

EMI FILTER

MCF18 (1608 (0603) size, 4A)

● **Features**

- 1) Small package.
- 2) Suitable for noise reduction for power supply lines.
- 3) The entire series is rated at 4A.
- 4) Low inner resistance, low dissipation internal.

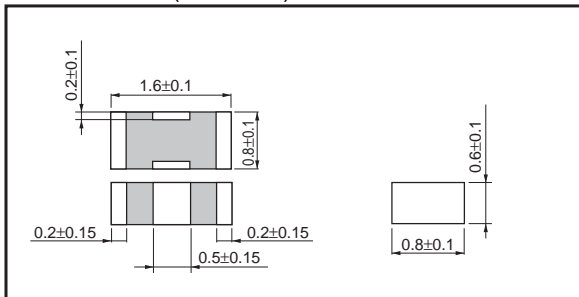
● **Quick Reference**

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.

Part No.	Model Name	Capacitance (pF)	Capacitance tolerance (%)	Temperature characteristics	Rated voltage (V)	Rated current (A/DC)	Insulation resistance(MΩ)	Operating temperature(°C)	Thickness (mm)	
				code						
MCF18	MCF182CN102M04AK	1000	M (±20)	CN	Rate of capacitance change ±15%	25	4	1000 Min.	-55 to +125	0.6
	MCF182CN222M04AK	2200								
	MCF182CN332M04AK	3300								
	MCF182CN472M04AK	4700								
	MCF182CN103M04AK	10000								
	MCF182CN223M04AK	22000								
	MCF182CN473M04AK	47000								
	MCF183CN104M04AK	100000								
	☆ MCF184CN224M04AK	220000								
	☆ MCF184CN474M04AK	470000								
MCF188CN105M04AK	1000000									

☆ Under development

● **Dimensions (Unit : mm)**



● **Part No. Explanation**

Code	Rated current
04A	4A

Rated current

Code	Product thickness	Packaging specifications	Reel	Basic ordering unit(pcs.)
K	0.6mm	Paper tape(width 8mm, pitch 4mm)	φ180mm (7inch)	4,000

Reel(φ180mm).Compatible with JEITA standard "EIAJ ET-7200B"

Packaging Style

Part No.



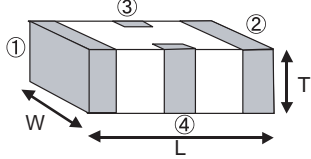
Rated voltage

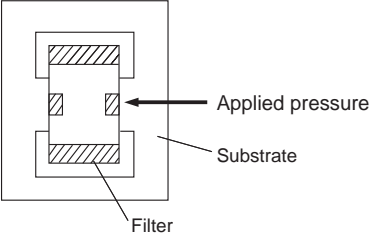
Code	Voltage
2	25V
3	16V
4	10V
8	6.3V

Temperature characteristic code
:Refer to quick reference table.

Nominal capacitance	Capacitance tolerance	
	Code	Tolerance
3-digit designation according to IEC	M	±20%

● Performance and test method

No.	Items	Performance	Test Method						
1	Appearance and dimensions	No marked defects shall be allowed for appearance.	Using a Magnifier.						
2	Withstanding voltage	No dielectrical breakdown or other damage shall be allowed.	Voltage shall be applied as per Table1. <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">Table 1</td> </tr> <tr> <td style="text-align: center;">Voltage</td> </tr> <tr> <td style="text-align: center;">250% Rated voltage</td> </tr> </table> Voltage shall be applied for 1 to 5s with 50mA charging and discharging current.	Table 1	Voltage	250% Rated voltage			
Table 1									
Voltage									
250% Rated voltage									
3	Insulation resistance	Not less than 1000MΩ or 100MΩ · μF, whichever is less.	Measurements shall be made after 60+/-5s period of the rated voltage						
4	Capacitance	Capacitance shall be within specified tolerance range.	Measurements shall be made under the conditions specified in Table 2. <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">Table 2</td> </tr> <tr> <td style="text-align: center;">Frequency · Voltage</td> </tr> <tr> <td style="text-align: center;">1+/-0.1kHz</td> </tr> <tr> <td style="text-align: center;">1+/-0.1Vrms.</td> </tr> </table>	Table 2	Frequency · Voltage	1+/-0.1kHz	1+/-0.1Vrms.		
Table 2									
Frequency · Voltage									
1+/-0.1kHz									
1+/-0.1Vrms.									
5	Dielectric loss tangent	$\tan \delta \leq 3.0\%$	Measurements shall be made under the conditions specified in Table 2.						
6	Resistance	Within specified tolerance range <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>Rated current</td> <td>between ①-② terminal resistance</td> <td>between ③-④ terminal resistance</td> </tr> <tr> <td>4A</td> <td>20mΩMax.</td> <td>2000mΩMax.</td> </tr> </table>	Rated current	between ①-② terminal resistance	between ③-④ terminal resistance	4A	20mΩMax.	2000mΩMax.	Measurement current 100mA max 
Rated current	between ①-② terminal resistance	between ③-④ terminal resistance							
4A	20mΩMax.	2000mΩMax.							

No.	Items		Performance	Test Method		
7	Temperature characteristic Without voltage application	Change rate from initial value	+/-15% (-55°C to +125°C)	If required measurements shall be made at a given temperature.		
8	Solderability		More than 75% of each end termination shall be covered with new solder.	The solder specified in SnAg3.0Cu0.5 shall be used. And 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.		
9	Resistance to solderin heat	Appearance	Without mechanical damage.	The solder specified in SnAg3.0Cu0.5 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. <div style="text-align: center;"> <table border="1" data-bbox="863 925 1043 1010"> <caption>Table3</caption> <tr> <td>Time</td> </tr> <tr> <td>48+/-4 h</td> </tr> </table> </div>	Time	48+/-4 h
		Time				
		48+/-4 h				
		Change rate from initial value	Within +/-7.5%			
Dielectric loss tangent	Within specified initial value.					
Insulation resistance	Within specified initial value.					
10	End termination adherence		Without peeling or sign of peeling shall be allowed on the end terminations.	A 5N weight for 10+/-1s shall be applied to the soldered specimens as shown by the arrow mark in the below sketch. 		

No.	Items	Performance	Test Method																	
11	Bending strength	Appearance Without mechanical damage.	Glass epoxy board with soldered specimens shall be bent till 1mm by 1.0mm/s.																	
12	Vibration	Appearance	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" style="margin-left: auto; margin-right: auto;"> <tr><td>Time</td></tr> <tr><td>48+/-4 h</td></tr> </table>	Time	48+/-4 h															
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	48+/-4 h																			
Change rate from initial value	Within +/-7.5%																			
Dielectric loss tangent	Within specified initial value.																			
13	Temperature cycling	Appearance	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. <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Step</th> <th>Temp. (°C)</th> <th>Time (min)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Min operating temp.+/-3</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.+/-3</td> <td>30+/-3</td> </tr> <tr> <td>4</td> <td>Room temp.</td> <td>≤ 3</td> </tr> </tbody> </table> Table3 <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>Time</td></tr> <tr><td>48+/-4 h</td></tr> </table>	Step	Temp. (°C)	Time (min)	1	Min operating temp.+/-3	30+/-3	2	Room temp.	≤ 3	3	Max operating temp.+/-3	30+/-3	4	Room temp.	≤ 3	Time	48+/-4 h
		Step		Temp. (°C)	Time (min)															
		1		Min operating temp.+/-3	30+/-3															
		2		Room temp.	≤ 3															
3	Max operating temp.+/-3	30+/-3																		
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Time																				
48+/-4 h																				
Change rate from initial value	Within +/-7.5%																			
Dielectric loss tangent	Within specified initial value.																			
Insulation resistance	Within specified initial value.																			

No.	Items	Performance	Test Method		
14	Humidity (Steady)	Appearance	Without mechanical damage.		
		Change rate from initial value	Within \pm 12.5% (capacitance \leq 47,000pF) Within \pm 25% (capacitance 1,000,000 to 1,000,000pF)		
		Dielectric tangent	$\tan \delta \leq$ 200% initial spec.		
		Insulation resistance	Not less than 500M Ω or 5M $\Omega \cdot \mu$ F, whichever is less.		
			Test temperature : 60 \pm 2 $^{\circ}$ 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 border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>Time</td></tr> <tr><td>48\pm4 h</td></tr> </table>	Time	48 \pm 4 h
Time					
48 \pm 4 h					
15	Humidity life test	Appearance	Without mechanical damage.		
		Change rate from initial value	Within \pm 12.5% (capacitance \leq 47,000pF) Within \pm 25% (capacitance 100,000 to 1,000,000pF)		
		Dielectric loss tangent	$\tan \delta \leq$ 200% initial spec.		
		Insulation resistance	Not less than 500M Ω or 5M $\Omega \cdot \mu$ F, whichever is less.		
			Test temperature : 60 \pm 2 $^{\circ}$ 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 border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>Time</td></tr> <tr><td>48\pm4 h</td></tr> </table>	Time	48 \pm 4 h
Time					
48 \pm 4 h					
16	Heat life test	Appearance	Without mechanical damage.		
		Change rate from initial value	Within \pm 15% (capacitance \leq 47,000pF) Within \pm 25% (capacitance 100,000 to 1,000,000pF)		
		Dielectric loss tangent	$\tan \delta \leq$ 200% initial spec.		
		Insulation resistance	Not less than 1000M Ω or 5M $\Omega \cdot \mu$ F, whichever is less.		
			Test temperature : 125 \pm 2 $^{\circ}$ C Voltage : Rated voltage x 200% Test time : 1000 +48/-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 border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>Time</td></tr> <tr><td>48\pm4 h</td></tr> </table>	Time	48 \pm 4 h
Time					
48 \pm 4 h					

[Remarks]

Pre-conditioning

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

(1) Thermal pre-conditioning

Prior to initial measurements, specimens shall be conditioned at a temperature of 150 0/-10 $^{\circ}$ 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

● Packaging specifications

Taping dimensions		Reel dimensions							
Symbol	C D E F G H J t t1								
Dimensions	8.0 +/-0.3	3.5 +/-0.05	1.75 +/-0.1	4.0 +/-0.1	2.0 +/-0.05	4.0 +/-0.1	φ1.5 +0.1/-0	0.9 MAX.	1.2 MAX.
(Unit : mm)									
Symbol	A	B							
Style	1.0	1.8							
MCF18	+/-0.05	+/-0.05							
(Unit : mm)									
A	B	C	D						
φ180 ⁺⁰ _{-1.5}	φ60 ^{+1.0} ₋₀	9.0 ^{+1.0} ₋₀	φ13±0.2						
(Unit : mm)									

● Electrical characteristics

■ CN (X7R) Characteristics

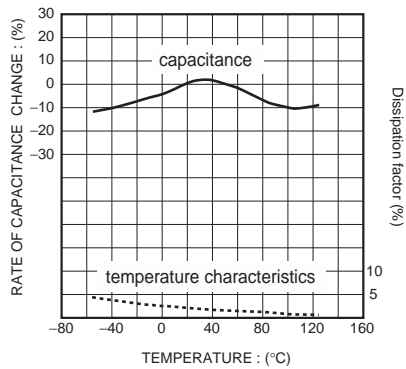


Fig.1 Capacitance - temperature characteristics

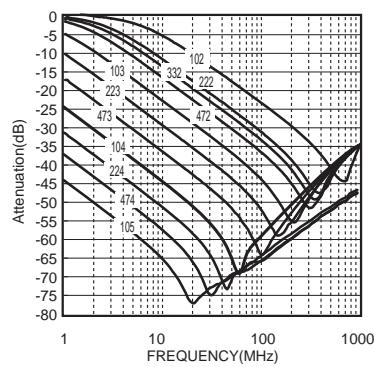


Fig.2 Attenuation characteristics

Notes

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