

Helping Customers Innovate, Improve & Grow



### Features

- EFC Standard
- Small Size
- 100% RoHS Compliant
- Low Profile
- Frequency range of 6.4 - 52 MHz
- Standard Frequencies: 10, 12.8, 16.384, 19.44, 20, 20.48 MHz

### Applications

- PCS Base Stations
- Land Mobile Radio
- Cellular Telephony
- Radio in the Local Loop

### Previous Vectron Model Numbers - C2260

### Performance Specifications

| Frequency Stabilities <sup>1</sup>                         |       |         |       |       |                                                                                                                                                                                                           |                      |
|------------------------------------------------------------|-------|---------|-------|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| Parameter                                                  | Min   | Typical | Max   | Units | Condition                                                                                                                                                                                                 |                      |
| vs. operating temperature range<br>(referenced to +25°C)   | -1.5  |         | +1.5  | ppm   | -40 to +85°C                                                                                                                                                                                              | Options <sup>5</sup> |
|                                                            | -1.0  |         | +1.0  | ppm   | -40 to +85°C                                                                                                                                                                                              |                      |
|                                                            | -2.5  |         | +2.5  | ppm   | -20 to +70°C                                                                                                                                                                                              |                      |
|                                                            | -1.0  |         | +1.0  | ppm   | -20 to +70°C                                                                                                                                                                                              |                      |
|                                                            | -1.0  |         | +1.0  | ppm   | 0 to +50°C                                                                                                                                                                                                |                      |
|                                                            | -0.5  |         | +0.5  | ppm   | 0 to +50°C                                                                                                                                                                                                |                      |
| Initial tolerance                                          | -2.5  |         | +2.5  | ppm   | at time of shipment, nominal EFC<br>V <sub>S</sub> ±5%<br>Load ±10%<br>after 30 days of operation                                                                                                         |                      |
| vs. supply voltage change                                  | -0.5  |         | +0.5  | ppm   |                                                                                                                                                                                                           |                      |
| vs. load change                                            | -0.2  |         | +0.2  | ppm   |                                                                                                                                                                                                           |                      |
| vs. aging / 1 Year                                         | -1.0  |         | +1.0  | ppm   |                                                                                                                                                                                                           |                      |
| Frequency Stabilities <sup>1</sup> (Stratum 3 TCXO) <32MHz |       |         |       |       |                                                                                                                                                                                                           |                      |
| vs. operating temperature range<br>(referenced to +25°C)   | -0.80 |         | +0.80 | ppm   | -20 to +70°C                                                                                                                                                                                              | Options <sup>5</sup> |
|                                                            | -0.28 |         | +0.28 | ppm   | 0 to +50°C                                                                                                                                                                                                |                      |
|                                                            | -0.28 |         | +0.28 | ppm   | -20 to +70°C                                                                                                                                                                                              |                      |
|                                                            | -0.80 |         | +0.80 | ppm   | -40 to +85°C                                                                                                                                                                                              |                      |
|                                                            | -0.28 |         | +0.28 | ppm   | -30 to +85°C                                                                                                                                                                                              |                      |
|                                                            | -0.28 |         | +0.28 | ppm   | -40 to +85°C                                                                                                                                                                                              |                      |
| Initial tolerance                                          | -1.0  |         | +1.0  | ppm   | at time of shipment, nominal EFC<br>V <sub>S</sub> ±5% static<br>Load ±5% static<br>Note:*Stratum 3 per GR-1244-CORE:<br><±4.6ppm for all causes and 20 years aging,<br>holdover: <±0.37ppm over 24 hours |                      |
| vs. supply voltage change                                  | -0.2  |         | +0.2  | 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

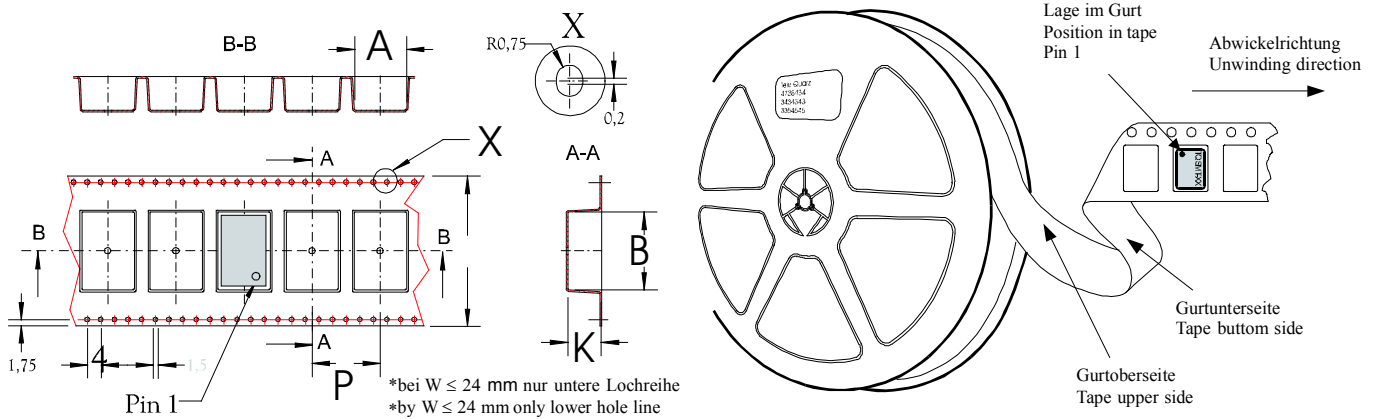
| Frequency Stabilities <sup>1</sup>                                                          |       |         |       |       |                                                                                                                                                                                              |  |
|---------------------------------------------------------------------------------------------|-------|---------|-------|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Parameter                                                                                   | Min   | Typical | Max   | Units | Condition                                                                                                                                                                                    |  |
| vs. operating temperature range<br>(referenced to +25°C)<br>For 10, 12.8, 16.384, 20.26 MHz | -0.15 |         | +0.15 | ppm   | 0 to +50°C                                                                                                                                                                                   |  |
| Initial tolerance                                                                           | -1.0  |         | +1.0  | ppm   | at time of shipment, nominal EFC<br>V <sub>s</sub> ±5%<br>Load ±10%<br>Note:*Stratum 3 per GR-1244-CORE:<br><±4.6ppm for all causes and 20 years aging,<br>holdover: <±0.37ppm over 24 hours |  |
| vs. supply voltage change                                                                   | -0.2  |         | +0.2  | 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   |                                                                                                                                                                                              |  |

| Supply Voltage (Vs)                                           |                                            |                                    |                                                  |                                                |                                            |         |
|---------------------------------------------------------------|--------------------------------------------|------------------------------------|--------------------------------------------------|------------------------------------------------|--------------------------------------------|---------|
| Parameter                                                     | Min                                        | Typical                            | Max                                              | Units                                          | Condition                                  |         |
| Supply voltage (standard)                                     | 3.135                                      | 3.3                                | 3.465                                            | VDC                                            |                                            |         |
| Current consumption                                           |                                            |                                    | 6                                                | mA                                             | steady state @ +25°C                       |         |
| RF Output (Clipped Sinewave)                                  |                                            |                                    |                                                  |                                                |                                            |         |
| Load R                                                        | 9                                          | 10                                 | 11                                               | kΩ                                             |                                            |         |
| C                                                             | 9                                          | 10                                 | 11                                               | pF                                             |                                            |         |
| Output Power                                                  | 0.7                                        |                                    |                                                  | V <sub>pp</sub>                                | @ 10kΩ    10pF                             |         |
| RF Output (HCMOS)                                             |                                            |                                    |                                                  |                                                |                                            |         |
| Load                                                          | 13.5                                       | 15                                 | 16.5                                             | pF                                             |                                            |         |
| Signal Level (Vol)                                            |                                            |                                    | 0.3                                              | VDC                                            | with Vs=3.3V and 15pF Load                 |         |
| Signal Level (Voh)                                            | 3.0                                        |                                    |                                                  | VDC                                            | with Vs=3.3V and 15pF Load                 |         |
| Rise and Fall time                                            |                                            |                                    | 5                                                | ns                                             |                                            |         |
| Duty Cycle                                                    | 40                                         | 50                                 | 60                                               | %                                              | @ (Voh-Vol)/2                              |         |
| Frequency Tuning (EFC)                                        |                                            |                                    |                                                  |                                                |                                            |         |
| Tuning Range                                                  | Fixed TCXO; No adjust                      |                                    |                                                  |                                                | Option <sup>5</sup>                        |         |
| Tuning Range for Stability: 807, 287, 157 / Stratum 3 Version | ±5.0                                       | ±14.0                              | ±20.0                                            | ppm                                            |                                            |         |
| Tuning Range                                                  | ±8.0                                       | ±14.0                              | ±20.0                                            | ppm                                            |                                            |         |
| Linearity                                                     | 10%                                        |                                    |                                                  |                                                |                                            |         |
| Tuning Slope                                                  | Positive                                   |                                    |                                                  |                                                |                                            |         |
| Control Voltage Range                                         | 0.3                                        | 1.65                               | 3.0                                              | VDC                                            | with Vs=3.3V                               |         |
| Freq. control input impedance                                 | 10                                         |                                    |                                                  | kΩ                                             |                                            |         |
| Enable (instead of EFC)                                       | True table<br>Pin 1<br>High<br>Open<br>Low |                                    | RF_out<br>Pin 3<br>Data<br>Data<br>High Tristate |                                                |                                            |         |
| Additional Parameters                                         |                                            |                                    |                                                  |                                                |                                            |         |
| Phase Noise <sup>3</sup>                                      |                                            | -65<br>-95<br>-120<br>-145<br>-152 |                                                  | dBc/Hz<br>dBc/Hz<br>dBc/Hz<br>dBc/Hz<br>dBc/Hz | 1 Hz<br>10 Hz<br>100 Hz<br>1 kHz<br>10 kHz | @ 10MHz |
| Weight                                                        |                                            |                                    |                                                  | 8.0 g                                          |                                            |         |
| Processing & Packing                                          | Handling & Processing Note                 |                                    |                                                  |                                                |                                            |         |
| Reflow Profile                                                | IPC / JEDEC J-STD-020 (latest version)     |                                    |                                                  |                                                |                                            |         |
| Absolute Maximum Ratings                                      |                                            |                                    |                                                  |                                                |                                            |         |
| Supply voltage (Vs)                                           |                                            |                                    | 6.0                                              | V                                              |                                            |         |
| Control Voltage                                               | 0                                          |                                    | Vs                                               | V                                              |                                            |         |
| Operable Temperature Range                                    | -40                                        |                                    | +85                                              | °C                                             |                                            |         |
| Storage Temperature Range                                     | -55                                        |                                    | +125                                             | °C                                             |                                            |         |

# Cross Reference List

| Vectron Part | Frequency (MHz) | Temp Range (°C) | Temp Stability (ppm) | Holdover Stability (ppm) | Overall Stability (ppm) | Supply (V) |         |
|--------------|-----------------|-----------------|----------------------|--------------------------|-------------------------|------------|---------|
| C2260A1-0028 | 12.8            | -20 to +70      | ±0.28                | ±0.37                    | ±4.6                    | 3.3        | Semtech |
| C2260A1-0032 | 12.8            | -40 to +85      | ±0.28                | ±0.37                    | ±4.6                    | 3.3        | Semtech |
| C2260A1-0029 | 12.8            | -40 to +85      |                      | ±4.60                    | ±20                     | 3.3        | Semtech |
| C2260A1-0021 | 20              | -20 to +70      | ±0.28                |                          | ±4.6                    | 3.3        | Zarlink |
| C2260A1-0009 | 20              | -20 to +80      | ±0.28                |                          | ±4.6                    | 3.3        | Zarlink |
| C2260A1-0015 | 20              | -40 to +85      |                      | ±4.6                     | ±20                     | 3.3        | Zarlink |

## Standard Shipping Method

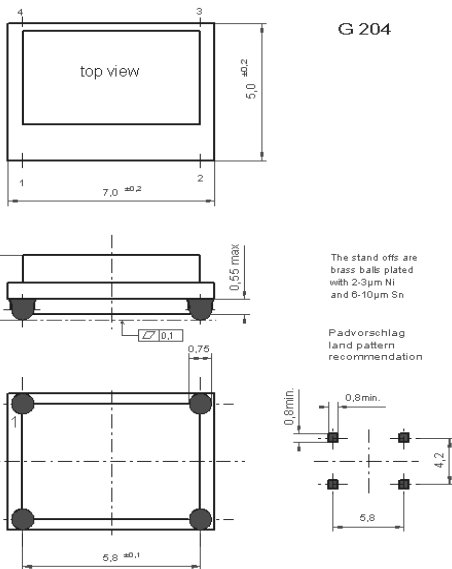


| Enclosure Type | Tape Width W (mm) | Quantity per meter | Quantity per reel | Dimension P |
|----------------|-------------------|--------------------|-------------------|-------------|
| G204/G211      | 12                | 150.               | 750.              | 8           |

## Outline Drawing / Enclosure

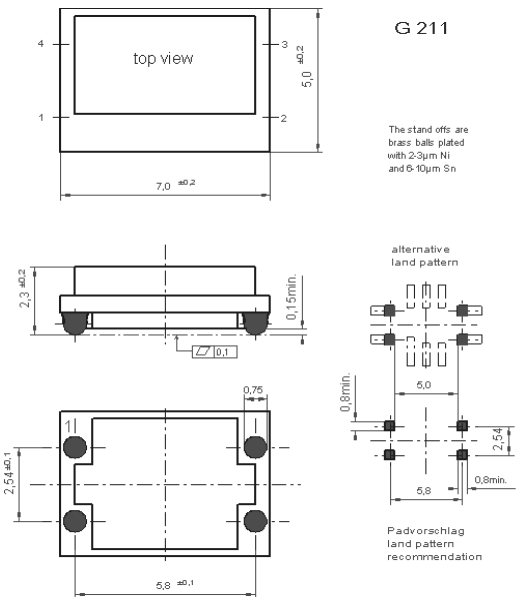
### Package Codes: 700

| Type | Height "H" | Pin Length "L" |
|------|------------|----------------|
| G204 | 2.5        | NA             |



### Package Codes: 701

| Type | Height "H" |
|------|------------|
| G211 | 2.5        |



### Pin Connections

|   |                                     |
|---|-------------------------------------|
| 1 | Voltage Control (Vc) / Enable / N.C |
| 2 | Ground (Case)                       |
| 3 | RF Output                           |
| 4 | Supply Voltage Input (Vs)           |

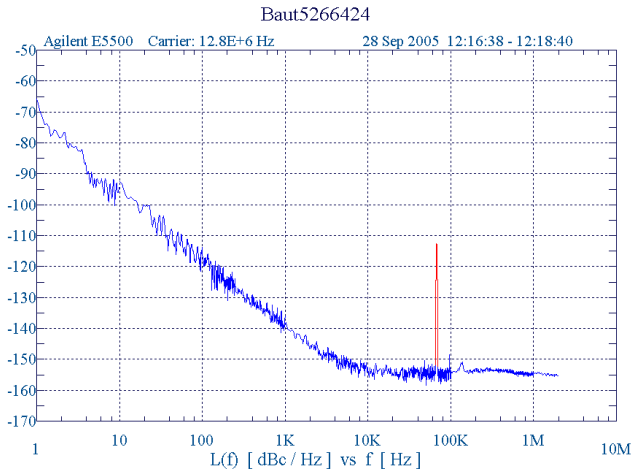
### Marking

|           |
|-----------|
| TX-700    |
| Frequency |
| ● AYYWW   |

# Typical Performance

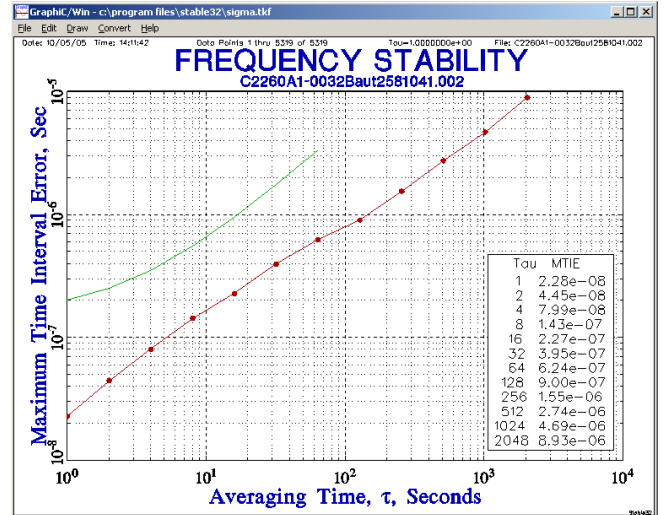
## Phase Noise

C2260 @ 12.8 MHz

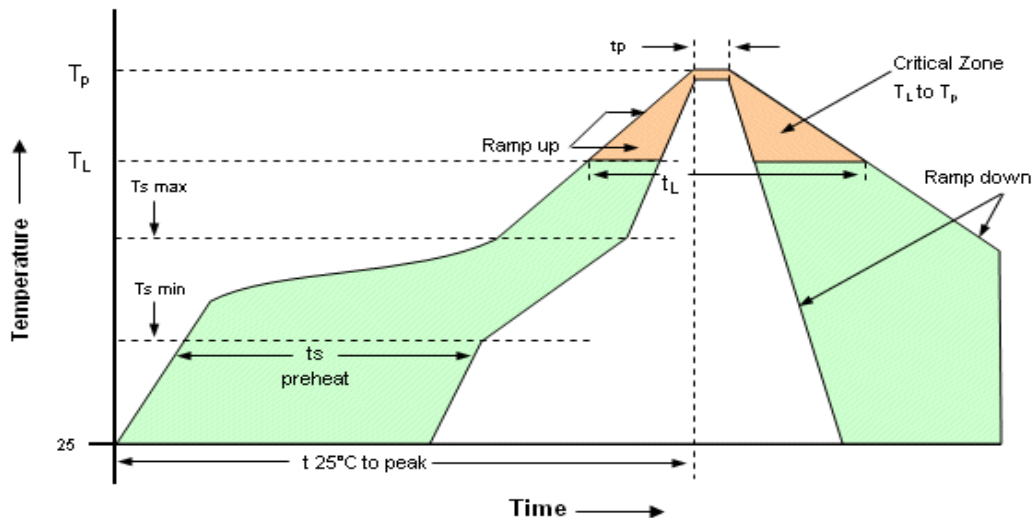


## MTIE according-1244-CORE:

C2260 @ 12.8 MHz



# Recommended Reflow Profile

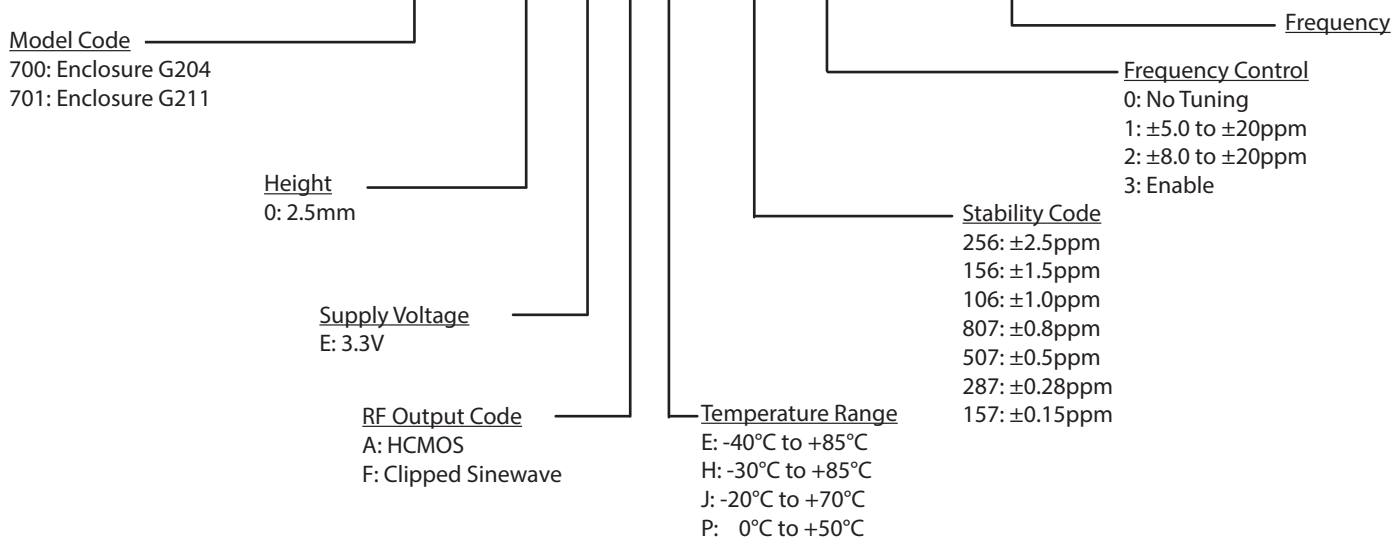


| Profile Feature                                                                                                     | Pb-Free Assembly/<br>Sn-Pb Assembly | Profile Feature                                                    | Pb-Free Assembly/<br>Sn-Pb Assembly |
|---------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------------------------------------------------|-------------------------------------|
| 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 $T_{s \text{ min}}$<br>-Temperature Max $T_{s \text{ max}}$<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             |
| $T_{s \text{ max}}$ 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. SMD oscillators must be on the top side of the PCB during the reflow process.

## Ordering Information

**TX-70X 0 - E A J - 256 0 - 10M0000000**



**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.

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