

**Table 1. Electrical Performance**

| Parameter                            | Symbol     | Min.                         | Typ | Max    | Units |
|--------------------------------------|------------|------------------------------|-----|--------|-------|
| Nominal Frequency                    | $F_{NOM}$  | 12.000                       |     | 60.000 | MHz   |
| Mode                                 |            | Fundamental                  |     |        |       |
| Operating Temperature Range          | $T_{OP}$   | 0/70, -10/70, -20/70, -40/85 |     |        | °C    |
| Stability Over $T_{OP}$ <sup>1</sup> | $F_{STAB}$ | ±10                          |     | ±100   | ppm   |
| Frequency Tolerance <sup>2</sup>     | $F_{TOL}$  |                              | ±10 | ±20    | ppm   |
| Load Capacitance                     | $C_L$      | 6                            |     | 32     | pF    |
| Shunt Capacitance                    | $C_o$      |                              |     | 5      | pF    |
| Drive Level                          |            |                              | 10  | 100    | uW    |
| Aging / 1st year (at 25 °C)          | $F_{AGE}$  |                              |     | ±5     | ppm   |
| Insulation Resistance                |            | 500                          |     |        | MOhm  |
| Storage Temperature                  | $T_{STO}$  | -40                          |     | 90     | °C    |
| Equivalent Series Resistance         |            |                              |     |        |       |
| Crystal Frequency                    | ESR        |                              |     |        | Ohm   |
| 12.001MHz-16.000MHz                  |            |                              |     | 80     |       |
| 16.001MHz-20.000MHz                  |            |                              |     | 60     |       |
| 20.001MHz-24.000MHz                  |            |                              |     | 50     |       |
| 24.001MHz-60.000MHz                  |            |                              |     | 40     |       |

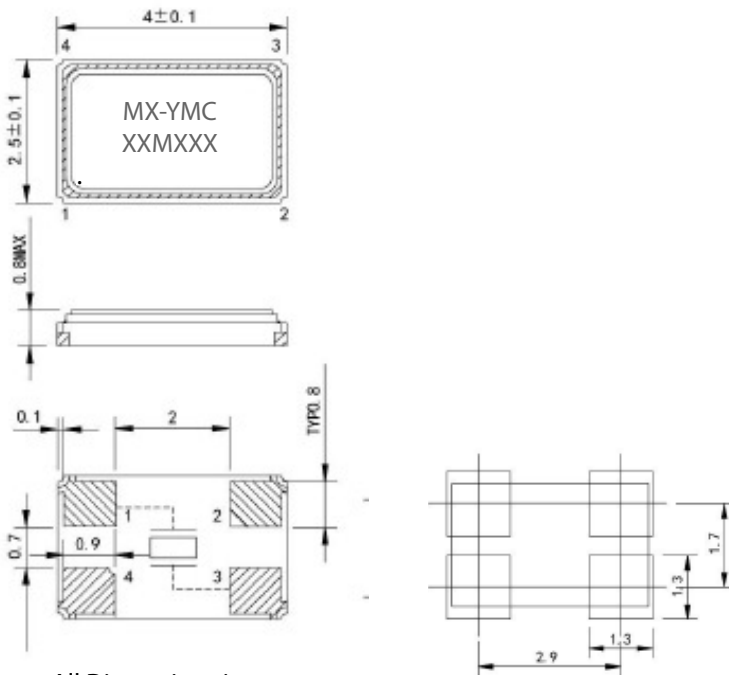
Notes:

1. Referenced to the Frequency at 25 °C.
2. Frequency measured at 25 °C ± 3 °C.

Product is compliant to RoHS directive and fully compatible with lead free assembly.



## Package Drawing and Pad LayOut



All Dimensions in mm

### Part Marking:

MX = VXM4 Product Family

Y = Year

M = Month

A = January

B = February

C = March

D = April

E = May

F = June

G = July

H = August

I = September

J = October

K = November

L = December

C = Manufacturing Location

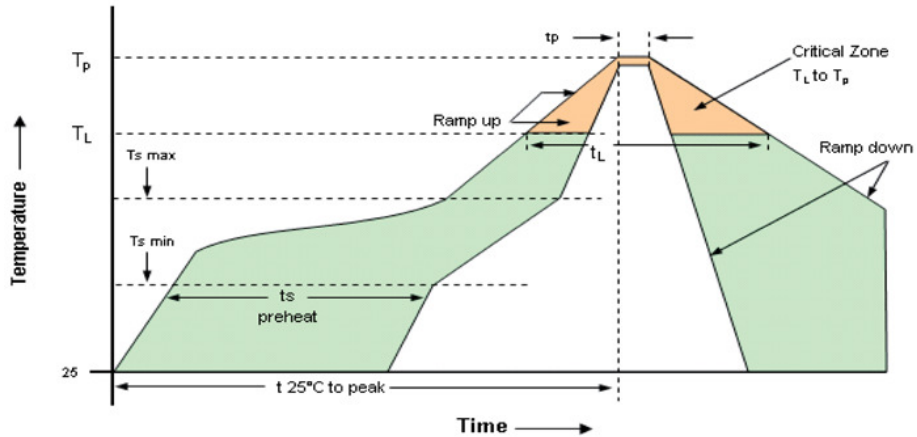
XXMXXX = frequency

**Table 2. Environmental Compliance**

| Parameter                  | Conditions                            |
|----------------------------|---------------------------------------|
| Mechanical Shock           | MIL-STD-883, Method 2002, Condition B |
| Mechanical Vibration       | MIL-STD-883, Method 2007, Condition A |
| Temperature Cycle          | MIL-STD-883, Method 1010, Condition B |
| Solderability              | MIL-STD-202-210, Condition B          |
| Gross and Fine Leak        | MIL-STD-883, Method 1014              |
| Altitude                   | MIL-STD-883, Method 1001, Condition B |
| Moisture Sensitivity Level | MSL 1                                 |
| Contact Pads               | Gold (0.3 um min) over Nickel         |
| Weight                     | 22 mg                                 |

## Reliability & IR Compliance

**Solderprofile:**



**Table 3: Reflow Profile**

| Parameter                        | Symbol      | Value                                     |
|----------------------------------|-------------|---|
| PreHeat Time<br>Ts-min<br>Ts-max | $t_s$       | 60 sec Min, 260 sec Max<br>150°C<br>200°C |
| Ramp Up                          | $R_{UP}$    | 3 °C/sec Max                              |
| Time Above 217 °C                | $t_L$       | 60 sec Min, 150 sec Max                   |
| Time To Peak Temperature         | $T_{AMB-P}$ | 480 sec Max                               |
| Time at 260 °C                   | $t_p$       | 30 sec Max                                |
| Ramp Down                        | $R_{DN}$    | 6 °C/sec Max                              |

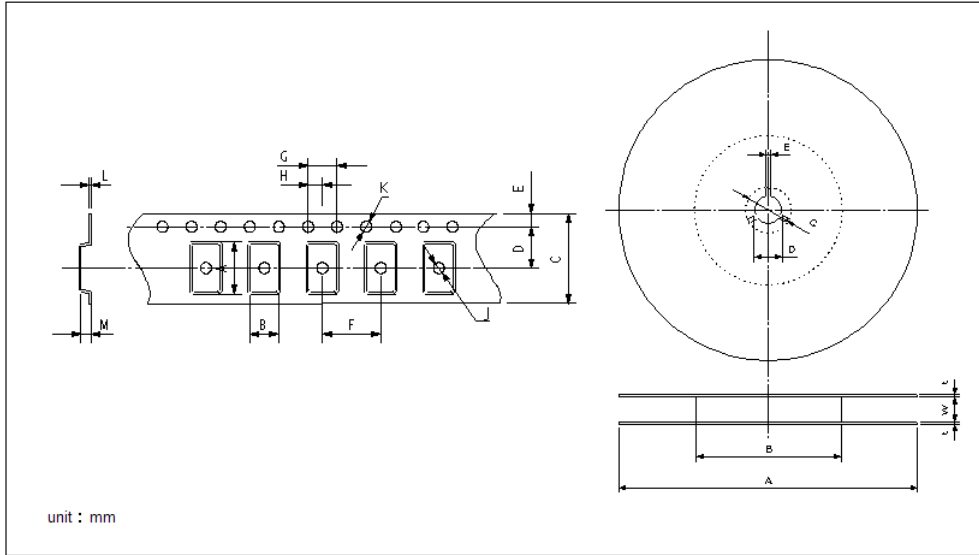
Pads are Au over Ni and compatible with either SnPb or Pb free attachment.

MSL: 1

# Tape & Reel

**Table 4. Tape and Reel Dimensions (mm)**

| Tape |     |      |     |      |     |     |     |     |      |      |     | Reel |    |      |      |     |     |     |  |
|------|-----|------|-----|------|-----|-----|-----|-----|------|------|-----|------|----|------|------|-----|-----|-----|--|
| A    | B   | C    | D   | E    | F   | G   | H   | J   | K    | L    | M   | A    | B  | C    | D    | E   | W   | T   |  |
| 4.40 | 2.9 | 12.0 | 5.5 | 1.75 | 8.0 | 4.0 | 2.0 | 0.5 | 1.55 | 0.25 | 0.8 | 180  | 60 | 21.0 | 13.0 | 2.0 | 9.0 | 2.0 |  |



## Ordering Information

### VXM4 - XXX - XX- xxMxxxxxxxxXX

**Product**  
4.0 x 2.5mm, Crystal

**Mode**  
1: Fundamental

**Temp Stability**  
**C:** ±10ppm  
**D:** ±15ppm  
**E:** ±20ppm  
**F:** ±25ppm  
**G:** ±30ppm  
**H:** ±35ppm  
**I:** ±40ppm  
**J:** ±45ppm  
**K:** ±50ppm  
**S:** ±100ppm

*\*Note: not all combination of options are available.  
Other specifications may be available upon request.*

**Packaging**  
 TR: Tape and Reel  
 blank: Cut Tape / non Tape and Reel quantities  
 \_SNPB: Tin lead solder dipped

**Frequency in MHz**

**Load Capacitance**  
 0: Series Resonance  
 06-32pF

**Operating Temperature**  
**E:** -40 to 85 °C  
**J:** -20 to 70 °C  
**W:** -10 to 70 °C  
**T:** 0 to 70 °C

**Example:**

VXM4-1EE-12-25M0000000TR

VXM4-1EE-12-25M0000000

VXM4-1EE-12-25M0000000\_SNPB

**Tape and Reel**

**Cut Tape**

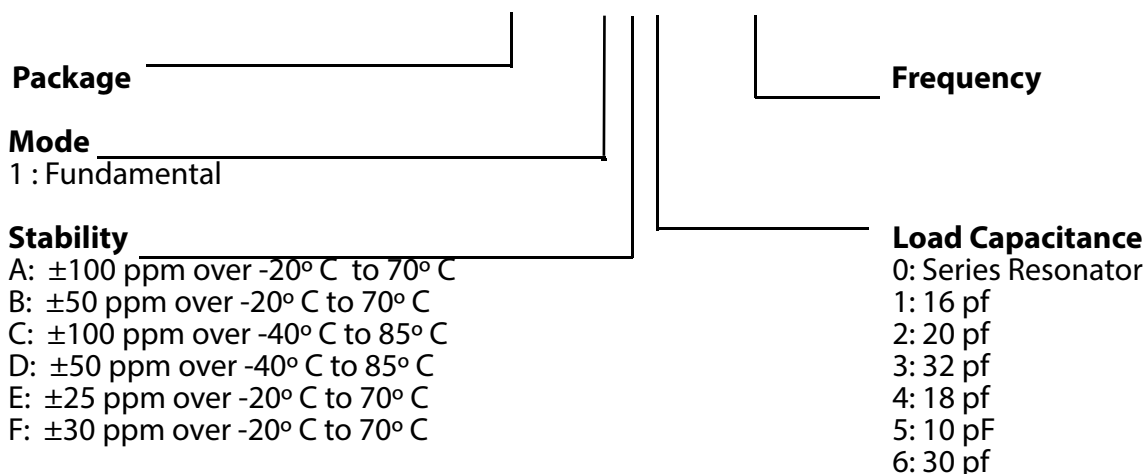
**Tin lead solder dipped**

## Revision History

| Revision Date   | Approved | Description   |
|-----------------|----------|---|
| August 29, 2016 | RC       | Initial datasheet for factory approval and release to customer.                                       |
| August 10, 2018 | FB       | Update logo and contact information, add "SNPBDIP" ordering option                                    |
| June 07, 2019   | FB       | Update logo and contact information, add Table 2 Environmental compliance, change "SNPBDIP" to "SNPB" |
| April 30, 2020  | FB       | Add tape and reel ordering option   |

**Previous Ordering Information for Reference Only  
Do Not Use to Build a New Part Number**

### VXM4-1A2-10M000



The ordering codes for the VXM4 were changed in 2016. If you had ordered a specific code based off this ordering method, it is still available for purchase under the old code however no new part numbers will be created using this system.

Due to the change in the 8th character from numeric to alphabetic, there is no opportunity for overlap between the two ordering methods.

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