

Helping Customers Innovate, Improve & Grow



## Description

OX-501 is a small form factor precision OXCO providing excellent levels of overall stability in a tiny footprint, making the OX-501 ideal for designs where high performance is required but space is limited.

## Features

- 6-Pin SMD package
- Fast warm-up
- Frequency Range, 10 MHz to 40 MHz
- Standard frequencies: 10, 12.8, 19.2, 20, 38.88, MHz

## Applications

- Base stations
- Test equipment
- Small Cells
- Military communication equipment
- Packet based timing (e.g. 1588).

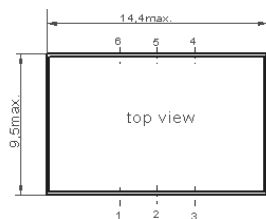
## Performance Specifications

| Parameter  | Frequency Stabilities <sup>1</sup> |     |      |         | Condition   | Options <sup>5</sup> |
|--|------------------------------------|-----|------|---------|---|----------------------|
|  | Min                                | Typ | Max  | Units   |   |                      |
| vs. operating temperature range<br>(referenced to +25°C) | -20                                |     | +20  | ppb     | -20 to +70°C  |                      |
|  | -100                               |     | +100 | ppb     | -20 to +70°C  |                      |
|  | -20                                |     | +20  | ppb     | -40 to +85°C  |                      |
|  | -100                               |     | +100 | ppb     | -40 to +85°C  |                      |
| Initial tolerance  | -0.5                               |     | +0.5 | ppm     | at time of shipment, nominal EFC                                |                      |
| vs. supply voltage change                                | -20                                |     | +20  | ppb     | $V_s \pm 5\%$ static  |                      |
| vs. load change  | -30                                |     | +30  | ppb     | Load $\pm 5\%$ static   |                      |
| vs. aging / day  | -5                                 |     | +5   | ppb     | after 30 days of operation                                      |                      |
| vs. aging / year   | -500                               |     | +500 | ppb     | $\leq 40$ MHz after 30 days of operation                        |                      |
| Warm-up time   |                                    |     | 3    | minutes | to $\pm 200$ ppb of final frequency (1 hour reading)<br>@ +25°C |                      |

# Performance Specifications

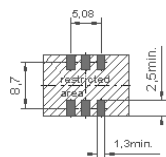
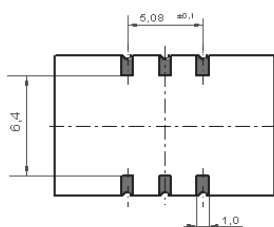
| Supply Voltage (Vs)        |                            |         |       |        |                            |
|----------------------------|----------------------------|---------|-------|--------|----------------------------|
| Parameter                  | Min                        | Typical | Max   | Units  | Condition                  |
| Supply voltage (standard)  | 3.135                      | 3.3     | 3.465 | VDC    |                            |
| Power consumption          |                            | 1.4     | 2.0   | Watts  | during warm-up             |
|                            |                            | 0.5     | 0.66  | Watts  | steady state @ +25°C       |
| RF Output                  |                            |         |       |        |                            |
| Signal [standard]          | HCMOS                      |         |       |        |                            |
| Load                       |                            | 15      |       | pF     |                            |
| Signal Level (Vol)         |                            |         | 0.4   | VDC    | with Vs=3.3V and 15pF Load |
| Signal Level (Voh)         | 2.4                        |         |       | VDC    | with Vs=3.3V and 15pF Load |
| Duty Cycle                 | 45                         |         | 55    | %      | @ (Voh-Vol)/2              |
| Frequency Tuning (EFC)     |                            |         |       |        |                            |
| Tuning Range               | Fixed OCXO; No adjust      |         |       |        |                            |
| Linearity                  | 10%                        |         |       |        |                            |
| Tuning Slope               | Positive                   |         |       |        |                            |
| Control Voltage Range      | 0.0                        | 1.4     | 2.8   | VDC    | with Vs=3.3V               |
| Additional Parameters      |                            |         |       |        |                            |
| Phase Noise <sup>3</sup>   |                            | -60     | -45   | dBc/Hz | 1 Hz                       |
|                            |                            | -100    | -95   | dBc/Hz | 10 Hz                      |
|                            |                            | -128    | -120  | dBc/Hz | 100 Hz                     |
|                            |                            | -140    | -135  | dBc/Hz | 1 kHz                      |
|                            |                            | -148    | -145  | dBc/Hz | 10 kHz                     |
| Weight                     |                            |         | 8.0   | g      |                            |
| Processing & Packing       | Handling & Processing Note |         |       |        |                            |
| Absolute Maximum Ratings   |                            |         |       |        |                            |
| Supply voltage (Vs)        |                            |         | 4.0   | V      | with Vs=3.3 VDC            |
| Output Load                |                            |         | 50    | pF     |                            |
| Operable Temperature Range | -40                        |         | +85   | °C     |                            |
| Storage Temperature Range  | -55                        |         | +85   | °C     |                            |

# Outline Drawing / Enclosure



Dimensions in mm

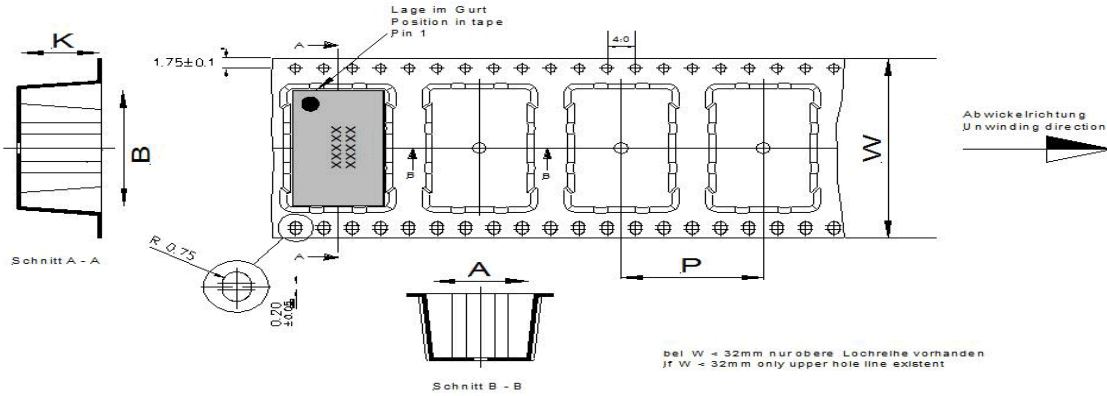
| OX-501     |                |
|------------|----------------|
| Height "H" | cover material |
| 6.2        | plastic        |



Padvorschlag  
land pattern  
recommendation

| Pin Connections |                      |
|-----------------|----------------------|
| 1               | I.C (Do not connect) |
| 2               | N.C                  |
| 3               | Ground (Case)        |
| 4               | RF Output            |
| 5               | N.C                  |
| 6               | Supply Voltage Input |

# Standard Shipping Method (OX-501)



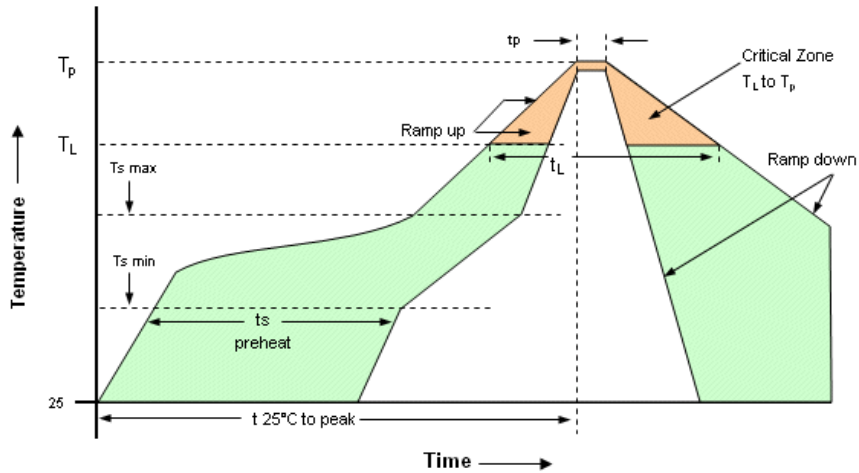
Maßangaben in mm :  
 A, B und K Maße vom Bauelement abhängig.  
 Fertigungstoleranzen entsprechen der DIN IEC 286-3

Dimension in mm :  
 A, B and K are dependent upon component dimensions,  
 production tolerance complying DIN IEC 286-3

All dimensions in millimetres unless otherwise stated.

| Enclosure Type   | Tape Width W (mm) | Quantity per meter | Quantity per reel | Dimension P |
|------------------|-------------------|--------------------|-------------------|-------------|
| OX-5011 (6.2 mm) | 24                | 83.5               | 850               | 12          |

## Recommended Reflow Profile

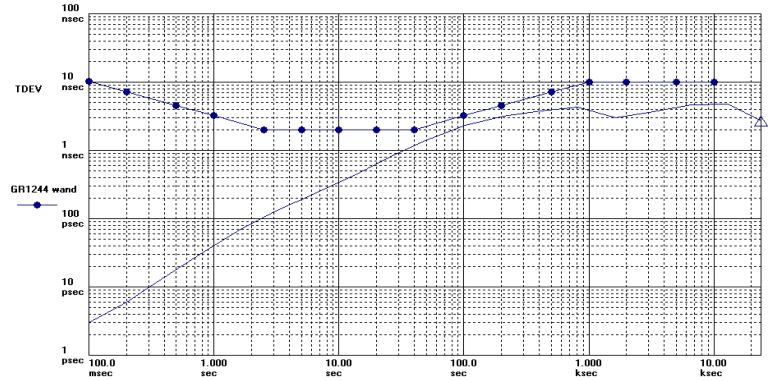
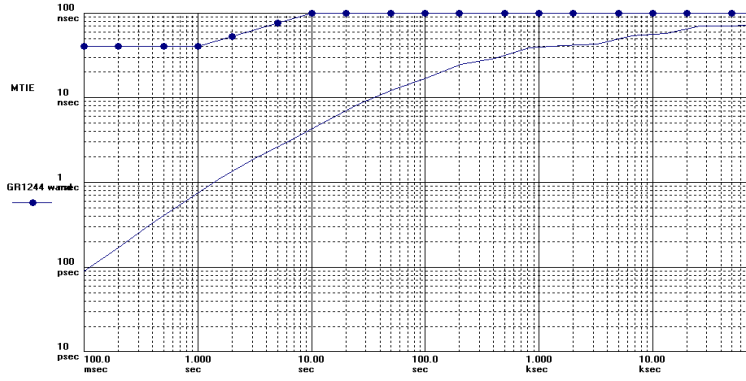


| Profile Feature   | Pb-Free Assembly/<br>Sn-Pb Assembly | Profile Feature  | Pb-Free Assembly/<br>Sn-Pb Assembly |
|---|-------------------------------------|--|-------------------------------------|
| Average ramp-up rate ( $T_L$ to $T_p$ )   | 3°C/second max.                     | Time 25°C to Peak Temperature                                      | 8 minutes max.                      |
| Preheat<br>-Temperature Min $T_{Smin}$<br>-Temperature Min $T_{Smax}$<br>-Time (min to max) $t_s$ | 150°C<br>200°C<br>60-180 seconds    | Time maintained above<br>-Temperature ( $T_L$ )<br>-Time ( $t_L$ ) | 217°C<br>60-150 seconds             |
| $T_{Smax}$ to $T_L$ -Ramp-up Rate   | 3°C/second max                      |  |                                     |
| Time maintained above<br>-Temperature ( $T_L$ )<br>-Time ( $t_L$ )                                | 217°C<br>60-150 seconds             | Time within 5°C of actual Peak<br>Temperature ( $t_p$ )            | 20-40 seconds                       |
| Peak Temperature ( $T_p$ )  | max 260°C                           | Ramp-down Rate   | 6°C/ second max                     |

**Note:** All temperatures refer to topside of the package, measured on the package body surface.

# Performance Data

GR-1244 Wander Generation: MTIE and TDEV with 3MHz high pass filter applied to free-running data



# Ordering Information

**OX - 501 1 - E A E - 208 0 - 20M0000000**

Product Family  
OX: OCXO

Package  
SMD version

Height  
1: 6.2mm

Supply Voltage  
E: 3.3V

RF Output Code  
A: HCMOS

Temperature Range  
E: -40°C to +85°C  
J: -20°C to +70°C

Stability Code  
208: ±20ppb  
107: ±100ppb

Frequency

Frequency Control  
0: No Tuning

**Notes:**

1. Contact factory for improved stabilities or additional product options. Not all options and codes are available at all frequencies.
2. Unless other stated all values are valid after warm-up time and refer to typical conditions for supply voltage, frequency control voltage, load, temperature (25°C).
3. Phase noise degrades with increasing output frequency.
4. Subject to technical modification.
5. Contact factory for availability.

# For Additional Information, Please Contact

**USA:**

Vectron International  
267 Lowell Road  
Hudson, NH 03051  
Tel: 1.888.328.7661  
Fax: 1.888.329.8328

**Europe:**

Vectron International  
Landstrasse, D-74924  
Neckarbischofsheim, Germany  
Tel: +49 (0) 7268.801.100  
Fax: +49 (0) 7268.801.282

**Asia:**

Vectron International  
1589 Century Avenue, the 19th Floor  
Chamtime International Financial Center  
Shanghai, China  
Tel: 86.21.6081.2888  
Fax: 86.21.6163.3598

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