KYOCERA

Crystal Devices 2022

KYOCERA AVX

KYOCERA Corporation

Products			Dimensions (mm)			Applications					
Product Type	Page No.	Part Number	L	W	T (max.)	Digital Electronics OA, PC Peripherals Amusement	Car Electronics, ITS, Car Audio, Car Navigation	Car Electronics (ECU, Air Bag, ABS, TPMS etc.)	Mobile Comm. Wireless LAN Dedicatedd Short Range Comm.(DSRC)	Industrial Use (Broadcast, Medical, Base Station etc.)	
Crystal Units	3	CT1612RB	1.6	1.2	0.65				○		
	4	CT2016DB (Low Profile)	2.0	1.6	0.65				○		
	4	CT2016DB	2.0	1.6	1.0				○		
	5	CX1008SB	1.0	0.8	0.3	○			○		
	6	CX1210DB	1.2	1.0	0.3	○			○		
	7	CX1210SB	1.2	1.0	0.35	○			○		
	8	CX1612DB	1.6	1.2	0.33/0.4	○			○		
	9	CX2016DB	2.0	1.6	0.45	○			○		
	10	CX2016SA	2.0	1.6	0.5	○	○	○	○		
	11	CX3225SA (for Automotive)	3.2	2.5	0.8		○	○			
	12	CX3225GA (for Automotive)	3.2	2.5	0.95		○	○			
Clock Oscillators (SPXO)	15-16	KC2016Z (X type)	2.0	1.6	0.8	○			○	○	
	15,17	KC2016Z (Y type)	2.0	1.6	0.8	○			○	○	
	15-16	KC2520Z (X type)	2.5	2.0	0.8	○			○	○	
	15,17	KC2520Z (Y type)	2.5	2.0	0.8	○			○	○	
	15-16	KC3225Z (X type)	3.2	2.5	0.8	○			○	○	
	15,17	KC3225Z (Y type)	3.2	2.5	0.8	○			○	○	
	15-16	KC5032Z (X type)	5.0	3.2	1.2	○			○	○	
	15,17	KC5032Z (Y type)	5.0	3.2	1.2	○			○	○	
	15-16	KC7050Z (X type)	7.0	5.0	1.2	○			○	○	
	15,17	KC7050Z (Y type)	7.0	5.0	1.2	○			○	○	
	18-19	MC2016Z (X type)	2.0	1.6	0.8		○				
	18,20	MC2016Z (Y type)	2.0	1.6	0.8		○				
	18-19	MC2520Z (X type)	2.5	2.0	0.8		○				
	18,20	MC2520Z (Y type)	2.5	2.0	0.8		○				
	18-19	MC3225Z (X type)	3.2	2.5	0.8		○				
	18,20	MC3225Z (Y type)	3.2	2.5	0.8		○				
	18-19	MC5032Z (X type)	5.0	3.2	1.2		○				
	18,20	MC5032Z (Y type)	5.0	3.2	1.2		○				
	18-19	MC7050Z (X type)	7.0	5.0	1.2		○				
	18,20	MC7050Z (Y type)	7.0	5.0	1.2		○				
	21-23	KC2016K	2.0	1.6	0.8	○			○	○	
	21-23	KC2520K	2.5	2.0	0.8	○			○	○	
	21-23	KC3225K	3.2	2.5	0.8	○			○	○	
	21-23	KC5032K	5.0	3.2	1.2	○			○	○	
	21-23	KC7050K	7.0	5.0	1.2	○			○	○	
	24-26	MC2016K	2.0	1.6	0.8		○				
	24-26	MC2520K	2.5	2.0	0.8		○				
	24-26	MC3225K	3.2	2.5	0.8		○				
	24-26	MC5032K	5.0	3.2	1.2		○				
	24-26	MC7050K	7.0	5.0	1.2		○				
	27	KC5032P-P2/ P3	5.0	3.2	1.3	○				○	
	28	KC7050P-P2/ P3	7.0	5.0	1.8	○				○	
	29	KC7050R-P3	7.0	5.0	1.8	○				○	
	30	KC7050G-P3	7.0	5.0	1.8	○				○	
	31	KC5032P-L2/ L3	5.0	3.2	1.3	○				○	
	32	KC7050P-L2/ L3	7.0	5.0	1.8	○				○	
	33	KC5032P-H2/ H3	5.0	3.2	1.3	○				○	
	34	KC7050P-H2/ H3	7.0	5.0	1.8	○				○	
Voltage Controlled Crystal Oscillators (VCXO)	35	KV5032R	5.0	3.2	1.2	○	○		○	○	
	36	KV5032G	5.0	3.2	1.2	○	○		○	○	
	37	KV7050R-P3	7.0	5.0	1.8	○	○			○	
	38	KV7050G-P3	7.0	5.0	1.8	○	○			○	
Temperature Compensated Crystal Oscillators (TCXO)	39	KT1612A (Low Phase Noise)	1.65	1.25	0.55	○			○	○	
	40	KT1612A	1.65	1.25	0.55	○			○	○	
	41	KT2016K	2.0	1.6	0.8	○	○		○	○	
	42	KT2520K	2.5	2.0	0.8	○	○		○	○	
	43	KT5032F	5.0	3.2	1.7					○	
	44	KT7050	7.0	5.0	1.7					○	

NR = Not recommended

Products	Frequency Range (MHz)	Conditions of Use				RoHS Compli-ant*	AEC	
		Solder			Washable			
Part Number	1 10 50 100 300 to 800	Manual	Reflow	Flow			Q100	Q200
CT1612RB	38.4 ----------76.8	Yes	Yes	No	Yes	Yes		
CT2016DB (Low Profile)	19.2 38.4	Yes	Yes	No	Yes	Yes		
CT2016DB	19.2 38.4	Yes	Yes	No	Yes	Yes		
CX1008SB	37.4 ----------80	Yes	Yes	No	Yes	Yes		
CX1210DB	37.4 ----------80	Yes	Yes	No	Yes	Yes		
CX1210SB	27.12 32 48	Yes	Yes	No	Yes	Yes		
CX1612DB	24 -------- 48	Yes	Yes	No	Yes	Yes		
CX2016DB	16 ---------- 50	Yes	Yes	No	Yes	Yes		
CX2016SA	16 ---------- 50	Yes	Yes	No	Yes	Yes		Yes
CX3225SA (for Automotive)	8 ---------- 40	Yes	Yes	No	Yes	Yes		Yes
CX3225GA (for Automotive)	8 ---------- 40	Yes	Yes	No	Yes	Yes		Yes
KC2016Z (X type)	0.5 ---------- 170	No	Yes	No	NR	Yes		
KC2016Z (Y type)	24---------- 72	No	Yes	No	NR	Yes		
KC2520Z (X type)	0.5 ---------- 170	No	Yes	No	NR	Yes		
KC2520Z (Y type)	24---------- 72	No	Yes	No	NR	Yes		
KC3225Z (X type)	0.5 ---------- 170	No	Yes	No	NR	Yes		
KC3225Z (Y type)	24---------- 72	No	Yes	No	NR	Yes		
KC5032Z (X type)	0.5 ---------- 170	No	Yes	No	NR	Yes		
KC5032Z (Y type)	24---------- 72	No	Yes	No	NR	Yes		
KC7050Z (X type)	0.5 ---------- 170	No	Yes	No	NR	Yes		
KC7050Z (Y type)	24---------- 72	No	Yes	No	NR	Yes		
MC2016Z (X type)	0.5 ---------- 170	No	Yes	No	NR	Yes	Yes (option)	Yes
MC2016Z (Y type)	24---------- 72	No	Yes	No	NR	Yes	Yes (option)	Yes
MC2520Z (X type)	0.5 ---------- 170	No	Yes	No	NR	Yes	Yes (option)	Yes
MC2520Z (Y type)	24---------- 72	No	Yes	No	NR	Yes	Yes (option)	Yes
MC3225Z (X type)	0.5 ---------- 170	No	Yes	No	NR	Yes	Yes (option)	Yes
MC3225Z (Y type)	24---------- 72	No	Yes	No	NR	Yes	Yes (option)	Yes
MC5032Z (X type)	0.5 ---------- 170	No	Yes	No	NR	Yes	Yes (option)	Yes
MC5032Z (Y type)	24---------- 72	No	Yes	No	NR	Yes	Yes (option)	Yes
MC7050Z (X type)	0.5 ---------- 170	No	Yes	No	NR	Yes	Yes (option)	Yes
MC7050Z (Y type)	24---------- 72	No	Yes	No	NR	Yes	Yes (option)	Yes
KC2016K	1.5 ----------160	No	Yes	No	NR	Yes		
KC2520K	1.5 ----------160	No	Yes	No	NR	Yes		
KC3225K	1.5 ----------160	No	Yes	No	NR	Yes		
KC5032K	1.5 ----------160	No	Yes	No	NR	Yes		
KC7050K	1.5 ----------160	No	Yes	No	NR	Yes		
MC2016K	1.5 ----------160	No	Yes	No	NR	Yes	Yes (option)	Yes
MC2520K	1.5 ----------160	No	Yes	No	NR	Yes	Yes (option)	Yes
MC3225K	1.5 ----------160	No	Yes	No	NR	Yes	Yes (option)	Yes
MC5032K	1.5 ----------160	No	Yes	No	NR	Yes	Yes (option)	Yes
MC7050K	1.5 ----------160	No	Yes	No	NR	Yes	Yes (option)	Yes
KC5032P-P2/ P3	25---------- 175	Yes	Yes	No	NR	Yes		
KC7050P-P2/ P3	25---------- 175	Yes	Yes	No	NR	Yes		
KC7050R-P3	10 ----------800	Yes	Yes	No	NR	Yes		
KC7050G-P3	10 ----------800	Yes	Yes	No	NR	Yes		
KC5032P-L2/ L3	25---------- 175	Yes	Yes	No	NR	Yes		
KC7050P-L2/ L3	25---------- 175	Yes	Yes	No	NR	Yes		
KC5032P-H2/ H3	25---------- 175	Yes	Yes	No	NR	Yes		
KC7050P-H2/ H3	25---------- 175	Yes	Yes	No	NR	Yes		
KV5032R	10 ----------800	Yes	Yes	No	NR	Yes		
KV5032G	10 ----------800	Yes	Yes	No	NR	Yes		
KV7050R-P3	10 ----------800	Yes	Yes	No	NR	Yes		
KV7050G-P3	10 ----------800	Yes	Yes	No	NR	Yes		
KT1612A (Low Phase Noise)	19.2 ---------- 76.8	No	Yes	No	No	Yes		
KT1612A	19.2 ---------- 76.8	No	Yes	No	No	Yes		
KT2016K	19.2 ---------- 52.0	No	Yes	No	No	Yes	Yes (option)	Yes
KT2520K	19.2 ---------- 52.0	No	Yes	No	No	Yes	Yes (option)	Yes
KT5032F	10 ---------- 40	Contact us	Yes	No	No	Yes		
KT7050	10 ---------- 40	Contact us	Yes	No	No	Yes		

* RoHS Compliant Products : Products which do not contain lead, cadmium, mercury, hexavalent chromium, PBB, PBDE, DEHP, BBP, DBP and DIBP, based on EU DIRECTIVE 2015/863/EU. Substances exempted by the DIRECTIVE and impurities observed in the natural environment are excepted.

KYOCERA

1.6×1.2mm for Mobile Communications

RoHS Compliant

Features

- Crystal Unit with Thermistor
- Reference frequency for telecommunication systems
- Reflow compatible
- Using ceramic package resulting in high reliability

Applications

- Mobile Communications, GNSS

How to Order

CT1612RB 38400 □□ □ □ □ □□
① ② ③ ④ ⑤ ⑥ ⑦

①Series
②Frequency
③Load Capacitance

B0	6 pF	—
C0	7 pF	—
D0	8 pF	Std.

④Frequency Tolerance

F	±10×10^{-6}	Std.
G	±15×10^{-6}	—

⑤Operating Temp. Range ⑥Frequency Temp. Stability

LH	−30 to +85°C	±12×10^{-6}(at −30 to +85°C)

⑦Individual Specification

Packaging (Tape & Reel 15000 pcs./ reel)

Specifications

Item	Symbol	Specification	Unit	Remarks
Frequency Range	f_{nom}	38400 to 76800	kHz	
Overtone Order	OT	Fundamental	—	
Load Capacitance	CL	8	pF	Please contact us for other CL requirements.
Frequency Tolerance	f_{tol}	±10	×10^{-6}	25°C±3°C
Motional Series Resistance	R1	Table 1	ohm	
Drive Level	DL	10	μW	100μW max.
Operating Temp. Range	T_{use}	−30 to +85	°C	
Storage Temp. Range	T_{stg}	−40 to +105	°C	
Frequency Temp. Characteristics	f_{tem}	±12	×10^{-6}	
Thermistor Resistance	—	Table 2	ohm	25°C±3°C
Thermistor B-Constant	—	Table 3	K	25°C to 50°C

Please contact us for other specifications.

Table 1 Motional Series Resistance

Frequency Range	Motional Series Resistance
38400 to 76800kHz	50 Ω max.

Table 2 Thermistor Resistance

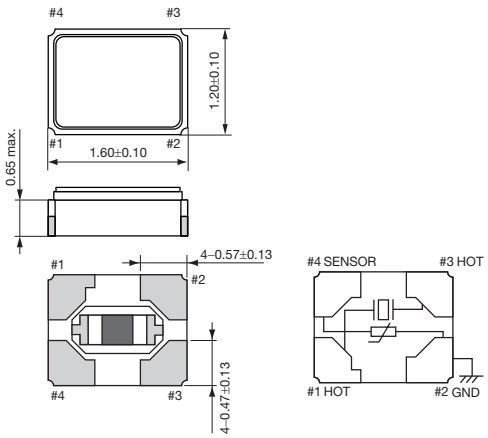
Resistance	Specification
100kΩ	±1%

Table 3 Thermistor B-Constant

B-Constant	Specification
4250K	±1%

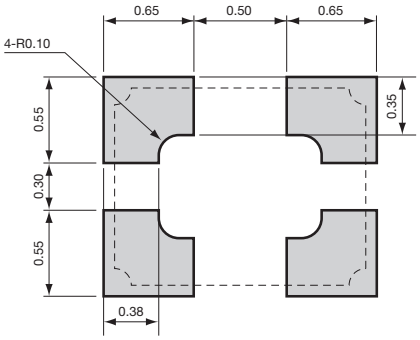
Dimensions

(Unit: mm)



Recommended Land Pattern

(Unit: mm)



Crystal Units

KYOCERA

2.0×1.6mm for Mobile Communications

RoHS Compliant

Features

- Crystal Unit with Thermistor
- Height 0.65 (max.) mm is also available
- Reference frequency for telecommunication systems
- Reflow compatible
- Using ceramic package resulting in high reliability

Applications

- Mobile Communications, GNSS

How to Order

CT2016DB 19200 □□ □ □ □ □□
① ② ③ ④ ⑤ ⑥ ⑦

①Series
②Frequency
③Load Capacitance

B0	6 pF	—
C0	7 pF	Std.

④Frequency Tolerance

F	±10×10^{-6}	Std.
G	±15×10^{-6}	—

⑤Operating Temp. Range ⑥Frequency Temp. Stability

PF	−40 to +85°C	±10×10^{-6}(at −25 to +85°C)
RH	−40 to +105°C	±12×10^{-6}(at −30 to +85°C)

⑦Individual Specification

Packaging (Tape & Reel 12000 pcs./ reel)

Specifications

Item	Symbol	Specification	Unit	Remarks
Frequency Range	f_{nom}	19200/ 38400	kHz	
Overtone Order	OT	Fundamental	—	
Load Capacitance	CL	7	pF	
Frequency Tolerance	f_{tol}	±10	×10^{-6}	25°C±3°C
Motional Series Resistance	R1	Table 1	ohm	
Drive Level	DL	10	μW	100μW max.
Operating Temp. Range	T_{use}	−30 to +85	°C	
Storage Temp. Range	T_{stg}	−40 to +105	°C	
Frequency Temp. Characteristics	f_{tem}	±12	×10^{-6}	Freq. deviation from the value at 32°C
Thermistor Resistance	—	Table 2	ohm	25°C
Thermistor B-Constant	—	Table 3	K	25°C to 50°C

Please contact us for other specifications.

Table 1 Motional Series Resistance

Frequency Range	Motional Series Resistance
19200/ 38400kHz	80 Ω max.

Table 2 Thermistor Resistance

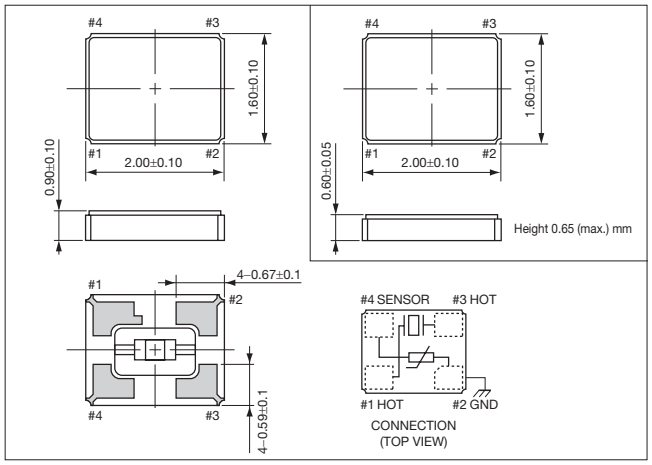
Resistance	Specification
100kΩ	±1%

Table 3 Thermistor B-Constant

B-Constant	Specification
4250K	±1%

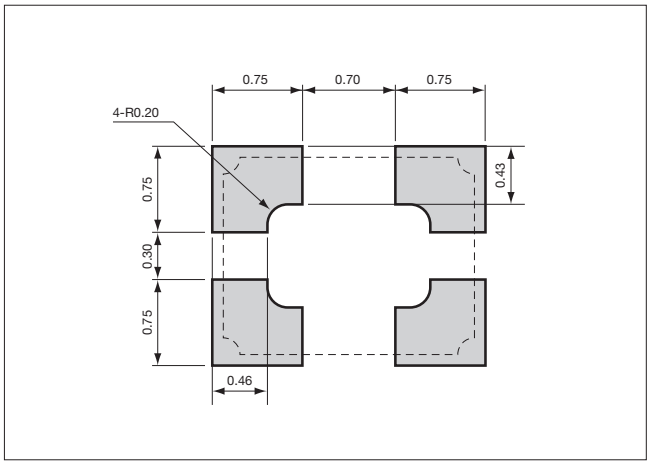
Dimensions

(Unit: mm)



Recommended Land Pattern

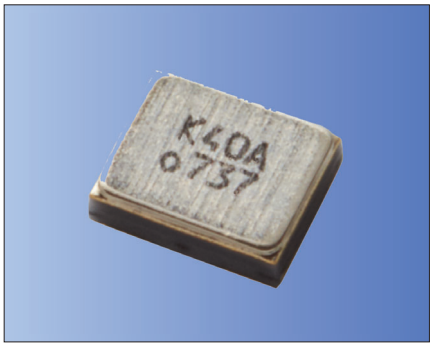
(Unit: mm)



Crystal Units

KYOCERA

1.0×0.8mm for Mobile Communications



RoHS Compliant

Features

- Ultra-miniature and low profile (1.0×0.8×0.3mm max.)
- Crystal unit for mobile communication Systems.
- Reflow compatible
- Using ceramic package resulting in high reliability

Applications

- Mobile Communications

How to Order

CX1008SB 37400 □□ □ □ □ □□
① ② ③ ④ ⑤ ⑥ ⑦

①Series
②Frequency
③Load Capacitance

B0	6 pF	—
C0	7 pF	Std.

④Frequency Tolerance

F	±10×10^{-6}	Std.
G	±15×10^{-6}	—

⑤Operating Temp. Range ⑥Frequency Temp. Stability

LH	−30 to +85°C	±12×10^{-6}

⑦Individual Specification

Packaging (Tape & Reel 21000 pcs./ reel)

Specifications

Item	Symbol	Specification	Unit	Remarks
Frequency Range	f_{nom}	37400 to 80000	kHz	
Overtone Order	OT	Fundamental	—	
Load Capacitance	CL	7	pF	Please contact us for other CL requirements.
Frequency Tolerance	f_{tol}	±10	×10^{-6}	25°C±3°C
Motional Series Resistance	R1	Table 1	ohm	
Drive Level	DL	Table 2	μW	
Operating Temp. Range	T_{use}	−30 to +85	°C	
Storage Temp. Range	T_{stg}	−40 to +105	°C	
Frequency Temp. Characteristics	f_{tem}	±12	×10^{-6}	

Please contact us for other specifications.

Crystal Units

Table 1 Motional Series Resistance

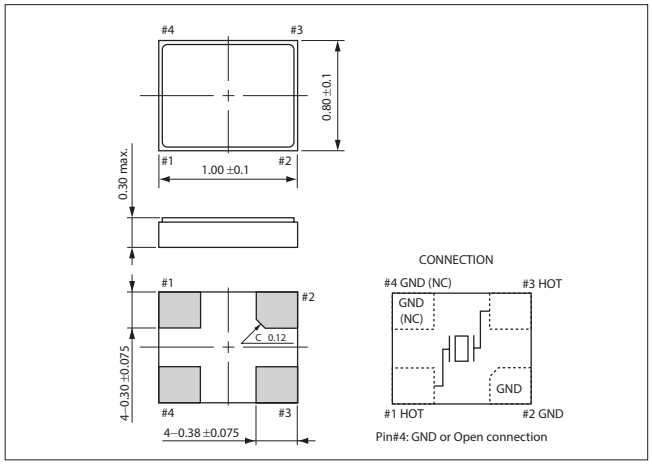
Frequency Range	Motional Series Resistance
f_{nom}=37400 to 80000kHz	60 Ω max.

Table 2 Level of Drive

Frequency Range	Level of Drive
f_{nom}=37400 to 80000kHz	10μW (100μW max.)

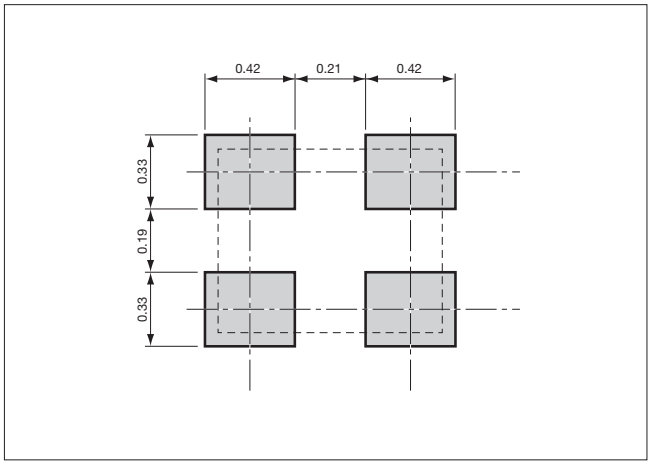
Dimensions

(Unit: mm)

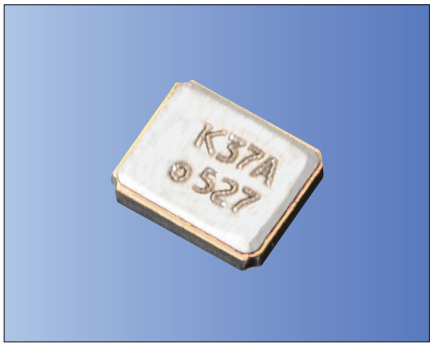


Recommended Land Pattern

(Unit: mm)



1.2×1.0mm for Mobile Communications



RoHS Compliant

Features

- Ultra-miniature and low profile (1.2×1.0×0.3mm max.)
- Crystal unit for mobile communication Systems.
- Reflow compatible
- Using ceramic package resulting in high reliability

Applications

- Mobile Communications, Bluetooth®, Wireless LAN

* Bluetooth® Trademarks are owned by Bluetooth SIG, Inc.

How to Order

CX1210DB 37400 □□ □ □ □ CC
① ② ③ ④ ⑤ ⑥ ⑦

①Series ②Frequency
③Load Capacitance ④Frequency Stability

D0	8 pF
H0	12 pF

F	±10×10⁻⁶
G	±15×10⁻⁶

⑤Operating Temp. Range ⑥Frequency Temp. Stability

FF	−20 to +70°C	±10×10⁻⁶
LH	−30 to +85°C	±12×10⁻⁶
LJ	−30 to +85°C	±15×10⁻⁶

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

Packaging (Tape & Reel 1000/ 3000/ 12000/ 21000pcs./ reel)

Specifications

Item	Symbol	Specification	Unit	Remarks
Frequency Range	f_{nom}	37400/ 40000/ 52000/ 80000	kHz	
Overtone Order	OT	Fundamental	—	
Load Capacitance	CL	8	pF	
Frequency Tolerance	f_{tol}	±10	×10⁻⁶	25°C±3°C
Motional Series Resistance	R1	Table 1	ohm	
Drive Level	DL	Table 2	μW	
Operating Temp. Range	T_{use}	−30 to +85	°C	
Storage Temp. Range	T_{stg}	−40 to +105	°C	
Frequency Temp. Characteristics	f_{tem}	±12	×10⁻⁶	Freq. deviation from the value at 25°C

Please contact us for other specifications.

Table 1 Motional Series Resistance

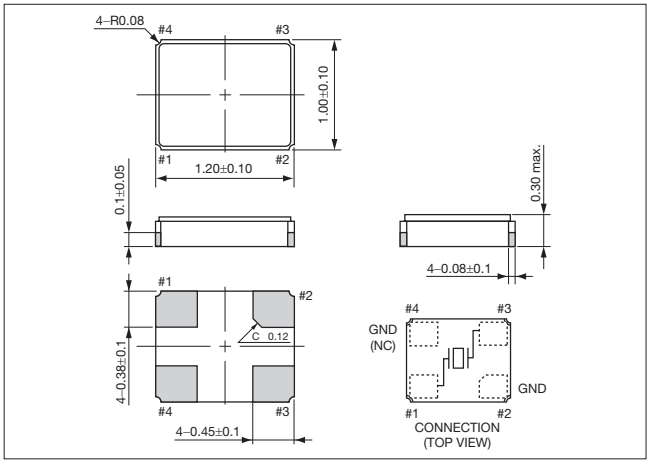
Frequency Range	Motional Series Resistance
f_{nom}=37400/ 40000/ 52000/ 80000kHz	60 Ω max.

Table 2 Level of Drive

Frequency Range	Level of Drive
f_{nom}=37400/ 40000/ 52000/ 80000kHz	10μW (100μW max.)

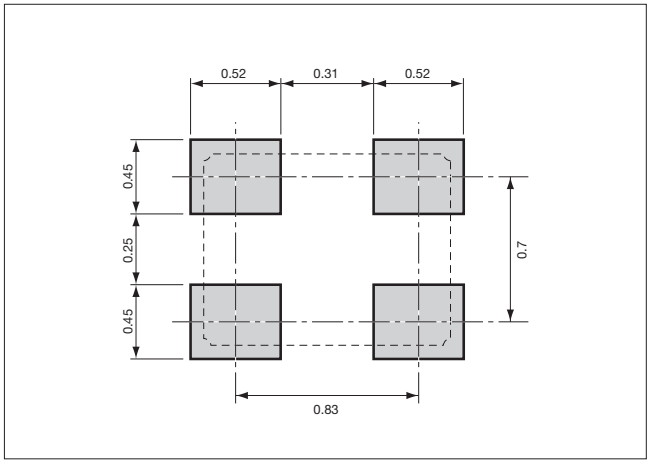
Dimensions

(Unit: mm)



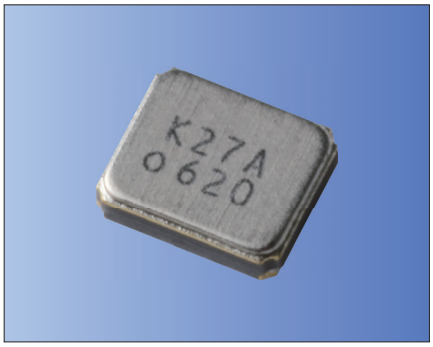
Recommended Land Pattern

(Unit: mm)



KYOCERA

1.2×1.0mm for Mobile Communications



RoHS Compliant

Features

- Ultra-miniature and low profile (1.2×1.0×0.35mm max.)
- Crystal unit for mobile communication Systems.
- Reflow compatible
- Using ceramic package resulting in high reliability

Applications

- Mobile Communications, Bluetooth®, Wireless LAN

* Bluetooth® Trademarks are owned by Bluetooth SIG, Inc.

How to Order

CX1210SB 27120 □□ □ □ □ CC
① ② ③ ④ ⑤ ⑥ ⑦

①Series ②Frequency
③Load Capacitance ④Frequency Stability

B0	6 pF
D0	8 pF

F	±10×10⁻⁶
G	±15×10⁻⁶

⑤Operating Temp. Range ⑥Frequency Temp. Stability

FF	−20 to +70°C	±10×10⁻⁶
LH	−30 to +85°C	±12×10⁻⁶
LJ	−30 to +85°C	±15×10⁻⁶

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

Packaging (Tape & Reel 1000/ 3000/ 12000/ 21000pcs./ reel)

Specifications

Item	Symbol	Specification	Unit	Remarks
Frequency Range	f_{nom}	27120/ 32000/ 48000	kHz	
Overtone Order	OT	Fundamental	—	
Load Capacitance	CL	8	pF	
Frequency Tolerance	f_{tol}	±10	×10⁻⁶	25°C±3°C
Motional Series Resistance	R1	Table 1	ohm	
Drive Level	DL	Table 2	μW	
Operating Temp. Range	T_{use}	−30 to +85	°C	
Storage Temp. Range	T_{stg}	−40 to +105	°C	
Frequency Temp. Characteristics	f_{tem}	±12	×10⁻⁶	Freq. deviation from the value at 25°C

Please contact us for other specifications.

Table 1 Motional Series Resistance

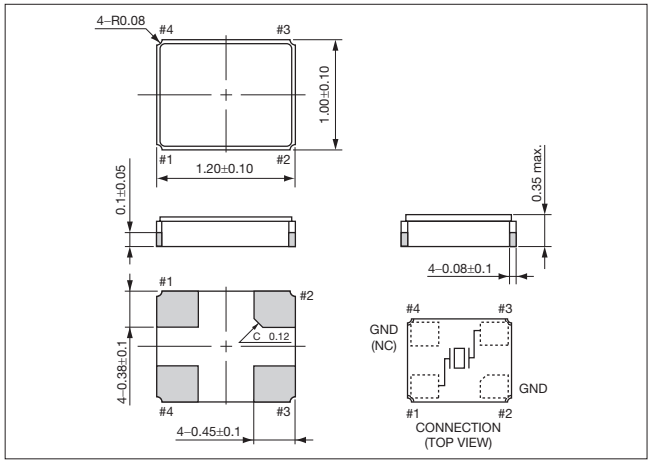
Frequency Range	Motional Series Resistance
f_{nom}=27120kHz	100 Ω max.
f_{nom}=32000kHz	60 Ω max.

Table 2 Level of Drive

Frequency Range	Level of Drive
f_{nom}=27120/ 32000kHz	10μW (100μW max.)

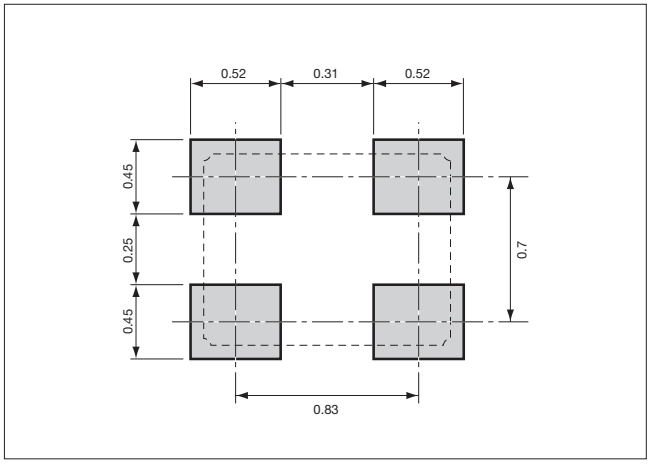
Dimensions

(Unit: mm)



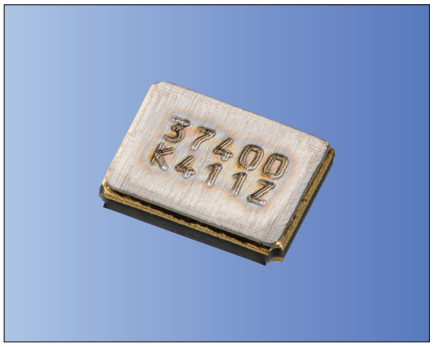
Recommended Land Pattern

(Unit: mm)



KYOCERA

1.6×1.2mm for Consumer Products/ Mobile Communications



RoHS Compliant

Features

- Crystal unit for Digital Electronics and Consumer Products
- Ultra-miniature and low profile 32000kHz or more accepts 0.33mm-high
- Ceramic package
- Reflow compatible

Applications

- Smartphone (Bluetooth®, Wireless LAN, NFC)
- Wearable devices
- Short range wireless (LPWA)

* Bluetooth® Trademarks are owned by Bluetooth SIG, Inc.

How to Order

CX1612DB 24000 □□ G L L CC
① ② ③ ④ ⑤ ⑥ ⑦

①Series ②Frequency
③Load Capacitance ④Frequency Tolerance

D0	8 pF	G	±15×10⁻⁶

⑤Operating Temp. Range ⑥Frequency Temp. Stability

LL	−30 to +85°C	±20×10⁻⁶

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

Packaging (Tape & Reel 3000/ 20000 pcs./ reel)

Specifications

Item	Symbol	Specification	Unit	Remarks
Frequency Range	f_{nom}	24, 26, 32, 37.4, 38.4, 40, 48	MHz	Please contact us for other frequency range.
Overtone Order	OT	Fundamental	—	
Load Capacitance	CL	8	pF	
Frequency Tolerance	f_{tol}	±15	×10⁻⁶	25°C±3°C
Motional Series Resistance	R1	Table 1	ohm	
Drive Level	DL	10μW(100μW max.)	μW	
Operating Temp. Range	T_{use}	−30 to +85	°C	
Storage Temp. Range	T_{stg}	−40 to +85	°C	
Frequency Temp. Characteristics	f_{tem}	±20	×10⁻⁶	Freq. deviation from the value at 25°C

Please contact us for other specifications.

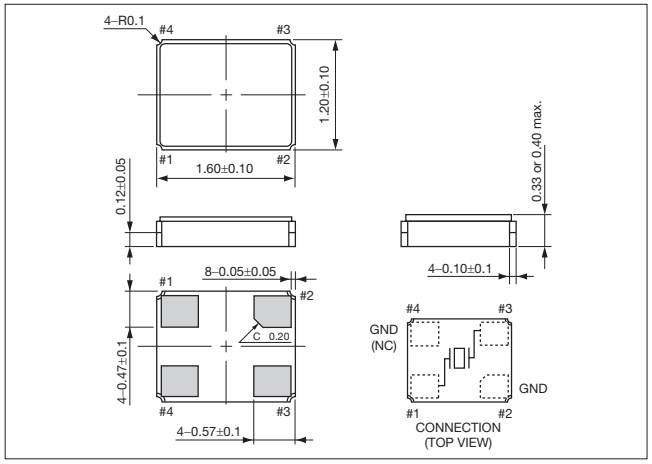
Table 1 Motional Series Resistance

Please contact us for other frequency range.

Frequency Range	Motional Series Resistance
24MHz	150 Ω max.
38.4MHz	80 Ω max.
48MHz	50 Ω max.

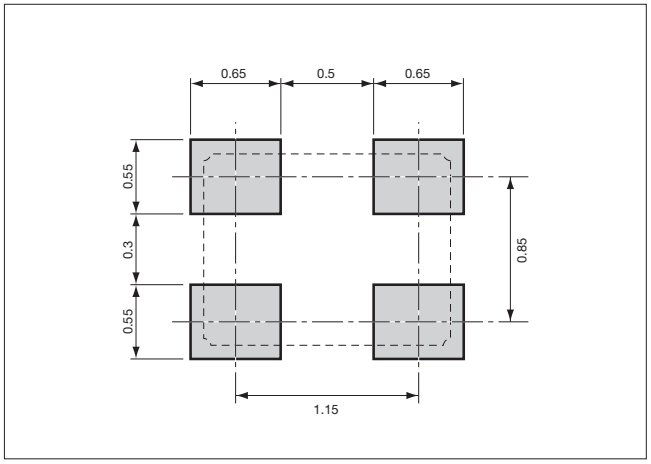
Dimensions

(Unit: mm)

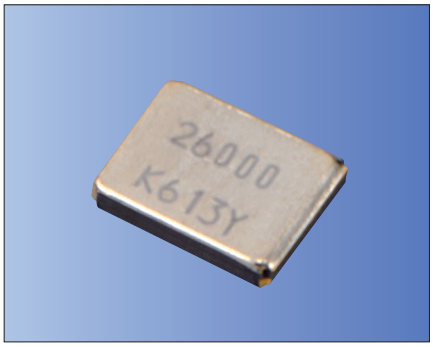


Recommended Land Pattern

(Unit: mm)



2.0×1.6mm for Consumer Products/ Mobile Communications



RoHS Compliant

Features

- Crystal unit for Consumer Products
- Ultra-miniature and low profile (2.0×1.6×0.40mm)
- Ceramic package
- Reflow compatible

Applications

- Digital Electronics
- Consumer Products
- Mobile Communications, Bluetooth®, Wireless LAN

* Bluetooth® Trademarks are owned by Bluetooth SIG, Inc.

How to Order

CX2016DB 27000 D0 G L L CC
① ② ③ ④ ⑤ ⑥ ⑦

①Series
②Frequency
③Load Capacitance ④Frequency Tolerance

D0	8 pF	G	±15×10⁻⁶

⑤Operating Temp. Range ⑥Frequency Temp. Stability

LL	−30 to +85°C	±20×10⁻⁶

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

Packaging (Tape & Reel 1000/ 3000/ 15000 pcs./ reel)

Specifications

Item	Symbol	Specification	Unit	Remarks
Frequency Range	f_{nom}	16, 20, 24, 25, 26, 27, 30, 32, 37.4, 38.4, 40, 48, 50	MHz	Please contact us for other frequency range.
Overtone Order	OT	Fundamental	—	
Load Capacitance	CL	8	pF	Please contact us for other CL requirements.
Frequency Tolerance	f_{tol}	±15	×10⁻⁶	25°C±3°C
Motional Series Resistance	R1	Table 1	ohm	
Drive Level	DL	10μW(100μW max.)	μW	
Operating Temp. Range	T_{use}	−30 to +85	°C	
Storage Temp. Range	T_{stg}	−40 to +85	°C	
Frequency Temp. Characteristics	f_{tem}	±20	×10⁻⁶	Freq. deviation from the value at 25°C

Please contact us for other specifications.

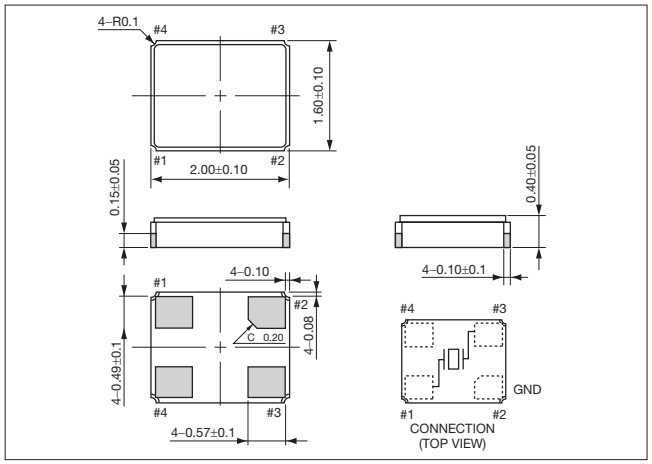
Table 1 Motional Series Resistance

Please contact us for other frequency range.

Frequency	Motional Series Resistance
16MHz	200 Ω max.
20MHz	150 Ω max.
32MHz	60 Ω max.
50MHz	50 Ω max.

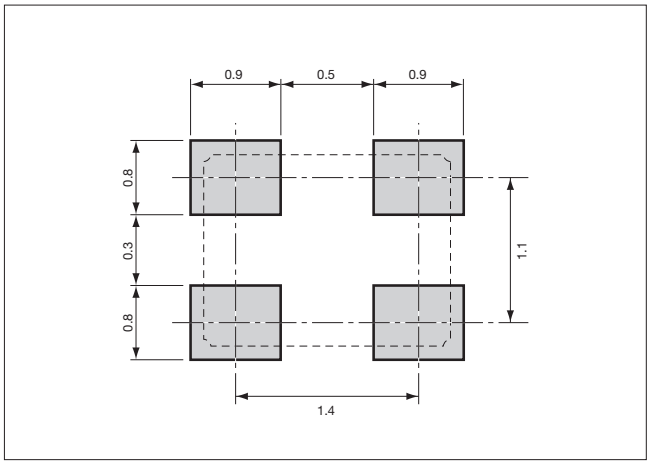
Dimensions

(Unit: mm)



Recommended Land Pattern

(Unit: mm)



KYOCERA

2.0×1.6mm for Consumer Products/ Mobile Communication/ Automotive

AEC-Q200 RoHS Compliant

Features

- Support a wide range of applications
- Ultra-miniature and low profile (2.05×1.65×0.45mm)
- Ceramic package
- Reflow compatible

Applications

- ECU
- Automotive Camera
- Digital Electronics
- Mobile Communication

How to Order

CX2016SA 20000 D0 G S S CC
① ② ③ ④ ⑤ ⑥ ⑦

①Series
②Frequency
③Load Capacitance

D0	8 pF

④Frequency Tolerance

G	±15×10⁻⁶

⑤Operating Temp. Range ⑥Frequency Temp. Stability

SS	−40 to +125°C	±50×10⁻⁶
TW	−40 to +150°C	±200×10⁻⁶

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

Packaging (Tape & Reel 3000/ 15000 pcs./ reel)

Specifications

Item	Symbol	Specification		Unit	Remarks
Frequency Range	f_{nom}	16, 20, 24, 25, 26, 27, 30, 32, 37.4, 38.4, 40, 48, 50		MHz	Please contact us for other frequency range.
Overtone Order	OT	Fundamental		—	
Load Capacitance	CL	8		pF	Please contact us for other CL requirements.
Frequency Tolerance	f_{tol}	±15		×10⁻⁶	25°C±3°C
Motional Series Resistance	R1	Table 1		ohm	
Drive Level	DL	10μW(200μW max.)		μW	
Operating Temp. Range	T_{use}	−40 to +125	−40 to +150	°C	
Storage Temp. Range	T_{stg}	−40 to +150		°C	
Frequency Temp. Characteristics	f_{tem}	±50	±200	×10⁻⁶	Freq. deviation from the value at 25°C

Please contact us for other specifications.

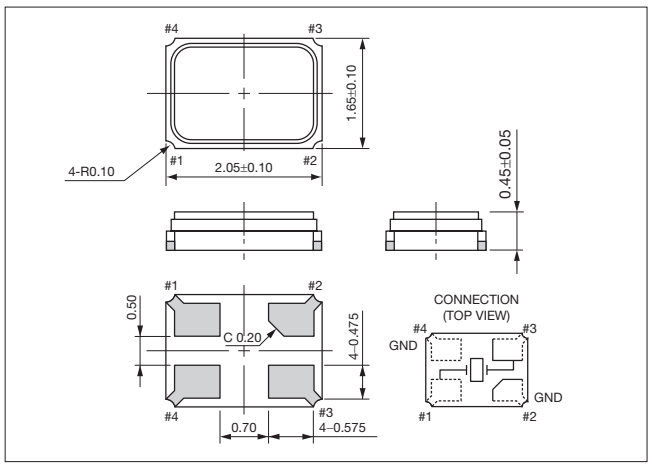
Table 1 Motional Series Resistance

Please contact us for other frequency range.

Frequency Range	Motional Series Resistance
16MHz	200 Ω max.
20MHz	150 Ω max.
32MHz	60 Ω max.
50MHz	50 Ω max.

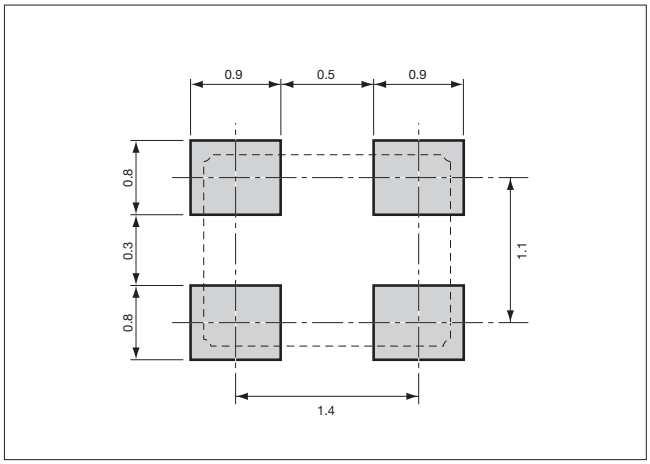
Dimensions

(Unit: mm)



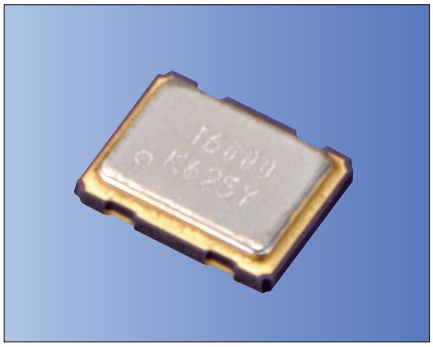
Recommended Land Pattern

(Unit: mm)



KYOCERA

3.2×2.5mm for Automotive



AEC-Q200 RoHS Compliant

Features

- Crystal unit for automotive electronics
- Improved solderability
- Improved mounting stability with 4 terminals
- Improved anti-noise performance with GND terminal
- Ceramic package
- Small and low profile
- Improved rust prevention performance
- Reflow compatible
- Highly reliable solder junction (3000 heat cycles −40 to +125°C)

Applications

- ECU
- TPMS
- High-Speed Automotive Network

How to Order

CX3225SA	12000	D0	G	T	V	CC
①	②	③	④	⑤	⑥	⑦

①Series ②Frequency
③Load Capacitance ④Frequency Tolerance

D0	8 pF	G	±15×10⁻⁶

⑤Operating Temp. Range ⑥Frequency Temp. Stability

TV	−40 to +150°C	±150×10⁻⁶

⑦Individual Specification
(STD Standard is "CC".)

Packaging (Tape & Reel 3000 pcs./ reel)

Specifications

Item	Symbol	Specification	Unit	Remarks
Frequency Range	f_{nom}	8, 10, 12, 15, 16, 20, 24, 26, 27, 40	MHz	Please contact us for other frequency range.
Overtone Order	OT	Fundamental	—	
Load Capacitance	CL	8	pF	Please contact us for other CL requirements.
Frequency Tolerance	f_{tol}	±15	×10⁻⁶	25°C±3°C
Motional Series Resistance	R1	Table 1	ohm	
Drive Level	DL	10μW(200μW max.)	μW	
Operating Temp. Range	T_{use}	−40 to +150	°C	
Storage Temp. Range	T_{stg}	−40 to +150	°C	
Frequency Temp. Characteristics	f_{tem}	±150	×10⁻⁶	Freq. deviation from the value at 25°C

Please contact us for other specifications.

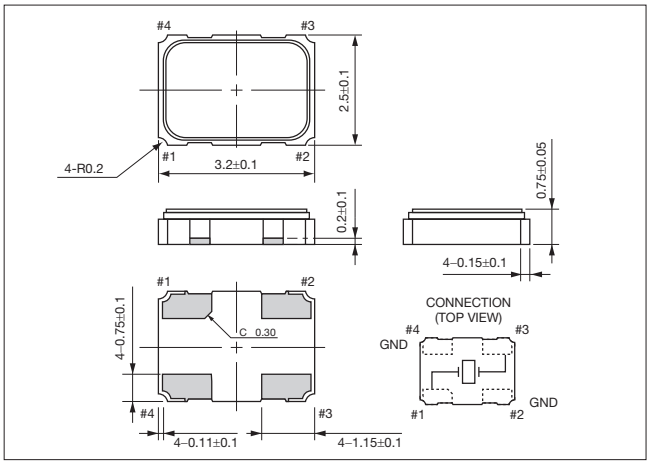
Table 1 Motional Series Resistance

Please contact us for other frequency range.

Frequency	Motional Series Resistance
8MHz	500 Ω max.
12MHz	200 Ω max.
16MHz	60 Ω max.
20MHz	50 Ω max.

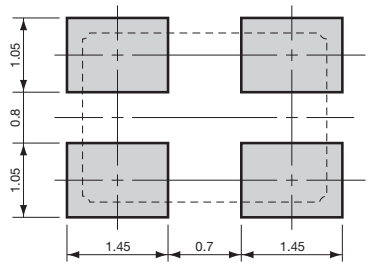
Dimensions

(Unit: mm)



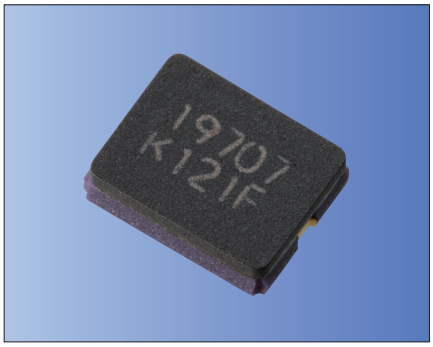
Recommended Land Pattern

(Unit: mm)



KYOCERA

3.2×2.5mm for Automotive



AEC-Q200 RoHS Compliant

Features

- Crystal unit for automotive electronics
- Improved solderability
- Small and low profile (3.2×2.5×0.85mm)
- Ceramic package
- Reflow compatible
- Acceptable heat cycle solder junction for 3000 cycles (−40 to +125°C)

Applications

- ECU
- TPMS
- High-Speed Automotive Network

How to Order

CX3225GA	16000	D0	P	T	V	CC
①	②	③	④	⑤	⑥	⑦

①Series ②Frequency
③Load Capacitance ④Frequency Tolerance

D0	8 pF	P	±50×10^{-6}

⑤Operating Temp. Range ⑥Frequency Temp. Stability

TV	−40 to +150°C	±150×10^{-6}

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

Packaging (Tape & Reel 3000 pcs./ reel)

Specifications

Item	Symbol	Specification	Unit	Remarks
Frequency Range	f_{nom}	8, 12, 16, 20, 25, 40	MHz	Please contact us for other frequency range.
Overtone Order	OT	Fundamental	—	
Load Capacitance	CL	8	pF	Please contact us for other CL requirements.
Frequency Tolerance	f_{tol}	±50	×10^{-6}	25°C±3°C
Motional Series Resistance	R1	Table 1	ohm	
Drive Level	DL	10μW(200μW max.)	μW	
Operating Temp. Range	T_{use}	−40 to +150	°C	
Storage Temp. Range	T_{stg}	−40 to +150	°C	
Frequency Temp. Characteristics	f_{tem}	±150	×10^{-6}	Freq. deviation from the value at 25°C

Please contact us for other specifications.

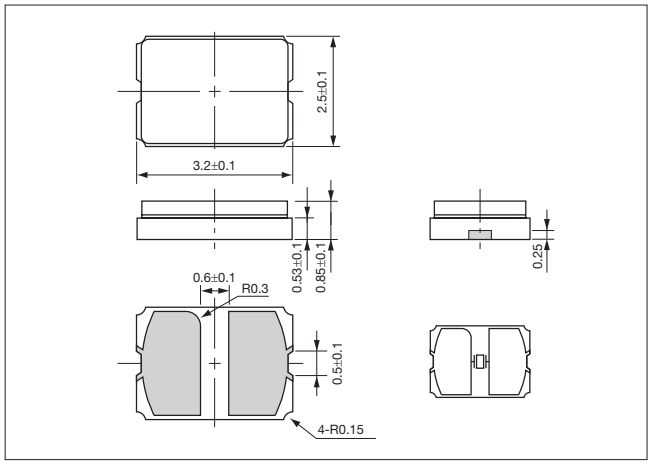
Table 1 Motional Series Resistance

Please contact us for other frequency range.

Frequency	Motional Series Resistance
8MHz	500 Ω max.
12MHz	200 Ω max.
20MHz	100 Ω max.

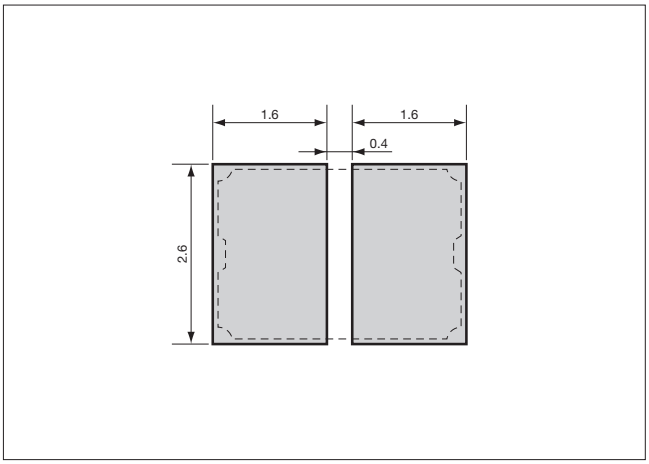
Dimensions

(Unit: mm)



Recommended Land Pattern

(Unit: mm)



1. Shock & Drop / Vibration

Do not inflict excessive shock and mechanical vibration that exceeds the norm, such as hitting or mistakenly dropping, when transporting and mounting on a board. There are cases when pieces of crystal break, and pieces that are used become damaged, and become inoperable. When a shock or vibration that exceeds the norm has been inflicted, make sure to check the characteristics.

2. Cleaning

Since a crystal piece can be broken by resonance when a crystal device is cleaned by ultrasonic cleaning, be careful when carrying out ultrasonic cleaning.

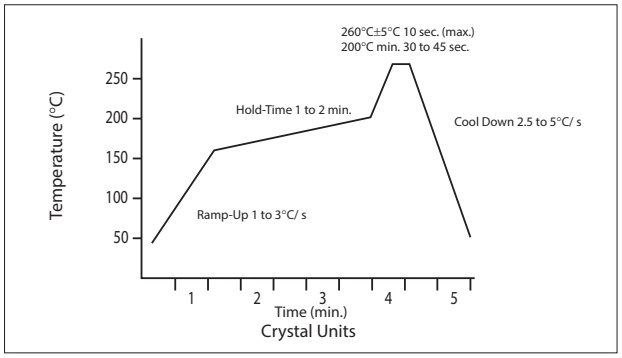
3. Soldering conditions

To maintain the product reliability, please follow recommended conditions.

Standard soldering iron conditions

	Crystal Units
Soldering iron	280°C to 340°C
Time	3+1/ −0 sec. max.

Reflow conditions (Example)



Recommended reflow Conditions vary depending upon products.
Please check with the respective specification for details.

4. Mounting Precautions

The lead of the device and the pattern of the board is soldered on the surface. Since extreme deformation of the board tears off the pattern, tears off the lead metal, cracks the solder and damages the sealed part of the device and there are cases in which performance deteriorates and operation fails, use it within the stipulated bending conditions. Due to the small cracks in the board resulting from mounting, please pay sufficient attention when attaching a device at the position where the warping of the board is great.
When using an automatic loading machine, as far as possible, select a type that has a small impact and use it while confirming that there is no damage.
Surface mount devices are NOT flow soldering compatible.

5. Storage Condition

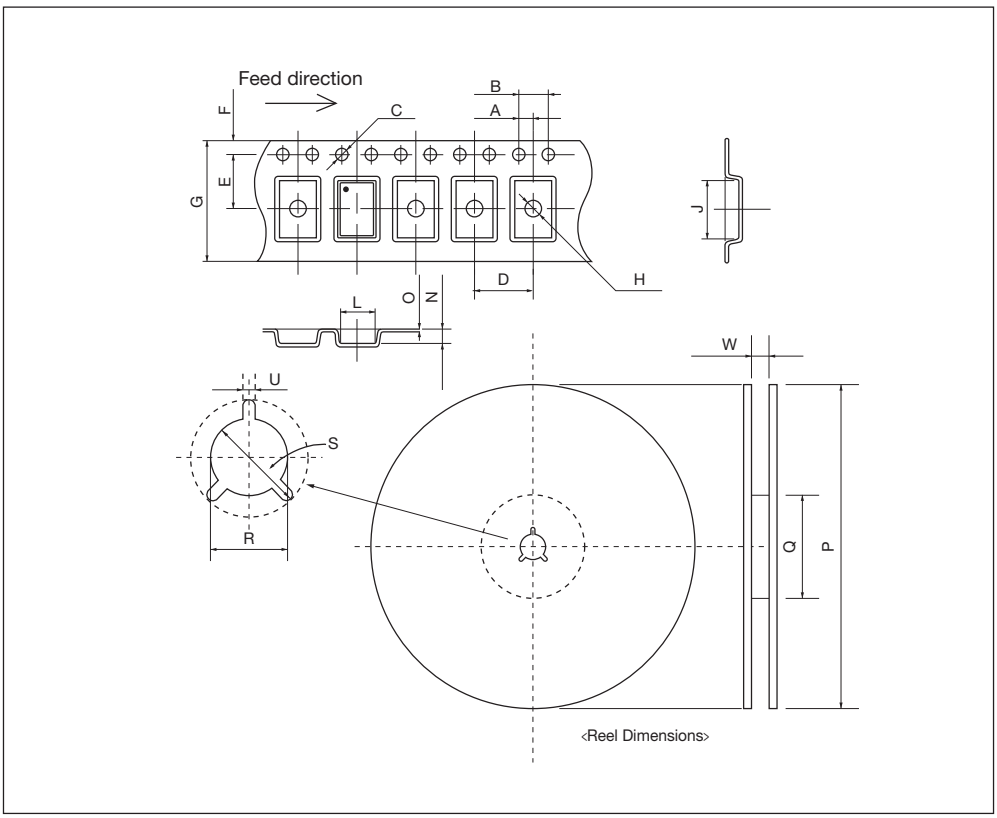
Since the long hour high temperature and low temperature storage, as well as the storage at high humidity are causes of deterioration in frequency accuracy and solderability.
Parts should be stored in temperature range of −5 to +40°C, humidity 40 to 60% RH, and avoid direct sunlight. Then use within 6 months.

Tape & Reel Specifications

■Crystal Units

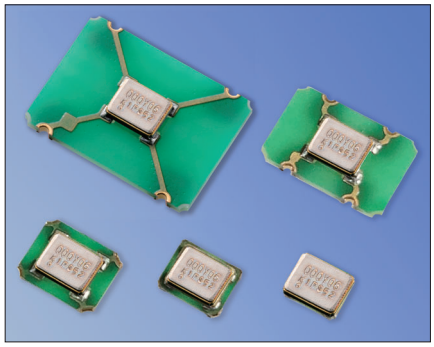
(Unit: mm)

		CT1612RB	CT2016DB	CX1008SB	CX1210DB CX1210SB	CX1612DB		CX2016DB CX2016SA		CX2520DB	
TAPE	A	2.0±0.05	2.0±0.05	2.0±0.05	2.0±0.05	2.0±0.05		2.0±0.05		2.0±0.05	
	B	4.0±0.1	4.0±0.1	4.0±0.1	4.0±0.1	4.0±0.1		4.0±0.1		4.0±0.1	
	C	ϕ1.5+0.1/−0	ϕ1.5+0.1/−0	ϕ1.5+0.1/−0	ϕ1.5+0.1/−0	ϕ1.5+0.1/−0		ϕ1.5+0.1/−0		ϕ1.5+0.1/−0	
	D	4.0±0.1	4.0±0.1	4.0±0.1	4.0±0.1	4.0±0.1		4.0±0.1		4.0±0.1	
	E	3.5±0.05	3.5±0.05	3.5±0.05	3.5±0.05	3.5±0.05		3.5±0.05		3.5±0.05	
	F	1.75±0.1	1.75±0.1	1.75±0.1	1.75±0.1	1.75±0.1		1.75±0.1		1.75±0.1	
	G	8.0±0.2	8.0±0.2	8.0±0.2	8.0±0.2	8.0±0.2		8.0±0.2		8.0±0.2	
	H	ϕ0.5+0.05	ϕ1.0+0.1/−0	ϕ0.5±0.1	ϕ0.5+0.05	ϕ0.5±0.05		ϕ1.05±0.05		ϕ1.05±0.05	
	J	1.90±0.1	2.3±0.05/ 2.2±0.05	1.20±0.05	1.55±0.05	1.80±0.1		2.30±0.1		2.7±0.1	
	L	1.50±0.1	1.9±0.05	1.00±0.05	1.35±0.05	1.40±0.1		1.90±0.1		2.2±0.1	
	N	0.75±0.05	1.1±0.05/ 0.75±0.05	0.45±0.05	0.45±0.05	0.5±0.1		0.7±0.05		0.6±0.1	
	O	0.2±0.05	0.25±0.05	0.2±0.05	0.25±0.05	0.2±0.05		0.2±0.05		0.2±0.05	
REEL	P	ϕ330±2	ϕ330±0.2	ϕ330±2	ϕ330±2	ϕ180+0/−3	ϕ330±2	ϕ180+0/−3	ϕ330±2	ϕ180+0/−3	ϕ330±2
	Q	ϕ100±1.0	ϕ100±1.0	ϕ100±1.0	ϕ100±1.0	ϕ60+1/−0	ϕ100±1.0	ϕ60+1/−0	ϕ100±1.0	ϕ60+1/−0	ϕ100±1.0
	R	ϕ13±0.2	ϕ13±0.2	ϕ13±0.2	ϕ13±0.2	ϕ13±0.2	ϕ13±0.2	ϕ13±0.2	ϕ13±0.2	ϕ13±0.2	ϕ13±0.2
	S	ϕ21±0.8	ϕ21±0.8	ϕ21±0.8	ϕ21±0.8	ϕ21±0.8	ϕ21±0.8	ϕ21±0.8	ϕ21±0.8	ϕ21±0.8	ϕ21±0.8
	U	2.0±0.5	2.0±0.5	2.0±0.5	2.0±0.5	2.0±0.5	2.0±0.5	2.0±0.5	2.0±0.5	2.0±0.5	2.0±0.5
	W	9.4±1.0	9.4±1.0	9.4±1.0	9.4±1.0	9.0±1.0	9.4±1.0	9.0±1.0	9.4±1.0	9.0±1.0	9.4±1.0
Qty.		15000	12000	21000	12000/21000	3000	20000	3000	15000	3000	12000



<Reel Dimensions>

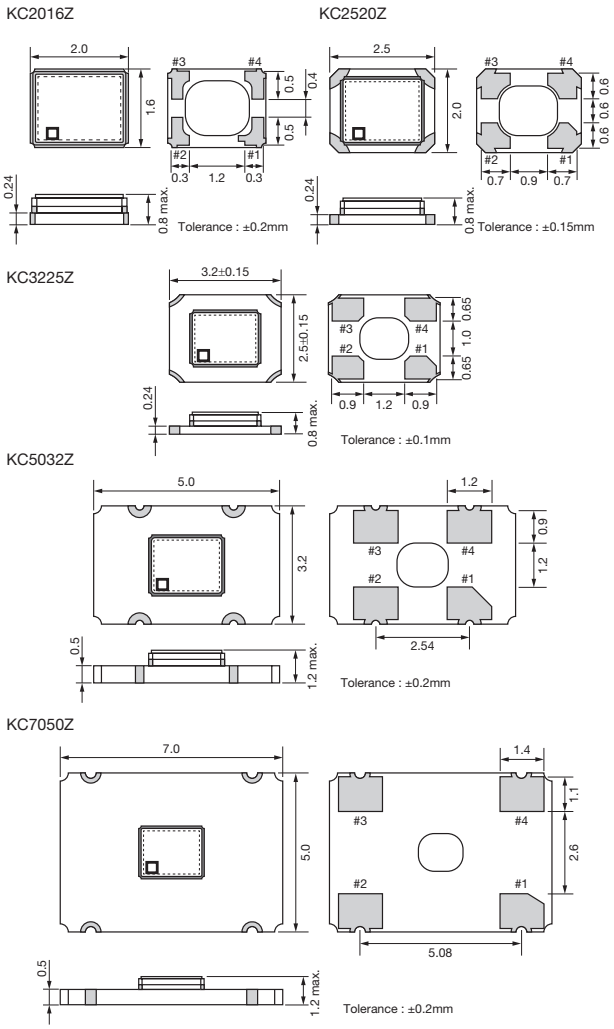
CMOS/ 1.8V, 2.5V, 3.3V/ 2.0×1.6, 2.5×2.0, 3.2×2.5, 5.0×3.2, 7.0×5.0mm



RoHS Compliant

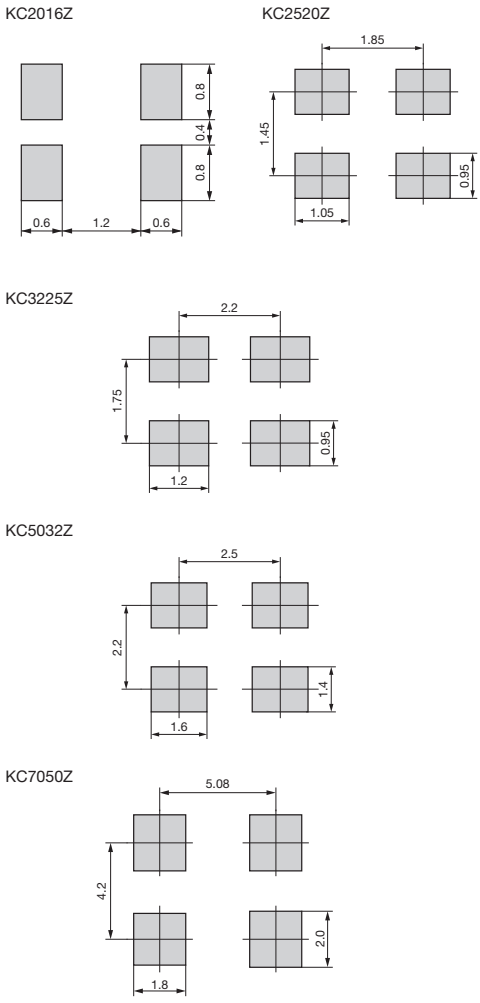
Dimensions

(Unit : mm)



Recommended Land Patterns

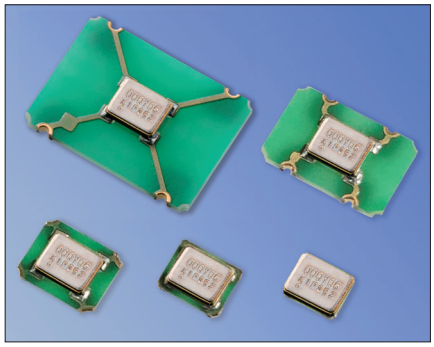
(Unit : mm)



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)

CMOS/ 1.8V, 2.5V, 3.3V / 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 0.5 to 170 MHz
- CMOS Output
- Short Lead Time
- Heat resistant up to +125°C

Applications

- Consumer/ Networking/ Industrial/ Amuse

Table 1

Freq. Tol. Code	Freq. Tol. × 10^{-6}	Operating Temperature Range (°C)	Note
S	± 30	−10 to +70	For additional stability, please contact us.
U	± 25		
W	± 20		
G	± 50	−40 to +85	
H	± 30		
J	± 25		
K	± 20		
L	± 15		
6	± 50	−40 to +105	
5	± 30		
X	± 100	−40 to +125	
Z	± 50		
9	± 30		

How to Order

KC□□□□Z 25.0000 C 1 □ X 00
① ② ③ ④ ⑤ ⑥ ⑦

①Series

KC2016Z	2016 Size	KC2520Z	2520 Size
KC3225Z	3225 Size	KC5032Z	5032 Size
KC7050Z	7050 Size		

②Output Frequency (25.0000 : 25MHz)
③Output Type (C : CMOS)
④Supply Voltage
(1 : 1.8V/ 2.5V/ 3.3V Compatible)
⑤Frequency Tolerance (See Table 1)
⑥Symmetry/ INH Function

X	STD 45/ 55%

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

Packaging Tape&Reel

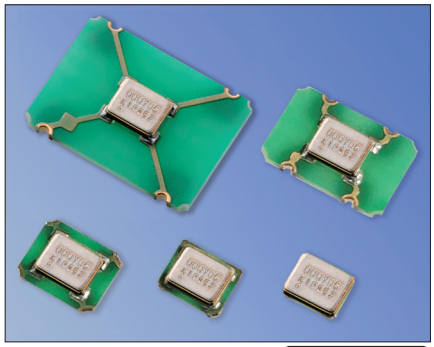
KC7050Z/ KC5032Z	1000 pcs./ reel
KC3225Z/ KC2520Z/ KC2016Z	2000 pcs./ reel

Specifications

Item	Symbol	Conditions		Min.	Max.	Unit
Output Frequency Range	fo			0.5	170	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		See Table 1.		
Storage Temperature Range	$T_{\_stg}$			−55	150	°C
Operating Temperature Range	$T_{\_use}$			See Table 1.		
Max. Supply Voltage	—			−0.3	4.5	V
Supply Voltage	Vcc			1.71	3.63	V
Current Consumption (Noload/ 1.71≤Vcc≤2.25)	Icc	0.5≤fo<5MHz		—	5.2	mA
		5≤fo<15MHz		—	5.8	
		15≤fo<30MHz		—	6.2	
		30≤fo<50MHz		—	6.8	
		50≤fo≤60MHz		—	6.8	
		60<fo<75MHz		—	9	
		75≤fo<105MHz		—	10	
		105≤fo<130MHz		—	10.5	
		130≤fo<160MHz		—	11.5	
		160≤fo≤170MHz		—	12.5	
Current Consumption (Noload/ 2.25<Vcc≤2.8)	Icc	0.5≤fo<5MHz		—	5.5	
		5≤fo<15MHz		—	6	
		15≤fo<30MHz		—	6.5	
		30≤fo<50MHz		—	7.2	
		50≤fo≤60MHz		—	7.4	
		60<fo<75MHz		—	10	
		75≤fo<105MHz		—	11.5	
		105≤fo<130MHz		—	12.5	
		130≤fo<160MHz		—	14	
		160≤fo≤170MHz		—	15	
Current Consumption (Noload/ 2.8<Vcc≤3.63)	Icc	0.5≤fo<5MHz		—	5.8	
		5≤fo<15MHz		—	6.5	
		15≤fo<30MHz		—	7.3	
		30≤fo<50MHz		—	8	
		50≤fo≤60MHz		—	8.5	
		60<fo<75MHz		—	12.5	
		75≤fo<105MHz		—	14.5	
		105≤fo<130MHz		—	15.5	
		130≤fo<160MHz		—	18	
		160≤fo≤170MHz		—	19.5	
Stand-by Current	$I_{\_std}$			—	5	μA
Symmetry	SYM	@50% Vcc		45	55	%
Rise/ Fall Time (20% to 80% Output Level)	Tr/ Tf	0.5≤fo≤60MHz	Loaded/ 1.71≤Vcc≤2.25	—	4	ns
			Loaded/ 2.25<Vcc≤2.8	—	3	
			Loaded/ 2.8<Vcc≤3.63	—	2.5	
		60<fo≤170MHz	Loaded/ 1.71≤Vcc≤2.25	—	1.5	
			Loaded/ 2.25<Vcc≤2.8	—	1.3	
			Loaded/ 2.8<Vcc≤3.63	—	1	
Low Level Output Voltage	VOL	IOL = 4mA		—	10% Vcc	V
High Level Output Voltage	VOH	IOH = −4mA		90% Vcc	—	V
Output Load (CMOS)	L_CMOS			—	15	pF
Low Level Input Voltage	VIL			—	30% Vcc	V
High Level Input Voltage	VIH			70% Vcc	—	V
Disable Time	$t_{\_dis}$			—	200	ns
Enable Time	$t_{\_ena}$			—	5	ms
Start-up Time	$t_{\_str}$	@Minimum operating voltage to be 0 sec.		—	5	ms

All electrical characteristics are defined at the maximum load and operating temperature range.

CMOS/ 1.8V, 2.5V, 3.3V / 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 24 to 72 MHz
- CMOS Output
- Low Jitter
- Heat resistant up to +125°C

Applications

- Consumer/ Networking/ Industrial/ Amuse

Table 3

Freq. Tol. Code	Freq. Tol. × 10^{-6}	Operating Temperature Range (°C)	Note
S	± 30	−10 to +70	For additional stabillity, please contact us.
U	± 25		
W	± 20		
G	± 50	−40 to +85	
H	± 30		
J	± 25		
K	± 20		
L	± 15		
6	± 50	−40 to +105	
5	± 30		
X	± 100	−40 to +125	
Z	± 50		
9	± 30		

How to Order

KC□□□□Z 25.0000 C 1 □ Y 00
① ② ③ ④ ⑤ ⑥ ⑦

①Series

KC2016Z	2016 Size	KC2520Z	2520 Size
KC3225Z	3225 Size	KC5032Z	5032 Size
KC7050Z	7050 Size		

②Output Frequency (25.0000 : 25MHz)
③Output Type (C : CMOS)
④Supply Voltage
(1 : 1.8V/ 2.5V/ 3.3V Compatible)
⑤Frequency Tolerance (See Table 3)
⑥Symmetry/ INH Function

Y	STD/ Low Jitter 45/ 55%

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

Packaging Tape&Reel

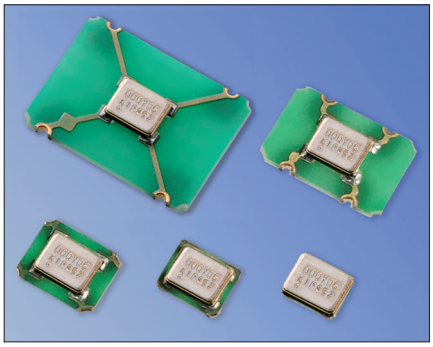
KC7050Z/ KC5032Z	1000 pcs./ reel
KC3225Z/ KC2520Z/ KC2016Z	2000 pcs./ reel

Specifications

Item	Symbol	Conditions		Min.	Max.	Unit
Output Frequency Range	fo			24	72	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		See Table 3		
Storage Temperature Range	T_{stg}			−55	150	°C
Operating Temperature Range	T_{use}			See Table 3		
Max. Supply Voltage	—			−0.3	4.5	V
Supply Voltage	V_{CC}			1.71	3.63	V
Current Consumption (Noload/ 1.71≤V_{CC}≤2.25)	I_{CC}	24≤fo<30MHz		—	2.7	mA
		30≤fo<50MHz		—	3.3	
		50≤fo≤60MHz		—	3.7	
		60<fo<72MHz		—	4	
Current Consumption (Noload/ 2.25<V_{CC}≤2.8)	I_{CC}	24≤fo<30MHz		—	3.5	
		30≤fo<50MHz		—	4	
		50≤fo≤60MHz		—	4.3	
		60<fo<72MHz		—	4.8	
Current Consumption (Noload/ 2.8<V_{CC}≤3.63)	I_{CC}	24≤fo<30MHz		—	4	
		30≤fo<50MHz		—	5	
		50≤fo≤60MHz		—	5.5	
		60<fo<72MHz		—	6	
Stand-by Current	I_{std}			—	5	μA
Symmetry	SYM	@50% V_{CC}	24≤fo≤40MHz	40	55	%
			40<fo≤72MHz	45	55	
Rise/ Fall Time (20% to 80% Output Level)	Tr/ Tf	Loaded/ 1.71≤V_{CC}≤2.25		—	4	ns
		Loaded/ 2.25<V_{CC}≤2.8		—	3.2	
		Loaded/ 2.8<V_{CC}≤3.63		—	2.7	
Low Level Output Voltage	V_{OL}	I_{OL} = 4mA		—	10% V_{CC}	V
High Level Output Voltage	V_{OH}	I_{OH} = −4mA		90% V_{CC}	—	V
Output Load (CMOS)	L_CMOS			—	15	pF
Low Level Input Voltage	V_{IL}			—	30% V_{CC}	V
High Level Input Voltage	V_{IH}			70% V_{CC}	—	V
Disable Time	t_{dis}			—	200	ns
Enable Time	t_{ena}			—	5	ms
Start-up Time	t_{str}	@Minimum operating voltage to be 0 sec.		—	5	ms
1 Sigma Jitter	J_{Sigma}	Measured with Wavecrest SIA-3000		—	5	ps
Peak to Peak Jitter	J_{PK_PK}			—	50	
Phase Jitter	—	@50MHz V_{CC} = 3.3V	BW : 12kHz to 20MHz	1		ps

All electrical characteristics are defined at the maximum load and operating temperature range.

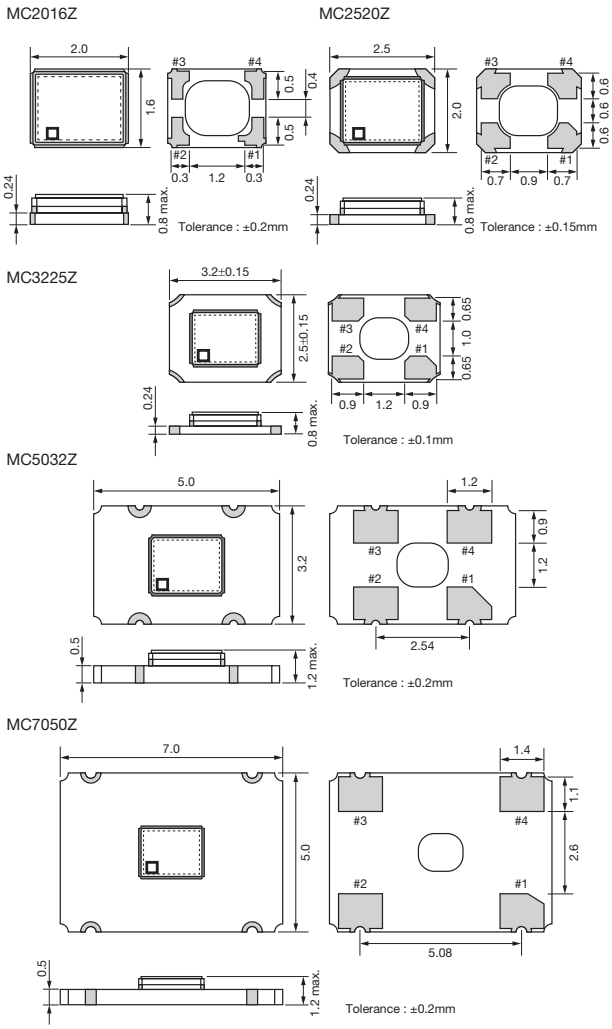
CMOS/ 1.8V, 2.5V, 3.3V / 2.0×1.6, 2.5×2.0, 3.2×2.5, 5.0×3.2, 7.0×5.0mm for Automotive



AEC-Q100/ 200 RoHS Compliant

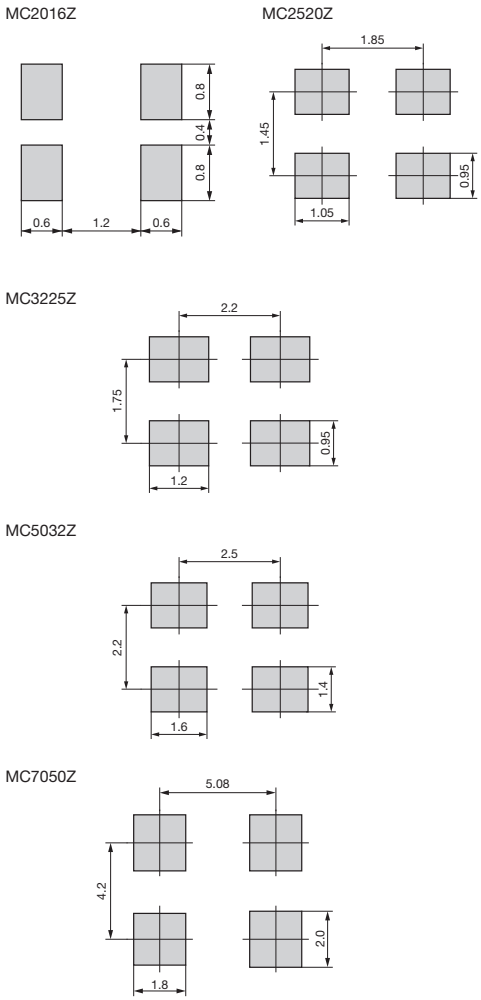
Dimensions

(Unit : mm)



Recommended Land Pattern

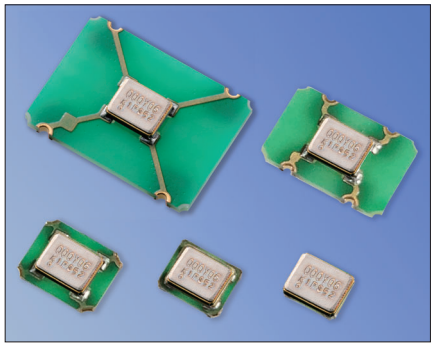
(Unit : mm)



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)

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



AEC-Q100/ 200 RoHS Compliant

Features

- Frequency Range 0.5 to 170 MHz
- CMOS Output
- Short Lead Time
- Heat resistant up to +125°C

Applications

- Automotive

Table 5

Freq. Tol. Code	Freq. Tol. × 10^{-6}	Operating Temperature Range (°C)	Note
G	± 50	−40 to +85	For additional stabillity, please contact us.
H	± 30		
J	± 25		
K	± 20		
6	± 50	−40 to +105	
5	± 30		
X	± 100	−40 to +125	
Z	± 50		
9	± 30		

How to Order

MC□□□□Z 25.0000 C 1 □ X SH
① ② ③ ④ ⑤ ⑥ ⑦

①Series

MC2016Z	2016 Size	MC2520Z	2520 Size
MC3225Z	3225 Size	MC5032Z	5032 Size
MC7050Z	7050 Size		

②Output Frequency (25.0000 : 25MHz)
③Output Type (C : CMOS)
④Supply Voltage
(1 : 1.8V/ 2.5V/ 3.3V Compatible)
⑤Frequency Tolerance (See Table 5)
⑥Symmetry/ INH Function

X	STD 45/ 55%

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

Packaging Tape&Reel

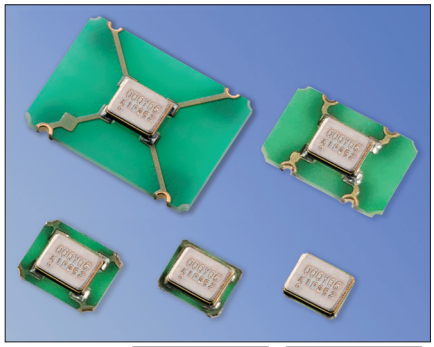
MC7050Z/ MC5032Z	1000 pcs./ reel
MC3225Z/ MC2520Z/ MC2016Z	2000 pcs./ reel

Specifications

Item	Symbol	Conditions		Min.	Max.	Unit
Output Frequency Range	fo			0.5	170	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		See Table 5		
Storage Temperature Range	T_{stg}			−55	150	°C
Operating Temperature Range	T_{use}			See Table 5		
Max. Supply Voltage	—			−0.3	4.5	V
Supply Voltage	Vcc			1.71	3.63	V
Current Consumption (Noload/ 1.71≤Vcc≤2.25)	Icc	0.5≤fo<5MHz		—	5.2	mA
		5≤fo<15MHz		—	5.8	
		15≤fo<30MHz		—	6.2	
		30≤fo<50MHz		—	6.8	
		50≤fo≤60MHz		—	6.8	
		60<fo<75MHz		—	9	
		75≤fo<105MHz		—	10	
		105≤fo<130MHz		—	10.5	
		130≤fo<160MHz		—	11.5	
		160≤fo≤170MHz		—	12.5	
Current Consumption (Noload/ 2.25<Vcc≤2.8)	Icc	0.5≤fo<5MHz		—	5.5	
		5≤fo<15MHz		—	6	
		15≤fo<30MHz		—	6.5	
		30≤fo<50MHz		—	7.2	
		50≤fo≤60MHz		—	7.4	
		60<fo<75MHz		—	10	
		75≤fo<105MHz		—	11.5	
		105≤fo<130MHz		—	12.5	
		130≤fo<160MHz		—	14	
		160≤fo≤170MHz		—	15	
Current Consumption (Noload/ 2.8<Vcc≤3.63)	Icc	0.5≤fo<5MHz		—	5.8	
		5≤fo<15MHz		—	6.5	
		15≤fo<30MHz		—	7.3	
		30≤fo<50MHz		—	8	
		50≤fo≤60MHz		—	8.5	
		60<fo<75MHz		—	12.5	
		75≤fo<105MHz		—	14.5	
		105≤fo<130MHz		—	15.5	
		130≤fo<160MHz		—	18	
		160≤fo≤170MHz		—	19.5	
Stand-by Current	I_{std}			—	5	μA
Symmetry	SYM	@50% Vcc		45	55	%
Rise/ Fall Time (20% to 80% Output Level)	Tr/ Tf	0.5≤fo≤60MHz	Loaded/ 1.71≤Vcc≤2.25	—	4	ns
			Loaded/ 2.25<Vcc≤2.8	—	3	
			Loaded/ 2.8<Vcc≤3.63	—	2.5	
		60<fo≤170MHz	Loaded/ 1.71≤Vcc≤2.25	—	1.5	
			Loaded/ 2.25<Vcc≤2.8	—	1.3	
			Loaded/ 2.8<Vcc≤3.63	—	1	
Low Level Output Voltage	Vol	Iol = 4mA		—	10% Vcc	V
High Level Output Voltage	Voh	Ioh = −4mA		90% Vcc	—	V
Output Load (CMOS)	L_CMOS			—	15	pF
Low Level Input Voltage	Vil			—	30% Vcc	V
High Level Input Voltage	Vih			70% Vcc	—	V
Disable Time	t_{dis}			—	200	ns
Enable Time	t_{ena}			—	5	ms
Start-up Time	t_{str}	@Minimum operating voltage to be 0 sec.		—	5	ms

All electrical characteristics are defined at the maximum load and operating temperature range.

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



AEC-Q100/ 200 RoHS Compliant

Features

- Frequency Range 24 to 72 MHz
- CMOS Output
- Low Jitter
- Heat resistant up to +125°C

Applications

- Automotive (Radar, Camera, Network)

Table 7

Freq. Tol. Code	Freq. Tol. × 10^{-6}	Operating Temperature Range (°C)	Note
G	± 50	−40 to +85	For additional stability, please contact us.
H	± 30		
J	± 25		
K	± 20		
6	± 50	−40 to +105	
5	± 30		
X	± 100	−40 to +125	
Z	± 50		
9	± 30		

How to Order

MC□□□□Z 25.0000 C 1 □ Y SH
① ② ③ ④ ⑤ ⑥ ⑦

①Series

MC2016Z	2016 Size	MC2520Z	2520 Size
MC3225Z	3225 Size	MC5032Z	5032 Size
MC7050Z	7050 Size		

②Output Frequency (25.0000 : 25MHz)
③Output Type (C : CMOS)
④Supply Voltage
(1 : 1.8V/ 2.5V/ 3.3V Compatible)
⑤Frequency Tolerance (See Table 7)
⑥Symmetry/ INH Function

Y	STD/ Low Jitter 45/ 55%

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

Packaging Tape&Reel

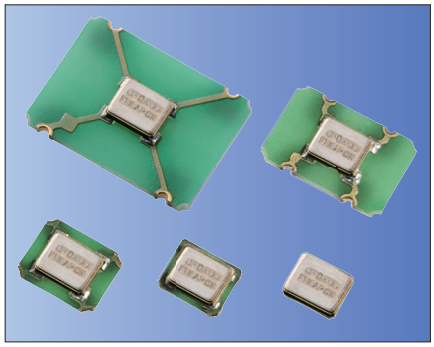
MC7050Z/ MC5032Z	1000 pcs./ reel
MC3225Z/ MC2520Z/ MC2016Z	2000 pcs./ reel

Specifications

Item	Symbol	Conditions		Min.	Max.	Unit
Output Frequency Range	fo			24	72	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		See Table 7		
Storage Temperature Range	$T_{\_stg}$			−55	150	°C
Operating Temperature Range	$T_{\_use}$			See Table 7		
Max. Supply Voltage	—			−0.3	4.5	V
Supply Voltage	V_{CC}			1.71	3.63	V
Current Consumption (Noload/ 1.71≤V_{CC}≤2.25)	I_{CC}	24≤fo<30MHz		—	2.7	mA
		30≤fo<50MHz		—	3.3	
		50≤fo≤60MHz		—	3.7	
		60<fo<72MHz		—	4	
Current Consumption (Noload/ 2.25<V_{CC}≤2.8)	I_{CC}	24≤fo<30MHz		—	3.5	
		30≤fo<50MHz		—	4	
		50≤fo≤60MHz		—	4.3	
		60<fo<72MHz		—	4.8	
Current Consumption (Noload/ 2.8<V_{CC}≤3.63)	I_{CC}	24≤fo<30MHz		—	4	
		30≤fo<50MHz		—	5	
		50≤fo≤60MHz		—	5.5	
		60<fo<72MHz		—	6	
Stand-by Current	$I_{\_std}$			—	5	µA
Symmetry	SYM	@50% V_{CC}	24≤fo≤40MHz	40	55	%
			40<fo≤72MHz	45	55	
Rise/ Fall Time (20% to 80% Output Level)	Tr/ Tf	Loaded/ 1.71≤V_{CC}≤2.25		—	4	ns
		Loaded/ 2.25<V_{CC}≤2.8		—	3.2	
		Loaded/ 2.8<V_{CC}≤3.63		—	2.7	
Low Level Output Voltage	V_{OL}	I_{OL} = 4mA		—	10% V_{CC}	V
High Level Output Voltage	V_{OH}	I_{OH} = −4mA		90% V_{CC}	—	V
Output Load (CMOS)	L_CMOS			—	15	pF
Low Level Input Voltage	V_{IL}			—	30% V_{CC}	V
High Level Input Voltage	V_{IH}			70% V_{CC}	—	V
Disable Time	$t_{\_dis}$			—	200	ns
Enable Time	$t_{\_ena}$			—	5	ms
Start-up Time	$t_{\_str}$	@Minimum operating voltage to be 0 sec.		—	5	ms
1 Sigma Jitter	J_{Sigma}	Measured with Wavecrest SIA-3000		—	5	ps
Peak to Peak Jitter	J_{PK_PK}			—	50	
Phase Jitter	—	@50MHz V_{CC} = 3.3V	BW : 12kHz to 20MHz	1		ps

All electrical characteristics are defined at the maximum load and operating temperature range.

CMOS/ 1.8V, 2.5V, 3.3V / 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
- Low current consumption
- Low Phase Noise

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 □ □ E 00
① ② ③ ④ ⑤ ⑥ ⑦

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

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

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

E	45/ 55%

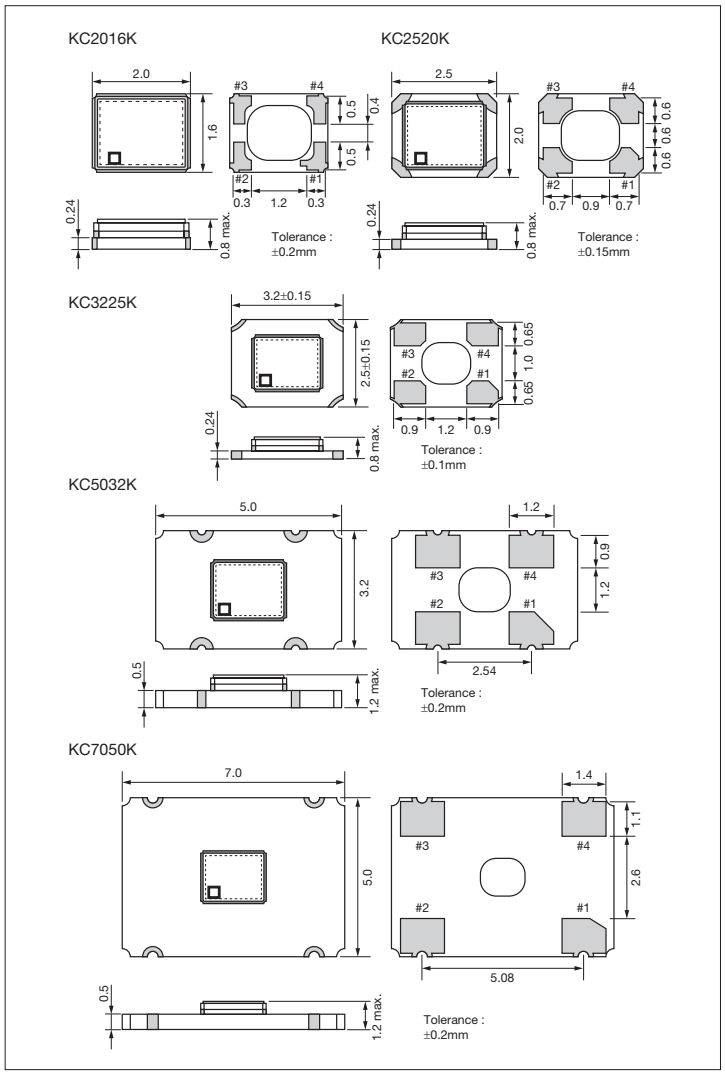
⑦Individual Specification
(STD Specification is "00".)

Packaging Tape & Reel

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

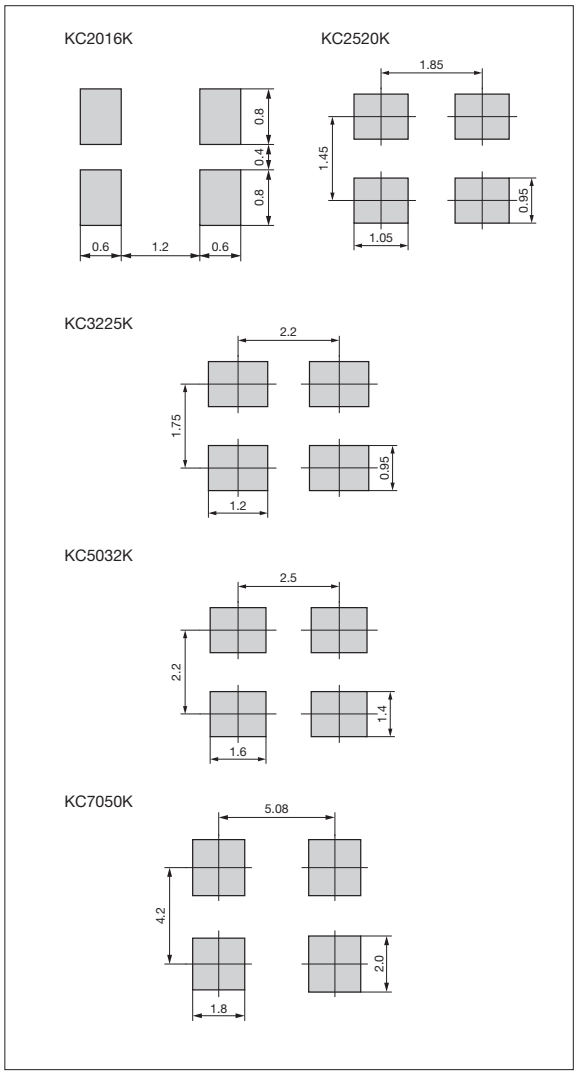
Dimensions

(Unit: mm)



Recommended Land Pattern

(Unit: mm)



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

Specifications

Item	Symbol	Conditions		Min.	Max.	Unit
Output Frequency Range[Note1]	fo			1.5	160	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	×10⁻⁶
			Temp.: −10 to +70°C	−30	+30	
			Temp.: −10 to +70°C	−25	+25	
Storage Temperature Range	T_stg			−55	+125	°C
Operating Temperature Range	T_use			−10	+70	°C
				−40	+85	
				−40	+105	
Max. Supply Voltage	—			−0.3	+4.0	V
Supply Voltage	Vcc	Code④ : 1 : 1.5≤F0≤125MHz		+1.60	+3.63	V
		Code④ : 2 : 125<F0≤160MHz		+2.25	+3.63	
Current Consumption (Maximum Loaded)	Icc	1.5≤F0≤24MHz	1.6≤Vcc≤2.25V	—	2.5	mA
			2.25<Vcc≤2.8V	—	3.0	
			2.8<Vcc≤3.63V	—	3.5	
		24<F0≤40MHz	1.6≤Vcc≤2.25V	—	3.5	
			2.25<Vcc≤2.8V	—	4.5	
			2.8<Vcc≤3.63V	—	5.0	
		40<F0≤62.5MHz	1.6≤Vcc≤2.25V	—	5.0	
			2.25<Vcc≤2.8V	—	5.5	
			2.8<Vcc≤3.63V	—	6.0	
		62.5<F0≤80MHz	1.6≤Vcc≤2.25V	—	6.0	
			2.25<Vcc≤2.8V	—	6.5	
			2.8<Vcc≤3.63V	—	8.0	
		80<F0≤125MHz	1.6≤Vcc≤2.25V	—	11.0	
			2.25<Vcc≤2.8V	—	14.0	
			2.8<Vcc≤3.63V	—	17.0	
		125<F0≤160MHz	2.25<Vcc≤2.8V	—	25.0	
			2.8<Vcc≤3.63V	—	27.0	
Stand-by Current	I_std	1.5≤Fo≤80MHz		—	5.0	μA
		80<Fo≤160MHz		—	10.0	
Symmetry	SYM	@50% Vcc		45	55	%
Rise/ Fall Time (10% to 90% Output Level)	Tr/ Tf	1.5≤F0≤80MHz	1.6≤Vcc≤2.25V	—	6.0	ns
			2.25<Vcc≤2.8V	—	5.0	
			2.8<Vcc≤3.63V	—	4.5	
		80<F0≤125MHz	1.6<Vcc≤3.63V	—	4.0	
		125<F0≤160MHz	2.25<Vcc≤3.63V	—	2.5	
Low Level Output Voltage	VOL	IOL= 4mA (F0≤80MHz), IOL= 8mA (F0>80MHz)		—	10% Vcc	V
High Level Output Voltage	VOH	IOH= −4mA (F0≤80MHz), IOH= −8mA (F0>80MHz)		90% Vcc	—	V
Output Load	L_CMOS			15		pF
Low Level Input Voltage	VIL			—	30% Vcc	V
High Level Input Voltage	VIH			70% Vcc	—	V
Disable Time	t_dis	1.5≤F0≤80MHz		—	200	ns
		80<F0≤125MHz		—	100	
		125<F0≤160MHz		—	100	
Enable Time	t_ena			—	5	ms
Start-up Time	t_str	1.5≤F0≤80MHz	@Minimum operating voltage to be 0 sec.	—	5	ms
		80<F0≤125MHz		—	10	
		125<F0≤160MHz		—	10	
1 Sigma Jitter	Jsigma	1.5≤F0≤80MHz	Measured with Wavecrest SIA-3000	—	5	ps
		80<F0≤125MHz		—	4	
		125<F0≤160MHz		—	3	
Peak to Peak Jitter	JPK-PK	1.5≤F0≤80MHz		—	50	ps
		80<F0≤125MHz		—	40	
		125<F0≤160MHz		—	25	
Phase Jitter	JPhase	@25MHz	BW : 12kHz to 20MHz	—	1.0	ps

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

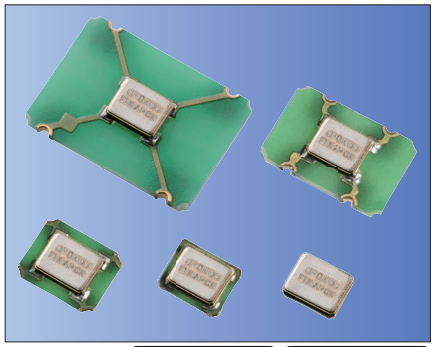
Item	Symbol	Conditions		Min.	Max.	Unit
Phase Noise	—	@25MHz	@10Hz offset	Typ. −89		dBc/ Hz
			@100Hz offset	Typ. −119		
			@1kHz offset	Typ. −143		
			@10kHz offset	Typ. −157		
			@100kHz offset	Typ. −160		
			@1MHz offset	Typ. −162		
			@10MHz offset	Typ. −162		

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)

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



AEC-Q100/ 200 RoHS Compliant

Features

- Frequency Range 1.5 to 160MHz
- CMOS output
- Wide Supply Voltage
  - 1.6 to 3.63V
- Low current consumption
- Low Phase Noise

Applications

- Automotive Radar/ Camera/ Navigation/ Sensor/ Mirror/ Head light

Table 1

Freq. Tol. Code	Freq. Tol. × 10^{-6}	Operating Temperature Range (°C)	Note
G	± 50	−40 to +85	Standard specifications
6	± 50	−40 to +105	
X	± 100	−40 to +125	

How to Order

MC2520K 25.0000 C □ □ E SH
① ② ③ ④ ⑤ ⑥ ⑦

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

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

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

E	45/ 55%

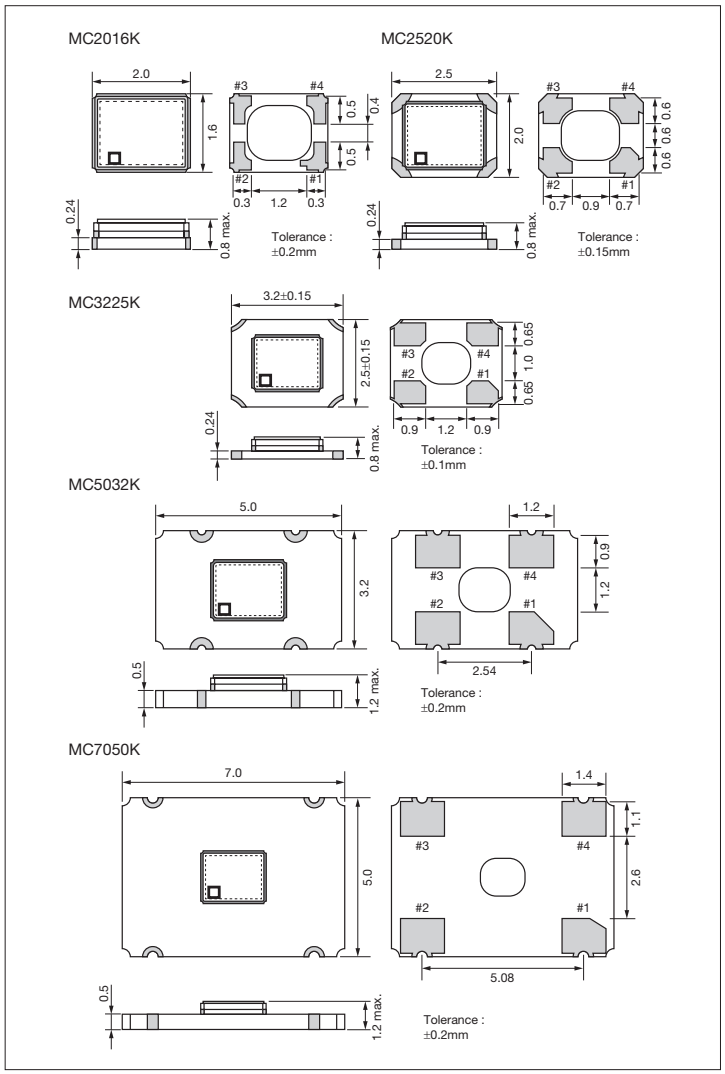
⑦Individual Specification
(STD Specification is "SH".)

Packaging Tape & Reel

MC7050K/ MC5032K	1000 pcs./ reel
MC3225K/ MC2520K/ MC2016K	2000 pcs./ reel

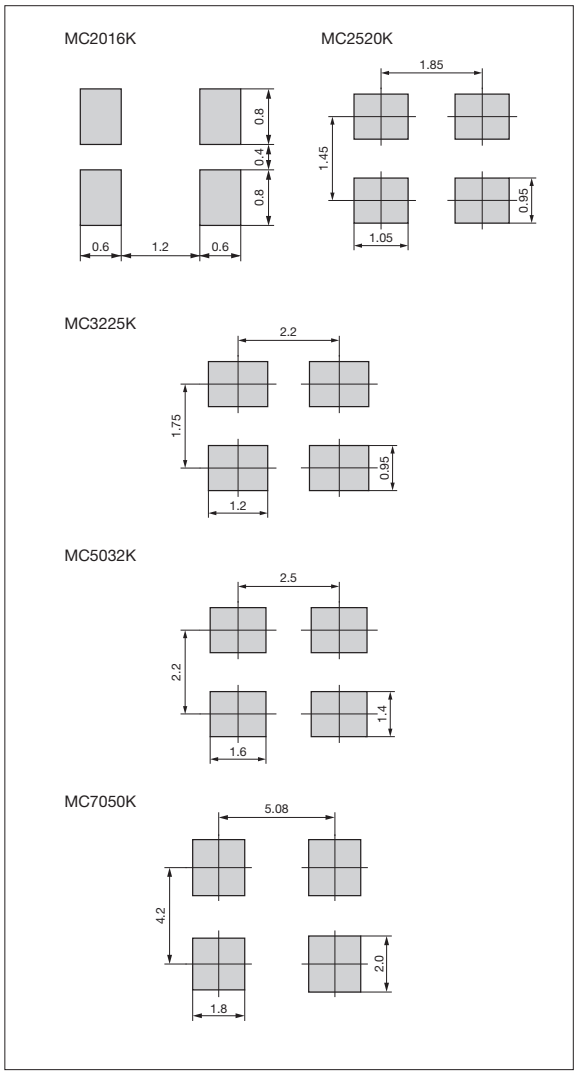
Dimensions

(Unit: mm)



Recommended Land Pattern

(Unit: mm)



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

Specifications

Item	Symbol	Conditions		Min.	Max.	Unit
Output Frequency Range[Note1]	fo			1.5	160	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.: −40 to +85°C/ −40 to +105°C	−50	+50	×10⁻⁶
			Temp.: −40 to +125°C	−100	+100	
Storage Temperature Range	T_stg			−55	+125	°C
Operating Temperature Range	T_use			−40	+85	°C
				−40	+105	
				−40	+125	
Max. Supply Voltage	—			−0.3	+4.0	V
Supply Voltage	Vcc	Code④ : 1 : 1.5≤F0≤125MHz		+1.60	+3.63	V
		Code④ : 2 : 125<F0≤160MHz		+2.25	+3.63	
Current Consumption (Maximum Loaded)	Icc	1.5≤F0≤24MHz	1.6≤Vcc≤2.25V	—	2.5	mA
			2.25<Vcc≤2.8V	—	3.0	
			2.8<Vcc≤3.63V	—	3.5	
		24<F0≤40MHz	1.6≤Vcc≤2.25V	—	3.5	
			2.25<Vcc≤2.8V	—	4.5	
			2.8<Vcc≤3.63V	—	5.0	
		40<F0≤62.5MHz	1.6≤Vcc≤2.25V	—	5.0	
			2.25<Vcc≤2.8V	—	5.5	
			2.8<Vcc≤3.63V	—	6.0	
		62.5<F0≤80MHz	1.6≤Vcc≤2.25V	—	6.0	
			2.25<Vcc≤2.8V	—	6.5	
			2.8<Vcc≤3.63V	—	8.0	
		80<F0≤125MHz	1.6≤Vcc≤2.25V	—	11.0	
			2.25<Vcc≤2.8V	—	14.0	
			2.8<Vcc≤3.63V	—	17.0	
		125<F0≤160MHz	2.25<Vcc≤2.8V	—	25.0	
			2.8<Vcc≤3.63V	—	27.0	
Stand-by Current	I_std	1.5≤Fo≤80MHz		—	5.0	μA
		80<Fo≤160MHz		—	10.0	
Symmetry	SYM	@50% Vcc		45	55	%
Rise/ Fall Time (10% to 90% Output Level)	Tr/ Tf	1.5≤F0≤80MHz	1.6≤Vcc≤2.25V	—	6.0	ns
			2.25<Vcc≤2.8V	—	5.0	
			2.8<Vcc≤3.63V	—	4.5	
		80<F0≤125MHz	1.6<Vcc≤3.63V	—	4.0	
		125<F0≤160MHz	2.25<Vcc≤3.63V	—	2.5	
Low Level Output Voltage	VOL	IOL= 4mA (F0≤80MHz), IOL= 8mA (F0>80MHz)		—	10% Vcc	V
High Level Output Voltage	VOH	IOH= −4mA (F0≤80MHz), IOH= −8mA (F0>80MHz)		90% Vcc	—	V
Output Load	L_CMOS			15		pF
Low Level Input Voltage	VIL			—	30% Vcc	V
High Level Input Voltage	VIH			70% Vcc	—	V
Disable Time	t_dis	1.5≤F0≤80MHz		—	200	ns
		80<F0≤125MHz		—	100	
		125<F0≤160MHz		—	100	
Enable Time	t_ena			—	5	ms
Start-up Time	t_str	1.5≤F0≤80MHz	@Minimum operating voltage to be 0 sec.	—	5	ms
		80<F0≤125MHz		—	10	
		125<F0≤160MHz		—	10	
1Sigma Jitter	JSigma	1.5≤F0≤80MHz	Measured with Wavecrest SIA-3000	—	5	ps
		80<F0≤125MHz		—	4	
		125<F0≤160MHz		—	3	
Peak to Peak Jitter	JPK-PK	1.5≤F0≤80MHz		—	50	ps
		80<F0≤125MHz		—	40	
		125<F0≤160MHz		—	25	
Phase Jitter	JPhase	@25MHz	BW : 12kHz to 20MHz	—	1.0	ps

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

Item	Symbol	Conditions		Min.	Max.	Unit
Phase Noise	—	@25MHz	@10Hz offset	Typ. −89		dBc/ Hz
			@100Hz offset	Typ. −119		
			@1kHz offset	Typ. −143		
			@10kHz offset	Typ. −157		
			@100kHz offset	Typ. −160		
			@1MHz offset	Typ. −162		
			@10MHz offset	Typ. −162		

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)

KYOCERA

LV-PECL/ 3.3V or 2.5V/ 5.0×3.2mm

RoHS Compliant

Features

- Miniature ceramic package
- Highly reliable with seam welding
- LV-PECL output
- Supply voltage Vcc=3.3V, 2.5V
- ±25×10^{-6} available
- Low Phase Noise

Table 1

Freq. Tol. Code	Freq. Tol. × 10^{-6}	Operating Temperature Range (°C)	Note
0	± 50	0 to +70	Standard specifications
S	± 30		Please contact us for available frequencies.
U	± 25		
F	±100	−40 to +85	
G	± 50		
6	± 50	−40 to +105	

How to Order

KC5032P 125.000 P □ □ J 00
① ② ③ ④ ⑤ ⑥ ⑦

①Series
②Output Frequency
③Output Type (LV-PECL)
④Supply Voltage (3 : 3.3V or 2 : 2.5V)
⑤Frequency Tolerance (See Table 1)
⑥Symmetry/ INH Function
J : 45/ 55%
⑦Individual Specification
(STD Specification is "00".)

Packaging (Tape & Reel 1000 pcs./ reel)

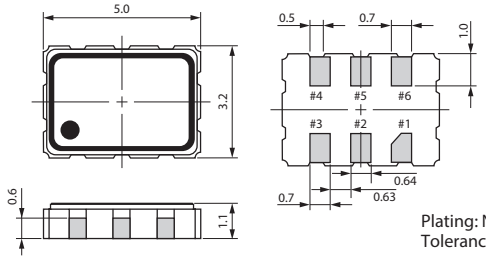
Specifications

Item	Symbol	Conditions		Specifications KC5032P-P2	Specifications KC5032P-P3	Unit
Output Frequency Range[Note1]	fo			25 to 175		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		±50/ −40 to +105°C		×10^{-6}
				±100/ −40 to +85°C		
				±50/ −40 to +85°C		
				±50/ 0 to +70°C		
				±30/ 0 to +70°C		
				±25/ 0 to +70°C		
Storage Temperature Range	T_stg			−55 to +125		°C
Operating Temperature Range	T_use	Standard Specifications		0 to +70/ −40 to +85		°C
		Extend (Option)		−40 to +105		
Max. Supply Voltage	—			−0.3 to +4.0		V
Supply Voltage	Vcc			+2.375 to +2.625	+2.97 to +3.63	V
Current Consumption	Icc			70 max.		mA
Stand-by Current	I_std			30 max.		μA
Symmetry	SYM	50ohm @crossing point		50±5		%
Rise/ Fall Time (20% Vcc to 80% Vcc Maximum Loaded)	Tr/ Tf	50ohm		0.6 max.		ns
Low Level Output Voltage[Note2]	VOL			Vcc−1.810 to Vcc−1.620		V
High Level Output Voltage[Note2]	VOH			Vcc−1.025 to Vcc−0.880		V
Output Load	RL			50		ohm
Input Voltage Range	VIN			0 to Vcc		
Low Level Input Voltage	VIL			30% Vcc max.		V
High Level Input Voltage	VIH			70% Vcc min.		V
Disable Time	t_dis			200 max.		ns
Enable Time	t_ena			10 max.		ms
Start-up Time	t_str	@Minimum operating voltage to be 0 sec.		10 max.		ms
Deterministic Jitter	DJ	Measured with Wavecrest SIA-3000		2 max.		ps
1 Sigma Jitter	Jsigma			4 max.		ps
Peak to Peak Jitter	JPK-PK			30 max.		ps
Phase Jitter	JPhase	@156.25MHz Vcc=3.3V	BW : 12kHz to 20MHz	0.3 max.		ps

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.
Note2: DC characteristic

Dimensions

(Unit: mm)



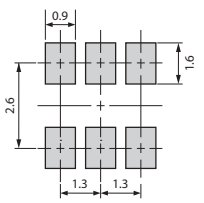
Plating: Ni+Au
Tolerance: ±0.2

Pad Connections	
#1	INH
#2	NC
#3	Case GND
#4	Output
#5	Complementary Output
#6	Vcc

INH Function	
Pad1	Pad4/ Pad5 (Output)
Open	Active
"H" Level	Active
"L" Level	High Z (No-Oscillation)

Recommended Land Pattern

(Unit: mm)



Note: 0.01μF and 10μF capacitor between Vcc and GND is recommended for bypass purpose.

KYOCERA

LV-PECL/ 3.3V or 2.5V/ 7.0×5.0mm

RoHS Compliant

Features

- Miniature ceramic package
- Highly reliable with seam welding
- LV-PECL output
- Supply voltage Vcc=3.3V, 2.5V
- ±25×10^{-6} available
- Low Phase Noise

Table 1

Freq. Tol. Code	Freq. Tol. × 10^{-6}	Operating Temperature Range (°C)	Note
0	± 50	0 to +70	Standard specifications
S	± 30		Please contact us for available frequencies.
U	± 25		
F	±100	−40 to +85	
G	± 50		
6	± 50	−40 to +105	

How to Order

KC7050P 125.000 P □ □ J 00
① ② ③ ④ ⑤ ⑥ ⑦

①Series
②Output Frequency
③Output Type (LV-PECL)
④Supply Voltage (3 : 3.3V or 2 : 2.5V)
⑤Frequency Tolerance (See Table 1)
⑥Symmetry/ INH Function
J : 45/ 55%
⑦Individual Specification
(STD Specification is "00".)

Packaging (Tape & Reel 1000 pcs./ reel)

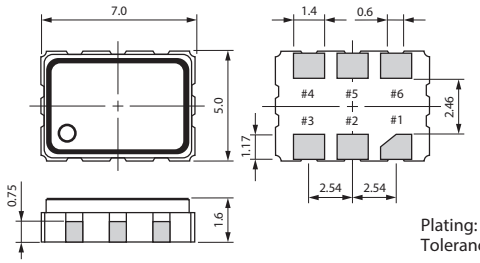
Specifications

Item	Symbol	Conditions		Specifications KC7050P-P2	Specifications KC7050P-P3	Unit
Output Frequency Range[Note1]	fo			25 to 175		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		±50/ −40 to +105°C		×10^{-6}
				±100/ −40 to +85°C		
				±50/ −40 to +85°C		
				±50/ 0 to +70°C		
				±30/ 0 to +70°C		
				±25/ 0 to +70°C		
Storage Temperature Range	T_stg			−55 to +125		°C
Operating Temperature Range	T_use	Standard Specifications		0 to +70/ −40 to +85		°C
		Extend (Option)		−40 to +105		
Max. Supply Voltage	—			−0.3 to +4.0		V
Supply Voltage	Vcc			+2.375 to +2.625	+2.97 to +3.63	V
Current Consumption	Icc			70 max.		mA
Stand-by Current	I_std			30 max.		μA
Symmetry	SYM	50ohm @crossing point		50±5		%
Rise/ Fall Time (20% Vcc to 80% Vcc Maximum Loaded)	Tr/ Tf	50ohm		0.6 max.		ns
Low Level Output Voltage[Note2]	VOL			Vcc−1.810 to Vcc−1.620		V
High Level Output Voltage[Note2]	VOH			Vcc−1.025 to Vcc−0.880		V
Output Load	RL			50		ohm
Input Voltage Range	VIN			0 to Vcc		
Low Level Input Voltage	VIL			30% Vcc max.		V
High Level Input Voltage	VIH			70% Vcc min.		V
Disable Time	t_dis			200 max.		ns
Enable Time	t_ena			10 max.		ms
Start-up Time	t_str	@Minimum operating voltage to be 0 sec.		10 max.		ms
Deterministic Jitter	DJ	Measured with Wavecrest SIA-3000		2 max.		ps
1 Sigma Jitter	JSigma			4 max.		ps
Peak to Peak Jitter	JPK-PK			30 max.		ps
Phase Jitter	JPhase	@156.25MHz Vcc=3.3V	BW : 12kHz to 20MHz	0.3 max.		ps

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.
Note2: DC characteristic

Dimensions

(Unit: mm)



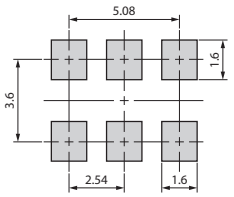
Plating: Ni+Au
Tolerance: ±0.2

Pad Connections	
#1	INH
#2	NC
#3	Case GND
#4	Output
#5	Complementary Output
#6	Vcc

INH Function	
Pad1	Pad4/ Pad5 (Output)
Open	Active
"H" Level	Active
"L" Level	High Z (No-Oscillation)

Recommended Land Pattern

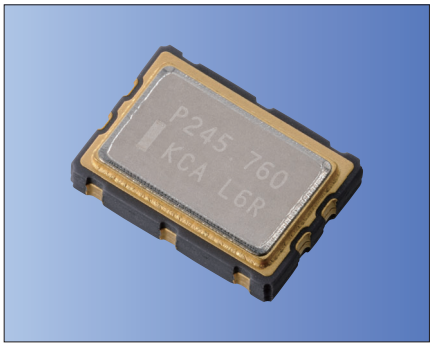
(Unit: mm)



Note: 0.01μF and 10μF capacitor between Vcc and GND is recommended for bypass purpose.

As of August 2021

LV-PECL/ 3.3V/ 7.0×5.0mm



RoHS Compliant

Features

- High frequency to 800MHz
- LV-PECL output
- Miniature ceramic package
- for WDM, Networking Applications

Table 1

Freq. Tol. Code	Freq. Tol. × 10^{-6}	Operating Temperature Range (°C)	Note
G	±50	−40 to +85	Please contact us for available frequencies.

How to Order

KC7050R 622.080 P 3 G D 00
① ② ③ ④ ⑤ ⑥ ⑦

①Series
②Output Frequency
③Output Type (LV-PECL)
④Supply Voltage (3.3V)
⑤Frequency Tolerance (See Table 1)
⑥Symmetry/ INH Function
(45/ 55%, Disable)
⑦Individual Specification
(STD Specification is "00".)

Packaging (Tape & Reel 1000 pcs./ reel)

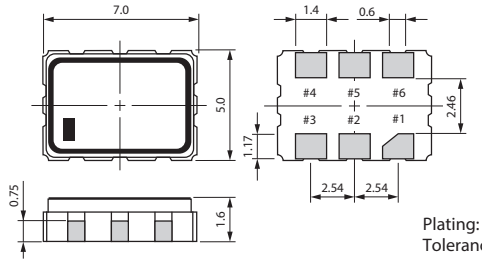
Specifications

Item	Symbol	Conditions		Min.	Max.	Unit
Output Frequency Range[Note1]	fo			10	800	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.: −40 to +85°C	−50	+50	$\times 10^{-6}$
Storage Temperature Range	$T_{\_stg}$			−55	+125	°C
Operating Temperature Range	$T_{\_use}$			−40	+85	°C
Max. Supply Voltage	—			−0.5	+4.2	V
Supply Voltage	V_{CC}			+2.97	+3.63	V
Current Consumption	I_{CC}			—	100	mA
Disable Current	I_{DE}			—	30	mA
Symmetry	SYM	50ohm @crossing point		45	55	%
Rise/ Fall Time (20% to 80% Output Level)	Tr/ Tf	50ohm		—	0.4	ns
Low Level Output Voltage[Note2]	V_{OL}			—	V_{CC}−1.620	V
High Level Output Voltage[Note2]	V_{OH}			V_{CC}−1.025	—	V
Output Load	—	LV-PECL Output		50		ohm
Low Level Input Voltage[Note2]	V_{IL}			—	30% V_{CC}	V
High Level Input Voltage[Note2]	V_{IH}			70% V_{CC}	—	V
Disable Time	$t_{\_dis}$			—	200	ns
Enable Time	$t_{\_ena}$			—	2	ms
Start-up Time	$t_{\_str}$	@Minimum operating voltage to be 0 sec.		—	10	ms
Phase Jitter	J_{Phase}	@622.08MHz	BW : 12kHz to 20MHz	Typ. 3.0		ps
Phase Noise	—	@622.08MHz	@10Hz offset	Typ. −40		dBc/ Hz
			@100Hz offset	Typ. −70		
			@1kHz offset	Typ. −95		
			@10kHz offset	Typ. −105		
			@100kHz offset	Typ. −105		
			@1MHz offset	Typ. −125		
			@10MHz offset	Typ. −135		

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.
Note2: DC characteristic

Dimensions

(Unit: mm)



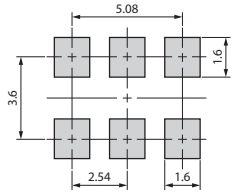
Plating: Ni+Au
Tolerance: ±0.2

Pad Connections	
#1	INH
#2	NC
#3	Case GND
#4	Output
#5	Complementary Output
#6	V_{CC}

INH Function	
Pad1	Pad4/ Pad5 (Output)
Open	Active
"H" Level	Active
"L" Level	High Z (No-Oscillation)

Recommended Land Pattern

(Unit: mm)



Note: 0.01µF and 10µF capacitor between Vcc and GND is recommended for bypass purpose.

LV-PECL/ 3.3V/ 7.0×5.0mm

RoHS Compliant

Features

- High frequency to 800MHz
- Dual frequency selectable
- LV-PECL output
- Miniature ceramic package
- for WDM, Networking Applications

Table 1

Freq. Tol. Code	Freq. Tol. × 10^{-6}	Operating Temperature Range (°C)	Note
G	±50	−40 to +85	Please contact us for available frequencies.

How to Order

KC7050G 622A644 P 3 G D 00
① ② ③ ④ ⑤ ⑥ ⑦

①Series
②Output Frequency/ Selection Frequency
③Output Type (LV-PECL)
④Supply Voltage (3.3V)
⑤Frequency Tolerance (See Table 1)
⑥Symmetry/ INH Function
(45/ 55%, Disable)
⑦Individual Specification
(STD Specification is "00".)

Packaging (Tape & Reel 1000 pcs./ reel)

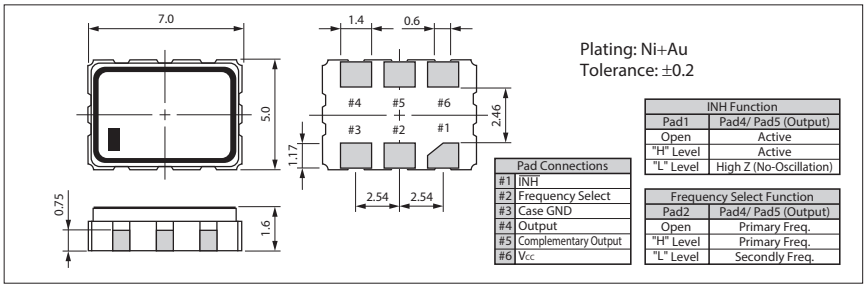
Specifications

Item	Symbol	Conditions		Min.	Max.	Unit
Output Frequency Range[Note1]	f1	Primary Output/ #2 "H"−Level or Open		10	800	MHz
	f2	Secondary Output/ #2 "L"-Level		10	800	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.: −40 to +85°C	−50	+50	×10^{-6}
Storage Temperature Range	$T_{\_stg}$			−55	+125	°C
Operating Temperature Range	$T_{\_use}$			−40	+85	°C
Max. Supply Voltage	—			−0.5	+4.2	V
Supply Voltage	V_{CC}			+2.97	+3.63	V
Current Consumption	I_{CC}			—	100	mA
Symmetry	SYM	50ohm @crossing point		45	55	%
Rise/ Fall Time (20% to 80% Output Level)	Tr/ Tf	50ohm		—	0.4	ns
Low Level Output Voltage[Note2]	V_{OL}			—	V_{CC}−1.620	V
High Level Output Voltage[Note2]	V_{OH}			V_{CC}−1.025	—	V
Output Load	—	LV-PECL Output		50		ohm
Low Level Input Voltage	V_{IL}			—	30% V_{CC}	V
High Level Input Voltage	V_{IH}			70% V_{CC}	—	V
Start-up Time	$t_{\_str}$	@Minimum operating voltage to be 0 sec.		—	10	ms
Phase Jitter	J_{Phase}	@622.08MHz	BW : 12kHz to 20MHz	Typ. 3.0		ps
Phase Noise	—	@622.08MHz	@10Hz offset	Typ. −40		dBc/ Hz
			@100Hz offset	Typ. −70		
			@1kHz offset	Typ. −95		
			@10kHz offset	Typ. −105		
			@100kHz offset	Typ. −105		
			@1MHz offset	Typ. −125		
			@10MHz offset	Typ. −135		

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.
Note2: DC characteristic

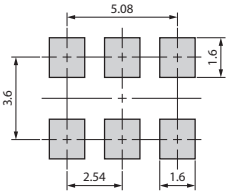
Dimensions

(Unit: mm)



Recommended Land Pattern

(Unit: mm)



Note: 0.01µF and 10µF capacitor between Vcc and GND is recommended for bypass purpose.

LVDS/ 3.3V or 2.5V/ 5.0×3.2mm

RoHS Compliant

Features

- Miniature ceramic package
- Highly reliable with seam welding
- LVDS output
- Supply voltage Vcc=3.3V, 2.5V
- ±25×10^{-6} available
- Low Phase Noise

Table 1

Freq. Tol. Code	Freq. Tol. × 10^{-6}	Operating Temperature Range (°C)	Note
0	± 50	0 to +70	Standard specifications
S	± 30		Please contact us for available frequencies.
U	± 25		
F	±100	−40 to +85	
G	± 50		
6	± 50	−40 to +105	

How to Order

KC5032P 125.000 L □ □ J 00
① ② ③ ④ ⑤ ⑥ ⑦

①Series
②Output Frequency
③Output Type (LVDS)
④Supply Voltage (3 : 3.3V or 2 : 2.5V)
⑤Frequency Tolerance (See Table 1)
⑥Symmetry/ INH Function
J : 45/ 55%
⑦Individual Specification
(STD Specification is "00".)

Packaging (Tape & Reel 1000 pcs./ reel)

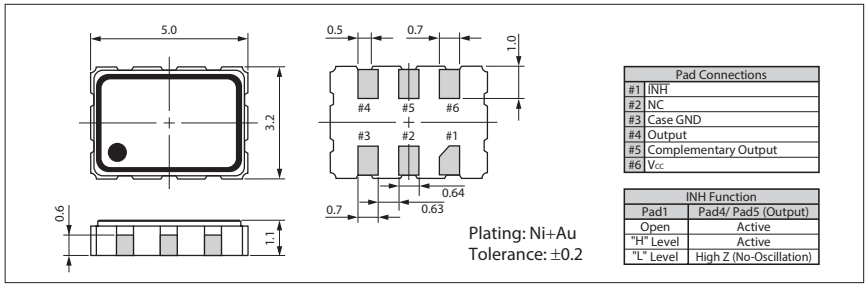
Specifications

Item	Symbol	Conditions	Specifications KC5032P-L2	Specifications KC5032P-L3	Unit
Output Frequency Range[Note1]	fo		25 to 175		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	±50/ −40 to +105°C		×10^{-6}
			±100/ −40 to +85°C		
			±50/ −40 to +85°C		
			±50/ 0 to +70°C		
			±30/ 0 to +70°C		
			±25/ 0 to +70°C		
Storage Temperature Range	T_stg		−55 to +125		°C
Operating Temperature Range	T_use	Standard Specifications	0 to +70/ −40 to +85		°C
		Extend (Option)	−40 to +105		
Max. Supply Voltage	—		−0.3 to +4.0		V
Supply Voltage	Vcc		+2.375 to +2.625	+2.97 to +3.63	V
Current Consumption	Icc		50 max.		mA
Stand-by Current	I_std		30 max.		μA
Symmetry	SYM	100ohm @crossing point	50±5		%
Rise/ Fall Time (20% Vcc to 80% Vcc Maximum Loaded)	Tr/ Tf	100ohm	0.6 max.		ns
Low Level Output Voltage[Note2]	VOL		0.9 min. Typ.:1.1		V
High Level Output Voltage[Note2]	VOH		1.6 max. Typ.:1.43		V
Diffrentical Output Voltage[Note2]	VOD		247 to 454 Typ.:330		mV
Diffrentical Output Voltage Error[Note2]	dVOD	dVOD=|VOD1−VOD2|	50 max.		mV
Offset Voltage	VOS		1.125 to 1.375		V
Offset Voltage Error	dVOS	dVOS=|VOS1−VOS2|	50 max.		mV
Output Load	RL	LVDS Output	100		ohm
Input Voltage Range	VIN		0 to Vcc		V
Low Level Input Voltage	VIL		30% Vcc max.		V
High Level Input Voltage	VIH		70% Vcc min.		V
Disable Time	t_dis		200 max.		ns
Enable Time	t_ena		10 max.		ms
Start-up Time	t_str	@Minimum operating voltage to be 0 sec.	10 max.		ms
Deterministic Jitter	DJ	Measured with Wavecrest SIA-3000	2 max.		ps
1 Sigma Jitter	Jsigma		4 max.		ps
Peak to Peak Jitter	JPK-PK		30 max.		ps
Phase Jitter	JPhase	@156.25MHz Vcc=3.3V, BW : 12kHz to 20MHz	0.3 max.		ps

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.
Note2: DC characteristic

Dimensions

(Unit: mm)



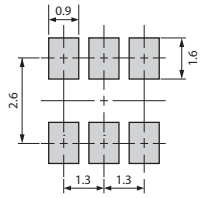
Plating: Ni+Au
Tolerance: ±0.2

Pad Connections	
#1	INH
#2	NC
#3	Case GND
#4	Output
#5	Complementary Output
#6	Vcc

INH Function	
Pad1	Pad4/ Pad5 (Output)
Open	Active
"H" Level	Active
"L" Level	High Z (No-Oscillation)

Recommended Land Pattern

(Unit: mm)



Note: 0.01μF and 10μF capacitor between Vcc and GND is recommended for bypass purpose.

LVDS/ 3.3V or 2.5V/ 7.0×5.0mm

RoHS Compliant

Features

- Miniature ceramic package
- Highly reliable with seam welding
- LVDS output
- Supply voltage Vcc=3.3V, 2.5V
- ±25×10^{-6} available
- Low Phase Noise

Table 1

Freq. Tol. Code	Freq. Tol. × 10^{-6}	Operating Temperature Range (°C)	Note
0	± 50	0 to +70	Standard specifications
S	± 30		Please contact us for available frequencies.
U	± 25		
F	±100	−40 to +85	
G	± 50		
6	± 50	−40 to +105	

How to Order

KC7050P 125.000 L □ □ J 00
① ② ③ ④ ⑤ ⑥ ⑦

①Series
②Output Frequency
③Output Type (LVDS)
④Supply Voltage (3 : 3.3V or 2 : 2.5V)
⑤Frequency Tolerance (See Table 1)
⑥Symmetry/ INH Function
J : 45/ 55%
⑦Individual Specification
(STD Specification is "00".)

Packaging (Tape & Reel 1000 pcs./ reel)

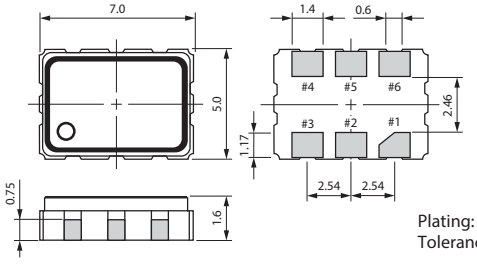
Specifications

Item	Symbol	Conditions	Specifications KC7050P-L2	Specifications KC7050P-L3	Unit
Output Frequency Range[Note1]	fo		25 to 175		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	±50/ −40 to +105°C		×10^{-6}
			±100/ −40 to +85°C		
			±50/ −40 to +85°C		
			±50/ 0 to +70°C		
			±30/ 0 to +70°C		
			±25/ 0 to +70°C		
Storage Temperature Range	T_stg		−55 to +125		°C
Operating Temperature Range	T_use	Standard Specifications	0 to +70/ −40 to +85		°C
		Extend (Option)	−40 to +105		
Max. Supply Voltage	—		−0.3 to +4.0		V
Supply Voltage	Vcc		+2.375 to +2.625	+2.97 to +3.63	V
Current Consumption	Icc		50 max.		mA
Stand-by Current	I_std		30 max.		μA
Symmetry	SYM	100ohm @crossing point	50±5		%
Rise/ Fall Time (20% Vcc to 80% Vcc Maximum Loaded)	Tr/ Tf	100ohm	0.6 max.		ns
Low Level Output Voltage[Note2]	VOL		0.9 min. Typ.:1.1		V
High Level Output Voltage[Note2]	VOH		1.6 max. Typ.:1.43		V
Diffrentical Output Voltage[Note2]	VOD		247 to 454 Typ.:330		mV
Diffrentical Output Voltage Error[Note2]	dVOD	dVOD=|VOD1−VOD2|	50 max.		mV
Offset Voltage	VOS		1.125 to 1.375		V
Offset Voltage Error	dVOS	dVOS=|VOS1−VOS2|	50 max.		mV
Output Load	RL	LVDS Output	100		ohm
Input Voltage Range	VIN		0 to Vcc		V
Low Level Input Voltage	VIL		30% Vcc max.		V
High Level Input Voltage	VIH		70% Vcc min.		V
Disable Time	t_dis		200 max.		ns
Enable Time	t_ena		10 max.		ms
Start-up Time	t_str	@Minimum operating voltage to be 0 sec.	10 max.		ms
Deterministic Jitter	DJ	Measured with Wavecrest SIA-3000	2 max.		ps
1 Sigma Jitter	Jsigma		4 max.		ps
Peak to Peak Jitter	JPK-PK		30 max.		ps
Phase Jitter	JPhase	@156.25MHz Vcc=3.3V, BW : 12kHz to 20MHz	0.3max.		ps

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.
Note2: DC characteristic

Dimensions

(Unit: mm)



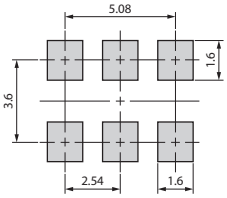
Plating: Ni+Au
Tolerance: ±0.2

Pad Connections	
#1	INH
#2	NC
#3	Case GND
#4	Output
#5	Complementary Output
#6	Vcc

INH Function	
Pad1	Pad4/ Pad5 (Output)
Open	Active
"H" Level	Active
"L" Level	High Z (No-Oscillation)

Recommended Land Pattern

(Unit: mm)



Note: 0.01μF and 10μF capacitor between Vcc and GND is recommended for bypass purpose.

As of August 2021

HCSL/ 3.3V or 2.5V/ 5.0×3.2mm

RoHS Compliant

Features

- Miniature ceramic package
- Highly reliable with seam welding
- HCSL output
- Supply voltage Vcc=3.3V, 2.5V
- ±25×10^{-6} available
- Low Phase Noise

Table 1

Freq. Tol. Code	Freq. Tol. × 10^{-6}	Operating Temperature Range (°C)	Note
0	± 50	0 to +70	Standard specifications
S	± 30		Please contact us for available frequencies.
U	± 25		
F	±100	−40 to +85	
G	± 50		
6	± 50	−40 to +105	

How to Order

KC5032P 100.000 H □ □ J 00
① ② ③ ④ ⑤ ⑥ ⑦

①Series
②Output Frequency
③Output Type (HCSL)
④Supply Voltage (3 : 3.3V or 2 : 2.5V)
⑤Frequency Tolerance (See Table 1)
⑥Symmetry/ INH Function (45/ 55%)
⑦Individual Specification
(STD Specification is "00".)

Packaging (Tape & Reel 1000 pcs./ reel)

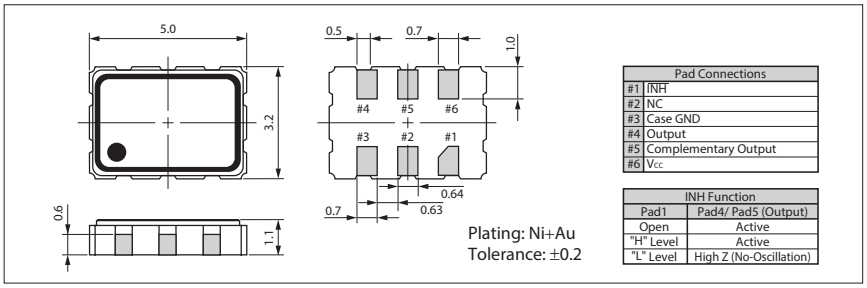
Specifications

Item	Symbol	Conditions		Specifications KC5032P-H2 Min.	KC5032P-H2 Max.	KC5032P-H3 Min.	KC5032P-H3 Max.	Unit
Output Frequency Range[Note1]	fo			25	175	25	175	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		−50	+50	−50	+50	×10^{-6}
Storage Temperature Range	T_stg			−55	+125	−55	+125	°C
Operating Temperature Range	T_use			0	+70	0	+70	°C
				−40	+85	−40	+85	
				−40	+105	−40	+105	
Max. Supply Voltage	—			−0.3	+4.0	−0.3	+4.0	V
Supply Voltage	Vcc			2.375	2.625	2.97	3.63	V
Current Consumption	Icc			—	50	—	50	mA
Stand-by Current	I_std			—	20	—	20	μA
Symmetry	SYM	50ohm @crossing point		45	55	45	55	%
Rise/ Fall Time 0.175V to 0.525V	Tr/ Tf	50ohm		—	0.5	—	0.5	ns
Low Level Output Voltage[Note2]	VOL			−0.15	+0.15	−0.15	+0.15	V
High Level Output Voltage[Note2]	VOH			+0.66	+0.85	+0.66	+0.85	V
Output Load	RL	HCSL Output		50		50		ohm
Low Level Input Voltage	VIL			—	30% Vcc	—	30% Vcc	V
High Level Input Voltage	VIH			70% Vcc	—	70% Vcc	—	V
Disable Time	t_dis			—	200	—	200	ns
Enable Time	t_ena			—	10	—	10	ms
Start-up Time	t_str	@Minimum operating voltage to be 0 sec.		—	10	—	10	ms
Deterministic Jitter	DJ	Measured with Wavecrest SIA-3000		—	2	—	2	ps
1 sigma Jitter	Jsigma			—	4	—	4	ps
Peak to Peak Jitter	JPK-PK			—	30	—	30	ps
Phase Jitter	JPhase	@100MHz Vcc=3.3V	BW : 12kHz to 20MHz	—	0.5	—	0.5	ps
Phase Noise	—	@100MHz Vcc=3.3V	@10Hz offset	Typ. −77				dBc/ Hz
			@100Hz offset	Typ. −107				
			@1kHz offset	Typ. −130				
			@10kHz offset	Typ. −142				
			@100kHz offset	Typ. −149				
			@1MHz offset	Typ. −150				
			@10MHz offset	Typ. −152				

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.
Note2: DC characteristic

Dimensions

(Unit: mm)



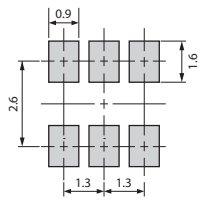
Plating: Ni+Au
Tolerance: ±0.2

Pad Connections	
#1	INH
#2	NC
#3	Case GND
#4	Output
#5	Complementary Output
#6	Vcc

INH Function	
Pad1	Pad4/ Pad5 (Output)
Open	Active
"H" Level	Active
"L" Level	High Z (No-Oscillation)

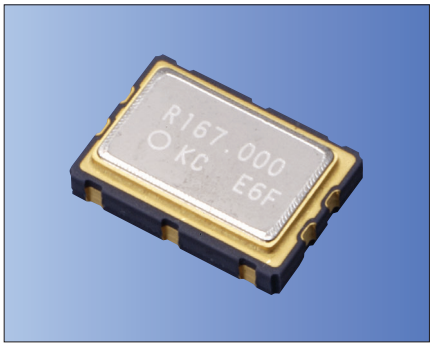
Recommended Land Pattern

(Unit: mm)



Note: 0.01μF and 10μF capacitor between Vcc and GND is recommended for bypass purpose.

HCSL/ 3.3V or 2.5V/ 7.0×5.0mm



RoHS Compliant

Features

- Miniature ceramic package
- Highly reliable with seam welding
- HCSL output
- Supply voltage Vcc=3.3V, 2.5V
- ±25×10^{-6} available
- Low Phase Noise

Table 1

Freq. Tol. Code	Freq. Tol. × 10^{-6}	Operating Temperature Range (°C)	Note
0	± 50	0 to +70	Standard specifications
S	± 30		Please contact us for available frequencies.
U	± 25		
F	±100	−40 to +85	
G	± 50		
6	± 50	−40 to +105	

How to Order

KC7050P 100.000 H □ □ J 00
① ② ③ ④ ⑤ ⑥ ⑦

①Series
②Output Frequency
③Output Type (HCSL)
④Supply Voltage (3 : 3.3V or 2 : 2.5V)
⑤Frequency Tolerance (See Table 1)
⑥Symmetry/ INH Function(45/ 55%)
⑦Individual Specification
(STD Specification is "00".)

Packaging (Tape & Reel 1000 pcs./ reel)

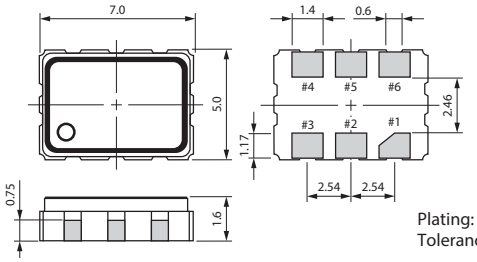
Specifications

Item	Symbol	Conditions		Specifications KC7050P-H2 Min.	KC7050P-H2 Max.	KC7050P-H3 Min.	KC7050P-H3 Max.	Unit
Output Frequency Range[Note1]	fo			25	175	25	175	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		−50	+50	−50	+50	×10-6
Storage Temperature Range	T_stg			−55	+125	−55	+125	°C
Operating Temperature Range	T_use			0	+70	0	+70	°C
				−40	+85	−40	+85	
				−40	+105	−40	+105	
Max. Supply Voltage	—			−0.3	+4.0	−0.3	+4.0	V
Supply Voltage	Vcc			2.375	2.625	2.97	3.63	V
Current Consumption	Icc			—	50	—	50	mA
Stand-by Current	I_std			—	20	—	20	μA
Symmetry	SYM	50ohm @crossing point		45	55	45	55	%
Rise/ Fall Time 0.175V to 0.525V	Tr/ Tf	50ohm		—	0.5	—	0.5	ns
Low Level Output Voltage[Note2]	VOL			−0.15	+0.15	−0.15	+0.15	V
High Level Output Voltage[Note2]	VOH			+0.66	+0.85	+0.66	+0.85	V
Output Load	RL	HCSL Output		50		50		ohm
Low Level Input Voltage	VIL			—	30% Vcc	—	30% Vcc	V
High Level Input Voltage	VIH			70% Vcc	—	70% Vcc	—	V
Disable Time	t_dis			—	200	—	200	ns
Enable Time	t_ena			—	10	—	10	ms
Start-up Time	t_str	@Minimum operating voltage to be 0 sec.		—	10	—	10	ms
Deterministic Jitter	DJ	Measured with Wavecrest SIA-3000		—	2	—	2	ps
1 sigma Jitter	Jsigma			—	4	—	4	ps
Peak to Peak Jitter	JPK-PK			—	30	—	30	ps
Phase Jitter	JPhase	@100MHz Vcc=3.3V	BW : 12kHz to 20MHz	—	0.5	—	0.5	ps
Phase Noise	—	@100MHz Vcc=3.3V	@10Hz offset	Typ. −77				dBc/ Hz
			@100Hz offset	Typ. −107				
			@1kHz offset	Typ. −130				
			@10kHz offset	Typ. −142				
			@100kHz offset	Typ. −149				
			@1MHz offset	Typ. −150				
			@10MHz offset	Typ. −152				

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.
Note2: DC characteristic

Dimensions

(Unit: mm)



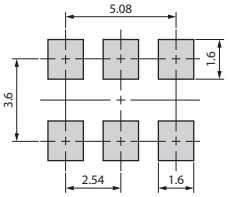
Plating: Ni+Au
Tolerance: ±0.2

Pad Connections	
#1	INH
#2	NC
#3	Case GND
#4	Output
#5	Complementary Output
#6	Vcc

INH Function	
Pad1	Pad4/ Pad5 (Output)
Open	Active
"H" Level	Active
"L" Level	High Z (No-Oscillation)

Recommended Land Pattern

(Unit: mm)



Note: 0.01μF and 10μF capacitor between Vcc and GND is recommended for bypass purpose.

LV-PECL or LVDS/ 3.3V or 2.5V/ 5.0×3.2mm

RoHS Compliant

Features

- High frequency to 800MHz
- LV-PECL output or LVDS output
- Miniature ceramic package
- Compact and low profile (5.0×3.2×1.2mm max.)
- Low current consumption

Applications

- WDM/ Networking

Table 1

Freq. Tol. Code	Freq. Tol. × 10^{-6}	Operating Temperature Range (°C)	Note
G	±50	−40 to +85	Please contact us for available frequencies.

How to Order

KV5032R 622.080 □ □ G D 00
① ② ③ ④ ⑤ ⑥ ⑦

①Series
②Output Frequency
③Output Type (P : LV-PECL or L : LVDS)
④Supply Voltage (3 : 3.3V or 2 : 2.5V)
⑤Frequency Tolerance (See Table 1)
⑥Symmetry/ INH Function
(45/ 55%, Disable)
⑦Individual Specification
(STD Specification is "00".)

Packaging (Tape & Reel 1000 pcs./ reel)

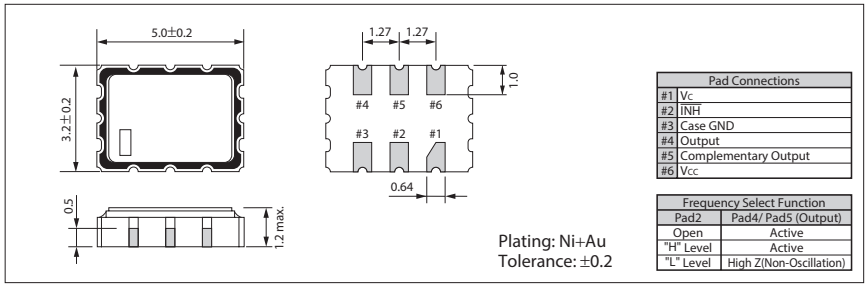
Specifications

Item	Symbol	Conditions		Min.	Max.	Unit
Output Frequency Range Note1	fo			10	800	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.: −40 to +85°C	−50	+50	×10^{-6}
Absolute Pull Range	APR			±100	—	×10^{-6}
Control Voltage	Vc			0	+3.3	V
Storage Temperature Range	T_stg			−55	+125	°C
Operating Temperature Range	T_use			−40	+85	°C
Max. Supply Voltage	—			−0.5	+4.2	V
Supply Voltage	Vcc			+2.25	+2.75	V
				+2.97	+3.63	
Linearity	—	Vc=0V to +3.3V		−10	10	%
Current Consumption	Icc	LV-PECL Output (2.25≤Vcc≤2.75V)		—	80	mA
		LV-PECL Output (2.97≤Vcc≤3.63V)		—	100	
		LVDS Output (2.25≤Vcc≤2.75V, 2.77≤Vcc≤3.63V)		—	40	
Symmetry	SYM	LV-PECL Output 50ohm @crossing point		45	55	%
		LVDS Output 100ohm @crossing point		45	55	
Rise/ Fall Time (20% to 80% Output Level)	Tr/ Tf	LV-PECL Output 50ohm		—	0.4	ns
		LVDS Output 100ohm		—	0.6	
Low Level Output Voltage Note2	VOL	LV-PECL Output		—	Vcc −1.620	V
High Level Output Voltage Note2	VOH			Vcc −1.025	—	V
Output Load	—			50		ohm
Low Level Output Voltage Note2	VOL	LVDS Output	Typ. 1.1V	0.9	—	V
High Level Output Voltage Note2	VOH		Typ. 1.43V	—	1.6	V
Diffrentical Output Voltage Note2	VOD		Typ. 330mV	175	454	mV
Diffrentical Output Voltage Error Note2	dVOD		dVOD= ¦VOD1−VOD2¦	—	50	mV
Offset Voltage	VOS		Typ. 1.25V	1.125	1.375	V
Offset Voltage Error	dVOS		dVOS= ¦VOS1−VOS2¦	—	50	mV
Output Load	—			100		ohm
Low Level Input Voltage Note2	VIL			—	30% Vcc	V
High Level Input Voltage Note2	VIH			70% Vcc	—	V
Input Resistance	—			150	—	k ohm
Disable Time	t_dis			—	200	ns
Enable Time	t_ena			—	2	ms
Start-up Time	t_str	@Minimum operating voltage to be 0 sec.		—	10	ms
Phase Jitter	JPhase	@622.08MHz	BW : 12kHz to 20MHz	Typ. 3.0		ps
Phase Noise	—	@622.08MHz	@10Hz offset	Typ. −40		dBc/ Hz
			@100Hz offset	Typ. −70		
			@1kHz offset	Typ. −95		
			@10kHz offset	Typ. −105		
			@100kHz offset	Typ. −105		
			@1MHz offset	Typ. −125		
			@10MHz offset	Typ. −135		

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. Note2: DC characteristic

Dimensions

(Unit: mm)



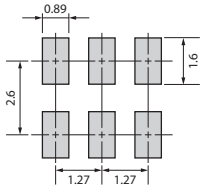
Pad Connections	
#1	Vc
#2	INH
#3	Case GND
#4	Output
#5	Complementary Output
#6	Vcc

Frequency Select Function	
Pad2	Pad4/ Pad5 (Output)
Open	Active
"H" Level	Active
"L" Level	High Z(Non-Oscillation)

Plating: Ni+Au
Tolerance: ±0.2

Recommended Land Pattern

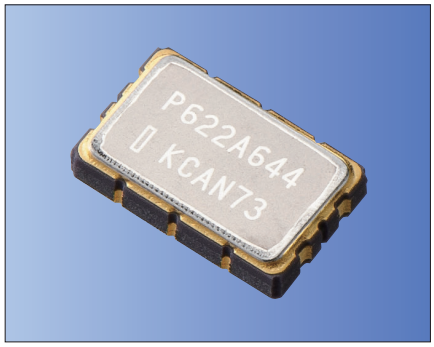
(Unit: mm)



Note: 0.01μF capacitor between Vcc and GND is recommended for bypass purpose.

As of August 2021

LV-PECL or LVDS/ 3.3V or 2.5V/ 5.0×3.2mm



RoHS Compliant

Features

- High frequency to 800MHz
- Dual frequency selectable
- LV-PECL output or LVDS output
- Miniature ceramic package
- Compact and low profile (5.0×3.2×1.2mm max.)
- Low current consumption

Applications

- WDM/ Networking

Table 1

Freq. Tol. Code	Freq. Tol. × 10^{-6}	Operating Temperature Range (°C)	Note
G	±50	−40 to +85	Please contact us for available frequencies.

How to Order

KV5032G 622A644 □ □ G F 00
① ② ③ ④ ⑤ ⑥ ⑦

①Series
②Output Frequency/ Selection Frequency
③Output Type (P : LV-PECL or L : LVDS)
④Supply Voltage (3 : 3.3V or 2 : 2.5V)
⑤Frequency Tolerance (See Table 1)
⑥Symmetry/ INH Function
(45/ 55%)
⑦Individual Specification
(STD Specification is "00".)

Packaging (Tape & Reel 1000 pcs./ reel)

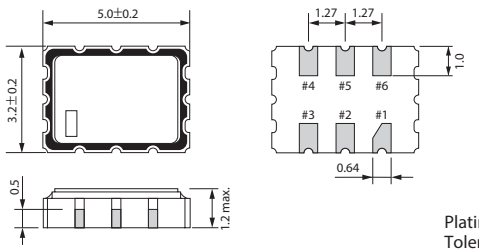
Specifications

Item	Symbol	Conditions		Min.	Max.	Unit
Output Frequency Range[Note1]	f1	Primary Output/ #2 "H" -Level or Open		10	800	MHz
	f2	Secondary Output/ #2 "L" -Level		10	800	
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.: −40 to +85°C	−50	+50	×10^{-6}
Absolute Pull Range	APR			±100	—	×10^{-6}
Control Voltage	Vc			0	+3.3	V
Storage Temperature Range	T_stg			−55	+125	°C
Operating Temperature Range	T_use			−40	+85	°C
Max. Supply Voltage	—			−0.5	+4.2	V
Supply Voltage	Vcc			+2.25	+2.75	V
				+2.97	+3.63	
Linearity	—	Vc=0V to +3.3V		−10	10	%
Current Consumption	Icc	LV-PECL Output (2.25≤Vcc≤2.75V)		—	80	mA
		LV-PECL Output (2.97≤Vcc≤3.63V)		—	100	
		LVDS Output (2.25≤Vcc≤2.75V, 2.77≤Vcc≤3.63V)		—	40	
Symmetry	SYM	LV-PECL Output 50ohm @crossing point		45	55	%
		LVDS Output 100ohm @crossing point		45	55	
Rise/ Fall Time (20% to 80% Output Level)	Tr/ Tf	LV-PECL Output 50ohm		—	0.4	ns
		LVDS Output 100ohm		—	0.6	
Low Level Output Voltage[Note2]	VOL	LV-PECL Output		—	Vcc −1.620	V
High Level Output Voltage[Note2]	VOH			Vcc −1.025	—	V
Output Load	—			50		ohm
Low Level Output Voltage[Note2]	VOL	LVDS Output	Typ. 1.1V	0.9	—	V
High Level Output Voltage[Note2]	VOH		Typ. 1.43V	—	1.6	V
Diffrentical Output Voltage[Note2]	VOD		Typ. 330mV	175	454	mV
Diffrentical Output Voltage Error[Note2]	dVOD		dVOD= ¦VOD1−VOD2¦	—	50	mV
Offset Voltage	VOS		Typ. 1.25V	1.125	1.375	V
Offset Voltage Error	dVOS		dVOS= ¦VOS1−VOS2¦	—	50	mV
Output Load	—			100		ohm
Low Level Input Voltage[Note2]	VIL			—	30% Vcc	V
High Level Input Voltage[Note2]	VIH			70% Vcc	—	V
Input Resistance	—			150	—	k ohm
Start-up Time	t_str	@Minimum operating voltage to be 0 sec.		—	10	ms
Phase Jitter	Jphase	@622.08MHz	BW : 12kHz to 20MHz	Typ. 3.0		ps
Phase Noise	—	@622.08MHz	@10Hz offset	Typ. −40		dBc/ Hz
			@100Hz offset	Typ. −70		
			@1kHz offset	Typ. −95		
			@10kHz offset	Typ. −105		
			@100kHz offset	Typ. −105		
			@1MHz offset	Typ. −125		
			@10MHz offset	Typ. −135		

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. Note2: DC characteristic

Dimensions

(Unit: mm)



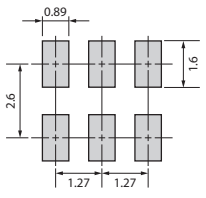
Plating: Ni+Au
Tolerance: ±0.2

Pad Connections	
#1	Vc
#2	Frequency Select
#3	Case GND
#4	Output
#5	Complementary Output
#6	Vcc

Frequency Select Function	
Pad2	Pad4/ Pad5 (Output)
Open	Primary Freq.
"H" Level	Primary Freq.
"L" Level	Secondly Freq.

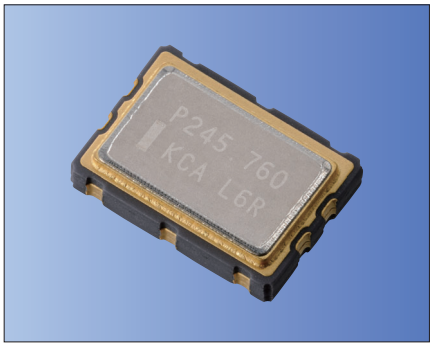
Recommended Land Pattern

(Unit: mm)



Note: 0.01µF capacitor between Vcc and GND is recommended for bypass purpose.

LV-PECL/ 3.3V/ 7.0×5.0mm



RoHS Compliant

Features

- High frequency to 800MHz
- LV-PECL output
- Miniature ceramic package
- for WDM, Networking Applications

Table 1

Freq. Tol. Code	Freq. Tol. × 10^{-6}	Operating Temperature Range (°C)	Note
G	±50	−40 to +85	Please contact us for available frequencies.

How to Order

KV7050R 622.080 P 3 G D 00
① ② ③ ④ ⑤ ⑥ ⑦

①Series
②Output Frequency
③Output Type (LV-PECL)
④Supply Voltage (3.3V)
⑤Frequency Tolerance (See Table 1)
⑥Symmetry/ INH Function
(45/ 55%, Disable)
⑦Individual Specification
(STD Specification is "00".)

Packaging (Tape & Reel 1000 pcs./ reel)

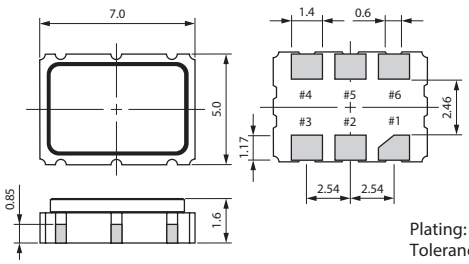
Specifications

Item	Symbol	Conditions		Min.	Max.	Unit
Output Frequency Range[Note1]	fo			10	800	MHz
Frequency Tolerance @Vc=+1.65V	f_tol	Initial tolerance, Operating temperature range, Rated power supply voltage change, Load change, Aging (1 year @25°C), Shock and vibration	Temp.: −40 to +85°C	−50	+50	×10^{-6}
Absolute Pull Range	APR			±100	—	×10^{-6}
Control Voltage	Vc			0	+3.3	V
Storage Temperature Range	T_stg			−55	+125	°C
Operating Temperature Range	T_use			−40	+85	°C
Max. Supply Voltage	—			−0.5	+4.2	V
Supply Voltage	Vcc			+2.97	+3.63	V
Linearity	—	Vc=0V to +3.3V		−10	+10	%
Current Consumption	Icc			—	100	mA
Symmetry	SYM	50ohm @crossing point		45	55	%
Rise/ Fall Time (20% to 80% Output Level)	Tr/ Tf	50ohm		—	0.4	ns
Low Level Output Voltage[Note2]	VOL			—	Vcc−1.620	V
High Level Output Voltage[Note2]	VOH			Vcc−1.025	—	V
Output Load	—	LV-PECL Output		50		ohm
Low Level Input Voltage	VIL			—	30% Vcc	V
High Level Input Voltage	VIH			70% Vcc	—	V
Input Resistance	—			150	—	k ohm
Disable Time	t_dis			—	200	ns
Enable Time	t_ena			—	2	ms
Start-up Time	t_str	@Minimum operating voltage to be 0 sec.		—	10	ms
Phase Jitter	Jphase	@622.08MHz	BW : 12kHz to 20MHz	Typ. 3.0		ps
Phase Noise	—	@622.08MHz	@10Hz offset	Typ. −40		dBc/ Hz
			@100Hz offset	Typ. −70		
			@1kHz offset	Typ. −95		
			@10kHz offset	Typ. −105		
			@100kHz offset	Typ. −105		
			@1MHz offset	Typ. −125		
			@10MHz offset	Typ. −135		

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.
Note2: DC characteristic

Dimensions

(Unit: mm)



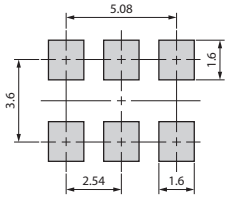
Plating: Ni+Au
Tolerance: ±0.2

Pad Connections	
#1	Vc
#2	INH
#3	Case GND
#4	Output
#5	Complementary Output
#6	Vcc

Frequency Select Function	
Pad2	Pad4/ Pad5 (Output)
Open	Active
"H" Level	Active
"L" Level	High Z(Non-Oscillation)

Recommended Land Pattern

(Unit: mm)



Note: 0.01µF capacitor between Vcc and GND is recommended for bypass purpose.

LV-PECL/ 3.3V/ 7.0×5.0mm

RoHS Compliant

Features

- High frequency to 800MHz
- Dual Selectable
- LV-PECL output
- Miniature ceramic package
- for WDM, Networking Applications

Table 1

Freq. Tol. Code	Freq. Tol. × 10^{-6}	Operating Temperature Range (°C)	Note
G	±50	−40 to +85	Please contact us for available frequencies.

How to Order

KV7050G 622A644 P 3 G F 00
① ② ③ ④ ⑤ ⑥ ⑦

①Series
②Output Frequency/ Selection Frequency
③Output Type (LV-PECL)
④Supply Voltage (3.3V)
⑤Frequency Tolerance (See Table 1)
⑥Symmetry (45/ 55%)
⑦Individual Specification
(STD Specification is "00".)

Packaging (Tape & Reel 1000 pcs./ reel)

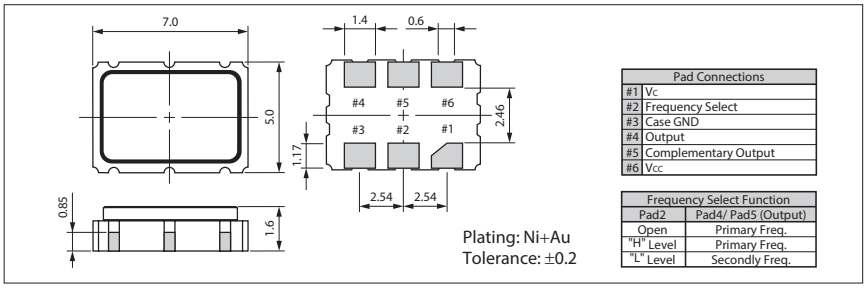
Specifications

Item	Symbol	Conditions		Min.	Max.	Unit
Output Frequency Range[Note1]	f1	Primary Output/ #2 "H"-Level or Open		10	800	MHz
	f2	Secondary Output/ #2 "L"-Level		10	800	MHz
Frequency Tolerance @Vc=+1.65V	f_tol	Initial tolerance, Operating temperature range, Rated power supply voltage change, Load change, Aging (1 year @25°C), Shock and vibration	Temp.: −40 to +85°C	−50	+50	×10^{-6}
Absolute Pull Range	APR			±100	—	×10^{-6}
Control Voltage	Vc			0	+3.3	V
Storage Temperature Range	T_stg			−55	+125	°C
Operating Temperature Range	T_use			−40	+85	°C
Max. Supply Voltage	—			−0.5	+4.2	V
Supply Voltage	Vcc			+2.97	+3.63	V
Linearity	—	Vc=0V to +3.3V		−10	+10	%
Current Consumption	Icc			—	100	mA
Symmetry	SYM	50ohm @crossing point		45	55	%
Rise/ Fall Time (20% to 80% Output Level)	Tr/ Tf	50ohm		—	0.4	ns
Low Level Output Voltage[Note2]	VOL			—	Vcc−1.620	V
High Level Output Voltage[Note2]	VOH			Vcc−1.025	—	V
Output Load	—	LV-PECL Output		50		ohm
Low Level Input Voltage	VIL			—	30% Vcc	V
High Level Input Voltage	VIH			70% Vcc	—	V
Input Resistance	—			TYP	1	Mohm
Start-up Time	t_str	@Minimum operating voltage to be 0 sec.		—	10	ms
Phase Jitter	Jphase	@622.08MHz	BW : 12kHz to 20MHz	Typ. 3.0		ps
Phase Noise	—	@622.08MHz	@10Hz offset	Typ. −40		dBc/ Hz
			@100Hz offset	Typ. −70		
			@1kHz offset	Typ. −95		
			@10kHz offset	Typ. −105		
			@100kHz offset	Typ. −105		
			@1MHz offset	Typ. −125		
			@10MHz offset	Typ. −135		

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.
Note2: DC characteristic

Dimensions

(Unit: mm)



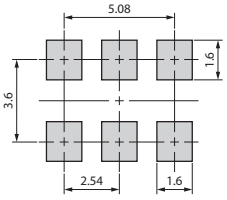
Plating: Ni+Au
Tolerance: ±0.2

Pad Connections	
#1	Vc
#2	Frequency Select
#3	Case GND
#4	Output
#5	Complementary Output
#6	Vcc

Frequency Select Function	
Pad2	Pad4/ Pad5 (Output)
Open	Primary Freq.
"H" Level	Primary Freq.
"L" Level	Secondly Freq.

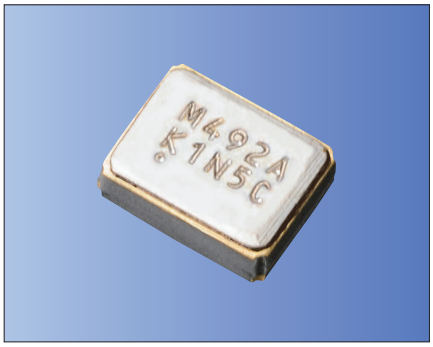
Recommended Land Pattern

(Unit: mm)



Note: 0.01µF capacitor between Vcc and GND is recommended for bypass purpose.

1.6×1.2mm



RoHS Compliant

Features

- Ultra-miniature SMD type (1.65×1.25×0.55mm)
- Low Phase Noise : −164dBc/ Hz@100kHz offset, 52MHz
- With Disable Function
- Freq. temp. characteristics. : ±2.0×10^{-6}/ −30 to +85°C : ±0.5×10^{-6}/ −30 to +85°C (for GNSS)
- 1.68 to 3.63V drive available
- Reflow compatible

Applications

- Mobile communications, Wireless modules
- GNSS Unit
- Wi-Fi® 6 (IEEE802.11ax)
- Networking equipments

*Wi-Fi® Trademarks are owned by Wi-Fi Alliance.

How to Order

KT1612A 52000 □ □ □ □□ N x G
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

①Series

KT1612A	1612 Size

②Output Frequency

③Freq. Temp. Chrst.

A	±0.5×10^{-6}
B	±1.0×10^{-6}
C	±1.5×10^{-6}
D	±2.0×10^{-6}

④Lower Operating Temp.

C	−30°C
E	−20°C
G	−10°C

⑤Upper Operating Temp.

W	+85°C
V	+80°C
U	+75°C

⑥Supply Voltage

18	1.8V	28	2.8V
30	3.0V	33	3.3V

⑦Disable Function

N	With Disable Function

⑧Individual Specification

⑨Low Phase Noise Type

G	Low Phase Noise

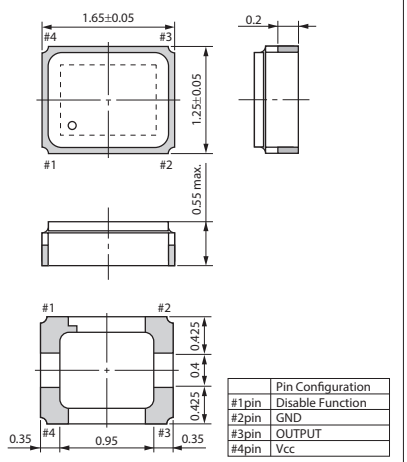
Packaging (Tape & Reel 18000 pcs./ reel)

Specifications

Item	Symbol	Conditions	Min.	Max.	Units
Output Frequency Range	fo	Standard Output Frequency: 19.2, 26.0, 38.4, 48.0, 52.0, 76.8	19.2	76.8	MHz
Frequency Tolerance	f_tol	vs Temperature	−0.5/ −2	+0.5/ +2	×10^{-6}
		vs Load	−0.1	+0.1	
		vs Voltage	−0.1	+0.1	
Frequency Aging	f_age	Per Year	−1	+1	×10^{-6}
Storage Temperature Range	T_stg		−40	+85	°C
Operating Temperature Range	T_use		−30	+85	°C
Supply Voltage	Vcc		1.68	3.63	V
Output Level	Vpp	Clipped Sine*, Load: 10k ohm / / 10pF	0.8	—	Vp−p
Current Consumption	Icc		—	3	mA
Harmonics	—		—	−5	dBc

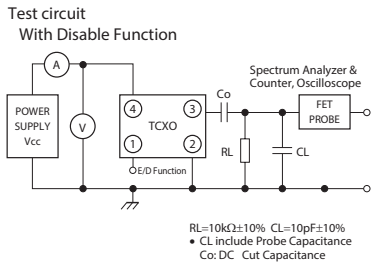
* : A DC-cut capacitor is not embedded in this crystal oscillator. Connect a DC-cut capacitor (≥1nF) to the line-out terminal of the oscillator.
* Please contact us for other specifications.

Dimensions (Unit: mm)

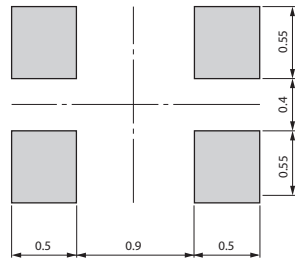


	Pin Configuration
#1pin	Disable Function
#2pin	GND
#3pin	OUTPUT
#4pin	Vcc

Test Circuit

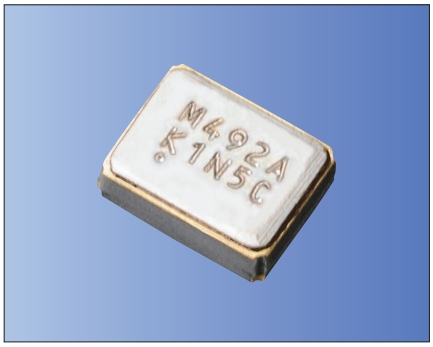


Recommended Land Pattern (Unit: mm)



Note: 0.01μF capacitor between Vcc and GND is recommended for bypass purpose.

1.6×1.2mm



RoHS Compliant

Features

- Ultra-miniature SMD type (1.65×1.25×0.55mm)
- Freq. temp. characteristics.
  : ±2.0×10^{-6}/ −30 to +85°C
  : ±0.5×10^{-6}/ −30 to +85°C (for GNSS)
- 1.68 to 3.63V drive available
- Reflow compatible
- Operating Temp. −40 to +105°C (Option)
- Disable Function (Option)

Applications

- Mobile Communications, W-LAN
- Low power radio communications
- GNSS Unit

How to Order

KT1612A 26000 □ □ □ □□ □ xx
① ② ③ ④ ⑤ ⑥ ⑦ ⑧

①Series
②Output Frequency
③Freq. Temp. Chrst.

A	±0.5×10^{-6}
B	±1.0×10^{-6}
C	±1.5×10^{-6}
D	±2.0×10^{-6}

④Lower Operating Temp.

C	−30°C
E	−20°C
G	−10°C

⑤Upper Operating Temp.

W	+85°C
V	+80°C
U	+75°C

⑥Supply Voltage

18	1.8V	28	2.8V
30	3.0V	33	3.3V

⑦Voltage Control Function

T	TCXO
Spec. Code*	VCTCXO

*Please contact us for Spec. Code.
⑧Individual Specification

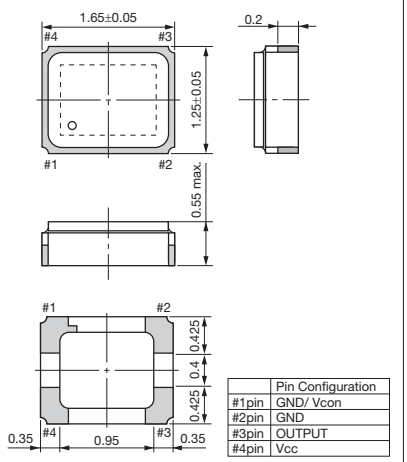
Packaging (Tape & Reel 18000 pcs./ reel)

Specifications

Item	Symbol	Conditions	Min.	Max.	Unit
Output Frequency Range	fo	Standard Output Frequency: 19.2, 26.0, 38.4, 48.0, 52.0, 76.8	19.2	76.8	MHz
Frequency Tolerance	f_tol	vs Temperature	−0.5/ −2	+0.5/ +2	×10^{-6}
		vs Load	−0.2	+0.2	
		vs Voltage	−0.2	+0.2	
Frequency Aging	f_age	Per Year	−1	+1	×10^{-6}
Storage Temperature Range	T_stg		−40	+85	°C
Operating Temperature Range	T_use		−30	+85	°C
Voltage Control Range	f_cont	Positive	±8	±15	×10^{-6}
Supply Voltage	Vcc		1.68	3.63	V
Output Level	Vpp	Clipped Sine*, Load: 10k ohm / / 10pF	0.8	—	Vp−p
Current Consumption	Icc		—	2	mA
Harmonics	—		—	−5	dBc

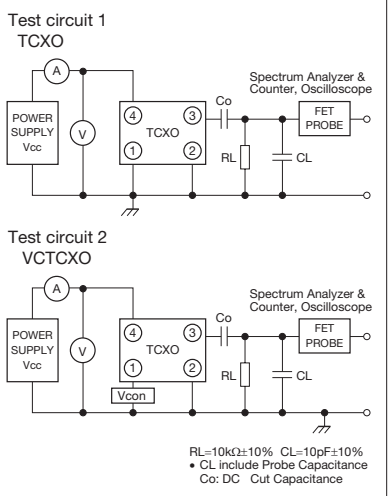
* : A DC-cut capacitor is not embedded in this crystal oscillator. Connect a DC-cut capacitor (≥1nF) to the line-out terminal of the oscillator.
* Please contact us for other specifications.

Dimensions (Unit: mm)

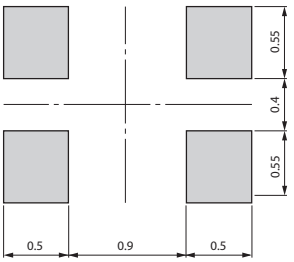


	Pin Configuration
#1pin	GND/ Vcon
#2pin	GND
#3pin	OUTPUT
#4pin	Vcc

Test Circuit

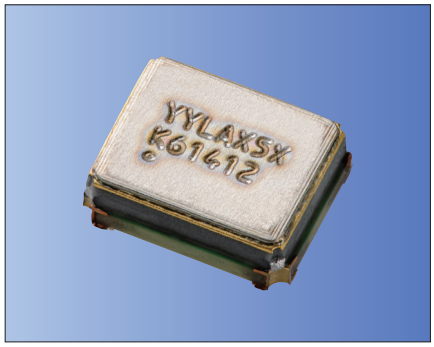


Recommended Land Pattern (Unit: mm)



Note: 0.01μF capacitor between Vcc and GND is recommended for bypass purpose.

2.0×1.6mm



AEC-Q100/ 200 RoHS Compliant
*AEC-Q100 qualified (Option)

Features

- Miniature SMD type (2.0×1.6×0.8mm)
- Freq. temp. characteristics.
  : ±2.0×10^{-6}/ −30 to +85°C
  : ±0.5×10^{-6}/ −30 to +85°C (for GNSS)
- 1.68 to 3.63V available
- Reflow compatible
- Operating Temp. −40 to +105°C (Option)
- Disable Function (Option)

Applications

- Mobile Communications, W-LAN
- Low power radio communications
- GNSS Unit

How to Order

KT2016K 26000 □ □ □ □□ □ xx
① ② ③ ④ ⑤ ⑥ ⑦ ⑧

①Series
②Output Frequency
③Freq. Temp. Chrst.

A	±0.5×10^{-6}
B	±1.0×10^{-6}
C	±1.5×10^{-6}
D	±2.0×10^{-6}

④Lower Operating Temp.

C	−30°C
E	−20°C
G	−10°C

⑤Upper Operating Temp.

W	+85°C
V	+80°C
U	+75°C

⑥Supply Voltage

18	1.8V	28	2.8V
30	3.0V	33	3.3V

⑦Voltage Control Function

T	TCXO
Spec. Code*	VCTCXO

*Please contact us for Spec. Code.
⑧Individual Specification

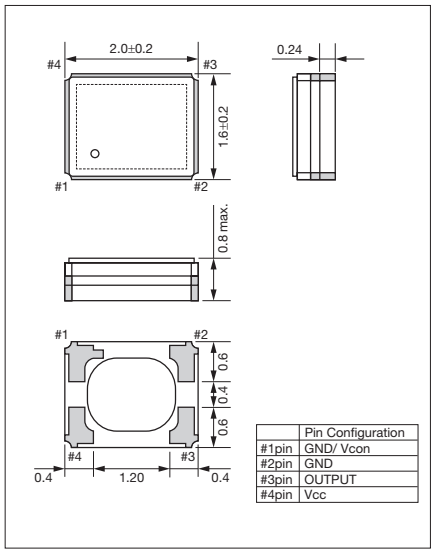
Packaging (Tape & Reel 15000 pcs./ reel)

Specifications

Item	Symbol	Conditions	Min.	Max.	Unit
Output Frequency Range	fo	Standard Output Frequency: 19.2, 26.0, 32.0, 38.4, 48.0, 52.0	19.2	52	MHz
Frequency Tolerance	f_tol	vs Temperature	−0.5/ −2	+0.5/ +2	×10^{-6}
		vs Load	−0.2	+0.2	
		vs Voltage	−0.2	+0.2	
Frequency Aging	f_age	Per Year	−1	+1	×10^{-6}
Storage Temperature Range	T_stg		−40	+85	°C
Operating Temperature Range	T_use		−30	+85	°C
Voltage Control Range	f_cont	Positive	±8	±15	×10^{-6}
Supply Voltage	Vcc		1.68	3.63	V
Output Level	Vpp	Clipped Sine*, Load: 10k ohm / / 10pF	0.8	—	Vp-p
Current Consumption	Icc		—	2	mA
Harmonics	—		—	−5	dBc

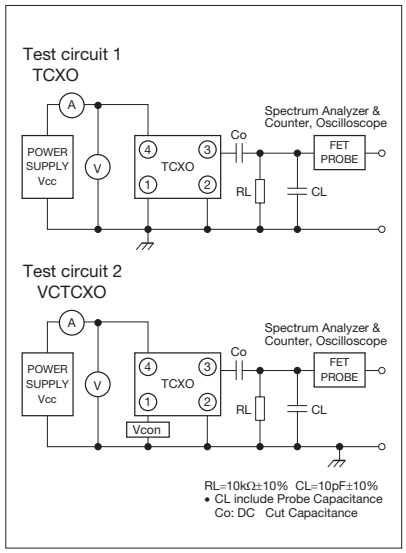
* : A DC-cut capacitor is not embedded in this crystal oscillator. Connect a DC-cut capacitor (≥1nF) to the line-out terminal of the oscillator.
* Please contact us for other specifications.

Dimensions (Unit: mm)

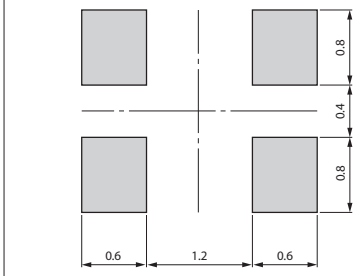


	Pin Configuration
#1pin	GND/ Vcon
#2pin	GND
#3pin	OUTPUT
#4pin	Vcc

Test Circuit

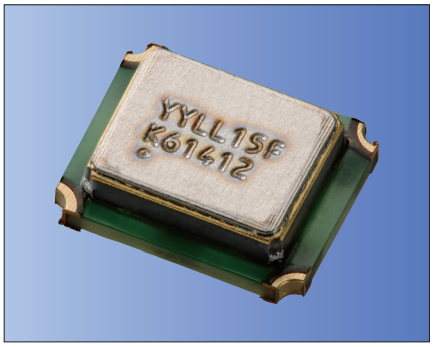


Recommended Land Pattern (Unit: mm)



Note: 0.01μF capacitor between Vcc and GND is recommended for bypass purpose.

2.5×2.0mm



AEC-Q100/ 200 RoHS Compliant
*AEC-Q100 qualified (Option)

Features

- Miniature SMD type (2.5×2.0×0.8mm)
- Freq. temp. characteristics.
  : ±2.0×10^{-6}/ −30 to +85°C
  : ±0.5×10^{-6}/ −30 to +85°C (for GNSS)
- 1.68 to 3.63V drive available
- Reflow compatible
- Operating Temp. −40 to +105°C (Option)
- Disable Function (Option)

Applications

- Mobile Communications, W-LAN
- Low power radio communications
- GNSS Unit

How to Order

KT2520K 26000 □ □ □ □□ □ xx
① ② ③ ④ ⑤ ⑥ ⑦ ⑧

①Series
②Output Frequency
③Freq. Temp. Chrst.

A	±0.5×10^{-6}
B	±1.0×10^{-6}
C	±1.5×10^{-6}
D	±2.0×10^{-6}

④Lower Operating Temp.

C	−30°C
E	−20°C
G	−10°C

⑤Upper Operating Temp.

W	+85°C
V	+80°C
U	+75°C

⑥Supply Voltage

18	1.8V	28	2.8V
30	3.0V	33	3.3V

⑦Voltage Control Function

T	TCXO
Spec. Code*	VCTCXO

*Please contact us for Spec. Code.
⑧Individual Specification

Packaging (Tape & Reel 12000 pcs./ reel)

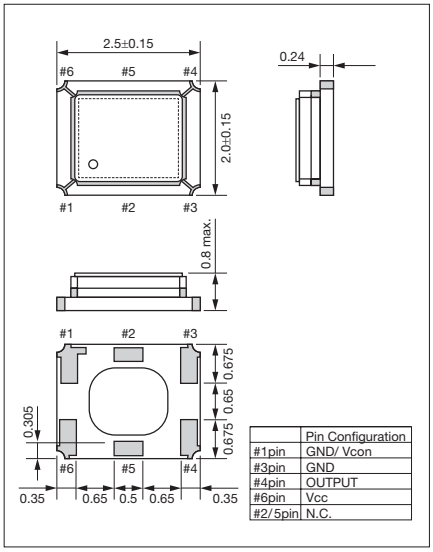
Specifications

Item	Symbol	Conditions	Min.	Max.	Unit
Output Frequency Range	fo	Standard Output Frequency: 19.2, 26.0, 32.0, 38.4, 48.0, 52.0	19.2	52	MHz
Frequency Tolerance	f_tol	vs Temperature	−0.5/ −2	+0.5/ +2	×10^{-6}
		vs Load	−0.2	+0.2	
		vs Voltage	−0.2	+0.2	
Frequency Aging	f_age	Per Year	−1	+1	×10^{-6}
Storage Temperature Range	T_stg		−40	+85	°C
Operating Temperature Range	T_use		−30	+85	°C
Voltage Control Range	f_cont	Positive	±8	±15	×10^{-6}
Supply Voltage	Vcc		1.68	3.63	V
Output Level	Vpp	Clipped Sine*, Load: 10k ohm / / 10pF	0.8	—	Vp-p
Current Consumption	Icc		—	2	mA
Harmonics	—		—	−5	dBc

* : A DC-cut capacitor is not embedded in this crystal oscillator. Connect a DC-cut capacitor (≥1nF) to the line-out terminal of the oscillator.
* Please contact us for other specifications.

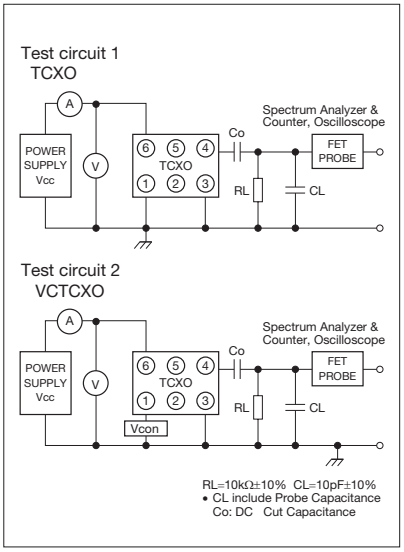
Dimensions

(Unit: mm)



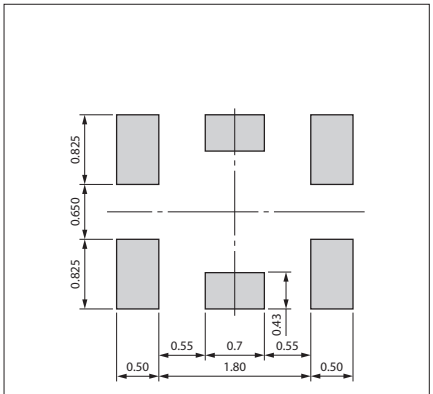
	Pin Configuration
#1pin	GND/ Vcon
#3pin	GND
#4pin	OUTPUT
#6pin	Vcc
#2/5pin	N.C.

Test Circuit



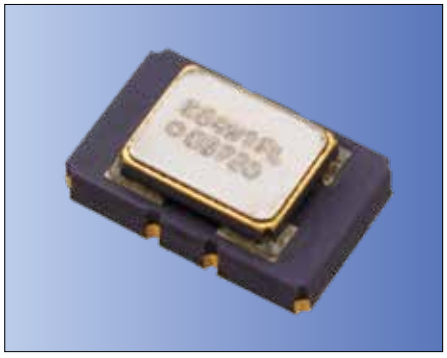
Recommended Land Pattern

(Unit: mm)



Note: 0.01μF capacitor between Vcc and GND is recommended for bypass purpose.

5.0×3.2mm



RoHS Compliant

Features

- High stability and high reliability
- 2.3 to 3.63V drive available
- Clipped sine wave or CMOS level output
- Low phase noise
- Operating Temp. −40 to +105°C (Option)

Applications

- 5G, Smallcell, Stratum3
- SONET/ SDH/ Ethernet
- SyncE/ IEEE 1588

How to Order

KT5032F 20000 □ □□ 33 T xx
① ② ③ ④ ⑤ ⑥ ⑦

①Series

②Output Frequency

③Frequency Tolerance

U	±0.5×10⁻⁶
K	±0.28×10⁻⁶
A	±0.1×10⁻⁶

④Operating Temperature Range

GT	-10°C to 70°C
AW	-40°C to 85°C
AY	-40°C to 105°C

⑤Supply Voltage

33	3.3V

⑥Voltage Control Function

T	TCXO
Spec. Code*	VCTCXO

*Please contact us for Spec. Code.

⑧Individual Specification

Packaging (Tape & Reel 1000 pcs./ reel)

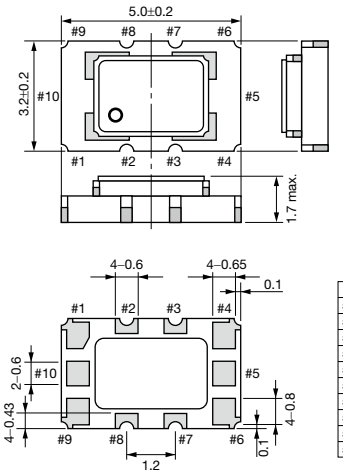
Specifications

Item	Symbol	Conditions		Min.	Max.	Unit
Output Frequency Range	fo	Standard Frequency: 10, 19.2, 20, 24.576, 26, 30.72, 38.88, 40		10	40	MHz
Frequency Tolerance	f_tol	vs Temperature [±(fmax-fmin)/ 2fo]		−0.5	+0.5	×10⁻⁶
				−0.28	+0.28	
				−0.1	+0.1	
		vs Voltage		−0.1	+0.1	
Supply Voltage	Vcc			+2.3	+3.63	V
Current Consumption	Icc	CMOS Output		—	6	mA
Frequency Aging	f_age	20years aging @40°C Including temp characteristics, initial tolerance, rated power supply voltage change and load change.		−4.6	+4.6	×10⁻⁶
Voltage Control Range	f_cont	Positive *100k ohm min		±5	±20	×10⁻⁶
Output Level	Vpp	Clipped Sine*, Load: 10k ohm // 10pF		0.8	—	Vp-p
Low Level Output Voltage	VOL	CMOS, Load: 15pF IOL=4mA		—	10% Vcc	V
High Level Output Voltage	VOH	CMOS, Load: 15pF IOH=−4mA		90% Vcc	—	V
Rise / Fall Time (10%Vcc to 90%Vcc)	Tr/ Tf	CMOS, Load: 15pF		—	8	ns
Symmetry	SYM	50% Vcc		45	55	%
Phase Noise	—	@20MHz	@10Hz offset	—	−90	dBc/ Hz
			@100Hz offset	—	−120	
			@1kHz offset	—	−140	
			@10kHz offset	—	−150	
			@100kHz offset	—	−150	

* : A DC-cut capacitor is not embedded in this crystal oscillator. In case of clipped sine output, connect a DC-cut capacitor (≥1nF) to the line-out terminal of the oscillator.
* Please contact us for other specifications.

Dimensions

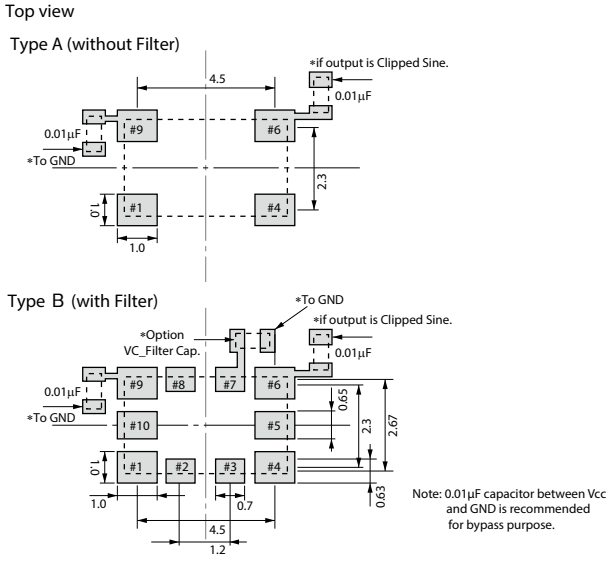
(Unit: mm)



	Pin Configuration
#1pin	Voltage Control (VCTCXO), GND (TCXO)
#2pin	Do not connect
#3pin	Do not connect
#4pin	GND
#5pin	GND
#6pin	Output
#7pin	Vcfilter/ N/ C
#8pin	Do not connect
#9pin	Vcc
#10pin	GND

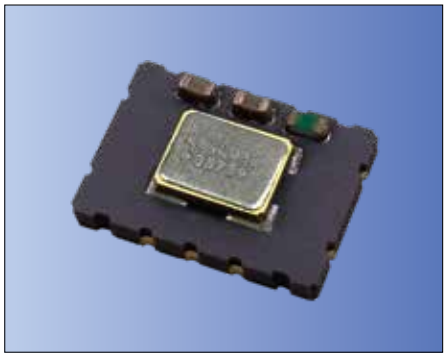
Recommended Land Pattern

(Unit: mm)



As of November 2021

7.0×5.0mm



RoHS Compliant

Features

- High stability and high reliability
- 2.3 to 3.63V drive available
- Clipped sine wave or CMOS level output
- Low phase noise
- Disable Function (KT7050A)
- Operating Temp. −40 to +105°C (Option)

Applications

- 5G, Smallcell, Stratum3
- SONET/ SDH/ Ethernet
- SyncE/ IEEE 1588

- Compliant to the GR1244-Core & GR253-Core
- Recommended in Microsemi's ZLAN-68 app. note for Stratum3 applications based on tests performed by Kyocera.

How to Order

KT7050 □ 20000 □ □□ 33 T xx
① ② ③ ④ ⑤ ⑥ ⑦ ⑧

①Series
③Output Frequency
④Freq. Temp. Chrst.

U	±0.5×10⁻⁶
K	±0.28×10⁻⁶
A	±0.1×10⁻⁶

⑥Supply Voltage

33	3.3V

②Land Type

A	10Pads
B	4Pads

⑤Operating Temperature Range

GT	-10°C to 70°C
AW	-40°C to 85°C
AY	-40°C to 105°C

⑦Voltage Control Function

T	TCXO
Spec. Code*	VCTCXO

*Please contact us for Spec. Code.

⑨Individual Specification
Packaging (Tape & Reel 1000 pcs./ reel)

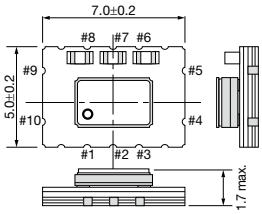
Specifications

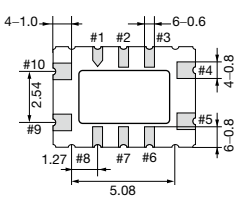
Item	Symbol	Conditions		Min.	Max.	Unit
Output Frequency Range	fo	Standard Frequency: 10, 19.2, 20, 24.576, 26, 30.72, 38.88, 40		10	40	MHz
Frequency Tolerance	f_tol	vs Temperature [±(fmax-fmin)/ 2fo]		−0.5	+0.5	×10⁻⁶
				−0.28	+0.28	
				−0.1	+0.1	
		vs Voltage		−0.1	+0.1	
Supply Voltage	Vcc			+2.7	+5.5	V
Current Consumption	Icc	CMOS Output		—	6	mA
Frequency Aging	f_age	20years aging @40°C Including temp characteristics, initial tolerance, rated power supply voltage change and load change.		−4.6	+4.6	×10⁻⁶
Voltage Control Range	f_cont	Positive *100k ohm min		±5	±20	×10⁻⁶
Output Level	Vpp	Clipped Sine, Load: 10k ohm // 10pF		0.8	—	Vp-p
Low Level Output Voltage	VOL	CMOS, Load: 15pF IOL=4mA		—	10% Vcc	V
High Level Output Voltage	VOH	CMOS, Load: 15pF IOH=−4mA		90% Vcc	—	V
Rise / Fall Time (10%Vcc to 90%Vcc)	Tr/ Tf	CMOS, Load: 15pF		—	8	ns
Symmetry	SYM	50% Vcc		45	55	%
Phase Noise	—	@20MHz	@10Hz offset	—	−90	dBc/ Hz
			@100Hz offset	—	−120	
			@1kHz offset	—	−140	
			@10kHz offset	—	−150	
			@100kHz offset	—	−150	

* Please contact us for other specifications.

Dimensions

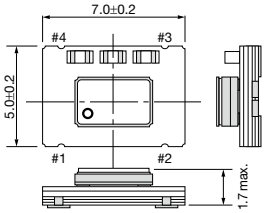
KT7050A

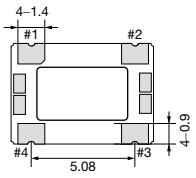




Pin Connection	
#1	Do not connect (Pin1)
#2/3	Do not connect
#4	GND
#5	Output
#6/7	Do not connect
#8	Tri-state Enable/ Disable connect
#9	Vcc
#10	Voltage Control (VCTCXO), GND (TCXO)

KT7050B

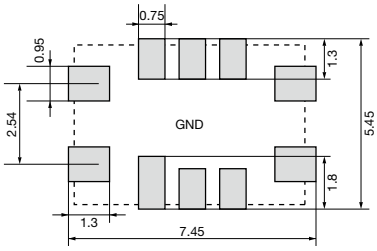


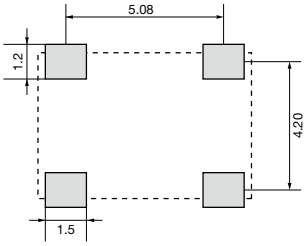


Pin Connection	
#1	Voltage Control (VCTCXO), GND (TCXO)
#2	GND
#3	Output
#4	Vcc

Recommended Land Pattern

(Unit: mm)





As of November 2021

1. Shock & Drop / Vibration

Do not inflict excessive shock and mechanical vibration that exceeds the norm, such as hitting or mistakenly dropping, when transporting and mounting on a board. There are cases when pieces of crystal break, and pieces that are used become damaged, and become inoperable. When a shock or vibration that exceeds the norm has been inflicted, make sure to check the characteristics.

2. Cleaning

Since a crystal piece can be broken by resonance when a crystal device is cleaned by ultrasonic cleaning, be careful when carrying out ultrasonic cleaning.

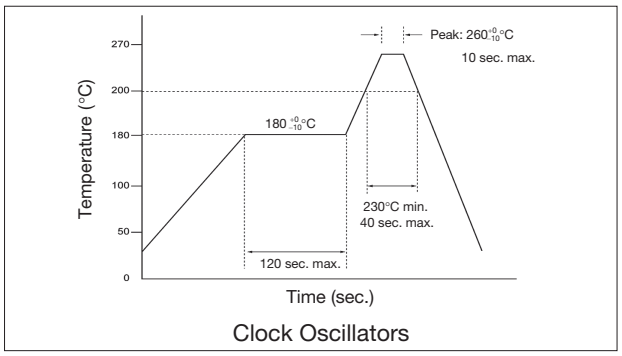
3. Soldering conditions

To maintain the product reliability, please follow recommended conditions.

Standard soldering iron conditions

	Clock Oscillators
Soldering iron	280°C to 340°C
Time	3+1/ −0 sec. max.

Reflow conditions (Example)



Clock Oscillators

Recommended reflow Conditions vary depending upon products.
Please check with the respective specification for details.

4. Mounting Precautions

The lead of the device and the pattern of the board is soldered on the surface. Since extreme deformation of the board tears off the pattern, tears off the lead metal, cracks the solder and damages the sealed part of the device and there are cases in which performance deteriorates and operation fails, use it within the stipulated bending conditions. Due to the small cracks in the board resulting from mounting, please pay sufficient attention when attaching a device at the position where the warping of the board is great.
When using an automatic loading machine, as far as possible, select a type that has a small impact and use it while confirming that there is no damage.
Surface mount devices are NOT flow soldering compatible.

5. Storage Condition

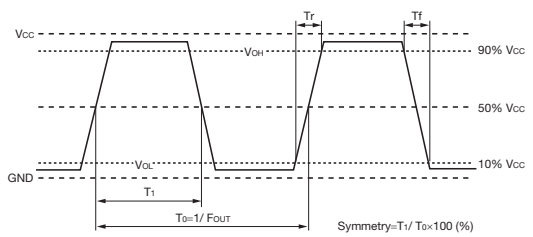
Since the long hour high temperature and low temperature storage, as well as the storage at high humidity are causes of deterioration in frequency accuracy and solderability.
Parts should be stored in temperature range of −5 to +40°C, humidity 40 to 60% RH, and avoid direct sunlight. Then use within 6 months.

6. In order to use clock oscillators

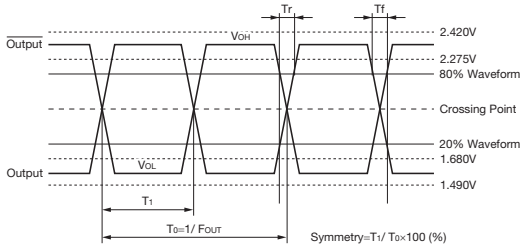
(1) The miniature oscillator for the clock utillzes a CMOS IC and incorporates a protective circuit against static electricity. However, exercise care in the same manner as for a normal CMOS IC.
(2) Internal capacitor is not provided in the power supply section (+DC-GND). *
To serve as overimpressed voltage and overcurrent protective device, place a bypass capacitor (0.01µF) as near as possible to the (+DC-GND) terminal. However, the capacitance value is meant as a guideline. Depending on the capacitor type, frequency characteristics vary. Accordingly, use a capacitor that matches the frequency characteristics.
* KC7050S series has Bypass Capacitior between Vcc and GND.
(3) Applying reverse voltage could result in damage to internal parts. Take care not to connect terminals incorrectly.
(4) Please do not use oscillators under unfavorable condition such as beyond specified range in catalog or specification sheet.
(5) Please keep oscillators away from water, salt water or harmful gas.
(6) KC7050S series should be stored in humidity-controlled area after the package is unsealed, in temperature +25±5°C, under humidity of 65%RH, and should be mounted on PCB within 7 days.
(7) Frequency drift may occur as a result of application of light such as direct sunlight or LED light etc when operating clock oscillator Z series MC-Z series.
Please use in a design and environment that consider light shielding.
Note the frequency drift will not occur if used in a light-shielded environment.

Clock Timing Chart

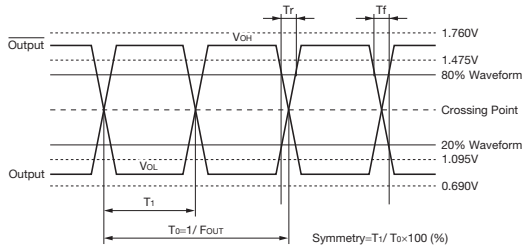
[CMOS Output]



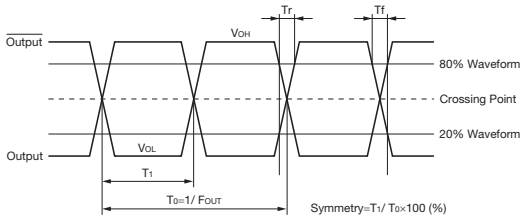
[LV-PECL (3.3V) Output]



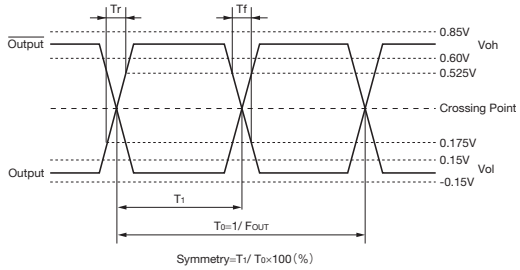
[LV-PECL (2.5V) Output]



[LVDS Output]

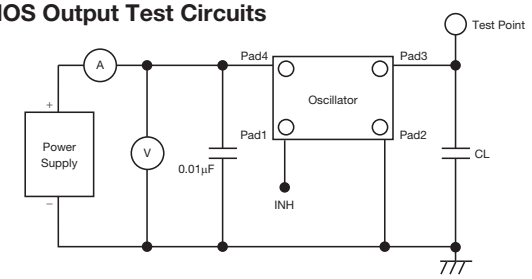


[HCSL-Output]



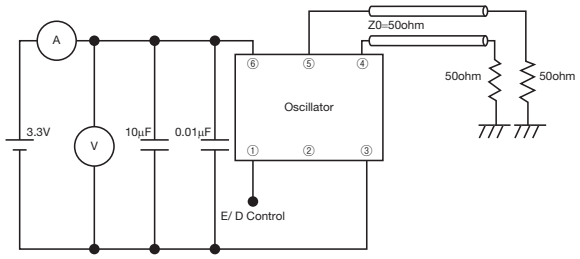
Test Circuits

CMOS Output Test Circuits

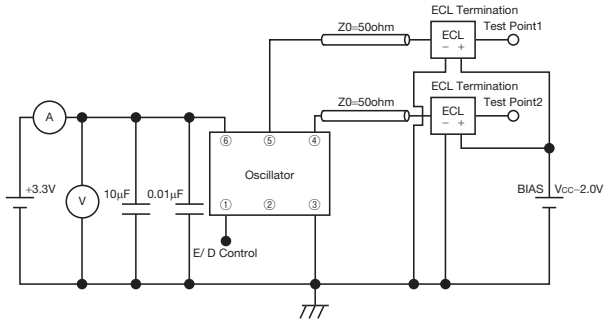


Note) Maximum load (Includes capacitances of fixture and probe)

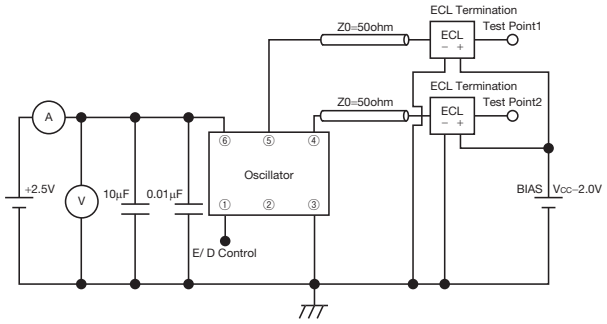
HCSL Output Test Circuits



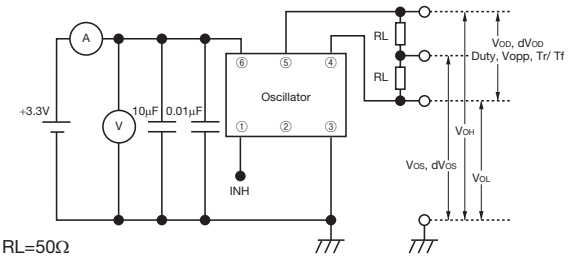
LV-PECL (3.3V/ XO) Output Test Circuits



LV-PECL (2.5V/ XO) Output Test Circuits

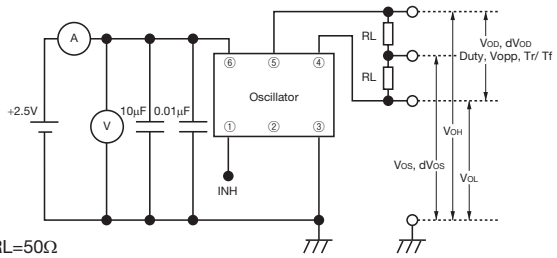


LVDS (3.3V/ XO) Output Test Circuits



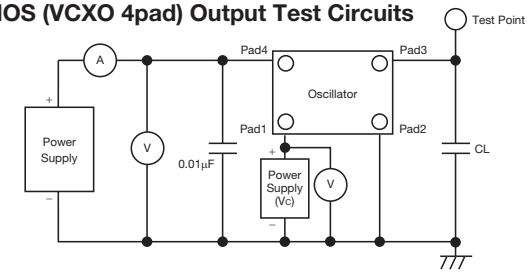
Note) RL=50Ω

LVDS (2.5V/ XO) Output Test Circuits



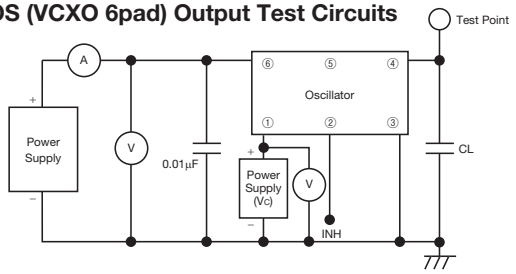
Note) RL=50Ω

CMOS (VCXO 4pad) Output Test Circuits



Note) Maximum load (Includes capacitances of fixture and probe)

CMOS (VCXO 6pad) Output Test Circuits



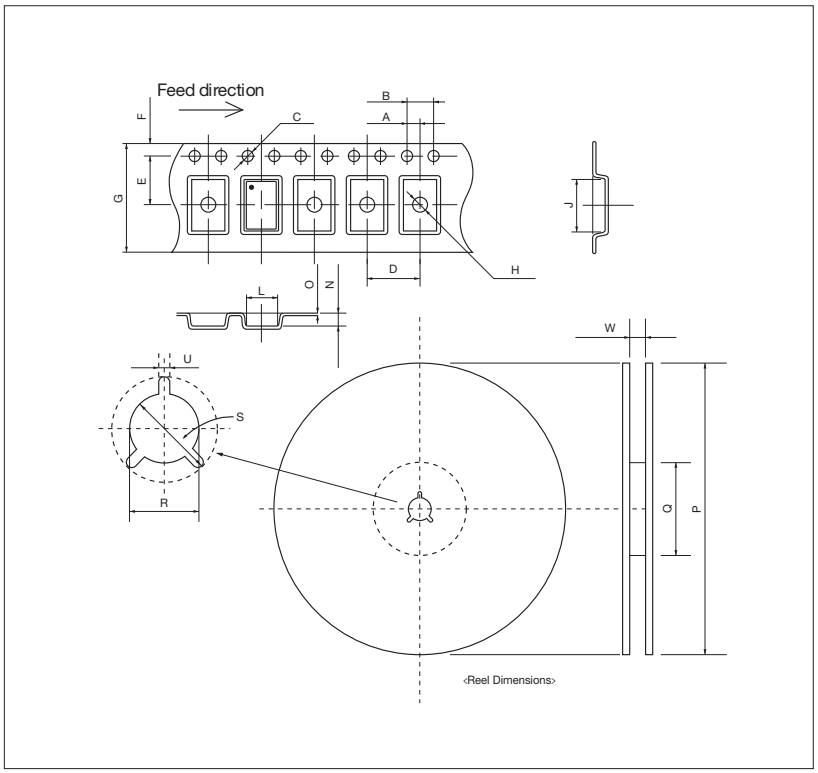
Note) Maximum load (Includes capacitances of fixture and probe)

Tape & Reel Specifications

■Clock Oscillators, Voltage Controlled Crystal Oscillators ■Temperature Compensated Crystal Oscillators (TCXO)

		KC2016Z KC2016K MC2016Z MC2016K	KC2520B KC2520K KC2520Z MC2520K MC2520Z	KC3225K KC3225Z MC3225K MC3225Z	KC5032K KC5032P KC5032Z MC5032K MC5032Z KV5032G KV5032R	KC7050G KC7050K KC7050P KC7050R KC7050Z MC7050K MC7050Z KV7050B KV7050G KV7050R	KT1612A	KT2016K	KT2520K	KT5032F	KT7050
TAPE	A	2.0±0.05	2.0±0.05	2.0±0.05	1.5+0.1/ −0	2.0±0.1	2.0±0.05	2.0±0.05	2.0±0.05	2.0±0.05	2.0±0.1
	B	4.0±0.1	4.0±0.1	4.0±0.1	4.0±0.1	4.0±0.1	4.0±0.05	4.0±0.1	4.0±0.1	4.0±0.1	4.0±0.1
	C	ϕ1.5+0.1/ −0	ϕ1.5+0.1/ −0	ϕ1.5+0.1/ −0	ϕ1.5+0.1/ −0	ϕ1.5±0.1	ϕ1.5+0.1/ −0	ϕ1.5+0.1/ −0	ϕ1.5+0.1/ −0	ϕ1.55±0.05	ϕ1.5+0.1/ −0
	D	4.0±0.1	4.0±0.1	4.0±0.1	8.0±0.1	8.0±0.1	4.0±0.1	4.0±0.1	4.0±0.1	8.0±0.1	8.0±0.1
	E	3.5±0.05	3.5±0.05	3.5±0.05	5.5±0.05	7.5±0.1	3.5±0.05	3.5±0.05	3.5±0.05	5.5±0.05	7.5±0.1
	F	1.75±0.1	1.75±0.1	1.75±0.1	1.75±0.1	1.75±0.1	1.75±0.1	1.75±0.1	1.75±0.1	1.75±0.1	1.75±0.1
	G	8.0±0.2	8.0±0.2	8.0±0.2	12.0±0.3	16.0±0.2	8.0±0.2	8.0±0.2	8.0+0.3/ −0.2	12.0±0.2	16.0+0.3/ −0.1
	H	ϕ1.05±0.1	ϕ1.1±0.1	ϕ1.5+0.1/ 0	ϕ1.5+0.1/ 0	ϕ1.55±0.1	ϕ0.5±0.05	ϕ1.0+0.1/ −0	ϕ1.1±0.1	ϕ1.55±0.05	ϕ1.55±0.05
	J	2.25±0.1	2.7±0.1	3.5±0.05	5.5±0.1	7.4±0.1	1.85±0.1	2.4±0.05	2.9±0.1	5.9±0.1	8.21±0.1
	L	1.85±0.1	2.2±0.1	2.8±0.05	3.7±0.1	5.4±0.1	1.45±0.1	2.0±0.05	2.4±0.1	3.7±0.1	5.78±0.1
	N	0.95±0.1	1.0±0.1	1.1±0.05	1.4±0.1	2.0±0.1	0.65±0.05	0.9±0.05	1.15±0.1	2.0±0.1	2.16±0.1
	O	0.2±0.05	0.2±0.05	0.25±0.05	0.3±0.05	0.3±0.05	0.2±0.05	0.25±0.05	0.25±0.05	0.3±0.05	0.3±0.05
REEL	P	ϕ180+0/ −3	ϕ180+0/ −3	ϕ180+0/ −3	ϕ180+0/ −3	ϕ180+0/ −3	ϕ330+0/ −2	ϕ330+0/ −2	ϕ330+0/ −2	ϕ254±2.0	ϕ254±2.0
	Q	ϕ60+1/ −0	ϕ60+1/ −0	ϕ60+1/ −0	ϕ60+1/ −0	ϕ60+1/ −0	ϕ100±1.0	ϕ100±1.0	ϕ100±1.0	ϕ100±1.0	ϕ100+1.0/ −0
	R	ϕ13±0.2	ϕ13±0.2	ϕ13±0.2	ϕ13±0.2	ϕ13±0.2	ϕ13±0.2	ϕ13±0.2	ϕ13±0.2	ϕ13±0.2	ϕ13±0.2
	S	ϕ21±0.8	ϕ21±0.8	ϕ21±0.8	ϕ21±0.8	ϕ21±0.8	ϕ21±0.8	ϕ21±0.8	ϕ21±0.8	ϕ21±0.8	ϕ21±0.8
	U	2.0±0.5	2.0±0.5	2.0±0.5	2.0±0.5	2.0±0.5	2.0±0.5	2.0±0.5	2.0±0.5	2.0±0.5	2.0±0.5
	W	9.0+0.3/ −0	9.0+0.3/ −0	9.0±0.3	13.0±0.3	17±0.2	9.4+1.0/ −0.5	9.4+1.0/ −0.5	9.4+1.0/ −0.5	13.5±1.0	16.4+1.0/ −0
Qty.		2000	2000	2000	1000	1000	18000	15000	12000	1000	1000

(Unit: mm)



‹Reel Dimensions›

1. Specifications described in this catalog are for references. Products specifications shall be based on written documents agreed by each party.

2. Contents in this catalog are subject to change without notice. It is recommended to confirm the latest information at the time of usage. Also, Kyocera Electronic Components Catalog is revised once a year. We may not be able to accept requests based on old catalogs.

3. Products in this catalog are intended to be used in general electronic equipment such as office equipment, audio and visual equipment, communication equipment, measurement instrument and home appliances. It is absolutely recommended to consult with our sales representatives in advance upon planning to use our products in applications which require extremely high quality and reliability such as aircraft and aerospace equipment, traffic systems, safety systems, power plant and medical equipment including life maintenance systems.

4. Even though we strive for improvements of quality and reliability of products, it is requested to design with enough safety margin in equipment or systems in order not to threaten human lives directly or damage human bodies or properties by an accidental result of products.

5. It is requested to design based on guaranteed specifications for such as maximum ratings, operating voltage and operating temperature. It is not the scope of our guarantee for unsatisfactory results due to misuse or inadequate usage of products in the catalog.

6. Operation summaries and circuit examples in this catalog are intended to explain typical operation and usage of the product. It is recommended to perform circuit and assembly design considering surrounding conditions upon using products in this catalog.

7. Technical information described in this catalog is meant to explain typical operations and applications of products, and it is not intended to guarantee or license intellectual properties or other industrial rights of the third party or Kyocera.

8. Trademarks, logos and brand names used in this catalog are owned by Kyocera or the corresponding third party.

9. Certain products in this catalog are subject to the Foreign Exchange and Foreign Trade Control Act of Japan, and require the license from Japanese Government upon exporting the restricted products and technical information under the law.
   Besides, it is requested not to use products and technical information in the catalog for the development and/or manufacture of weapons of mass destruction or other conventional weapons, nor to provide them to any third party with the possibility of having such purposes.

10. It is prohibited to reprint and reproduce a part or whole of this catalog without permission.

11. Contents described herein are as of August 2021.

The information contained in this catalog is current as of August 2021.