

Multi-layer ceramic chip capacitors

MCH15 (1005 (0402) size, chip capacitor)

●Features

- 1) Miniture, light weight
- 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)
MCH15	1005 (0402)	A (AN)	0±120(CJ)	-55 to +125	50	0.5 to 3.9 (E24 Series) *	C(±0.25pF)	0.5 ± 0.05	
			0±60(CH)			4 to 5 (E24 Series) *			
			0±30 (CG)(C0G)			5.1 to 9.1 (E24 Series) *			
						10 (E24 Series) *	D(±0.5pF)		
						11 to 220 (E24 Series)	J(±5%)		
	270 to 470 (E12 Series)								

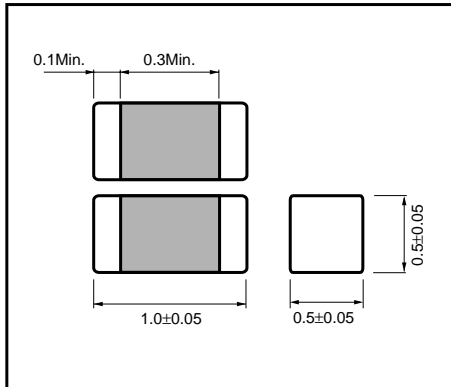
* : 0.5pF/0.75pF/2pF/3pF/4pF/5pF/6pF/7pF/8pF/9pF available

●High dielectric constant

Part No.	Size code	Temperature characteristics code	Temperature characteristics	Operating temp. range (°C)	Rated voltage (V)	Capacitance (pF)		Capacitance tolerance	Thickness (mm)
MCH15	1005 (0402)	CN	0±10% (B)	-25 to +125	50	220 to 6,800 (E6 Series)	K(±10%)	0.5 ± 0.05	
					16	10,000 (E6 Series)			
			0±15% (R) (X7R)	-55 to +125	50	220 to 6,800 (E6 Series)			
					16	10,000 (E6 Series)			
			0±15% (X5R)	-55 to +85	16	15,000 to 47,000 (E6 Series)			
					10	68,000 to 220,000 (E6 Series)			
		FN	+30% , -80% (F)	-25 to +85	6.3	470,000 to 1,000,000 (E6 Series)	M(±20%)		
					50	1,000 to 10,000 (E3 Series)	Z(+80% , -20%)		
					25	22,000 (E3 Series)			
			16	47,000 to 100,000 (E3 Series)					
			6.3	1,000,000 (E3 Series)					
			50	1,000 to 10,000 (E3 Series)					
+22% , -82% (Y5V)	-30 to +85	25	22,000 (E3 Series)						
		16	47,000 to 100,000 (E3 Series)						
		6.3	1,000,000 (E3 Series)						

Ceramic capacitors

●External dimensions (Unit : mm)



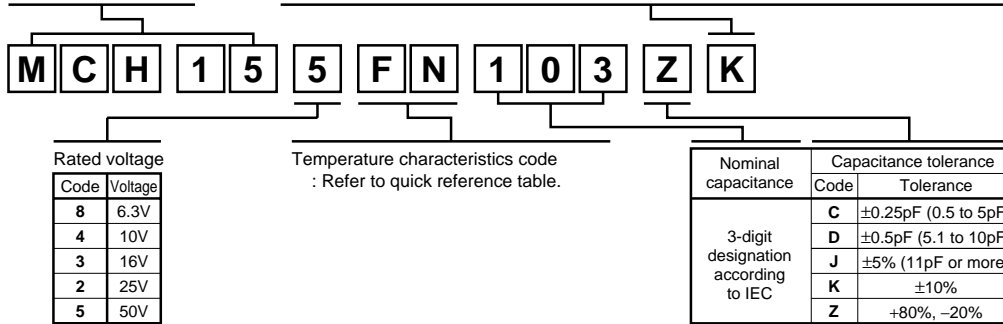
●Product designation

Code	Product thickness	Packing specification	Reel	Basic ordering unit (pcs.)
K	0.5mm	Paper tape(width 8mm, pitch 2mm)	φ180mm (7in.)	10,000
L	0.5mm	Paper tape(width 8mm, pitch 2mm)	φ330mm (13in.)	50,000
C	0.5mm	Bulk case	-	50,000

Reel (φ180, φ330mm) : compatible with EIAJ ET-7200A
 Bulk case : compatible with EIAJ ET-7201A

Part No.

Packing Style



Ceramic capacitors

●Product No. list

●Thermal compensation capacitors

Capacitance (pF)	Temperature		A·AN(CG) (COG) (CH) Characteristic 50V Product No.	Capacitance (pF)	Temperature		A·AN(CG) (COG) (CH) Characteristic 50V Product No.
	Rated voltage (V)				Rated voltage (V)		
	Tolerance	Product thickness (mm)			Tolerance	Product thickness (mm)	
0.5	C (±0.25pF)	0.5 ± 0.05	MCH155A (AN) 0R5C*	11	J (±5%)	0.5 ± 0.05	MCH155A (AN) 110J*
0.75			MCH155A (AN) R75C*	12			MCH155A (AN) 120J*
1.0			MCH155A (AN) 010C*	13			MCH155A (AN) 130J*
1.1			MCH155A (AN) 1R1C*	15			MCH155A (AN) 150J*
1.2			MCH155A (AN) 1R2C*	16			MCH155A (AN) 160J*
1.3			MCH155A (AN) 1R3C*	18			MCH155A (AN) 180J*
1.5			MCH155A (AN) 1R5C*	20			MCH155A (AN) 200J*
1.6			MCH155A (AN) 1R6C*	22			MCH155A (AN) 220J*
1.8			MCH155A (AN) 1R8C*	24			MCH155A (AN) 240J*
2.0			MCH155A (AN) 020C*	27			MCH155A (AN) 270J*
2.2			MCH155A (AN) 2R2C*	30			MCH155A (AN) 300J*
2.4			MCH155A (AN) 2R4C*	33			MCH155A (AN) 330J*
2.7			MCH155A (AN) 2R7C*	36			MCH155A (AN) 360J*
3.0			MCH155A (AN) 030C*	39			MCH155A (AN) 390J*
3.3			MCH155A (AN) 3R3C*	43			MCH155A (AN) 430J*
3.6			MCH155A (AN) 3R6C*	47			MCH155A (AN) 470J*
3.9			MCH155A (AN) 3R9C*	51			MCH155A (AN) 510J*
4.0			MCH155A (AN) 040C*	56			MCH155A (AN) 560J*
4.3			MCH155A (AN) 4R3C*	62			MCH155A (AN) 620J*
4.7			MCH155A (AN) 4R7C*	68			MCH155A (AN) 680J*
5.0	MCH155A (AN) 050C*	75	MCH155A (AN) 750J*				
5.1	D (±0.5pF)		MCH155A (AN) 5R1D*	82	MCH155A (AN) 820J*		
5.6			MCH155A (AN) 5R6D*	91	MCH155A (AN) 910J*		
6			MCH155A (AN) 060D*	100	MCH155A (AN) 101J*		
6.2			MCH155A (AN) 6R2D*	110	MCH155A (AN) 111J*		
6.8			MCH155A (AN) 6R8D*	120	MCH155A (AN) 121J*		
7			MCH155A (AN) 070D*	130	MCH155A (AN) 131J*		
7.5			MCH155A (AN) 7R5D*	150	MCH155A (AN) 151J*		
8			MCH155A (AN) 080D*	160	MCH155A (AN) 161J*		
8.2			MCH155A (AN) 8R2D*	180	MCH155A (AN) 181J*		
9			MCH155A (AN) 090D*	200	MCH155A (AN) 201J*		
9.1	MCH155A (AN) 9R1D*	220	MCH155A (AN) 221J*				
10	MCH155A (AN) 100D*	270	MCH155A (AN) 271J*				
		330	MCH155A (AN) 331J*				
		390	MCH155A (AN) 391J*				
		470	MCH155A (AN) 471J*				

* : Packaging Code

Ceramic capacitors

•High dielectric constant capacitors

Capacitance (pF)	Temperature		CN (R) (B) (X7R) Characteristic		CN (X5R) Characteristic			
	Rated voltage (V)		50V	16V	16V	10V	6.3V	
	Tolerance	Product thickness (mm)	Product No.	Product No.	Product No.	Product No.	Product No.	
220	K (±10%)	0.5 ± 0.05	MCH155CN221K*					
330			MCH155CN331K*					
470			MCH155CN471K*					
680			MCH155CN681K*					
1,000			MCH155CN102K*					
1,500			MCH155CN152K*					
2,200			MCH155CN222K*					
3,300			MCH155CN332K*					
4,700			MCH155CN472K*					
6,800			MCH155CN682K*					
10,000					MCH152CN103K*			
15,000						MCH153CN153K*		
22,000						MCH153CN223K*		
33,000						MCH153CN333K*		
47,000						MCH153CN473K*		
68,000							MCH154CN683K*	
100,000							MCH154CN104K*	
220,000							MCH154CN224K*	
470,000								MCH158CN474K*
1,000,000								MCH158CN105K*

*: Packaging Code

Capacitance (pF)	Temperature		FN (F) (Y5V) Characteristic				
	Rated voltage (V)		50V	25V	16V	6.3V	
	Tolerance	Product thickness (mm)	Product No.	Product No.	Product No.	Product No.	
1,000	Z (+80%, -20%)	0.5 ± 0.05	MCH155FN102Z*				
2,200			MCH155FN222Z*				
4,700			MCH155FN472Z*				
10,000			MCH155FN103Z*				
22,000					MCH152FN223Z*		
47,000						MCH153FN473Z*	
100,000						MCH153FN104Z*	
1,000,000							MCH158FN105Z*

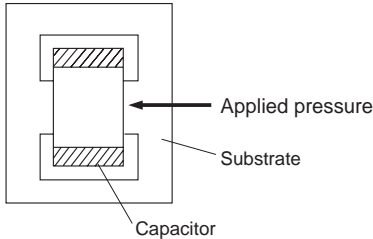
*: Packaging Code

Ceramic capacitors

•Performance and test method

No.	Items	Performance	Test Method (As per JIS C 5101-1, JIS C 5101-10)														
1	Appearance and dimensions	No marked defects shall be allowed for appearance. Dimensions shall be as specified in the clause 4.	As per 4.4 of JIS C 5101-1. As per 4.5 of JIS C 5101-10 Using a Magnifier.														
2	Withstanding voltage	No dielectrical breakdown or other damage shall be allowed.	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 Table 1. <table border="1" style="margin-left: auto; margin-right: auto;"> <caption>Table 1</caption> <thead> <tr> <th>Characteristic</th> <th>Voltage</th> </tr> </thead> <tbody> <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> </tbody> </table> Voltage shall be applied for 1 to 5s with 50mA charging and discharging current.	Characteristic	Voltage	A (AN)	300% Rated voltage	CN	250% Rated voltage	FN							
Characteristic	Voltage																
A (AN)	300% Rated voltage																
CN	250% Rated voltage																
FN																	
3	Insulation resistance	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.)	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.														
4	Capacitance	Capacitance shall be within specified tolerance range.	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 border="1" style="margin-left: auto; margin-right: auto;"> <caption>Table 2</caption> <thead> <tr> <th rowspan="2">Characteristic</th> <th colspan="2">Frequency · Voltage</th> </tr> <tr> <th>≤ 1000 pF</th> <th>> 1000 pF</th> </tr> </thead> <tbody> <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">1+/-0.1kHz</td> </tr> <tr> <td>FN</td> <td colspan="2">1+/-0.1Vrms.</td> </tr> </tbody> </table>	Characteristic	Frequency · Voltage		≤ 1000 pF	> 1000 pF	A (AN)	1+/-0.1MHz 1+/-0.1Vrms.	1+/-0.1kHz 1+/-0.1Vrms.	CN	1+/-0.1kHz		FN	1+/-0.1Vrms.	
Characteristic	Frequency · Voltage																
	≤ 1000 pF	> 1000 pF															
A (AN)	1+/-0.1MHz 1+/-0.1Vrms.	1+/-0.1kHz 1+/-0.1Vrms.															
CN	1+/-0.1kHz																
FN	1+/-0.1Vrms.																
5	Dielectric loss tangent	<table border="1" style="width: 100%;"> <tbody> <tr> <td style="width: 10%;">A (AN)</td> <td>Capacitance < 30pF tan δ ≤ 100/(400+20C)% Capacitance ≥ 30pF tan δ ≤ 0.1%</td> </tr> <tr> <td>C N</td> <td>Rated voltage ≥ 25V tan δ ≤ 3.0% Rated voltage ≤ 16V tan δ ≤ 5.0%</td> </tr> <tr> <td>F N</td> <td>Rated voltage=50V tan δ ≤ 5.0% Rated voltage=25V tan δ ≤ 7.5% Rated voltage=16V tan δ ≤ 10.0%</td> </tr> </tbody> </table>	A (AN)	Capacitance < 30pF tan δ ≤ 100/(400+20C)% Capacitance ≥ 30pF tan δ ≤ 0.1%	C N	Rated voltage ≥ 25V tan δ ≤ 3.0% Rated voltage ≤ 16V tan δ ≤ 5.0%	F N	Rated voltage=50V tan δ ≤ 5.0% Rated voltage=25V tan δ ≤ 7.5% Rated voltage=16V tan δ ≤ 10.0%	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.								
A (AN)	Capacitance < 30pF tan δ ≤ 100/(400+20C)% Capacitance ≥ 30pF tan δ ≤ 0.1%																
C N	Rated voltage ≥ 25V tan δ ≤ 3.0% Rated voltage ≤ 16V tan δ ≤ 5.0%																
F N	Rated voltage=50V tan δ ≤ 5.0% Rated voltage=25V tan δ ≤ 7.5% Rated voltage=16V tan δ ≤ 10.0%																

Ceramic capacitors

No.	Items	Performance	Test Method (As per JIS C 5101-1, JIS C 5101-10)						
6	Temperature characteristic	A (AN)	CG · C0G 0+/-30ppm / °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.					
			CH 0+/-60ppm / °C (-55°C to +125°C)						
			CJ 0+/-120ppm / °C (-55°C to +125°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	F +30%, -80% (-25°C to +85°C)							
	Y5V +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.								
Table3									
<table border="1"> <thead> <tr> <th>Charac-teristic</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>A (AN)</td> <td>24+/-2 h</td> </tr> <tr> <td>CN, FN</td> <td>48+/-4 h</td> </tr> </tbody> </table>				Charac-teristic	Time	A (AN)	24+/-2 h	CN, FN	48+/-4 h
Charac-teristic	Time								
A (AN)	24+/-2 h								
CN, FN	48+/-4 h								
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 of JIS C 5101-10 A 5N weight for 10+/-1s shall be applied to the soldered specimens as shown by the arrow mark in the below sketch. 						

Ceramic capacitors

No.	Items		Performance		Test Method (As per JIS C 5101-1, JIS C 5101-10)																					
10	Bending strength	Appearance	Without mechanical damage.		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.																					
11	Vibration	Appearance	Without mechanical damage.		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 in 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 border="1"> <thead> <tr> <th>Charac-teristic</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>A (AN)</td> <td>24+/-2 h</td> </tr> <tr> <td>CN, FN</td> <td>48+/-4 h</td> </tr> </tbody> </table>	Charac-teristic	Time	A (AN)	24+/-2 h	CN, FN	48+/-4 h															
		Charac-teristic	Time																							
		A (AN)	24+/-2 h																							
		CN, FN	48+/-4 h																							
Change rate from initial value	A (AN)	Capacitance shall be within specified tolerance range.																								
	C N	Within +/-7.5%																								
	F N	Within +/-20%																								
	Dielectric loss tangent	Within specified initial value.																								
12	Temperature cycling	Appearance	Without mechanical damage.		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 : 100cycles 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 border="1"> <thead> <tr> <th>Step</th> <th>Temp. (°C)</th> <th>Time (min)</th> </tr> </thead> <tbody> <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> </tbody> </table> Table3 <table border="1"> <thead> <tr> <th>Charac-teristic</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>A (AN)</td> <td>24+/-2 h</td> </tr> <tr> <td>CN, FN</td> <td>48+/-4 h</td> </tr> </tbody> </table>	Step	Temp. (°C)	Time (min)	1	Min operating temp.	30+/-3	2	Room temp.	≤ 3	3	Max operating temp.	30+/-3	4	Room temp.	≤ 3	Charac-teristic	Time	A (AN)	24+/-2 h	CN, FN	48+/-4 h
		Step	Temp. (°C)	Time (min)																						
		1	Min operating temp.	30+/-3																						
		2	Room temp.	≤ 3																						
		3	Max operating temp.	30+/-3																						
		4	Room temp.	≤ 3																						
		Charac-teristic	Time																							
A (AN)	24+/-2 h																									
CN, FN	48+/-4 h																									
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.																								

Ceramic capacitors

No.	Items		Performance		Test Method (As per JIS C 5101-1, JIS C 5101-10)	
13	Humidity (Steady)	Appearance	Without mechanical damage.		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.	
		Change rate from initial value	A (AN)	Within +/-5.0% or +/-0.5pF whichever is larger.		
			C N	Within +/-12.5%		
			F N	Within +/-30%		
		Dielectric tangent	A (AN)	tan $\delta \leq 0.3\%$		
			C N	Less than 200% of initial spec.		
			F N	Less than 150% of initial spec.		
Insulation resistance	Not less than 1000M Ω or 50M $\Omega \cdot \mu\text{F}$, whichever is less. (For products with rated voltage less than 16V, it is not less than 1000M Ω or 10M $\Omega \cdot \mu\text{F}$, whichever is less.)					
14	Humidity life test	Appearance	Without mechanical damage.		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.	
		Change rate from initial value	A (AN)	Within +/-7.5% or +/-7.5pF whichever is larger.		
			C N	Within +/-12.5%		
			F N	Within +/-30%		
		Dielectric loss tangent	A (AN)	tan $\delta \leq 0.5\%$		
			C N	Less than 200% of initial spec.		
			F N	Less than 150% of initial spec.		
Insulation resistance	Not less than 500M Ω or 25M $\Omega \cdot \mu\text{F}$, whichever is less. (For products with rated voltage less than 16V, it is not less than 500m Ω or 5M $\Omega \cdot \mu\text{F}$, whichever is less.)					

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

Ceramic capacitors

No.	Items	Performance	Test Method (As per JIS C 5101-1, JIS C 5101-10)																		
15	Heat life test	Appearance	Without mechanical damage.																		
		Change rate from initial value	A (AN)	Within $\pm 3.0\%$ or $\pm 0.3\text{pF}$ whichever is larger.																	
			C N	Within $\pm 15\%$																	
			F N	Within $\pm 30\%$																	
		Dielectric loss tangent	A (AN)	$\tan \delta \leq 0.3\%$																	
			C N	Less than 200% of initial spec.																	
			F N	Less than 150% of initial spec.																	
		Insulation resistance	Not less than $1000\text{M}\Omega$ or $50\text{M}\Omega \cdot \mu\text{F}$, whichever is less. (For products with rated voltage less than 16V, it is not less than $1000\text{m}\Omega$ or $10\text{M}\Omega \cdot \mu\text{F}$, whichever is less.)																		
					As per 4.23 of JIS C 5101-1. As per 4.15 of JIS C 5101-10																
					<table border="1"> <thead> <tr> <th></th> <th>Test temperature(°C)</th> <th>Voltage</th> <th>Test time (h)</th> </tr> </thead> <tbody> <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</td> <td>200% Rated voltage</td> <td rowspan="2">1000 +48/-0</td> </tr> <tr> <td>125</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> </tbody> </table>		Test temperature(°C)	Voltage	Test time (h)	A (AN)	125	200% Rated voltage	1000 +48/-0	CN	85	200% Rated voltage	1000 +48/-0	125	200% Rated voltage	FN	85
	Test temperature(°C)	Voltage	Test time (h)																		
A (AN)	125	200% Rated voltage	1000 +48/-0																		
CN	85	200% Rated voltage	1000 +48/-0																		
	125	200% Rated voltage																			
FN	85	200% Rated voltage	1000 +48/-0																		
			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																		
			<p>Table3</p> <table border="1"> <thead> <tr> <th>Charac-teristic</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>A (AN)</td> <td>24\pm2 h</td> </tr> <tr> <td>CN, FN</td> <td>48\pm4 h</td> </tr> </tbody> </table>	Charac-teristic	Time	A (AN)	24 \pm 2 h	CN, FN	48 \pm 4 h												
Charac-teristic	Time																				
A (AN)	24 \pm 2 h																				
CN, FN	48 \pm 4 h																				

[Remarks]

Pre-conditioning

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

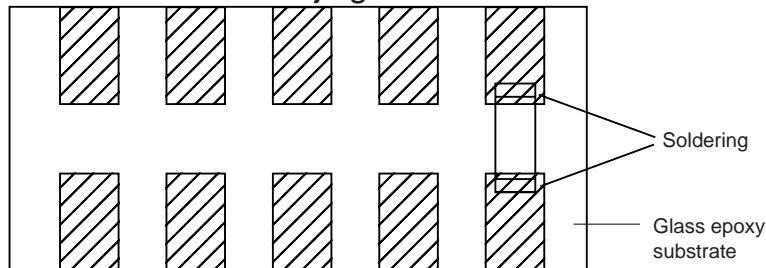
(1) Thermal pre-conditioning

Prior to initial measurements, specimens shall be conditioned at a temperature of $150 \text{ } 0/-10^\circ\text{C}$ for a period of 1hr., and shall be allowed to stabilize at room temperature for 48 \pm 4h

(2) Voltage pre-conditioning

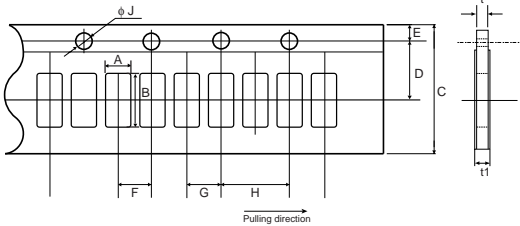
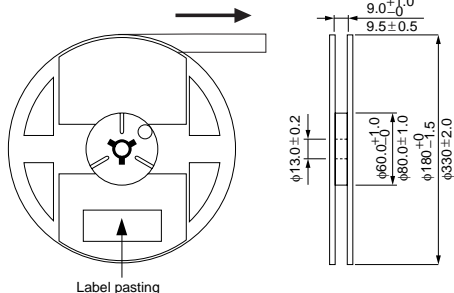
Prior to initial measurements, voltage specified as a test condition shall be applied to specimens for a period of 1hr., and the specimens shall be allowed to stabilize at room temperature for 48 \pm 4h

<Test jig>



Ceramic capacitors

●Packaging specifications

Taping dimensions	Reel dimensions																										
 <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th>Symbol</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> <th>G</th> <th>H</th> <th>J</th> <th>t</th> <th>t₁</th> </tr> </thead> <tbody> <tr> <td>Dimensions</td> <td>8.0 +/-0.2</td> <td>3.5 +/-0.05</td> <td>1.75 +/-0.1</td> <td>2.0 +/-0.05</td> <td>2.0 +/-0.05</td> <td>4.0 +/-0.1</td> <td>φ1.5 +0.1/-0</td> <td>0.7 +/-0.05</td> <td>0.8 MAX.</td> </tr> </tbody> </table> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th>Symbol</th> <th>A</th> <th>B</th> </tr> </thead> <tbody> <tr> <td>MCH15</td> <td>0.62 +/-0.05</td> <td>1.12 +/-0.05</td> </tr> </tbody> </table> <p style="text-align: center;">(Unit : mm)</p>	Symbol	C	D	E	F	G	H	J	t	t ₁	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	0.7 +/-0.05	0.8 MAX.	Symbol	A	B	MCH15	0.62 +/-0.05	1.12 +/-0.05	 <p style="text-align: center;">As per EIAJ ET-7200A</p> <p style="text-align: center;">(Unit : mm)</p>
Symbol	C	D	E	F	G	H	J	t	t ₁																		
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	0.7 +/-0.05	0.8 MAX.																		
Symbol	A	B																									
MCH15	0.62 +/-0.05	1.12 +/-0.05																									

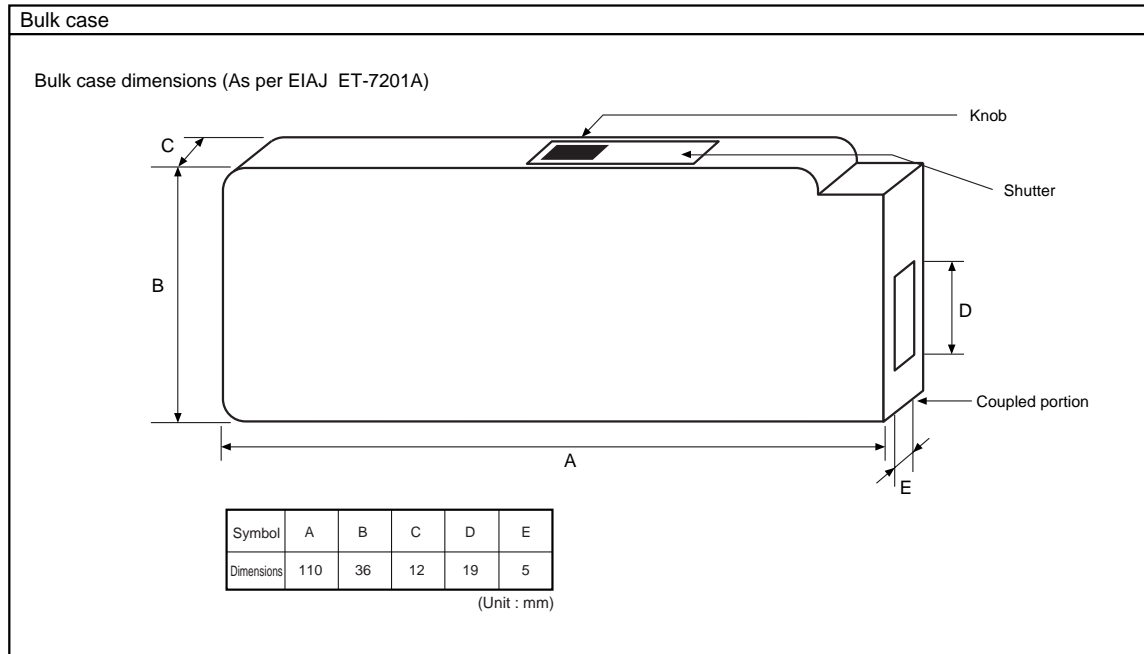
(1) The quantity for one reel is as bellows.

Kind of reel	Series	Paper tape	
		Quantity	Symbol
φ180 reel	MCH15	10,000 pcs.	K
φ330 reel	MCH15	50,000 pcs.	L

- (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. Over 300mm (no chips)
 - Beginning(reel's round) : Approx. Over 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.

Ceramic capacitors

●Bulk case



(a)Quantity of package

Style	T dimensions(mm)	Quantity (pcs)
MCH15	0.5	50,000 +10/-0

●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 04 01 A0001 J
 (1) (2) (3) (4)

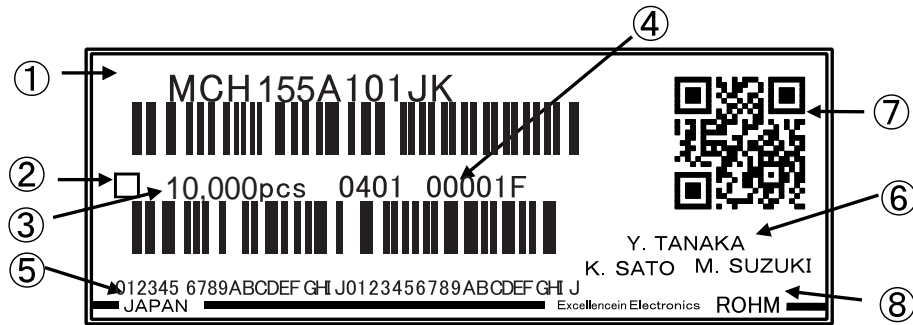
- (1) The end of the Christian Era <two digits> of production finish.
- (2) Week in completing part of production finish.
- (3) Manufacture continuity number.
- (4) The symbol of manufacturing plant.

Ceramic capacitors

●Label expression

The Figure below is label expression

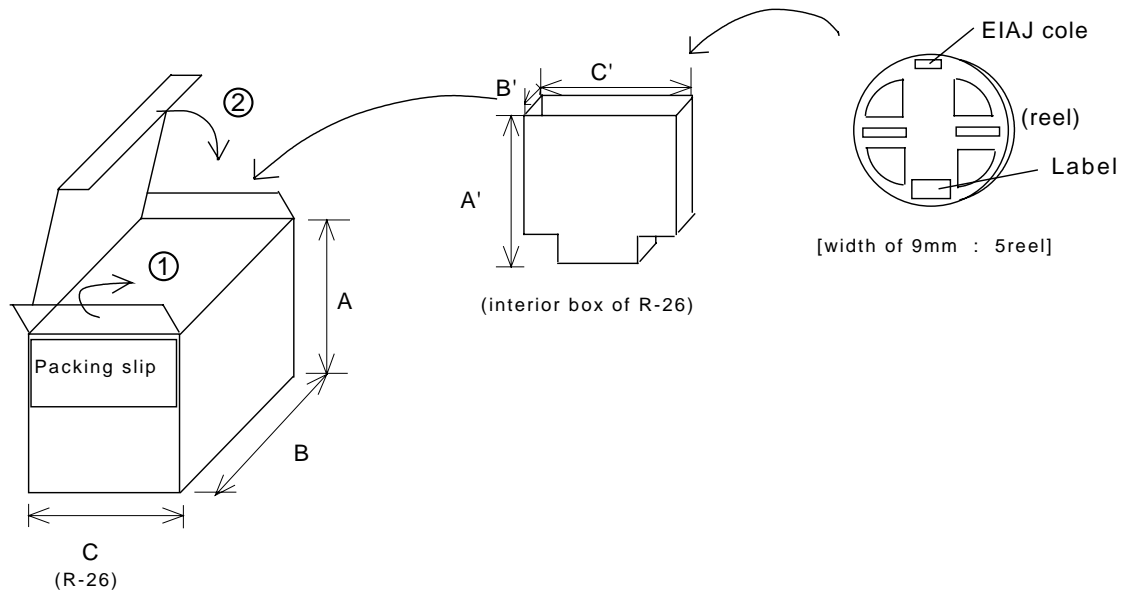
< Label Example > Part Number : MCH155A101JK



- 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) ϕ 180mm Reel



Ceramic capacitors

< 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	Characteristics	Weight / Piece
1005 (0402)	MCH15	0.5mm	A	1.5
			AN	1.2
			CN	1.5
			FN	1.5

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

Ceramic capacitors

● Electrical characteristics

■ A (C0G) Characteristics

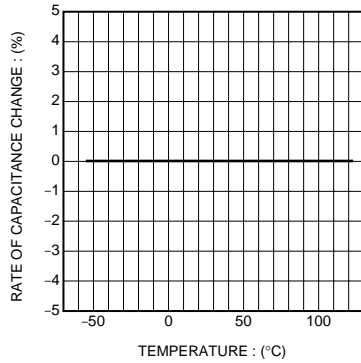


Fig.1 Capacitance-temperature characteristics

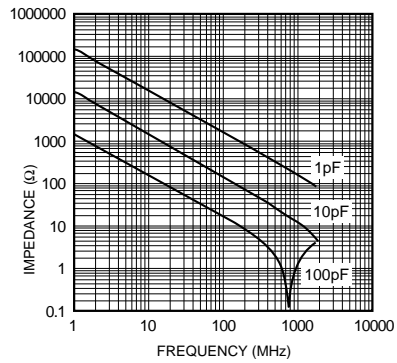


Fig.2 Impedance-frequency characteristics

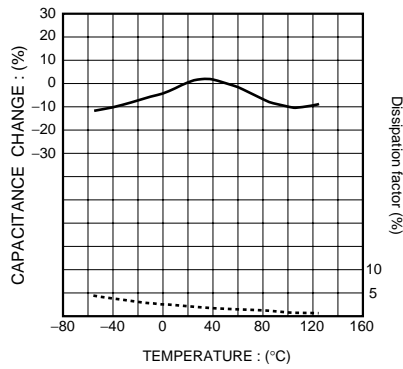


Fig.3 Capacitance-temperature characteristics

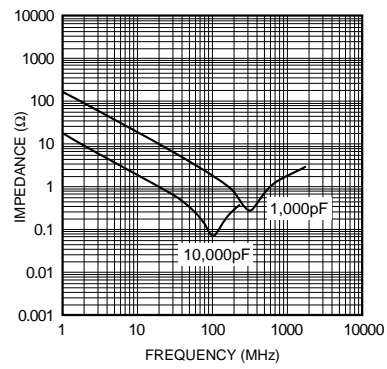


Fig.4 Impedance-frequency characteristics

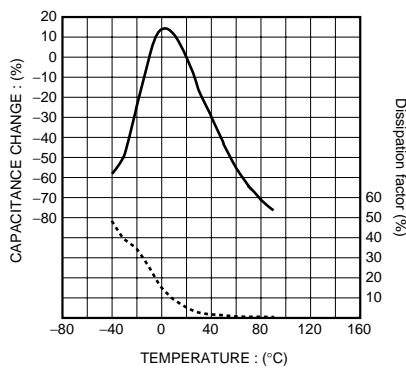


Fig.5 Capacitance-temperature characteristics

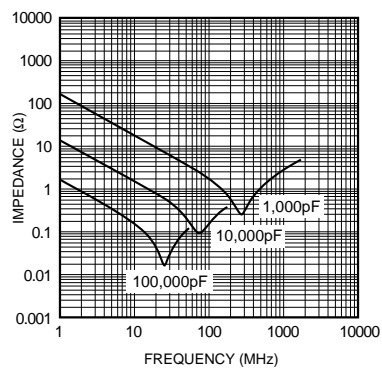


Fig.6 Impedance-frequency characteristics

Notes

- No technical content pages of this document may be reproduced in any form or transmitted by any means without prior permission of ROHM CO.,LTD.
- The contents described herein are subject to change without notice. The specifications for the product described in this document are for reference only. Upon actual use, therefore, please request that specifications to be separately delivered.
- Application circuit diagrams and circuit constants contained herein are shown as examples of standard use and operation. Please pay careful attention to the peripheral conditions when designing circuits and deciding upon circuit constants in the set.
- Any data, including, but not limited to application circuit diagrams information, described herein are intended only as illustrations of such devices and not as the specifications for such devices. ROHM CO.,LTD. disclaims any warranty that any use of such devices shall be free from infringement of any third party's intellectual property rights or other proprietary rights, and further, assumes no liability of whatsoever nature in the event of any such infringement, or arising from or connected with or related to the use of such devices.
- Upon the sale of any such devices, other than for buyer's right to use such devices itself, resell or otherwise dispose of the same, no express or implied right or license to practice or commercially exploit any intellectual property rights or other proprietary rights owned or controlled by
- ROHM CO., LTD. is granted to any such buyer.
- Products listed in this document are no antiradiation design.

The products listed in this document are designed to be used with ordinary electronic equipment or devices (such as audio visual equipment, office-automation equipment, communications devices, electrical appliances and electronic toys).

Should you intend to use these products with equipment or devices which require an extremely high level of reliability and the malfunction of which would directly endanger human life (such as medical instruments, transportation equipment, aerospace machinery, nuclear-reactor controllers, fuel controllers and other safety devices), please be sure to consult with our sales representative in advance.

About Export Control Order in Japan

Products described herein are the objects of controlled goods in Annex 1 (Item 16) of Export Trade Control Order in Japan.

In case of export from Japan, please confirm if it applies to "objective" criteria or an "informed" (by MITI clause) on the basis of "catch all controls for Non-Proliferation of Weapons of Mass Destruction.