



3.2×2.5×0.7mm typ

12MHz up to 60MHz



### Feature

A small surface mount type crystal unit, especially suited for small-sizing requirements.

- Ultra compact and thin. (3.2×2.5×0.7 mm typ.)
- Tight Tolerance 10ppm available.
- Application: Bluetooth ; Mobile phone; W-LAN; Office Automation; Audio & Visual.
- Meets the requirements for re-flow profiling using lead-free solder.

### Specifications

| Item                        | Type | TX3-Type  |            |            |          |
|-----------------------------|------|---|------------|------------|----------|
|                             |      | 12~13MHz  | 13~19.5MHz | 19.5~27MHz | 27~60MHz |
| Frequency Range             |      | 12~13MHz  | 13~19.5MHz | 19.5~27MHz | 27~60MHz |
| Oscillator Mode             |      | Fundamental   |            |            |          |
| Load Capacitance            |      | Series, 6~32pf, or specify  |            |            |          |
| Drive Level                 |      | 10μW(200μW max.)  |            |            |          |
| Frequency Tolerance         |      | ±10×10 <sup>-6</sup> , ±20×10 <sup>-6</sup> , ±30×10 <sup>-6</sup> , ±50×10 <sup>-6</sup> (at 25°C) |            |            |          |
| Series Resistance           |      | 150Ω max.   | 80Ω max.   | 60Ω max.   | 50Ω max. |
| Operating Temperature Range |      | -10~+60°C, -20~+70°C, -40~+85°C   |            |            |          |
| Storage Temperature Range   |      | -55~+125°C  |            |            |          |
| Packing Unit                |      | 3000pcs/reel(Ø180)  |            |            |          |

### Outline Drawing(mm)



### Frequency Stability Vs. Temperature Range

| Temp.(°C) | Ppm | ±5 | ±10 | ±15 |
|-----------|-----|----|-----|-----|
| -10 ~ +60 |     | +  | ✓   | ✓   |
| -20 ~ +70 |     | ×  | ✓   | ✓   |
| -40 ~ +85 |     | ×  | ×   | +   |

  

| Temp.(°C)  | Ppm | ±15 | ±20 | ±30 | ±50 |
|------------|-----|-----|-----|-----|-----|
| -40 ~ +105 |     | +   | ✓   | ✓   | ✓   |
| -40 ~ +125 |     | ×   | ×   | +   | ✓   |

✓ Available + Conditional × Not Available

### Oscillation Circuit of Fundamental Mode





# Model Numbering Guide – Crystal Units

## Available options

| ①    | ②               | ③               | ④                     |                        | ⑤                     |                                      |  |  |            |                |      |
|------|-----------------|-----------------|-----------------------|------------------------|-----------------------|--------------------------------------|--|--|------------|----------------|------|
| Type | package (mm)    | Frequency range | Load Capacitance (pF) | Freq. Tol. @25°C (ppm) | Freq. Stability (ppm) | Temp. Range(°C)                      | Special Requirement  | Oscillator Mode                            | Appearance | Lead Free      | Dash |
| 1612 | 1.6x1.2         | 3.00~100.00MHZ  | 6                     | ± 5                    | ± 5                   | A:~20~+70<br>B:~40~+85<br>J:~40~+105 | For Automotive Spurious DLD No Special Pullability Several | AT Fundamental AT 3 <sup>rd</sup> Overtone | Normal     | RoHs Compliant | -    |
| 2016 | 2.0x1.6         |                 | 7                     | ± 10                   | ± 10                  |                                      |  |  |            |                |      |
| 2520 | 2.5x2.0         |                 | 8                     | ± 15                   | ± 15                  |                                      |  |  |            |                |      |
| 3225 | 3.2x2.5         |                 | 9                     | ± 20                   | ± 20                  |                                      |  |  |            |                |      |
| 5032 | 5.0x3.2 (4Pads) |                 | 10                    | ± 25                   | ± 25                  |                                      |  |  |            |                |      |
| 6035 | 6.0x3.5         |                 | 12                    | ± 30                   | ± 30                  |                                      |  |  |            |                |      |
| 3225 | 3.2x2.5         |                 | 15                    | ± 40                   | ± 40                  |                                      |  |  |            |                |      |
| 5032 | 5.0x3.2 (2Pads) |                 | 16                    | ± 50                   | ± 50                  |                                      |  |  |            |                |      |
| 8045 | 8.0x4.5         |                 | 18                    | ± 100                  | ± 100                 |                                      |  |  |            |                |      |
| 49S  | 11.1x4.68       |                 | 20                    | ± 150                  | ± 150                 |                                      |  |  |            |                |      |
| 49MD | 13.0x4.85       |                 | 22                    |                        |                       |                                      |  |  |            |                |      |
|      |                 |                 | 25                    |                        |                       |                                      |  |  |            |                |      |
|      |                 | 30              |                       |                        |                       |                                      |  |  |            |                |      |
|      |                 | 32              |                       |                        |                       |                                      |  |  |            |                |      |

example



① package ② Frequency range ③ Load Capacitance ④ Freq. Tol. @25°C X10<sup>-n</sup>, +25°C ⑤ Temp. Range(°C)

3225-12.00-20-20-A

① ② ③ ④ ⑤

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