 pins which provides greater holdability onto the pcb board. Each oscillator is burned-in at 125°C for 168 hours, temperature cycled and centrifuged and fully tested in accordance with Table 1. Reliability tests are performed per Table 2. The calculated MTBF is 1.4 X 10^6 hours at 125°C.

<table>
<thead>
<tr>
<th>Model</th>
<th>Package</th>
<th>Operatin Temperature</th>
<th>Frequency Stability</th>
</tr>
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<tbody>
<tr>
<td>M5500, M5516</td>
<td>M-2</td>
<td>-55 to +125°C</td>
<td>+/-75 ppm</td>
</tr>
<tr>
<td>M5515</td>
<td>M-2</td>
<td>0 to 70°C</td>
<td>+/-50 ppm</td>
</tr>
<tr>
<td>M5622</td>
<td>M</td>
<td>-55 to +85°C</td>
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Full Size

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Half Size

Extended Temperature Hi-Rel Product Specification

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ELECTRICAL SPECIFICATIONS

Frequency Range
M5500, M5515, M5516, M5622, M5623- 1 Hz to 125 MHz
H5622, H5623-1KHz to 125 MHz

Frequency Stability
Includes calibration at 25°C, operating temperature, change of input voltage, change of load, shock and vibration.

Input Voltage,

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<th>M5622, M5623</th>
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<tbody>
<tr>
<td>1.</td>
<td>Case</td>
<td>N.C</td>
<td>Case &amp; Electrical Ground</td>
</tr>
<tr>
<td>2.</td>
<td>N.C.</td>
<td>N.C.</td>
<td>Pins 2 thru 6 are not present</td>
</tr>
<tr>
<td>3.</td>
<td>N.C.</td>
<td>N.C.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>N.C.</td>
<td>N.C.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>N.C.</td>
<td>N.C.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>N.C.</td>
<td>N.C.</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Electrical Ground</td>
<td>Case &amp; Electrical Ground</td>
<td>Case &amp; Electrical Ground</td>
</tr>
<tr>
<td>8.</td>
<td>Output</td>
<td>Output</td>
<td>Output</td>
</tr>
<tr>
<td>9.</td>
<td>N.C.</td>
<td>N.C.</td>
<td>Pins 9 thru 13 are not present</td>
</tr>
<tr>
<td>10.</td>
<td>N.C.</td>
<td>N.C.</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>N.C.</td>
<td>N.C.</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>N.C.</td>
<td>N.C.</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>N.C.</td>
<td>N.C.</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>+5V, VDD</td>
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CONNECTIONS

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<tr>
<th>Pin</th>
<th>Half Size</th>
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<tbody>
<tr>
<td>1.</td>
<td>Not Used</td>
</tr>
<tr>
<td>4.</td>
<td>Ground and Case</td>
</tr>
<tr>
<td>5.</td>
<td>Output</td>
</tr>
<tr>
<td>8.</td>
<td>+5V, VDD</td>
</tr>
</tbody>
</table>

ENVIRONMENTAL SPECIFICATIONS

Shock- MIL-STD 883, Method 2002, Test Condition B (1500 peak g, 0.5 ms duration, ½ sine wave, 5 shocks in 6 planes)

Vibration- MIL-STD 883, Method 2007, Test Condition A (20-2000 Hz of .06” d.a. or 20 Gs, whichever is less)

Humidity- Resistant to 85° R.H. at 85°C

Valpey Fisher Corporation • 75 South Street, Hopkinton, MA 01748 • Tel. 1-800-XTALREP, 508-435-6831 • FAX 508 4355289

Rev 1.0 11/04
M5500 Series
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MECHANICAL DESCRIPTION
Case - Stainless Steel
Marking - Valpey part number, date code, serial number and description. Markings will withstand MIL-STD 202, Method 215.
Optional Marking - Customer part number if required
Leads - Kovar, nickel plated, gold flash
Vibration - MIL-STD 883, Method 2007, Test Condition A

TABLE 1
Each unit undergoes the following:
7. Electrical Test at 25°C and temperature extremes, as follows:
   A. Frequency* F. Duty Cycle (FL)
   B. Current G. Frequency at 5.5V
   C. Rise Time (FL) H. Frequency at 4.5V
   D. Fall Time (FL) I. “Zero” logic level
   E. Duty Cycle (NL) J. “One” logic level

*Within 75 ppm from -55 to +125°C (M5500, M5516 and M5623)
Within 50 ppm from 0 to +70°C (M5515)
Within 50 ppm from -55 to +85°C (M5622)

HOW TO ORDER
For Part Number, put package type before mode number, and add frequency in MHz, for example:
M 5516 - 32M
M is full size DIL
H is half size DIL
5516 is model type
32M Frequency in MHz

TABLE 2 - RELIABILITY TEST PROCEDURE AND CONDITIONS FOR QUARTZ CRYSTAL OSCILLATORS
I. Group A
   Electrical Characteristics at -55°, (0° for ‘5515), 25° and 125° (70° for M5515 and 85° for M5622)
   Frequency @ 4.5, 5.0 and 5.5 volts (for 5 volts units)
   Symmetry (Duty Cycle)
   Input current
   Zero/One levels
   Rise/Fall times
   Physical Dimensions
   Length/width
   Height
   Package finish (Corrosion, discoloration, etc.)
   Marking placement/legibility
II. Group B - Life Test
   1000 hrs at 125°C with bias and load
III. Group C - All units have passed Group A testing
A. Subgroup 1-8 pcs.
   Condition Cond.B
   Description Mechanical Shock
   End point measurement Frequency
   Output Waveform
   1500 g’s, 5ms
   Output Waveform
   5 drops, 6 axis
   Frequency
   0.6” disp., 20-20, 000-20 Hz
   Cond. A.
   Vibration, var.
   freq. 20 g’s
   .06” disp., 20-20, 000-20 Hz
   MIL-STD-883 Method 2003
   Cond. B
   Solderability
   Visual 95% coverage
B. Subgroup 2-4 pcs (One-half of Subgroup 1)
   MIL-STD-883 Method 1004
   Cond. B
   Solder Heat
   Visual in 350°C
   3.5 sec
   MIL-STD-883 Method 1014
   Cond. A1
   Gross Leak
   Detector fluid
   MIL-STD-883 Method 1014
   Cond. C
   Visual in 125°C
   Detector fluid

   Within 75 ppm from -55 to +125°C (M5500, M5516 and M5623)
   Within 50 ppm from 0 to +70°C (M5515)
   Within 50 ppm from -55 to +85°C (M5622)