TDK

Ceramic Resonators(SMD)
CCR Series

Conformity to RoHS Directive

FEATURES

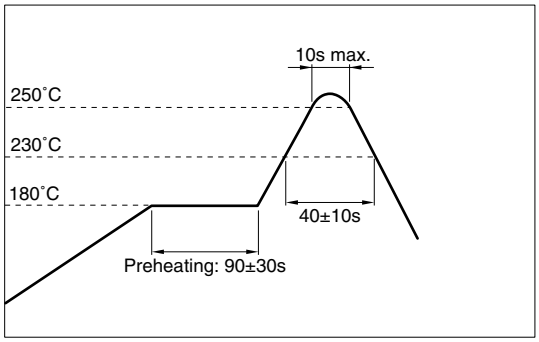
- The CCR series are thin-type ceramic chip resonators. Thickness shear mode or 3rd over-tone thickness expansion mode element are used for both the 4.0 to 11.0MHz band and the 16.0 to 50.0MHz band.
- Products with built-in loading capacitance have piezoelectric elements that are mounted onto a capacity-forming dielectric substrate.
  This eliminates the need for external capacitors, thus simplifying circuit requirements.
- Optimization of the temperature characteristics of both the piezoelectric element and dielectric materials has resulted in stable oscillating frequency.
- Corresponds to reflow soldering. Moreover, it is possible to correspond Pb-free soldering.(260°C,10sec. max.)
  Packaging style is emboss taping.
- Setting or matching of oscillating frequency which correspond to new models, application IC or custom IC are also available, please contact TDK.

TEMPERATURE RANGES

Operating/Storage	–40 to +85°C

RECOMMENDED SOLDERING CONDITIONS

REFLOW SOLDERING



PRODUCT IDENTIFICATIONS

CCR	20.0	MXC7	□□□	□□	□□	□□	T□
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

(1) Series name

CCR	Ceramic resonator(SMD)

(2) Oscillating frequency

(3) Production type and dimensions

Symbol	Oscillating frequency range (MHz)	Loading capacitors	Dimensions L×W (mm)
MUC8	4.0 to 7.99	Internal	4.0×2.0
MXC8	8.0 to 11.0	Internal	3.2×1.3
MX7	16.0 to 50.0	External	2.5×2.0
MXC7	16.0 to 50.0	Internal	2.5×2.0
MYC7	24.0 to 50.0	Internal	2.0×1.6

(4) Initial oscillating frequency tolerance

Symbol	MUC8	MXC8	MXC7/MX7/MYC7
Non	±0.5%	±0.5%	±0.5%
A	±0.3%	±0.3%	±0.3%
A2	—	—	±0.2%
A15	—	—	±0.15%
Others	Custom made		

(5) Oscillating frequency correlation

Non	Non correlation for TDK standard
F	Custom made
F1	Custom made
F2	Custom made
Others	Custom made

(6) Built-in loading capacitance

Symbol	MUC8	MXC8	MXC7
Non	Standard(27pF)	Standard(18pF)	Standard(8/9pF)
J	—	—	11.5pF
J1	—	—	6/4pF
J2	—	—	2pF
Others	Custom made		

(7) Product's thickness

Non	Standard
N	Custom made
N1	Custom made
N2	Custom made
Others	Custom made

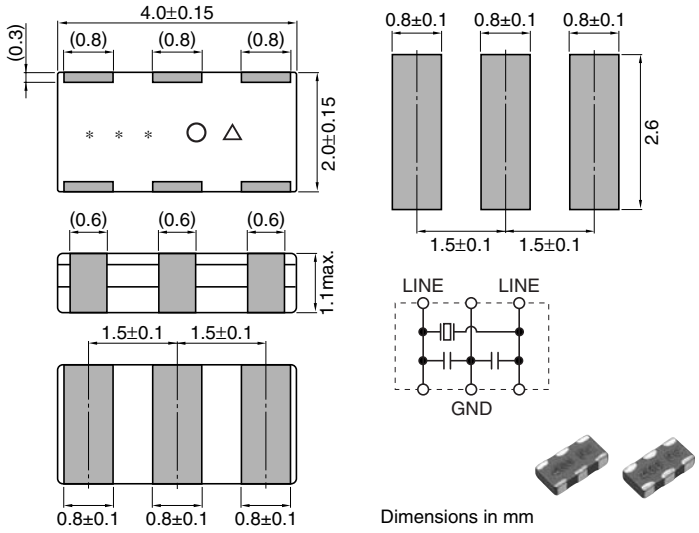
(8) Taping style

Symbol	MUC8	MXC8	MXC7/MX7	MYC7
T	2,000pieces/ reel (ø180mm)	2,000pieces/ reel (ø180mm)	2,000pieces/ reel (ø180mm)	—
T1	—	—	3,000pieces/ reel (ø180mm)	3,000pieces/ reel (ø180mm)
T2	—	—	4,000pieces/ reel (ø180mm)	—
T3	—	—	10,000pieces/ reel (ø330mm)	—

- Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.

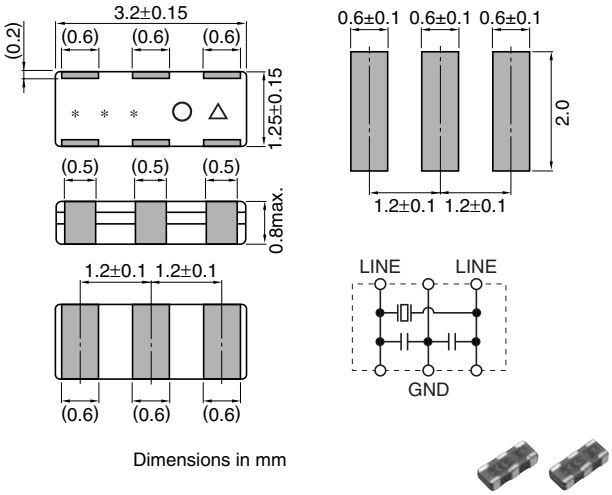
SHAPES AND DIMENSIONS/RECOMMENDED PC BOARD PATTERNS

MUC8 TYPE
FUNDAMENTAL WAVE MODE: 4.0 to 7.99MHz/
BUILT-IN LOAD CAPACITY



Dimensions in mm

MXC8 TYPE
FUNDAMENTAL WAVE MODE: 8.0 to 11.00MHz/
BUILT-IN LOAD CAPACITY



Dimensions in mm

MUC8 TYPE

Part No.	Oscillating frequency Fosc (MHz)	Resonant impedance Z_0 (Ω)max.	Initial Fosc tolerance* (%)max.	Built-in load capacity(pF)		T (mm)max.
				CL_1	CL_2	
CCR4.0MUC8T	4.000	40	±0.5/0.3	27	27	1.1
CCR4.19MUC8T	4.194	40	±0.5/0.3	27	27	1.1
CCR4.91MUC8T	4.915	40	±0.5/0.3	27	27	1.1
CCR5.0MUC8T	5.000	40	±0.5/0.3	27	27	1.1
CCR6.0MUC8T	6.000	40	±0.5/0.3	27	27	1.1

• These are representative characteristics. Oscillating frequencies and built-in load capacity values other than these shown here can be supported.
* ±0.5% is standard. Also available for custom made, please contact TDK.

MXC8 TYPE

Part No.	Oscillating frequency Fosc (MHz)	Resonant impedance Z_0 (Ω)max.	Initial Fosc tolerance* (%)max.	Built-in load capacity(pF)		T (mm)max.
				CL_1	CL_2	
CCR8.0MXC8T	8.000	40	±0.5/0.3	18	18	0.8
CCR8.38MXC8T	8.380	40	±0.5/0.3	18	18	0.8
CCR10.0MXC8T	10.000	40	±0.5/0.3	18	18	0.8
CCR11.0MXC8T	11.000	40	±0.5/0.3	18	18	0.8

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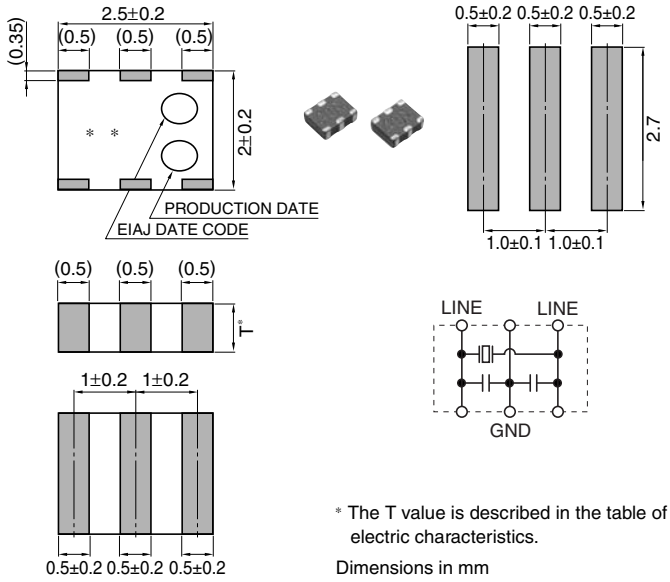
MXC7 TYPE

THIRD HARMONIC MODE: 16.0 to 50.0MHz/
BUILT-IN LOAD CAPACITY

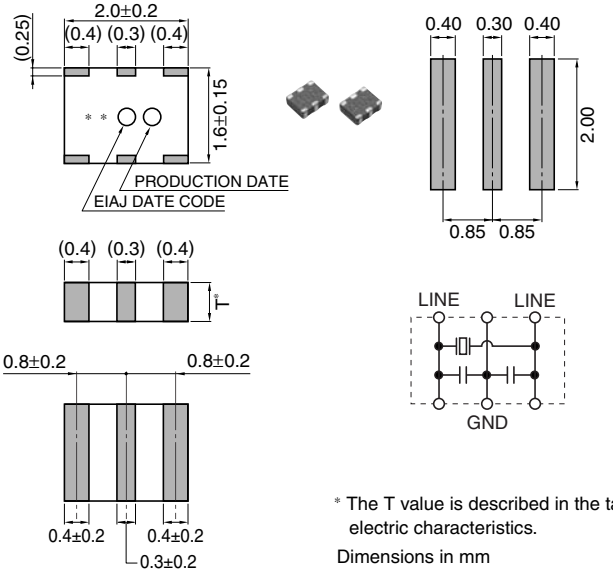


* The T value is described in the table of electric characteristics.

Dimensions in mm

MYC7 TYPE

THIRD HARMONIC MODE: 24.0 to 50.0MHz/
BUILT-IN LOAD CAPACITY



* The T value is described in the table of electric characteristics.

Dimensions in mm

MXC7 TYPE

Part No.	Oscillating frequency Fosc (MHz)	Resonant impedance Z_0 (Ω)max.	Initial Fosc tolerance* (%)max.	Built-in load capacity(pF)		T (mm)
				CL_1	CL_2	
CCR16.0MXC7T	16.000	70	±0.5/0.3/0.15	10.0	10.0	1.1±0.2
CCR16.93MXC7T	16.934	70	±0.5/0.3/0.15	9.0	9.0	1.1±0.2
CCR18.0MXC7T	18.000	70	±0.5/0.3/0.15	9.0	9.0	1±0.2
CCR20.0MXC7T	20.000	40	±0.5/0.3/0.15	9.0	9.0	1±0.2
CCR22.58MXC7T	22.580	40	±0.5/0.3/0.15	9.0	9.0	1±0.2
CCR24.0MXC7T	24.000	40	±0.5/0.3/0.15	9.0	9.0	1±0.2
CCR25.0MXC7T	25.000	40	±0.5/0.3/0.15	8.0	8.0	0.9±0.2
CCR30.0MXC7T	30.000	40	±0.5/0.3/0.15	8.0	8.0	0.9±0.2
CCR32.0MXC7T	32.000	40	±0.5/0.3/0.15	8.0	8.0	0.8±0.2
CCR33.33MXC7T	33.333	40	±0.5/0.3/0.15	8.0	8.0	0.8±0.2
CCR33.86MXC7T	33.868	40	±0.5/0.3/0.15	8.0	8.0	0.8±0.2
CCR34.57MXC7T	34.570	40	±0.5/0.3/0.15	8.0	8.0	0.8±0.2
CCR40.0MXC7T	40.000	40	±0.5/0.3/0.15	8.0	8.0	0.8±0.2
CCR48.0MXC7T	48.000	40	±0.5/0.3/0.15	8.0	8.0	0.8±0.2
CCR50.0MXC7T	50.000	40	±0.5/0.3/0.15	8.0	8.0	0.8±0.2

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* ±0.5% is standard. Also available for custom made, please contact TDK.

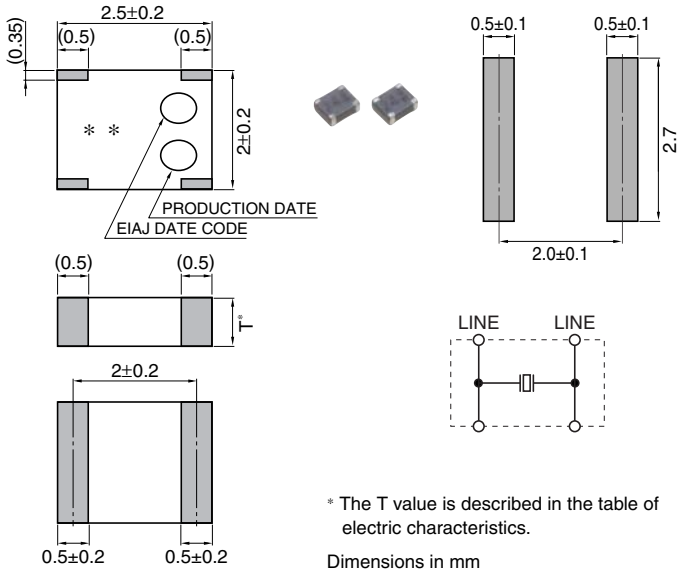
MYC7 TYPE

Part No.	Oscillating frequency Fosc (MHz)	Resonant impedance Z_0 (Ω)max.	Initial Fosc tolerance* (%)max.	Built-in load capacity(pF)		T (mm)
				CL_1	CL_2	
CCR24.0MYC7T1	24.000	40	±0.5/0.3/0.15	7.0	7.0	0.9±0.1
CCR25.0MYC7T1	25.000	40	±0.5/0.3/0.15	7.0	7.0	0.9±0.1
CCR27.12MYC7T1	27.120	40	±0.5/0.3/0.15	7.0	7.0	0.85±0.1
CCR30.0MYC7T1	30.000	40	±0.5/0.3/0.15	7.0	7.0	0.85±0.1
CCR33.33MYC7T1	33.333	40	±0.5/0.3/0.15	7.0	7.0	0.85±0.1
CCR33.86MYC7T1	33.868	40	±0.5/0.3/0.15	7.0	7.0	0.85±0.1
CCR40.0MYC7T1	40.000	40	±0.5/0.3/0.15	7.0	7.0	0.8±0.1
CCR48.0MYC7T1	48.000	40	±0.5/0.3/0.15	7.0	7.0	0.8±0.1

• These are representative characteristics. Oscillating frequencies and built-in load capacity values other than these shown here can be supported.
* ±0.5% is standard. Also available for custom made, please contact TDK.

MX7 TYPE

THIRD HARMONIC MODE: 16.0 to 50.0MHz/EXTERNAL LOAD CAPACITY



* The T value is described in the table of electric characteristics.

Dimensions in mm

MX7 TYPE

Part No.	Oscillating frequency Fosc (MHz)	Resonant impedance Z_0 (Ω)max.	Initial Fosc tolerance* (%)max.	Built-in load capacity(pF)		T (mm)
				CL_1	CL_2	
CCR16.0MX7T	16.000	70	±0.5/0.3/0.15	—	—	1.1±0.2
CCR16.93MX7T	16.934	70	±0.5/0.3/0.15	—	—	1.1±0.2
CCR18.0MX7T	18.000	70	±0.5/0.3/0.15	—	—	1±0.2
CCR20.0MX7T	20.000	40	±0.5/0.3/0.15	—	—	1±0.2
CCR22.58MX7T	22.580	40	±0.5/0.3/0.15	—	—	1±0.2
CCR24.0MX7T	24.000	40	±0.5/0.3/0.15	—	—	1±0.2
CCR25.0MX7T	25.000	40	±0.5/0.3/0.15	—	—	0.9±0.2
CCR30.0MX7T	30.000	40	±0.5/0.3/0.15	—	—	0.9±0.2
CCR32.0MX7T	32.000	40	±0.5/0.3/0.15	—	—	0.8±0.2
CCR33.33MX7T	33.333	40	±0.5/0.3/0.15	—	—	0.8±0.2
CCR33.86MX7T	33.868	40	±0.5/0.3/0.15	—	—	0.8±0.2
CCR34.57MX7T	34.570	40	±0.5/0.3/0.15	—	—	0.8±0.2
CCR40.0MX7T	40.000	40	±0.5/0.3/0.15	—	—	0.8±0.2
CCR48.0MX7T	48.000	40	±0.5/0.3/0.15	—	—	0.8±0.2
CCR50.0MX7T	50.000	40	±0.5/0.3/0.15	—	—	0.8±0.2

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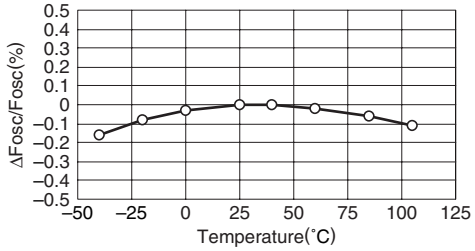
* ±0.5% is standard. Also available for custom made, please contact TDK.

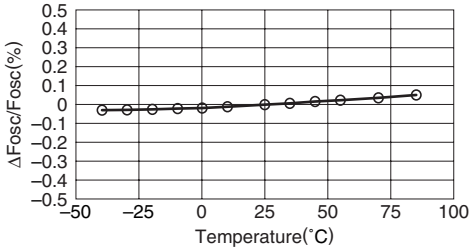
TYPICAL ELECTRICAL CHARACTERISTICS

OSCILLATING FREQUENCY DRIFT OVER TEMPERATURE

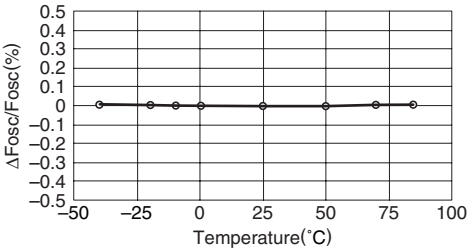
MUC8/MXC8: ±0.3%/–40 to +85°C(Standard)
CCR8.0MXC8



MXC7: ±0.2%/–40 to +85°C(Standard)
CCR48.0MXC7

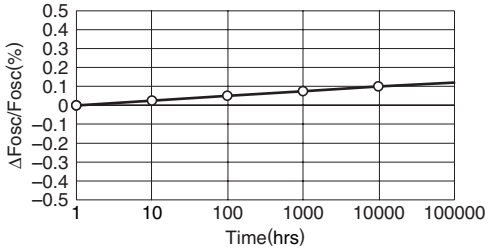


MYC7: ±0.1%/–40 to +85°C(Standard)
±0.05%/–10 to +70°C
CCR48.0MYC7T1

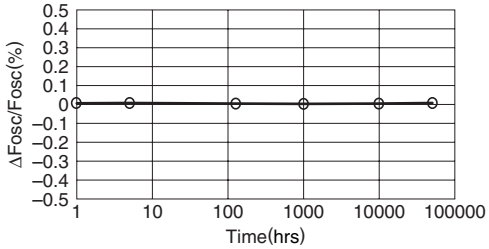


OSCILLATING FREQUENCY AGING

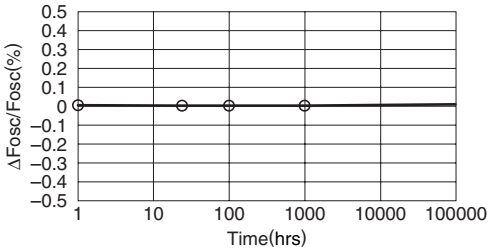
MUC8/MXC8: ±0.2%/10years(Standard)
CCR8.0MXC8



MXC7: ±0.1%/10years(Standard)
CCR48.0MXC7

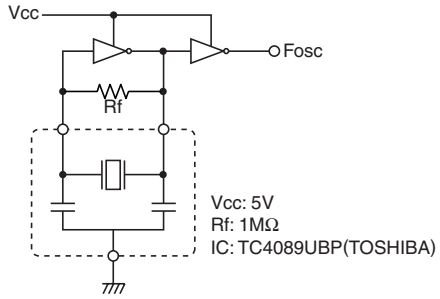


MYC7 : ±0.05%/10years(Standard)
CCR48.0MYC7T1

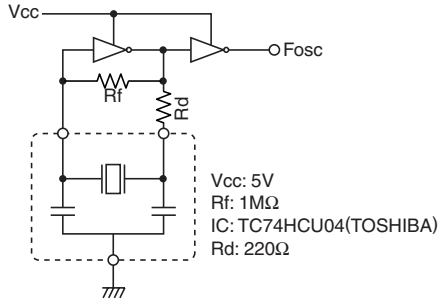


OSCILLATING FREQUENCY-TEMPERATURE CHARACTERISTIC MEASURING CIRCUIT

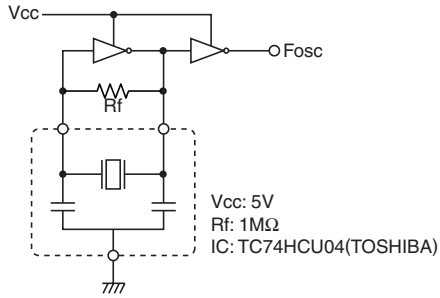
MUC8/MXC8 TYPE 4.0 to 9.99MHz



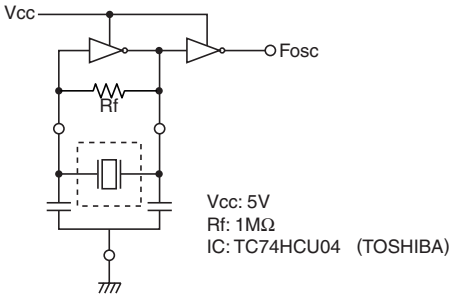
MXC8 TYPE 10.0 to 11.0MHz



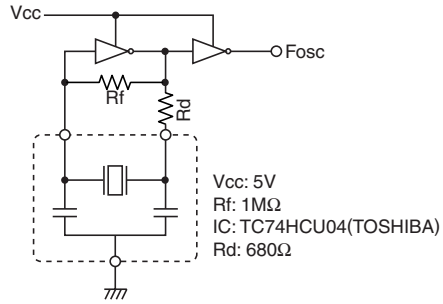
MXC7 TYPE 16.0 to 50.0MHz



MX7 TYPE 16.0 to 50.0MHz



MYC7 TYPE 24.0 to 50.0MHz



RELIABILITY AND TEST CONDITIONS

The following test items are satisfied.

(1) Oscillating frequency change: Within ±0.25%

(2) Resonant resistance change: Within ±10Ω

(3) Appearance; serious abnormalities not to exist.

Test items	Test conditions
Low temperature storage	Temperature: –40±3°C Time: 1000h
High temperature storage	Temperature: +85±2°C Time: 1000h
Loading humidity resistance	Humidity: 90 to 95(%)RH Temperature: 60±2°C Time: 1000h
Thermal shock	–40°C (30min), 85°C (30min) x 100 cycles
Soldering heat resistance	Solder temperature: peak 260°C, 10s reflow
Drop	Drop 3 times onto the concrete from a height of 1m
Vibration	Frequency: 10 ⟺ 55 ⟺ 10Hz/min Amplitude: 1.5mm X, Y and Z directions for 2h each
Board bend test	Solder this product onto a glass epoxy board (L100×W40×T1.6mm), press it by up to 1mm in 1mm/s and keep it for 5sec.