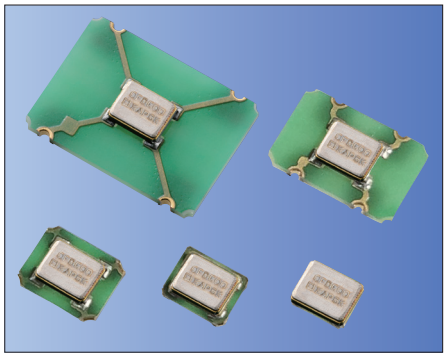
# CMOS/ 1.8V, 2.5V, 3.3V, 5.0V / 2.0×1.6, 2.5×2.0, 3.2×2.5, 5.0×3.2, 7.0×5.0mm



RoHS Compliant

## Features

- Frequency Range 1.5 to 160MHz
- CMOS output
- Wide Supply Voltage
  - 1.6 to 3.63V (Ver.E)
  - 2.5,3.3,5.0V(Ver.N)
- Low current consumption
- Option: Low Phase Noise Version

## Applications

- Consumer/ Networking/ Industrial/ Audio Codec/ Amuse

## Table 1

| Freq. Tol. Code | Freq. Tol. × $10^{-6}$ | Operating Temperature Range (°C) | Note |
|---|---|---|---|
| 0 | ± 50 | −10 to +70 | Standard specifications |
| S | ± 30 | | With only certain frequencies |
| U | ± 25 | | |
| G | ± 50 | −40 to +85 | |
| 6 | ± 50 | −40 to +105 | |

## How to Order

KC2520K 25.0000 C □ □ □ 00
① ② ③ ④ ⑤ ⑥ ⑦

①Series
②Output Frequency (25.0000: 25MHz)
③Output Type (C: CMOS)
④Supply Voltage
Standard : Version E

| | |
|---|---|
| 1 | 1.8V/ 2.5V/ 3.3V compatible |
| 2 | 2.5V/ 3.3V compatible |

Low Phase Noise : Version N

| | | | |
|---|---|---|---|
| 2 | 2.5V | 3 | 3.3V |
| 5 | 5.0V | | |

⑤Frequency Tolerance (See Table 1)
⑥Symmetry/ INH Function

| | |
|---|---|
| E | 45/ 55% |
| N | 45/ 55% |

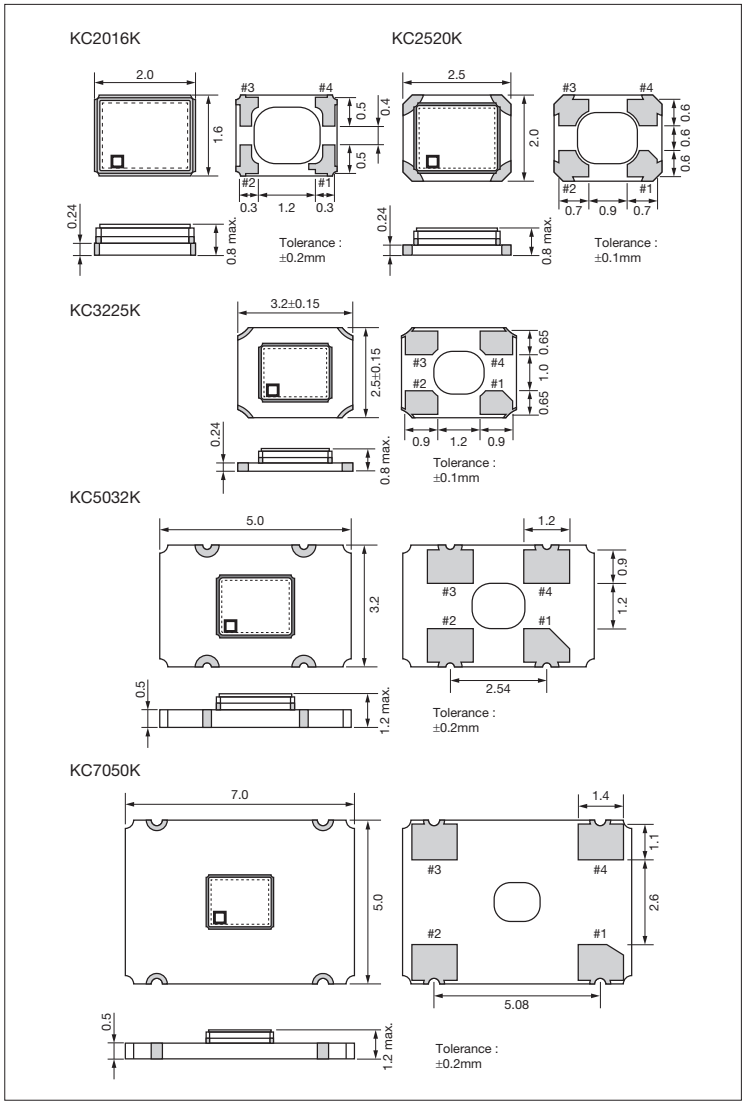
⑦Individual Specification
(STD Specification is "00".)

Packaging Tape & Reel

| | |
|---|---|
| KC7050K/ KC5032K | 1000 pcs./ reel |
| KC3225K/ KC2520K/ KC2016K | 2000 pcs./ reel |

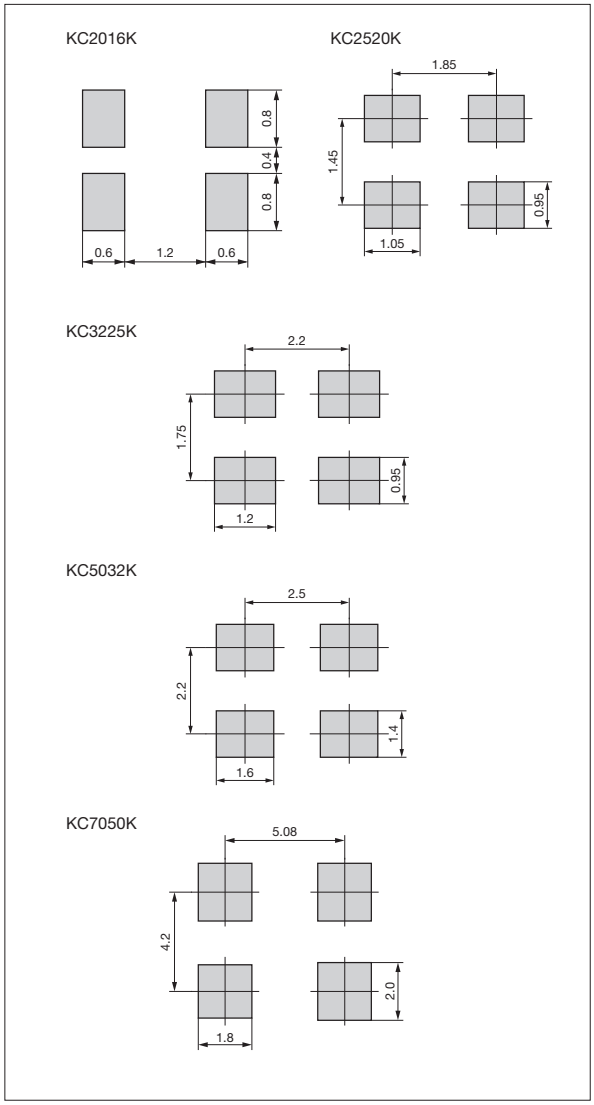
## Dimensions

(Unit: mm)




## Recommended Land Pattern

(Unit: mm)



CMOS/ 1.8V, 2.5V, 3.3V, 5.0V / 2.0×1.6, 2.5×2.0, 3.2×2.5, 5.0×3.2, 7.0×5.0mm

## Specifications

| Item | Symbol | Conditions | | Version E (Standard) Min. | Version E (Standard) Max. | Version N (Low Phase Noise) Min.(codeU) | Version N (Low Phase Noise) Max.(codeU) | Unit |
|---|---|---|---|---|---|---|---|---|
| Output Frequency Range[Note1] | fo | | | 1.5 | 160 | 1.5 | 80 | MHz |
| Frequency Tolerance | f_tol | Initial tolerance, Operating temperature range, Rated power supply voltage change, Load change, Aging (1 year @25°C), Shock and vibration | Temp.: −10 to +70°C/ −40 to +85°C/ −40 to +105°C | −50 | +50 | −50 | +50 | ×10⁻⁶ |
| | | | Temp.: −10 to +70°C | −30 | +30 | −30 | +30 | |
| | | | Temp.: −10 to +70°C | −25 | +25 | −25 | +25 | |
| Frequency Aging | f_age | @25°C First year | | −3 | +3 | −3 | +3 | ×10⁻⁶/ y |
| Storage Temperature Range | T_stg | | | −55 | +125 | −55 | +125 | °C |
| Operating Temperature Range | T_use | | | −10 | +70 | −10 | +70 | °C |
| | | | | −40 | +85 | −40 | +85 | |
| | | | | −40 | +105 | −40 | +105 | |
| Max. Supply Voltage | — | | | −0.3 | +4.0 | −0.3 | +7.0 | V |
| Supply Voltage | Vcc | Code④ : 1/ E : 1.5≤F0≤125MHz | | +1.60 | +3.63 | — | — | V |
| | | Code④ : 2/ E : 125<F0≤160MHz | | +2.25 | +3.63 | — | — | |
| | | Code④ : 2/ N : 1.5≤F0≤80MHz | | — | — | +2.25(+2.38) | +2.75(+2.62) | |
| | | Code④ : 3/ N : 1.5≤F0≤80MHz | | — | — | +2.97(+3.14) | +3.63(+3.46) | |
| | | Code④ : 5/ N : 1.5≤F0≤80MHz | | — | — | +4.5(+4.75) | +5.5(+5.25) | |
| Current Consumption (Maximum Loaded) | Icc | 1.5≤F0≤24MHz | E : 1.6≤Vcc≤2.25V | — | 2.5 | — | — | mA |
| | | | E : 2.25<Vcc≤2.8V/ N : 2.25≤Vcc≤2.75V | — | 3.0 | — | 4 | |
| | | | E : 2.8<Vcc≤3.63V/ N : 2.97≤Vcc≤3.63V | — | 3.5 | — | 6 | |
| | | | N : 4.50≤Vcc≤5.50V | — | — | — | 24 | |
| | | 24<F0≤40MHz | E : 1.6≤Vcc≤2.25V | — | 3.5 | — | — | |
| | | | E : 2.25<Vcc≤2.8V/ N : 2.25≤Vcc≤2.75V | — | 4.5 | — | 5 | |
| | | | E : 2.8<Vcc≤3.63V/ N : 2.97≤Vcc≤3.63V | — | 5.0 | — | 7 | |
| | | | N : 4.50≤Vcc≤5.50V | — | — | — | 24 | |
| | | 40<F0≤62.5MHz | E : 1.6≤Vcc≤2.25V | — | 5.0 | — | — | |
| | | | E : 2.25<Vcc≤2.8V/ N : 2.25≤Vcc≤2.75V | — | 5.5 | — | 8 | |
| | | | E : 2.8<Vcc≤3.63V/ N : 2.97≤Vcc≤3.63V | — | 6.0 | — | 11 | |
| | | | N : 4.50≤Vcc≤5.50V | — | — | — | 24 | |
| | | 62.5<F0≤80MHz | E : 1.6≤Vcc≤2.25V | — | 6.0 | — | — | |
| | | | E : 2.25<Vcc≤2.8V/ N : 2.25≤Vcc≤2.75V | — | 6.5 | — | 14 | |
| | | | E : 2.8<Vcc≤3.63V/ N : 2.97≤Vcc≤3.63V | — | 8.0 | — | 18 | |
| | | | N : 4.50≤Vcc≤5.50V | — | — | — | 40 | |
| | | 80<F0≤125MHz | E : 1.6≤Vcc≤2.25V | — | 11.0 | — | — | |
| | | | E : 2.25<Vcc≤2.8V | — | 14.0 | — | — | |
| | | | E : 2.8<Vcc≤3.63V | — | 17.0 | — | — | |
| | | 125<F0≤160MHz | E : 2.25<Vcc≤2.8V | — | 25.0 | — | — | |
| | | | E : 2.8<Vcc≤3.63V | — | 27.0 | — | — | |
| Stand-by Current | I_std | 1.5≤Fo≤80MHz | | — | 5.0 | — | 10.0 | μA |
| | | 80≤Fo≤125MHz | | — | 5.0 | — | — | |
| | | 125≤Fo≤160MHz | | — | 10.0 | — | — | |
| Symmetry | SYM | @50% Vcc | | 45 | 55 | 45 | 55 | % |
| Rise/ Fall Time (10% to 90% Output Level) | Tr/ Tf | 1.5≤F0≤80MHz | E : 1.6≤Vcc≤2.25V | — | 6.0 | — | — | ns |
| | | | E : 2.25<Vcc≤2.8V/ N : 2.25≤Vcc≤2.75V | — | 5.0 | — | 6.0 | |
| | | | E : 2.8<Vcc≤3.63V/ N : 2.97≤Vcc≤3.63V | — | 4.5 | — | 5.0 | |
| | | | N : 4.50≤Vcc≤5.50V | — | — | — | 8.0 | |
| | | 80<F0≤125MHz | E : 1.6<Vcc≤3.63V | — | 4.0 | — | — | |
| | | 125<F0≤160MHz | E : 2.25<Vcc≤3.63V | — | 2.5 | — | — | |
| Low Level Output Voltage | Vol | E : Iol= 4mA | | — | 10% Vcc | — | 10% Vcc | V |
| | | N (1.5≤Fo≤62.5MHz) : Iol= 4mA | | | | | | |
| | | N (62.5<Fo≤80MHz) : Iol= 8mA | | | | | | |
| High Level Output Voltage | Voh | E : Ioh= −4mA | | 90% Vcc | — | 90% Vcc | — | V |
| | | N (1.5≤Fo≤62.5MHz) : Ioh= −4mA | | | | | | |
| | | N (62.5<Fo≤80MHz) : Ioh= −8mA | | | | | | |
| Output Load | L_CMOS | | | 15 | | 30 | | pF |
| Low Level Input Voltage | Vil | | | — | 30% Vcc | — | 30% Vcc | V |
| High Level Input Voltage | Vih | | | 70% Vcc | — | 70% Vcc | — | V |

## CMOS/ 1.8V, 2.5V, 3.3V, 5.0V / 2.0×1.6, 2.5×2.0, 3.2×2.5, 5.0×3.2, 7.0×5.0mm

| Item | Symbol | Conditions | | Version E (Standard) | | Version N (Low Phase Noise) | | Unit |
|---|---|---|---|---|---|---|---|---|
| | | | | Min. | Max. | Min.(codeU) | Max.(codeU) | |
| Disable Time | $t_{\_dis}$ | 1.5≤F0≤80MHz | | — | 200 | — | 150 | ns |
| | | 80<F0≤125MHz | | — | 200 | — | — | |
| | | 125<F0≤160MHz | | — | 100 | — | — | |
| Enable Time | $t_{\_ena}$ | | | — | 5 | — | 5 | ms |
| Start-up Time | $t_{\_str}$ | 1.5≤F0≤80MHz | @Minimum operating voltage to be 0 sec. | — | 5 | — | 5 | ms |
| | | 80<F0≤125MHz | | — | 5 | — | — | |
| | | 125<F0≤160MHz | | — | 10 | — | — | |
| 1 Sigma Jitter | $J_{Sigma}$ | 1.5≤F0≤80MHz | Measured with Wavecrest SIA-3000 | — | 5 | — | 4 | ps |
| | | 80<F0≤125MHz | | — | 5 | — | — | |
| | | 125<F0≤160MHz | | — | 3 | — | — | |
| Peak to Peak Jitter | $J_{PK-PK}$ | 1.5≤F0≤80MHz | | — | 50 | — | 40 | ps |
| | | 80<F0≤125MHz | | — | 50 | — | — | |
| | | 125<F0≤160MHz | | — | 25 | — | — | |
| Phase Jitter | $J_{Phase}$ | @25MHz | BW : 12kHz to 20MHz | — | 1.0 | — | 0.5 | ps |
| Phase Noise | — | @25MHz | @10Hz offset | Typ. −89 | | Typ. −92 | | dBc/ Hz |
| | | | @100Hz offset | Typ. −119 | | Typ. −126 | | |
| | | | @1kHz offset | Typ. −143 | | Typ. −151 | | |
| | | | @10kHz offset | Typ. −157 | | Typ. −160 | | |
| | | | @100kHz offset | Typ. −160 | | Typ. −167 | | |
| | | | @1MHz offset | Typ. −162 | | Typ. −170 | | |
| | | | @10MHz offset | Typ. −162 | | Typ. −170 | | |

Note: All electrical characteristics are defined at the maximum load and operating temperature range.
Note1: Please contact us for inquiry about operating temperature range, available frequencies and other conditions.

| Pad Connections | |
|---|---|
| #1 | INH |
| #2 | Case GND |
| #3 | Output |
| #4 | Vcc |

| INH Function | |
|---|---|
| Pad1 | Pad3 (Output) |
| Open | Active |
| "H" Level | Active |
| "L" Level | High Z (No-Oscillation) |