Multi-layer ceramic chip capacitors

MCH03 (0603 (0201) size, chip capacitor)

●Features

1) Ultra miniature (0.6mm×0.3mm×0.3mm), Ultra light weight (0.3mg)
2) Suitable for mobile devices
3) Lead-free plating terminal
4) No polarity

●Quick Reference

The design and specifications are subject to change without prior notice. Please check the most recent technical specifications prior to placing orders or using the product. For more detail information regarding packaging style code, please check product designation.

Thermal compensation

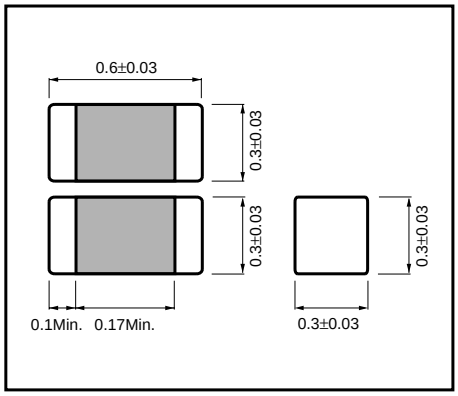
Part No.	Size code	Temperature characteristics code	Temperature characteristics (ppm/°C)	Operating temp. range (°C)	Rated voltage (V)	Capacitance (pF)	Capacitance tolerance	Thickness (mm)
MCH03	0603	A (AN)	0±250(CK)	−55 to +125	25	0.5 to 2.7 (E12 Series) *	C(±0.25pF)	0.3 ± 0.03
			0±120(CJ)			3.0 to 3.9 (E12 Series) *		
			0±60(CH)			4 to 5 (E12 Series) *		
						5.1 to 10 (E12 Series) *	D(±0.5pF)	
						11 to 100 (E12 Series)	J(±5%)	

* : 0.5pF/0.75pF/2pF/3pF/4pF/5pF/6pF/7pF/8pF/9pF available

●High dielectric constant

Part No.	Size code	Temperature characteristics code		Operating temp. range (°C)	Rated voltage (V)	Capacitance (pF)	Capacitance tolerance	Thickness (mm)
MCH03	0603	CN	±10%(B)	−25 to +85	25	100 to 2,200 (E6 Series)	K (±10%)	0.3 ± 0.03
					16	4,700 (E3 Series)		
			±15% (R) (X7R)	−55 to +125	25	100 to 2,200 (E6 Series)		
					16	4,700 (E3 Series)		
			±15%(X5R)	−55 to +85	6.3	10,000 (E6 Series)		
		FN	+30%, −80% (F)	−25 to +85	16	10,000 (E1 Series)	Z (+80%, −20%)	
			+22%, −82% (Y5V)	−30 to +85	16	10,000 (E1 Series)		

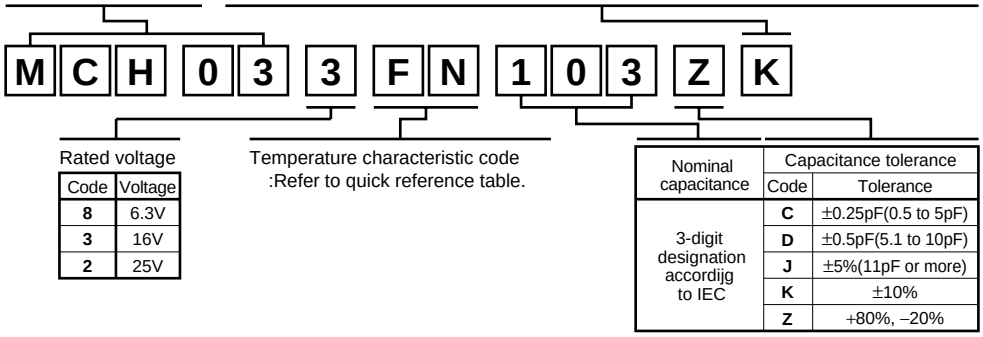
●External dimensions (Unit : mm)



●Product designation

Code	Prduct thickness	Packing specification	Reel	Basic ordering unit(pcs.)
K	**0.3mm**	Paper tape(width 8mm, pitch 2mm)	ϕ180mm (7in.)	15,000

Part No. Packaging Style



●Product No.list

•Thermal compensation capacitors

Capacitance (pF)	Temperature		A·AN(CG) (COG) (CH) Characteristic
	Rated voltage (V)		25V
	Tolerance	Product thickness(mm)	Product No.
0.5	C (±0.25pF)	0.6 ± 0.03	MCH032A (AN) 0R5CK
0.75			MCH032A (AN) R75CK
1.0			MCH032A (AN) 010CK
1.2			MCH032A (AN) 1R2CK
1.5			MCH032A (AN) 1R5CK
1.8			MCH032A (AN) 1R8CK
2.0			MCH032A (AN) 020CK
2.2			MCH032A (AN) 2R2CK
2.7			MCH032A (AN) 2R7CK
3.0			MCH032A (AN) 030CK
3.3			MCH032A (AN) 3R3CK
3.9			MCH032A (AN) 3R9CK
4.0			MCH032A (AN) 040CK
4.7			MCH032A (AN) 4R7CK
5.0			MCH032A (AN) 050CK
5.6	D (±0.5pF)		MCH032A (AN) 5R6DK
6			MCH032A (AN) 060DK
6.8			MCH032A (AN) 6R8DK
7			MCH032A (AN) 070DK
8			MCH032A (AN) 080DK
8.2			MCH032A (AN) 8R2DK
9			MCH032A (AN) 090DK
10			MCH032A (AN) 100DK

Capacitance (pF)	Temperature		A·AN(CG) (COG) (CH) Characteristic
	Rated voltage (V)		25V
	Tolerance	Product thickness(mm)	Product No.
12	J (±5%)	0.6 ± 0.03	MCH032A (AN) 120JK
15			MCH032A (AN) 150JK
18			MCH032A (AN) 180JK
22			MCH032A (AN) 220JK
27			MCH032A (AN) 270JK
33			MCH032A (AN) 330JK
39			MCH032A (AN) 390JK
47			MCH032A (AN) 470JK
56			MCH032A (AN) 560JK
68			MCH032A (AN) 680JK
82			MCH032A (AN) 820JK
100			MCH032A (AN) 101JK

•High dielectric constant capacitors

Capacitance (pF)	Temperature		CN (R) (B) (X7R) Characteristic		CN (X5R) Characteristic
	Rated voltage (V)		25V	16V	6.3V
	Tolerance	Product thickness(mm)	Product No.	Product No.	Product No.
100	K (±10%)	0.6 ± 0.03	MCH032CN101KK		
150			MCH032CN151KK		
220			MCH032CN221KK		
330			MCH032CN331KK		
470			MCH032CN471KK		
680			MCH032CN681KK		
1,000			MCH032CN102KK		
1,500			MCH032CN152KK		
2,200			MCH032CN222KK		
4,700				MCH033CN472KK	
10,000					MCH038CN103KK

Capacitance (pF)	Temperature		FN(F) (Y5V) Characteristic
	Rated voltage (V)		16V
	Tolerance	Product thickness(mm)	Product No.
10,000	Z (+80%, −20%)	0.6 ± 0.03	MCH033FN103ZK

●Performance and test method

<table>
<tr><th>No.</th><th>Items</th><th colspan="2">Performance</th><th>Test Method
(As per JIS C 5101-1, JIS C 5101-10)</th></tr>
<tr><td>1</td><td>Appearance and dimensions</td><td colspan="2">No marked defects shall be allowed for appearance.
Dimensions shall be as specified the clause 4.</td><td>As per 4.4 of JIS C 5101-1.
As per 4.5 of JIS C 5101-10
Using a Magnifier.</td></tr>
<tr><td>2</td><td>Withstanding voltage</td><td colspan="2">No dielectrical breakdown or other damage shall be allowed.</td><td>As per 4.6 of JIS C 5101-1.
As per 4.6.4 of JIS C 5101-10
Voltage shall be applied as per Table1.
Table 1
<table><tr><th>Charac-teristic</th><th>Voltage</th></tr><tr><td>A, AN</td><td>300% Rated voltage</td></tr><tr><td>CN</td><td rowspan="2">250% Rated voltage</td></tr><tr><td>FN</td></tr></table>Voltage shall be applied for 1 to 5s with 50mA charging and discharging curent.</td></tr>
<tr><td>3</td><td>Insulation resistance</td><td colspan="2">Not less than 10000MΩ or 500MΩ・μF, whichever is less.
(For products with rated voltage less than 16V, it is not less than 10000MΩ or 100MΩ・μF, whichever is less.)</td><td>As per 4.5 of JIS C 5101-1.
As per 4.6.3 of JIS C 5101-10
Measurements shall be made after 60+/–5s period of the rated voltage applied.</td></tr>
<tr><td>4</td><td>Capacitance</td><td colspan="2">Capacitance shall be within specified tolerance range.</td><td>As per 4.7 of JIS C 5101-1.
As per 4.6.1 of JIS C 5101-10
Measurements shall be made under the conditions specified in Table 2.
Table 2
<table><tr><th rowspan="2">Charac-teristic</th><th colspan="2">Frequency・Voltage</th></tr><tr><th>≤ 1000 pF</th><th>> 1000 pF</th></tr><tr><td>A, AN</td><td>1+/–0.1MHz
1+/–0.1Vrms.</td><td>1+/–0.1kHz
1+/–0.1Vrms.</td></tr><tr><td>CN</td><td colspan="2" rowspan="2">1+/–0.1kHz
1+/–0.1Vrms.</td></tr><tr><td>FN</td></tr></table></td></tr>
<tr><td>5</td><td>Dielectric loss tangent</td><td>A, AN</td><td>Capacitance < 30pF
tan δ ≤ 100/(400+20C)%
Capacitance ≥ 30pF
tan δ ≤ 0.1%</td><td>As per 4.8 of JIS C 5101-1.
As per 4.6.2 of JIS C 5101-10
Measurements shall be made under the conditions specified in Table 2.</td></tr>
<tr><td></td><td></td><td>C N</td><td>Rated voltage=25V
tan δ ≤ 3.0%
Rated voltage=16V
tan δ ≤ 5.0%
Rated voltage=6.3V
tan δ ≤ 10.0%</td><td></td></tr>
<tr><td></td><td></td><td>F N</td><td>Rated voltage=16V
tan δ≤ 10.0%</td><td></td></tr>
</table>

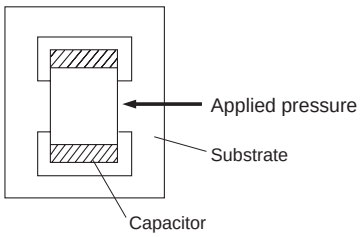
No.	Items		Performance			Test Method (As per JIS C 5101-1, JIS C 5101-10)
6	Temperature characteristic		A, AN	Capacitance C ≤ 2pF 0+/–250ppm/°C Capacitance C=3pF 0+/–120ppm/°C Capacitance C ≥ 4pF 0+/–60ppm/°C (–55°C to +125°C)		As per 4.24 of JIS C 5101-1. As per 4.7 of JIS C 5101-10 Temperature coefficient shall be calculated at 20°C and 85°C.
			C N	X7R・R	+/–15% (–55°C to +125°C)	As per 4.24 of JIS C 5101-1. As per 4.7 of JIS C 5101-10 If required, measurements shall be made at a given temperature.
				B	+/–10% (–25°C to +85°C)	
				X5R	+/–15% (–55°C to +85°C)	
			F N	+30%, –80% (–25°C to +85°C)		
				+22%, –82% (–30°C to +85°C)		
7	Solderability		More than 3/4 of each end termination shall be covered with new solder.			As per 4.15.2 of JIS C 5101-1. As per 4.11 of JIS C 5101-10 The solder specified in JIS Z 3282 H63A shall be used. Ans the flux containing 25% rosin and ethanol solution shall be used. The specimens shall be immersed into the solder at 235+/–5°C for 2+/–0.5s So that both end terminations are completely under solder.
8	Resistance to solderin heat	Appearance	Without mechanical damage.			As per 4.14 of JIS C 5101-1. As per 4.10 of JIS C 5101-10 The solder specified in JIS Z 3282. H63A shall be used. The specimens shall be immersed into the solder at 260+/–5°C for 5+/–0.5s so that both end terminations are completely under the solder. Pre-heating at 150+/–10°C for 1 to 2min Initial measurements prior to test shall be performed after the thermal Pre-conditioning specified in Remarks (1). Final measurements shall be made after the specimens have been left at room temperature as per Table3.
		Change rate from initial value	A, AN	Within +/–2.5% or +/–0.25pF whichever is larger.		
			C N	Within +/–7.5%		
			F N	Within +/–20%		
		Dielectric loss tangent	Within specified initial value.			
		Insulation resistance	Within specified initial value.			
		Withstanding voltage	No defects shall be allowed.			
9	End termination adherence		Without peeling or sign of peeling shall be allowed on the end terminations.			As per 4.13 of JIS C 5101-1. As per 4.8 ofJIS C 5101-10 A 2N weight for 10+/–1s shall be applied to the soldered specimens as shown by the arrow mark in the below sketch. 

Table3

Charac-teristic	Time
A, AN	24+/–2 h
CN, FN	48+/–4 h

<table>
<tr><th>No.</th><th colspan="2">Items</th><th colspan="3">Performance</th><th>Test Method
(As per JIS C 5101-1, JIS C 5101-10)</th></tr>
<tr><td>10</td><td>Bending strength</td><td>Appearance</td><td colspan="3">Without mechanical damage.</td><td>As per 4.35 of JIS C 5101-1.
As per 4.9 of JIS C 5101-10
Glass epoxy board with soldered specimens shall be bent till 1mm by 1.0mm/s.</td></tr>
<tr><td rowspan="5">11</td><td rowspan="5">Vibration</td><td>Appearance</td><td colspan="3">Without mechanical damage.</td><td rowspan="5">As per 4.17 of JIS C 5101-1
The specimens shall be soldered on the specified test jig.
Initial measurements shall be made after the thermal pre-conditioning specified in Remarks(1).
Final measurements shall be made after the specimens have been left at room temperature as per Table3.
[Condition]
Directions : 2h each X, Y and Z directions
Total : 6h
Frequency range : 10 to 55 to 10Hz(1min)
Applitude : 1.5mm
(shall not exceed acceleration196m/s^2)
Table3<table><tr><th>Charac-teristic</th><th>Time</th></tr><tr><td>A, AN</td><td>24+/–2 h</td></tr><tr><td>CN, FN</td><td>48+/–4 h</td></tr></table></td></tr>
<tr><td rowspan="3">Change rate from initial value</td><td>A, AN</td><td>Capacitance shall be within specified tolerance range.</td></tr>
<tr><td>C N</td><td>Within +/–7.5%</td></tr>
<tr><td>F N</td><td>Within +/–20%</td></tr>
<tr><td>Dielectric loss tangent</td><td colspan="2">Within specified initial value.</td></tr>
<tr><td rowspan="8">12</td><td rowspan="8">Temperature cycling</td><td>Appearance</td><td colspan="3">Without mechanical damage.</td><td rowspan="8">As per 4.16 of JIS C 5101-1
As per 4.12 of JIS C 5101-10
The specimens shall be soldered on the test jig shown in Remarks.
Temperature cycle : 5cycles Initial measurements prior to test shall be performed after the thermal per-conditioning specified in Remarks (1).
Final measurements shall be made after the specimens have been left at room temperature as per Table3.
Test condition<table><tr><th>Step</th><th>Temp. (°C)</th><th>Time (min)</th></tr><tr><td>1</td><td>Min operating temp.</td><td>30+/–3</td></tr><tr><td>2</td><td>Room temp.</td><td>≤ 3</td></tr><tr><td>3</td><td>Max operating temp.</td><td>30+/–3</td></tr><tr><td>4</td><td>Room temp.</td><td>≤ 3</td></tr></table>Table3<table><tr><th>Charac-teristic</th><th>Time</th></tr><tr><td>A, AN</td><td>24+/–2 h</td></tr><tr><td>CN, FN</td><td>48+/–4 h</td></tr></table></td></tr>
<tr><td rowspan="4">Change rate from initial value</td><td colspan="2">A, AN</td><td>Within +/–2.5% or +/–0.25pF whichever is larger.</td></tr>
<tr><td rowspan="2">C N</td><td>Rated voltage 25V,16V</td><td>Within +/–7.5%</td></tr>
<tr><td>Rated voltage 6.3V</td><td>Within +/–10.0%</td></tr>
<tr><td colspan="2">F N</td><td>Within +/–20%</td></tr>
<tr><td>Dielectric loss tangent</td><td colspan="3">Within specified initial value.</td></tr>
<tr><td>Insulation resistance</td><td colspan="3">Within specified initial value.</td></tr>
<tr><td>Withstanding voltage</td><td colspan="3">No defects shall be allowed.</td></tr>
</table>

<table>
<tr><th>No.</th><th colspan="2">Items</th><th colspan="3">Performance</th><th>Test Method
(As per JIS C 5101-1, JIS C 5101-10)</th></tr>
<tr><td rowspan="8">13</td><td rowspan="8">Humidity (Steady)</td><td>Appearance</td><td colspan="3">Without mechanical damage.</td><td rowspan="8">As per 4.22 of JIS C 5101-1
JIS C 5101-10
Test temperature : 60+/–2°C
Relative humidity : 90 to 95%
Test time : 500 +24/–0 h
Initial measurements prior to test shall be made after the voltage pre-conditioning specified in Remarks (2).
Final measurements have been left at room temperature as per Table3.

Table3
<table><tr><th>Charac-teristic</th><th>Time</th></tr><tr><td>A, AN</td><td>24+/–2 h</td></tr><tr><td>CN, FN</td><td>48+/–4 h</td></tr></table></td></tr>
<tr><td rowspan="4">Change rate from initial value</td><td colspan="2">A, AN</td><td>Within +/–5.0% or +/–0.5pF whichever is larger.</td></tr>
<tr><td rowspan="2">C N</td><td>Rated voltage 25V,16V</td><td>Within +/–12.5%</td></tr>
<tr><td>Rated voltage 6.3V</td><td>Within +/–25.0%</td></tr>
<tr><td colspan="2">F N</td><td>Within +/–30.0%</td></tr>
<tr><td rowspan="3">Dielectric tangent</td><td colspan="2">A, AN</td><td>tan δ ≤ 0.3%</td></tr>
<tr><td colspan="2">C N</td><td>Less than 200% of initial spec.</td></tr>
<tr><td colspan="2">F N</td><td>Less than 150% of initial spec.</td></tr>
<tr><td>Insulation resistance</td><td colspan="3">Not less than 1000MΩ or 50MΩ・μF, whichever is less.
(For products with rated voltage less than 16V, it is not less than 1000MΩ or 10MΩ・μF, whichever is less.)</td></tr>
<tr><td rowspan="8">14</td><td rowspan="8">Humidity life test</td><td>Appearance</td><td colspan="3">Without mechanical damage.</td><td rowspan="8">As per 4.22 of JIS C 5101-1
As per 4.14 of JIS C 5101-10
Test temperature : 60+/–2°C
Relative humidity : 90 to 95%
Voltage : Rated voltage
Test time : 500 +24/–0 h
Initial measurements prior to test shall be made after the voltage pre-conditioning specified in Remarks (2).
Final measurements shall be made after the specimens have been left at room temperature as per Table3.

Table3
<table><tr><th>Charac-teristic</th><th>Time</th></tr><tr><td>A, AN</td><td>24+/–2 h</td></tr><tr><td>CN, FN</td><td>48+/–4 h</td></tr></table></td></tr>
<tr><td rowspan="4">Change rate from initial value</td><td colspan="2">A, AN</td><td>Within +/–7.5% or +/–0.75pF whichever is larger.</td></tr>
<tr><td rowspan="2">C N</td><td>Rated voltage 25V,16V</td><td>Within +/–12.5%</td></tr>
<tr><td>Rated voltage 6.3V</td><td>Within +/–25.0%</td></tr>
<tr><td colspan="2">F N</td><td>Within +/–30.0%</td></tr>
<tr><td rowspan="3">Dielectric loss tangent</td><td colspan="2">A, AN</td><td>tan δ ≤ 0.5%</td></tr>
<tr><td colspan="2">C N</td><td>Less than 200% of initial spec.</td></tr>
<tr><td colspan="2">F N</td><td>Less than 150% of initial spec.</td></tr>
<tr><td>Insulation resistance</td><td colspan="3">Not less than 500MΩ or 25MΩ・μF, whichever is less.
(For products with rated voltage less than 16V, it is not less than 500mΩ or 5MΩ・μF, whichever is less.)</td></tr>
</table>

<table>
<tr><th>No.</th><th colspan="2">Items</th><th colspan="3">Performance</th><th>Test Method
(As per JIS C 5101-1, JIS C 5101-10)</th></tr>
<tr><td rowspan="7">15</td><td rowspan="7">Heat life test</td><td>Appearance</td><td colspan="3">Without mechanical damage.</td><td rowspan="7">As per 4.23 of JIS C 5101-1.
As per 4.15 of JIS C 5101-10

<table><tr><th></th><th>Test temperature(°C)</th><th>Voltage</th><th>Test time (h)</th></tr><tr><td>A, AN</td><td>125</td><td>200% Rated voltage</td><td>1000 +48/–0</td></tr><tr><td rowspan="2">CN</td><td>85 (B, X5R)</td><td>200% Rated voltage</td><td rowspan="2">1000 +48/–0</td></tr><tr><td>125 (R, X7R)</td><td>200% Rated voltage</td></tr><tr><td>FN</td><td>85</td><td>200% Rated voltage</td><td>1000 +48/–0</td></tr></table>
Initial measurements prior to test shall be made after the voltage pre-conditioning specified in Remarks (2).
Final measurements shall be made after the specimens have been left at room temperature

Table3
<table><tr><th>Charac-teristic</th><th>Time</th></tr><tr><td>A, AN</td><td>24+/–2 h</td></tr><tr><td>CN, FN</td><td>48+/–4 h</td></tr></table></td></tr>
<tr><td rowspan="2">Change rate from initial value</td><td colspan="2">A, AN</td><td>Within +/–3.0% or +/–0.3pF whichever is larger.</td></tr>
<tr><td rowspan="2">C N</td><td>Rated voltage 25V,16V</td><td>Within +/–15.0%</td></tr>
<tr><td>Rated voltage 6.3V</td><td>Within +/–25.0%</td></tr>
<tr><td colspan="2">F N</td><td>Within +/–30.0%</td></tr>
<tr><td rowspan="3">Dielectric loss tangent</td><td colspan="2">A, AN</td><td>tan δ ≤ 0.3%</td></tr>
<tr><td colspan="2">C N</td><td>Less than 200% of initial spec.</td></tr>
<tr><td colspan="2">F N</td><td>Less than 150% of initial spec.</td></tr>
<tr><td>Insulation resistance</td><td colspan="3">Not less than 1000MΩ or 50MΩ・μF, whichever is less.
(For products with rated voltage less than 16V, it is not less than 1000mΩ or 10MΩ・μF, whichever is less.)</td></tr>
</table>

[Remarks]

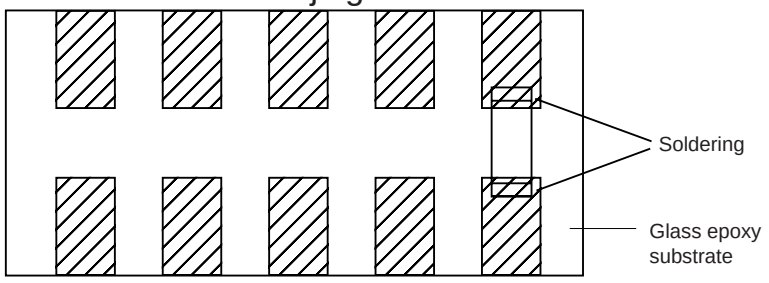
Pre-conditioning

If specified in test method of as per 3(Performance and test merhod), capacitors of CN, FN characteristics shall be pre-conditionded as follows.

(1) Thermal pre-conditioning
Prior to initial measurements, specimens shall be conditioned at a temperature of 150 0/–10°C for a period of 1hr., and shall be allowed to stabilize at room temperature for 48+/–4h

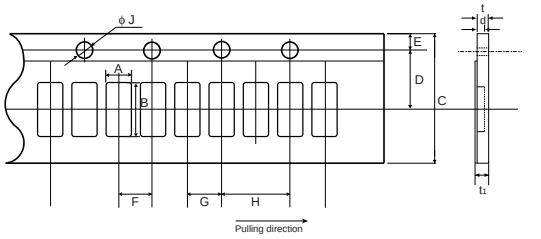
(2) Voltage pre-conditioning
Prior to initial measurements, voltage specified as a test condition shall be applied to specimens for a period of 1hr., and the specimens shall be allowed to stabilize at room temperature for 48+/–4h

<Test jig>



●Packaging specifications

Taping dimensions



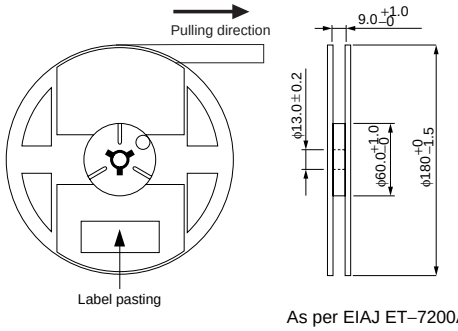
Symbol	C	D	E	F	G	H	J	d	t	t1
Dimensions	8.0 +/ −0.2	3.5 +/ −0.05	1.75 +/ −0.1	2.0 +/ −0.05	2.0 +/ −0.05	4.0 +/ −0.1	ϕ1.5 +0.1/ −0	0.37 +/ −0.02	0.42 +/ −0.02	0.5 MAX.

(Unit : mm)

Style \ Symbol	A	B
MCH03	0.37 +/ −0.03	0.67 +/ −0.03

(Unit : mm)

Reel dimensions



As per EIAJ ET−7200A

(Unit : mm)

(1) The quantity for one reel is as bellows.

Kind of reel	Series	Paper tape	
		Quantity	Symbol
ϕ180 reel	MCH03	15,000 pcs.	K

(2) When the tape is pulled out towards the operator with the cover tape facing upward, the feeding holes shall be found on the right portion of the tape.
(3) Specification of beginning and ending of the tape are as follows.

Ending(reel's center) : Approx. 300mm (no chips)
Beginning(reel's round) : Approx. 270mm (no chips)
: Approx. 30mm (no pasted tape)
: Approx. 260mm (cover tape only)

(4) No juncture of tape shall be allowed.
(5) The share strength of tape shall be more than 5N at the break down strength.
(6) The peel strength of the cover tape shall be 0.1 to 0.7(N) when the cover tape are peeled 0 to 15° degree from the surface.
(7) The number of missing components shall not exceed 0.1% of the total number of components (marked number) or one whichever is the larger, and no consecutive missing exceeding two is allowed.
(8) The reels made from resin shall be used, as per EIAJ ET-7200A.

●Marking

No marking shall be performed on the chip.

Trademark, parts number, quantity, lot No. , and country of origin shall be labeled on each reel, bulk case.

●Numbering system for LOT No.

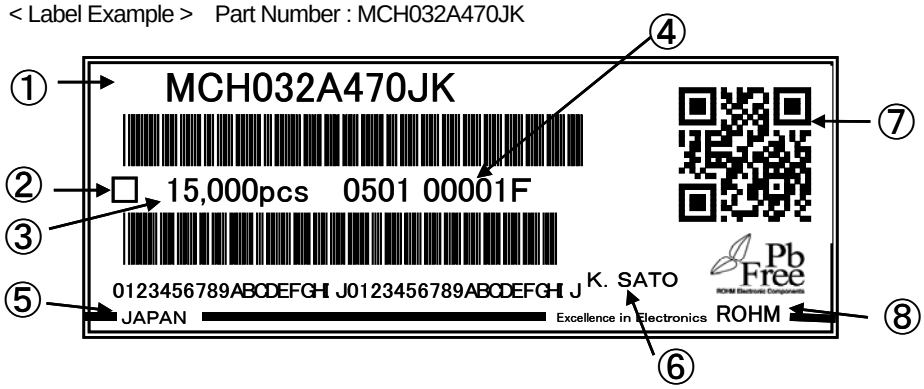
Example 03 (1) 01 (2) A0001 (3) J (4)

(1) The end of the Christian Era <two digits> of production finish.
(2) Week in completing part of production finish.
(3) Manufacture continuity number.
(4) The symbol of manufacturing plant.

●**Label expression**

The Figure below is label expression

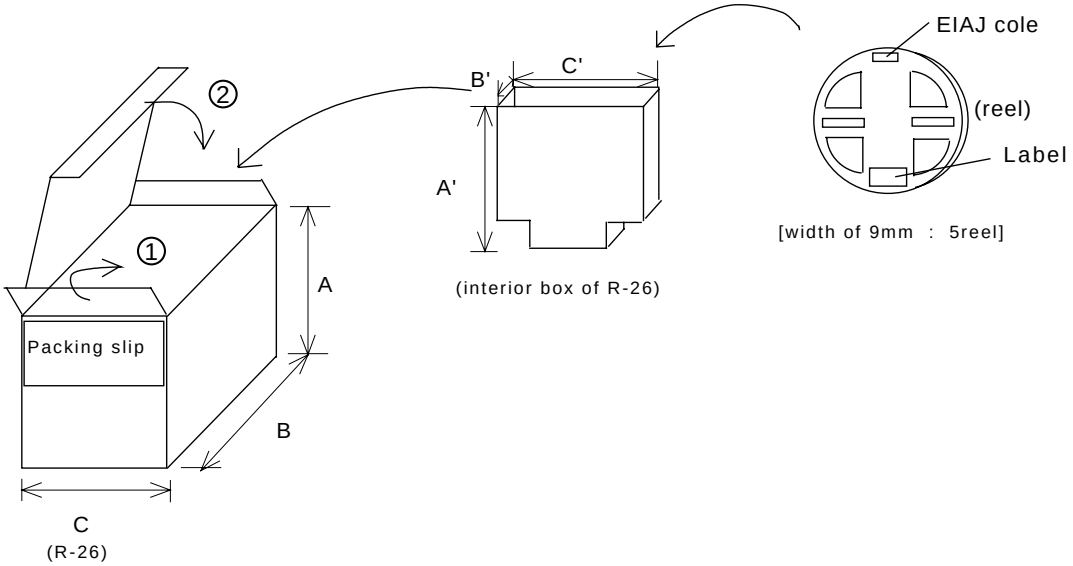
< Label Example > Part Number : MCH032A470JK



① Part Number
② Division cord
③ Quantity
④ Lot No.
⑤ The Country of origin
⑥ Inspector
⑦ QR code
⑧ Trademark

●**Packing method**

1) ϕ180mm Reel



< Packaging unit >

Symbol	K
Quantity of reel in interior box	5
Quantity of reel in box of R-26	20

Dimensions	Packaging	
	R-26	interior box of R-26
A (A')	195	185
B (B')	255	60
C (C')	190	185

(Unit : mm)

< Appearance >

Carton

< Accumulation >

You must do accumulation by ten boxes

< Packaging slip >

1. Customer
2. Parts number
3. Quantity
4. Box quantity
5. Trade mark

●**Weight / Piece**

(Unit : mg)

Size	Item	Thickness	Characteristic	Weight / Piece
0603 (0201)	MCH03	0.3mm	A, AN	0.3
			CN	0.3
			FN	0.3

(Note) The measured values in the table are for reference only.
Actual weight of these chips may very slightly lot by lot.

●**Electrical characteristics**

■A (C0G) Characteristics

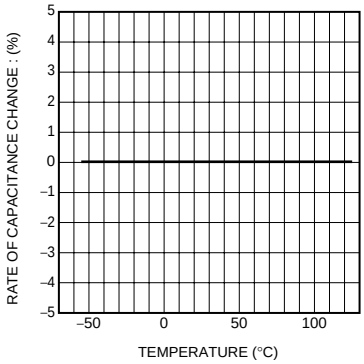


Fig.1 Capacitance-temperature characteristics

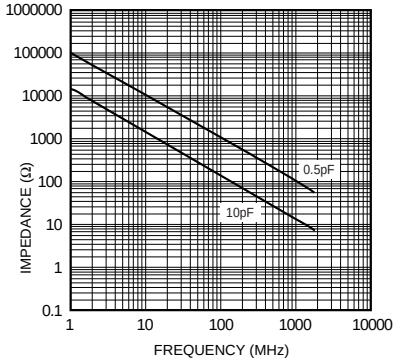


Fig.2 Impedance-frequency characteristics

■CN (X7R) Characteristics

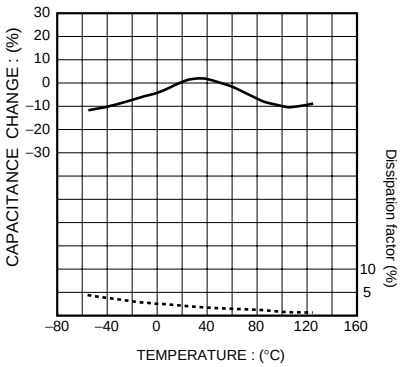


Fig.3 Capacitance-temperature characteristics

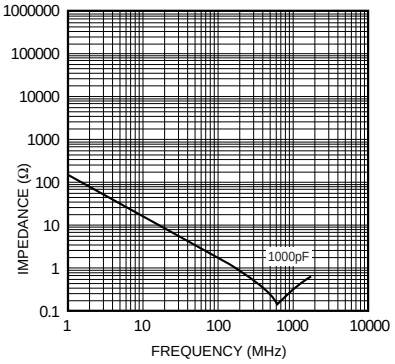


Fig.4 Impedance-frequency characteristics

■FN (Y5V) Characteristics

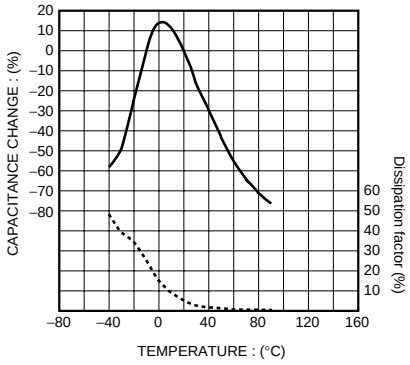


Fig.5 Capacitance-temperature characteristics

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