

Temperature Compensated Crystal Oscillators (TCXO's)

TC-140 (R Series)



Description:

The TC-140 series offers performance for short-term stability, phase noise, aging and temperature stability normally only associated with Oven Controlled Crystal Oscillators, while consuming typically <20 mA.

Features:

- Stratum 3 option
- Frequency from 0.5 to 160 MHz
- “1 ppm Forever” option
- TTL, HCMOS and Sinewave
- Over 600,000 units produced

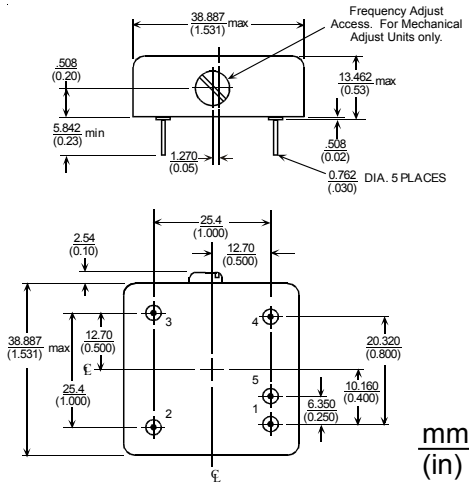
Performance Characteristics

| Parameter | Characteristics | | | | | | | | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|----------------|-------------------|----------------|----------------------------|----------------|------------------------------|-------------------------------|--------|-------------|
| Standard Frequencies: | 4.096, 10.00, 12.80, 13.00, 16.384, 19.44, 20.00, 20.48 MHz Available from 0.5 MHz to 160 MHz | | | | | | | | | | |
| Supply Voltage (Vdd): (other options are available upon request) | 12.0 Vdc $\pm 5\%$ 5.0 Vdc $\pm 5\%$ | | | | | | | | | | |
| Current: | Current draw will vary greatly depending on frequency and output type. For this series TCXO typical current draw will be about 20 mA. Please consult the factory about your exact current requirements. | | | | | | | | | | |
| Output: | <table border="0"> <tr> <td>A = HCMOS / ACMOS</td> <td>0.5 to 160 MHz</td> </tr> <tr> <td>B = 10 TTL</td> <td>0.5 to 160 MHz</td> </tr> <tr> <td>G = 0 dBm to +6 dBm</td> <td>3.0 to 100 MHz</td> </tr> <tr> <td>J = +7 dBm to +13 dBm</td> <td>3.0 to 100 MHz (+12 Vdc only)</td> </tr> </table> | A = HCMOS / ACMOS | 0.5 to 160 MHz | B = 10 TTL | 0.5 to 160 MHz | G = 0 dBm to +6 dBm | 3.0 to 100 MHz | J = +7 dBm to +13 dBm | 3.0 to 100 MHz (+12 Vdc only) | | |
| A = HCMOS / ACMOS | 0.5 to 160 MHz | | | | | | | | | | |
| B = 10 TTL | 0.5 to 160 MHz | | | | | | | | | | |
| G = 0 dBm to +6 dBm | 3.0 to 100 MHz | | | | | | | | | | |
| J = +7 dBm to +13 dBm | 3.0 to 100 MHz (+12 Vdc only) | | | | | | | | | | |
| Temperature Stability: Note: Not all stabilities are available with all frequency/output combinations. Please consult the factory. | <p>B-1PM - $\pm 1.0 \times 10^{-6}$ over 0°C to +50°C, 10 years and initial accuracy B-207 - $\pm 2.0 \times 10^{-7}$ over 0°C to +50°C, Aging <2 ppm/10 years B-ST3 - Stratum 3 over 0°C to +50°C, *See note below B-4PM - $\pm 4.6 \times 10^{-6}$ over 0°C to +50°C, 10 years and initial accuracy C-1PM - $\pm 1.0 \times 10^{-6}$ over 0°C to +70°C, 10 years and initial accuracy C-ST3 - Stratum 3 over 0°C to +70°C, *See note below C-507 - $\pm 5.0 \times 10^{-7}$ over 0°C to +70°C, Aging <2 ppm/10 years C-4PM - $\pm 4.6 \times 10^{-6}$ over 0°C to +70°C, 10 years and initial accuracy F-106 - $\pm 1.0 \times 10^{-6}$ over -40°C to +85°C, Aging <2 ppm/10 years F-4PM - $\pm 4.6 \times 10^{-6}$ over -40°C to +85°C, 10 years and initial accuracy</p> <p>*STRATUM 3 per GR-1244-CORE Table 3-1 Total Stability: $< \pm 4.6 \times 10^{-6}$ for all causes and 10 years Total Stability: $< \pm 3.7 \times 10^{-7}$ for all causes and 24 hours Note: Tighter stabilities and wider temperature ranges are available, please consult the factory.</p> | | | | | | | | | | |
| Phase Noise (Typical): 10 MHz +12 Vdc J - Output | <table border="0"> <thead> <tr> <th>Offset</th> <th>Phase Noise</th> </tr> </thead> <tbody> <tr> <td>10 Hz</td> <td>-110 dBc/Hz</td> </tr> <tr> <td>100 Hz</td> <td>-135 dBc/Hz</td> </tr> <tr> <td>1 kHz</td> <td>-150 dBc/Hz</td> </tr> <tr> <td>10 kHz</td> <td>-155 dBc/Hz</td> </tr> </tbody> </table> | Offset | Phase Noise | 10 Hz | -110 dBc/Hz | 100 Hz | -135 dBc/Hz | 1 kHz | -150 dBc/Hz | 10 kHz | -155 dBc/Hz |
| Offset | Phase Noise | | | | | | | | | | |
| 10 Hz | -110 dBc/Hz | | | | | | | | | | |
| 100 Hz | -135 dBc/Hz | | | | | | | | | | |
| 1 kHz | -150 dBc/Hz | | | | | | | | | | |
| 10 kHz | -155 dBc/Hz | | | | | | | | | | |
| Frequency vs. Supply: | < ± 0.05 ppm for a $\pm 5\%$ change in supply voltage | | | | | | | | | | |
| Package: | 38.89 x 38.89 x 13.462 mm (1.53" x 1.53" x 0.53") | | | | | | | | | | |

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Outline Drawing



Frequency Adjust Options

| | |
|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A | ±3 ppm minimum via internal mechanical adjust positive slope. |
| B | ±3 ppm minimum via external voltage, 0 to +5 Vdc |
| F | No Frequency Adjust. Standard option for ±1 ppm and ±4.6 ppm for 10 years units. However, this option is available with all Stability options. No user adjustment is needed. Unit is Plug-N-Play. Note: This option is ideal for high volume applications where minimal set-up and testing is desired. |

TCXO

Pin Out Information

| Pin | Function |
|-----|-----------------|
| 1 | Output |
| 2 | Supply (Vdd) |
| 3 | Gnd |
| 4 | Freq. Adjust/NC |
| 5 | Gnd |

Output Levels

| Output Option | A | B |
|----------------|--------------------|------------|
| Output | HCMOS/ACMOS | 10 TTL |
| Voh min.. | 0.8 (Vdd) | +2.4 Vdc |
| Vol max. | +0.5 Vdc | +0.5 Vdc |
| Load (typical) | 100 k ohm // 10 pF | 10 TTL |
| Symmetry | 50% ±10% | 50% ±10% |
| Rise/Fall Time | 5 ns max. | 10 ns max. |

Sine

| Output Option | G | J |
|----------------|-----------------|-------------------|
| Output | Sinewave | Sinewave |
| Level | 0 dBm to +6 dBm | +7 dBm to +13 dBm |
| Load | 50 ohm | 50 ohm |
| Harmonics/subs | -20 dBc max. | -20 dBc max. |
| Other Spurious | -60 dBc max. | -80 dBc max. |

Ordering Information

TC - **140** - **C** **A** **B** - **4PM** **F** **12.80** - **MHz**

Product Family
 TC = TCXO

Package
 140 = package

Supply Voltage
 B = 12 Vdc ±5%
 C = 5.0 Vdc ±5%

Output
 A = HCMOS/ACMOS
 B = 10 TTL
 G = 0 dBm / 50 ohm
 J = +7 dBm / 50 ohm

Frequency Adjust Options
 A = Internal Mech. Adjust (standard)
 B = External Voltage Adjust
 F = No Frequency adjust (see above)

Temperature Stability
 B-1PM = ±1.0 x 10⁻⁶ over 0°C to +50°C, 10 years (no freq. adjust)
 B-207 = ±2.0 x 10⁻⁷ over 0°C to +50°C
 B-ST3 = Stratum 3 over 0°C to +50°C
 B-4PM = ±4.6 x 10⁻⁶ over 0°C to +50°C, 10 years (no freq. adjust)
 C-1PM = ±1.0 x 10⁻⁶ over 0°C to +70°C, 10 years (no freq. adjust)
 C-ST3 = Stratum 3 over 0°C to +70°C
 C-507 = ±5.0 x 10⁻⁷ over 0°C to +70°C
 C-4PM = ±4.6 x 10⁻⁶ over 0°C to +70°C, 10 years (no freq. adjust)
 F-106 = ±1.0 x 10⁻⁶ over -40°C to +85°C
 F-4PM = ±4.6 x 10⁻⁶ over -40°C to +85°C, 10 years (no freq. adjust)
Note: Other stabilities are available upon request.

Output Frequency
 0.5 MHz to 160 MHz