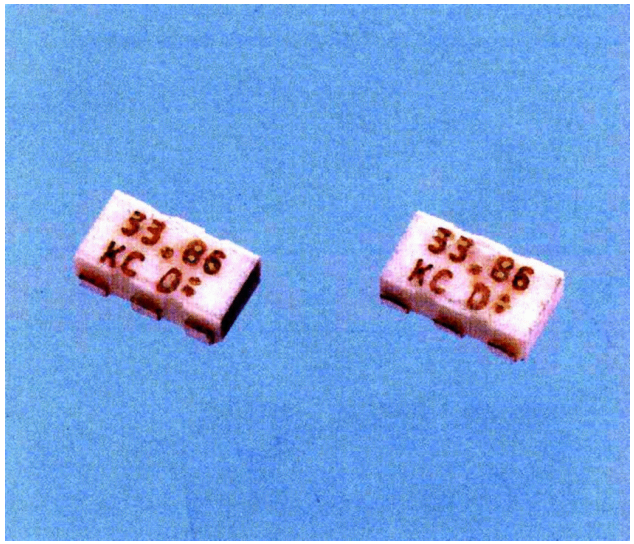
Ultra Miniature Chip Resonator

SSR series (16 to 60MHz)



Piezoelectric Comp. Division

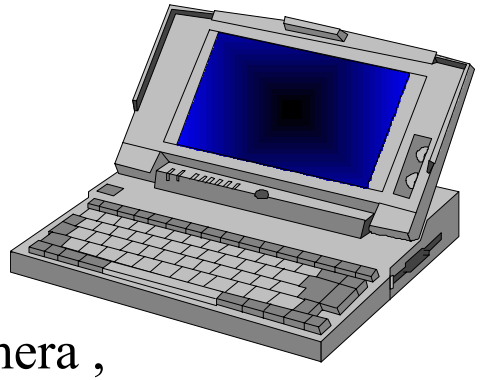
Electronic Comp. Group

KYOCERA Corporation

Outline

SSR is a ultra miniature and high performance chip resonator with built-in capacitors. SSR was developed with technologies of precision fabrication and assembly using Kyocera piezo ceramic which has superior electrical characteristics.

This miniature resonator has the most suitable application in portable equipment with need high density assembly for down sizing.



Applications

Clock for Various Micro Computer

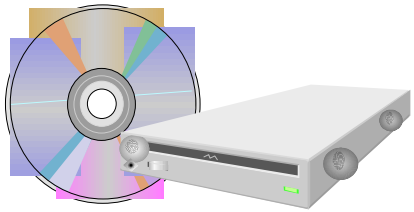
- Portable Equipment

  Cellular Telephone (CDMA) , Camcorder , Digital Camera ,

  Portable Audio & Visual Equipment , Personal Digital Assistant , etc.

- Personal Computer Peripherals

  CD-ROM , DVD , HDD , Printer , etc.



Features

1 **Ultra Miniature & Light Weight**

(3.2 * 2.1 * 1.5 / 0.010cc , 0.03g)

Ultra miniature size enables high density assembly.

High speed assembly is feasible with universal pick and place machine.

2 **High Performance**

Superior resonant and temperature characteristics.

3 **Built-in Capacitors**

Simplify the circuit, reduce parts and assembly cost.

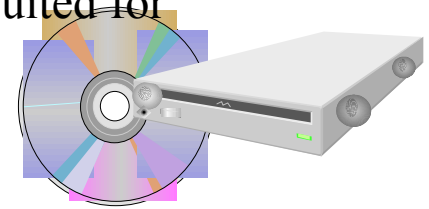
4 **Resistant to Shocks**

Highly resistant against drop and vibration, and best suited for portable equipment.

How to Order

SSR	27.00	B	R -	C15
a	b	c	d	e

a. Model-1
b. Oscillating frequency
c. Model -2
d. Packaging
   Taping & reel
e. Custom use



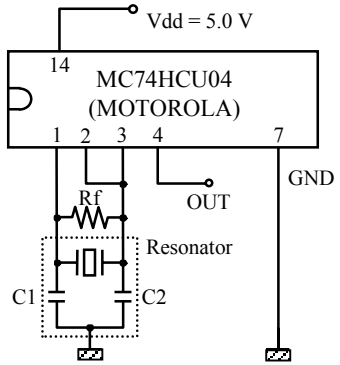
Specifications

1. Electrical Characteristics

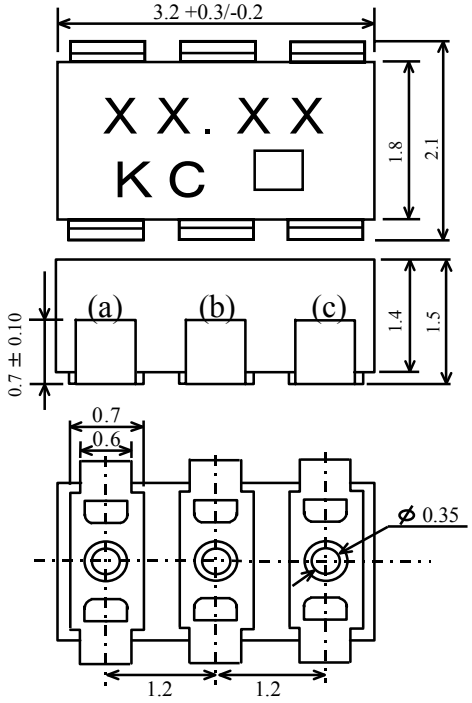
Oscillating frequency	16.0～60.0MHz *1)
Frequency tolerance	±0.5%
Resonant impedance	100Ω max..
Temperature stability	±0.3% （-20～+80℃） to initial value
Insulation Resistance	100MΩ min.（10V D.C.）
Operating temp. range	-20～+80℃
Storage temp. range	-30～+85℃
Aging for 10 years	±0.3% max.. to initial value

*1) There are cases where we can not meet spec. depending on the frequency.

Measuring circuit



2. Dimensions

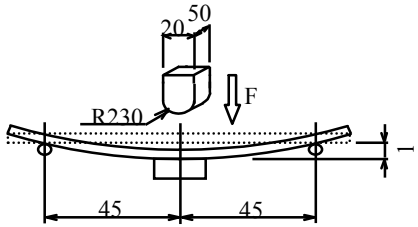


XX.XX	: Oscillating frequency
□	: Date code
Tolerance	: +/- 0.2
Unit	: mm
(a), (c)	: input / output (changeable)
(b)	: GND

Specifications

3. Environmental Characteristics

項目 Items	試験条件 Condition	判定 Criteria
耐湿特性 Humidity	温度60 ±5 ℃ ,湿度 90 ～ 95%RH , 1000+12/-0 時間 60+/-5 deg.C , 90 to 95%RH , 1000 +12/-0 Hrs.	表1を満足する meet spec. (Table 1)
耐高温特性 High Temperature	温度85 ±5 ℃ , 1000 +12/-0 時間 85+/-5 deg.C , 1000 +12/-0 Hrs.	
耐低温特性 Low Temperature	温度-40 ±5 ℃ , 1000 +12/-0 時間 -40+/-5 deg.C , 1000 +12/-0 Hrs.	
温度サイクル Heat Cycle	温度-55 ±5 ℃←→+85 ±5 ℃, 各30 分　以上を5 サイクル -55+/-5 deg.C to +85+/-5 deg.C , 30 min. each , 5 cycles	
耐振動特性 Vibration	全振幅 1.5 mm , 10 ～ 55 Hz/ 分 , XYZ 3 方向　各1 時間 amplitude 1.5 mm , 10 to 55 Hz/min. , XYZ 3 directions 1Hr. each	
耐衝撃特性 Mechanical Shock	ｺﾝｸﾘｰﾄ上1ｍの高さより3回自然落下 free fall on concrete block from 1m height 3 times	
半田付け性 Solderability	ﾛｼﾞﾝのﾒﾀﾉｰﾙ溶液に5秒浸した後、半田温度235 ± 5℃、浸漬時間2 ±0.5 秒 After soaked in Rosin / Methanol solution , soaked in bath of Pd/Sn solder at 235 +/- 5 deg.C, 2+/-0.5 sec.	電極表面の 95% 以上半田で濡れる soldered more than 95% of electrode
リフロー耐熱性 Reflow Soldering	予熱150～180℃ 1分 ,ﾋﾟｰｸ温度 230 ±5℃、200℃以上　20秒以内 preheat 150 to 180 deg.C for 1min. , max. Temp. 230 +/-5deg.C & above 200 deg.C for 20sec. max.	表1を満足する meet spec. (Table 1)
基板たわみ強度 Bend Strength	所定のﾌﾟﾘﾝﾄ基板上に半田付けし、下図の様に 1mmのたわみを加える。 After soldered on the board , load 1mm bent to the board	外観に異常が発生しない no defect in the appearance



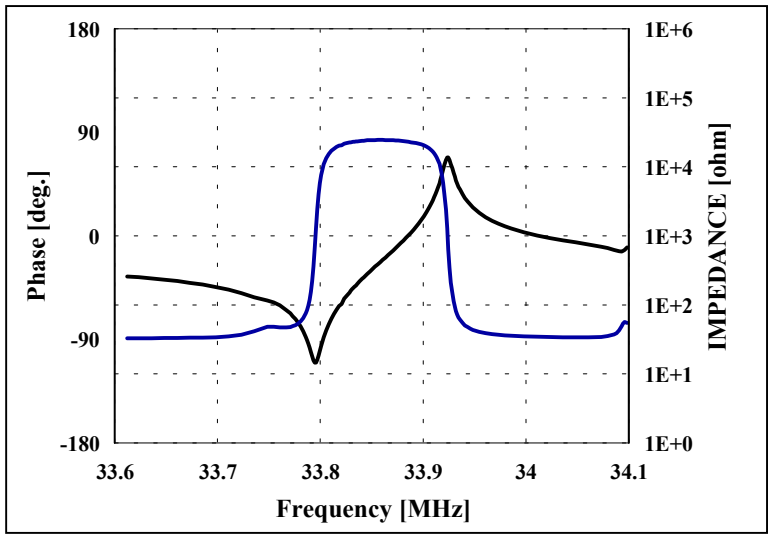
P.C.board
Material : Glass-epoxy
Thickness : 0.8mm
Size : 100 mm × 40 mm

Table 1

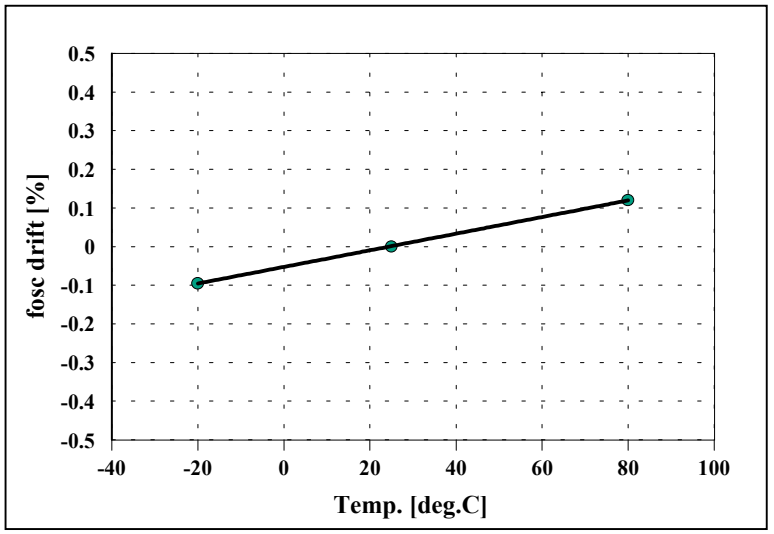
	規格値 Specifications
発振周波数の変化 Oscillating frequency	±0.3%以下（初期値からの変化） +/- 0.3% max. from intial value
共振抵抗値の値 Resonant impedance	110 ohm 以下. 110 ohm max.

Electrical Characteristics

1. Impedance/Phase Characteristics



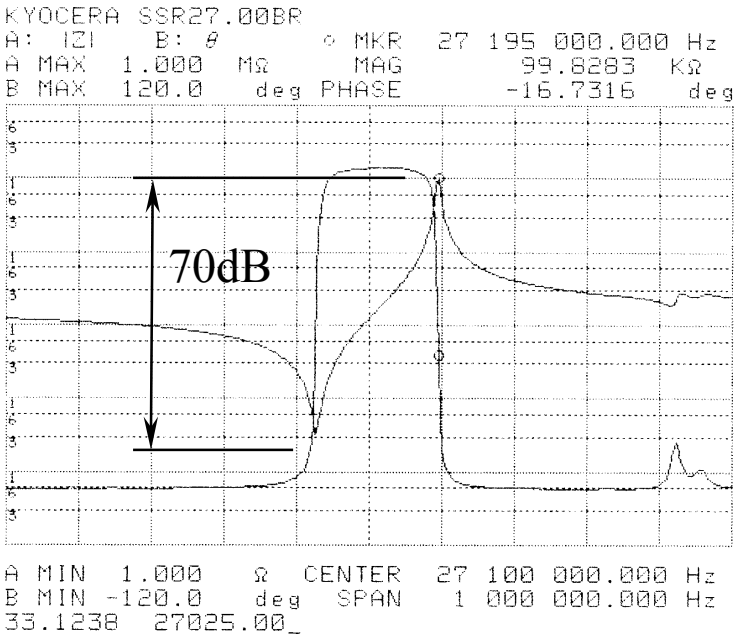
2. Temperature Characteristics



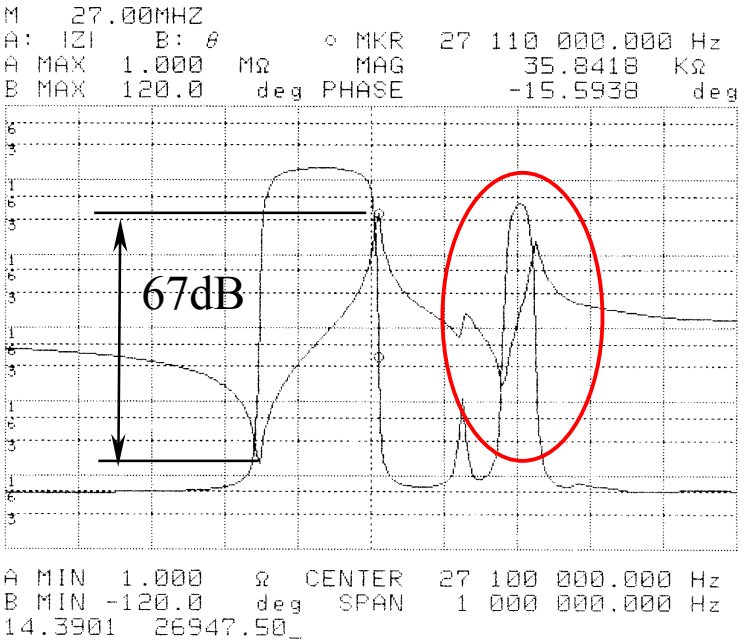
Ultra Miniature Chip Resonator SSR series

Comparison with Impedance/Phase Characteristics

KYOCERA SSR 27.00B



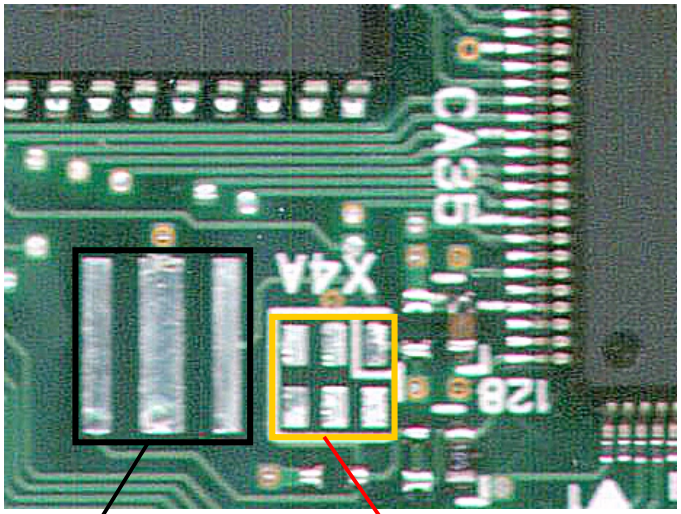
Other vender



Ultra Miniature Chip Resonator SSR series

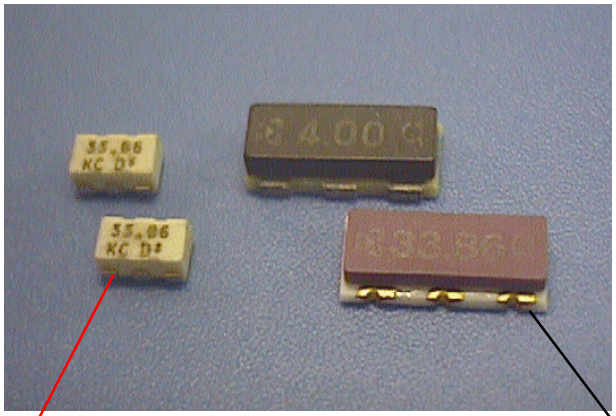
Comparison with Size

Comparison of circuits



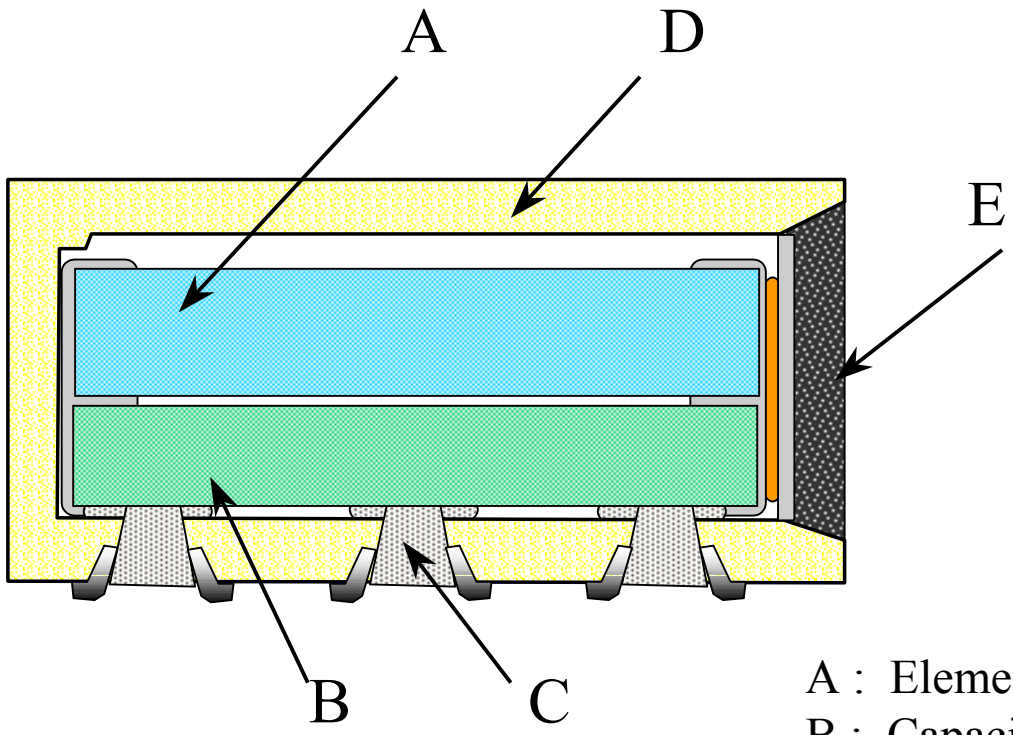
Other series **SSR series**

Comparison of sizes (between Kyocera products)



SSR series **PBRC series**

Construction



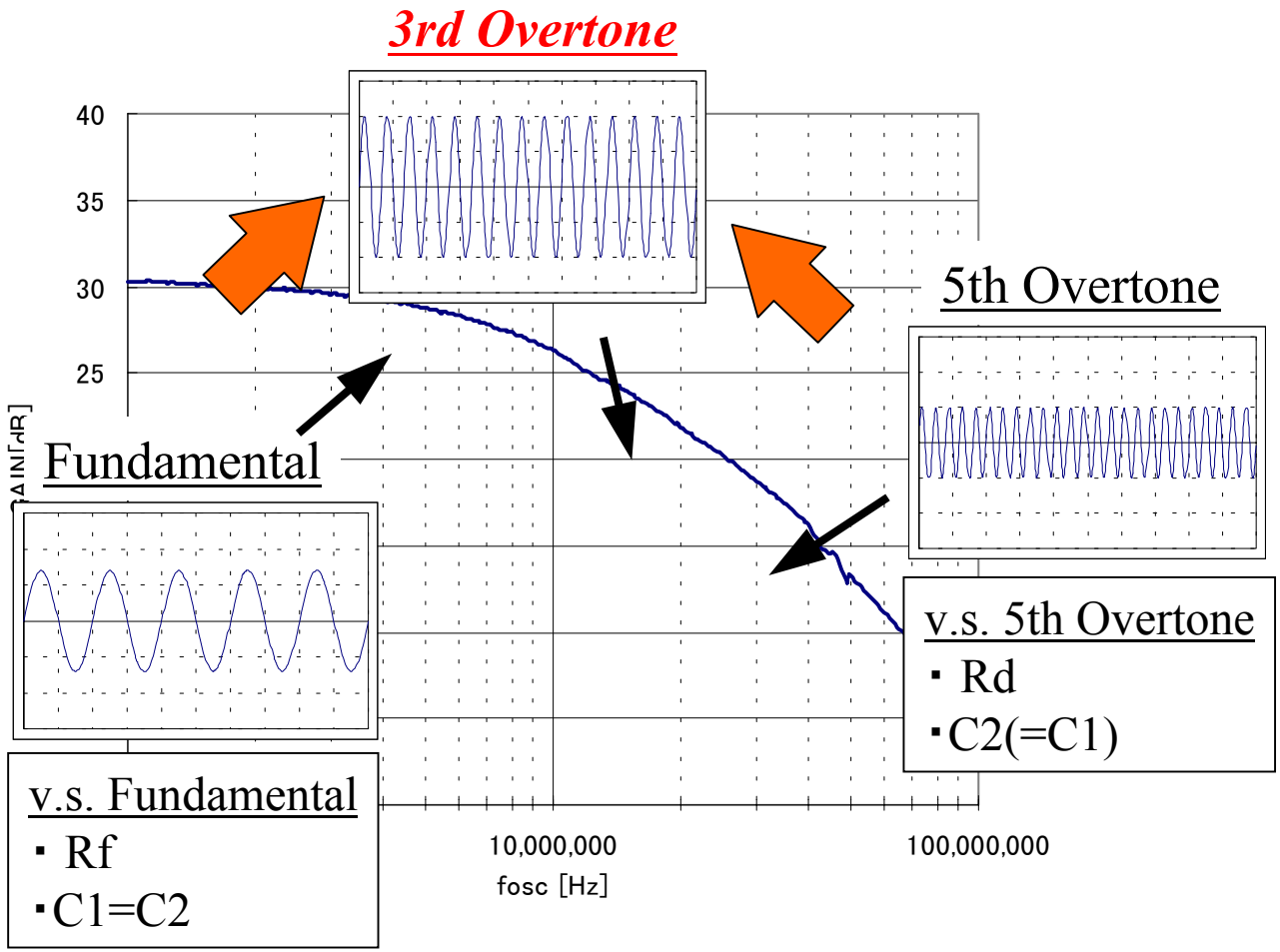
A : Element
B : Capacitor
C : Conductive paste
D : Case
E : Resin

Circuit Design

Quickly IC Matching Service

Judgement
- Osc. Amplitude
- Osc. Frequency Drift
- Start up Supply Voltage
- Start up Time

Parameters
- Temperature
- Supply Voltage
- Load Capacitors
- Dumping Resistance
- Feedback Resistance



Circuit Design Open-loop Gain/Phase Characteristics

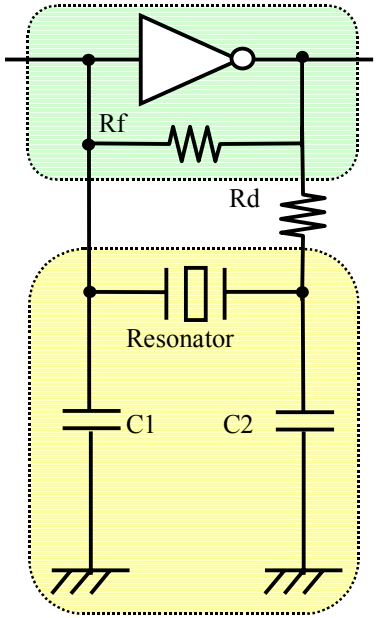


Fig.1 Oscillating Circuit

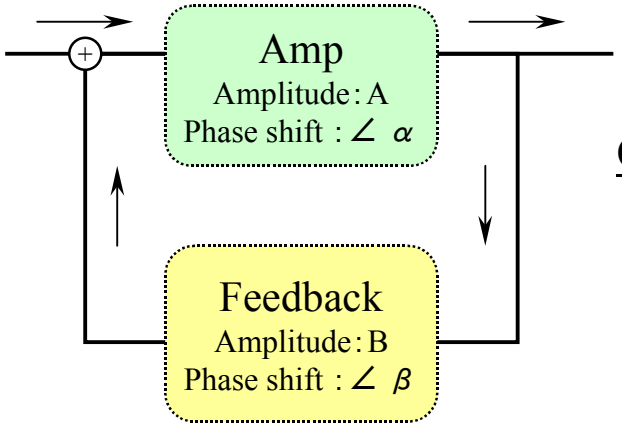


Fig.2 Oscillating Circuit Model

Oscillating conditions

Gain Condition

$$G = 20\log(A \cdot B) \geqq 0$$

Phase Condition

$$\theta = \angle\alpha + \angle\beta = 360^\circ \times n$$

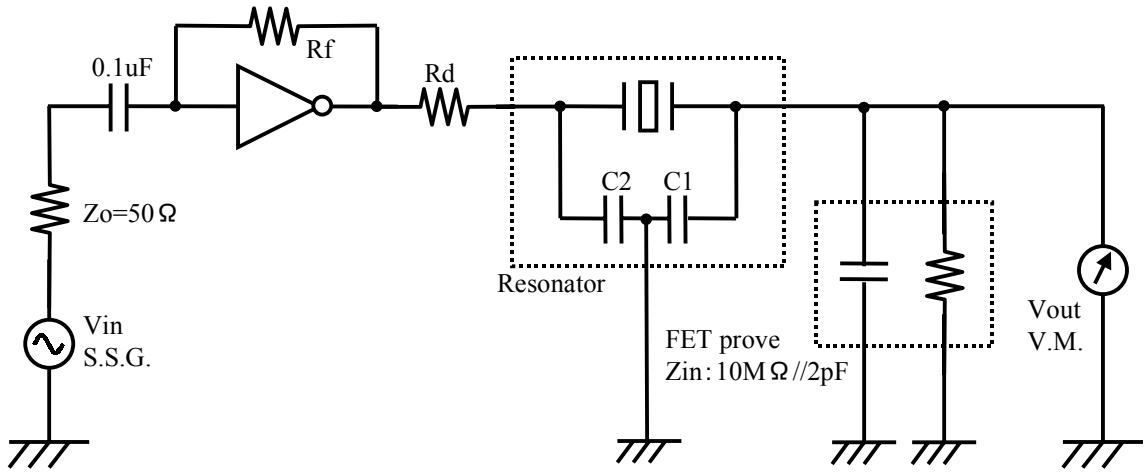


Fig.3 Open-loop Circuit

Technical data of Ceramic Resonator

SSR-D series

Kyocera Corporation
Electronic Component Division
Piezo Device Division

Rev. Jun., 2000

KYOCERA

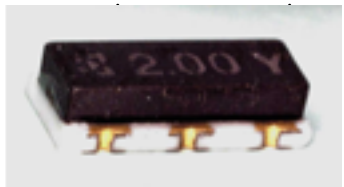
Line up

PBRC series

7.4*3.4*2.0mm

2-8MHz 8-20MHz

Fundamental



SSR-B series

3.2*2.1*1.5mm

16-60MHz

3rd Overtone

SSR-D series

Itís New!

2.5*2.0*1.0mm

20-30MHz 30-60MHz

Fundamental 3rd Overtone

0 10 20 30 40 50 60

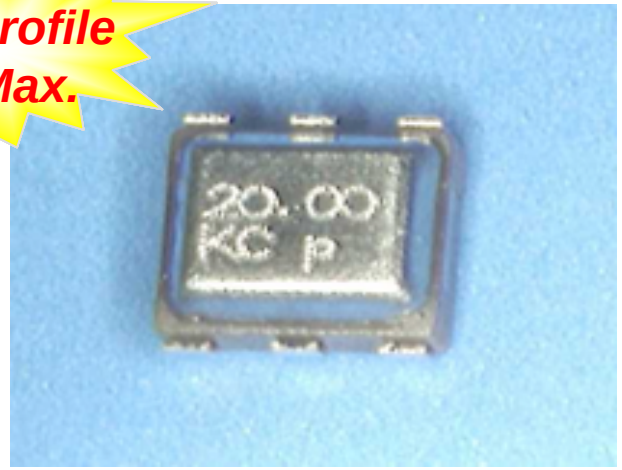
(MHz)

Rev. Jun., 2000

SMD Ceramic Resonator : SSR-D

- **Small Size**
  2.5 x 2.0 x 1.0(max) mm
- **Frequency Range**
  20 to 60MHz
- **Compatible Land Pattern**
  with Other Venders
- **Built-in Capacitors**
- **Washable**
- **Application :**
  Micro Controller for various usage
  Low Profile / High Density Mounting Products
- **Standard Frequency**
  20.0 / 25.0 / 30.0 / 33.86 / 40.0MHz

Low Profile
1.0 Max.

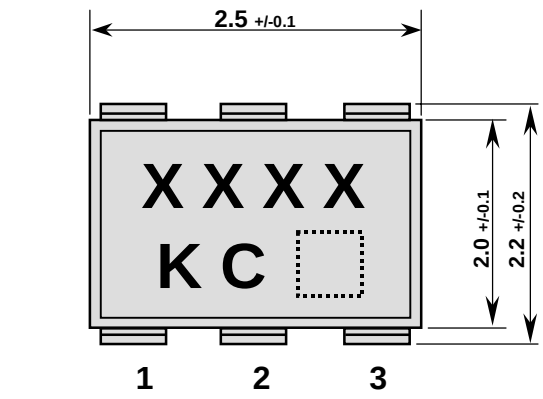


Oct., 2000 on sale

Lead Free Material

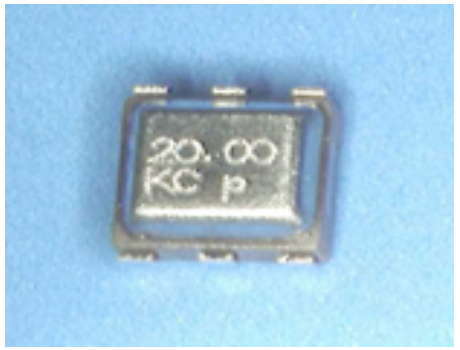
Dimension & Recommended Land Pattern

SSR-D series



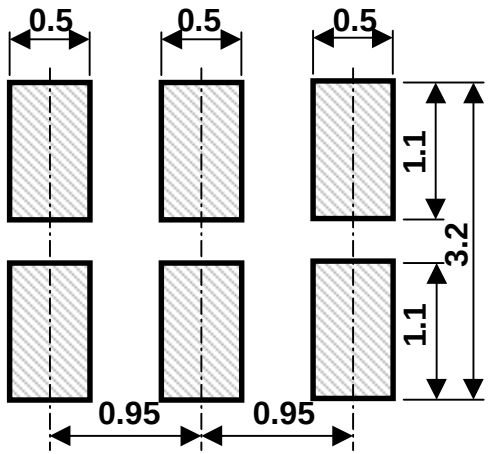
xxxx : Oscillating Frequency

: EIAJ Date Code



SSR-D series

Recommended land pattern



Tolerance : ± 0.3mm

Units: [mm]

#	Pad Connection
1	Input
2	GND
3	Output

Note: Pads 1 and 3 are interchangeable

Rev. Jun., 2000

KYOCERA

SSR-D