CERAMIC RESONATOR (CERALOCK®)

CERAMIC RESONATOR (CERALOCK®)

■CONTENTS

✽ Available in several standard frequencies

■NOTICE

● Unstable oscillation or oscillation stoppage might happen when CERALOCK® is used in improper way in conjunction with ICs. We are happy to evaluate the application circuit to avoid this for you.
● Oscillation frequency of our standard CERALOCK   is adjusted with our standard measuring circuit. There could be slight shift is frequency if other types of IC are used. When you require exact oscillation frequency in your application, we can adjust it with your specified circuit.
● Please consult with us regarding ultrasonic cleaning conditions to avoid possible damage during ultrasonic cleaning.

CERAMIC RESONATOR (CERALOCK®)

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Chip Ceramic Resonator **CSTC/CSTCC/CSTCS** Series (CERALOCK®)

Chip CERALOCK® with built-in load capacitance in an extremely small package.

MURATA's package technology expertise has enabled the deveopment of the Chip CERALOCK® with built-in load capacitance.
High-density mounting can be realized because of the small package and the elimination of the need for an external load capacitor.

■FEATURES

1. Oscillation circuits do not require external load capacitors.
2. The series is available in a wide frequency range.
3. The resonators are extremely small and have a low profile.
4. No adjustment is necessary for oscillation circuits.

■APPLICATIONS

1. Clock oscillators for microprocessors.
2. Electronic control circuits for small electronic equipment such as hand held movie
3. Automotive electronics
4. Dual Tone Multi Frequency (DTMF) generator for cordless telephones

■SPECIFICATIONS

Type Item	CSTC Series	CSTCC Series	CSTCS Series	
	CSTC□MG	CSTCC□MG	CSTCS□MT	CSTCS□MX040
Frequency Range	2.00−3.5MHz	3.51−8.00MHz	8.01−13.0MHz	14.00−60.00MHz
Oscillation Frequency Initial Tolerance	±0.5%	±0.5%	±0.5%	±0.5%
Oscillation Frequency Temperature Stability[1]	±0.3%	±0.3%	±0.4%	±0.3%
Aging[2]	±0.3%	±0.3%	±0.3%	±0.3%
Oscillation Frequency Measuring Circuit	V_{DD} ... IC 1MΩ ... IC ... Output ... (1) (3) (2) ... ※4 ... IC :1/6CD4069UBE×2[3] V_{DD} :5V (MT Series:12V) X :Chip CERALOCK®			

※1 At −20 to +80˚C
※2 For 10 years at room temperature
※3 TC74HCU04 is used as the standard circuit for the MX040 series.
※4 If connected with incorrect orientation, the above specification may not be guaranteed.
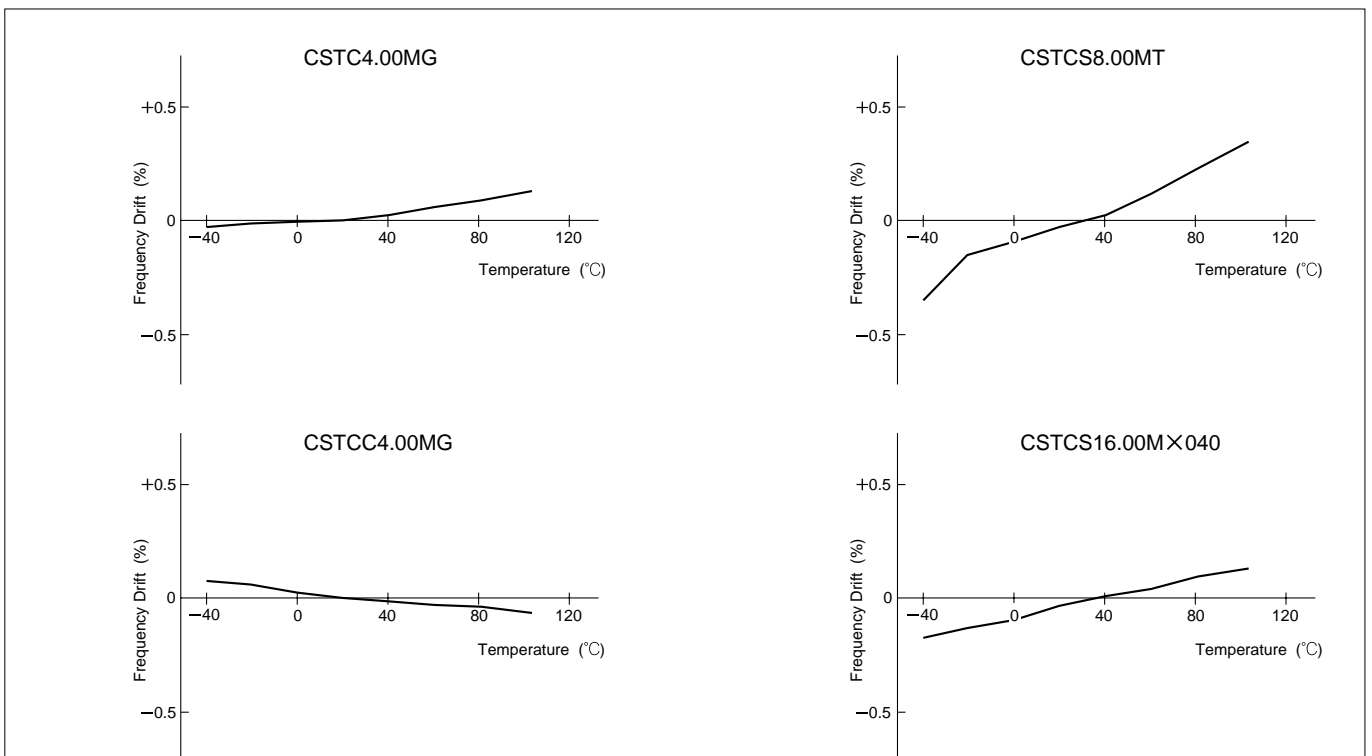
CERAMIC RESONATOR (CERALOCK®)

Chip Ceramic Resonator **CSTC/CSTCC/CSTCS** Series (CERALOCK®)

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■DIMENSIONS/STANDARD LAND PATTERN (in mm tol.:±0.3mm)

Frequency	2.00—3.50MHz	3.51—8.00MHz	8.01—13.0MHz	14.00—60MHz
Type	CSTC□MG	CSTCC□MG	CSTCS□MT	CSTCS□MX040
Dimensions	8.0±0.2 2.0max 2.5±0.2 (2.0) (2.0) (2.0) 1.5±0.5 1.5±0.5 1.5±0.5 4.75±0.5 4.70±0.5 2.2±0.5 1.4±0.5 2.2±0.5	7.2±0.2 0.45±0.15 C M* 2.1max 3.0±0.2 0.3±0.15 0.5±0.05 6.6max 0.6 0.6 0.6 1.55±0.05 1.2±0.2 1.2±0.2 1.4±0.2 2.5±0.1 1.1±0.1 2.5±0.1	4.7±0.2 1.6±0.2 1.3±0.3 C M* (0.8) (1.3) (0.8) (3) (2) (1) 1.3±0.3 1.3±0.3 0.6±0.3 0.9±0.3 0.6±0.3 ※.Thickness varies with frequencies. ※ The electrode pattern varies with built-in load capacit- ance value.	0.8±0.2 1.3±0.2 0.8±0.2 0.9±0.2 0.9±0.2 1.95±0.2 1.95±0.2 2.35±0.2
Standard Land Pattern	1.6 1.4 1.6 1.4 1.6 3.5~4.5 2.6 2.6	1.2 1.2 1.4 1.2 1.2 3.8~4.4 Land Pattern an electrode	0.8 0.9 1.3 0.9 0.8 5.1 1.95 1.95	

■THE STABILITY OF OSCILLATION FREQUENCY WITH TEMPERATURE VARIATION

CSTC4.00MG

CSTCS8.00MT

CSTCC4.00MG

CSTCS16.00M×040

CERAMIC RESONATOR (CERALOCK®)

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Chip Ceramic Resonator **CSAC/CSACS** Series (CERALOCK®)

Wide range of chip CERALOCK® is now available.

This diverse series owes its development to MURATA's package technology expertise and original mass production techniques. It enables high-density mounting and further miniaturization of electronic equipment.

■FEATURES

1. The series is available in a wide frequency range.
2. The resonators are extremely small and have a low profile (CSACS series).
3. No adjustment is neccesary for ocillation circuits.

■APPLICATIONS

1. Clock oscillators for microprocessors.
2. Electronic control circuits for small electronic equipment.
3. Automotive electronics
4. DTMF generators for cordless telephones.

■SPECIFICATIONS

Type / Item	CSAC Series	CSACS Series	
	CSAC☐MGC/MGCM	CSACS☐MT	CSACS☐MX040
Frequency Range	1.80−6.00MHz	6.01−13.0MHz	14.00−60.00MHz
Oscillation Frequency Initial Tolerance	±0.5%	±0.5%	±0.5%
Oscillation Frequency Temperature Stability※1	±0.3%	±0.5%	±0.3%
Aging※2	±0.3%	±0.5%	±0.3%
Oscillation Frequency Measuring Circuit			

Oscillation Frequency Measuring Circuit:

V_{DD} — IC — IC — Output
$1M\Omega$
C_1 — X — C_2
L

IC :1/6CD4069UBE×2※3
V_{DD} :5V (MT Series:12V)
X   :Chip CERALOCK®

※1 At −20 to +80℃
※2 For 10 years at room temperature
※3 TC74HCU04 is used as the standard circuit for the MX040 series.
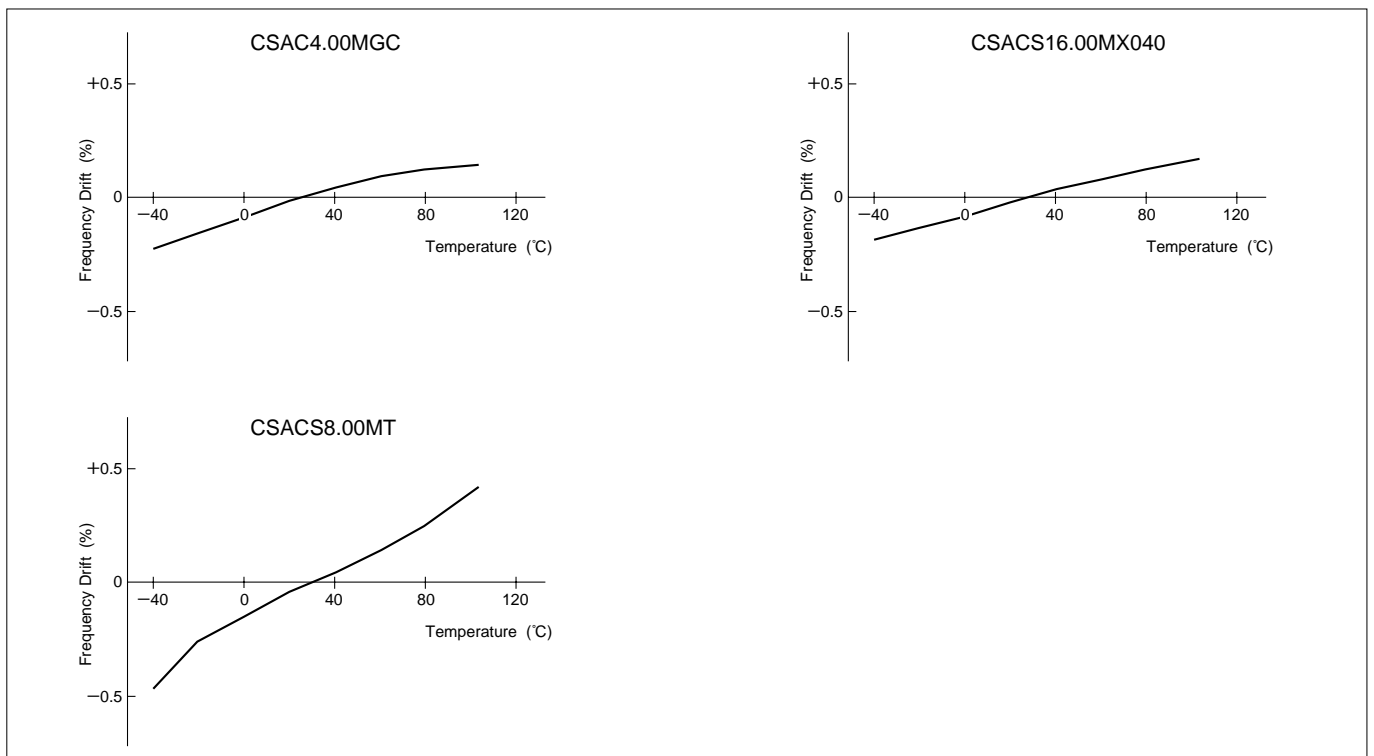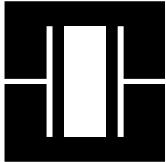
CERAMIC RESONATOR (CERALOCK®)

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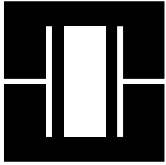
Chip Ceramic Resonator **CSAC/CSACS** Series (CERALOCK®)

■DIMENSIONS/STANDARD LAND PATTERN (in mm tol.:±0.3mm)

Frequency	1.80─6.00MHz	6.01─13.0MHz	14.00─60.00MHz
Type	CSAC□MGC/MGCM	CSACS□MT	CSACS□MX040
Dimensions	(MGCM) 7.0±0.2　2.85±0.1 1.7 4.00C**　2.6±0.15 1.5±0.15　2.5～3.5　1.5±0.15 (MGC) 7.0±0.2　2.8±0.15 1.7 2.6±0.15 1.5±0.15　1.5±0.15	4.7±0.2　1.6±0.2 4.1±0.2 C * (0.9)　(0.9)	0.9±0.2　2.9±0.2　0.9±0.2 1.9±0.2 1.9±0.2 2.35±0.2 ※Thickness varies with frequency.
Standard Land Pattern	8.9 1.5 4.4	1.4　2.9　1.4 4.1 2.15　2.15	

■THE STABILITY OF OSCILLATION FREQUENCY WITH TEMPERATURE VARIATION

CSAC4.00MGC

Frequency Drift (%) vs Temperature (℃)

CSACS16.00MX040

Frequency Drift (%) vs Temperature (℃)

CSACS8.00MT

Frequency Drift (%) vs Temperature (℃)

CERAMIC RESONATOR (CERALOCK®)

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KHz Band SMD Ceramic Resonator **CSBF** Series (CERALOCK®)

Can be reflow soldered and mounted by automatic placers.

MURATA's original package technologies have enabled the development of the KHz band CERALOCK®.
The series is perfect in miniature remote control units and A. V. modules.

■FEATURES

1. The series withstands reflow soldering.
2. The series is mountable by automatic placers.
3. Its high performance provides stable oscillation.

■APPLICATIONS

1. Clock oscillators for microprocessors.
2. OA equipment
3. AV modules

■SPECIFICATIONS

Item \ Type	CSBF Series	
	CSBF□J	CSBF□J[※1]
Frequency Range	430—519kHz	700—1250kHz
Oscillation Frequency Initial Tolerance	±0.5%	±0.5%
Oscillation Frequency Temperature Stability[※2]	±0.3%	±0.3%
Aging[※3]	±0.3%	±0.3%
Oscillation Frequency Measuring Circuit	IC :1/6CD4069UBE×2 V_DD :5V (MT Series:12V) X :CERALOCK® C1,C2 :100pF Rd :5.6KΩ[※4]	

※1 Available in several standard frequencies (ex. 700, 800, 820, 910, 983, 1000, 1200KHz)
※2 At −20℃ to +80℃
※3 For 10 years at room temperature.
※4 This resistance value appies to the 700—1250 KHz range.

CERAMIC RESONATOR (CERALOCK®)

KHz Band SMD Ceramic Resonator **CSBF** Series (CERALOCK®)

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■DIMENSIONS/STANDARD LAND PATTERN (in mm tol.:±0.3mm)

Frequency	430–519kHz	700–1250kHz
Type	CSBF□J	CSBF□J[※1]
Dimensions		
Standard Land Pattern		

※1 Available in several standard frequencies.
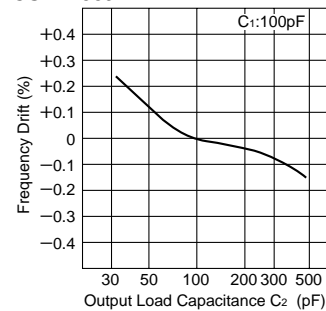
■TECHNICAL DATA

Temperature characteristics
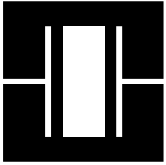CSBF455J
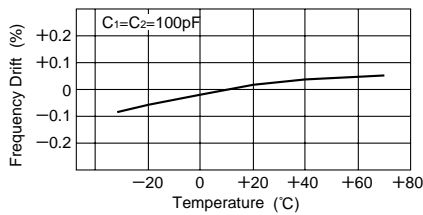
Supply voltage characteristics
CSBF455J
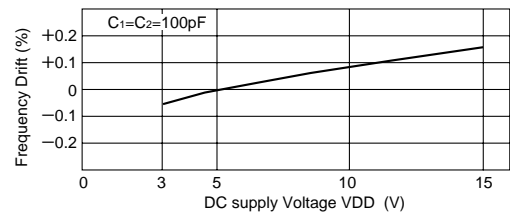
Input load capacitance (C_1)
characteristics
CSBF455J
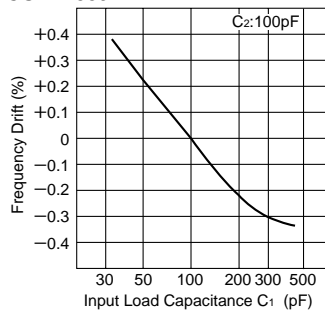
Output load capacitance (C_2)
characteristics
CSBF455J

CERAMIC RESONATOR (CERALOCK®)

Ceramic Resonator **CSA/CSB** Series (CERALOCK®)

CERALOCK® with two leaded terminals.

The CSA and CSB series ceramic resonator owe their development to MURATA's innovative expert technologies and the application of mass production techniques typically utilized in the manufacture of piezoelectric ceramic components. Because of their high mechnical Q and consistent high quality, both the CSA and CSB series are ideally suited to microprocessor and remote control unit applications.

The CSA series is available in two types: one for MOS technology and the other for LS-TTL technology. The CSB series includes the thin and compact J type which is ideal in high-speed 4-bit microprocessor applications.

In addition, MURATA offers a special CERALOCK® version suitable for automatic insertion utilizzing tape and reel and other packaging forms. For further information, please contact your local MURATA representative office or authorized distributor.

■FEATURES

1. The series is stable over a wide temperature range and with respect to long-term aging.
2. The series comprises fixed, tuned, solid-state devices.
3. The resonators are miniature and light weight.
4. They exhibit excellent shock resistance performance.
5. Oscillating circuits requiring no adjustment can be designed by utilizing these resonators in conjunction with transistors or appropriate ICs.

■APPLICATIONS

1. Square-wave and sine-wave oscillator.
2. Clock generator for microprocessors.
3. Tone Dialers and Pulse Dialers for telephone.
4. Remote control systems.
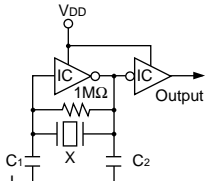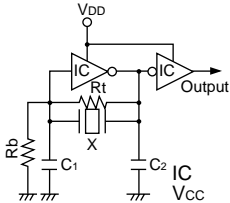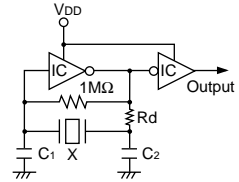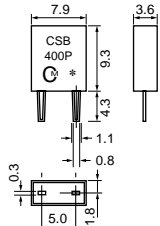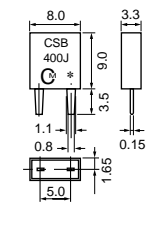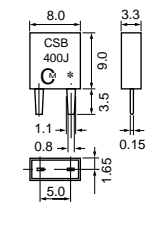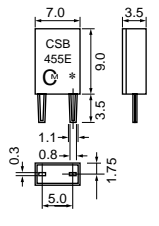5. Automotive electronics (engine control, digital speed meters, etc.)

CERAMIC RESONATOR (CERALOCK®)

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Ceramic Resonator **CSA/CSB** Series (CERALOCK®)
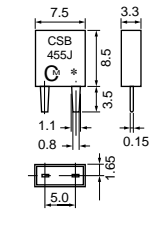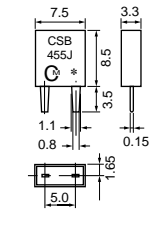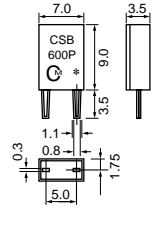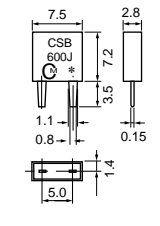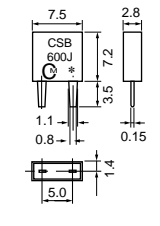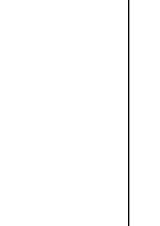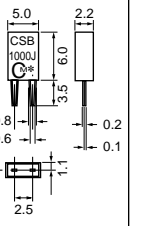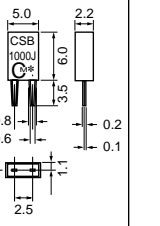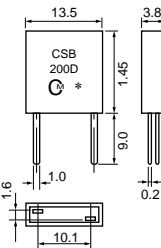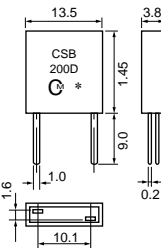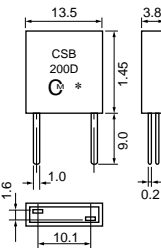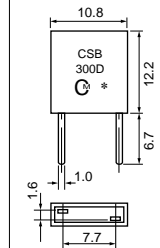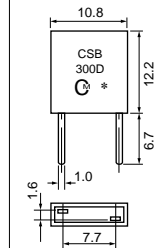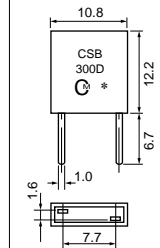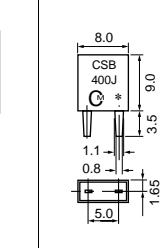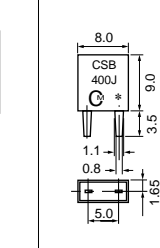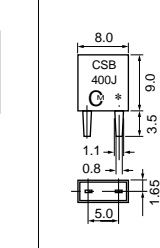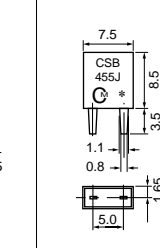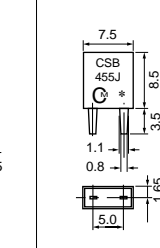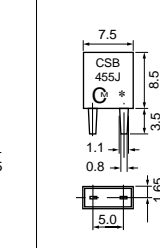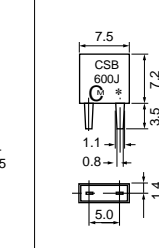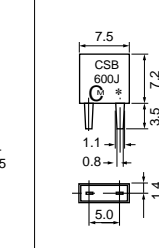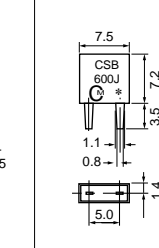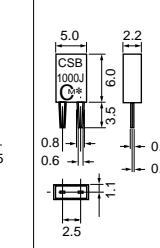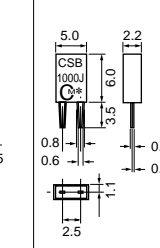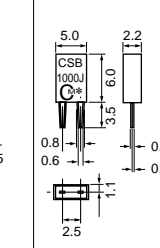
■SPECIFICATIONS

Type / Item	CSA Series (for MOS)				CSA Series (for LS-TTL)				CSB Series		
	CSA□MK	CSA□MG	CSA□MTZ	CSA□MXZ040	CSA□MK011	CSA□MG011	CSA□MTZ011	CSA□MXZ011	Not Washable	Washable※7	
Frequency Range	1.26— 1.79MHz	1.80— 6.30MHz	6.31— 13.0MHz	13.01— 60.0MHz	1.26— 1.79MHz	1.80— 6.30MHz	6.31— 11.9MHz	12.0— 30MHz	375— 699kHz	190— 374kHz	375— 1250kHz
Oscillation Frequency Initial Tolerance	±0.5%				±0.5%				±2KHz	±1KHz	±0.5%
Oscillation Frequency Temperature Stability※1	±0.3%		±0.5%	±0.3%	±0.3%		±0.5%	±0.3%	±0.3%		
Aging※2	±0.3%		±0.5%	±0.3%	±0.3%		±0.5%	±0.3%	±0.5%		
Oscillation Frequency Measuring Circuit	IC :1/6CD4069UBE×2※5 V_DD :5V (MTZ Series:12V) X :CERALOCK® C1,C2 :30pF※6				IC :1/6SN74LS04×2 Vcc :5V X :CERALOCK® C1,C2 :Load Capacitors※3 Rt :2.2—4.7Ω Rb :2.2—22kΩ				IC :1/6CD4069UBE×2 V_DD :5V X :CERALOCK® C1,C2 :Load Capacitors※3 Rd :5.6KΩ※4		

※1 At −20°C to +80°C
※2 For 10 years at room temperature
※3 Values vary according to frequency. Please contact us for details.
※4 700—1250KHz (J Type) only.
※5 TC74HCU04 is used as the standard circuit for the MXZ040 series.
　 Please contact us for details.

※6 For the MXZ040 series, the value changes according to frequency.
※7 Washing the resonator is allowed. However, temperature, time and other washing conditions should be evaluated to confirm that stable electrical characteristics are maintained.

■DIMENSIONS

Standard Products	**Not Washable**	Frequency	—	—	375—429kHz	430—509kHz	510—699kHz	—
		Part Number	—	—	CSB□P	CSB□E	CSB□P	—
		Dimensions (in mm)						
	Washable	Frequency	190—249kHz	250—374kHz	375—429kHz	430—519kHz	520—699kHz	700—1250kHz
		Part Number	CSB□D	CSB□D	CSB□J※	CSB□J※	CSB□J※	CSB□J※
		Ultrasonic Cleaning※	NOT ALLOWED	NOT ALLOWED	ALLOWED	ALLOWED	ALLOWED	ALLOWED
		Dimensions (in mm)						

※ Please consult MURATA regarding ultrasonic cleaning conditions to avoid possible damage during ultrasonic cleaning.

CERAMIC RESONATOR (CERALOCK®)

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Ceramic Resonator **CSA/CSB** Series (CERALOCK®)

Frequency	1.26–1.79MHz	1.80–2.44MHz	2.45–6.30kHz	6.31–13.00MHz	12.00–32.00kHz	32.01–60.00MHz
Part Number	CSA☐MK※	CSA☐MG	CSA☐MG	CSA☐MTZ	CSA☐MXZ	CSA☐MXZ
Oscillation Mode※	Shear Vibration	Thickness Shear Vibration	Thickness Shear Vibration	Thickness Longitudinal Vibration	Thickness Longitudinal Vibration (3rd OVERTONE)	Thickness Longitudinal Vibration (3rd OVERTONE)
Dimensions (in mm)						

※The CSA☐MK type is not washable.

■THE STABILITY OF OSCILLATION FREQUENCY WITH TEMPERATURE VARIATION

CSB455E

CSA8.00MTZ

CSA4.00MG

CSA16.00MXZ040
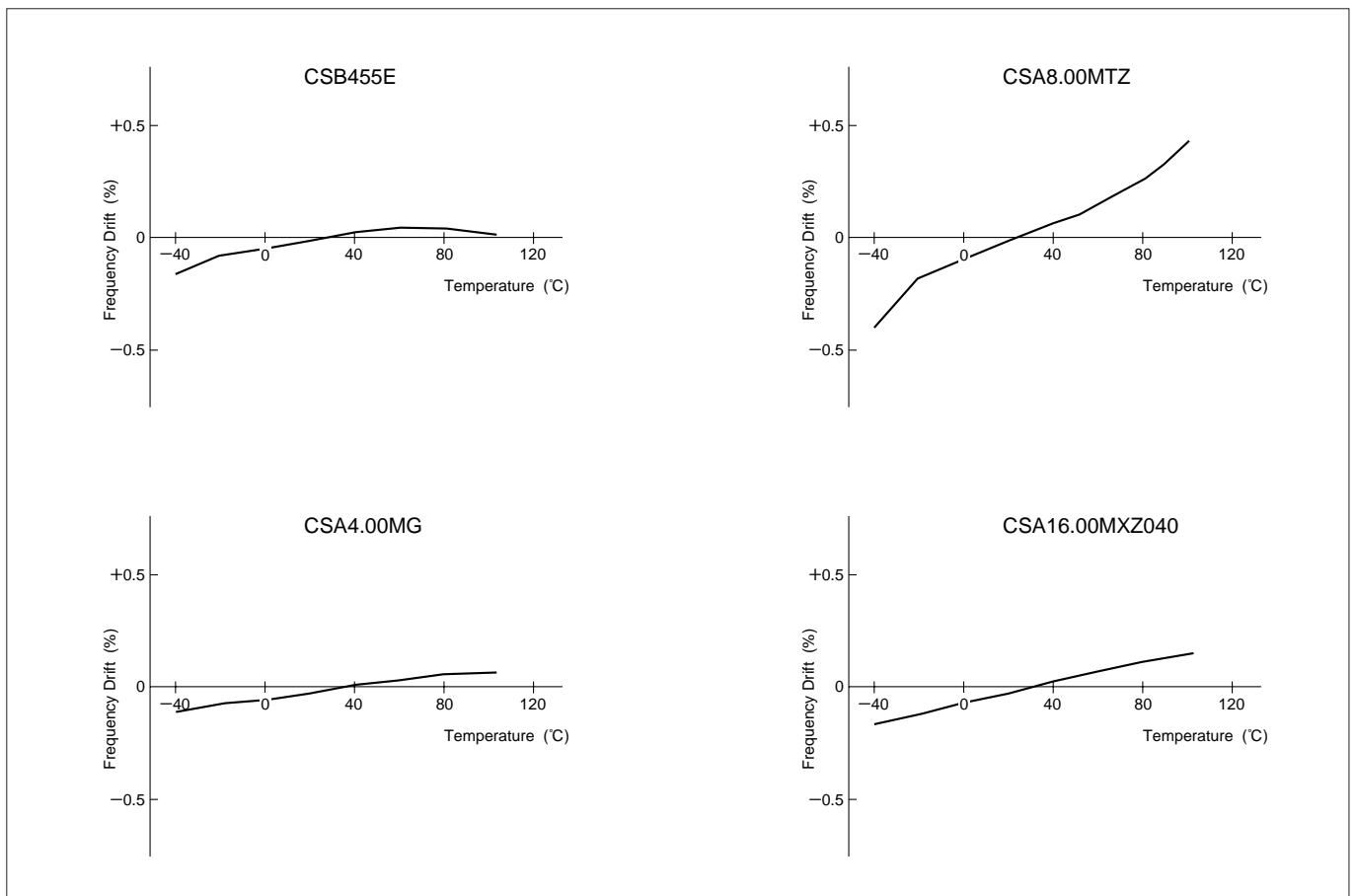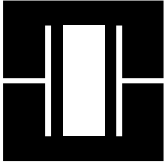
CERAMIC RESONATOR (CERALOCK®)

Ceramic Resonator **CSU/CST** Series (CERALOCK®)

CERALOCK® with built in loading capacitors.

MURATA's ceramic resonator, CERALOCK®, has been widely applied as the most suitable component for clock oscillators in a broad range of microprocessors. The CSU series (KHz band) and CST series (MHz band) can be used in the design of oscillation circuits not requiring external load capacitors, enabling both high-density mounting and cost reduction.

■FEATURES

1. Oscillation circuits do not require external load capacitors.
2. The series is stable over a wide temperature range.
3. The resonators are compact, light weight and exhibit superior shock resistance performance.
4. They enable the design of oscillator circuits requiring no adjustment.
5. The series is inexpensive and avaiable in stable supply.
6. There are some variation of built-in capacitance value to apply various of IC.

■APPLICATIONS

1. DTMF generators   ●Remote control units
2. Clock oscillators for microcomputers
3. Automated office equipment
    ●Automotive electronics (Suffixed "−A"   ex. CST□MGWA)

■SPECIFICATIONS

Type〱Item	CSU Series	CST Series			
		CST□MG	CST□MGW	CST□MTW	CST□MXW040
Frequency Range	450−500kHz	1.80−2.44MHz	2.45−6.30MHz	6.31−13.0MHz	13.01−60.0MHz
Oscillation Frequency Initial Tolerance	±2kHz	±0.5%	±0.5%	±0.5%	±0.5%
Oscillation Frequency Temperature Stability[※1]	±0.3%	±0.3%	±0.3%	±0.4%	±0.3%
Aging[※2]	±0.5%	±0.3%	±0.3%	±0.3%	±0.3%
Oscillation Frequency Test Circuit	IC :1/6CD4069UBE×2 V_{DD} :5V X :Chip CERALOCK®	IC :1/6CD4069UBE×2[※3] V_{DD} :5V (MTW Series:12V) X :CERALOCK®			

※1 At −20 to +80℃ (Temperture Condition)
※2 Room Temperature 10Years.
※3 MXW040 Series are used with the TC74HCU04IC.
※4 Input terminal (1) shuld be connected to the input of an inverter.
※5 If connected with incorrect orientation, the above specification may not be garanteed.

CERAMIC RESONATOR (CERALOCK®)

muRata
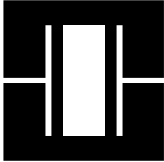
Ceramic Resonator **CSU/CST** Series (CERALOCK®)

■DIMENSIONS

Frequency	450—500MHz	1.80—2.44MHz	2.45—6.30MHz	6.31—13.0MHz	13.01—60.00MHz
Part number	CSU□P	CST□MG	CST□MGW	CST□MXW	CST□MXW
Dimensions (Unit : mm)	7.0 / U480 P ⊙ * / 9.0 / 3.5 / 1.1 / (3)(2)(1) ※3 / 0.3 / 3.5	12.0max / 2.00 ⊙ * / 10.0max / 5.0 / (3)(2)(1) / 0.3 / 5.0max / 2.5 2.5	10.0max / 4.00 ⊙ * / 6.0max / 5.0 / (3)(2)(1) / 0.3 / 5.0max / 2.5 2.5	10.0max / 8.00 ⊙ * / 8.0max ※1 / 5.0 / (3)(2)(1) / 0.3 / 5.0max / 2.5 2.5	10.0max / 16.00X ⊙ * / 8.0max ※2 / 5.0 / (3)(2)(1) / 0.3 / 5.0max / 2.5 2.5

※1 6.01—7.99MHz: 9.0mm max.

※2 13.01—14.99MHz: 9.0mm max., 33.00—60.00MHz:7.0mm max.

※3 Terminals have directionality : (1)Input (2)Ground (3)Output

※4 The CSU□P is not washable.

■THE STABILITY OF OSCILLATION FREQUENCY WITH TEMPERATURE VARIATION

CSU480P

CST11.0MTW

CST3.58MGW

CST16.00MXW040
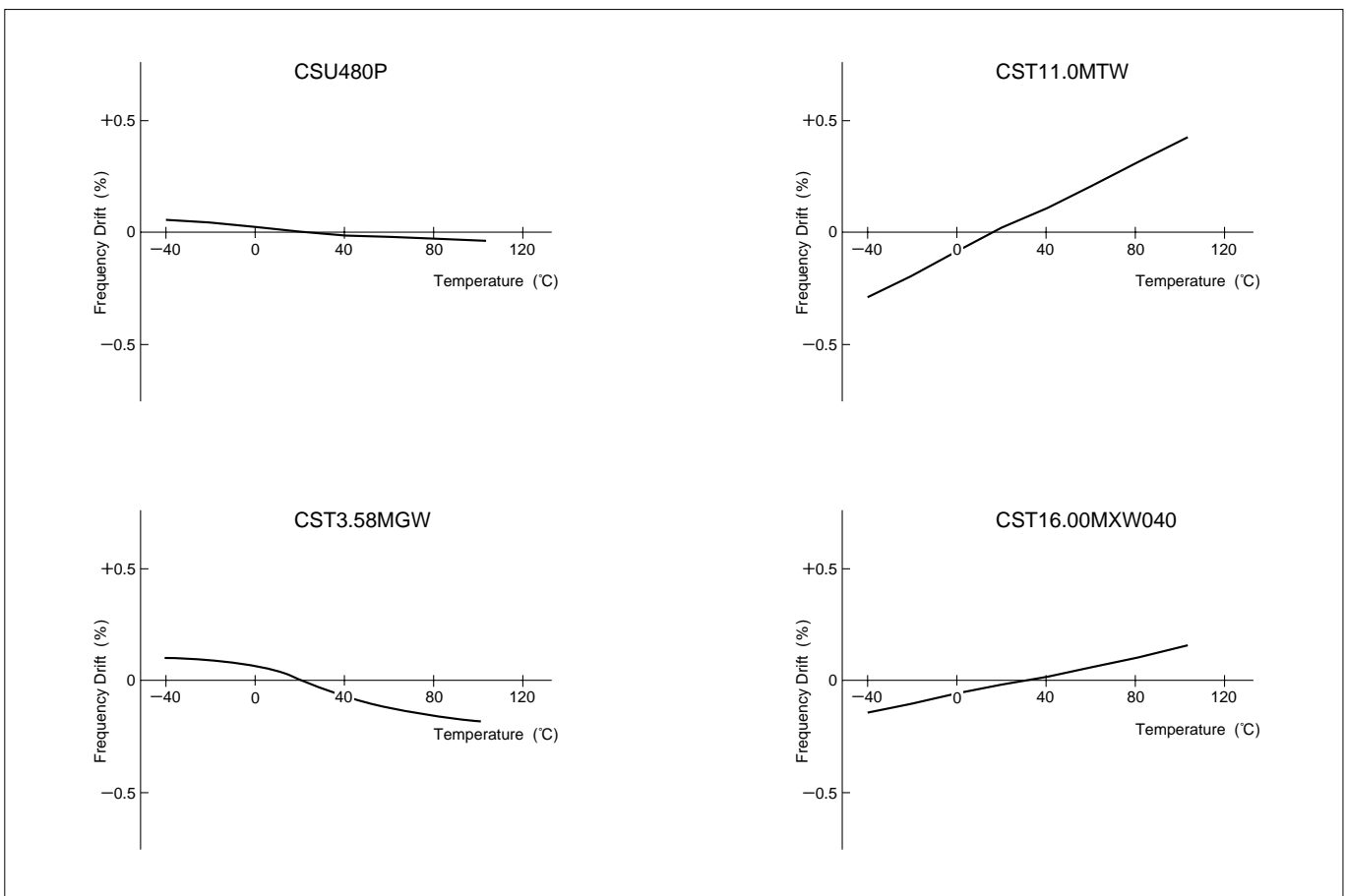
■APPLICATION CIRCUITS UTILIZING THE CERALOCK®

Application to 80C49 (8-bit Microcomputer)

CSA4.00MG
(4MHz)
CSA6.00MG
(6MHz)
CSA11.0MT
(11MHz)
Can be applied

(1)80C49(INTEL)
(2)μPD80C49(NEC)
(3)TMP80C49(TOSHIBA)
(4)MSM80C49(OKI)
(5)M5L80C49(MITSUBISHI)
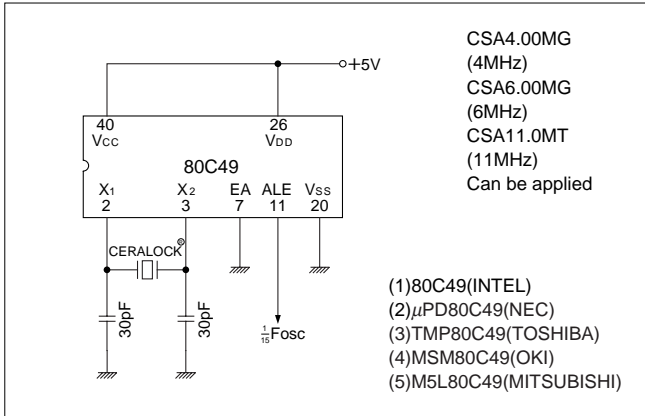
Application to M38063E6FP (MITSUBISHI) (8-bit Microcomputer)

Recommendable Value
CERALOCK® : CST4.00MGW
C_1=30pF±20%
C_2=30pF±20%
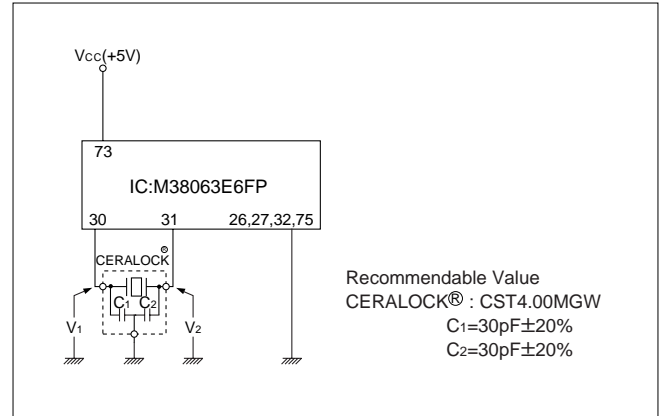
Application to HD64F3434 (HITACHI) (8-bit Microcomputer)

H:1,4,8,9,37,59
L:5,6,7,15,46,70,71,100

Recommendable Value
CERALOCK® : CSA16.00MXZ040
C_1=22pF
C_2=22pF
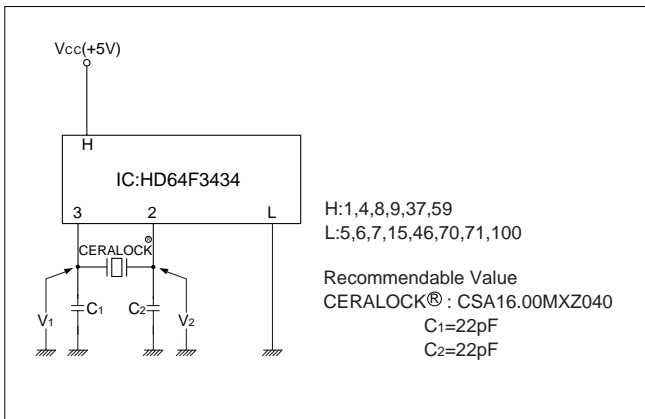
Application to MSM65344A (8-bit Microcomputer)

H:25,52,73-75
L:18,63

Recommendable Value
CERALOCK® : CSA5.00MG
C_1=30pF
C_2=30pF
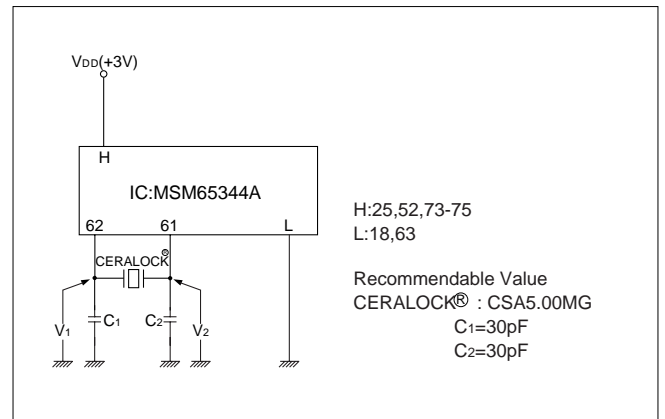
Application to 8085 (8-bit Microcomputer)

CSA4.00MG

(1)8085A(INTEL)
(2)μPD8085A(NEC)
(3)TMP8085A(TOSHIBA)
(4)MSM8085A(MITSUBISHI)
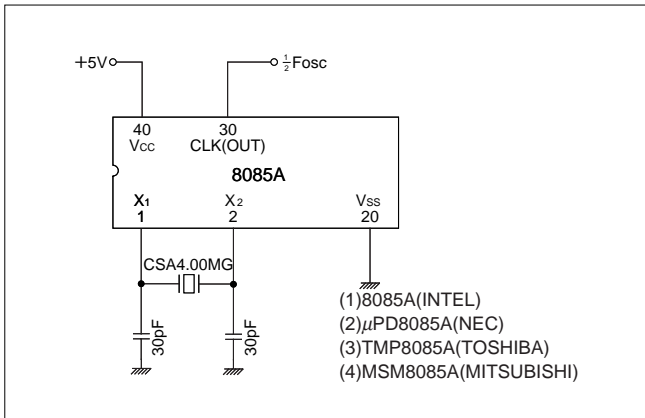
Application to MC68HC05P6 (MOTOROLA) (8-bit Microcomputer)

H:2,15-18,23,25,28
L:11-14

Recommendable Value
CERALOCK® : CSA4.00MG
C_1=30pF
C_2=30pF
Rf=1MΩ
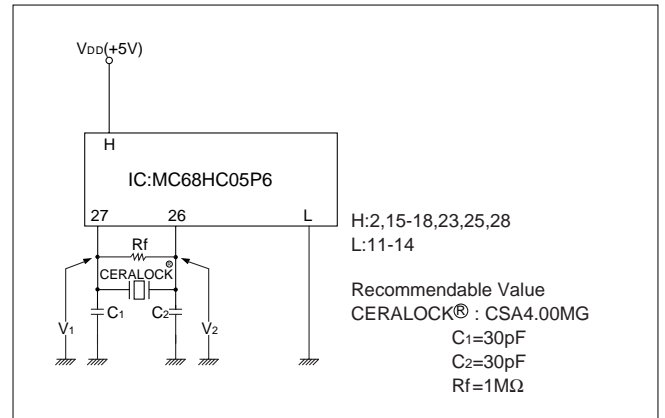
Application to M34550M4 (MITSUBISHI) (Remote Control Unit)

L:13-27,29,32,37-40

Recommendable Value
CERALOCK® : CSB455E
C_1=220pF
C_2=220pF
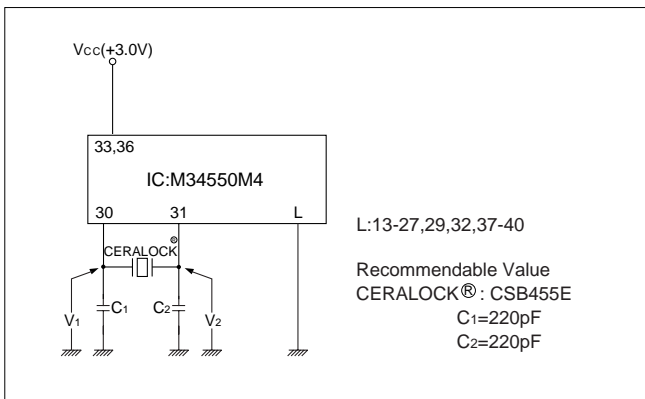
Application to TC88402F (TOSHIBAI) (Speech Synthesizer)

Recommendable Value
CERALOCK® : CST24,57MXW0WH1
C_1=5pF±20%
C_2=5pF±20%

13
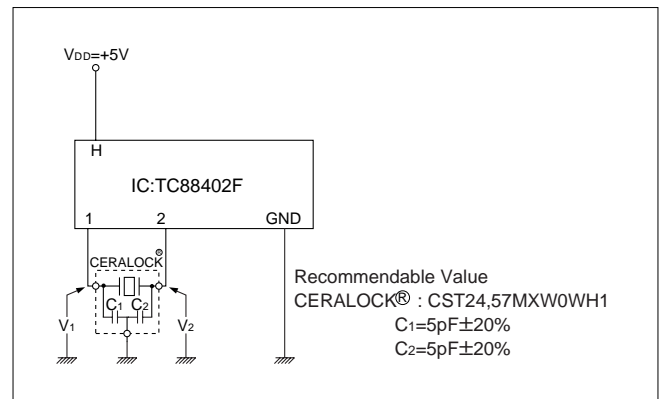
Application to μ PD754304GS (4-bit Microcomputer)

$V_{DD}(+5V)$

19,20

IC: μPD754304GS

2   3   1,4

CERALOCK®

V_1 C_1 C_2 V_2

Recommendable Value
CERALOK® : CSA4.00MG
C_1=30pF
C_2=30pF
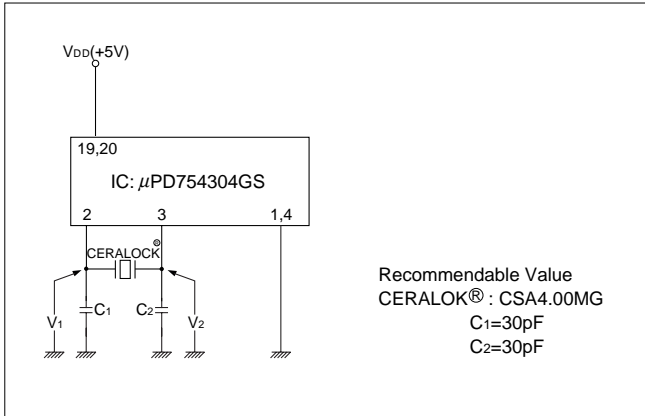
Application to 651104F (SANYO) (4-bit Microcomputer)

$V_{DD}(+5V)$

10

IC:LC651104F

8   9   L

CERALOCK®

V_1 C_1 C_2 V_2

L:1-7,11,16-20,25,26,29

Recommendable Value
CERALOCK® : CSA4.00MG
C_1=33pF
C_2=33pF
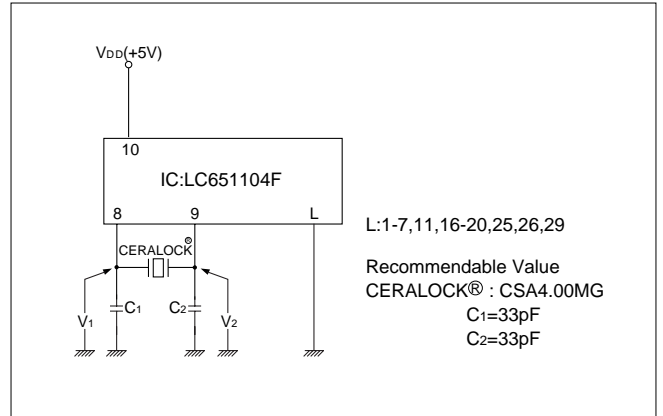
Application to LC7367J (SANYO) (Ton / Pulse Diater)

$V_{DD}(+5V)$

H   2   21

IC:LC7367J

9   10   L

CERALOCK®

V_1 C_1 C_2 V_2

H:11
L:5,6,7,8,12

Recommendable Value
CERALOCK® : CSA3.58MG300GA
C_1=30pF
C_2=30pF
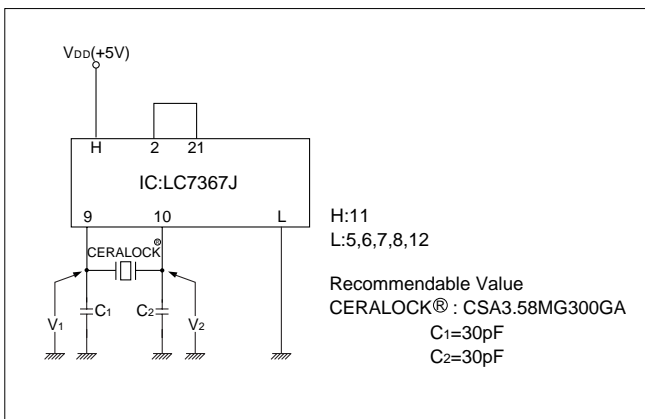
Application to UM93403 (UMC) (Tone / Pulse Diater)

$V_{CC}(+5V)$

S.W.

H   2

IC:UM93403

76   77   L

Rf

CERALOCK®

V_1 C_1 C_2 V_2

Recommendable Value
CERALOCK® : CSA3.58MG300FGA
C_1=30pF
C_2=30pF
Rf=1MΩ
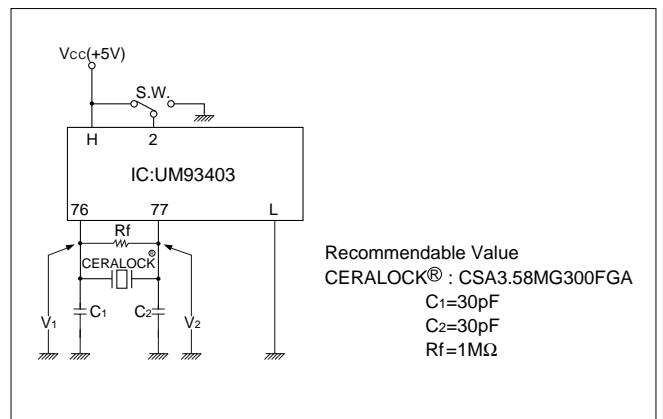
Application to μ PD70216H (NEC) (16-bit Microcomputer)

V_{DD}=+5V

H

IC: μPD70216H

54   53   18,52,68

CERALOCK®

V_1 C_1 C_2 V_2

Recommendable Value
CERALOCK® : CSACS32.00MX040
C_1=5pF
C_2=5pF
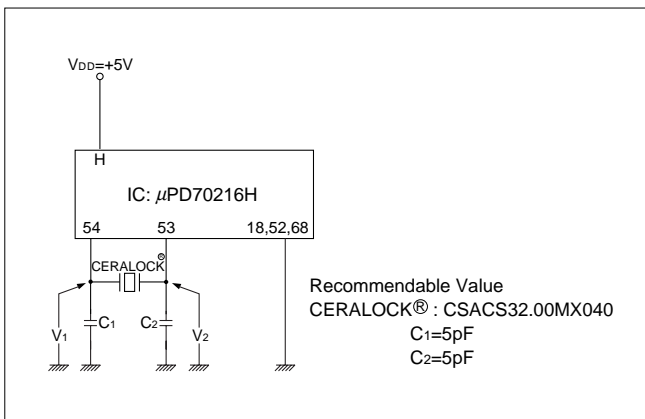
Application to CXD2510Q (SONY) (Digital Signal Processing IC forCD)

$V_{DD}(+5V)$

H

IC:CXD2510Q

53   54   L

CERALOCK®

V_1 C_1 C_2 V_2

H:33,37
L:12,52

Recommendable Value
CERALOCK® : CSA33.86MXZ040
C_1=5pF
C_2=5pF
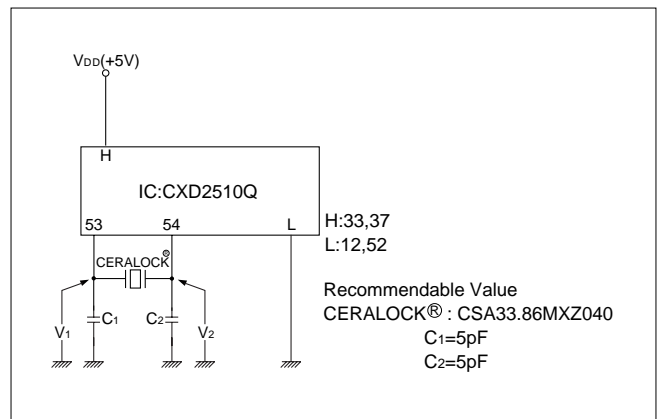
Application to LC895194-X30 (SANYO)

V_{DD}=+5V

H

IC:LC895194-X30

70   71   L

Rf

CERALOCK®   Rd

V_1 C_1 C_2 V_2

H:18,37,73,90
L:1,4,7,19,36,55,69,
72,75,82,91,108

Recommendable Value
CERALOCK® : CSA33.86MXZ040
C_1= 0pF
C_2=47pF
Rd=15Ω
Rf =1MΩ
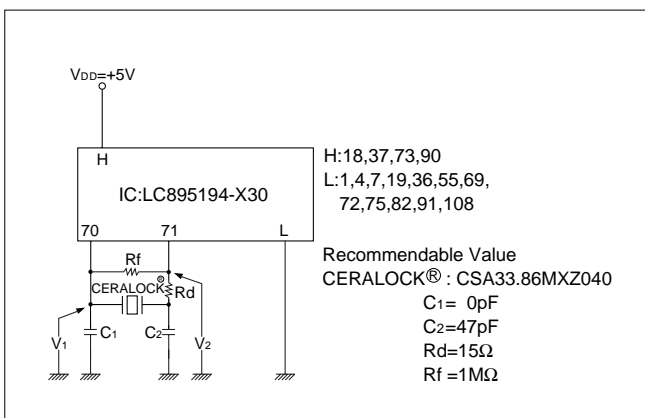
Application to TMP47C443 (TOSHIBA) (4-bit Microcomputer)

$V_{DD}(+5V)$

23

IC:TMP47C443

2   1   3

CERALOCK

V_1 C_1 C_2 V_2

Recommendable Value
CERALOCK® : CST4.00MGW
C_1=30pF±20%
C_2=30pF±20%
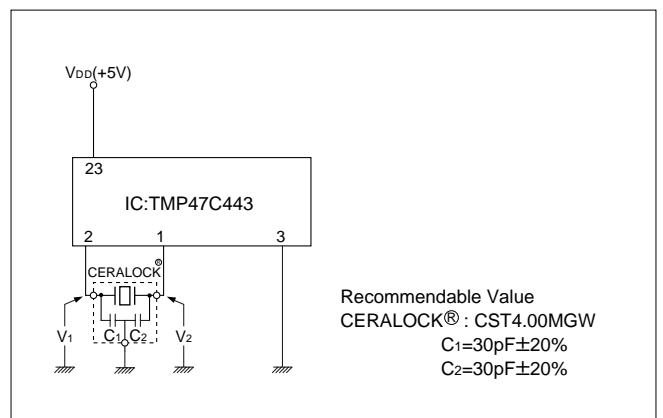
Application to TA8690AN (TOSHIBA)
(TV Horizontal / Vertical Synthesizer Circuit)

Vcc(+9.0V±0.1V)

47 μF
0.022 μF

44 37

IC:TA8690AN

8
20 22 23 24 25
510KΩ
390Ω 430Ω
FH
(1/32 Fosc)
Vcont
CERALOCK® RS

Recommendable Value
CERALOCK® : CSB503F46
RS=150ohm

Application to TEA2130 (THOMSON)
(TV Horizontal / Compatible with synthesizer Circuit)

Vcc(+12.0V)
Flyback in.

100 μF
0.01 μF
1KΩ
47 μF
H-out

5 11 13

IC:TEA2130

17 3 9 18 4

27KΩ
RS CERALOCK®
3.9KΩ
2.2 μF
3.3 μF
Vcont.
3.32KΩ
100 μF

Recommendable Value
CERALOCK® : CSB503F12
RS=470Ω

Application to LA3430 (SANYO) (FM Stereo MPX)

LA3430

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

Vcc
(12.0V)
100 μF
0.047 μF
2.2KΩ
100 μF
Fcont(30mVrms)
1KΩ
1μF
0.022 μF
5.6KΩ
0.22 μF
1 μF
CERALOCK®
Fosc

Recommendable Value
CERALOCK® : CSB456F15
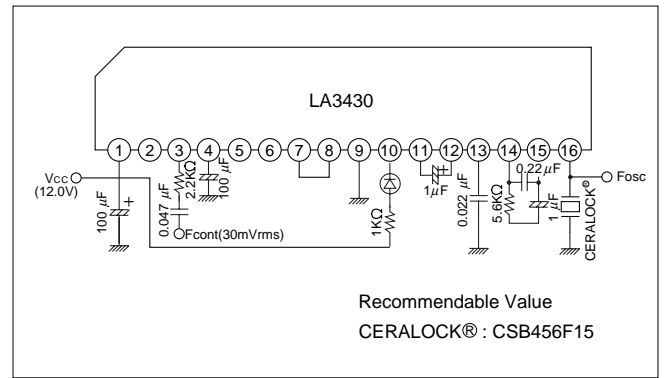
Application to LA7687 (SANYO)
(TV Horizontal Synthesizer Circuit)

Vcc=+7.8V

0.01 μF
100 μF

48 44 40

IC:LA7687

15 22 23 24 25

CERALOCK®
330Ω
0.033 μF
1.8KΩ 3.3 μF
22 μF
Vcont
HVcc 13mA
Hout(Fosc/32)

Recommendable Value
CERALOCK® : CSB500F55

Oscillation Circuit incorporating Transistor

30kΩ
−10V
CSB455E
0.005 μF
0.001 μF
1kΩ
Output
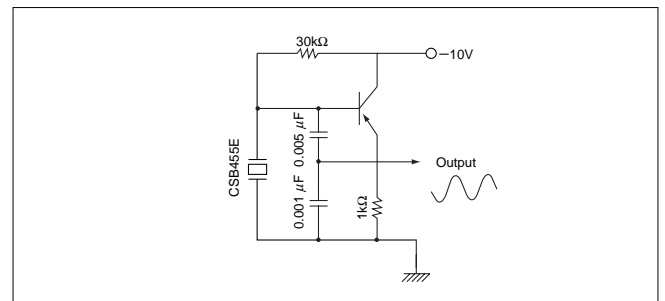
Application to MC13022P (MOTOROLA) (AM Stereo Decoder)

Vcc(+9.0±0.1V)
10k
2.2k
0.22 1.0μF

0.001 0.001
0.001
VCO Voltage
LED
CERALOCK
0.01
47μm 20μm
C1
Pilot
Det Input

I
Det
LR
Det
Q
Out
Vcc
Loop
Filt
Blend
Gnd
Stereo
Lamp
Osc
Fbk
Osc
In
Pilot
Det Input
Pilot
I
Pilot
O
0.47
Filter
Control

28 27 26 25 24 23 22 21 20 19 18 17 16 15

IC:MC13022P

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Env
Det
Decoder
Input
Ref
AGC
L
Out
740
43k 43k
R
Out
740
43k 43k

0.001
T2
10μF
IF Input
Fcont in
100k
0.01
Filtered
Left
Output
21.5k
370 370
21.5k
370 370
Filtered
Right
Output

RF AGC.
Stop Sense.
SS Meter

T2-Broad Resonance@450kHz
Effective Rp of 8.0K to12K
(Part No.to be Determined)

Recommendable Value
CERALOCK® : CSA3.60MGF103
C_1=56pF
R_1=2.2Kohm

15

⚠ **Note:**

1. Export Control

   〈**For customers outside Japan**〉

   Murata products should not be used or sold for use in the development, production, stockpiling or utilization of any conventional weapons or mass-destructive weapons (nuclear weapons, chemical or biological weapons, or missiles), or any other weapons.

   〈**For customers in Japan**〉

   For products which are controlled items subject to "the Foreign Exchange and Foreign Trade Control Law" of Japan, the export license specified by the law is required for export.

2. Please contact our sales representatives or engineers before using our products listed in this catalog for the applications requiring especially high reliability what defects might directly cause damage to other party's life, body or property (listed below) or for other applications not specified in this catalog.

   ① Aircraft equipment
   ② Aerospace equipment
   ③ Undersea equipment
   ④ Medical equipment
   ⑤ Transportation equipment (automobiles, trains, ships,etc.)
   ⑥ Traffic signal equipment
   ⑦ Disaster prevention / crime prevention equipment
   ⑧ Data-processing equipment
   ⑨ Applications of similar complexity or with reliability requirements comparable to the applications listed in the above

3. Product specifications in this catalog are as of September 1997, and are subject to change or stop the supply without notice. Please confirm the specifications before ordering any product. If there are any questions, please contact our sales representatives or engineers.

4. The categories and specifications listed in this catalog are for information only. Please confirm detailed specifications by checking the product specification document or requesting for the approval sheet for product specification, before ordering.

5. Please note that unless otherwise specified, we shall assume no responsibility whatsoever for any conflict or dispute that may occur in connection with the effect of our and/or third party's intellectual property rights and other related rights in consideration of your using our products and/or information described or contained in our catalogs. In this connection, no representation shall be made to the effect that any third parties are authorized to use the rights mentioned above under licenses without our consent.

6. None of ozone depleting substances (ODS) under the Montreal Protocol is used in manufacturing process of us.

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