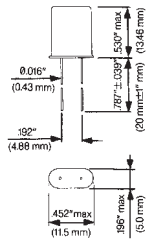




## MICROPROCESSOR CRYSTALS



HC-49/U  
RESISTANCE WELD

### SPECIFICATIONS

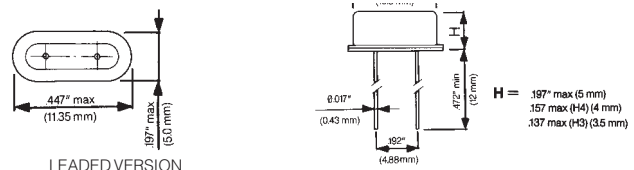
|   |                              |                          |
|---|------------------------------|--------------------------|
| Nominal Frequency                                   | Type A HC-49/U               | 1.800 MHz-300.000 MHz    |
|   | Type C HC-45U                | 3.579545 MHz-300.000 MHz |
| Frequency Tolerance at 25°C                         | ±30 ppm typ (±50 ppm max)    |                          |
| Frequency Stability over temperature -20°C to +70°C | ±50 ppm typ (±100 ppm max)   |                          |
| Aging   | ±5 ppm/year                  |                          |
| Load Capacitance                                    | 12 to 32 pF/18pF is standard |                          |
| Shunt Capacitance                                   | 7 pF max                     |                          |
| Drive Level   | 1mW                          |                          |
| Mode of Oscillation                                 | Fundamental                  |                          |

### RALTRON MICROPROCESSOR CRYSTALS

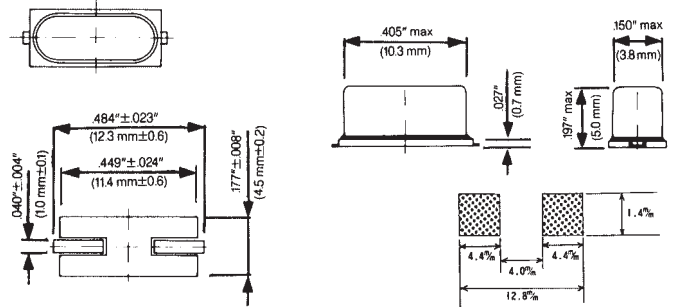
| Cat. No.                   | Frequency* (MHz) | Series Res. (Ohms) | Net Price |
|----------------------------|------------------|--------------------|-----------|
| <b>HOLDER TYPE HC-49/U</b> |                  |                    |           |
| A-1.8432-18                | 1.843200         | 700                | \$1.57    |
| A-2.000-18                 | 2.000000         | 500                | .75       |
| A-2.4576-18                | 2.457600         | 400                | .75       |
| A-3.000-18                 | 3.000000         | 200                | 1.15      |
| A-3.2768-18                | 3.276800         | 180                | 1.50      |
| A-3.579545-18              | 3.579545         | 180                | .20       |
| A-3.6864-18                | 3.686400         | 160                | .20       |
| A-4.000-18                 | 4.000000         | 100                | .20       |
| A-4.096-18                 | 4.096000         | 100                | .20       |
| A-4.194304-18              | 4.194304         | 100                | .20       |
| A-4.608-18                 | 4.608000         | 80                 | .61       |
| A-4.9152-18                | 4.915200         | 70                 | .20       |
| A-5.000-18                 | 5.000000         | 70                 | .68       |
| A-5.120-18                 | 5.120000         | 70                 | .64       |
| A-6.000-18                 | 6.000000         | 50                 | .20       |
| A-6.144-18                 | 6.144000         | 50                 | .20       |
| A-7.3728-18                | 7.372800         | 40                 | .20       |
| A-8.000-18                 | 8.000000         | 35                 | .20       |
| A-9.216-18                 | 9.216000         | 35                 | 2.60      |
| A-10.000-18                | 10.000000        | 30                 | .20       |
| A-11.000-18                | 11.000000        | 30                 | .20       |
| A-11.0592-18               | 11.059200        | 30                 | .20       |
| A-12.000-18                | 12.000000        | 30                 | .20       |
| A-12.288-18                | 12.288000        | 30                 | .20       |
| A-14.31818-18              | 14.318180        | 25                 | .20       |
| A-15.000-18                | 15.000000        | 25                 | .33       |
| A-16.000-18                | 16.000000        | 25                 | .20       |
| A-18.000-18                | 18.000000        | 20                 | .57       |
| A-18.432-18                | 18.432000        | 20                 | .20       |
| A-20.000-18*               | 20.000000        | 20                 | .20       |
| A-24.000-18*               | 24.000000        | 20                 | .22       |

\*Other frequencies are available to special order. Minimum quantities may apply.  
NOTE: Load Capacitance (12pF-32pF), for parallel resonance.

## LOW-PROFILE MICROPROCESSOR CRYSTALS



LEADED VERSION



HC 49S-SMD

SUGGESTED PADS

### SPECIFICATIONS

|   |                                  |
|---|----------------------------------|
| Nominal Frequency                                   | 3.000 MHz-50.000 MHz             |
| Frequency Tolerance at 25°C                         | ±50 ppm max                      |
| Frequency Stability over temperature -10°C to +70°C | ±50 ppm typ (±100 ppm max)       |
| Aging   | <3 ppm/year                      |
| Load Capacitance                                    | 12 to 32 pF/18 pF is Standard    |
| Equivalent Series Resistance (ESR)                  | 300 Ω max (depends on frequency) |
| Drive Level   | 1 mW                             |
| Cut   | At strip                         |
| Storage Temperature Range                           | -30°C to +80°C                   |
| Mode of Oscillation                                 | Fundamental                      |

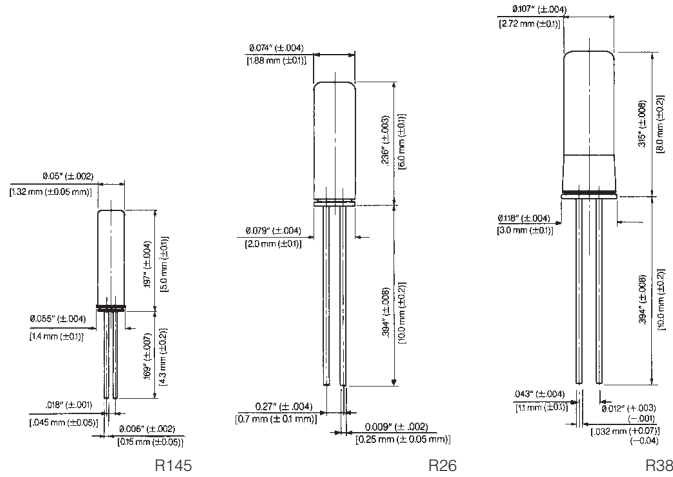
### RALTRON LOW PROFILE MICROPROCESSOR CRYSTALS

| Cat. No.  | Frequency* (MHz) | Series Res. (Ohms) | Net Price |
|---|------------------|--------------------|-----------|
| <b>HOLDER TYPE HC-49 SHORT, LEADED VERSION</b>        |                  |                    |           |
| AS-3.579545-18  | 3.579545         | 180                | \$.23     |
| AS-4.000-18   | 4.000000         | 130                | .23       |
| AS-6.000-18   | 6.000000         | 80                 | .23       |
| AS-7.3728-18  | 7.372800         | 40                 | .23       |
| AS-8.000-18   | 8.000000         | 60                 | .23       |
| AS-10.000-18  | 10.000000        | 30                 | .23       |
| AS-12.000-18  | 12.000000        | 50                 | .23       |
| AS-14.31818-18  | 14.318180        | 25                 | .23       |
| AS-16.000-18  | 16.000000        | 40                 | .23       |
| AS-20.000-18  | 20.000000        | 20                 | .23       |
| AS-24.000-18  | 24.000000        | 40                 | .73       |
| <b>HOLDER TYPE HC-49 SHORT, SURFACE MOUNT VERSION</b> |                  |                    |           |
| AS-4.000-18-SMD                                       | 4.000000         | 130                | .25       |
| AS-7.3728-18-SMD                                      | 7.372800         | 40                 | .25       |
| AS-8.000-18-SMD                                       | 8.000000         | 60                 | .25       |
| AS-10.000-18-SMD                                      | 10.000000        | 30                 | .25       |
| AS-12.000-18-SMD                                      | 12.000000        | 50                 | .25       |
| AS-14.31818-18-SMD                                    | 14.318180        | 25                 | .25       |
| AS-16.000-18-SMD                                      | 16.000000        | 40                 | .25       |
| AS-20.000-18-SMD                                      | 20.000000        | 20                 | .25       |

\*Other frequencies are available to special order. Minimum quantities may apply.  
NOTE: Load Capacitance (12pF-32pF), for parallel resonance.  
AS-SMD is available on tape and reel, 24mm taping, 12mm pitch, 330mm reel, 1000 pcs. per reel.

**IF YOU CAN'T FIND WHAT YOU NEED, CALL US**  
**1-800-56-SONIC**  
**OR EMAIL US: info@e-sonic.com**  
**WE ARE EAGER TO HELP.**

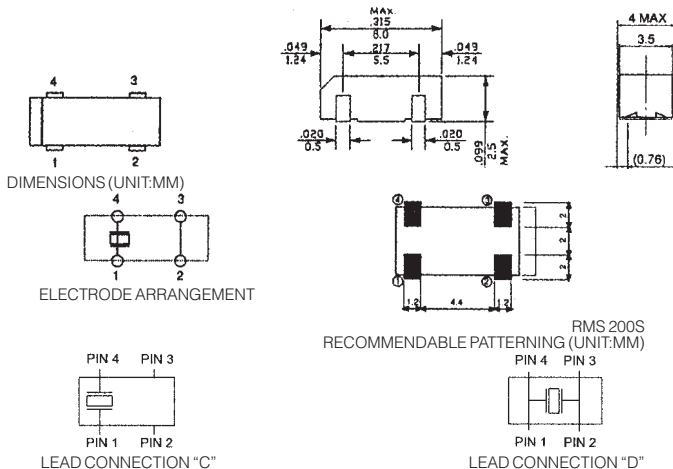
## WATCH CRYSTAL TUNING FORKS



### SPECIFICATIONS

| Holder Type/Item                            | R38                       | R26                       | R145                      |
|---|---------------------------|---------------------------|---------------------------|
| Nominal Frequency (24°C)                    | 32.768 KHz ±20 ppm        | 32.768 KHz ±20 ppm        | 32.768 KHz ±20 ppm        |
| Turnover Temperature                        | 24°C ±4°C                 | 24°C ±4°C                 | 22.5°C ±4°C               |
| Parabolic Curvature Constant                | -0.035 ppm/°C typ         | -0.035 ppm/°C typ         | -0.035 ppm/°C typ         |
| Quality Factor                              | 80,000 typ/<br>50,000 min | 70,000 typ/<br>50,000 min | 80,000 typ/<br>60,000 min |
| Equivalent Series Resistance R <sub>1</sub> | 18K Ω typ                 | 23K Ω typ/<br>35K Ω max   | 25K Ω typ/<br>40K Ω max   |
| Motional Capacitance C <sub>1</sub>         | 0.0035 pF typ             | 0.003 pF typ              | 0.0025 pF typ             |
| Shunt Capacitance C <sub>0</sub>            | 1.7 pF typ                | 1.4 pF typ                | 1.0 pF typ                |
| Capacitance Ratio                           | 490 typ                   | 470 typ                   | 400 typ                   |
| Motional Inductance L <sub>1</sub>          | 7 mH typ                  | 8 mH typ                  | 9.5 mH typ                |
| Aging (First Year)                          | ±3 ppm max                | ±3 ppm max                | ±3 ppm max                |
| Operating Temp. Range                       | -10°C to +60°C            | -10°C to +60°C            | -10°C to +60°C            |
| Storage Temp. Range                         | -30°C to +100°C           | -30°C to +80°C            | -30°C to +80°C            |
| Part Numbering System                       | R38—32.768 KHz            | R26—32.768 KHz            | R145—32.768 KHz           |

## SURFACE MOUNT TUNING FORK CRYSTALS



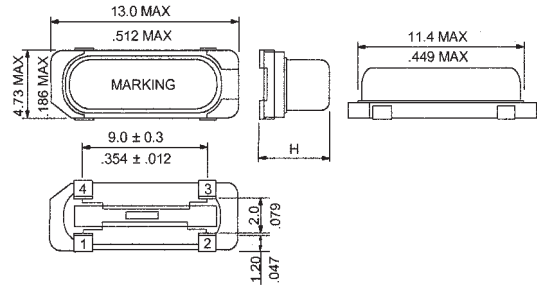
|                                    |   |
|------------------------------------|---|
| Nominal Frequency                  | 32.768 KHz  |
| Frequency Tolerance                | ±20 PPM Maximum<br>(±50 PPM and ±100 PPM available)   |
| Turnover Temperature               | ±25°C ±5°C  |
| Temperature Coefficient            | (-0.035 ±0.8) PPM/Δ°C <sup>2</sup>  |
| Load Capacitance                   | 6.0 to 12.5 pF  |
| Equivalent Series Resistance (ESR) | 50 K Ohm Maximum  |
| Drive Level                        | 1.0 μW Maximum  |
| Shunt Capacitance                  | 1.0 pF Typical  |
| Aging (First Year)                 | ±5 PPM Maximum  |
| Operating Temperature Range        | -40°C to +85°C  |
| Storage Temperature Range          | -55°C to +125°C   |
| Shock Resistance                   | ±5 PPM Maximum 75 cm Drop Test<br>in 3 Axes onto a hard surface or<br>3000 g x 0.3 ms x 1/2 Sine wave in 3 Axes |
| Solder Reflow Conditions           | 230°C Maximum for 20 s Maximum  |

### RALTRON TUNING FORK QUARTZ CRYSTALS

| Cat. No.   | Frequency* (KHz) | Net Price    |
|--|------------------|--------------|
| <b>HOLDER TYPE R26, LEADED VERSION</b>           |                  |              |
| R26-32.768KHz                                    | 32.768           | <b>\$.25</b> |
| <b>HOLDER TYPE R38, LEADED VERSION</b>           |                  |              |
| R38-32.768KHz                                    | 32.768           | <b>.18</b>   |
| <b>HOLDER TYPE R145, LEADED VERSION</b>          |                  |              |
| R145-32.768KHz                                   | 32.768           | <b>2.39</b>  |
| <b>HOLDER TYPE RSM200, SURFACE MOUNT VERSION</b> |                  |              |
| RSM200S-32.768KHz                                | 32.768           | <b>6.50</b>  |

\*Other frequencies are available to special order. Minimum quantities may apply. RSM200S available on 16 mm taping, 8 mm pitch, 3000 pcs per 330 mm Reel.

## SURFACE MOUNT MICROPROCESSOR CRYSTALS



|  |  |
|--|--|
| Frequency Range                            | 3.20 MHz to 70.00 MHz                              |
| Mode of Oscillation                        |  |
| Fundamental                                | 3.20 MHz to 40.320 MHz                             |
| Third Overtone                             | 24.576 MHz to 70.00 MHz                            |
| Frequency Tolerance at 25°C                | ±30 PPM Typical<br>±50 PPM Maximum                 |
| Frequency Stability over Temperature Range | ±50 PPM Typical<br>±100 PPM Maximum                |
| Operating Temperature Range                | -20°C to +70°C Standard<br>-40°C to +85°C Extended |
| Storage Temperature Range                  | -55°C to +125°C                                    |
| Aging                                      | ±5 PPM Per Year Maximum                            |
| Load Capacitance                           | 10 pF to 32 pF or Series                           |
| Equivalent Series Resistance (ESR)         | See Table  |
| Drive Level                                | 0.1 mW Typical                                     |
| Crystal Cut                                | At Strip   |

### RALTRON MICROPROCESSOR SURFACE MOUNT CRYSTALS

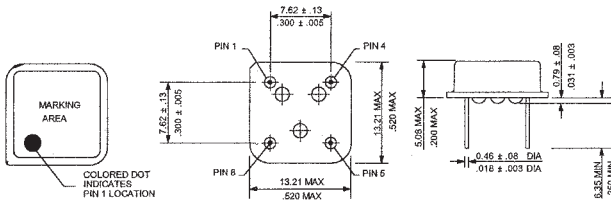
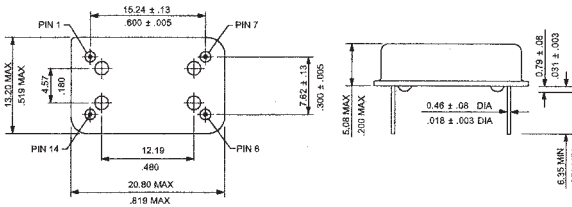
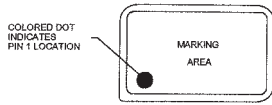
| Cat. No.   | Frequency* (MHz) | Net Price    |
|--|------------------|--------------|
| <b>HOLDER TYPE TT-SMDC, ECONOMICAL, AND SLIGHTLY SMALLER</b> |                  |              |
| AS-3.579545-18-4PD-TR  | 3.579545         | <b>\$.70</b> |
| AS-4.000-18-4PD-TR   | 4.000000         | <b>.70</b>   |
| AS-6.000-18-4PD-TR   | 6.000000         | <b>.70</b>   |
| AS-8.000-18-4PD-TR   | 8.000000         | <b>.70</b>   |
| AS-12.000-18-4PD-TR  | 12.000000        | <b>.70</b>   |
| AS-16.000-18-4PD-TR  | 16.000000        | <b>.70</b>   |

\*Other frequencies are available to special order. Minimum quantities may apply.

NOTE: Load capacitance (12pF-32pF), for parallel resonance.

TT-SMDC Tape/Reel Specifications: 330mm reel, 24mm taping width, 12mm pitch, 3000 pcs. per reel.

## HCMOS & TTL CLOCK OSCILLATORS



| Series                           | CO1   | CO13  |
|----------------------------------|---|---|
| Package                          | 14 PIN DIP  | 8 PIN DIP   |
| Frequency Range                  | 500.00 KHz to 125.00 MHz  | 500.00 KHz to 125.00 MHz  |
| Frequency Stability              | CO1100: ±100 ppm<br>CO1050: ±50 ppm<br>CO1025: ±25 ppm  | CO13100: ±100 ppm<br>CO13050: ±50 ppm<br>CO13025: ±25 ppm   |
| Operating Temperature Range      | 0°C to +70°C Standard<br>-40°C to +85°C Extended  | 0°C to +70°C Standard<br>-40°C to +85°C Extended  |
| Storage Temperature Range        | -55°C to +125°C   | -55°C to +125°C   |
| Input                            |   |   |
| Voltage                          | +5 VDC ±0.5 VDC   | +5 VDC ±0.5 VDC   |
| Current (Max)                    | 500.00 KHz to 2.999 MHz: 30 mA<br>3.00 MHz to 31.999 MHz: 50 mA<br>32.00 MHz to 79.999 MHz: 70 mA<br>80.00 MHz to 125.00 MHz: 80 mA | 500.00 KHz to 2.999 MHz: 30 mA<br>3.00 MHz to 31.999 MHz: 50 mA<br>32.00 MHz to 79.999 MHz: 70 mA<br>80.00 MHz to 125.00 MHz: 80 mA |
| Output                           |   |   |
| Symmetry (At 1.4 VDC Level)      | 40 to 60% Normal<br>45 to 55% Tight   | 40 to 60% Normal<br>45 to 55% Tight   |
| Rise and Fall Time (0.4-2.4 VDC) | Under 9 MHz: ±15 ns MAX<br>9 MHz to 32 MHz: ±10 ns MAX<br>32 MHz to 80 MHz: ±6 ns MAX<br>80 MHz to 125 MHz: ±4 ns MAX               | Under 9 MHz: ±15 ns MAX<br>9 MHz to 32 MHz: ±10 ns MAX<br>32 MHz to 80 MHz: ±6 ns MAX<br>80 MHz to 125 MHz: ±4 ns MAX               |
| Logic "0" Level                  | ±0.5V Max, Sink to 16 mA  | +0.5V Max, Sink to 16 mA  |
| Logic "1" Level                  | ±2.4V Min, Source 0.4 mA  | ±2.4V Min, Source 0.4 mA  |
| Load                             | 1 to 10 TTL Standard  | 1 to 10 TTL Standard  |

### PIN CONNECTION CO1100 SERIES/CO1300 SERIES

| CO1100 Series Pin | CO1300 Series Pin | Connection |
|-------------------|-------------------|------------|
| #1                | #1                | NC         |
| #7                | #4                | GND        |
| #8                | #5                | OUTPUT     |
| #14               | #8                | +Vcc       |

### RALTRON CLOCK OSCILLATORS—TTL COMPATIBLE

| Cat. No.                                | Frequency* (MHz) | Net Price |
|---|------------------|-----------|
| <b>HOLDER TYPE CO1-TTL (14 PIN DIP)</b> |                  |           |
| CO1100-1.000-MHZ                        | 1.000000         | \$2.46    |
| CO1100-1.8432-MHZ                       | 1.843200         | 1.67      |
| CO1100-2.4576-MHZ                       | 2.457600         | 2.46      |
| CO1100-3.6864-MHZ                       | 3.686400         | 2.46      |
| CO1100-4.000-MHZ                        | 4.000000         | 1.16      |
| CO1100-4.9152-MHZ                       | 4.915200         | 2.46      |
| CO1100-5.0688-MHZ                       | 5.068800         | 2.46      |
| CO1100-6.000-MHZ                        | 6.000000         | 2.46      |
| CO1100-6.144-MHZ                        | 6.144000         | 2.46      |
| CO1100-7.3728-MHZ                       | 7.372800         | 1.16      |
| CO1100-8.000-MHZ                        | 8.000000         | 1.16      |
| CO1100-10.000-MHZ                       | 10.000000        | 1.16      |
| CO1100-12.000-MHZ                       | 12.000000        | 1.16      |
| CO1100-14.31818-MHZ                     | 14.318180        | 1.16      |
| CO1100-16.000-MHZ                       | 16.000000        | 1.16      |
| CO1100-16.257-MHZ                       | 16.257000        | 2.46      |
| CO1100-18.432-MHZ                       | 18.432000        | 1.16      |
| CO1100-20.000-MHZ                       | 20.000000        | 1.16      |
| CO1100-24.000-MHZ                       | 24.000000        | 1.16      |
| CO1100-25.000-MHZ                       | 25.000000        | 1.16      |
| CO1100-32.000-MHZ                       | 32.000000        | 2.46      |
| CO1100-40.000-MHZ                       | 40.000000        | 1.16      |
| <b>HOLDER TYPE CO13-TTL (8 PIN DIP)</b> |                  |           |
| CO13100-4.000-MHZ                       | 4.000000         | 1.16      |
| CO13100-8.000-MHZ                       | 8.000000         | 1.16      |
| CO13100-16.000-MHZ                      | 16.000000        | 1.16      |

\*Other frequencies are available to special order. Minimum quantities may apply.  
**NOTE:** "N" indicates normal symmetry (40%-60%). Replace with "T" for tight symmetry (45%-55%).

| Series                           | CO6  | CO12   |
|----------------------------------|--|--|
| Package                          | 14 PIN DIP   | 8 PIN DIP  |
| Frequency Range                  | 500.00 KHz to 125.00 MHz   | 500.00 KHz to 125.00 MHz   |
| Frequency Stability              | CO6100: ±100 PPM<br>CO6050: ±50 PPM<br>CO6025: ±25 PPM   | CO12100: ±100 PPM<br>CO12050: ±50 PPM<br>CO12025: ±25 PPM  |
| Operating Temperature Range      | 0°C to +70°C Standard<br>-40°C to +85°C Extended   | 0°C to +70°C Standard<br>-40°C to +85°C Extended   |
| Storage Temperature Range        | -55°C to +125°C  | -55°C to +125°C  |
| Input                            |  |  |
| Voltage                          | +5 VDC ±0.5 VDC  | +5 VDC ±0.5 VDC  |
| Current (Max)                    | 500 KHz to 19.999 MHz: 20 mA<br>20 MHz to 34.999 MHz: 30 mA<br>35 MHz to 69.999 MHz: 40 mA<br>70 MHz to 125 MHz: 60 mA | 500 KHz to 19.999 MHz: 20 mA<br>20 MHz to 34.999 MHz: 30 mA<br>35 MHz to 69.999 MHz: 40 mA<br>70 MHz to 125 MHz: 60 mA |
| Output                           |  |  |
| Symmetry                         | 40 to 60% Normal<br>45 to 55% Tight  | 40 to 60% Normal<br>45 to 55% Tight  |
| Rise and Fall Time (0.5-4.5 VDC) | Under 24 MHz: ±10 ns MAX<br>24 MHz to 70 MHz: ±6 ns MAX<br>70 MHz to 125 MHz: ±3 ns MAX                                | Under 24 MHz: ±10 ns MAX<br>24 MHz to 70 MHz: ±6 ns MAX<br>70 MHz to 125 MHz: ±3 ns MAX                                |
| Logic "0" Level                  | ±0.5 V Max. (10% VDD)  | ±0.5 V Max. (10% VDD)  |
| Logic "1" Level                  | ±4.5 V Min. (90% VDD)  | ±4.5 V Min. (90% VDD)  |
| Load                             | 15 pF or 10 LS TTL Standard  | 15 pF or 10 LS TTL Standard  |

### PIN CONNECTION CO6100 SERIES/CO12000 SERIES

| CO6100 Series Pin | CO12000 Series Pin | Connection |
|-------------------|--------------------|------------|
| #1                | #1                 | NC         |
| #7                | #4                 | GND        |
| #8                | #5                 | OUTPUT     |
| #14               | #8                 | +Vcc       |

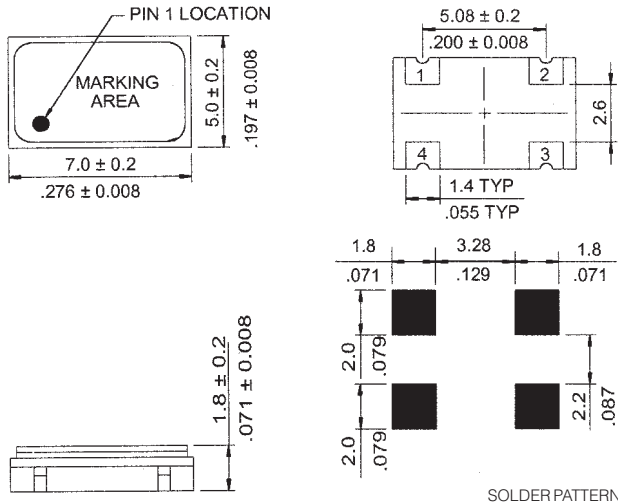
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## RALTRON CLOCK OSCILLATORS—HCMOS COMPATIBLE

| Cat. No.                                  | Frequency* (MHz) | Net Price |
|---|------------------|-----------|
| <b>HOLDER TYPE CO6-HCMOS (14 PIN DIP)</b> |                  |           |
| CO6100-4.000-MHZ                          | 4.000000         | \$1.16    |
| CO6100-6.000-MHZ                          | 6.000000         | 1.16      |
| CO6100-8.000-MHZ                          | 8.000000         | 1.16      |
| CO6100-12.000-MHZ                         | 12.000000        | 1.16      |
| CO6100-16.000-MHZ                         | 16.000000        | 1.16      |
| <b>HOLDER TYPE CO12-HCMOS (8 PIN DIP)</b> |                  |           |
| CO12100-4.000-MHZ                         | 4.000000         | 1.16      |
| CO12100-6.000-MHZ                         | 6.000000         | 2.27      |
| CO12100-8.000-MHZ                         | 8.000000         | 1.16      |
| CO12100-12.000-MHZ                        | 12.000000        | 1.16      |
| CO12100-16.000-MHZ                        | 16.000000        | 1.16      |

\*Other frequencies are available to special order. Minimum quantities may apply.  
NOTE: "N" indicates normal symmetry (40%-60%). Replace with "T" for tight symmetry (45%-55%).

## SURFACE MOUNT CLOCK OSCILLATORS



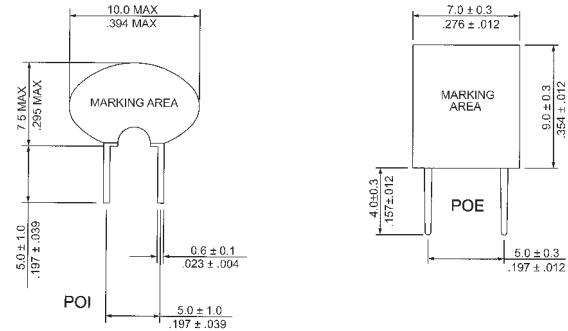
| Series                  | CO43  | CO46                                       |
|-------------------------|---|--|
| Frequency Range         | 1.8432 MHz–50.0 MHz   | 50.00 MHz–125.00 MHz                       |
| Frequency Stability     | CO4310: ±10 PPM<br>CO4305: ±50 PPM                                | CO4610: ±100 PPM<br>CO4605: ±50 PPM        |
| Temperature Range       |   |  |
| Operating               | –10°C to +70°C  | –10°C to +70°C                             |
| Extended                | –40°C to +85°C  | –40°C to +85°C                             |
| Storage                 | –55°C to +125°C   | –55°C to +125°C                            |
| Input                   |   |  |
| Voltage                 | +3.3 VDC ±0.3 VDC   | +3.3 VDC ±0.3 VDC                          |
| Current                 | 25 mA MAX   | 25 mA MAX                                  |
| Output                  |   |  |
| Symmetry                | 40 to 60%: Normal<br>45 to 55%: Tight                             | 40 to 60%: Normal<br>45 to 55%: Tight      |
| Voltage                 |   |  |
| Logic "0" Level         | 0.4 VDC MAX   | 0.5 VDC MAX                                |
| Logic "1" Level         | 0.9 X VCC MIN   | 2.8 VDC MIN                                |
| Load                    | 5 TTL MAX or 20 pF MOS  | 5 TTL MAX or 15 pF MOS                     |
| Rise Time               | 6 ns  | 7 ns                                       |
| Fall Time               | 6 ns  | 7 ns                                       |
| Enable/Disable Function | PIN 1: High (+2.2 VDC Min)<br>PIN 1: Low (+0.8 VDC Max)           | PIN 3: Enabled<br>PIN 3: Disabled (High Z) |
| Start-Up Time           | 10 ms MAX   | 15 ms MAX                                  |
| Shock                   | 1000 g, 0.35 ms, 1/2 SINEWAVE, 3 Shocks in 3 Axes                 |  |
| Vibration               | 10 to 55 Hz Amplitude 1.5 mm, Cycle 1 Minute in 3 Axes for 1 Hour |  |

## C066 SERIES SURFACE MOUNT CLOCK OSCILLATOR.

| Cat. No.           | Frequency (MHz) | Net Price |
|--------------------|-----------------|-----------|
| C066510-1.8432MHZ  | 1.84300         | \$3.49    |
| C066510-2.000MHZ   | 2.000000        | 3.49      |
| C066510-3.6864MHZ  | 3.68600         | 3.49      |
| C066510-4.000MHZ   | 4.000           | 3.49      |
| C066510-7.3728MHZ  | 7.372800        | 3.49      |
| C066510-8.000MHZ   | 8.000000        | 3.49      |
| C066510-11.0592MHZ | 11.059200       | 3.49      |
| C066510-14.7456MHZ | 14.745600       | 3.49      |
| C066510-16.000MHZ  | 16.000000       | 3.49      |
| C066510-18.432MHZ  | 18.43200        | 3.49      |
| C066510-24.000MHZ  | 24.000000       | 3.49      |
| C066510-32.000MHZ  | 32.000000       | 3.49      |
| C066510-33.333MHZ  | 33.33300        | 3.49      |
| C066510-33.8688MHZ | 33.86880        | 3.49      |
| C066510-40.000MHZ  | 40.000000       | 3.49      |
| C066510-44.2368MHZ | 44.236800       | 3.49      |
| C066510-50.000MHZ  | 50.000000       | 3.49      |

Packaging: 330mm reel diam., 24 mm tape width, 12 mm pitch. Quantity: 1000 pieces per reel.

## CERAMIC RESONATORS



FEATURES: Wide frequency range. Low cost. Excellent temperature stability.

| Cat. No.     | Frequency    | Net Price |
|--------------|--------------|-----------|
| POI-1.000MHZ | 1.000000 MHz | \$ .20    |
| POI-2.000MHZ | 2.000000 MHz | .20       |
| POI-4.000MHZ | 4.000000 MHz | .20       |
| POI-6.000MHZ | 6.000000 MHz | .20       |
| POC-4.000MHZ | 4.000000 MHz | .20       |
| POC-8.000MHZ | 8.000000 MHz | .20       |
| POE-B-455KHZ | 455kHz       | .20       |

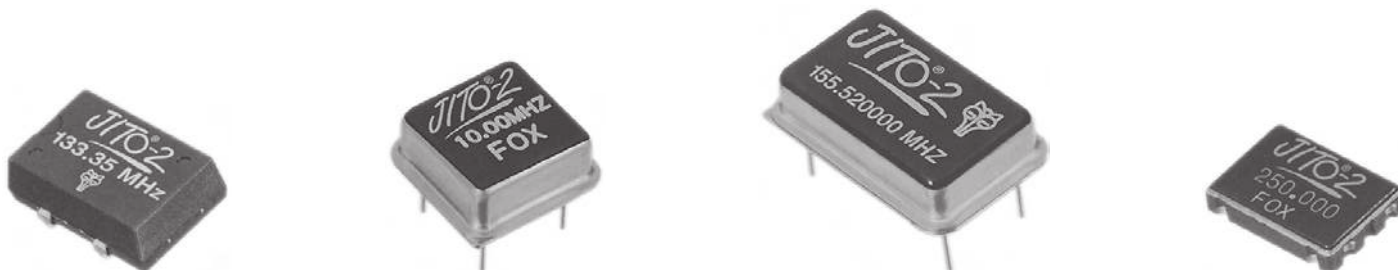
## RALTRON. GLOBAL EXPERTS IN FREQUENCY MANAGEMENT

Raltron offers the most comprehensive line of frequency management solutions in the market, including through hole and surface mount crystals, oscillators, filters, ceramic resonators, VCXO's, TCXO's, OCXO's and complete timing solutions for every application.

All Raltron facilities worldwide are certified ISO9001 which assures that our products are manufactured to global quality standards and allows us to provide the best quality solutions at the most competitive prices.

## FEATURES:

- Voltage Control Crystal Oscillators in thru-hole and SMD packages (1MHz–2.4GHz)
- Ultra Miniature TCXO's—RTxx-174 and RTxx-204 packages
- Custom design TCXO's and OCXO's power your specifications
- Application Specific Crystals for Blue Tooth and WLAN (low SMD profile with tight stabilities)
- Total Frequency Solutions—Synchronization Modules
- Economical Ceramic Resonators—KHz and MHz Values



## FOX JITO®-2 JUST-IN TIME OSCILLATORS®

**FEATURES:** Quantity shipments in 10 business days or less for custom or standard frequency oscillators. Custom prototypes and test samples shipped immediately. Custom and standard frequencies 144kHz to 300MHz. 20-100 PPM stability. Phase jitter comparable to fixed frequency oscillators. 3.3 or 5 volts; -40° to +85° C operating range; SMD and thru-hole. Perfect for JIT and BTO. Ideal for OEMs, CEMs and developers. Total ordering/scheduling flexibility. **Contact your Electro Sonic Sales Representative for more information.**

### JITO®-2 ORDERING INFORMATION

Use the part description guide below to order the JITO®-2 OSCILLATOR you need

**JITO®-2 - B C 3 A M C - 106.250000**

Frequency (MHz)

C = Custom  
(or leave blank)

#### Package Style:

**A** = 14 Pin DIP  
**B** = 8 Pin DIP  
**D** = MIN-6 (5x7.5x1.5mm  
 6 Pad SMD)  
**P** = Plastic (10x13x5mm)

#### Type:

**C** = HCMOS  
**P** = PECL  
**S** = HCMOS/Standby  
 (D & P Pkg. only)  
**X** = 2<sup>nd</sup> HCMOS Output/÷2  
 (D Pkg. only)  
**Y** = 2<sup>nd</sup> HCMOS Output/÷4  
 (D Pkg. only)  
**Z** = 2<sup>nd</sup> HCMOS Output/÷8  
 (D Pkg. only)

#### Supply Voltage:

**5** = +5.0V  
**3** = +3.3V

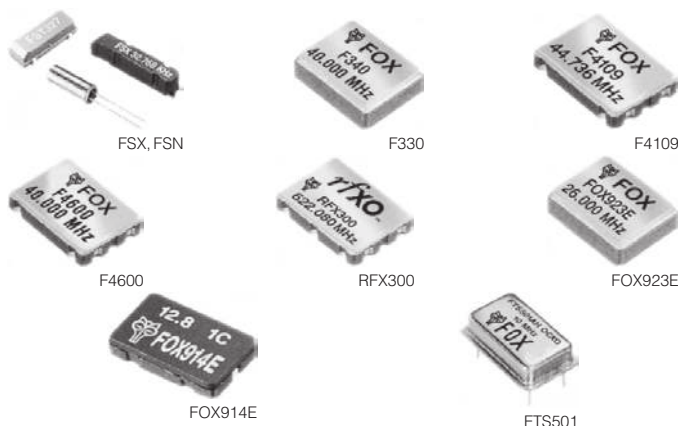
#### Stability:

**A** = ±100ppm  
**B** = ±50ppm  
**C** = ±30ppm  
**D** = ±25ppm  
**E** = ±20ppm\*\*

#### Temperature Range:

**F** = -20°C to +70°C  
**M** = -40°C to +85°C

NOTE: For assistance selecting the proper JITO®-2 oscillator for your specific application, an Electro Sonic sales representative can help you.



## FSX AND FSN SERIES 7 × 1.5MM (FSX), 3.2 × 1.2MM (FSN) 32.768 KHZ WATCH CRYSTAL

**FEATURES:** Tolerance PPM: ±20. Stability PPM: -0.04. Temperature range: -10°C to +60°C, (-40°C to +85°C optional). Miniature packages. Long term stability.

| Cat. No. | Net Price |
|----------|-----------|
| FSX327   | \$2.49    |
| FSN327   | 1.95      |

## F330 SERIES 3.2 × 2.5MM 3.3V HCMOS OSCILLATORS

**FEATURES:** PPM: ±100, ±50, ±25, ±20. Temperature range: -10°C to +70°C, (-40°C to +85°C optional). Low current standby. Pb free.

| Cat. No.        | Frequency (MHz) | Net Price |
|-----------------|-----------------|-----------|
| F335-1.8432MHz  | 1.843200        | \$20.26   |
| F335-3.6864MHz  | 3.686400        | 20.26     |
| F335-4.000MHz   | 4.000000        | 20.26     |
| F335-8.000MHz   | 8.000000        | 20.26     |
| F335-10.000MHz  | 10.000000       | 20.26     |
| F335-11.0592MHz | 11.059200       | 20.26     |
| F335-12.000MHz  | 12.000000       | 20.26     |
| F335-18.432MHz  | 18.432000       | 20.26     |
| F335-20.000MHz  | 20.000000       | 20.26     |
| F338-22.000MHz  | 22.000000       | 20.26     |
| F335-24.000MHz  | 24.000000       | 20.26     |
| F335-24.576MHz  | 24.576000       | 20.26     |
| F335-25.000MHz  | 25.000000       | 20.26     |
| F335-27.000MHz  | 27.000000       | 20.26     |
| F335-32.000MHz  | 32.000000       | 20.26     |
| F335-40.000MHz  | 40.000000       | 20.26     |
| F335-44.000MHz  | 44.000000       | 20.26     |
| F335-48.000MHz  | 48.000000       | 20.26     |
| F335-50.000MHz  | 50.000000       | 20.26     |

## F4100 SERIES 7 × 5MM 3.3V HCMOS OSCILLATORS

**FEATURES:** PPM: ±100, ±50, ±25, ±20. Temperature range: -10°C to +70°C, (-40°C to +85°C optional). Low current standby. Pb free.

| Cat. No.         | Frequency (MHz) | Net Price |
|------------------|-----------------|-----------|
| F4105-75.000MHz  | 75.000000       | \$43.65   |
| F4105-77.76MHz   | 77.760000       | 43.65     |
| F4105-80.000MHz  | 80.000000       | 43.65     |
| F4105-90.000MHz  | 90.000000       | 43.65     |
| F4105-100.000MHz | 100.000000      | 10.91     |
| F4105-106.250MHz | 106.250000      | 10.91     |
| F4105-125.000MHz | 125.000000      | 10.91     |

## F4600 SERIES 7 × 5MM 3.3V LV-PECL OSCILLATORS

**FEATURES:** PPM: ±100, ±50, ±25, ±20. Temperature range: -10°C to +70°C, (-40°C to +85°C optional). E/D function. Pb free.

| Cat. No.         | Frequency (MHz) | Net Price |
|------------------|-----------------|-----------|
| F4600-100.000MHz | 100.000000      | \$87.29   |
| F4605-106.250MHz | 106.000000      | 87.29     |
| F4605-125.000MHz | 125.000000      | 87.29     |
| F4605-155.520MHz | 155.520000      | 93.53     |
| F4605-156.250MHz | 156.250000      | 93.53     |

## RFX0 SERIES 7 × 5MM 3.3V LV-PECL, XO (RFX300), VCXO (RFV300) OSCILLATORS

**FEATURES:** PPM: ±25, ±20. Temperature range: -10°C to +70°C, (-40°C to +85°C optional). Extremely low jitter. Pb free.

| Cat. No.           | Frequency (MHz) | Net Price |
|--------------------|-----------------|-----------|
| RFX300-622.080MHz  | 622.080000      | \$82.61   |
| RFX300-1000.000MHz | 1000.000000     | 115.35    |
| RFX300-1250.000MHz | 1250.000000     | 115.35    |
| RFV300-622.080MHz  | 622.080000      | 82.61     |
| RFV300-1000.000MHz | 1000.000000     | 115.35    |
| RFV300-1250.000MHz | 1250.000000     | 115.35    |

## FOX923E SERIES 3.2 × 2.5 × 1.2MM 3V VCTCXO OSCILLATORS

**FEATURES:** PPM: ±2.5 Temperature range: -20°C to +75°C, clipped sine output. Pb free.

| Cat. No.          | Frequency (MHz) | Net Price |
|-------------------|-----------------|-----------|
| FOX923E-13.000MHz | 13.000000       | \$96.64   |
| FOX923E-14.440MHz | 14.400000       | 96.64     |
| FOX923E-19.200MHz | 19.200000       | 96.64     |
| FOX923E-19.440MHz | 19.440000       | 96.64     |
| FOX923E-20.000MHz | 20.000000       | 96.64     |
| FOX923E-26.000MHz | 26.000000       | 96.64     |

## FOX914E SERIES 5 × 3.2 × 1.5MM 3.0V OSCILLATORS

**FEATURES:** Temperature range: -20°C to +75°C, clipped sine output. Pb free.

| Cat. No.          | Frequency (MHz) | Net Price |
|-------------------|-----------------|-----------|
| FOX914E-12.800MHz | 12.800000       | \$14.03   |
| FOX914E-13.000MHz | 13.000000       | 10.13     |
| FOX914E-14.440MHz | 14.400000       | 10.13     |
| FOX914E-19.200MHz | 19.200000       | 10.13     |
| FOX914E-19.440MHz | 19.440000       | 10.13     |
| FOX914E-20.000MHz | 20.000000       | 10.13     |
| FOX914E-26.000MHz | 26.000000       | 10.13     |

## FTS501AH SERIES 5V 14 PIN DIP HCMOS OCXO OSCILLATORS

**FEATURES:** Temperature range: -0°C to +70°C. PPB: ±250. HCMOS/TTL output. Meets stratum III.

| Cat. No.           | Frequency (MHz) | Net Price |
|--------------------|-----------------|-----------|
| FTS501AH-10.000MHz | 10.000000       | \$349.00  |
| FTS501AH-12.800MHz | 12.800000       | 349.00    |
| FTS501AH-13.000MHz | 13.000000       | 349.00    |
| FTS501AH-19.440MHz | 19.440000       | 349.00    |
| FTS501AH-20.000MHz | 20.000000       | 349.00    |
| FTS501AH-20.480MHz | 20.480000       | 349.00    |
| FTS501AH-26.000MHz | 26.000000       | 349.00    |
| FTS501AH-32.768MHz | 32.768000       | 349.00    |
| FTS501AH-38.880MHz | 38.880000       | 349.00    |
| FTS501AH-40.000MHz | 40.000000       | 349.00    |