



frequency control solutions

T32

WIDE TEMPERATURE RANGE
LOW ACCELERATION SENSITIVITY
HIGH SHOCK SURVIVABILITY

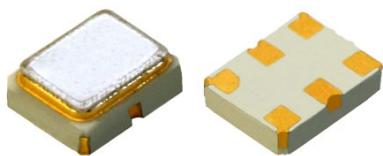
tcxo

Product Description

Greenray Industries' T32 Series TCXO has been developed in an ultra-small 3.2 x 2.5 mm package. It can survive extremely high pyrotechnic shocks while providing very low acceleration sensitivity. The T32 operating temperature covers the full MIL range of -55°C to +125°C while holding a frequency stability of only ± 1.0 ppm.

Features

- Wide temperature range -55 °C to +125 °C
- Small and rugged 3.2 x 2.5 mm package
- Tight temperature stability as low as ± 1 ppm over -55 °C to +125°C
- Acceleration sensitivity as low as 0.2 ppb/g
- Shock survivability up to 75,000 g
- Low power consumption
- CMOS or Clipped Sine output
- Fundamental frequency; no PLL artifacts
- Testing per MIL-PRF-55310 product level B available



Applications

- Telecommunications
- High-shock electronics
- Mobile radio
- Mobile instrumentation
- Airborne communications
- Wireless communications
- Microwave receivers

REV: B1



Greenray Industries, Inc., 840 West Church Road, Mechanicsburg, PA 17055
TEL: 717-766-0223 FAX: 717-790-9509 e-mail: sales@greenrayindustries.com
www.greenrayindustries.com

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frequency control solutions

T32 SERIES
10 MHz to 52 MHz**Electrical Characteristics**

| Parameter | Conditions | Min | Typical | Max | Units | Ordering Code |
|--------------------------|---------------------------------|-----|---------|-----|-------|---------------|
| Nominal Frequency | @ +25°C | 10 | | 52 | MHz | (FREQ.) |
| | -40°C to +85°C | | ± 0.5 | ± 1 | ppm | T57 |
| | -45°C to +105°C | | ± 0.5 | ± 1 | ppm | J57 |
| | -55°C to +105°C | | ± 1.0 | ± 2 | ppm | W16 |
| | -55°C to +125°C | | ± 1.0 | ± 2 | ppm | X16 |
| Aging | 1 st year | | | ± 1 | ppm | |
| Acceleration Sensitivity | Worst axis tested @ 90 Hz, 10 g | | | 2.5 | ppb/g | SG |
| | | | | 1 | ppb/g | SD |
| | | | 0.2 | 0.5 | ppb/g | LG |
| Frequency vs Reflow | After 24 hrs recovery | | | 1.0 | ppm | |
| Frequency vs Voltage | ± 5% | | | 0.2 | ppm | |
| Frequency vs Load | ± 10% | | | 0.1 | ppm | |
| Voltage Control (EFC) | Available upon request | | | | | |
| Start-up Time | | | 10 | | mSec | |

Phase Noise Performance

| Parameter | Frequency Offset (Hz) | Min | Typical | Max | Units | Ordering Code |
|----------------------------|-----------------------|-----|---------|-----|--------|---------------|
| Static @ 40 MHz Nom. Freq. | 10 | | -75 | | dBc/Hz | |
| | 100 | | -110 | | dBc/Hz | |
| | 1 k | | -132 | | dBc/Hz | |
| | 10 k | | -148 | | dBc/Hz | |
| | 100 k | | -150 | | dBc/Hz | |
| | RMS Jitter | | 570 | | fSec | |

DC Supply

| Parameter | Conditions | Min | Typical | Max | Units | Ordering Code |
|----------------|--------------|-----|---------|-----|-------|---------------|
| Supply Voltage | | 3.0 | 3.3 | 3.6 | Vdc | B |
| Supply Current | CMOS | | | 6 | mA | |
| | Clipped Sine | | | 3 | mA | |

RF Output

| Parameter | Conditions | Min | Typical | Max | Units | Ordering Code |
|--------------|------------|----------------------|-------------------|----------------------|-------|---------------|
| CMOS | | | | | | C |
| Load | | | 15 | | pF | |
| Level | | 0.8 Vdd "1" Level | | 0.2 Vdd "0" Level | V | |
| Symmetry | | 40 | 50 | 60 | % | |
| Clipped Sine | | | | | | CS |
| Load | | | 10 pF // 10 kΩ | | | |
| Output Power | | + 0.8 | + 1.9 | + 3.0 | V p-p | |



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Environmental and Mechanical Specifications

| Test | Standard | Method | Condition | Description |
|-----------|--------------|-----------------------------------|-----------|------------------------------------|
| Vibration | MIL-STD-202G | 204 | D | 20 g, 20 Hz to 2000 Hz, swept sine |
| Shock | STD | 5,000 g, 0.5 ms, half sine | | |
| | HG | Up to 75,000 g, 0.5 ms, half sine | | (Specify required Level) |

Recommendations and General Information

| Parameter | Notes |
|-----------------------|--|
| Operating Temperature | -55°C to +125°C |
| Storage Temperature | -60°C to +125°C |
| Terminal Finish | Au (RoHS) (SnPb 63/37 (non-RoHS) Available upon request) |
| Package Weight | < 0.1 gram |
| Soldering Instruction | Reflow |
| Shipping | Tray Pack, Tape & Reel |

Ordering Example

| T32 | - | T | 56 | - | CS | - | SG | - | 10.0 MHz |
|-------|-------------|-----------|--------|---------------|-------------|---|----|---|----------|
| Model | Temp. Range | Stability | Output | G-Sensitivity | Freq. (MHz) | | | | |

J: -45 to +105°C
W: -55 to +105°C
X: -55 to +125°C

57: ±0.5ppm
16: ±1ppm
26: ±2ppm
36: ±3ppm
56: ±5ppm

C: CMOS
CS: Clipped Sine

SG: < 2.5 ppb/g
LG: < 1.0 ppb/g
ULG: < 0.5 ppb/g
HG: Customer-specific

10 to 52

The Order ID (T32-X56-CS-SG-10.0MHz) is only used to issue the preliminary quote. The Part Number (T32-1) for the quoted Electrical Characteristics, Screenings, and other options, will be provided with the Greenray Sales Order.

Other specification options are available, please use the contact information below for more information.



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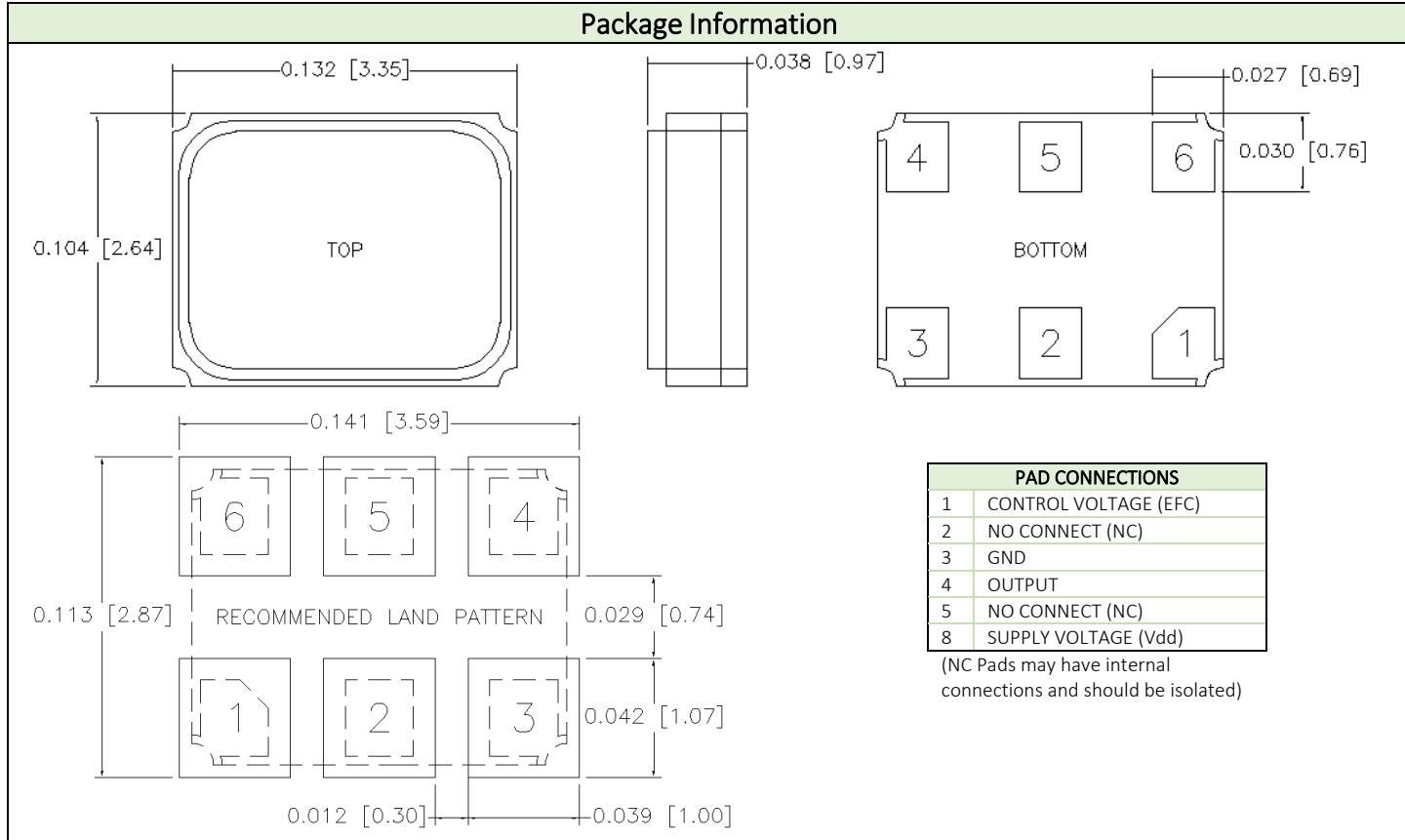


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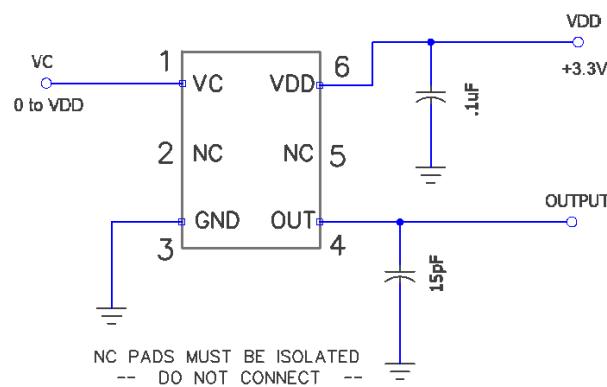
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Package Information

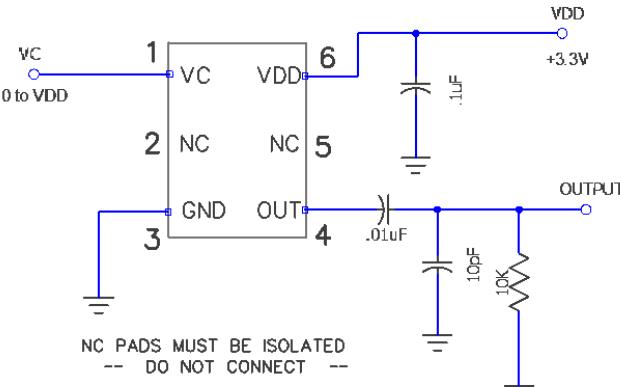


Recommended Configuration

T32 CMOS OUTPUT CONFIGURATION



T32 CLIPPED SINE CONFIGURATION



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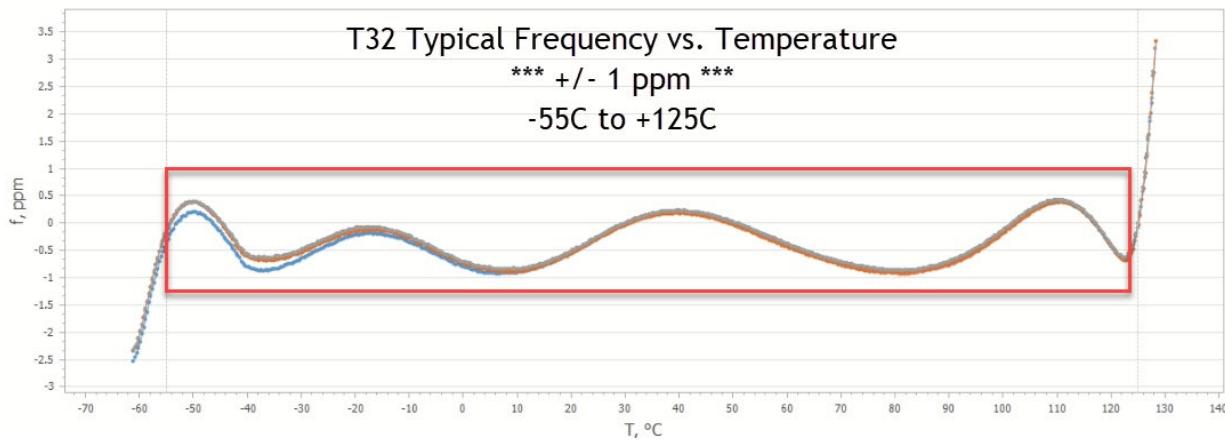
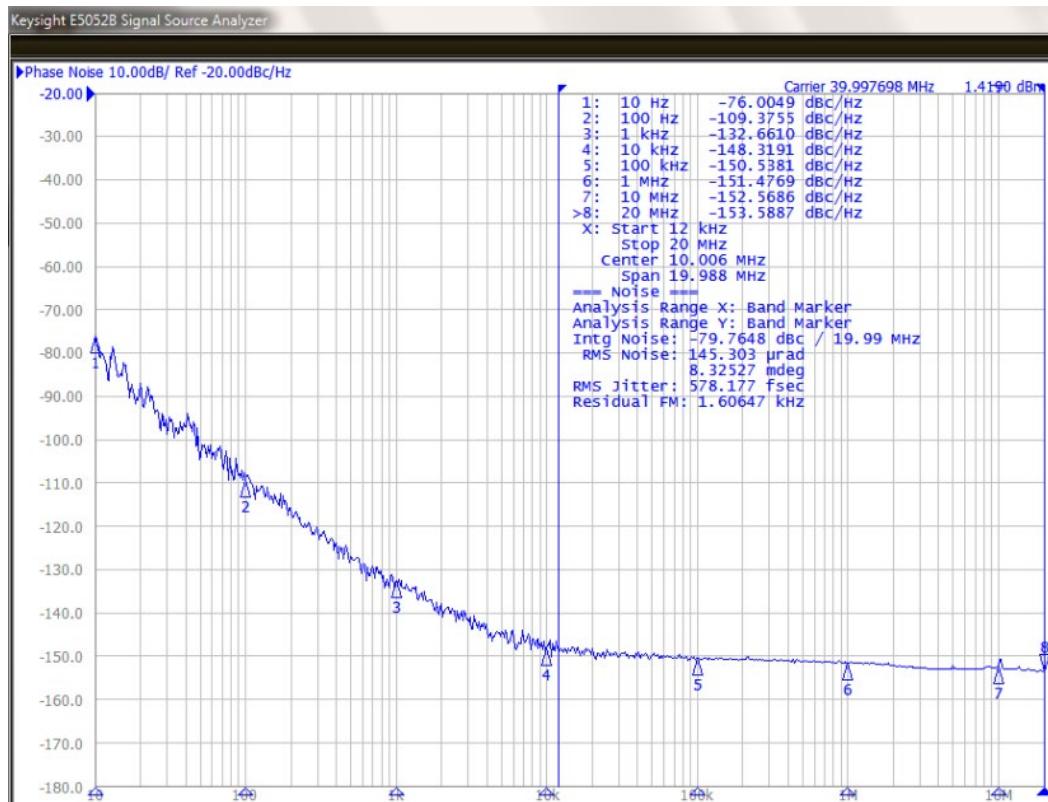


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PHASE NOISE AND JITTER PERFORMANCE



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