

Helping Customers Innovate, Improve & Grow



TX-508

### Features

- Low G-Sensitivity
- Vibration hardened
- Tight Tolerances
- Low Phase Noise
- Frequency Range<sup>1</sup>: 10 - 100 MHz

### Applications

- Vibration Environment
- Portable Equipment
- Land Mobile Radio

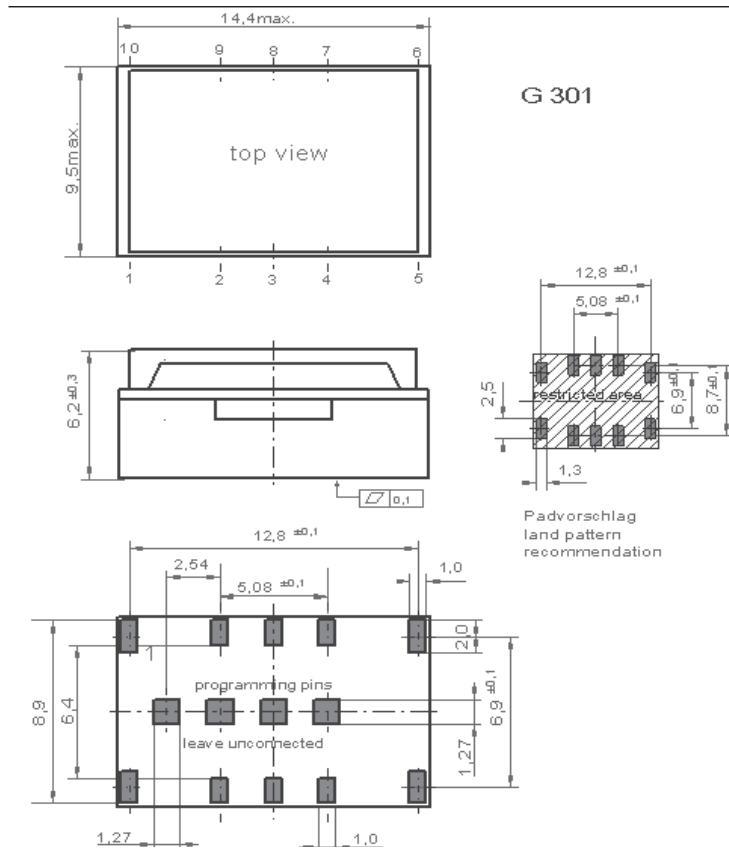
### Performance Specifications<sup>2</sup>

| Frequency Stabilities <sup>1</sup> (Standard)                                       |        |         |        |       |                                                                                                                                                                                                                                                          |                      |
|-------------------------------------------------------------------------------------|--------|---------|--------|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| Parameter                                                                           | Min    | Typical | Max    | Units | Condition                                                                                                                                                                                                                                                |                      |
| vs. operating temperature range<br>(referenced to +25°C)                            | -1.0   |         | +1.0   | ppm   | -40 to +85°C                                                                                                                                                                                                                                             | Options <sup>4</sup> |
|                                                                                     | -1.0   |         | +1.0   | ppm   | -20 to +70°C                                                                                                                                                                                                                                             |                      |
|                                                                                     | -0.5   |         | +0.5   | ppm   | -0 to +50°C                                                                                                                                                                                                                                              |                      |
| Initial tolerance                                                                   | -1.5   |         | +1.5   | ppm   | at time of shipment, nominal EFC, 25°C<br>V <sub>s</sub> ±5% static<br>Load ±10% static<br>after 30 days of operation<br>after 30 days of operation                                                                                                      |                      |
| vs. supply voltage change                                                           | -0.3   |         | +0.3   | ppm   |                                                                                                                                                                                                                                                          |                      |
| vs. load change                                                                     | -0.2   |         | +0.2   | ppm   |                                                                                                                                                                                                                                                          |                      |
| vs. aging / 1 year                                                                  | -1.0   |         | +1.0   | ppm   |                                                                                                                                                                                                                                                          |                      |
| vs. aging / 10 year                                                                 | -2.5   |         | +2.5   | ppm   |                                                                                                                                                                                                                                                          |                      |
| Frequency Stabilities <sup>1</sup> (Stratum 3 TCXO Frequency range - 10 to 100 MHz) |        |         |        |       |                                                                                                                                                                                                                                                          |                      |
| vs. operating temperature range<br>(referenced to +25°C)                            | -0.8   |         | +0.8   | ppm   | -40 to +85°C                                                                                                                                                                                                                                             | Options <sup>4</sup> |
|                                                                                     | -0.8   |         | +0.8   | ppm   | -20 to +70°C                                                                                                                                                                                                                                             |                      |
|                                                                                     | -0.28* |         | +0.28* | ppm   | -20 to +70°C                                                                                                                                                                                                                                             |                      |
|                                                                                     | -0.28* |         | +0.28* | ppm   | -0 to +50°C                                                                                                                                                                                                                                              |                      |
| Initial tolerance                                                                   | -1.0   |         | +1.0   | ppm   | at time of shipment, nominal EFC, 25°C<br>V <sub>s</sub> ±5% static<br>Load ±10% static<br>after 30 days of operation<br>Note:<br>* Stratum 3 per GR-1244-CORE:<br><±4.6 ppm for all causes and<br>20 Years aging,<br>Holdover: <±0.37 ppm over 24 hours |                      |
| vs. supply voltage change                                                           | -0.3   |         | +0.3   | ppm   |                                                                                                                                                                                                                                                          |                      |
| vs. load change                                                                     | -0.1   |         | +0.1   | ppm   |                                                                                                                                                                                                                                                          |                      |
| vs. aging / 20 years                                                                | -2.5   |         | +2.5   | ppm   |                                                                                                                                                                                                                                                          |                      |
| overall tolerance                                                                   | -4.6   |         | +4.6   | ppm   |                                                                                                                                                                                                                                                          |                      |

## Performance Specifications<sup>2</sup>

| Supply Voltage (Vs)                 |                                                                                                                                                                                    |                                     |            |                                                |                                               |                              |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|------------|------------------------------------------------|-----------------------------------------------|------------------------------|
| Parameter                           | Min                                                                                                                                                                                | Typical                             | Max        | Units                                          | Condition                                     |                              |
| Supply voltage (standard)           | 3.135                                                                                                                                                                              | 3.3                                 | 3.465      | VDC                                            | @LVCMOS                                       | Option <sup>4</sup>          |
| Current consumption                 |                                                                                                                                                                                    |                                     | 30         | mA                                             |                                               |                              |
| Supply voltage                      | 4.75                                                                                                                                                                               | 5.0                                 | 5.25       | VDC                                            | @HCMOS                                        |                              |
| Current consumption                 |                                                                                                                                                                                    |                                     | 40         | mA                                             |                                               |                              |
| RF Output                           |                                                                                                                                                                                    |                                     |            |                                                |                                               |                              |
| Signal [standard]                   | LVCMOS/HCMOS                                                                                                                                                                       |                                     |            |                                                |                                               |                              |
| Load                                | 13.5                                                                                                                                                                               | 15                                  | 16.5       | pF                                             |                                               |                              |
| Signal Level (Vol) LVCMOS           |                                                                                                                                                                                    |                                     | 0.3        | VDC                                            | @ Vs=3.3V and 15pF Load                       |                              |
| Signal Level (Voh) LVCMOS           | 3.0                                                                                                                                                                                |                                     |            | VDC                                            | @ Vs=3.3V and 15pF Load                       |                              |
| Signal Level (Vol) HCMOS            |                                                                                                                                                                                    |                                     | 0.5        | VDC                                            | @ Vs=5.0V and 15pF Load                       |                              |
| Signal Level (Voh) HCMOS            | 4.5                                                                                                                                                                                |                                     |            |                                                | @ Vs=5.0V and 15pF Load                       |                              |
| Duty Cycle                          | 40                                                                                                                                                                                 |                                     | 60         | %                                              | @ (Voh-Vol)/2                                 |                              |
| Rise and Fall time                  |                                                                                                                                                                                    |                                     | 5          | ns                                             | @15 pF 10 to 90 %                             |                              |
| Frequency Control (EFC)             |                                                                                                                                                                                    |                                     |            |                                                |                                               |                              |
| Tuning Range                        | Fixed TCXO; No adjust                                                                                                                                                              |                                     |            |                                                |                                               | Option <sup>4</sup>          |
| Tuning Range                        | ±5.0<br>±8.0                                                                                                                                                                       | ±12<br>±14                          | ±20<br>±20 | ppm<br>ppm                                     | S3 Version<br>Standard Version                |                              |
| Linearity                           | <10%                                                                                                                                                                               |                                     |            |                                                |                                               |                              |
| Tuning Slope                        | Positive                                                                                                                                                                           |                                     |            |                                                |                                               |                              |
| Control Voltage Range               | 0.3                                                                                                                                                                                | 1.65                                | 3.0        | VDC                                            | @ Vs=3.3V                                     |                              |
| Control Voltage Range               | 0.5                                                                                                                                                                                | 2.5                                 | 4.5        | VDC                                            | @ Vs=5.0V                                     |                              |
| Frequency control input impedance   | 10                                                                                                                                                                                 |                                     |            | kOhm                                           |                                               |                              |
| Additional Parameters               |                                                                                                                                                                                    |                                     |            |                                                |                                               |                              |
| Phase Noise <sup>3</sup>            |                                                                                                                                                                                    | -95<br>-123<br>-143<br>-152<br>-155 |            | dBc/Hz<br>dBc/Hz<br>dBc/Hz<br>dBc/Hz<br>dBc/Hz | 10 Hz<br>100 Hz<br>1 kHz<br>10 kHz<br>100 kHz | @ 10 MHz<br>LVCMOS<br>3.3 V  |
| Jitter                              |                                                                                                                                                                                    | 1.14                                |            | ps RMS                                         | @ 12 kHz to 20 MHz                            |                              |
| Phase Noise <sup>3</sup>            |                                                                                                                                                                                    | -74<br>-103<br>-134<br>-152<br>-160 |            | dBc/Hz<br>dBc/Hz<br>dBc/Hz<br>dBc/Hz<br>dBc/Hz | 10 Hz<br>100 Hz<br>1 kHz<br>10 kHz<br>100 kHz | @ 100 MHz<br>LVCMOS<br>3.3 V |
| Jitter                              |                                                                                                                                                                                    | 0.073                               |            | ps RMS                                         | @ 12 kHz to 20 MHz                            |                              |
| Weight                              |                                                                                                                                                                                    |                                     | 8.0        | g                                              |                                               |                              |
| Reflow Process                      | IPC / JEDEC J-STD-020 (latest version)                                                                                                                                             |                                     |            |                                                |                                               |                              |
| Additional Environmental Conditions |                                                                                                                                                                                    |                                     |            |                                                |                                               |                              |
| Random Vibration                    | MIL-STD-202G; Method 214A; Condition II-J, 1g2/Hz / 43.92 grms guaranteed<br>(Qualification testing performed at MIL-STD-202G; Method 214A; Condition II-K, 1.5g2/Hz / 53.79 grms) |                                     |            |                                                |                                               |                              |
| Sine Vibration                      | MIL-STD-883; Method 2007, Test Condition B 50 g<br>(Qualification testing performed at MIL-STD-883; Method 2007; Test Condition C 70 g)                                            |                                     |            |                                                |                                               |                              |
| Shock                               | MIL-STD-883G; Method 2002.4; Condition D, 5000 g / 0.3 ms<br>higher values on request                                                                                              |                                     |            |                                                |                                               |                              |
| Solderability                       | JEDEC J-STD-002: 100% RoHS 6 compliant                                                                                                                                             |                                     |            |                                                |                                               |                              |
| Solvent Resistance                  | non-washable device                                                                                                                                                                |                                     |            |                                                |                                               |                              |
| Absolute Maximum Ratings            |                                                                                                                                                                                    |                                     |            |                                                |                                               |                              |
| supply voltage (Vs)                 |                                                                                                                                                                                    |                                     | 6.0        | V                                              |                                               |                              |
| Output Load                         |                                                                                                                                                                                    |                                     | 50         | pF                                             |                                               |                              |
| Operable Temperature Range          | -40                                                                                                                                                                                |                                     | +85        | °C                                             |                                               |                              |
| Storage Temperature Range           | -55                                                                                                                                                                                |                                     | +105       | °C                                             |                                               |                              |

## Outline Drawing / Enclosure



Dimensions in mm

### Pin Connections:

|    |                                 |
|----|---------------------------------|
| 1  | N/C                             |
| 2  | NC / Control Voltage Input (Vc) |
| 3  | N/C / Enable (optional)         |
| 4  | Ground (Case)                   |
| 5  | NC                              |
| 6  | NC                              |
| 7  | RF-Output                       |
| 8  | NC                              |
| 9  | Supply Voltage (Vs)             |
| 10 | NC                              |

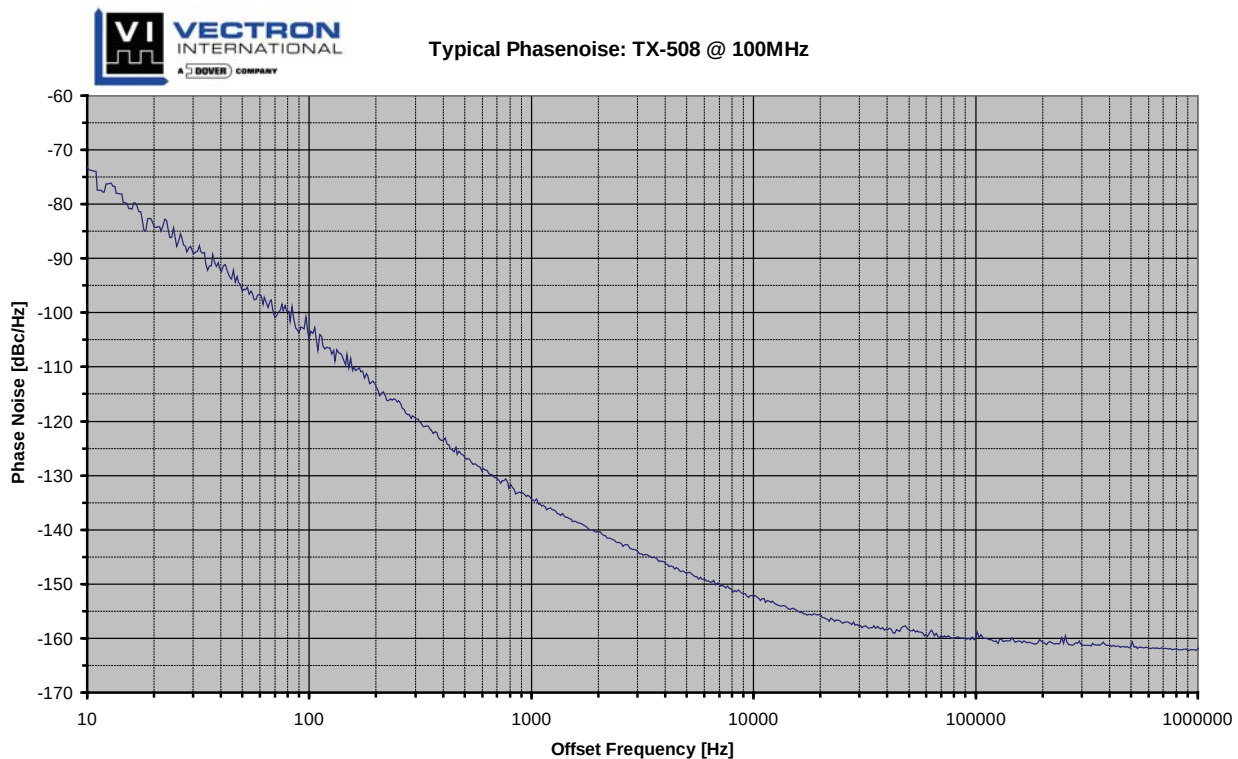
### Enable (Option\*):

| Pin 3 | Pin 7         |
|-------|---------------|
| High  | Data          |
| Open  | Date          |
| Low   | High Tristate |

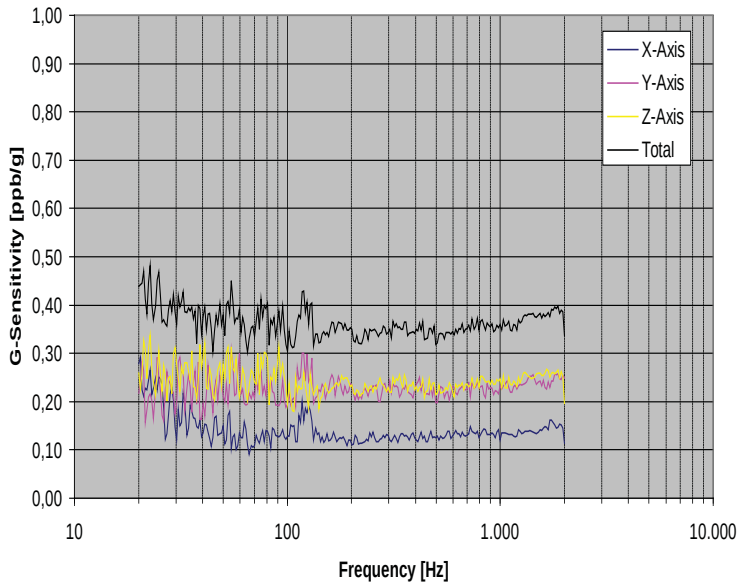
### Package Code: 508

| Type | Height |
|------|--------|
| G301 | 6.2 mm |

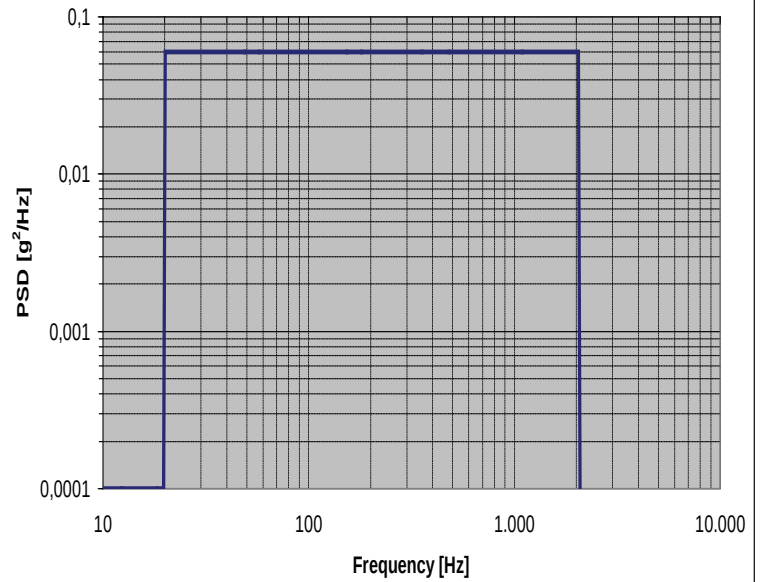
## Typical Phase Noise @ 100 MHz HCMOS



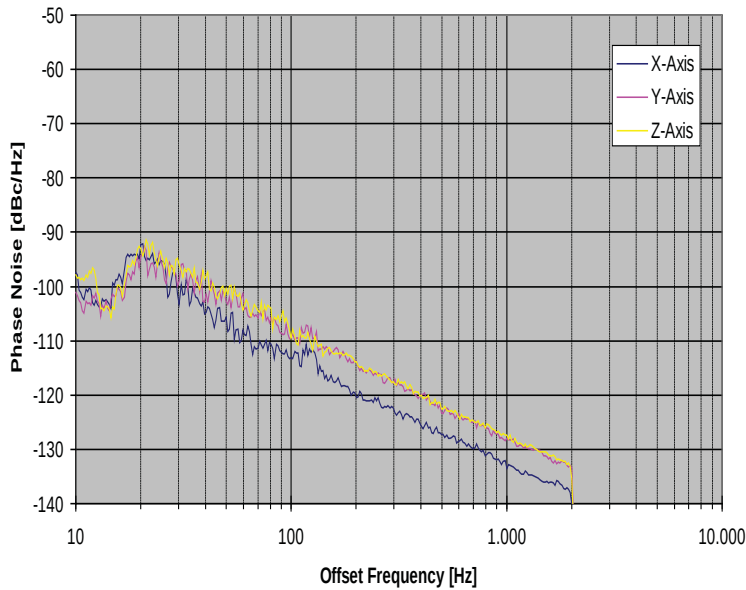
G-Sensitivity: TX-508; 10 MHz; 0,06g2/Hz



Vibration spectrum



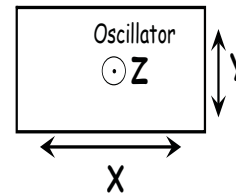
Phase noise: TX-508; 10 MHz; 0,06g2/Hz



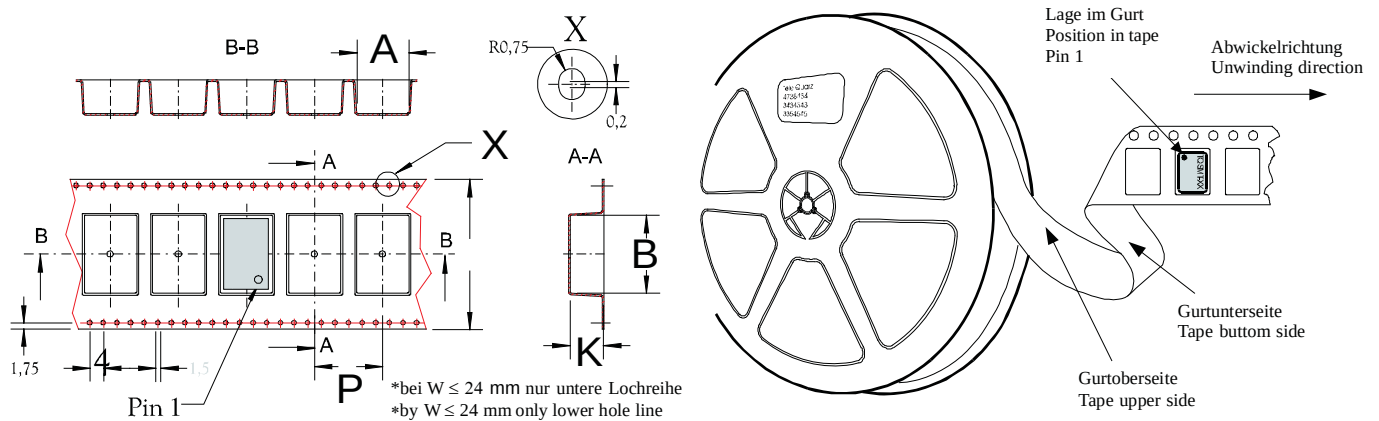
Calculation equation according to Vig-Tutorial

$$g\text{-sensitivity: } G = \frac{2 \cdot f_v}{A_{peak} \cdot f_0} \cdot 10^{\frac{L(f_v)}{20}}$$

$$\text{Peak g-level: } A_{peak} = \sqrt{PSD \cdot 2}$$

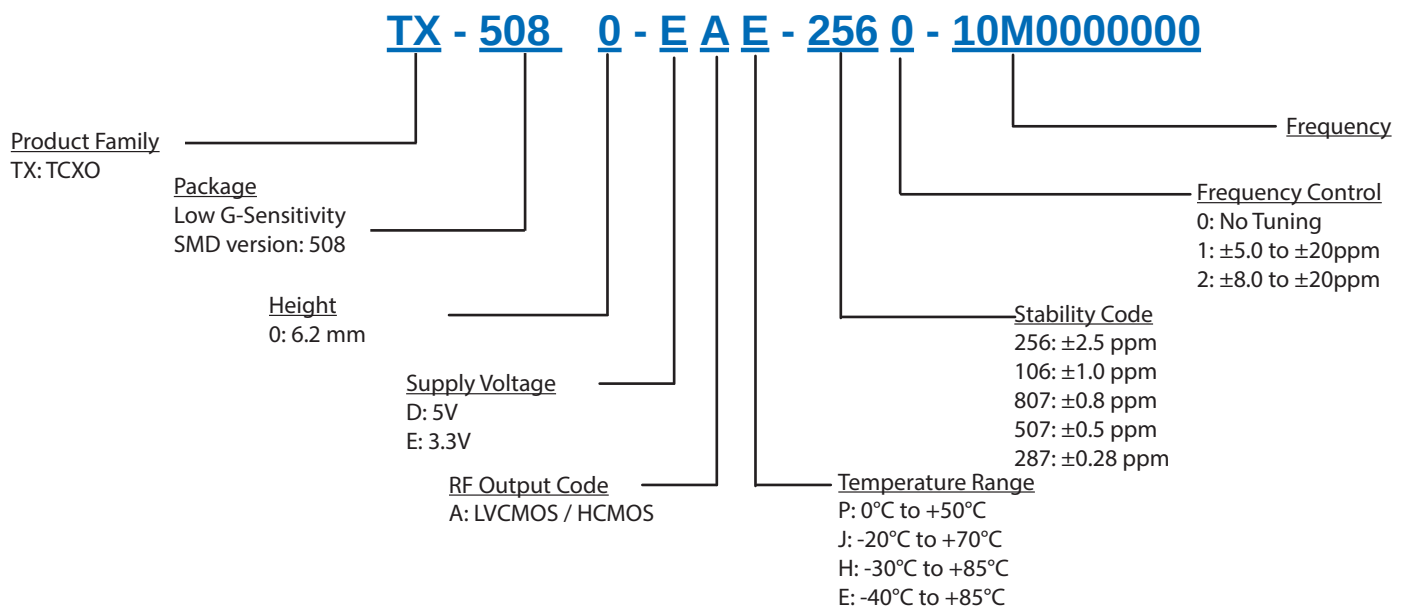


## Standard Shipping Method (TX-508)



| Enclosure Type | Tape Width W (mm) | Quantity per meter | Quantity per reel | Dimension P |
|----------------|-------------------|--------------------|-------------------|-------------|
| G301           | 24                | 83,3               | 850               | 12          |

## Ordering Information



### Notes:

- Contact factory for improved stabilities or additional product options. Not all options and codes are available at all frequencies.
  - 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).
  - Phase noise degrades with increasing output frequency.
  - Contact factory for availability.
- Subject to technical modification.

## For Additional Information, Please Contact

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