

High-voltage Ceramic Capacitors DC10-40kV

HIGH-VOLTAGE CERAMIC CAPACITORS



muRata *Innovator
in Electronics*

Murata
Manufacturing Co., Ltd.

Cat.No.C41E-1

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● **Part Numbering** (The structure of the "Global Part Numbers" that have been adopted since June 2001 and the meaning of each code are described herein.)
 (If you have any questions about details, inquire at your usual Murata sales office or distributor.)

High-voltage Ceramic Capacitors (over 10kV)

(Global Part Number)

DH	R	B3	4A	101	M	2B	B
①	②	③	④	⑤	⑥	⑦	⑧

① Product ID

Product ID	
DH	High-voltage Ceramic Capacitors (over 10kV)

② Series Category

Code	Contents
R	Radial Type
S	Mold Type

First three digit of part number (①Product ID and ②Series Category) express "Series Name".

③ Temperature Characteristics

Code	Temp. Char.	Cap. Change or Temp. Coeff.	Temp. Range
B3	B	±10%	-25 to +85°C
F4	Z5V	+22%, -82%	+10 to +85°C
4E	ZM N4700	-4700±1000ppm/°C	+20 to +85°C

④ Rated Voltage

Code	Rated Voltage
4A	DC10kV
4B	DC12kV
4C	DC15kV
4D	DC20kV
4F	DC30kV
4G	DC40kV

⑤ Capacitance

Expressed by three figures. The unit is pico-farad(pF). The first and second figures are significant digits, and the third figure expresses the number of zeros which follow the two numbers. If there is a decimal point, it is expressed by the capital letter "R". In this case, all figures are significant digits.

⑥ Capacitance Tolerance

Code	Capacitance Tolerance
K	±10%
M	±20%
Z	+80%, -20%

⑦ Lead Type (DHR Series)

Code	Lead Type	Lead Spacing	Lead Diameter
2B	Straight Long	9.5mm	ø0.65mm
2F		12.7mm	ø0.8mm

⑦ Body Diameter and Terminal Type (DHS Series)

Code	Body Diameter	Terminal Type
CX	20mm	No.8-32 Tapped Holes
DX	24mm	
HX	30mm	
LX	38mm	
NX	43mm	
RX	52mm	
TX	60mm	

⑧ Packaging

Code	Packaging
B	Bulk

1

ZM Characteristics

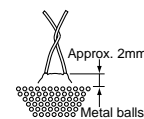
Part Number	Rated Voltage (kV)	Capacitance (pF)	Body Dia. D (mm)	Lead Spacing F (mm)	Body Thickness T (mm)	Lead Dia. Ød (mm)
DHR4E4A101K2BB	DC10	100 +10, -10%	8.0	9.5	7.3	0.65
DHR4E4A151K2BB	DC10	150 +10, -10%	8.0	9.5	7.0	0.65
DHR4E4A221K2BB	DC10	220 +10, -10%	9.0	9.5	7.0	0.65
DHR4E4A331K2BB	DC10	330 +10, -10%	10.0	9.5	7.0	0.65
DHR4E4A471K2BB	DC10	470 +10, -10%	12.0	9.5	7.0	0.65
DHR4E4A681K2BB	DC10	680 +10, -10%	13.0	9.5	7.0	0.65
DHR4E4A102K2BB	DC10	1000 +10, -10%	15.0	9.5	7.0	0.65
DHR4E4B101K2BB	DC12	100 +10, -10%	8.0	9.5	7.3	0.65
DHR4E4B151K2BB	DC12	150 +10, -10%	9.0	9.5	7.3	0.65
DHR4E4B221K2BB	DC12	220 +10, -10%	9.0	9.5	7.3	0.65
DHR4E4B331K2BB	DC12	330 +10, -10%	11.0	9.5	7.3	0.65
DHR4E4B471K2BB	DC12	470 +10, -10%	12.0	9.5	7.3	0.65
DHR4E4B681K2BB	DC12	680 +10, -10%	14.0	9.5	7.3	0.65
DHR4E4B102K2BB	DC12	1000 +10, -10%	16.0	9.5	7.3	0.65
DHR4E4C101K2BB	DC15	100 +10, -10%	8.0	9.5	8.2	0.65
DHR4E4C151K2BB	DC15	150 +10, -10%	9.0	9.5	8.2	0.65
DHR4E4C221K2BB	DC15	220 +10, -10%	10.0	9.5	8.2	0.65
DHR4E4C331K2BB	DC15	330 +10, -10%	12.0	9.5	8.2	0.65
DHR4E4C471K2BB	DC15	470 +10, -10%	13.0	9.5	8.2	0.65
DHR4E4C681K2BB	DC15	680 +10, -10%	15.0	9.5	8.2	0.65
DHR4E4C102K2FB	DC15	1000 +10, -10%	18.0	12.7	8.2	0.8

B Characteristics

Part Number	Rated Voltage (kV)	Capacitance (pF)	Body Dia. D (mm)	Lead Spacing F (mm)	Body Thickness T (mm)	Lead Dia. Ød (mm)
DHRB34A101M2BB	DC10	100 +20, -20%	8.0	9.5	7.0	0.65
DHRB34A151M2BB	DC10	150 +20, -20%	8.0	9.5	7.0	0.65
DHRB34A221M2BB	DC10	220 +20, -20%	9.0	9.5	7.0	0.65
DHRB34A331M2BB	DC10	330 +20, -20%	10.0	9.5	7.0	0.65
DHRB34A471M2BB	DC10	470 +20, -20%	12.0	9.5	7.0	0.65
DHRB34A681M2BB	DC10	680 +20, -20%	13.0	9.5	7.0	0.65
DHRB34A102M2BB	DC10	1000 +20, -20%	15.0	9.5	7.0	0.65
DHRB34B101M2BB	DC12	100 +20, -20%	8.0	9.5	7.7	0.65
DHRB34B151M2BB	DC12	150 +20, -20%	9.0	9.5	7.5	0.65
DHRB34B221M2BB	DC12	220 +20, -20%	9.0	9.5	7.5	0.65
DHRB34B331M2BB	DC12	330 +20, -20%	11.0	9.5	7.5	0.65
DHRB34B471M2BB	DC12	470 +20, -20%	12.0	9.5	7.5	0.65
DHRB34B681M2BB	DC12	680 +20, -20%	14.0	9.5	7.5	0.65
DHRB34B102M2BB	DC12	1000 +20, -20%	16.0	9.5	7.5	0.65
DHRB34C101M2BB	DC15	100 +20, -20%	8.0	9.5	8.5	0.65
DHRB34C151M2BB	DC15	150 +20, -20%	9.0	9.5	8.2	0.65
DHRB34C221M2BB	DC15	220 +20, -20%	10.0	9.5	8.2	0.65
DHRB34C331M2BB	DC15	330 +20, -20%	12.0	9.5	8.2	0.65
DHRB34C471M2BB	DC15	470 +20, -20%	13.0	9.5	8.2	0.65
DHRB34C681M2BB	DC15	680 +20, -20%	15.0	9.5	8.2	0.65
DHRB34C102M2FB	DC15	1000 +20, -20%	18.0	12.7	8.2	0.8

Specification and Test Methods

No.	Item	Specification	Testing Method																		
1	Operating Temperature Range	-25 to +100°C	—																		
2	Capacitance	Within the specified tolerance.	The capacitance shall be measured at 20°C with 1±0.2kHz and AC 5V (r.m.s.) max..																		
3	Dissipation Factor (D.F.)	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>ZM</td> <td>1.0% max.</td> </tr> <tr> <td>B</td> <td>2.5% max.</td> </tr> </table>	ZM	1.0% max.	B	2.5% max.	Same condition as capacitance.														
ZM	1.0% max.																				
B	2.5% max.																				
4	Insulation Resistance (I.R.)	Between lead wires 10000MΩ min.	The insulation resistance shall be measured with DC1000V within 60±5 s of charging.																		
5	Dielectric Strength	Between lead wires No failure.	The capacitors shall not be damage when DC voltage of 150% of the rated voltage are applied between the lead wires for 60±5 s in insulate liquid or gas. (Charge/discharge current≤50mA)																		
		Body insulation No failure.	The capacitors is placed in the container with metal balls of diameter 1mm so that each lead wire, shortcircuited, is kept approximately 2mm off the balls as shown in the figure, and DC voltage of 3kV is applied for 10 s between capacitor lead wires and small metals. (Charge/discharge current≤50mA)																		
6	Temperature Characteristic	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <th>Temp. Char.</th> <th>Temp. Coefficient or Max. Cap. Change</th> </tr> <tr> <td>ZM</td> <td>-4700±1000ppm/°C</td> </tr> <tr> <td>B</td> <td>±10%</td> </tr> </table>	Temp. Char.	Temp. Coefficient or Max. Cap. Change	ZM	-4700±1000ppm/°C	B	±10%	The capacitance measurement shall be made at each step specified in table. Capacitance change from the value of step 3 shall not exceed the limit specified.												
		Temp. Char.	Temp. Coefficient or Max. Cap. Change																		
ZM	-4700±1000ppm/°C																				
B	±10%																				
			<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <th>Step Char.</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> </tr> <tr> <td>ZM</td> <td>—</td> <td>—</td> <td>20±2°C</td> <td>85±2°C</td> <td>20±2°C</td> </tr> <tr> <td>B</td> <td>20±2°C</td> <td>-25±3°C</td> <td>20±2°C</td> <td>85±2°C</td> <td>20±2°C</td> </tr> </table>	Step Char.	1	2	3	4	5	ZM	—	—	20±2°C	85±2°C	20±2°C	B	20±2°C	-25±3°C	20±2°C	85±2°C	20±2°C
Step Char.	1	2	3	4	5																
ZM	—	—	20±2°C	85±2°C	20±2°C																
B	20±2°C	-25±3°C	20±2°C	85±2°C	20±2°C																
7	Soldering Effect	Appearance No marked defect.	The lead wires shall be immersed into the melted solder of 350±10°C up to about 1.5 to 2.0mm from the main body for 3.5±0.5 s. Post-treatment: Capacitor shall be stored for 24±2 h at *room condition.																		
		Capacitance Change Within ±10%																			
		Dielectric Strength (Between lead wires) No failure.																			
8	Humidity (Under Steady State)	Appearance No marked defect.	Set the capacitor for 240±8 h at 40±2°C in 90 to 95% humidity.																		
		Capacitance Change Within ±10%	Post-treatment: Capacitor shall be stored for 1 to 2 h at *room condition.																		
		D.F. <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>ZM</td> <td>1.5% max.</td> </tr> <tr> <td>B</td> <td>4.0% max.</td> </tr> </table>	ZM	1.5% max.	B	4.0% max.															
		ZM	1.5% max.																		
		B	4.0% max.																		
I.R. 5000MΩ min.																					
Dielectric Strength (Between lead wires) No failure.																					
9	Life	Appearance No marked defect.	Apply a DC voltage of 125% of the rated voltage for 1000 ⁺⁴⁸ ₀ h in silicon oil at 85±2°C. Post-treatment: Capacitor shall be stored for 24±2 h at *room condition. (Charge/discharge current≤50mA)																		
		Capacitance Change Within ±10%																			
		D.F. <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>ZM</td> <td>1.5% max.</td> </tr> <tr> <td>B</td> <td>4.0% max.</td> </tr> </table>		ZM	1.5% max.	B	4.0% max.														
		ZM		1.5% max.																	
		B		4.0% max.																	
I.R. 5000MΩ min.																					
Dielectric Strength (Between lead wires) No failure																					



Continued on the following page.

Specification and Test Methods

Continued from the preceding page.

No.	Item	Specification	Testing Method					
10	Charge Discharge Test	Appearance	No marked defect.	Charge discharge test shall be measured in the following test circuit and cycle. Applied voltage : Rated voltage Cycle numbers : 20000 cycles Post-treatment : Capacitor shall be stored for 4 h at *room condition. <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p><Circuit></p> </div> <div style="text-align: center;"> <p><Cycle></p> </div> </div> <p style="font-size: small;">Cx : specimen R1 : circuit protective resistor (300kΩ) C0 : supplied energy for Cx. C0=10Cx R2 : current limiting resistor (E/10Ω) E : direct-current voltage source</p>				
		Capacitance Change	Within ±10%					
		D.F.	<table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <tr><td style="text-align: center;">ZM</td><td style="text-align: center;">1.5% max.</td></tr> <tr><td style="text-align: center;">B</td><td style="text-align: center;">4.0% max.</td></tr> </table>		ZM	1.5% max.	B	4.0% max.
		ZM	1.5% max.					
		B	4.0% max.					
I.R.	5000MΩ min.							
Dielectric Strength (Between lead wires)	No failure.							
11	Temperature Cycling	Appearance	No marked defect.	Temperature cycling shall be measured in the following test. Cycle numbers : 5 cycles Post-treatment : Capacitor shall be stored for 4 h at *room condition. <div style="text-align: center;"> </div>				
		Capacitance Change	Within ±10%					
		D.F.	<table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <tr><td style="text-align: center;">ZM</td><td style="text-align: center;">1.5% max.</td></tr> <tr><td style="text-align: center;">B</td><td style="text-align: center;">4.0% max.</td></tr> </table>		ZM	1.5% max.	B	4.0% max.
		ZM	1.5% max.					
		B	4.0% max.					
I.R.	5000MΩ min.							
Dielectric Strength (Between lead wires)	No failure.							
12	Strength of Lead	Pull	Lead wire shall not cut off. Capacitor shall not be broken.	As a figure, fix the body of capacitor, apply a tensile weight gradually to each lead wire in the radial direction of capacitor up to 10N, and keep it for 10±1 s.				
		Bending			Each lead wire shall be subjected to 5N weight and then a 90° bend, at the point of egress, in one direction, return to original position, and then a 90° bend in the opposite direction at the rate of one bend in 2 to 3 s.			
13	Solderability of Leads	Lead wire shall be soldered with uniformly coated on the axial direction over $\frac{3}{4}$ of the circumferential direction.	The lead wire of a capacitor shall be dipped into a 25% methanol solution of rosin and then into molten solder of 235±5°C for 2±0.5 s. In both cases the depth of dipping is up to about 1.5 to 2.0mm from the root of lead wires.					

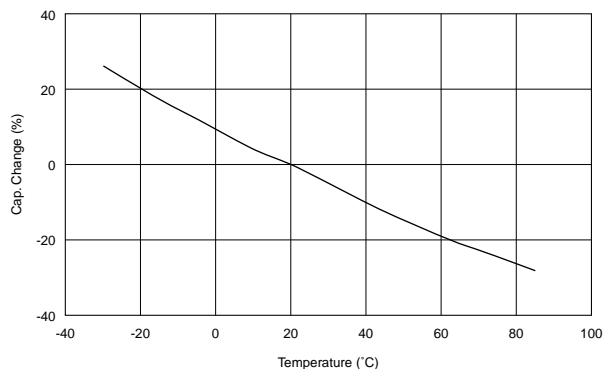
(Note) Tests for Dielectric Strength (Between lead wires), Charge Discharge Test, Humidity, Temperature Cycling and Life shall be performed with specimens having molded resin (MR1023C : made by Murata) extending over 3mm on all the surface.

* "room condition" temperature: 15 to 35°C, humidity: 45 to 75%, atmospheric pressure: 86 to 106kPa

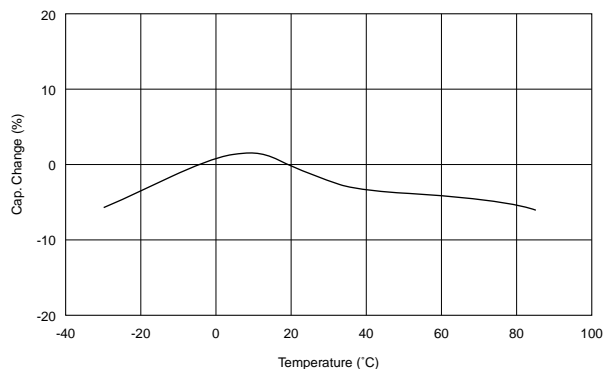
Typical Characteristics Data/Packaging

Cap.-Temp. Char.

ZM Characteristics

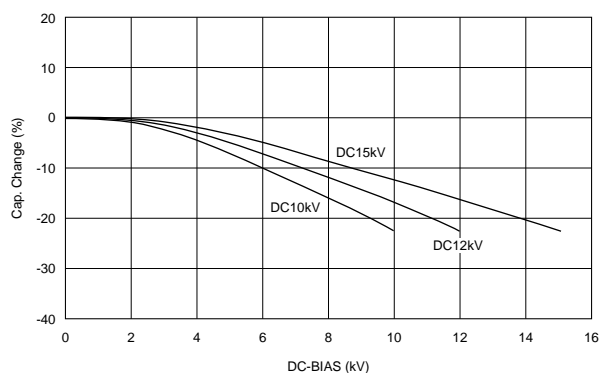


B Characteristics

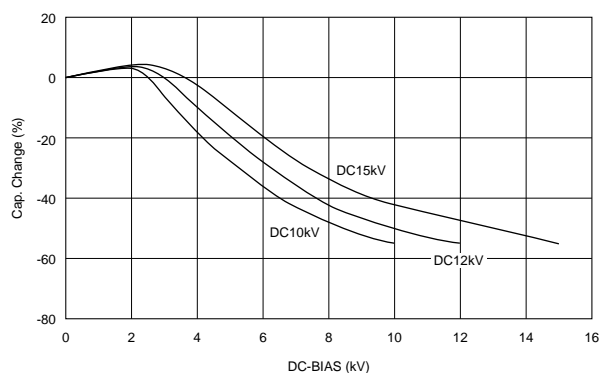


Cap.-DC Bias Char.

ZM Characteristics



B Characteristics



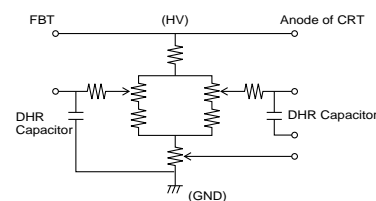
Packaging Styles



Minimum Quantity (Order in Sets Only)	100 (pcs.)
Minimum Order Quantity	500 (pcs.)

- "Minimum Quantity" means the numbers of units of each delivery or order. The quantity should be an integral multiple of the "minimum quantity". (Please note that the actual delivery quantity in a package may change sometimes.)

Example



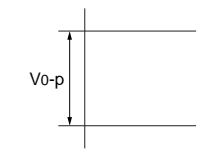
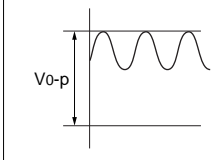
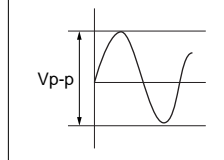
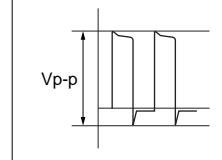
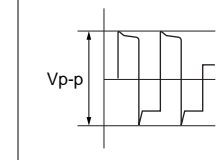
⚠Caution/Notice

■ ⚠Caution (Rating)

1. Operating Voltage

When DC-rated capacitors are to be used in AC or ripple current circuits, be sure to maintain the V_{p-p} value of the applied voltage or the V_{o-p} which contains DC bias within the rated voltage range.

When the voltage is started to apply to the circuit or it is stopped applying, the irregular voltage may be generated for a transit period because of resonance or switching. Be sure to use a capacitor within rated voltage containing these irregular voltage.

Voltage	DC Voltage	DC+AC Voltage	AC Voltage	Pulse Voltage (1)	Pulse Voltage (2)
Positional Measurement					

2. Operating Temperature and Self-generated Heat

Keep the surface temperature of a capacitor below the upper limit of its rated operating temperature range. Be sure to take into account the heat generated by the capacitor itself. When the capacitor is used in a high-frequency current, pulse current or the like, it may have the self-generated heat due to dielectric-loss.

Applied voltage should be the load such as self-generated heat is within 10 °C on the condition of atmosphere temperature 25 °C. When measuring, use a thermocouple of small thermal capacity-K of $\phi 0.1\text{mm}$ and be in the condition where capacitor is not affected by radiant heat of other components and wind of surroundings. Excessive heat may lead to deterioration of the capacitor's characteristics and reliability.

Failure to follow the above cautions may result, worst case, in a short circuit and cause fuming or partial dispersion when the product is used.

■ ⚠Caution (Storage and Operation Condition)

Operating and storage environment

The insulating coating of capacitors does not form a perfect seal; therefore, do not use or store capacitors in a corrosive atmosphere, especially where chloride gas, sulfide gas, acid, alkali, salt or the like are present. And avoid exposure to moisture.


The capacitor is designed to be used in the insulating media, such as epoxy resin, silicone oil, etc..

There must be 3mm or more insulating media for each direction of the capacitor.

Before cleaning, bonding, or molding this product, verify that these processes do not affect product quality by testing the performance of a cleaned, bonded or molded product in the intended equipment. Store the capacitors where the temperature and relative humidity do not exceed -10 to 40 degrees centigrade and 15 to 85%. Use capacitors within 6 months.

"Failure to follow the above cautions may result, worst case, in a short circuit and cause fuming or partial dispersion when the product is used."

 **Caution/Notice**

■  **Caution (Soldering and Mounting)**


1. Vibration and impact

Do not expose a capacitor or its leads to excessive shock or vibration during use.

2. Soldering

When soldering this product to a PCB/PWB, do not exceed the solder heat resistance specification of the capacitor. Subjecting this product to excessive heating could melt the internal junction solder and may result in thermal shocks that can crack the ceramic element.

"Failure to follow the above cautions may result, worst case, in a short circuit and cause fuming or partial dispersion when the product is used."

■  **Caution (Handling)**

Vibration and impact

Do not expose a capacitor or its leads to excessive shock or vibration during use.

"Failure to follow the above cautions may result, worst case, in a short circuit and cause fuming or partial dispersion when the product is used."

■ **Notice (Soldering and Mounting)**

Cleaning(ultrasonic cleaning)

To perform ultrasonic cleaning, observe the following conditions. Rinse bath capacity : Output of 20 watts per liter or less.

Rinsing time : 5min maximum.

Do not vibrate the PCB/PWB directly.

Excessive ultrasonic cleaning may lead to fatigue destruction of the lead wires.

■ **Notice (Rating)**

Capacitance change of capacitor

1. Class 1 capacitors

Capacitance might change a little depending on a surrounding temperature or an applied voltage.

Please contact us if you use for the strict time constant circuit.

2. Class 2 and 3 capacitors

Class 2 and 3 capacitors like temperature characteristic B, E and F have an aging

characteristic, whereby the capacitor continually decreases its capacitance slightly if the capacitor leaves for a long time. Moreover, capacitance might change greatly depending on a surrounding temperature or an applied voltage. So, it is not likely to be able to use for the time constant circuit. Please contact us if you need a detail information.

High-voltage Ceramic Capacitors DC10-40kV



Mold Type DHS N4700 Series

2

Murata's high voltage ceramic capacitors, DHS N4700 series, are designed to meet the stringent requirements of high voltage applications.

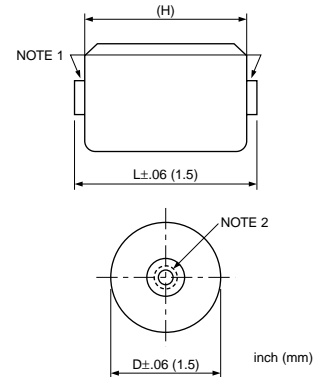
Especially these capacitors are adequate to the applications which need low dissipation factor and small voltage coefficient.

■ Features

1. Epoxy resin encapsulated
2. Small size
3. Low dissipation factor and low heating value
4. Linear temperature characteristic
5. Low DC, AC-voltage coefficient

■ Applications

- Gas laser
- DC HV power supplies
- Lightning arrester, voltage distribution systems
- Electron microscopes, synchroscopes
- Electrostatic coating machines



DC Rated Voltage (kV)	Depth inch (mm)
10, 15	0.16 (4)
20, 30	0.24 (6)
40	0.31 (8)

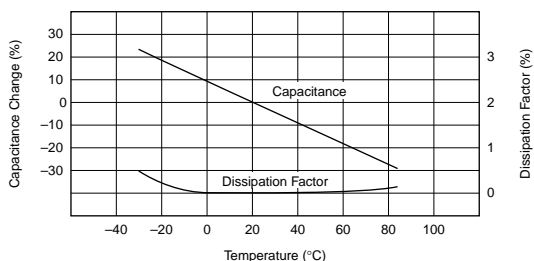
Part Number	Capacitance (pF)	Capacitance Tolerance (%)	DC Rated Voltage (kV)	DC Test Voltage (kV)	Dimensions inch (mm)		
					D	L	H
DHS4E4A561MCXB	560	±20	10	15	.78 (20)	.63 (16)	.47 (12)
DHS4E4A122MHXB	1200	±20	10	15	1.18 (30)	.63 (16)	.47 (12)
DHS4E4A282MLXB	2800	±20	10	15	1.49 (38)	.63 (16)	.47 (12)
DHS4E4A502MRXB	5000	±20	10	15	2.04 (52)	.63 (16)	.47 (12)
DHS4E4A802MTXB	8000	±20	10	15	2.36 (60)	.63 (16)	.47 (12)
DHS4E4C371MCXB	370	±20	15	23	.78 (20)	.71 (18)	.55 (14)
DHS4E4C112MHXB	1100	±20	15	23	1.18 (30)	.71 (18)	.55 (14)
DHS4E4C192MLXB	1900	±20	15	23	1.49 (38)	.71 (18)	.55 (14)
DHS4E4C342MRXB	3400	±20	15	23	2.04 (52)	.71 (18)	.55 (14)
DHS4E4C532MTXB	5300	±20	15	23	2.36 (60)	.71 (18)	.55 (14)
DHS4E4D281MCXB	280	±20	20	30	.78 (20)	.95 (24)	.79 (20)
DHS4E4D881MHXB	880	±20	20	30	1.18 (30)	.95 (24)	.79 (20)
DHS4E4D142MLXB	1400	±20	20	30	1.49 (38)	.95 (24)	.79 (20)
DHS4E4D252MRXB	2500	±20	20	30	2.04 (52)	.95 (24)	.79 (20)
DHS4E4D402MTXB	4000	±20	20	30	2.36 (60)	.95 (24)	.79 (20)
DHS4E4F191MCXB	190	±20	30	45	.78 (20)	1.10 (28)	.95 (24)
DHS4E4F591MHXB	590	±20	30	45	1.18 (30)	1.10 (28)	.95 (24)
DHS4E4F941MLXB	940	±20	30	45	1.49 (38)	1.10 (28)	.95 (24)
DHS4E4F172MRXB	1700	±20	30	45	2.04 (52)	1.10 (28)	.95 (24)
DHS4E4F272MTXB	2700	±20	30	45	2.36 (60)	1.10 (28)	.95 (24)
DHS4E4G141MCXB	140	±20	40	60	.78 (20)	1.42 (36)	1.26 (32)
DHS4E4G441MHXB	440	±20	40	60	1.18 (30)	1.42 (36)	1.26 (32)
DHS4E4G701MLXB	700	±20	40	60	1.49 (38)	1.42 (36)	1.26 (32)
DHS4E4G132MRXB	1300	±20	40	60	2.04 (52)	1.42 (36)	1.26 (32)
DHS4E4G202MTXB	2000	±20	40	60	2.36 (60)	1.42 (36)	1.26 (32)

Also available in the types with M4 thread.

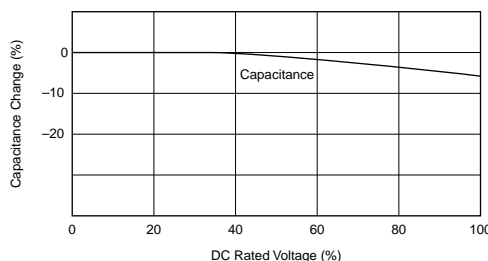


Typical Characteristics Data / Specification and Test Methods

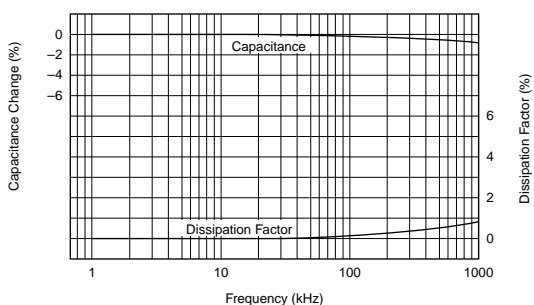
■ Temperature Characteristic



■ Typical Voltage Coefficient



■ Frequency Characteristic



No	Item	Specification	Testing Method														
1	Operating Temperature Range	-20 to +85°C	—————														
2	Capacitance	Within the specified tolerance.	The capacitance shall be measured at 20°C with 1±0.1kHz and AC 1 to 5V (r.m.s.).														
3	Temperature Characteristics	Temperature coefficient -4700±1000ppm/°C (Temp. range: +20 to +85°C)	The capacitance measurement shall be made at each step specified in table. Capacitance change from the value of step 3 shall not exceed the limit specified. <table border="1" style="width: 100%; margin-top: 5px;"> <thead> <tr> <th>char.</th> <th>step</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> </tr> </thead> <tbody> <tr> <td>N4700</td> <td></td> <td>20±2°C</td> <td>-20±3°C</td> <td>20±2°C</td> <td>85±2°C</td> <td>20±2°C</td> </tr> </tbody> </table>	char.	step	1	2	3	4	5	N4700		20±2°C	-20±3°C	20±2°C	85±2°C	20±2°C
char.	step	1	2	3	4	5											
N4700		20±2°C	-20±3°C	20±2°C	85±2°C	20±2°C											
4	Dissipation Factor (D.F.)	0.3% max.	The dissipation factor shall be measured at 20°C with 1±0.1kHz and AC 1 to 5V (r.m.s.).														
5	Dielectric Strength	Between terminal	No failure. The capacitors shall not be damage when DC voltage of 150% of the rated voltage are applied between the terminal for 60±5 s in insulate liquid or gas. (Charge/discharge current ≤ 50mA)														
6	Insulation Resistance (I.R.)	10000MΩ min.	The insulation resistance shall be measured with DC1000V within 60±5 s of charging.														
7	Strength of Terminal	Torque strength	Capacitor shall not be broken. When mounting the capacitors on equipment, be sure to mount them within the torque strength values shown in the table below. <table border="1" style="width: 100%; margin-top: 5px;"> <thead> <tr> <th>size</th> <th>torque (N·m)</th> </tr> </thead> <tbody> <tr> <td>No.8-32 NC-2B</td> <td>1.5</td> </tr> </tbody> </table>	size	torque (N·m)	No.8-32 NC-2B	1.5										
size	torque (N·m)																
No.8-32 NC-2B	1.5																
8	Life	Appearance	Apply a DC voltage of 125% of the rated voltage for 100+24/-0 h in silicon oil at 85±2°C. Post-treatment: capacitor shall be stored for 24 h at room condition. (Charge/discharge current ≤ 50mA)														
		Capacitance change															
		D.F.															
		I.R.															
9	Humidity (Under Steady State)	Appearance	Set the capacitor for 100+24/-0 h at 40±2°C in 90 to 95% humidity. Post-treatment: capacitor shall be stored for 24 h at room condition.														
		Capacitance change															
		D.F.															
		I.R.															

"Room condition" temperature: 15 to 35°C, relative humidity: 45 to 75%, atmospheric pressure: 86 to 106kPa

High-voltage Ceramic Capacitors DC10-40kV



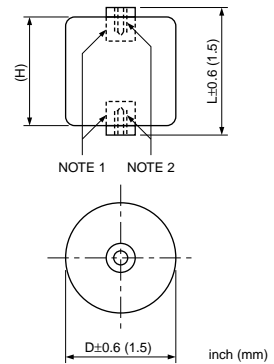
Mold Type DHS Z5V Series

Features

1. Epoxy resin encapsulated
2. Small size
3. Highly reliable internal construction
4. Wide selection of values
5. Up to DC 40kV working voltage

Applications

- Electrostatic coating machines
- Electron microscopes, synchroscopes
- CRT power supplies
- Lightning arrester voltage distribution systems
- DC HV power supplies



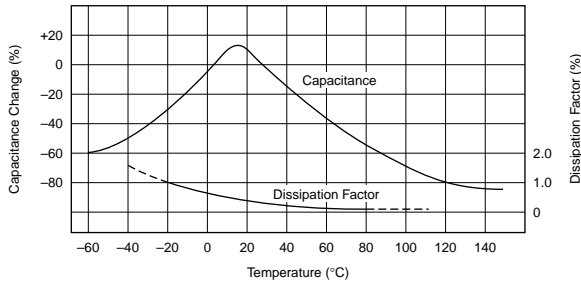
NOTE 1: This terminal may extend up to 0.100 (2.5) above insulated surface.
 NOTE 2: No.8-32 NC-2B tapped holes.
 Depth ; 0.16inches (4mm)

Part Number	Capacitance (pF)	Capacitance Tolerance (%)	DC Rated Voltage (kV)	DC Test Voltage (kV)	Dimensions inch (mm)		
					D	L	H
DHSF44D601ZDXB	600	+80, -20	20	30	.94 (24)	1.02 (26)	.94 (24)
DHSF44D102ZHXB	1000	+80, -20	20	30	1.18 (30)	1.02 (26)	.94 (24)
DHSF44D242ZNXB	2400	+80, -20	20	30	1.69 (43)	1.02 (26)	.94 (24)
DHSF44D332ZRXB	3300	+80, -20	20	30	2.04 (52)	1.02 (26)	.94 (24)
DHSF44D482ZTXB	4800	+80, -20	20	30	2.36 (60)	1.02 (26)	.94 (24)
DHSF44F461ZDXB	460	+80, -20	30	45	.94 (24)	1.33 (34)	1.25 (32)
DHSF44F781ZHXB	780	+80, -20	30	45	1.18 (30)	1.33 (34)	1.25 (32)
DHSF44F182ZNXB	1800	+80, -20	30	45	1.69 (43)	1.33 (34)	1.25 (32)
DHSF44F252ZRXB	2500	+80, -20	30	45	2.04 (52)	1.33 (34)	1.25 (32)
DHSF44F362ZTXB	3600	+80, -20	30	45	2.36 (60)	1.33 (34)	1.25 (32)
DHSF44G341ZDXB	340	+80, -20	40	60	.94 (24)	1.61 (41)	1.53 (39)
DHSF44G571ZHXB	570	+80, -20	40	60	1.18 (30)	1.61 (41)	1.53 (39)
DHSF44G132ZNXB	1300	+80, -20	40	60	1.69 (43)	1.61 (41)	1.53 (39)
DHSF44G192ZRXB	1900	+80, -20	40	60	2.04 (52)	1.61 (41)	1.53 (39)
DHSF44G272ZTXB	2700	+80, -20	40	60	2.36 (60)	1.61 (41)	1.53 (39)

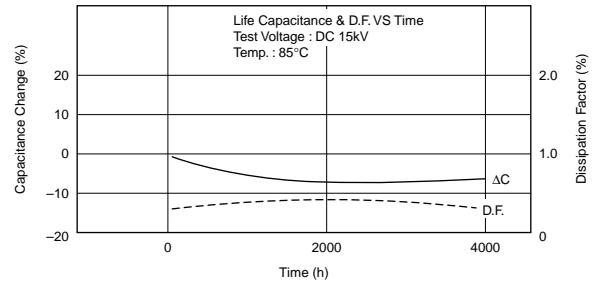
Also available in the types with M4 thread.

Typical Characteristics Data

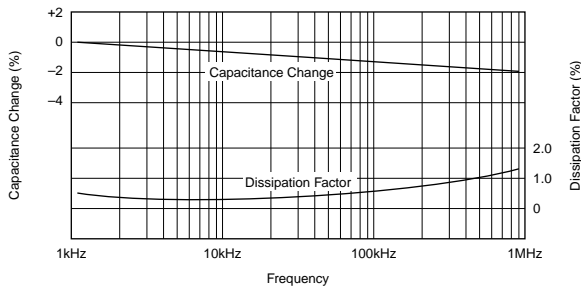
■ Dissipation Factor and Capacitance-Temperature



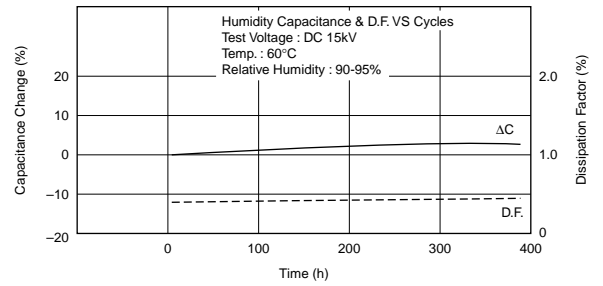
■ Life



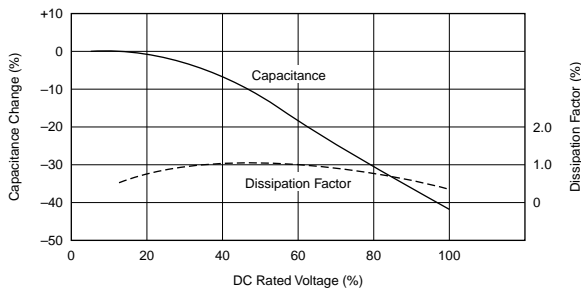
■ Dissipation Factor and Capacitance-Frequency



■ Humidity



■ Typical Voltage Coefficient



3

Specification and Test Methods

No	Item		Specification	Testing Method														
1	Operating Temperature Range		-20 to +85°C															
2	Capacitance		Within the specified tolerance.	The capacitance shall be measured at 25°C with 1±0.1kHz and AC 1 to 5V (r.m.s.).														
3	Temperature Characteristics		Capacitance change +22%/-82% (Temp. range: +10 to +85°C)	The capacitance measurement shall be made at each step specified in table. Capacitance change from the value of step 3 shall not exceed the limit specified. <table border="1"> <thead> <tr> <th>char.</th> <th>step</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> </tr> </thead> <tbody> <tr> <td>Z5V</td> <td></td> <td>25±2°C</td> <td>-20±3°C</td> <td>25±2°C</td> <td>85±2°C</td> <td>25±2°C</td> </tr> </tbody> </table>	char.	step	1	2	3	4	5	Z5V		25±2°C	-20±3°C	25±2°C	85±2°C	25±2°C
char.	step	1	2	3	4	5												
Z5V		25±2°C	-20±3°C	25±2°C	85±2°C	25±2°C												
4	Dissipation Factor (D.F.)		1.5% max.	The dissipation factor shall be measured at 25°C with 1±0.1kHz and AC 1 to 5V (r.m.s.).														
5	Dielectric Strength	Between terminal	No failure.	The capacitors shall not be damage when DC voltage of 150% of the rated voltage are applied between the terminal for 60±5 s in insulate liquid or gas. (Charge/discharge current ≤ 50mA)														
6	Insulation Resistance (I.R.)		1000MΩ min.	The insulation resistance shall be measured with DC1000V within 60±5 s of charging.														
7	Strength of Terminal	Torque strength	Capacitor shall not be broken.	When mounting the capacitors on equipment, be sure to mount them within the torque strength values shown in the table below. <table border="1"> <thead> <tr> <th>size</th> <th>torque (N·m)</th> </tr> </thead> <tbody> <tr> <td>No.8-32 NC-2B</td> <td>1.5</td> </tr> </tbody> </table>	size	torque (N·m)	No.8-32 NC-2B	1.5										
size	torque (N·m)																	
No.8-32 NC-2B	1.5																	
8	Life	Appearance	No marked defect.	Apply a DC voltage of 125% of the rated voltage for 100+24/-0 h in silicon oil at 85±2°C. Post-treatment: capacitor shall be stored for 24 h at room condition. (Charge/discharge current ≤ 50mA)														
		Capacitance change	Within ±20%															
		D.F.	5.0% max.															
		I.R.	1000MΩ min.															
9	Humidity (Under Steady State)	Appearance	No marked defect.	Set the capacitor for 100+24/-0 h at 40±2°C in 90 to 95% humidity. Post-treatment: capacitor shall be stored for 24 h at room condition.														
		Capacitance change	Within ±20%															
		D.F.	5.0% max.															
		I.R.	1000MΩ min.															

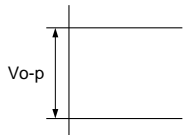
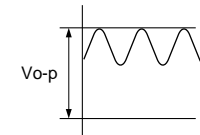
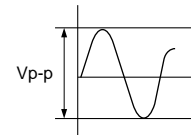
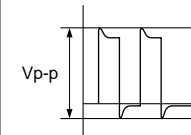
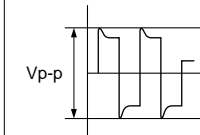
"Room condition" temperature: 15 to 35°C, relative humidity: 45 to 75%, atmospheric pressure: 86 to 106kPa

DHS Series ⚠ Caution and Notice

■ ⚠ Caution

1. Operating voltage

When DC-rated capacitors are to be used in AC or ripple current circuits, be sure to maintain the V_{p-p} value of the applied voltage or the V_{o-p} which contains DC bias within the rated voltage range. When the voltage is started to apply to the circuit or it is stopped applying, the irregular voltage may be generated for a transit period because of resonance or switching. Be sure to use a capacitor within rated voltage containing these irregular voltage.

Voltage	DC Voltage	DC+AC Voltage	AC Voltage	Pulse Voltage (1)	Pulse Voltage (2)
Positional Measurement					

2. Operating temperature and self-generated heat

Keep the surface temperature of a capacitor below the upper limit of its rated operating temperature range. Be sure to take into account the heat generated by the capacitor itself.

When the capacitor is used in a high-frequency current, pulse current or the like, it may have the self-generated heat due to dielectric-loss. Applied voltage should be the load such as self-generated heat is within 10°C on the condition of atmosphere temperature 25°C.

Excessive heat may lead to deterioration of the capacitor's characteristics and reliability.

3. Installation

Installation torque should not be exceed the torque strength values in "Specification and Test Method".

Do not employ a screw whose thread depth is greater than that specified.

Avoid installation in which any bending torque is applied to the capacitor terminal.

Do not rework or resolder the terminal.

4. Operating and storage environment

The insulating coating of capacitors does not form a perfect seal; therefore, do not use or store capacitors in a corrosive atmosphere, especially where chloride gas, sulfide gas, acid, alkali, salt or the like are present. And avoid exposure to moisture.

Before cleaning, bonding, or molding this product, verify that these processes do not affect product quality by testing the performance of a cleaned, bonded or molded product in the intended equipment.

Store the capacitors where the temperature and relative humidity do not exceed -10 to 40°C and 15 to 85%. Use capacitors within 6 months.

5. Vibration and impact

Do not expose a capacitor to excessive shock or vibration during use.

Failure to follow the above cautions may result, worst case, in a short circuit and cause fuming or partial dispersion when the product is used.

DHS Series ⚠ Caution and Notice

■ Notice

Capacitance change of capacitor

● Class 1 capacitors

Capacitance might change a little depending on a surrounding temperature or an applied voltage.

Please contact us if you use for the strict time constant circuit.

● Class 2 and 3 capacitors

Class 2 and 3 capacitors like temperature characteristic B, E and F have an aging characteristic, whereby the capacitor continually decreases its capacitance slightly if the capacitor leaves for a long time. Moreover, capacitance might change greatly depending on a surrounding temperature or an applied voltage. So, it is not likely to be able to use for the time constant circuit.

Please contact us if you need a detail information.

ISO9000 Certifications

Manufacturing plants of these products in this catalog have obtained the ISO9000 quality system certificate.

Plant	Certified Date	Organization	Registration No.	Applied standard
Izumo Murata Manufacturing Co., Ltd.	Feb. 1. '00	Underwriters Laboratories Inc.	A5587	ISO9001

⚠ 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 Law" of Japan, the export license specified by the law is required for export.

2. Please contact our sales representatives or product engineers before using our products listed in this catalog for the applications listed below which require especially high reliability for the prevention of defects which might directly cause damage to the third party's life, body or property, or when intending to use one of our products for other applications than specified in this catalog.

- ① Aircraft equipment
- ② Aerospace equipment
- ③ Undersea equipment
- ④ Power plant equipment
- ⑤ Medical equipment
- ⑥ Transportation equipment (vehicles, trains, ships, etc.)
- ⑦ Traffic signal equipment
- ⑧ Disaster prevention / crime prevention equipment
- ⑨ Data-processing equipment
- ⑩ Application of similar complexity and/or reliability requirements to the applications listed in the above

3. Product specifications in this catalog are as of October 2001. They are subject to change or our products in it may be discontinued without advance notice. Please check with our sales representatives or product engineers before your ordering. If there are any questions, please contact our sales representatives or product engineers.

4. Please read CAUTION and Notice in this catalog for safety. This catalog has only typical specifications. Therefore you are requested to approve our product specification or to transact the approval sheet for product specification, before your 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.