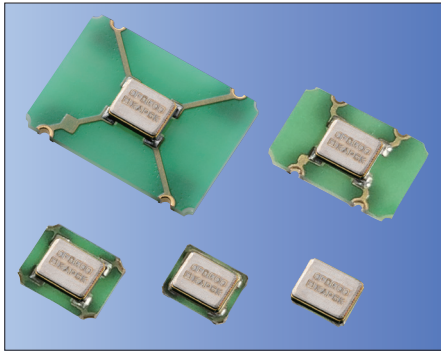




CMOS/ 1.8V, 2.5V, 3.3V, 5.0V / 2.0×1.6, 2.5×2.0, 3.2×2.5, 5.0×3.2, 7.0×5.0mm



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

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% |

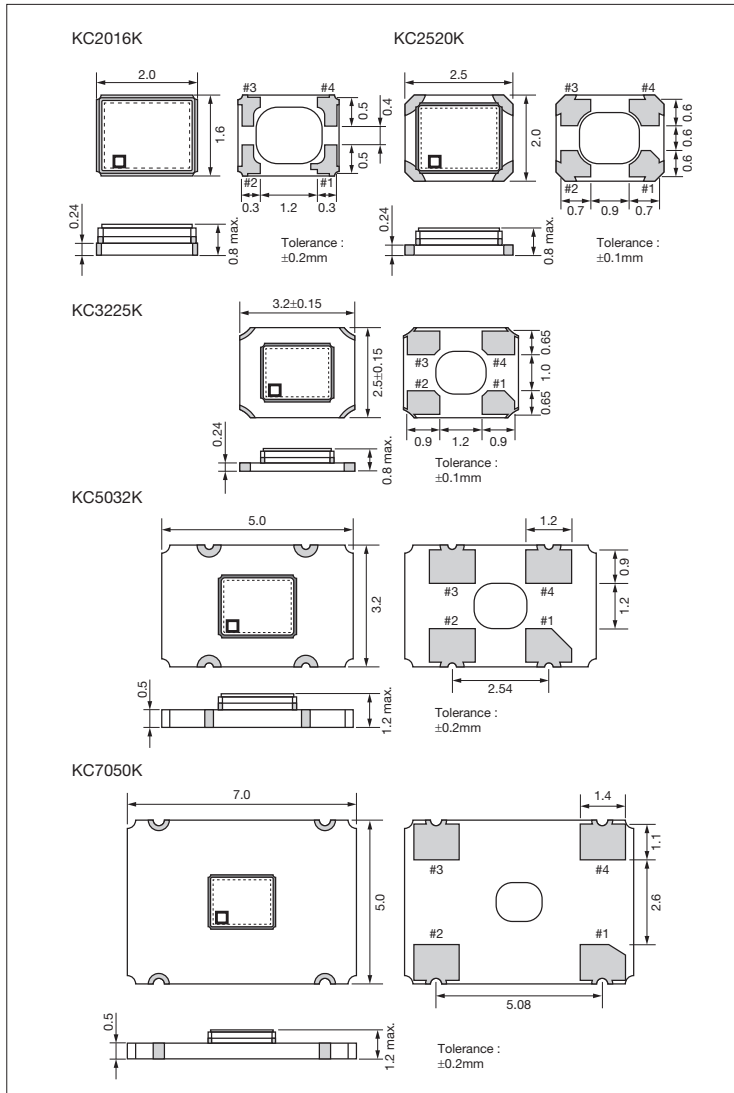
- ⑦Individual Specification
(STD Specification is "00".)

Packaging Tape & Reel

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

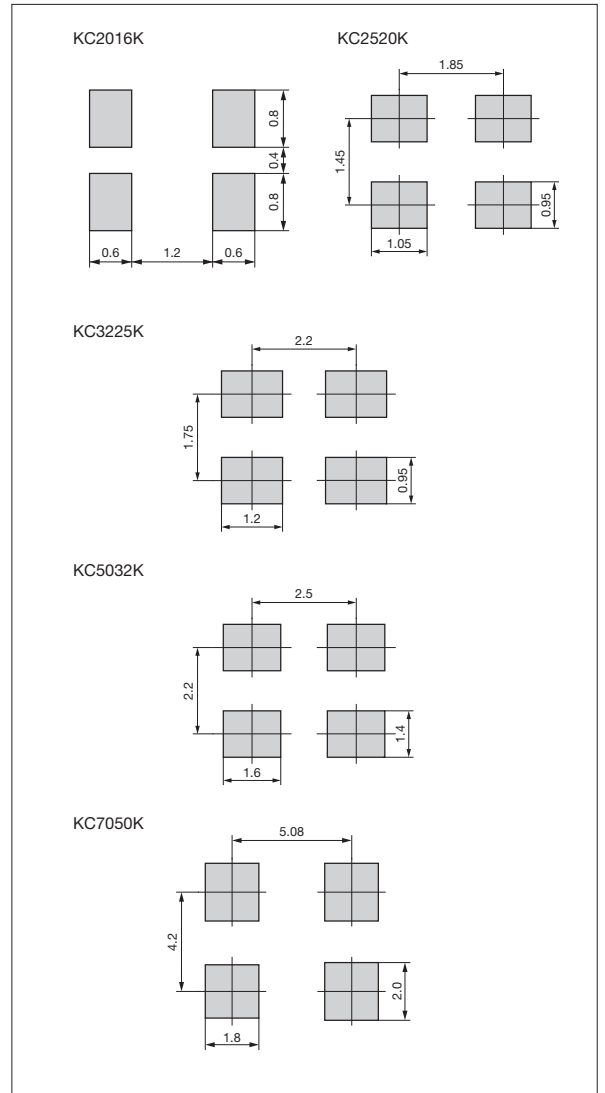
Dimensions

(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) | | Version N (Low Phase Noise) | | Unit | | | |
|---|---------------------------------|---|---|---------------------------|-----------------------------|---------------------|----------------------|-------------------|------|----|
| | | | Min. | Max. | Min.(codeU) | Max.(codeU) | | | | |
| Output Frequency Range ^{Note1} | f _o | | 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 | V _{cc} | CodeⓄ : 1/ E : 1.5≤F ₀ ≤125MHz | +1.60 | +3.63 | — | — | V | | | |
| | | CodeⓄ : 2/ E : 125<F ₀ ≤160MHz | +2.25 | +3.63 | — | — | | | | |
| | | CodeⓄ : 2/ N : 1.5≤F ₀ ≤80MHz | — | — | +2.25(+2.38) | +2.75(+2.62) | | | | |
| | | CodeⓄ : 3/ N : 1.5≤F ₀ ≤80MHz | — | — | +2.97(+3.14) | +3.63(+3.46) | | | | |
| | | CodeⓄ : 5/ N : 1.5≤F ₀ ≤80MHz | — | — | +4.5(+4.75) | +5.5(+5.25) | | | | |
| Current Consumption (Maximum Loaded) | I _{cc} | 1.5≤F ₀ ≤24MHz | E : 1.6≤V _{cc} ≤2.25V | — | 2.5 | — | — | mA | | |
| | | | E : 2.25<V _{cc} ≤2.8V/ N : 2.25≤V _{cc} ≤2.75V | — | 3.0 | — | 4 | | | |
| | | | E : 2.8<V _{cc} ≤3.63V/ N : 2.97≤V _{cc} ≤3.63V | — | 3.5 | — | 6 | | | |
| | | | N : 4.50≤V _{cc} ≤5.50V | — | — | — | 24 | | | |
| | | 24<F ₀ ≤40MHz | E : 1.6≤V _{cc} ≤2.25V | — | 3.5 | — | — | | | |
| | | | E : 2.25<V _{cc} ≤2.8V/ N : 2.25≤V _{cc} ≤2.75V | — | 4.5 | — | 5 | | | |
| | | | E : 2.8<V _{cc} ≤3.63V/ N : 2.97≤V _{cc} ≤3.63V | — | 5.0 | — | 7 | | | |
| | | | N : 4.50≤V _{cc} ≤5.50V | — | — | — | 24 | | | |
| | | 40<F ₀ ≤62.5MHz | E : 1.6≤V _{cc} ≤2.25V | — | 5.0 | — | — | | | |
| | | | E : 2.25<V _{cc} ≤2.8V/ N : 2.25≤V _{cc} ≤2.75V | — | 5.5 | — | 8 | | | |
| | | | E : 2.8<V _{cc} ≤3.63V/ N : 2.97≤V _{cc} ≤3.63V | — | 6.0 | — | 11 | | | |
| | | | N : 4.50≤V _{cc} ≤5.50V | — | — | — | 24 | | | |
| | | 62.5<F ₀ ≤80MHz | E : 1.6≤V _{cc} ≤2.25V | — | 6.0 | — | — | | | |
| | | | E : 2.25<V _{cc} ≤2.8V/ N : 2.25≤V _{cc} ≤2.75V | — | 6.5 | — | 14 | | | |
| | | | E : 2.8<V _{cc} ≤3.63V/ N : 2.97≤V _{cc} ≤3.63V | — | 8.0 | — | 18 | | | |
| | | | N : 4.50≤V _{cc} ≤5.50V | — | — | — | 40 | | | |
| | | 80<F ₀ ≤125MHz | E : 1.6≤V _{cc} ≤2.25V | — | 11.0 | — | — | | | |
| | | | E : 2.25<V _{cc} ≤2.8V | — | 14.0 | — | — | | | |
| | | | E : 2.8<V _{cc} ≤3.63V | — | 17.0 | — | — | | | |
| | | | E : 2.25<V _{cc} ≤2.8V | — | 25.0 | — | — | | | |
| | | 125<F ₀ ≤160MHz | E : 2.8<V _{cc} ≤3.63V | — | 27.0 | — | — | | | |
| | | | E : 2.8<V _{cc} ≤3.63V | — | — | — | — | | | |
| | | Stand-by Current | I _{std} | 1.5≤F ₀ ≤80MHz | — | 5.0 | — | | 10.0 | μA |
| | | | | 80≤F ₀ ≤125MHz | — | 5.0 | — | | — | |
| 125≤F ₀ ≤160MHz | — | | | 10.0 | — | — | | | | |
| Symmetry | SYM | @50% V _{cc} | 45 | 55 | 45 | 55 | % | | | |
| Rise/ Fall Time (10% to 90% Output Level) | Tr/ Tf | 1.5≤F ₀ ≤80MHz | E : 1.6≤V _{cc} ≤2.25V | — | 6.0 | — | — | ns | | |
| | | | E : 2.25<V _{cc} ≤2.8V/ N : 2.25≤V _{cc} ≤2.75V | — | 5.0 | — | 6.0 | | | |
| | | | E : 2.8<V _{cc} ≤3.63V/ N : 2.97≤V _{cc} ≤3.63V | — | 4.5 | — | 5.0 | | | |
| | | | N : 4.50≤V _{cc} ≤5.50V | — | — | — | 8.0 | | | |
| | | 80<F ₀ ≤125MHz | E : 1.6<V _{cc} ≤3.63V | — | 4.0 | — | — | | | |
| 125<F ₀ ≤160MHz | E : 2.25<V _{cc} ≤3.63V | — | 2.5 | — | — | | | | | |
| Low Level Output Voltage | V _{OL} | E : I _{OL} = 4mA | — | 10% V _{cc} | — | 10% V _{cc} | V | | | |
| | | N (1.5≤F ₀ ≤62.5MHz) : I _{OL} = 4mA | | | | | | | | |
| | | N (62.5<F ₀ ≤80MHz) : I _{OL} = 8mA | | | | | | | | |
| High Level Output Voltage | V _{OH} | E : I _{OH} = -4mA | 90% V _{cc} | — | 90% V _{cc} | — | V | | | |
| | | N (1.5≤F ₀ ≤62.5MHz) : I _{OH} = -4mA | | | | | | | | |
| | | N (62.5<F ₀ ≤80MHz) : I _{OH} = -8mA | | | | | | | | |
| Output Load | L _{CMOS} | | 15 | | 30 | | pF | | | |
| Low Level Input Voltage | V _{IL} | | — | 30% V _{cc} | — | 30% V _{cc} | V | | | |
| High Level Input Voltage | V _{IH} | | 70% V _{cc} | — | 70% V _{cc} | — | V | | | |

Crystal Oscillators





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) |

