muRata

Innovator in Electronics

Murata
Manufacturing Co., Ltd.

Cat.No.C85E-2

for EU RoHS Compliant

- · All the products in this catalog comply with EU RoHS.
- EU RoHS is "the European Directive 2002/95/EC on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment".
- · For more details, please refer to our website 'Murata's Approach for EU RoHS' (http://www.murata.com/info/rohs.html).



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Part Numbering

Safety Standard Certified Ceramic Capacitors

DE | 2 | E3 | KH | 102 | M | N3 | A | (Part Number)

Product ID

Product ID	
DE	Safety Standard Certified Ceramic Capacitors / High Voltage Ceramic Capacitors

2 Series Category

Code	Outline	Contents	
1	Safety Standard	IEC60384-14 Class X1, Y1	
2	Certified	IEC60384-14 Class X1, Y2	
J	AC250V (r.m.s.)	"Products which are based on the Electrical Appliance and Material Safety Law of Japan"	

In case of Electrical Appliance and Material Safety Law of Japan, first three digits (Product ID and Series Category) express "Series Name"

In case of Safety Certified Capacitors, first three digits express product code. The following fourth figure expresses certified type shown in 4 Safety Standard Certified Type column.

3Temperature Characteristics

Code	Temperature Characteristics	Cap.Change or Temp. Coeff.	Temperature Range
В3	В	±10%	
E3	E	+20%,-55%	-25 to +85℃
F3	F	+30%,-80%	
1X	SL	+350 to −1000ppm/°C	+20 to +85℃

Pated Voltage/Safety Standard Certified Type

Code	Rated Voltage
E2	AC250V
КН	X1, Y2; AC250V, (Safety Standard Certified Type KH)
KY	X1, Y2; AC250V, (Safety Standard Certified Type KY)
кх	X1, Y1; AC250V, (Safety Standard Certified Type KX)

6 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.

6Capacitance Tolerance

Code	Capacitance Tolerance	
J	±5%	
K	±10%	
М	±20%	
z	+80%, -20%	

Lead Style

	Lead		Dimensions (mm)		
Code	Style	Lead Spacing	Lead Diameter	Pitch of Components	
A2		5			
А3	Vertical Crimp	7.5	ø0.6±0.05		
A4	Long	10		_	
A5	J	10	ø0.6+0.1,-0.05		
B2		5			
В3	Vertical Crimp	7.5	ø0.6±0.05		
B4	Short	10			
B5		10	ø0.6+0.1, −0.05		
C3	Straight Long	7.5	ø0.6±0.05	_	
D3	Straight Short	7.5	ø0.6±0.05	_	
N2		5		12.7	
N3	Vertical	7.5	ø0.6±0.05	15	
N4	Crimp	10		25.4	
N5	Taping	10	ø0.6+0.1, −0.05	25.4	
N7		7.5	ø0.6±0.05	30	
P3	Straight Taping	7.5	ø0.6±0.05	15	

8 Packaging

Code	Packaging
Α	Ammo Pack Taping Type
В	Bulk Type

Individual Specification Code

In case part number cannot be identified without "Individual Specification", it is added at the end of part number. Expressed by three-digit alphanumerics.



High Voltage Ceramic Capacitors (250V-6.3kV)

DE B B3 3A 102 K N2 A (Part Number)

Product ID

Product ID	
DE	High Voltage Ceramic Capacitors (250V-6.3kV) / Safety Standard Certified Ceramic Capacitors

Series Category

Code	Outline	Contents	
Α		Class 1 (Char. SL) DC1-3.15kV Rated	
В	High Voltage	Class 2 DC1-3.15kV Rated	
С		Class 1, 2 DC6.3kV Rated	
н		High Temperature Guaranteed, Low-dissipation Factor (Char. R, C)	
s		High Temperature Guaranteed, Low-dissipation Factor (Char. D)	
F		LCD Backlight Inverter Circuit	

First three digits (Product ID and 2 Series Category) express "Series Name".

3Temperature Characteristics

Code	Temperature Characteristics	Cap. Change or Temp. Coeff.	Temperature Range
В3	В	±10%	
E3	E	+20%,-55%	-25 to +85℃
F3	F	+30%,-80%	
C3	С	±20%	-25 to +85℃
		+15%,-30%	+85 to +125℃
R3	R	±15%	-25 to +85℃
K3	K	+15%,-30%	+85 to +125℃
D3	D	+20%,-30%	-25 to +125℃
1X	SL	+350 to −1000ppm/°C	+20 to +85℃
2C	СН	0±60ppm/℃	+20 to +85℃

4 Rated Voltage

Code	Rated Voltage
2E	DC250V
2H	DC500V
3A	DC1kV
3D	DC2kV
3F	DC3.15kV
3J	DC6.3kV
LH	6.3kVp-p

6 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.

6Capacitance Tolerance

Code	Capacitance Tolerance
С	±0.25pF
D	±0.5pF
J	±5%
K	±10%
Z	+80%, -20%

DLead Style

	Lead		Dimensions (mm)		
Code	Style			Pitch of Components	
A2	Vertical	5			
А3	Crimp	7.5	ø0.6±0.05	_	
A4	Long	10			
B2/J2	Vertical	5			
B3/J3	Crimp	7.5	ø0.6±0.05	_	
B4	Short	10			
C1		5	ø0.5±0.05		
С3	Straight	7.5	ø0.6±0.05	_	
C4	Long	10	Ø0.0±0.05		
CD		7.5	ø0.5±0.05		
D1	Charlata	5	ø0.5±0.05		
D3	Straight Short	7.5	ø0.6±0.05	_	
DD	Short	7.5	ø0.5±0.05		
N2	Vertical	5		12.7	
N3	Crimp	7.5	ø0.6±0.05	15	
N7	Taping	7.5		30	
P2	Straight	5	ø0.6±0.05	12.7	
P3	Taping	7.5	Ø0.0 <u>E</u> 0.05	15	

8 Packaging

Code	Packaging
Α	Ammo Pack Taping Type
В	Bulk Type

9Individual Specification Code

In case part number cannot be identified without "Individual Specification", it is added at the end of part number. Expressed by three-digit alphanumerics.



Safety Certified Ceramic Capacitors/High Voltage Ceramic Capacitors



Type KY (Basic Insulation) -IEC60384-14 Class X1, Y2-

■ Features

- 1. We design capacitors in much more compact size than type KH, having reduced the diameter by 25% max.
- 2. Operating temperature range guaranteed up to 125 degrees (UL: 85 deg.).
- 3. Dielectric strength:
 - AC2000V (In case of lead spacing F=5mm) AC2600V (In case of lead spacing F=7.5mm)
- 4. Class X1/Y2 capacitors which are certified by UL/CSA/VDE/BSI/SEMKO/DEMKO/FIMKO/NEMKO/ESTI/ NSW.
- 5. Coated with flame-retardant epoxy resin (conforming to UL94V-0 standard).
- 6. Cost-saving automatic insertion available.

■ Applications

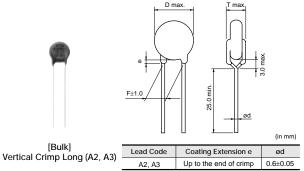
- 1. Ideal for use as X/Y capacitors for AC line filter and primary-secondary coupling on switching power supplies and AC adapters.
- 2. Ideal for use on D-A isolation and noise absorption for DAA modems without transformers.

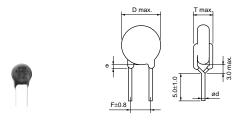
Do not use these products in any Automotive Power train or Safety equipment including Battery charger for Electric Vehicles and Plug-in Hybrid. Only Murata products clearly stipulated as "for Automotive use" on its catalog can be used for automobile applications such as Power train and Safety equipment.

■ Standard Certification

	Standard No.	Certified No.	Rated Voltage
UL	UL1414	E37921	
CSA	E384-14	1283280	
VDE	IEC 60384-14	40006273	
VDE	EN 60384-14	40000273	
	EN 60065 (8.8, 14.2)		
BSI	IEC 60384-14	KM 37901	
	EN 60384-14		
SEMKO		812168	AC250V(r.m.s.)
DEMKO	IEC 60384-14	314115	
FIMKO	EN 60384-14	24197	
NEMKO	EN 00304-14	P08209361	
ESTI		08.0710	
NSW	IEC 60384-14 AS3250	6824	

- The certification number might change by the revision of the application standard and the change within the range of acquisition
- Please contact us when the certification of Chinese Safety Standard or South Korean Safety Standard is necessary.





[Bulk] Vertical Crimp Short (B2, B3

	Lead Code	Coating Extension e	ød
3)	B2, B3	Up to the end of crimp	0.6±0.05

(in mm)

■ Marking

Example	Item
	① Type Designation KY
2 472M 3	② Nominal Capacitance (Under 100pF: Actual value, 100pF and over: Marked with 3 figures)
① ← KY250~ \	③ Capacitance Tolerance
X1 Y2 5 ← 65 M8 ≠ 4	Company Name Code 8: Made in Taiwan & 15: Made in Thailand
	⑤ Manufactured Date Code
	Class Code X1Y2
	Rated Voltage Mark 250~



Lead Spacing F=7.5mm

Part Number	AC Rated Voltage (Vac)	Temp. Char.	Capacitance (pF)	Body Dia. D (mm)	Lead Spacing F (mm)	Body Thickness T (mm)	Lead Package Long Bulk	Lead Package Short Bulk	Lead Package Taping (1)
DE21XKY100J	250	SL	10 ±5%	8 max.	7.5	5.0 max.	A3B	B3B	N3A
DE21XKY150J	250	SL	15 ±5%	8 max.	7.5	5.0 max.	A3B	B3B	N3A
DE21XKY220J□□□M02	250	SL	22 ±5%	8 max.	7.5	5.0 max.	A3B	B3B	N3A
DE21XKY330J□□□M02	250	SL	33 ±5%	8 max.	7.5	5.0 max.	A3B	B3B	N3A
DE21XKY470J□□□M02	250	SL	47 ±5%	8 max.	7.5	5.0 max.	A3B	B3B	N3A
DE21XKY680J□□□M02	250	SL	68 ±5%	8 max.	7.5	5.0 max.	A3B	B3B	N3A
DE2B3KY101K□□□M02	250	В	100 ±10%	7 max.	7.5	5.0 max.	A3B	B3B	N3A
DE2B3KY151K□□□M02	250	В	150 ±10%	7 max.	7.5	5.0 max.	A3B	B3B	N3A
DE2B3KY221K□□□M02	250	В	220 ±10%	7 max.	7.5	5.0 max.	A3B	B3B	N3A
DE2B3KY331K□□□M02	250	В	330 ±10%	7 max.	7.5	5.0 max.	A3B	B3B	N3A
DE2B3KY471K□□□M02	250	В	470 ±10%	7 max.	7.5	5.0 max.	A3B	B3B	N3A
DE2B3KY681K□□□M02	250	В	680 ±10%	8 max.	7.5	5.0 max.	A3B	B3B	N3A
DE2E3KY102M□□□M02	250	E	1000 ±20%	7 max.	7.5	5.0 max.	A3B	B3B	N3A
DE2E3KY152M□□□M02	250	E	1500 ±20%	7 max.	7.5	5.0 max.	A3B	B3B	N3A
DE2E3KY222M□□□M02	250	E	2200 ±20%	8 max.	7.5	5.0 max.	A3B	B3B	N3A
DE2E3KY332M□□□M02	250	E	3300 ±20%	9 max.	7.5	5.0 max.	A3B	B3B	N3A
DE2E3KY472M□□□M02	250	E	4700 ±20%	10 max.	7.5	5.0 max.	A3B	B3B	N3A
DE2F3KY103M□□□M02	250	F	10000 ±20%	14 max.	7.5	5.0 max.	A3B	B3B	N3A

Three blank columns are filled with the lead and packaging codes. Please refer to the 3 columns on the right for the appropriate code. Individual specification code "M02" expresses "simplicity marking and guarantee of dielectric strength between lead wires: AC2600V".

Murata part numbers might be changed depending on lead code or any other changes. Therefore, please specify only the type name (KY) and capacitance of products in the parts list when it is required for applying safety standard of electric equipment.

Lead Spacing F=5mm

Part Number	AC Rated Voltage (Vac)	Temp. Char.	Capacitance (pF)	Body Dia. D (mm)	Lead Spacing F (mm)	Body Thickness T (mm)	Lead Package Long Bulk	Lead Package Short Bulk	Lead Package Taping (1)
DE21XKY100J	250	SL	10 ±5%	8 max.	5.0	5.0 max.	A2B	B2B	N2A
DE21XKY150J	250	SL	15 ±5%	8 max.	5.0	5.0 max.	A2B	B2B	N2A
DE21XKY220J□□□M01	250	SL	22 ±5%	8 max.	5.0	5.0 max.	A2B	B2B	N2A
DE21XKY330J□□□M01	250	SL	33 ±5%	8 max.	5.0	5.0 max.	A2B	B2B	N2A
DE21XKY470J	250	SL	47 ±5%	8 max.	5.0	5.0 max.	A2B	B2B	N2A
DE21XKY680J□□□M01	250	SL	68 ±5%	8 max.	5.0	5.0 max.	A2B	B2B	N2A
DE2B3KY101K□□□M01	250	В	100 ±10%	7 max.	5.0	5.0 max.	A2B	B2B	N2A
DE2B3KY151K□□□M01	250	В	150 ±10%	7 max.	5.0	5.0 max.	A2B	B2B	N2A
DE2B3KY221K□□□M01	250	В	220 ±10%	7 max.	5.0	5.0 max.	A2B	B2B	N2A
DE2B3KY331K□□□M01	250	В	330 ±10%	7 max.	5.0	5.0 max.	A2B	B2B	N2A
DE2B3KY471K□□□M01	250	В	470 ±10%	7 max.	5.0	5.0 max.	A2B	B2B	N2A
DE2B3KY681K□□□M01	250	В	680 ±10%	8 max.	5.0	5.0 max.	A2B	B2B	N2A
DE2E3KY102M D M01	250	E	1000 ±20%	7 max.	5.0	5.0 max.	A2B	B2B	N2A
DE2E3KY152M□□□M01	250	Е	1500 ±20%	7 max.	5.0	5.0 max.	A2B	B2B	N2A
DE2E3KY222M□□□M01	250	Е	2200 ±20%	8 max.	5.0	5.0 max.	A2B	B2B	N2A
DE2E3KY332M□□□M01	250	Е	3300 ±20%	9 max.	5.0	5.0 max.	A2B	B2B	N2A
DE2E3KY472M□□□M01	250	E	4700 ±20%	10 max.	5.0	5.0 max.	A2B	B2B	N2A

Three blank columns are filled with the lead and packaging codes. Please refer to the 3 columns on the right for the appropriate code.

Individual specification code "M01" expresses "simplicity marking and guarantee of dielectric strength between lead wires: AC2000V".

Murata part numbers might be changed depending on lead code or any other changes. Therefore, please specify only the type name (KY) and capacitance of products in the parts list when it is required for applying safety standard of electric equipment.



Safety Certified Ceramic Capacitors/High Voltage Ceramic Capacitors



Type KH (Basic Insulation) -IEC60384-14 Class X1, Y2-

■ Features

- 1. Operating temperature range guaranteed up to 125 degrees (UL: 85 deg.).
- 2. Dielectric strength: AC2600V
- 3. Class X1/Y2 capacitors which are certified by UL/CSA/VDE/BSI/SEMKO/DEMKO/FIMKO/NEMKO/ESTI/
- 4. Coated with flame-retardant epoxy resin (conforming to UL94V-0 standard).
- 5. Cost-saving automatic insertion available.

■ Applications

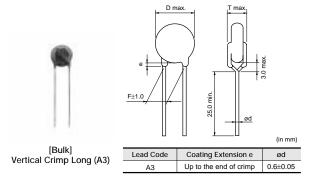
Ideal for use as X/Y capacitors for AC line filter and primary-secondary coupling on switching power supplies and AC adapters.

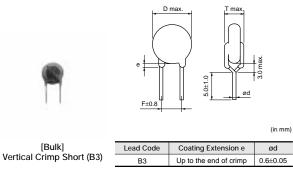
Do not use these products in any Automotive Power train or Safety equipment including Battery charger for Electric Vehicles and Plug-in Hybrid. Only Murata products clearly stipulated as "for Automotive use" on its catalog can be used for automobile applications such as Power train and Safety equipment.

■ Standard Certification

	Standard No.	Certified No.	Rated Voltage
UL	UL1414	E37921	
CSA	E384-14	1343805	
VDE	IEC 60384-14 EN 60384-14	40002796	
BSI	EN 60065 (8.8, 14.2) IEC 60384-14 EN 60384-14	KM 37901	AC2E0\/(r m a)
SEMKO		812163	AC250V(r.m.s.)
DEMKO	150 (0004 44	314578	
FIMKO	IEC 60384-14	24195	
NEMKO	EN 60384-14	P08209182	
ESTI		08.0708	
NSW	IEC 60384-14 AS3250	6529	

- The certification number might change by the revision of the application standard and the change within the range of acquisition.
- Please contact us when the certification of Chinese Safety Standard or South Korean Safety Standard is necessary.





■ Marking

Example	Item	
Example	Type Designation	KH
	Nominal Capacitance (Marked with 3 figures)	
(2)	3 Capacitance Tolerance	
	4 Company Name Code ©8: Made in Taiwan @15: Ma	ade in Thailand
1 KH472M 3	Manufactured Date Code	
T KH472M 3 X1Y2 26 BSI 6 C/8 4 91 5 N 65 5 250~ D	UL Approval Mark	97
	CSA Approval Mark	®
	VDE Approval Mark	₽
	BSI Approval Mark	BSI
	SEMKO Approval Mark	(2)
	DEMKO Approval Mark	D
	FIMKO Approval Mark	FI
	NEMKO Approval Mark	N
	ESTI Approval Mark	₲ MJ502
	Class Code	X1Y2
	Rated Voltage Mark	250~

u	
	=

Part Number	AC Rated Voltage (Vac)	Temp. Char.	Capacitance (pF)	Body Dia. D (mm)	Lead Spacing F (mm)	Body Thickness T (mm)	Lead Package Long Bulk	Lead Package Short Bulk	Lead Package Taping (1)
DE2B3KH101K□□□	250	В	100 ±10%	8 max.	7.5	7.0 max.	A3B	B3B	N3A
DE2B3KH151K□□□	250	В	150 ±10%	8 max.	7.5	7.0 max.	A3B	B3B	N3A
DE2B3KH221K□□□	250	В	220 ±10%	8 max.	7.5	7.0 max.	A3B	B3B	N3A
DE2B3KH331K□□□	250	В	330 ±10%	8 max.	7.5	7.0 max.	A3B	B3B	N3A
DE2B3KH471K□□□	250	В	470 ±10%	8 max.	7.5	7.0 max.	A3B	B3B	N3A
DE2B3KH681K□□□	250	В	680 ±10%	9 max.	7.5	7.0 max.	A3B	B3B	N3A
DE2E3KH102M□□□	250	E	1000 ±20%	8 max.	7.5	7.0 max.	A3B	B3B	N3A
DE2E3KH152M□□□	250	Е	1500 ±20%	9 max.	7.5	7.0 max.	A3B	B3B	N3A
DE2E3KH222M□□□	250	Е	2200 ±20%	10 max.	7.5	7.0 max.	A3B	B3B	N3A
DE2E3KH332M□□□	250	E	3300 ±20%	12 max.	7.5	7.0 max.	A3B	B3B	N3A
DE2E3KH472M□□□	250	E	4700 ±20%	13 max.	7.5	7.0 max.	A3B	B3B	N3A
DE2F3KH103M□□□	250	F	10000 ±20%	16 max.	7.5	7.0 max.	A3B	B3B	N7A

Three blank columns are filled with the lead and packaging codes. Please refer to the 3 columns on the right for the appropriate code. Murata part numbers might be changed depending on lead code or any other changes. Therefore, please specify only the type name (KH) and capacitance of products in the parts list when it is required for applying safety standard of electric equipment.

Safety Certified Ceramic Capacitors/High Voltage Ceramic Capacitors



Type KX Small Size (Reinforced Insulation) -IEC60384-14 Class X1, Y1-

■ Features

- 1. We design capacitors in much more compact size than current Type KX, having reduced the diameter by 20% max.
- 2. Operating temperature range guaranteed up to 125 degrees (UL: 85 deg.).
- 3. Dielectric strength: AC4000V
- 4. Class X1/Y1 capacitors which are certified by UL/CSA/VDE/BSI/SEMKO/DEMKO/FIMKO/NEMKO/ESTI/ IMQ.
- 5. Possible to use with a component in appliance requiring reinforced insulation and double insulation based on UL1492, IEC60065 and IEC60950.
- 6. Coated with flame-retardant epoxy resin (conforming to UL94V-0 standard).
- 7. Cost-saving automatic insertion available.

■ Applications

- 1. Ideal for use as X/Y capacitors for AC line filter and primary-secondary coupling on switching power supplies and AC adapters.
- 2. Ideal for use on D-A isolation and noise absorption for DAA modems without transformers.

Do not use these products in any Automotive Power train or Safety equipment including Battery charger for Electric Vehicles and Plug-in Hybrid. Only Murata products clearly stipulated as "for Automotive use" on its catalog can be used for automobile applications such as Power train and Safety equipment.

*: Small sized Type KX differs from current Type KX in electrical characteristics, such as the voltage dependency, of capacitance temperature dependecy, and Dielectric strength.

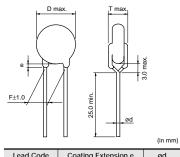
Therefore, before replacing current Type KX, please make a performance check by equipment. Please refer below too.

[Notice(Rating)

item 2. "Performance Check by Equipment".]



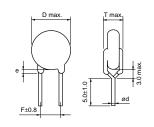




Lead Code	Coating Extension e	ød
A4	Up to the end of crimp	0.6±0.05



[Bulk] Vertical Crimp Short (B4)



Lead Code Coating Extension e B4 Up to the end of crimp 0.6±0.05

(in mm)

■ Standard Certification

	Standard No.	Certified No.	Rated Voltage		
UL	UL1414	E37921			
CSA	E384-14	1343810			
VDE	IEC 60384-14	40002831			
VDE	EN 60384-14	40002631			
	EN 60065 (8.8, 14.2)		AC250V(r.m.s.)		
BSI	IEC 60384-14	KM 37901			
	EN 60384-14				
SEMKO		812158			
DEMKO	IEC 60384-14	314577			
FIMKO		24191			
NEMKO	EN 60384-14	P08209173			
ESTI		08.0707			
IMQ	EN 60384-14	V4069			

- The certification number might change by the revision of the application standard and the change within the range of acquisition.
- Please contact us when the certification of Chinese Safety Standard or South Korean Safety Standard is necessary.

■ Marking

Example	Item
	① Type Designation KX
2 472M 3	Nominal Capacitance (Marked with 3 figures)
2 472M 3 1 + KX250~	③ Capacitance Tolerance
X1 Y1	4 Company Name Code പ്ര : Made in Taiwan പ്ര15 : Made in Thailand
$5 \leftarrow 65 \text{ (M8} \neq 4)$	⑤ Manufactured Date Code
	Class Code X1Y1
	Rated Voltage Mark 250~

Part Number	AC Rated Voltage (Vac)	Temp. Char.	Capacitance (pF)	Body Dia. D (mm)	Lead Spacing F (mm)	Body Thickness T (mm)	Lead Package Long Bulk	Lead Package Short Bulk	Lead Package Taping (1)
DE1B3KX101K□□□L01	250	В	100 ±10%	8 max.	10.0	7.0 max.	A4B	B4B	N4A
DE1B3KX151K□□□L01	250	В	150 ±10%	8 max.	10.0	7.0 max.	A4B	B4B	N4A
DE1B3KX221K□□□L01	250	В	220 ±10%	8 max.	10.0	7.0 max.	A4B	B4B	N4A
DE1B3KX331K□□□L01	250	В	330 ±10%	8 max.	10.0	7.0 max.	A4B	B4B	N4A
DE1B3KX471K□□□L01	250	В	470 ±10%	8 max.	10.0	7.0 max.	A4B	B4B	N4A
DE1B3KX681K□□□L01	250	В	680 ±10%	9 max.	10.0	7.0 max.	A4B	B4B	N4A
DE1E3KX102M□□□L01	250	E	1000 ±20%	7 max.	10.0	7.0 max.	A4B	B4B	N4A
DE1E3KX152M□□□L01	250	E	1500 ±20%	8 max.	10.0	7.0 max.	A4B	B4B	N4A
DE1E3KX222M□□□L01	250	E	2200 ±20%	9 max.	10.0	7.0 max.	A4B	B4B	N4A
DE1E3KX332M□□□L01	250	E	3300 ±20%	10 max.	10.0	7.0 max.	A4B	B4B	N4A
DE1E3KX472M□□□L01	250	E	4700 ±20%	12 max.	10.0	7.0 max.	A4B	B4B	N4A

Three blank columns are filled with the lead and packaging codes. Please refer to the 3 columns on the right for the appropriate code. Murata part numbers might be changed depending on lead code or any other changes. Therefore, please specify only the type name (KX) and capacitance of products in the parts list when it is required for applying safety standard of electric equipment.



Type KX (Reinforced Insulation) -IEC60384-14 Class X1, Y1-

■ Features

- 1. Operating temperature range guaranteed up to 125 degrees (UL: 85 deg.).
- 2. Dielectric strength: AC4000V
- 3. Class X1/Y1 capacitors which are certified by UL/CSA/VDE/BSI/SEMKO/DEMKO/FIMKO/NEMKO/ESTI/
- 4. Possible to use with a component in appliance requiring reinforced insulation and double insulation based on UL1492, IEC60065 and IEC60950.
- 5. Coated with flame-retardant epoxy resin (conforming to UL94V-0 standard).
- 6. Cost-saving automatic insertion available.

■ Applications

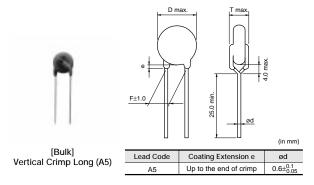
Ideal for use as X/Y capacitors for AC line filter and primary-secondary coupling on switching power supplies and AC adapters.

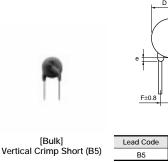
Do not use these products in any Automotive Power train or Safety equipment including Battery charger for Electric Vehicles and Plug-in Hybrid. Only Murata products clearly stipulated as "for Automotive use" on its catalog can be used for automobile applications such as Power train and Safety equipment.

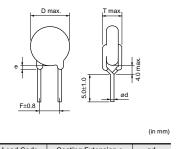
■ Standard Certification

	Standard No.	Certified No.	Rated Voltage		
UL	UL1414	E37921			
CSA	E384-14	1343810			
VDE	IEC 60384-14	40002831			
VDE	EN 60384-14	40002831			
	EN 60065 (8.8, 14.2)				
BSI	IEC 60384-14	0384-14 KM 37901			
	EN 60384-14		AC250V(r.m.s.)		
SEMKO		812158			
DEMKO	IEC 60384-14	314577			
FIMKO		24191			
NEMKO	EN 60384-14	P08209173			
ESTI		08.0707			
IMQ	EN 60384-14	V4069			

- The certification number might change by the revision of the application standard and the change within the range of acquisition.
- . Please contact us when the certification of Chinese Safety Standard or South Korean Safety Standard is necessary.







Coating Extension e 0.6±0 Up to the end of crimp

■ Marking

Example	Item				
	1 Type Designation	KX			
	② Nominal Capacitance (Under 100pF: Actual value, 100pF and over: N	Marked with 3 figures)			
	3 Capacitance Tolerance				
2	④ Company Name Code ©8: Made in Taiwan @15: Made in Thailand				
① KX222M 3 X1Y1 BSI DE	Manufactured Date Code				
	UL Approval Mark	<i>9</i> 7			
	CSA Approval Mark	@			
	VDE Approval Mark	<u> </u>			
\backslash MJ502 \bigcirc	BSI Approval Mark	BSI			
91 (S) (M) (M) (M) (M) (M) (M) (M) (M) (M) (M	SEMKO Approval Mark	<u> </u>			
	DEMKO Approval Mark	(D)			
	FIMKO Approval Mark	FI			
	NEMKO Approval Mark	N			
	ESTI Approval Mark	₿			
	IMQ Approval Mark	(4)			
	Class Code	X1Y1			
	Rated Voltage Mark	250~			

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Part Number	AC Rated Voltage (Vac)	Temp. Char.	Capacitance (pF)	Body Dia. D (mm)	Lead Spacing F (mm)	Body Thickness T (mm)	Lead Package Long Bulk	Lead Package Short Bulk	Lead Package Taping (1)
DE11XKX100J□□□	250	SL	10 ±5%	9 max.	10.0	8.0 max.	A5B	B5B	N5A
DE11XKX150J□□□	250	SL	15 ±5%	9 max.	10.0	8.0 max.	A5B	B5B	N5A
DE11XKX220J□□□	250	SL	22 ±5%	9 max.	10.0	8.0 max.	A5B	B5B	N5A
DE11XKX330J□□□	250	SL	33 ±5%	9 max.	10.0	8.0 max.	A5B	B5B	N5A
DE11XKX470J□□□	250	SL	47 ±5%	9 max.	10.0	8.0 max.	A5B	B5B	N5A
DE11XKX680J□□□	250	SL	68 ±5%	9 max.	10.0	8.0 max.	A5B	B5B	N5A
DE1B3KX101K□□□	250	В	100 ±10%	9 max.	10.0	8.0 max.	A5B	B5B	N5A
DE1B3KX151K□□□	250	В	150 ±10%	9 max.	10.0	8.0 max.	A5B	B5B	N5A
DE1B3KX221K□□□	250	В	220 ±10%	9 max.	10.0	8.0 max.	A5B	B5B	N5A
DE1B3KX331K□□□	250	В	330 ±10%	9 max.	10.0	8.0 max.	A5B	B5B	N5A
DE1B3KX471K□□□	250	В	470 ±10%	9 max.	10.0	8.0 max.	A5B	B5B	N5A
DE1B3KX681K□□□	250	В	680 ±10%	10 max.	10.0	8.0 max.	A5B	B5B	N5A
DE1E3KX102M□□□A01	250	E	1000 ±20%	8 max.	10.0	8.0 max.	A5B	B5B	N5A
DE1E3KX152M□□□A01	250	E	1500 ±20%	9 max.	10.0	8.0 max.	A5B	B5B	N5A
DE1E3KX222M□□□A01	250	E	2200 ±20%	10 max.	10.0	8.0 max.	A5B	B5B	N5A
DE1E3KX332M□□□A01	250	Е	3300 ±20%	12 max.	10.0	8.0 max.	A5B	B5B	N5A
DE1E3KX392M□□□A01	250	E	3900 ±20%	13 max.	10.0	8.0 max.	A5B	B5B	N5A
DE1E3KX472M□□□A01	250	Е	4700 ±20%	15 max.	10.0	8.0 max.	A5B	B5B	N5A

Three blank columns are filled with the lead and packaging codes. Please refer to the 3 columns on the right for the appropriate code. Murata part numbers might be changed depending on lead code or any other changes. Therefore, please specify only the type name (KX) and capacitance of products in the parts list when it is required for applying safety standard of electric equipment.

■ Apply to Type KY/KH/KX

Operating Temperature Range: -25 to +125°C (-25 to +85°C in case of the standard of UL)

No.	Item	Specifications	Test Method
1	Appearance and Dimens	ns No marked defect on appearance form and dimensions are within specified range.	The capacitor should be visually inspected for evidence of defect. Dimensions should be measured with slide calipers.
2	Marking	To be easily legible	The capacitor should be visually inspected.
3	Capacitance	Within specified tolerance	
4	Dissipation Factor (D.F.)	Char. Specifications B, E D.F.≤2.5% F D.F.≤5.0% SL Q≥400+20C*¹(C<30pF)	The capacitance, dissipation factor and Q should be measured at 20°C with 1±0.1kHz (char. SL: 1±0.1MHz) and AC5V(r.m.s.) max.
5	Insulation Resistance (I.R	10000MΩ min.	The insulation resistance should be measured with DC500 \pm 50V within 60 \pm 5 sec. of charging. The voltage should be applied to the capacitor through a resistor of 1M Ω .
6	Dielectric Strength Body Insulation	No failure No failure	The capacitor should not be damaged when test voltages of Table 1 are applied between the lead wires for 60 sec. Type Test Voltage
7	Temperature Characteris	Char. Capacitance Change B Within ±10% E Within ±28% F Within ±38% (Temp. range: -25 to +85°C) Char. Temperature Coefficient SL +350 to -1000ppm/°C (Temp. range: +20 to +85°C)	The capacitance measurement should be made at each step specified in Table 3. Step Temperature (°C) 1
8	Solderability of Leads	Lead wire should be soldered with uniform coating on the axial direction over 3/4 of the circumferential direction.	The lead wire of a capacitor should be dipped into molten solder for 2±0.5 sec. The depth of immersion is up to about 1.5 to 2.0mm from the root of lead wires. Temp. of solder: Lead Free Solder (Sn-3Ag-0.5Cu) 245±5°C H63 Eutectic Solder 235±5°C

^{*1 &}quot;C" expresses nominal capacitance value (pF).

Continued on the following page.





Continued from the preceding page

7	Continued from the	preceding page.			
No.	Ite	em	Specifications	Test Method	
		Appearance	No marked defect	As shown in figure, the lead wires	
		Capacitance Change	Within ±10%	should be immersed in solder of 350±10°C or 260±5°C up to 1.5 to 2.0mm from the root of terminal	
	Soldering	I.R.	1000MΩ min.	for 3.5±0.5 sec. (10±1 sec. for Molten	
9	Effect (Non-Preheat)	Dielectric Strength	Per Item 6	260±5°C). Pre-treatment: Capacitor should be stored at 85±2°C for 1 hr., then placed room condition*2 for 24±2 hrs. before initial measurements. Post-treatment: Capacitor should be stored for 1 to 2 hrs. at room condition*	
		Appearance	No marked defect	First the capacitor should be	
		Capacitance Change Within ±10%		stored at 120+0/-5°C for Screen	
		I.R.	1000MΩ min.	should be immersed in solder of	
10	Soldering Effect (On-Preheat)	Dielectric Strength	Per Item 6	260+0/-5°C up to 1.5 to 2.0mm from the root of terminal for 7.5+0/-1 sec. Pre-treatment: Capacitor should be stored at 85±2°C for 1 hr., then placed at room condition*2 for 24±2 hrs. before initial measurements. Post-treatment: Capacitor should be stored for 1 to 2 hrs. at room condition*2.	
		Appearance	No marked defect		
		Capacitance	Within the specified tolerance	The capacitor should be firmly soldered to the supporting lead wire and vibrated at a frequency range of 10 to 55Hz, 1.5mm in	
11	Vibration Resistance	D.F. Q	Char. Specifications B, E D.F.≤2.5% F D.F.≤5.0% SL Q≥400+20C*¹(C<30pF)	total amplitude, with about a 1 minute rate of vibration change from 10Hz to 55Hz and back to 10Hz. Apply for a total of 6 hrs., 2 hrs. each in 3 mutually perpendicular directions.	
		Appearance	No marked defect		
		Capacitance Change	Char. Capacitance Change B Within ±10% E, F Within ±15% SL Within ± 5%		
12	Humidity (Under Steady State)	D.F. Q	$\begin{tabular}{c c c} \hline Char. & Specifications \\ B, E & D.F. \le 5.0\% \\ \hline F & D.F. \le 7.5\% \\ SL & Q \ge 275 + 5/2 C^{*1} (C < 30 pF) \\ Q \ge 350 & (C \ge 30 pF) \\ \hline \end{tabular}$	Set the capacitor for 500±12 hrs. at 40±2°C in 90 to 95% relative humidity. Post-treatment: Capacitor should be stored for 1 to 2 hrs. at room condition*2.	
		I.R.	3000MΩ min.		
		Dielectric Strength	Per Item 6		
		Appearance	No marked defect		
		Capacitance Change	Char. Capacitance Change B Within ±10% E, F Within ±15% SL Within ± 5%		
13	Humidity Loading	D.F. Q	$ \begin{array}{c cccc} Char. & Specifications \\ B, E & D.F. \leq 5.0\% \\ \hline F & D.F. \leq 7.5\% \\ SL & Q \geq 275 + 5/2C^* (C < 30pF) \\ Q \geq 350 & (C \geq 30pF) \\ \end{array} $	Apply the rated voltage for 500±12 hrs. at 40±2°C in 90 to 95% relative humidity. Post-treatment: Capacitor should be stored for 1 to 2 hrs. at room condition*2.	
		I.R.	3000M $Ω$ min.		
		Dielectric	Per Item 6		
		Strength minal capacitance			

^{*1 &}quot;C" expresses nominal capacitance value (pF).

Continued on the following page.





 $^{^{\}star_2}$ "room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa

No.	Ite	em	Specifications	Test Method
		Appearance	No marked defect	Impulse Voltage
		Capacitance Change	Within ±20%	Each individual capacitor should be subjected to a 5kV (Type KX: 8kV) impulses for three times. After the capacitors are applied to life test.
		I.R.	3000M $Ω$ min.	100 (%)
14	Life	Dielectric Strength	Per Item 6	Front time (T1) =1.2µs=1.67T Time to half-value (T2) =50µs 1
				Applied Voltage AC425V(r.m.s.), except that once each hour the voltage is increased to AC1000V(r.m.s.) for 0.1 sec.
				Post-treatment: Capacitor should be stored for 1 to 2 hrs. at room condition*2.
				The capacitor should be subjected to applied flame for 15 sec. and then removed for 15 sec. until 5 cycles are completed.
15	Flame Test		The capacitor flame discontinues as follows. Cycle Time (sec.)	Capacitor
ij	riume rest		1 to 4 30 max.	
			5 60 max.	
				Gas Burner: Inside Dia. 9.5 (in mm)
16	Robustness of	Tensile	Lead wire should not be cut off. Capacitor should	As shown in the figure at right, fix the body of the capacitor and apply a tensile weight gradually to each lead wire in the radial direction of the capacitor up to 10N and keep it for 10±1 sec.
	Terminations	Bending	not be bloken.	Each lead wire should be subjected to 5N weight and then a 90° bend, at the point of egress, in one direction, return to original position, and then apply a 90° bend in the opposite direction at the rate of one bend in 2 to 3 sec.
				The capacitor should be individually wrapped in at least one but not more than two complete layers of cheesecloth. The capacitor should be subjected to 20 discharges. The interval between successive discharges should be 5 sec. The UAC should be maintained for 2 min. after the last discharge.
				$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
17	Active Flamma	bility	The cheese-cloth should not be on fire.	C1,2 : 1μF±10%
			to 35°C. Relative humidity: 45 to 75%. Atmospheric or	time

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^{*2 &}quot;room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa

Continued from the preceding page Specifications No. Item Test Method The capacitor under test should be held in the flame in the position which best promotes burning. Each specimen should only be exposed once to the flame. Time of exposure to flame: 30 sec. Length of flame: 12±1mm : Length 35mm min. Gas burner Inside Dia. 0.5±0.1mm Outside Dia. 0.9mm max. The burning time should not exceed 30 sec. Gas : Butane gas Purity 95% min. Passive Flammability The tissue paper should not ignite. -Test Specimen

		Appearance	No marked de	fect
		Capacitance Change	Char. B E, F SL	Capacitance Change Within ±10% Within ±20% Within ± 5%
19			Char.	Specifications
19	Temperature and	D.F. Q	B, E F SL	D.F.≤5.0% D.F.≤7.5% Q≥275+5/2C*1(C<30pF) Q≥350 (C≥30pF)
19	•		F	D.F.≦7.5% Q≧275+5/2C*¹(C<30pF)

Per Item 6

The capacitor should be subjected to 5 temperature cycles, then consecutively to 2 immersion cycles.

<Temperature Cycle>

About 10mm Thick Board

Step	Temperature (°C)	Time (min)
1	-25+0/-3	30
2	Room temp.	3
3	125+3/-0	30
4	Room temp.	3

Cycle time: 5 cycle

<Immersion Cycle>

Step	Temperature (°C)	Time (min)	Immersion Water
1	65+5/-0	15	Clean water
2	0±3	15	Salt water

Cycle time: 2 cycle

Pre-treatment:

Capacitor should be stored at 85±2°C for 1 hr., then placed at room condition*2 for 24±2 hrs.

Post-treatment:

Capacitor should be stored for 24±2 hrs. at room condition*2.

Dielectric

Strength



^{*1 &}quot;C" expresses nominal capacitance value (pF).

^{*2 &}quot;room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa

Safety Certified Ceramic Capacitors/High Voltage Ceramic Capacitors



DEJ Series -Based on the Electrical Appliance and Material Safety Law of Japan-

■ Features

- 1. Coated with flame-retardant epoxy resin (conforming to UL94V-0 standard).
- 2. Cost-saving automatic insertion available.
- 3. This type is based on the electrical appliance and material safety law of Japan (separated table 4).

■ Applications

Ideal for use on AC line filter and primary-secondary coupling for switching power supplies and AC adapters.

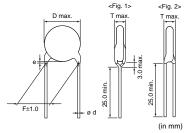
Do not use these products in any Automotive Power train or Safety equipment including Battery charger for Electric Vehicles and Plug-in Hybrid. Only Murata products clearly stipulated as "for Automotive use" on its catalog can be used for automobile applications such as Power train and Safety equipment.

■ Marking

	Temp. Char.	E, F	
Nominal Body Diameter	ø7-8mm	102Z 250~ 65	
Nomina Body Di	ø9-11mm	332Z 250~ @65	
Non	ninal Capacitance	Marked with 3 figures	
Capa	acitance Tolerance	Marked with code	
Rated Voltage		Marked with code	
	Manufacturer's dentification	Marked with ™ (omitted for nominal body diameter ø8mm and under)	
Manu	factured Date Code	Abbreviation	



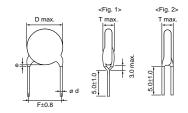
[Bulk] Vertical Crimp Long (A3) Straight Long (C3)



Lead Code Coating Extension e Style Up to the end of crimp 0.6±0.05 Fig. 1



[Bulk] Vertical Crimp Short (B3) Straight Short (D3)



			, ,
Lead Code	Coating Extension e	ød	Style
В3	Up to the end of crimp	0.6±0.05	Fig. 1
Da	3.0 may	0.6+0.05	Fig. 2

(in mm)

Part Number	AC Rated Voltage (Vac)	Temp. Char.	Capacitance (pF)	Body Dia. D (mm)	Lead Spacing F (mm)	Body Thickness T (mm)	Lead Package Long Bulk	Lead Package Short Bulk	Lead Package Taping (1)	Lead Package Taping (2)
DEJE3E2102Z	250	Е	1000 +80/-20%	7 max.	7.5	4.0 max.	C3B	D3B	N2A	P3A
DEJE3E222Z□□□	250	Е	2200 +80/-20%	8 max.	7.5	4.0 max.	A3B	B3B	N2A	N3A
DEJE3E2332Z□□□	250	Е	3300 +80/-20%	9 max.	7.5	4.0 max.	A3B	B3B	N2A	N3A
DEJE3E2472Z□□□	250	Е	4700 +80/-20%	11 max.	7.5	4.0 max.	A3B	B3B	N2A	N3A
DEJF3E2472Z□□□	250	F	4700 +80/-20%	8 max.	7.5	4.0 max.	A3B	B3B	N2A	N3A
DEJF3E2103Z□□□	250	F	10000 +80/-20%	11 max.	7.5	4.0 max.	A3B	B3B	N2A	N3A

Three blank columns are filled with the lead and packaging codes. Please refer to the 3 columns on the right for the appropriate code. Taping (1): Lead spacing F=5.0mm, Taping (2): Lead spacing F=7.5mm.

DEJ Series Specifications and Test Methods

■ Apply to DEJ Series (Products which are based on the electrical appliance and material safety law of Japan) Operating Temperature Range: -25 to +85°C

No.	Ite	em	Specifications	Test Method		
1	1 Appearance and Dimensions		No marked defect on appearance form and dimensions are within specified range.	The capacitor should be visually inspected for evidence of defect. Dimensions should be measured with slide calipers.		
2	Marking		To be easily legible	The capacitor should be visually inspected.		
3	Capacitance		Within specified tolerance	The capacitance should be measured at 20°C with 1±0.1kHz and AC5V(r.m.s.) max.		
4	Dissipation Fac (D.F.)	ctor	Char. Specifications E D.F.≤2.5% F D.F.≤5.0%	The dissipation factor should be measured at 20°C with 1±0.1kHz and AC5V(r.m.s.) max.		
5	Insulation Resi	stance (I.R.)	10000M Ω min.	The insulation resistance should be measured with DC500±50V within 60±5 sec. of charging.		
		Between Lead Wires	No failure	The capacitor should not be damaged when AC1500V(r.m.s.) are applied between the lead wires for 60 sec.		
6	Dielectric Strength	Body Insulation	No failure	First, the terminals of the capacitor should be connected together. Then, as shown in figure at right, the capacitor should be immersed into 10% salt solution up to a position of about 3 to 4mm apart from the terminals. Finally, AC1500V(r.m.s.) is applied for 60 sec. between the capacitor lead wires and electrode plate.		
7	7 Temperature Characteristics		Char. Capacitance Change E Within +28% F Within +38%	The capacitance measurement should be made at each step specified in Table 1.		
		Appearance	No marked defect	As in Figure 1, discharge is made 50 times at 5 sec. intervals		
8	Discharge Test	I.R. Dielectric Strength	1000MΩ min. Per Item 6	from the capacitor (Cd) charged at DC voltage of specified. Fig.1 Ct: Capacitor under test R2: $100M\Omega$ S: High-voltage switch R3: Surge resistance R1: 1000Ω Cd 0.001µF		
9	9 Solderability of Leads		Lead wire should be soldered with uniform coating on the axial direction over 3/4 of the circumferential direction.	The lead wire of a capacitor should be dipped into molten solder for 2±0.5 sec. The depth of immersion is up to about 1.5 to 2.0mm from the root of lead wires. Temp. of solder: Lead Free Solder (Sn-3Ag-0.5Cu) 245±5°C		
				H63 Eutectic Solder 235±5°C		

Continued on the following page. $\begin{tabular}{|c|c|c|c|} \hline \end{tabular}$



DEJ Series Specifications and Test Methods

 $\begin{tabular}{ll} \end{tabular}$ Continued from the preceding page.

No.	o. Item Specifications		Specifications	Test Method				
		Appearance	No marked defect	As shown in figure, the lead wires				
		I.R.	1000MΩ min.	should be immersed in solder of Screen 350±10°C up to 1.5 to 2.0mm from the root of terminal for 3.5±0.5 sec.				
10	Soldering Effect (Non-Preheat)	Dielectric Strength	Per Item 6	Pre-treatment: Capacitor should be stored at 85±2°C for 1 hr., then placed at room condition*¹ for 24±2 hrs. before initial measurements. Post-treatment: Capacitor should be stored for 4 to 24 hrs. at room condition*¹.				
		Appearance	No marked defect	First the capacitor should be Thermal Capacitor				
		I.R.	1000M Ω min.	stored at 120+0/-5°C for 60+0/-5 sec.				
11	Soldering Effect (On-Preheat)	Dielectric Strength	Per Item 6	Then, as in figure, the lead wires should be immersed in solder of 260+0/-5°C up to 1.5 to 2.0mm from the root of terminal for 7.5+0/-1 sec. Pre-treatment: Capacitor should be stored at 85±2°C for 1 hr., then placed at room condition*¹ for 24±2 hrs. before initial measurements. Post-treatment: Capacitor should be stored for 4 to 24 hrs. at room condition*¹.				
		Appearance	No marked defect	The capacitor should be firmly soldered to the supporting lead				
	Vibration Resistance	Capacitance	Within the specified tolerance	wire and vibrated at a frequency range of 10 to 55Hz, 1.5mm in				
12		D.F.	Char. Specifications E D.F.≤2.5% F D.F.≤5.0%	total amplitude, with about a 1 minute rate of vibration change from 10Hz to 55Hz and back to 10Hz. Apply for a total of 6 hrs., 2 hrs. each in 3 mutually perpendicula directions.				
13	Solvent Resistance	Appearance	No marked defect	The capacitor should be immersed into a isopropyl alcohol for 30±5 sec.				
		Appearance	No marked defect					
	Humidity	Capacitance Change	Char. Capacitance Change E Within ±20% F Within ±30%	Set the capacitor for 500±12 hrs. at 40±2°C in 90 to 95% relative humidity.				
14	(Under Steady State)	D.F.	Char. Specifications E D.F.≤5.0% F D.F.≤7.5%	Pre-treatment: Capacitor should be stored at 85±2°C for 1 hr., then placed at room condition*1 for 24±2 hrs. before initial measurements. Post-treatment: Capacitor should be stored for 1 to 2 hrs. at room condition*1.				
		I.R.	1000MΩ min.					
		Dielectric Strength	Per Item 6					
		Appearance	No marked defect					
		Capacitance Change	Char. Capacitance Change E Within ±20% F Within ±30%	The capacitor should be subjected to 40±2°C, relative humidity of 90 to 98% for 8 hrs., and then removed in room temperature for 16 hrs. until 5 cycles.				
15	Humidity Insulation	D.F.	Char. Specifications E D.F.≤5.0% F D.F.≤7.5%	Pre-treatment: Capacitor should be stored at 85±2°C for 1 hr., then placed at room condition*¹ for 24±2 hrs. before initial measurements. Post-treatment:				
		I.R.	1000MΩ min.	Capacitor should be stored for 1 to 2 hrs. at room condition*1.				
		Dielectric Strength	Per Item 6					

^{*1 &}quot;room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa

Continued on the following page.





DEJ Series Specifications and Test Methods

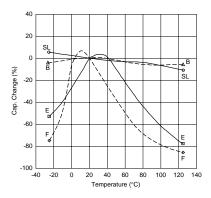
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No.		e preceding page.	Specifications			Toot NA	othod	
NO.	Ite	- 	No marked defect	Test Method				
16	Humidity Loading	Capacitance Change E Within ±20% F Within ±30% idity ling D.F. Char. Specifications E D.F.≤5.0%		Apply the rated voltage for 500±12 hrs. at 40±2°C in 90 to 95% relative humidity. Pre-treatment: Capacitor should be stored at 85±2°C for 1 hr., then placed a room condition*¹ for 24±2 hrs. before initial measurements.				
			F D.F.≦7.5%	Post-trea Capac			1 to 2 hrs.	at room condition*1.
		I.R.	1000MΩ min.					
		Dielectric Strength	Per Item 6					
		Appearance	No marked defect	Apply a humidity		ge of Table 2 for 15	00 hrs. at	85±2°C, relative
17	Life	Capacitance Change	Char. Capacitance Change E Within ±20% F Within ±30%	AC50	00V(r.	<pre><tabl '="" .m.s.),="" ac1000v(r.m.)<="" applied="" ed="" except="" o="" pre="" that="" to=""></tabl></pre>	Voltage once each	
17	Life	I.R.	1000MΩ min.			,	.5.) 101 0.1	Sec.
		Dielectric Strength	Per Item 6	Pre-treatment: Capacitor should be stored at 85±2°C for 1 hr., ther room condition*¹ for 24±2 hrs. before initial measur Post-treatment: Capacitor should be stored for 4 to 24 hrs. at room or				al measurements.
18	Flame Test		The capacitor flame discontinued as follows. Cycle Time (sec.) 1 to 2 15 max. 3 60 max.	The capacitor should be subjected to applied flame for 15 sec. and then removed for 15 sec. until 3 cycles are completed.		Capacitor Flame		
19	Robustness of Terminations	Tensile	Lead wire should not be cut off. Capacitor should not be broken.	capacito each lea up to 10	r, app d wire N and	igure at right, fix the oly a tensile weight e in the radial direct keep it for 10±1 so e should be subjected by the subjected in the subjecte	gradually tion of cap ec.	pacitor w
		Bending		90° bend, at the point of egress, in one direction, return to original position, and then apply a 90° bend in the opposite direction at the rate of one bend in 2 to 3 sec.				
		Appearance	No marked defect			should be subjecte		nperature cycles,
		Canacitanco	Char. Capacitance Change	then con	secui	tively to 2 immersio	•	
		Capacitance Charles Capacitance Change E Within ±20% F Within ±30%		Ste	'n	<temperature< td=""><td>-</td><td>Time (min)</td></temperature<>	-	Time (min)
			VVIIIIII ±30 /0	1		-25+0/-3	3	30
			Char. Specifications	2		Room tem 85+3/-0		3 30
		D.F.	E D.F.≦5.0% F D.F.≦7.5%	4		Room tem		3
								Cycle time: 5 cycle
20	Temperature and	I.R.	1000M Ω min.	 		<immersio< td=""><td>n Cycle></td><td></td></immersio<>	n Cycle>	
	Immersion Cycle			Step) Т	emperature (°C)	Time (min)	Immersion Water
				1		65+5/-0	15	Clean water
		Dielectric	Per Item 6	2		0±3	15	Salt water
		Strength	to 35°C, Relative humidity: 45 to 75%, Atmospheric p	room o Post-trea Capac	itor sh onditi atmen tor sh	nould be stored at 8 ion*1 for 24±2 hrs. ht: nould be stored for		Cycle time: 2 cycle 1 hr., then placed at . at room condition*1.

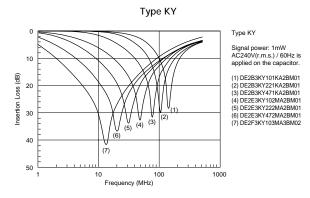


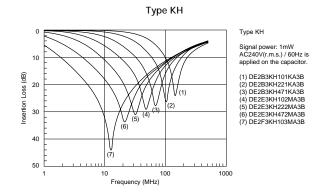
Safety Certified Ceramic Capacitors Characteristics Data (Typical Example)

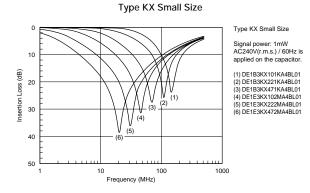
■ Capacitance - Temperature Characteristics

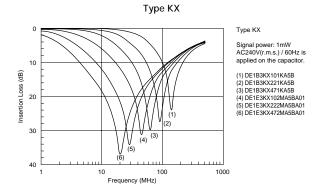


■ Insertion Loss - Frequency Characteristics



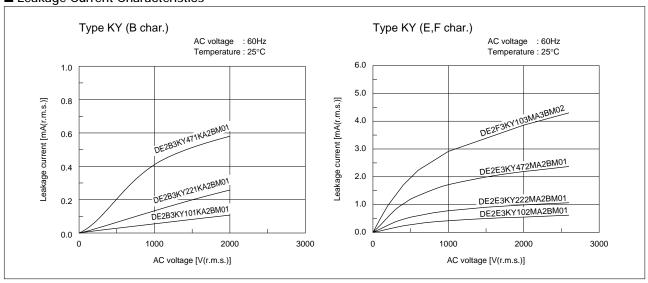


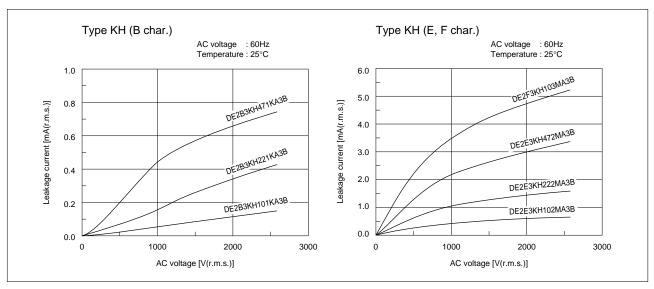


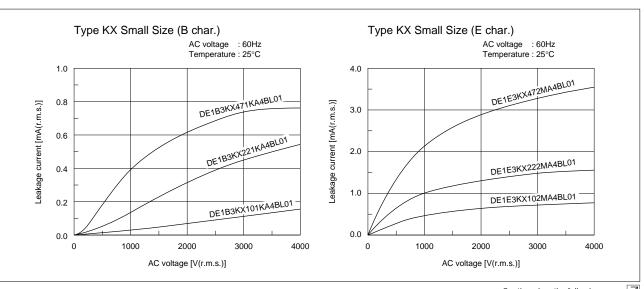


Safety Certified Ceramic Capacitors Characteristics Data (Typical Example)

■ Leakage Current Characteristics





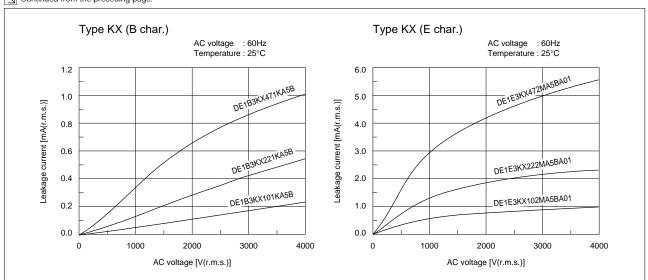


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Safety Certified Ceramic Capacitors Characteristics Data (Typical Example)

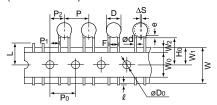
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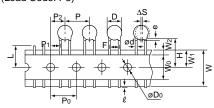
Safety Certified Ceramic Capacitors Packaging

■ Taping Specifications

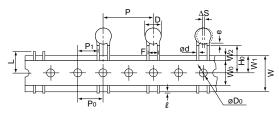
• 12.7mm pitch / lead spacing 5mm taping Vertical crimp type (Lead Code: N2)



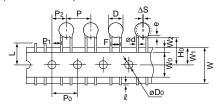
• 15mm pitch / lead spacing 7.5mm taping Straight type (Lead Code: P3)



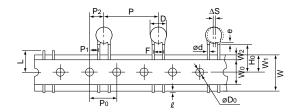
• 25.4mm pitch / lead spacing 10.0mm taping Vertical crimp type (Lead Code: N4, N5)

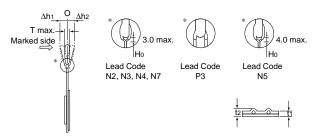


• 15mm pitch / lead spacing 7.5mm taping Vertical crimp type (Lead Code: N3)



• 30mm pitch / lead spacing 7.5mm taping Vertical crimp type (Lead Code: N7)





Item	Code	N2	N3	P3	N7	N4	N5
Pitch of component	Р	12.7	15.0	15.0	30.0	25	.4
Pitch of sprocket hole	P ₀	12.7±0.3	15.0±0.3	15.0±0.3	15.0±0.3	12.7	±0.3
Lead spacing	F	5.0 ^{+0.8} _{-0.2}	7.5±1.0	7.5±1.0	7.5±1.0	10.0	±1.0
Length from hole center to component center	P ₂	6.35±1.3	7.5±1.5	7.5±1.5	7.5±1.5	_	-
Length from hole center to lead	P1	3.85±0.7	3.75±1.0	3.75±1.0	3.75±1.0	7.7±	1.5
Body diameter	D		See th	e individual pr	oduct specific	cations.	
Deviation along tape, left or right	ΔS	0±1.0			0±2.0		
Carrier tape width	W			18.0	±0.5		
Position of sprocket hole	W ₁			9.0	±0.5		
Lead distance between reference	Ho	18.0	+2.0 -0	_		18.0 ^{+2.0}	
and bottom planes	Н	_	_	20.0+1.5		_	
Protrusion length	ℓ			+0.5 t	o -1.0		
Diameter of sprocket hole	øD0			4.0	<u></u> ±0.1		
Lead diameter	ød			0.6±0.05			$0.6^{+0.1}_{-0.05}$
Total tape thickness	t1			0.6	±0.3		
Total thickness, tape and lead wire	t2			1.5 ו	max.		
Body thickness	Т		See th	e individual pr	oduct specific	cations.	
Portion to cut in case of defect	L			11.0	+0 –1.0		
Hold down tape width	Wo			11.5	min.		
Hold down tape position	W2			1.5:	±1.5		
Coating extension on lead	е	Up to the end of crimp 3.0 max. Up to the end of crimp				rimp	
Deviation across tape, front	Δh1						
Deviation across tape, rear	Δh2	1.0 max. 2.0 max.					

Continued on the following page.

(in mm)

Safety Certified Ceramic Capacitors Packaging

Continued from the preceding page.

■ Packaging Styles



■ Minimum Quantity (Order in Sets Only)

[Bulk] 1,000 pcs.

[Taping]				(pcs.)
Lead Code	Type KY	Type KH	Type KX	DEJ Series
N2	1,000	-	-	1,500
N3, P3	900	900	-	1,000
N7	-	400	-	-
N4, N5	_	_	500	_

■ Minimum Order Quantity

[Bulk] 3,000 pcs.

[Taping]	(pcs.)					
Lead Code	Lead Code Type KY Type KH Type KX					
N2	3,000	-	-	3,000		
N3, P3	2,700	2,700	-	3,000		
N7	-	2,000	-	-		
N4, N5	-	-	2,000	-		

[&]quot;Minimum Quantity" means the numbers of units of each delivery or order. The quantity should be an integral multiple of the "minimum quantity". (In case of bulk packaging, minimum quantities differ from packing quantities in a bulk bag.)



Safety Certified Ceramic Capacitors **(1)** Caution

■ ①Caution (Rating)

1. Operating Voltage

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

When the voltage is applied to the circuit, starting or stopping may generate irregular voltage for a transit period because of resonance or switching. Be sure to use a capacitor with a rated voltage range that includes these irregular voltages.

Voltage	DC Voltage	DC+AC Voltage	AC Voltage	Pulse Voltage (1)	Pulse Voltage (2)
Positional Measurement	Vo-p	Vo-p	Vp-p	Vp-p	Vp-p

2. Operating Temperature and Self-generated Heat (Apply to B/E/F Char.)

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 highfrequency current, pulse current or similar current, it may have self-generated heat due to dielectric loss. Applied voltage load should be such that self-generated heat is within 20°C under the condition where the capacitor is subjected to an atmosphere temperature of 25°C. When measuring, use a thermocouple of small thermal capacity-K of ø0.1mm under conditions where the capacitor is not affected by radiant heat from other components or wind from surroundings. Excessive heat may lead to deterioration of the capacitor's characteristics and reliability. (Never attempt to perform measurement with the cooling fan running. Otherwise, accurate measurement cannot be ensured.)

3. Test Condition for Withstanding Voltage

(1) Test Equipment

Test equipment for AC withstanding voltage should be used with the performance of the wave similar to 50/60Hz sine wave.

If the distorted sine wave or overload exceeding the specified voltage value is applied, a defect may be caused.

Continued on the following page.





Safety Certified Ceramic Capacitors **(A)** Caution

Continued from the preceding page.

(2) Voltage Applied Method

When the withstanding voltage is applied, capacitor's lead or terminal should be firmly connected to the output of the withstanding voltage test equipment, and then the voltage should be raised from near zero to the test voltage.

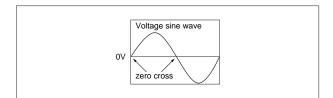
If the test voltage without the raise from near zero voltage would be applied directly to capacitor, test voltage should be applied with the zero cross*. At the end of the test time, the test voltage should be reduced to near zero, and then capacitor's lead or terminal should be taken off the output of the withstanding voltage test equipment. If the test voltage without the raise from near zero voltage would be applied directly to capacitor, the surge voltage may arise, and therefore, a defect may be caused.

*ZERO CROSS is the point where voltage sine wave passes 0V. See figure at right.

4. Fail-Safe

When capacitor is broken, failure may result in a short circuit. Be sure to provide an appropriate fail-safe function like a fuse on your product if failure could result in an electric shock, fire or fuming.

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.



• This PDF catalog has only typical specifications because there is no space for detailed specifications. Therefore, please approve our product specifications or transact the approval sheet for product specifications before ordering. • Report the data of the product specification of the product specifica

Safety Certified Ceramic Capacitors **(A)** Caution

■ **(**Caution (Storage and Operating 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. 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 after delivery.

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.

■ ①Caution (Soldering and Mounting)

1. Vibration and Impact Do not expose a capacitor or its leads to excessive shock or vibration during use.

2. Solderina

When soldering this product to a PCB/PWB, do not exceed the solder heat resistance specifications 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.

When soldering capacitor with a soldering iron, it should be performed in the following conditions.

Temperature of iron-tip: 400 degrees C. max. Soldering iron wattage: 50W max. Soldering time: 3.5 sec. max.

3. Bonding, Resin Molding and Coating Before bonding, molding or coating this product, verify that these processes do not affect the quality of capacitor by testing the performance of

the bonded, molded or coated product in the intended equipment.

In case the amount of applications, dryness/hardening conditions of adhesives and molding resins containing organic solvents (ethyl acetate, methyl ethyl ketone, toluene, etc.) are unsuitable, the outer coating resin of a capacitor is damaged by the organic solvents and it may result, worst case, in a short circuit. The variation in thickness of adhesive, molding resin or coating may cause outer coating resin cracking and/or ceramic element cracking of a capacitor in a temperature cycling.

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.

■ ①Caution (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.



Safety Certified Ceramic Capacitors Notice

■ 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: 5 min. maximum.

Do not vibrate the PCB/PWB directly.

Excessive ultrasonic cleaning may lead to fatigue

destruction of the lead wires.

■ Notice (Rating)

- 1. Capacitance Change of Capacitors
- (1) In case of SL char.

Capacitance might change a little depending on a surrounding temperature or an applied voltage. Please contact us if you use for the strict constant time circuit.

(2) In case of B/E/F char.

Capacitors have an aging characteristic, whereby the capacitor continually decreases its capacitance slightly if the capacitor is left on for a long time. Moreover, capacitance might change greatly depending on the surrounding temperature or an applied voltage. So, it is not likely to be suitable for use in a constant time circuit.

Please contact us if you need detailed information.

2. Performance Check by Equipment Before using a capacitor, check that there is no problem in the equipment's performance and the specifications.

Generally speaking, CLASS 2 (B/E/F char.) ceramic capacitors have voltage dependence characteristics and temperature dependence characteristics in capacitance. So, the capacitance value may change depending on the operating condition in the equipment. Therefore, be sure to confirm the apparatus performance of receiving influence in the capacitance value change of a capacitor, such as leakage current and noise suppression characteristic.

Moreover, check the surge-proof ability of a capacitor in the equipment, if needed, because the surge voltage may exceed specific value by the inductance of the circuit.



Safety Certified Ceramic Capacitors/High Voltage Ceramic Capacitors



DES Series (125 deg. C Guaranteed/Low-dissipation Factor/DC500V-1kV)

■ Features

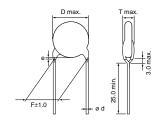
- 1. Low dissipation factor series which can be used for power supplies with an increased switching frequency.
- 2. The allowable power in the 100 to 300kHz band is improved to approximately one-and-a-half times that of DEH series while remaining the same size.
- 3. Operating temperature range is guaranteed up to 125 degrees C.
- 4. Coated with flame-retardant epoxy resin (equivalent to UL94V-0 standard).
- 5. Taping available for automatic insertion.

■ Applications

Ideal for use on high frequency pulse circuits such as snubber circuits for switching power supplies.

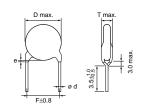
Do not use these products in any Automotive Power train or Safety equipment including Battery charger for Electric Vehicles and Plug-in Hybrid. Only Murata products clearly stipulated as "for Automotive use" on its catalog can be used for automobile applications such as Power train and Safety equipment.





Lead Code Coating Extension e ød Up to the end of crimp





Lead Code Coating Extension e ød 0.6±0.05

[Bulk] Vertical Crimp Short (J2,J3)

■ Marking

Rated Voltage Nominal Body Diameter	DC500V	DC1kV				
ø6mm	SD 101 66	SD 101 1KV 66				
ø7-9mm	S D 102K 66	S D 471K 1KV 66				
ø10-17mm	S D 222K M 66	S D 152K 1KV (M66				
Series Code	Abbreviation (S)					
Temperature Characteristic	Marked with code					
Nominal Capacitance	Marked with 3 figures					
Capacitance Tolerance	Marked with code (omitted for nominal body diameter ø6mm)					
Rated Voltage	Marked with code (omitted for DC500V)					
Manufacturer's Identification	Marked with (omitted for nominal body diameter ø9mm and under)					
Manufactured Date Code	Abbreviation					

D Characteristics

Part Number	DC Rated Voltage (V)	Capacitance (pF)	Body Dia. D (mm)	Lead Spacing F (mm)	Body Thickness T (mm)	Lead Package Long Bulk	Lead Package Short Bulk	Lead Package Taping
DESD32H101K□□□	500	100 ±10%	6	5.0	4.0	A2B	J2B	N2A
DESD32H151K□□□	500	150 ±10%	6	5.0	4.0	A2B	J2B	N2A
DESD32H221K□□□	500	220 ±10%	6	5.0	4.0	A2B	J2B	N2A
DESD32H331K□□□	500	330 ±10%	6	5.0	4.0	A2B	J2B	N2A
DESD32H471K□□□	500	470 ±10%	6	5.0	4.0	A2B	J2B	N2A
DESD32H681K□□□	500	680 ±10%	6	5.0	4.0	A2B	J2B	N2A
DESD32H102K□□□	500	1000 ±10%	8	5.0	4.0	A2B	J2B	N2A
DESD32H152K□□□	500	1500 ±10%	9	5.0	4.0	A2B	J2B	N2A
DESD32H222K□□□	500	2200 ±10%	10	5.0	4.0	A2B	J2B	N2A
DESD32H332K□□□	500	3300 ±10%	12	7.5	4.0	A3B	J3B	N3A
DESD32H472K□□□	500	4700 ±10%	14	7.5	4.0	A3B	J3B	N7A
DESD33A101K□□□	1000	100 ±10%	6	5.0	4.5	A2B	J2B	N2A
DESD33A151K□□□	1000	150 ±10%	6	5.0	4.5	A2B	J2B	N2A
DESD33A221K□□□	1000	220 ±10%	6	5.0	4.5	A2B	J2B	N2A
DESD33A331K□□□	1000	330 ±10%	6	5.0	4.5	A2B	J2B	N2A
DESD33A471K□□□	1000	470 ±10%	7	5.0	4.5	A2B	J2B	N2A
DESD33A681K□□□	1000	680 ±10%	8	5.0	4.5	A2B	J2B	N2A
DESD33A102K□□□	1000	1000 ±10%	9	5.0	4.5	A2B	J2B	N2A
DESD33A152K□□□	1000	1500 ±10%	10	5.0	4.5	A2B	J2B	N2A
DESD33A222K□□□	1000	2200 ±10%	12	7.5	4.5	A3B	J3B	N3A
DESD33A332K□□□	1000	3300 ±10%	14	7.5	4.5	A3B	J3B	N7A
DESD33A472K□□□	1000	4700 ±10%	17	7.5	4.5	A3B	J3B	N7A

Three blank columns are filled with the lead and packaging codes. Please refer to the three columns on the right for the appropriate code.

DES Series Specifications and Test Methods

No.		Item	Specifications	Test Method		
1	Operating Temper	ature Range	-25 to +125°C			
2	Appearance and E	-	No marked defect on appearance form and dimensions are within specified range.	The capacitor should be visually inspected for evidence of defect. Dimensions should be measured with slide calipers.		
3	Marking		To be easily legible	The capacitor should be visually inspected.		
		Between Lead Wires	No failure	The capacitor should not be damaged when DC voltage of 200% of the rated voltage (DC1kV) or DC voltage of 250% of the rated voltage (DC500V) is applied between the lead wires for 1 to 5 sec. (Charge/Discharge current≦50mA)		
4	Dielectric Strength	Body Insulation	No failure	The capacitor is placed in the container with metal balls of diameter 1mm so that each lead wire, short circuited, is kept about 2mm off the metal balls as shown in the figure at right, and AC1250V(r.m.s.) <50/60Hz> is applied for 1 to 5 sec. between capacitor lead wires and metal balls. (Charge/Discharge current≦50mA)		
5	Insulation Resistance (I.R.)	Between Lead Wires	10000MΩ min.	The insulation resistance should be measured with DC500±50V within 60±5 sec. of charging.		
6	Capacitance		Within specified tolerance	The capacitance should be measured at 20°C with 1±0.2kHz and AC5V(r.m.s.) max.		
7	Dissipation Factor	· (D.F.)	0.3% max.	The dissipation factor should be measured at 20°C with 1±0.2kHz and AC5V(r.m.s.) max.		
	Temperature Characteristics		Within +20/-30% (Temp. range: -25 to +125°C)	The capacitance measurement should be made at each step specified in Table.		
8			Pre-treatment: Capacitor should be stored room condition* for 24±2 hr Step 1 Temp. (°C) 20±2	·		
9	Strength of Lead	Pull	Lead wire should not be cut off. Capacitor should not be broken.	As shown in the figure at right, fix the body of the capacitor and apply a tensile weight gradually to each lead wire in the radial direction of the capacitor up to 10N and keep it for 10±1 sec.		
		Bending		Each lead wire should be subjected to 5N of weight and bent 90° at the point of egress, in one direction, then returned to its original position and bent 90° in the opposite direction at the rate of one bend in 2 to 3 sec.		
		Appearance	No marked defect	The capacitor should be firmly soldered to the supporting lead wire and vibrated at a frequency range of 10 to 55Hz, 1.5mm in		
10	Vibration Resistance	Capacitance	Within specified tolerance	total amplitude, with about a 1 minute rate of vibration change		
	Resistance	D.F.	0.3% max.	from 10Hz to 55Hz and back to 10Hz. Apply for a total of 6 hrs., 2 hrs. each in 3 mutually perpendicular directions.		
11	Solderability of Leads		Lead wire should be soldered with uniform coating on the axial direction over 3/4 of the circumferential direction.	The lead wire of a capacitor should be dipped into a ethanol solution of 25wt% rosin and then into molten solder for 2±0.5 sec. In both cases the depth of dipping is up to about 1.5 to 2mm from the root of lead wires. Temp. of solder: Lead Free Solder (Sn-3Ag-0.5Cu) 245±5°C H63 Eutectic Solder 235±5°C		
		Appearance Capacitance	No marked defect	The lead wire should be immersed into the melted solder of 350±10°C up to about 1.5 to 2mm from the main body for		
	Soldering Effect	Change	Within ±10%	3.5±0.5 sec. Pre-treatment:		
12	Soldering Effect (Non-Preheat)	~	(Non-Preheat)	Dielectric Strength (Between Lead Wires)	Per item 4.	Capacitor should be stored at 125±3°C for 1 hr., then placed at room condition* for 24±2 hrs. before initial measurements. Post-treatment: Capacitor should be stored for 24±2 hrs. at room condition*.

^{* &}quot;room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa

Continued on the following page. $\hfill \hfill \h$





DES Series Specifications and Test Methods

Continued from the preceding page.

No.		Item	Specifications	Test Method			
		Appearance	No marked defect	First the capacitor should be			
		Capacitance Change	Within ±10%	stored at 120+0/-5°C for 60+0/-5 sec. Then, as in figure, the lead wires Thermal Screen 1.5 1.5 1.5			
13	Soldering Effect (On-Preheat)	Dielectric Strength (Between Lead Wires)	Per item 4.	should be immersed in solder of 260+0/-5°C up to 1.5 to 2.0mm from the root of terminal for 7.5+0/-1 sec. Pre-treatment: Capacitor should be stored at 125±3°C for 1 hr., then placed at room condition* for 24±2 hrs. before initial measurements. Post-treatment: Capacitor should be stored for 24±2 hrs. at room condition*.			
		Appearance	No marked defect	The capacitor should be subjected to 5 temperature cycles.			
		Capacitance Change	Within ±10%	<temperature cycle=""> Step Temperature (°C) Time (min) 1</temperature>			
		D.F.	0.4% max.	2 Room Temp. 3			
14	Temperature Cycle	I.R.	1000MΩ min.	3 125±3 30 4 Room Temp. 3			
		Dielectric Strength (Between Lead Wires)	Per item 4.	Cycle time: 5 cycle Pre-treatment: Capacitor should be stored at 125±3°C for 1 hr., then place at room condition* for 24±2 hrs. before initial measurement: Post-treatment: Capacitor should be stored for 24±2 hrs. at room condition*			
		Appearance	No marked defect	Set the capacitor for 500+24/-0 hrs. at 40±2°C in 90 to 95%			
15	Humidity (Under	Capacitance Change	Within ±10%	relative humidity. Pre-treatment: Capacitor should be stored at 125±3°C for 1 hr., then placed			
	Steady State)	D.F.	0.4% max.	at room condition* for 24±2 hrs. before initial measurements.			
		I.R.	1000MΩ min.	Post-treatment: Capacitor should be stored for 1 to 2 hrs. at room condition*.			
		Appearance	No marked defect	Apply the rated voltage for 500+24/-0 hrs. at 40±2°C in 90 to 95% relative humidity. (Charge/Discharge current≦50mA)			
16	Humidity	Capacitance Change	Within ±10%	Pre-treatment: Capacitor should be stored at 125±3°C for 1 hr., then placed			
	Loading	D.F.	0.6% max.	at room condition* for 24±2 hrs. before initial measurements.			
		I.R.	1000MΩ min.	Post-treatment: Capacitor should be stored for 1 to 2 hrs. at room condition*.			
		Appearance	No marked defect	Apply a DC voltage of 200% of the rated voltage (DC500V) or			
		Capacitance Change	Within ±10%	DC voltage of 150% of the rated voltage (DC1kV) for 1000 +48/-0 hrs. at 125±2°C with a relative humidity of 50% max. (Charge/Discharge current≦50mA)			
17	Life	D.F.	0.4% max.	Pre-treatment:			
		I.R. perature: 15 to 35°C. Re	2000MΩ min.	Capacitor should be stored at 125±3°C for 1 hr., then placed at room condition* for 24±2 hrs. before initial measurements. Post-treatment: Capacitor should be stored at 125±3°C for 1 hr., then placed at room condition* for 24±2 hrs.			

room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa

Safety Certified Ceramic Capacitors/High Voltage Ceramic Capacitors



DEH Series (125 deg. C Guaranteed/Low-dissipation Factor/DC250V-3.15kV)

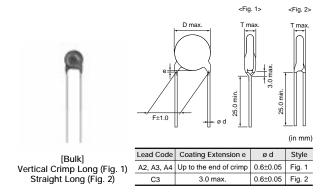
■ Features

- 1. Reduced heat dissipation permitted due to small dielectric loss of the ceramic material.
- 2. Operating temperature range is guaranteed up to 125 degrees C.
- 3. Coated with flame-retardant epoxy resin (equivalent to UL94V-0 standard).
- 4. Taping available for automatic insertion.

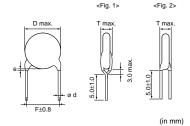
Applications

Ideal for use on high frequency pulse circuits such as a horizontal resonance circuit for CTV and snubber circuits for switching power supplies.

Do not use these products in any Automotive Power train or Safety equipment including Battery charger for Electric Vehicles and Plug-in Hybrid. Only Murata products clearly stipulated as "for Automotive use" on its catalog can be used for automobile applications such as Power train and Safety equipment.







[Bulk] Vertical Crimp Short (Fig. 1) Straight Short (Fig. 2)

Lead Code	Coating Extension e	ød	Style
B2, B3, B4	Up to the end of crimp	0.6±0.05	Fig. 1
D3	3.0 max.	0.6±0.05	Fig. 2

Marking

	Rated Voltage	DC250V	DC500V	DC1-3.15kV			
Nominal Body Diameter	Temp. Char.	R	С	R			
	ø6mm	HR 102 66	HR 471 66				
	ø7-9mm	HR R 332K 250V 66	HR C 152K 66	HR R 102K 1KV 66			
	ø10-21mm	HR R 103K 250V (M66	HR C 472K M66	HR R 272K 3KV (M66			
High Tempo	erature Guaranteed Code	HR	•				
Temper	rature Characteristics	Marked with code (omitted for nominal body diameter ø6mm)					
Non	ninal Capacitance	Marked with 3 figures					
Capa	acitance Tolerance	Marked with code (omitted for nominal body diameter ø6mm)					
Data d Valtaria	DC250V	Marked with code (Marked with horizontal line over nominal capacitance for nominal body diameter ø6mm)					
Rated Voltage	DC500V	Omitted					
DC1-3.15kV		Marked with code (In case of DC3.15kV, marked with 3KV)					
Manufa	cturer's Identification	Marked with ((omitted for nominal body diameter ø9mm and under)					
Manu	factured Date Code	Abbreviation					

DC250V, R Characteristics

Part Number	DC Rated Voltage (V)	Capacitance (pF)	Body Dia. D (mm)	Lead Spacing F (mm)	Body Thickness T (mm)	Lead Package Long Bulk	Lead Package Short Bulk	Lead Package Taping
DEHR32E221K□□□	250	220 ±10%	6	5.0	4.0	A2B	B2B	N2A
DEHR32E331K□□□	250	330 ±10%	6	5.0	4.0	A2B	B2B	N2A
DEHR32E471K□□□	250	470 ±10%	6	5.0	4.0	A2B	B2B	N2A
DEHR32E681K□□□	250	680 ±10%	6	5.0	4.0	A2B	B2B	N2A
DEHR32E102K□□□	250	1000 ±10%	6	5.0	4.0	A2B	B2B	N2A
DEHR32E152K□□□	250	1500 ±10%	7	5.0	4.0	A2B	B2B	N2A
DEHR32E222K□□□	250	2200 ±10%	8	5.0	4.0	A2B	B2B	N2A
DEHR32E332K□□□	250	3300 ±10%	9	5.0	4.0	A2B	B2B	N2A
DEHR32E472K□□□	250	4700 ±10%	10	5.0	4.0	A2B	B2B	N2A
DEHR32E682K□□□	250	6800 ±10%	12	5.0	4.0	A2B	B2B	N2A
DEHR32E103K□□□	250	10000 ±10%	12	5.0	4.0	A2B	B2B	N2A

Three blank columns are filled with the lead and packaging codes. Please refer to the three columns on the right for the appropriate code.

DC500V, C Characteristics

Part Number	DC Rated Voltage (V)	Capacitance (pF)	Body Dia. D (mm)	Lead Spacing F (mm)	Body Thickness T (mm)	Lead Package Long Bulk	Lead Package Short Bulk	Lead Package Taping
DEHC32H331K□□□	500	330 ±10%	6	5.0	4.0	A2B	B2B	N2A
DEHC32H471K□□□	500	470 ±10%	6	5.0	4.0	A2B	B2B	N2A
DEHC32H681K□□□	500	680 ±10%	7	5.0	4.0	A2B	B2B	N2A
DEHC32H102K□□□	500	1000 ±10%	8	5.0	4.0	A2B	B2B	N2A
DEHC32H152K□□□	500	1500 ±10%	9	5.0	4.0	A2B	B2B	N2A
DEHC32H222K□□□	500	2200 ±10%	10	5.0	4.0	A2B	B2B	N2A
DEHC32H332K□□□	500	3300 ±10%	12	5.0	4.0	A2B	B2B	N2A
DEHC32H472K□□□	500	4700 ±10%	14	10.0	4.0	A4B	B4B	-

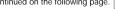
Three blank columns are filled with the lead and packaging codes. Please refer to the three columns on the right for the appropriate code.

DC1-3.15kV, R Characteristics

Part Number	DC Rated Voltage (V)	Capacitance (pF)	Body Dia. D (mm)	Lead Spacing F (mm)	Body Thickness T (mm)	Lead Package Long Bulk	Lead Package Short Bulk	Lead Package Taping
DEHR33A221K□□□	1000	220 ±10%	7	5.0	4.5	A2B	B2B	N2A
DEHR33A331K□□□	1000	330 ±10%	7	5.0	4.5	A2B	B2B	N2A
DEHR33A471K□□□	1000	470 ±10%	7	5.0	4.5	A2B	B2B	N2A
DEHR33A681K□□□	1000	680 ±10%	8	5.0	4.5	A2B	B2B	N2A
DEHR33A102K□□□	1000	1000 ±10%	9	5.0	4.5	A2B	B2B	N2A
DEHR33A152K□□□	1000	1500 ±10%	11	5.0	4.5	A2B	B2B	N2A
DEHR33A222K□□□	1000	2200 ±10%	13	7.5	4.5	A3B	B3B	N3A
DEHR33A332K□□□	1000	3300 ±10%	15	7.5	4.5	A3B	B3B	N7A
DEHR33A472K□□□	1000	4700 ±10%	17	7.5	4.5	A3B	B3B	N7A
DEHR33D221K□□□	2000	220 ±10%	7	7.5	5.0	C3B	D3B	P3A
DEHR33D271K□□□	2000	270 ±10%	7	7.5	5.0	C3B	D3B	P3A
DEHR33D331K□□□	2000	330 ±10%	8	7.5	5.0	A3B	B3B	N3A
DEHR33D391K□□□	2000	390 ±10%	8	7.5	5.0	A3B	B3B	N3A
DEHR33D471K□□□	2000	470 ±10%	9	7.5	5.0	A3B	B3B	N3A
DEHR33D561K□□□	2000	560 ±10%	9	7.5	5.0	A3B	B3B	N3A
DEHR33D681K□□□	2000	680 ±10%	10	7.5	5.0	A3B	B3B	N3A
DEHR33D821K□□□	2000	820 ±10%	11	7.5	5.0	A3B	B3B	N3A
DEHR33D102K□□□	2000	1000 ±10%	12	7.5	5.0	A3B	B3B	N3A
DEHR33D122K□□□	2000	1200 ±10%	12	7.5	5.0	A3B	B3B	N3A
DEHR33D152K□□□	2000	1500 ±10%	12	7.5	5.0	A3B	B3B	N3A
DEHR33D182K□□□	2000	1800 ±10%	14	7.5	5.0	A3B	B3B	N7A

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Part Number	DC Rated Voltage (V)	Capacitance (pF)	Body Dia. D (mm)	Lead Spacing F (mm)	Body Thickness T (mm)	Lead Package Long Bulk	Lead Package Short Bulk	Lead Package Taping
DEHR33D222K□□□	2000	2200 ±10%	15	7.5	5.0	A3B	B3B	N7A
DEHR33D272K□□□	2000	2700 ±10%	17	7.5	5.0	A3B	B3B	N7A
DEHR33D332K□□□	2000	3300 ±10%	19	10.0	5.0	A4B	B4B	-
DEHR33D392K□□□	2000	3900 ±10%	20	10.0	5.0	A4B	B4B	-
DEHR33D472K□□□	2000	4700 ±10%	21	10.0	5.0	A4B	B4B	-
DEHR33F151K□□□	3150	150 ±10%	7	7.5	6.0	C3B	D3B	P3A
DEHR33F181K□□□	3150	180 ±10%	7	7.5	6.0	C3B	D3B	P3A
DEHR33F221K□□□	3150	220 ±10%	7	7.5	6.0	C3B	D3B	P3A
DEHR33F271K□□□	3150	270 ±10%	7	7.5	6.0	C3B	D3B	P3A
DEHR33F331K□□□	3150	330 ±10%	8	7.5	6.0	A3B	B3B	N3A
DEHR33F391K□□□	3150	390 ±10%	9	7.5	6.0	A3B	B3B	N3A
DEHR33F471K□□□	3150	470 ±10%	10	7.5	6.0	A3B	B3B	N3A
DEHR33F561K□□□	3150	560 ±10%	10	7.5	6.0	A3B	B3B	N3A
DEHR33F681K□□□	3150	680 ±10%	11	7.5	6.0	A3B	B3B	N3A
DEHR33F821K□□□	3150	820 ±10%	12	7.5	6.0	A3B	B3B	N3A
DEHR33F102K□□□	3150	1000 ±10%	13	7.5	6.0	A3B	B3B	N3A
DEHR33F122K□□□	3150	1200 ±10%	14	7.5	6.0	A3B	B3B	N7A
DEHR33F152K□□□	3150	1500 ±10%	15	7.5	6.0	A3B	B3B	N7A
DEHR33F182K□□□	3150	1800 ±10%	16	7.5	6.0	A3B	B3B	N7A
DEHR33F222K□□□	3150	2200 ±10%	17	7.5	6.0	A3B	B3B	N7A
DEHR33F272K□□□	3150	2700 ±10%	19	10.0	6.0	A4B	B4B	-

Three blank columns are filled with the lead and packaging codes. Please refer to the three columns on the right for the appropriate code.

DEH Series Specifications and Test Methods

No.		Item	Specifications	Test Method		
1	Operating Temper	rature Range	-25 to +125°C			
2	Appearance and D	Dimensions	No marked defect on appearance form and dimensions are within specified range.	The capacitor should be visually inspected for evidence of defect. Dimensions should be measured with slide calipers.		
3	Marking		To be easily legible	The capacitor should be visually inspected.		
		Between Lead Wires	No failure	The capacitor should not be damaged when DC voltage of 200% of the rated voltage (DC1 to 3.15kV) or DC voltage of 250% of the rated voltage (DC250V, DC500V) is applied between the lead wires for 1 to 5 sec. (Charge/Discharge current≦50mA)		
4	Dielectric Strength	Body Insulation	No failure	The capacitor is placed in the container with metal balls of diameter 1mm so that each lead wire, short circuited, is kept about 2mm off the metal balls as shown in the figure at right, and AC1250V(r.m.s.) <50/60Hz> is applied for 1 to 5 sec. between capacitor lead wires and metal balls. (Charge/Discharge current≦50mA)		
5	Insulation Resistance (I.R.)	Between Lead Wires	Char. R [DC1 to 3.15kV], Char. C : 10000MΩ min. Char. R [DC250V]: 1000MΩ min.	The insulation resistance should be measured with DC500±50V (Char. R [DC 250V]: DC100±15V) within 60±5 sec. of charging.		
6	Capacitance		Within specified tolerance	The capacitance should be measured at 20°C with 1±0.2kHz and AC5V(r.m.s.) max.		
7	Dissipation Factor	(D.F.)	Char. R [DC250V]: 0.4% max. Char. R [DC1 to 3.15kV]: 0.2% max. Char. C: 0.3% max.	The dissipation factor should be measured at 20°C with 1±0.2kHz and AC5V(r.m.s.) max.		
8	Temperature Char	acteristics	T. C. Temp. Char. -25 to +85°C +85 to +125°C R Within ±15% C Within ±20% Within +15/-30% Pre-treatment: Capacitor should be stored room condition*¹ for 24±2 to 5tep 1 Temp. (°C) 20±2	The capacitance measurement should be made at each step specified in Table. I at 125±3°C for 1 hr., then placed at hrs. before measurements. 2		
9	Strength of Lead	Pull	Lead wire should not be cut off. Capacitor should not be broken.	As shown in the figure at right, fix the body of the capacitor and apply a tensile weight gradually to each lead wire in the radial direction of the capacitor up to 10N (5N for lead diameter 0.5mm), and keep it for 10±1 sec. Each lead wire should be subjected to 5N (2.5N for lead diameter 0.5mm) of weight and bent 90° at the point of egress, in one direction, then returned to its original position and bent		
				90° in the opposite direction at the rate of one bend in 2 to 3 sec.		
		Appearance	No marked defect	The capacitor should be firmly soldered to the supporting lead		
10	Vibration	Capacitance	Within specified tolerance	wire and vibrated at a frequency range of 10 to 55Hz, 1.5mm in		
10	Resistance	D.F.	Char. R [DC250V]: 0.4% max. Char. R [DC1 to 3.15kV]: 0.2% max. Char. C: 0.3% max.	total amplitude, with about a 1 minute rate of vibration change from 10Hz to 55Hz and back to 10Hz. Apply for a total of 6 hrs., 2 hrs. each in 3 mutually perpendicular directions.		
11	11 Solderability of Leads		Lead wire should be soldered with uniform coating on the axial direction over 3/4 of the circumferential direction.	The lead wire of a capacitor should be dipped into a ethanol solution of 25wt% rosin and then into molten solder for 2±0.5 sec. In both cases the depth of dipping is up to about 1.5 to 2mm from the root of lead wires. Temp. of solder: Lead Free Solder (Sn-3Ag-0.5Cu) 245±5°C H63 Eutectic Solder 235±5°C		

^{*1 &}quot;room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa



DEH Series Specifications and Test Methods

Continued from the preceding page.

No.		Item	Specifications	Test Method		
		Appearance	No marked defect	The lead wire should be immersed into the melted solder of		
		Capacitance Change	Within ±10%	350±10°C up to about 1.5 to 2mm from the main body for 3.5±0.5 sec. Pre-treatment:		
12	Soldering Effect (Non-Preheat)	Dielectric Strength (Between Lead Wires)	Per item 4.	Capacitor should be stored at 125±3°C for 1 hr., then place at room condition*¹ for 24±2 hrs. before initial measurement Post-treatment: Capacitor should be stored for 24±2 hrs. at room condition* Measurement order: Dielectric strength -> Pre-treatment -> Capacitance -> Soldering effect test -> Post-treatment -> Capacitance · Dielectric strength (Char. R [DC250V])		
		Appearance	No marked defect	First the capacitor should be		
		Capacitance Change	Within ±10%	stored at 120+0/-5°C for 60+0/-5 sec. Them, as in figure, the lead wires Themal Screen 1.5 to 2.0mm		
13	Soldering Effect (On-Preheat)	Dielectric Strength (Between Lead Wires)	Per item 4.	should be immersed in solder of 260+0/-5°C up to 1.5 to 2.0mm from the root of terminal for 7.5+0/-1 sec. Pre-treatment: Capacitor should be stored at 125±3°C for 1 hr., then placed at room condition*1 for 24±2 hrs. before initial measurements. Post-treatment: Capacitor should be stored for 24±2 hrs. at room condition*1. Measurement order: Dielectric strength -> Pre-treatment -> Capacitance -> Soldering effect test -> Post-treatment -> Capacitance · Dielectric strength (Char. R [DC250V])		
		Appearance	No marked defect	The capacitor should be subjected to 5 temperature cycles.		
		Capacitance Change	Within ±10%	<temperature cycle=""> Step Temperature (°C) Time (min) 1 -25±3 30</temperature>		
		D.F.	0.4% max.	2 Room Temp. 3		
		I.R.	1000MΩ min.	3 125±3 30 4 Room Temp. 3		
14	Temperature Cycle	Dielectric Strength (Between Lead Wires)	Per item 4.	Cycle time: 5 cycle Pre-treatment: Capacitor should be stored at 125±3°C for 1 hr., then placed at room condition*¹ for 24±2 hrs. before initial measurements. Post-treatment: Capacitor should be stored for 24±2 hrs. at room condition*¹. Measurement order: I.R. • Dielectric strength -> Pre-treatment -> Capacitance • D.F> Temperature cycle test -> Post-treatment -> Capacitance • D.F. • I.R. • Dielectric strength (Char. R [DC250V])		
		Appearance	No marked defect	Set the capacitor for 500 +24/-0 hrs. at 40±2°C in 90 to 95%		
		Capacitance Change	Within ±10%	relative humidity. Pre-treatment: Capacitor should be stored at 125±3°C for 1 hr., then placed		
	Humidity (Under	D.F.	0.4% max.	at room condition*1 for 24±2 hrs. before initial measurements.		
15	Steady State)	I.R.	1000M Ω min.	Post-treatment: Capacitor should be stored for 1 to 2 hrs. at room condition*1. Measurement order: I.R> Pre-treatment -> Capacitance • D.F> Humidity test -> Post-treatment -> Capacitance • D.F. • I.R. (Char. R [DC250V])		

^{* &}quot;room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa





DEH Series Specifications and Test Methods

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	Continued from the pr						
No.		Item	Specifications	Test Method			
		Appearance	No marked defect	Apply the rated voltage for 500+24/-0 hrs. at 40±2°C in 90 to			
		Capacitance Change	Within ±10%	95% relative humidity. (Charge/Discharge current≦50mA) Pre-treatment: Capacitor should be stored at 125±3°C for 1 hr., then placed at			
		D.F.	0.6% max.	room condition*1 for 24±2 hrs. before initial measurements.			
16	Humidity Loading	I.R.	1000MΩ min.	Post-treatment: Capacitor should be stored for 1 to 2 hrs. at room condition*1. (Char. R [DC1 to 3.15kV], Char. C) Post-treatment: Capacitor should be stored at 125±3°C for 1 hr., then placed at room condition*1 for 24±2 hrs. (Char. R [DC250V]) Measurement order: I.R> Pre-treatment -> Capacitance • D.F> Humidity loading test -> I.R.*2 -> Post-treatment -> Capacitance • D.F. (Char. R [DC250V])			
		Appearance	No marked defect	Apply a DC voltage of 200% of the rated voltage (DC250V,			
		Capacitance Change	Within ±10%	DC500V) or DC voltage of 150% of the rated voltage (DC1 to 3.15kV) for 1000 +48/-0 hrs. at 125±2°C with a relative humidity of 50% max.			
		D.F.	0.4% max.	(Charge/Discharge current≦50mA)			
17	Life	I.R.	Char. R [DC1 to 3.15kV], Char. C $: 2000 M\Omega \text{ min.}$ Char. R [DC250V]: $1000 M\Omega \text{ min.}$	Pre-treatment: Capacitor should be stored at 125±3°C for 1 hr., then placed at room condition*¹ for 24±2 hrs. before initial measurements. Post-treatment: Capacitor should be stored at 125±3°C for 1 hr., then placed at room condition*¹ for 24±2 hrs. Measurement order: I.R> Pre-treatment -> Capacitance • D.F> Life test -> I.R.*³ -> Post-treatment -> Capacitance • D.F. (Char. R [DC250V])			

^{*1 &}quot;room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa

^{*2} The measurement of I.R. will be held in 1 to 2 hrs. after Humidity loading test.

^{*3} The measurement of I.R. will be held in 12 to 24 hrs. after Life test.

Safety Certified Ceramic Capacitors/High Voltage Ceramic Capacitors



DEA Series (125 deg. C Guaranteed/Class 1/DC1k-3.15kV)

■ Features

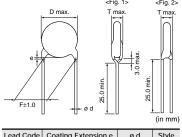
- 1. Temperature compensating type ceramics realize low heat dissipation than DEH/DES series.
- 2. Operating temperature range is guaranteed up to 125 degrees C.
- 3. Coated with flame-retardant epoxy resin (equivalent to UL94V-0 standard).
- 4. Taping available for automatic insertion.

■ Applications

- 1. Ideal for use as the ballast in back lighting inverters for liquid crystal display.
- 2. Ideal for use on high frequency pulse circuits such as a horizontal resonance circuit for CTV and snubber circuits for switching power supplies.

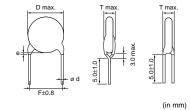
Do not use these products in any Automotive Power train or Safety equipment including Battery charger for Electric Vehicles and Plug-in Hybrid. Only Murata products clearly stipulated as "for Automotive use" on its catalog can be used for automobile applications such as Power train and Safety equipment.





Lead Code Coating Extension e Up to the end of crimp 0.6±0.05 Fig. 1 3.0 max 0.5±0.05 Fig. 2 3.0 max 0.6±0.05 Fig. 2 СЗ





[Bulk] D1, DD Vertical Crimp Short (Fig. 1) Straight Short (Fig. 2) D3

Lead Code | Coating Extension e ød Style 0.6±0.05 B2, B3 Up to the end of crimp Fig. 1 3.0 max 0.5±0.05 Fig. 2 3.0 max 0.6±0.05 Fig. 2

■ Marking

Temp. Char. Nominal Body Diameter	SL
ø4.5-5mm	68 1KV
ø6mm	39 3KV 66
ø7-9mm	181J 2KV 66
ø10-16mm	391J 3KV M 66
Nominal Capacitance	Under 100pF: Actual value, 100pF and over: Marked with 3 figures
Capacitance Tolerance	Marked with code (omitted for nominal body diameter ø6mm and under)
Rated Voltage	Marked with code (In case of DC3.15kV, marked with 3KV)
Manufacturer's Identification	Marked with (omitted for nominal body diameter ø9mm and under)
Manufactured Date Code	Abbreviation (omitted for nominal body diameter ø5mm and under)

SL Characteristics

Part Number	DC Rated Voltage (V)	Capacitance (pF)	Body Dia. D (mm)	Lead Spacing F (mm)	Body Thickness T (mm)	Lead Package Long Bulk	Lead Package Short Bulk	Lead Package Taping
DEA1X3A100J□□□	1000	10 ±5%	4.5	5.0	4.0	C1B	D1B	P2A
DEA1X3A120J□□□	1000	12 ±5%	4.5	5.0	4.0	C1B	D1B	P2A
DEA1X3A150J□□□	1000	15 ±5%	4.5	5.0	4.0	C1B	D1B	P2A
DEA1X3A180J□□□	1000	18 ±5%	4.5	5.0	4.0	C1B	D1B	P2A
DEA1X3A220J□□□	1000	22 ±5%	4.5	5.0	4.0	C1B	D1B	P2A
DEA1X3A270J□□□	1000	27 ±5%	4.5	5.0	4.0	C1B	D1B	P2A
DEA1X3A330J□□□	1000	33 ±5%	4.5	5.0	4.0	C1B	D1B	P2A
DEA1X3A390J□□□	1000	39 ±5%	4.5	5.0	4.0	C1B	D1B	P2A
DEA1X3A470J□□□	1000	47 ±5%	4.5	5.0	4.0	C1B	D1B	P2A
DEA1X3A560J□□□	1000	56 ±5%	5	5.0	4.0	C1B	D1B	P2A
DEA1X3A680J□□□	1000	68 ±5%	5	5.0	4.0	C1B	D1B	P2A
DEA1X3A820J□□□	1000	82 ±5%	6	5.0	4.0	A2B	B2B	N2A
DEA1X3A101J	1000	100 ±5%	6	5.0	4.0	A2B	B2B	N2A
DEA1X3A121J□□□	1000	120 ±5%	6	5.0	4.0	A2B	B2B	N2A
DEA1X3A151J	1000	150 ±5%	7	5.0	4.0	A2B	B2B	N2A
DEA1X3A181J	1000	180 ±5%	7	5.0	4.0	A2B	B2B	N2A
DEA1X3A221J	1000	220 ±5%	8	5.0	4.0	A2B	B2B	N2A
DEA1X3A271J	1000	270 ±5%	9	5.0	4.0	A2B	B2B	N2A
DEA1X3A331J	1000	330 ±5%	10	5.0	4.0	A2B	B2B	N2A
DEA1X3A391J	1000	390 ±5%	10	5.0	4.0	A2B A2B	B2B	N2A N2A
DEA1X3A471J	1000	470 ±5%	11	5.0	4.0	A2B	B2B	N2A
DEA1X3A561J	1000	560 ±5%	12	7.5	4.0	A3B	B3B	N3A
DEA1X3D100J	2000	10 ±5%	4.5	5.0	5.0	C1B	D1B	P2A
DEA1X3D120J	2000	10 ±5%	4.5	5.0	5.0	C1B	D1B	P2A
DEA1X3D150J	2000	15 ±5%	4.5	5.0	5.0	C1B	D1B D1B	P2A
DEA1X3D180J	2000	18 ±5%	4.5	5.0	5.0	C1B	D1B D1B	P2A
DEA1X3D220J	2000	22 ±5%	4.5	5.0	5.0	C1B	D1B	P2A P2A
		27 ±5%	4.5	5.0	5.0	C1B	D1B	P2A P2A
DEA1X3D270J	2000				+			
DEA1X3D330J	2000	33 ±5%	4.5	5.0	5.0	C1B	D1B	P2A
DEA1X3D390J	2000	39 ±5%	5	5.0	5.0	C1B	D1B	P2A
DEA1X3D470J	2000	47 ±5%	6	5.0	5.0	A2B	B2B	N2A
DEA1X3D560J	2000	56 ±5%	6	5.0	5.0	A2B	B2B	N2A
DEA1X3D680J	2000	68 ±5%	6	5.0	5.0	A2B	B2B	N2A
DEA1X3D820J	2000	82 ±5%	7	5.0	5.0	A2B	B2B	N2A
DEA1X3D101J	2000	100 ±5%	7	5.0	5.0	A2B	B2B	N2A
DEA1X3D121J	2000	120 ±5%	8	5.0	5.0	A2B	B2B	N2A
DEA1X3D151J	2000	150 ±5%	8	5.0	5.0	A2B	B2B	N2A
DEA1X3D181J	2000	180 ±5%	9	5.0	5.0	A2B	B2B	N2A
DEA1X3D221J	2000	220 ±5%	10	5.0	5.0	A2B	B2B	N2A
DEA1X3D271J	2000	270 ±5%	11	5.0	5.0	A2B	B2B	N2A
DEA1X3D331J	2000	330 ±5%	12	7.5	5.0	A3B	B3B	N3A
DEA1X3D391J	2000	390 ±5%	13	7.5	5.0	A3B	B3B	N3A
DEA1X3D471J	2000	470 ±5%	14	7.5	5.0	A3B	B3B	N7A
DEA1X3D561J□□□	2000	560 ±5%	15	7.5	5.0	A3B	B3B	N7A
DEA1X3F100J□□□	3150	10 ±5%	5	7.5	6.0	CDB	DDB	P3A
DEA1X3F120J□□□	3150	12 ±5%	5	7.5	6.0	CDB	DDB	P3A
DEA1X3F150J□□□	3150	15 ±5%	5	7.5	6.0	CDB	DDB	P3A
DEA1X3F180J□□□	3150	18 ±5%	5	7.5	6.0	CDB	DDB	P3A
DEA1X3F220J□□□	3150	22 ±5%	5	7.5	6.0	CDB	DDB	P3A
DEA1X3F270J□□□	3150	27 ±5%	6	7.5	6.0	C3B	D3B	P3A
DEA1X3F330J□□□	3150	33 ±5%	6	7.5	6.0	C3B	D3B	P3A
DEA1X3F390J□□□	3150	39 ±5%	6	7.5	6.0	C3B	D3B	P3A
DEA1X3F470J□□□	3150	47 ±5%	7	7.5	6.0	C3B	D3B	P3A
DEA1X3F560J□□□	3150	56 ±5%	7	7.5	6.0	C3B	D3B	P3A

Continued from the preceding page.

Part Number	DC Rated Voltage (V)	Capacitance (pF)	Body Dia. D (mm)	Lead Spacing F (mm)	Body Thickness T (mm)	Lead Package Long Bulk	Lead Package Short Bulk	Lead Package Taping
DEA1X3F680J□□□	3150	68 ±5%	8	7.5	6.0	A3B	B3B	N3A
DEA1X3F820J□□□	3150	82 ±5%	8	7.5	6.0	A3B	B3B	N3A
DEA1X3F101J□□□	3150	100 ±5%	9	7.5	6.0	A3B	B3B	N3A
DEA1X3F121J□□□	3150	120 ±5%	10	7.5	6.0	A3B	B3B	N3A
DEA1X3F151J□□□	3150	150 ±5%	11	7.5	6.0	A3B	B3B	N3A
DEA1X3F181J□□□	3150	180 ±5%	11	7.5	6.0	A3B	B3B	N3A
DEA1X3F221J□□□	3150	220 ±5%	12	7.5	6.0	A3B	B3B	N3A
DEA1X3F271J□□□	3150	270 ±5%	14	7.5	6.0	A3B	B3B	N7A
DEA1X3F331J□□□	3150	330 ±5%	15	7.5	6.0	A3B	B3B	N7A
DEA1X3F391J□□□	3150	390 ±5%	16	7.5	6.0	A3B	B3B	N7A

Three blank columns are filled with the lead and packaging codes. Please refer to the three columns on the right for the appropriate code.

No.	1	tem	Specifications	Test Method		
1	Operating Temper	ature Range	-25 to +125°C			
2	Appearance and D	Dimensions	No marked defect on appearance form and dimensions are within specified range.	The capacitor should be visually inspected for evidence of defect. Dimensions should be measured with slide calipers.		
3	Marking		To be easily legible	The capacitor should be visually inspected.		
		Between Lead Wires	No failure	The capacitor should not be damaged when DC voltage of 200% of the rated voltage is applied between the lead wires for 1 to 5 sec. (Charge/Discharge current≦50mA)		
4	Dielectric Strength	Body Insulation	No failure	The capacitor is placed in the container with metal balls of diameter 1mm so that each lead wire, short circuited, is kept about 2mm off the metal balls as shown in the figure at right, and AC1250V(r.m.s.) <50/60Hz> is applied for 1 to 5 sec. between capacitor lead wires and metal balls. (Charge/Discharge current≦50mA)		
5	Insulation Resistance (I.R.)	Between Lead Wires	10000MΩ min.	The insulation resistance should be measured with DC500±50V within 60±5 sec. of charging.		
6	Capacitance		Within specified tolerance	The capacitance should be measured at 20°C with 1±0.2MHz and AC5V(r.m.s.) max.		
7	Q		400+20C*2min. (30pF under) 1000 min. (30pF min.)	The Q should be measured at 20°C with 1±0.2MHz and AC5V(r.m.s.) max.		
			+350 to -1000ppm/°C (Temp. range: +20 to +85°C)	The capacitance measurement should be made at each step specified in Table.		
8	Temperature Char	acteristics	Step 1 Temp. (°C) 20±2	2 3 4 5 -25±3 20±2 85±2 20±2		
9	Strength of Lead	Pull	Lead wire should not be cut off.	As shown in the figure at right, fix the body of the capacitor and apply a tensile weight gradually to each lead wire in the radial direction of the capacitor up to 10N (5N for lead diameter 0.5mm), and keep it for 10±1 sec.		
	Š	Bending	- Capacitor should not be broken.	Each lead wire should be subjected to 5N (2.5N for lead diameter 0.5mm) of weight and bent 90° at the point of egress, in one direction, then returned to its original position and bent 90° in the opposite direction at the rate of one bend in 2 to 3 sec.		
		Appearance	No marked defect	The capacitor should be firmly soldered to the supporting lead		
10	Vibration	Capacitance	Within specified tolerance	wire and vibrated at a frequency range of 10 to 55Hz, 1.5mm in total amplitude, with about a 1 minute rate of vibration change		
	Resistance	Q	400+20C*2min. (30pF under) 1000 min. (30pF min.)	from 10Hz to 55Hz and back to 10Hz. Apply for a total of 6 hrs., 2 hrs. each in 3 mutually perpendicular directions.		
11	1 Solderability of Leads		Lead wire should be soldered with uniform coating on the axial direction over 3/4 of the circumferential direction.	The lead wire of a capacitor should be dipped into a ethanol solution of 25wt% rosin and then into molten solder for 2±0.5 sec. In both cases the depth of dipping is up to about 1.5 to 2mm from the root of lead wires. Temp. of solder: Lead Free Solder (Sn-3Ag-0.5Cu) 245±5°C H63 Eutectic Solder 235±5°C		
		Appearance	No marked defect	The lead wire should be immersed into the melted solder of		
12	Soldering Effect	Capacitance Change	Within ±2.5%	350±10°C (Body of ø5mm and under: 270±5°C) up to about 1.5 to 2mm from the main body for 3.5±0.5 sec.		
,_	(Non-Preheat)	Dielectric Strength (Between Lead Wires)	Per item 4.	(Body of ø5mm and under: 5±0.5 sec.) Post-treatment: Capacitor should be stored for 1 to 2 hrs. at room condition*1.		

muRata



^{*1 &}quot;room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa

 $^{^{\}star_2}$ "C" expresses nominal capacitance value (pF).

DEA Series Specifications and Test Methods

Continued from the preceding page.

No.		Item	Specifications	Test Method			
		Appearance Capacitance Change	No marked defect Within ±2.5%	First the capacitor should be stored at 120+0/-5°C for 60+0/-5 sec. Thermal Capacitor Screen 1.5			
13	Soldering Effect (On-Preheat)	Dielectric Strength (Between Lead Wires)	Per item 4.	Then, as in figure, the lead wires should be immersed in solder of 260+0/-5°C up to 1.5 to 2.0mm from the root of terminal for 7.5+0/-1 sec. Post-treatment: Capacitor should be stored for 1 to 2 hrs. at room condition*			
		Appearance	No marked defect	The capacitor should be subjected to 5 temperature cycles.			
		Capacitance Change	Within ±5%	<temperature cycle=""> Step Temperature (°C) Time (min)</temperature>			
14	Temperature Cycle	Q	275+5/2C*2min. (30pF under) 350 min. (30pF min.)	1 -25±3 30 2 Room Temp. 3 3 125±3 30			
		I.R.	1000MΩ min.	4 Room Temp. 3			
		Dielectric Strength (Between Lead Wires)	Per item 4.	Cycle time: 5 cycle Post-treatment: Capacitor should be stored for 1 to 2 hrs. at room condition*1.			
		Appearance	No marked defect				
15	Humidity (Under	Capacitance Change	Within ±5%	Set the capacitor for 500+24/-0 hrs. at 40±2°C in 90 to 95% relative humidity.			
15	Steady State)	Q	275+5/2C*2min. (30pF under) 350 min. (30pF min.)	Post-treatment: Capacitor should be stored for 1 to 2 hrs. at room condition*1.			
		I.R.	1000MΩ min.				
		Appearance	No marked defect				
16	Humidity	Capacitance Change	Within ±5%	Apply the rated voltage for 500+24/-0 hrs. at 40±2°C in 90 to 95% relative humidity. (Charge/Discharge current≦50mA)			
10	Loading	Q	275+5/2C*2min. (30pF under) 350 min. (30pF min.)	Post-treatment: Capacitor should be stored for 1 to 2 hrs. at room condition*¹.			
		I.R.	1000MΩ min.				
		Appearance	No marked defect				
17	Life	Capacitance Change	Within ±3%	Apply a DC voltage of 150% of the rated voltage for 1000+48/-0 hrs. at 125±2°C with a relative humidity of 50% max. (Charge/Discharge current≦50mA)			
17	Liie	Q	275+5/2C*2min. (30pF under) 350 min. (30pF min.)	Post-treatment: Capacitor should be stored for 1 to 2 hrs. at room condition*1.			
		I.R.	2000MΩ min.				

^{*1 &}quot;room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa

 $^{^{\}star_2}$ "C" expresses nominal capacitance value (pF).

Safety Certified Ceramic Capacitors/High Voltage Ceramic Capacitors



DEB Series (Class 2/DC1k-3.15kV)

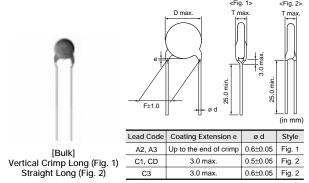
■ Features

- 1. Small size and high capacitance
- 2. Coated with flame-retardant epoxy resin (equivalent to UL94V-0 standard).
- 3. Taping available for automatic insertion.

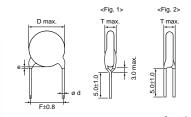
■ Applications

Ideal for use on decoupling circuits for power supplies.

Do not use these products in any Automotive Power train or Safety equipment including Battery charger for Electric Vehicles and Plug-in Hybrid. Only Murata products clearly stipulated as "for Automotive use" on its catalog can be used for automobile applications such as Power train and Safety equipment.







Lead Code | Coating Extension e Style B2, B3 0.6±0.05 Up to the end of crimp Fig. 1 D1, DD 3.0 max 0.5±0.05 Fig. 2

0.6±0.05

Fig. 2

3.0 max

D3

[Bulk] Vertical Crimp Short (Fig. 1) Straight Short (Fig. 2)

Marking

Temp. Char. Nominal Body Diameter	В	Е	F		
ø4.5-5mm	(221 3KV)	102 1KV	102 2KV		
ø6mm	331 3KV 66	102 2KV 66	222 1KV 66		
ø7-9mm	102K 3KV 66	102Z 3KV 66	472Z 2KV 66		
ø10-16mm	B 332K 3KV (M 66	E 472Z 3KV (M 66	103Z 2KV (M 66		
Temperature Characteristics	Marked with code for char. B a	nd E (omitted for nominal body di	ameter ø9mm and under)		
Nominal Capacitance	Marked with 3 figures				
Capacitance Tolerance	Marked with code (omitted for nominal body diameter ø6mm and under)				
Rated Voltage	Marked with code (In case of DC3.15kV, marked with 3KV)				
Manufacturer's Identification	Marked with ((omitted for nominal body diameter ø9mm and under)				
Manufactured Date Code	Abbreviation (omitted for nominal body diameter ø5mm and under)				

B Characteristics

Part Number	DC Rated Voltage (V)	Capacitance (pF)	Body Dia. D (mm)	Lead Spacing F (mm)	Body Thickness T (mm)	Lead Package Long Bulk	Lead Package Short Bulk	Lead Package Taping
DEBB33A101K□□□	1000	100 ±10%	4.5	5.0	4.0	C1B	D1B	P2A
DEBB33A151K□□□	1000	150 ±10%	4.5	5.0	4.0	C1B	D1B	P2A
DEBB33A221K□□□	1000	220 ±10%	4.5	5.0	4.0	C1B	D1B	P2A
DEBB33A331K□□□	1000	330 ±10%	4.5	5.0	4.0	C1B	D1B	P2A
DEBB33A471K□□□	1000	470 ±10%	5	5.0	4.0	C1B	D1B	P2A
DEBB33A681K□□□	1000	680 ±10%	6	5.0	4.0	A2B	B2B	N2A
DEBB33A102K□□□	1000	1000 ±10%	6	5.0	4.0	A2B	B2B	N2A
DEBB33A152K□□□	1000	1500 ±10%	8	5.0	4.0	A2B	B2B	N2A
DEBB33A222K□□□	1000	2200 ±10%	9	5.0	4.0	A2B	B2B	N2A
DEBB33A332K□□□	1000	3300 ±10%	10	5.0	4.0	A2B	B2B	N2A
DEBB33A472K□□□	1000	4700 ±10%	12	7.5	4.0	A3B	B3B	N3A
DEBB33A682K□□□	1000	6800 ±10%	15	7.5	4.0	A3B	B3B	N7A
DEBB33D101K□□□	2000	100 ±10%	4.5	5.0	5.0	C1B	D1B	P2A
DEBB33D151K□□□	2000	150 ±10%	4.5	5.0	5.0	C1B	D1B	P2A
DEBB33D221K□□□	2000	220 ±10%	4.5	5.0	5.0	C1B	D1B	P2A
DEBB33D331K□□□	2000	330 ±10%	5	5.0	5.0	C1B	D1B	P2A
DEBB33D471K□□□	2000	470 ±10%	6	5.0	5.0	A2B	B2B	N2A
DEBB33D681K□□□	2000	680 ±10%	7	5.0	5.0	A2B	B2B	N2A
DEBB33D102K□□□	2000	1000 ±10%	8	5.0	5.0	A2B	B2B	N2A
DEBB33D152K□□□	2000	1500 ±10%	9	5.0	5.0	A2B	B2B	N2A
DEBB33D222K□□□	2000	2200 ±10%	10	5.0	5.0	A2B	B2B	N2A
DEBB33D332K□□□	2000	3300 ±10%	12	7.5	5.0	A3B	B3B	N3A
DEBB33D472K□□□	2000	4700 ±10%	15	7.5	5.0	A3B	B3B	N7A
DEBB33F101K□□□	3150	100 ±10%	5	7.5	6.0	CDB	DDB	P3A
DEBB33F151K□□□	3150	150 ±10%	5	7.5	6.0	CDB	DDB	P3A
DEBB33F221K□□□	3150	220 ±10%	5	7.5	6.0	CDB	DDB	P3A
DEBB33F331K□□□	3150	330 ±10%	6	7.5	6.0	C3B	D3B	P3A
DEBB33F471K□□□	3150	470 ±10%	7	7.5	6.0	C3B	D3B	P3A
DEBB33F681K□□□	3150	680 ±10%	8	7.5	6.0	A3B	B3B	N3A
DEBB33F102K□□□	3150	1000 ±10%	9	7.5	6.0	A3B	B3B	N3A
DEBB33F152K□□□	3150	1500 ±10%	11	7.5	6.0	A3B	B3B	N3A
DEBB33F222K□□□	3150	2200 ±10%	13	7.5	6.0	A3B	B3B	N3A
DEBB33F332K□□□	3150	3300 ±10%	15	7.5	6.0	A3B	B3B	N7A

Three blank columns are filled with the lead and packaging codes. Please refer to the three columns on the right for the appropriate code.

E Characteristics

Part Number	DC Rated Voltage (V)	Capacitance (pF)	Body Dia. D (mm)	Lead Spacing F (mm)	Body Thickness T (mm)	Lead Package Long Bulk	Lead Package Short Bulk	Lead Package Taping
DEBE33A102Z□□□	1000	1000 +80/-20%	5	5.0	4.0	C1B	D1B	P2A
DEBE33A222Z□□□	1000	2200 +80/-20%	7	5.0	4.0	A2B	B2B	N2A
DEBE33A472Z□□□	1000	4700 +80/-20%	9	5.0	4.0	A2B	B2B	N2A
DEBE33A103Z□□□	1000	10000 +80/-20%	13	7.5	4.0	A3B	B3B	N3A
DEBE33D102Z□□□	2000	1000 +80/-20%	6	5.0	5.0	A2B	B2B	N2A
DEBE33D222Z□□□	2000	2200 +80/-20%	8	5.0	5.0	A2B	B2B	N2A
DEBE33D472Z□□□	2000	4700 +80/-20%	11	5.0	5.0	A2B	B2B	N2A
DEBE33D103Z□□□	2000	10000 +80/-20%	16	7.5	5.0	A3B	B3B	N7A
DEBE33F102Z□□□	3150	1000 +80/-20%	7	7.5	6.0	C3B	D3B	P3A
DEBE33F222Z□□□	3150	2200 +80/-20%	10	7.5	6.0	A3B	B3B	N3A
DEBE33F472Z□□□	3150	4700 +80/-20%	13	7.5	6.0	A3B	B3B	N3A

Three blank columns are filled with the lead and packaging codes. Please refer to the three columns on the right for the appropriate code.



F Characteristics

Part Number	DC Rated Voltage (V)	Capacitance (pF)	Body Dia. D (mm)	Lead Spacing F (mm)	Body Thickness T (mm)	Lead Package Long Bulk	Lead Package Short Bulk	Lead Package Taping
DEBF33A222Z□□□	1000	2200 +80/-20%	6	5.0	4.0	A2B	B2B	N2A
DEBF33A472Z□□□	1000	4700 +80/-20%	7	5.0	4.0	A2B	B2B	N2A
DEBF33A103Z□□□	1000	10000 +80/-20%	10	5.0	4.0	A2B	B2B	N2A
DEBF33D102Z□□□	2000	1000 +80/-20%	5	5.0	5.0	C1B	D1B	P2A
DEBF33D222Z□□□	2000	2200 +80/-20%	7	5.0	5.0	A2B	B2B	N2A
DEBF33D472Z□□□	2000	4700 +80/-20%	9	5.0	5.0	A2B	B2B	N2A
DEBF33D103Z□□□	2000	10000 +80/-20%	12	7.5	5.0	A3B	B3B	N3A

Three blank columns are filled with the lead and packaging codes. Please refer to the three columns on the right for the appropriate code.

DEB Series Specifications and Test Methods

No.		Item	Specifications	Test Method	
1	Operating Temper	rature Range	-25 to +85°C		
2	Appearance and [Dimensions	No marked defect on appearance form and dimensions are within specified range.	The capacitor should be visually inspected for evidence of defect. Dimensions should be measured with slide calipers.	
3	Marking		To be easily legible	The capacitor should be visually inspected.	
		Between Lead Wires	No failure	The capacitor should not be damaged when DC voltage of 200% of the rated voltage is applied between the lead wires for 1 to 5 sec. (Charge/Discharge current≦50mA)	
4	Dielectric Strength	Body Insulation	No failure	The capacitor is placed in the container with metal balls of diameter 1mm so that each lead wire, short circuited, is kept about 2mm off the metal balls as shown in the figure at right, and DC voltage of 1.3kV is applied for 1 to 5 sec. between capacitor lead wires and metal balls. (Charge/Discharge current≦50mA)	
5	Insulation Resistance (I.R.)	Between Lead Wires	10000MΩ min.	The insulation resistance should be measured with DC500±50V within 60±5 sec. of charging.	
6	Capacitance		Within specified tolerance	The capacitance should be measured at 20°C with 1±0.2kHz and AC5V(r.m.s.) max.	
7	Dissipation Factor	(D.F.)	Char. B, E: 2.5% max. Char. F: 5.0% max.	The dissipation factor should be measured at 20°C with 1±0.2kHz and AC5V(r.m.s.) max.	
	Temperature Characteristics		Char. B: Within ±10% Char. E: Within +20/-55% Char. F: Within +30/-80%	The capacitance measurement should be made at each step specified in Table.	
8			Pre-treatment: Capacitor should be stored room condition* for 24±2 hl Step 1 Temp. (°C) 20±2	, ,	
9	Strength of Lead	Pull	Lead wire should not be cut off.	As shown in the figure at right, fix the body of the capacitor and apply a tensile weight gradually to each lead wire in the radial direction of the capacitor up to 10N (5N for lead diameter 0.5mm), and keep it for 10±1 sec.	
	J	Bending	 Capacitor should not be broken. 	Each lead wire should be subjected to 5N (2.5N for lead diameter 0.5mm) of weight and bent 90° at the point of egress, in one direction, then returned to its original position and bent 90° in the opposite direction at the rate of one bend in 2 to 3 sec.	
		Appearance	No marked defect	The capacitor should be firmly soldered to the supporting lead	
10	Vibration	Capacitance	Within specified tolerance	wire and vibrated at a frequency range of 10 to 55Hz, 1.5mm in total amplitude, with about a 1 minute rate of vibration change	
.0	Resistance	D.F.	Char. B, E: 2.5% max. Char. F: 5.0% max.	from 10Hz to 55Hz and back to 10Hz. Apply for a total of 6 hrs., 2 hrs. each in 3 mutually perpendicular directions.	
11	1 Solderability of Leads		Lead wire should be soldered with uniform coating on the axial direction over 3/4 of the circumferential direction.	The lead wire of a capacitor should be dipped into a ethanol solution of 25wt% rosin and then into molten solder for 2±0.5 sec. In both cases the depth of dipping is up to about 1.5 to 2mm from the root of lead wires. Temp. of solder: Lead Free Solder (Sn-3Ag-0.5Cu) 245±5°C H63 Eutectic Solder 235±5°C	
		Appearance	No marked defect	The lead wire should be immersed into the melted solder of	
12	Soldering Effect	Capacitance Change	Char. B: Within ±5% Char. E: Within ±15% Char. F: Within ±20%	 350±10°C (Body of ø5mm and under: 270±5°C) up to about 1.5 to 2mm from the main body for 3.5±0.5 sec. (Body of ø5mm and under: 5±0.5 sec.) Pre-treatment: Capacitor should be stored at 85±2°C for 1 hr., 	
	(Non-Preheat)	Dielectric Strength (Between Lead Wires)	Per item 4.	then placed at room condition* for 24±2 hrs. before initial measurements. Post-treatment: Capacitor should be stored for 4 to 24 hrs. at room condition*.	

^{* &}quot;room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa



DEB Series Specifications and Test Methods

Continued from the preceding page.

	Item Specifications		Test Method
	Appearance Capacitance Change	No marked defect Char. B: Within ±5% Char. E: Within ±15% Char. F: Within ±20%	First the capacitor should be stored at 120+0/-5°C for 60+0/-5 sec. Then, as in figure, the lead wires
Soldering Effect (On-Preheat)	Dielectric Strength (Between Lead Wires)	Per item 4.	should be immersed in solder of 260+0/-5°C up to 1.5 to 2.0mm from the root of terminal for 7.5+0/-1 sec. Pre-treatment: Capacitor should be stored at 85±2°C for 1 hr., then placed at room condition* for 24±2 hrs. before initial measurements. Post-treatment: Capacitor should be stored for 4 to 24 hrs. at room condition*.
	Appearance	No marked defect	The capacitor should be subjected to 5 temperature cycles,
	Capacitance Change	Char. B: Within ±10% Char. E: Within ±20% Char. F: Within ±30%	then consecutively to 2 immersion cycles. <temperature cycle=""> Step Temperature (°C) Time (min) 1 -25±3 30</temperature>
	D.F.	Char. B, E: 4.0% max. Char. F: 7.5% max.	2 Room Temp. 3 3 85±3 30
Tomporatura	I.R.	2000MΩ min.	4 Room Temp. 3 Cycle time: 5 cycle
Cycle	Dielectric Strength (Between Lead Wires)	Per item 4.	Step Temperature (°C) Time (min) Immersion Water 1 65+5/-0 15 Clean water 2 0±3 15 Salt water Cycle time: 2 cycle
	Appearance	No marked defect	Set the capacitor for 500+24/-0 hrs. at 40±2°C in 90 to 95%
Humidity (Under	Capacitance Change	Char. B: Within ±10% Char. E: Within ±20% Char. F: Within ±30%	relative humidity. Pre-treatment: Capacitor should be stored at 85±2°C for 1 hr., then placed at room condition* for 24±2 hrs.
Steady State)	D.F.	Char. B, E: 5.0% max. Char. F: 7.5% max.	before initial measurements. Post-treatment: Capacitor should be stored for 1 to 2 hrs. at room condition*.
	I.R.	1000MΩ min.	Toom sommen.
	Appearance	No marked defect	Apply the rated voltage for 500+24/-0 hrs. at 40±2°C in 90 to
Humidity	Capacitance Change	Char. B: Within ±10% Char. E: Within ±20% Char. F: Within ±30%	95% relative humidity. (Charge/Discharge current≦50mA) Pre-treatment: Capacitor should be stored at 85±2°C for 1 hr., then placed at room condition* for 24±2 hrs.
Loading	D.F.	Char. B, E: 5.0% max. Char. F: 7.5% max.	before initial measurements. Post-treatment: Capacitor should be stored at 85±2°C for 1 hr., then placed at room condition* for 24±2 hrs.
	I.R.	500M Ω min.	then placed at room condition for 2412 his.
	Appearance	No marked defect	Apply a DC voltage of 150% of the rated voltage for
Life	Capacitance Change Char. B: Within ±10% Char. E: Within ±20% Char. F: Within ±30%	1000+48/-0 hrs. at 85±2°C with a relative humidity of 50% ma (Charge/Discharge current≦50mA) Pre-treatment: Capacitor should be stored at 85±2°C for 1 hr.	
Life	Change	Char. F: Within ±30%	then placed at room condition* for 24±2 hrs.
	Soldering Effect (On-Preheat) Temperature and Immersion Cycle Humidity (Under Steady State)	Soldering Effect (On-Preheat) Dielectric Strength (Between Lead Wires) Appearance Capacitance Change D.F. I.R. I.R. Appearance Capacitance Change D.F. I.R. Appearance Capacitance Change Dielectric Strength (Between Lead Wires) Dielectric Strength (Between Lead Wires) Appearance Capacitance Change D.F. I.R. Appearance	Appearance No marked defect

^{* &}quot;room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa

Safety Certified Ceramic Capacitors/High Voltage Ceramic Capacitors



DEC Series (Class 1, 2/DC6.3kV)

■ Features

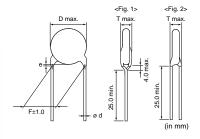
Coated with flame-retardant epoxy resin (equivalent to UL94V-0 standard).

■ Applications

- 1. Ideal for use as the ballast in back lighting inverters for liquid crystal displays (SL Char.).
- 2. Ideal for use on high voltage circuits such as Cockcroft circuits (B Char.).

Do not use these products in any Automotive Power train or Safety equipment including Battery charger for Electric Vehicles and Plug-in Hybrid. Only Murata products clearly stipulated as "for Automotive use" on its catalog can be used for automobile applications such as Power train and Safety equipment.





[Bulk] Vertical Crimp Long (Fig. 1) Straight Long (Fig. 2)

Lead Code	Coating Extension e	ød	Style
А3	Up to the end of crimp	0.6±0.05	Fig. 1
C4	3.0 max.	0.6±0.05	Fig. 2

■ Marking

- Marking				
Temp. Char. Nominal Body Diameter	SL	В	Е	
ø7mm	10J 6KV			
ø8-9mm	47J 6KV 66	331K 6KV 66		
ø10-15mm	151J 6KV (M 66	B 102K 6KV (M 66	222Z 6KV (M 66	
Temperature Characteristics	Marked with code for char. B (omitted for nominal body diameter ø9mm and under)			
Nominal Capacitance	Under 100pF: Actual value, 100pF and over: Marked with 3 figures			
Capacitance Tolerance	Marked with code			
Rated Voltage	Marked with code (In case of DC6.3kV, marked with 6KV)			
Manufacturer's Identification	Marked with (omitted for nominal body diameter ø9mm and under)			
Manufactured Date Code	Manufactured Date Code Abbreviation (omitted for nominal body diameter ø7mm)			

SL Characteristics

Part Number	DC Rated Voltage (V)	Capacitance (pF)	Body Dia. D (mm)	Lead Spacing F (mm)	Body Thickness T (mm)
DEC1X3J100JA3BMS1	6300	10 ±5%	7	7.5	7.0
DEC1X3J100JC4BMS1	6300	10 ±5%	7	10.0	7.0
DEC1X3J120JA3B	6300	12 ±5%	8	7.5	7.0
DEC1X3J120JC4B	6300	12 ±5%	8	10.0	7.0
DEC1X3J150JA3B	6300	15 ±5%	8	7.5	7.0
DEC1X3J150JC4B	6300	15 ±5%	8	10.0	7.0
DEC1X3J180JA3B	6300	18 ±5%	9	7.5	7.0
DEC1X3J180JC4B	6300	18 ±5%	9	10.0	7.0
DEC1X3J220JA3B	6300	22 ±5%	9	7.5	7.0
DEC1X3J220JC4B	6300	22 ±5%	9	10.0	7.0

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• This PDF catalog has only typical specifications because there is no space for detailed specifications. Therefore, please approve our product specifications or transact the approval sheet for product specifications before ordering.

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Continued from the preceding page.

Part Number	DC Rated Voltage (V)	Capacitance (pF)	Body Dia. D (mm)	Lead Spacing F (mm)	Body Thickness T (mm)
DEC1X3J270JA3B	6300	27 ±5%	9	7.5	7.0
DEC1X3J270JC4B	6300	27 ±5%	9	10.0	7.0
DEC1X3J330JA3B	6300	33 ±5%	9	7.5	7.0
DEC1X3J330JC4B	6300	33 ±5%	9	10.0	7.0
DEC1X3J390JA3B	6300	39 ±5%	9	7.5	7.0
DEC1X3J390JC4B	6300	39 ±5%	9	10.0	7.0
DEC1X3J470JA3B	6300	47 ±5%	9	7.5	7.0
DEC1X3J470JC4B	6300	47 ±5%	9	10.0	7.0
DEC1X3J560JC4B	6300	56 ±5%	10	10.0	7.0
DEC1X3J680JC4B	6300	68 ±5%	12	10.0	7.0
DEC1X3J820JC4B	6300	82 ±5%	12	10.0	7.0
DEC1X3J101JC4B	6300	100 ±5%	13	10.0	7.0
DEC1X3J121JC4B	6300	120 ±5%	14	10.0	7.0
DEC1X3J151JC4B	6300	150 ±5%	15	10.0	7.0

B Characteristics

Part Number	DC Rated Voltage (V)	Capacitance (pF)	Body Dia. D (mm)	Lead Spacing F (mm)	Body Thickness T (mm)
DECB33J101KC4B	6300	100 ±10%	9	10.0	7.0
DECB33J151KC4B	6300	150 ±10%	9	10.0	7.0
DECB33J221KC4B	6300	220 ±10%	9	10.0	7.0
DECB33J331KC4B	6300	330 ±10%	9	10.0	7.0
DECB33J471KC4B	6300	470 ±10%	10	10.0	7.0
DECB33J681KC4B	6300	680 ±10%	11	10.0	7.0
DECB33J102KC4B	6300	1000 ±10%	13	10.0	7.0

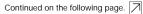
E Characteristics

Part Number	DC Rated Voltage (V)	Capacitance (pF)	Body Dia. D (mm)	Lead Spacing F (mm)	Body Thickness T (mm)
DECE33J102ZC4B	6300	1000 +80/-20%	11	10.0	7.0
DECE33J222ZC4B	6300	2200 +80/-20%	15	10.0	7.0

DEC Series Specifications and Test Methods

No.	1	Item	Specifications	Test Method	
1	Operating Temper	ature Range	-25 to +85°C		
2	Appearance and [Dimensions	No marked defect on appearance form and dimensions are within specified range.	The capacitor should be visually inspected for evidence of defect. Dimensions should be measured with slide calipers.	
3	Marking		To be easily legible	The capacitor should be visually inspected.	
		Between Lead Wires	No failure	The capacitor should not be damaged when DC voltage of 200% of the rated voltage is applied between the lead wires for 1 to 5 sec. (Charge/Discharge current≦50mA)	
4	Dielectric Strength	Body Insulation	No failure	The capacitor is placed in the container with metal balls of diameter 1mm so that each lead wire, short circuited, is kept about 2mm off the metal balls as shown in the figure at right, and DC voltage of 1.3kV is applied for 1 to 5 sec. between capacitor lead wires and metal balls. (Charge/Discharge current≦50mA)	
5	Insulation Resistance (I.R.)	Between Lead Wires	10000MΩ min.	The insulation resistance should be measured with DC500±50V within 60±5 sec. of charging.	
6	Capacitance		Within specified tolerance	The capacitance should be measured at 20°C with 1±0.2kHz (Char. SL: 1±0.2MHz) and AC5V(r.m.s.) max.	
7	Q		Char. SL: 400+20C*2min. (30pF under) 1000 min. (30pF min.)	The dissipation factor and Q should be measured at 20°C with 1±0.2kHz (Char. SL: 1±0.2MHz) and AC5V(r.m.s.) max.	
	Dissipation Factor (D.F.)		Char. B, E: 2.5% max.	120.2KH2 (OHall OL. 120.2WH2) and 7000 (1.111.5.) Max.	
	-		Char. SL: +350 to -1000ppm/°C (Temp. range: +20 to +85°C) Char. B: Within ±10% Char. E: Within +20/-55%	The capacitance measurement should be made at each step specified in Table.	
8	Temperature Characteristics		Pre-treatment: Capacitor should be stored room condition* for 24±2 h Step 1 Temp. (°C) 20±2	at 85±2°C for 1 hr., then placed at at the state of the s	
9	Strength of Lead	Pull	Lead wire should not be cut off. Capacitor should not be broken.	As shown in the figure at right, fix the body of the capacitor and apply a tensile weight gradually to each lead wire in the radial direction of the capacitor up to 10N and keep it for 10±1 sec.	
		Bending		Each lead wire should be subjected to 5N of weight and bent 90° at the point of egress, in one direction, then returned to its original position and bent 90° in the opposite direction at the rate of one bend in 2 to 3 sec.	
		Appearance	No marked defect	The capacitor should be firmly soldered to the supporting lead	
	Vibration	Capacitance	Within specified tolerance	wire and vibrated at a frequency range of 10 to 55Hz, 1.5mm in	
10	Resistance	Q	Char. SL: 400+20C*2min. (30pF under) 1000 min. (30pF min.)	total amplitude, with about a 1 minute rate of vibration change from 10Hz to 55Hz and back to 10Hz. Apply for a total of 6 hrs., 2 hrs. each in 3 mutually perpendicular directions.	
		D.F.	Char. B, E: 2.5% max.	2 ms. caem m s maturally perpendicular directions.	
11	Solderability of Leads		Lead wire should be soldered with uniform coating on the axial direction over 3/4 of the circumferential direction.	The lead wire of a capacitor should be dipped into a ethanol solution of 25wt% rosin and then into molten solder for 2±0.5 sec. In both cases the depth of dipping is up to about 1.5 to 2mm from the root of lead wires. Temp. of solder: Lead Free Solder (Sn-3Ag-0.5Cu) 245±5°C H63 Eutectic Solder 235±5°C	
		Appearance	No marked defect	The lead wire should be immersed into the melted solder of	
	Soldering Effoct	Capacitance Change	Char. SL: Within ±2.5% Char. B: Within ±5% Char. E: Within ±15%	350±10°C up to about 1.5 to 2mm from the main body for 3.5±0.5 sec. Pre-treatment: Capacitor should be stored at 85±2°C for 1 hr.,	
12	Soldering Effect (Non-Preheat)	Soldering Effect (Non-Preheat)	Dielectric Strength (Between Lead Wires)	Per item 4.	then placed at room condition*¹ for 24±2 hrs. before initial measurements. (Char. B, E) Post-treatment: Capacitor should be stored for 1 to 2 hrs. at room condition*¹. (Char. SL) Post-treatment: Capacitor should be stored for 4 to 24 hrs. at room condition*¹. (Char. B, E)

muRata





^{*1 &}quot;room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa

 $^{^{\}star_2}$ "C" expresses nominal capacitance value (pF).

DEC Series Specifications and Test Methods

Continued from the preceding page.

No.		Item	Specifications	Test Method		
		Appearance Capacitance Change	No marked defect Char. SL: Within ±2.5% Char. B: Within ±5% Char. E: Within ±15%	First the capacitor should be stored at 120+0/-5°C for 60+0/-5 sec. Then, as in figure, the lead wires Capacitor Capac		
13	Soldering Effect (On-Preheat)	Dielectric Strength (Between Lead Wires)	Per item 4.	should be immersed in solder of 260+0/-5°C up to 1.5 to 2.0mm from the root of terminal for 7.5+0/-1 sec. Pre-treatment: Capacitor should be stored at 85±2°C for 1 hr., then placed at room condition* for 24±2 hrs. before initial measurements. (Char. B, E) Post-treatment: Capacitor should be stored for 1 to 2 hrs. at room condition* (Char. SL) Post-treatment: Capacitor should be stored for 4 to 24 hrs. at room condition* (Char. B, E)		
		Appearance	No marked defect	The capacitor should be subjected to 5 temperature cycles,		
		Capacitance Change	Char. SL: Within ±3% Char. B: Within ±10% Char. E: Within ±20%	then consecutively to 2 immersion cycles. <temperature cycle=""></temperature>		
		Q	Char. SL: 275+5/2C*2min. (30pF under) 350 min. (30pF min.)	Step Temperature (°C) Time (min) 1 -25±3 30 2 Room Temp. 3		
		D.F.	Char. B, E: 4.0% max.	3 85±3 30 4 Room Temp. 3		
	Temperature	I.R.	2000MΩ min.	Cycle time: 5 cycle		
	and Immersion Cycle	Dielectric Strength (Between Lead Wires)	Per item 4.	Step Temperature (°C) Time (min) Immersion Water 1 65+5/-0 15 Clean water 2 0±3 15 Salt water Cycle time: 2 cycle Pre-treatment: Capacitor should be stored at 85±2°C for 1 hr., then placed at room condition* for 24±2 hrs. before initial measurements. (Char. B, E) Post-treatment: Capacitor should be stored for 4 to 24 hrs. at room condition*.		
		Appearance	No marked defect			
	Humidity (Under	Capacitance Change	Char. SL: Within ±5% Char. B: Within ±10% Char. E: Within ±20%	Set the capacitor for 500+24/-0 hrs. at 40±2°C in 90 to 95% relative humidity. Pre-treatment: Capacitor should be stored at 85±2°C for 1 hr.,		
15	Steady State)	Q	Char. SL: 275+5/2C*2min. (30pF under) 350 min. (30pF min.)	then placed at room condition*¹ for 24±2 hrs. before initial measurements. (Char. B, E) Post-treatment: Capacitor should be stored for 1 to 2 hrs. at		
		D.F.	Char. B, E: 5.0% max.	room condition*1.		
		I.R.	1000MΩ min.			
		Appearance	No marked defect	Apply the rated voltage for 500+24/-0 hrs. at 40±2°C in 90 to		
		Capacitance Change	Char. SL: Within ±7.5% Char. B: Within ±10% Char. E: Within ±20%	95% relative humidity. (Charge/Discharge current≦50mA.) Pre-treatment: Capacitor should be stored at 85±2°C for 1 hr., then placed at room condition*¹ for 24±2 hrs.		
16	Humidity Loading	Q	Char. SL: 100+10/3C*2min. (30pF under) 200 min. (30pF min.)	before initial measurements. (Char. B, E) Post-treatment: Capacitor should be stored for 1 to 2 hrs. at room condition*1. (Char. SL) Post-treatment: Capacitor should be stored at 85±2°C for 1 hr.,		
		D.F.	Char. B, E: 5.0% max.	then placed at room condition*1 for 24±2 hrs.		
		I.R.	500MΩ min.	(Char. B, E)		
		Appearance	No marked defect	Apply a DC voltage of 150% of the rated voltage for		
		Capacitance Change	Char. SL: Within ±3% Char. B: Within ±10% Char. E: Within ±20%	1000+48/-0 hrs. at 85±2°C with a relative humidity of 50% max. (Charge/Discharge current≦50mA.) Pre-treatment: Capacitor should be stored at 85±2°C for 1 hr., then placed at room condition*¹ for 24±2 hrs.		
17	Life	Q	Char. SL: 275+5/2C*2min. (30pF under) 350 min. (30pF min.)	before initial measurements. (Char. B, E) Post-treatment: Capacitor should be stored for 1 to 2 hrs. at		
		D.F.	Char. B, E: 4.0% max.	room condition*¹. (Char. SL) Post-treatment: Capacitor should be stored at 85±2°C for 1 hr.,		
		I.R.	2000M $Ω$ min.	Post-treatment: Capacitor should be stored at 85±2°C for 1 then placed at room condition*1 for 24±2 hrs (Char. B, E)		

^{*1 &}quot;room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa *2 "C" expresses nominal capacitance value (pF).



DEF Series (Only for LCD Backlight Inverter Circuit/6.3kVp-p)

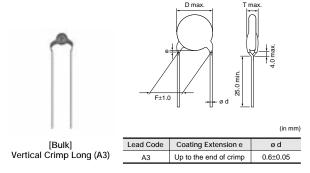
■ Features

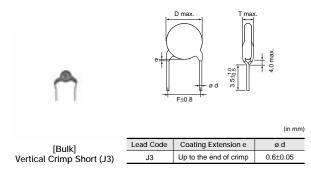
- 1. We design capacitors in much more compact size than DEC series, having reduced the diameter by 20% max.
- 2. Low self-heating at high frequency and high voltage due to low dielectric loss of the ceramic material.
- 3. Operating temperature range is guaranteed up to 105 degrees C.
- 4. Coated with flame-retardant epoxy resin (equivalent to UL94V-0 standard).
- 5. Taping available for automatic insertion.

Applications

Ideal for use in LCD backlight inverter.

Do not use these products in any Automotive Power train or Safety equipment including Battery charger for Electric Vehicles and Plug-in Hybrid. Only Murata products clearly stipulated as "for Automotive use" on its catalog can be used for automobile applications such as Power train and Safety equipment.





■ Marking

■ Iviai Kii iy			
Temp. Char. Nominal Body Diameter	СН	SL	
ø7-9mm	10J 6K- 66	33J 6K- 66	
Temperature Characteristics	Upper horizontal line	-	
Nominal Capacitance	Actual value		
Capacitance Tolerance	Marked with code		
Rated Voltage	Marked with code (Marked with 6K~)		
Manufactured Date Code	Abbreviation		

SL Characteristics

Part Number	Rated Voltage (Vp-p)	Capacitance (pF)	Body Dia. D (mm)	Lead Spacing F (mm)	Body Thickness T (mm)	Lead Package Long Bulk	Lead Package Short Bulk	Lead Package Taping
DEF1XLH100J□□□	6300	10 ±5%	7	7.5	6.0	A3B	J3B	N3A
DEF1XLH120J□□□	6300	12 ±5%	7	7.5	6.0	A3B	J3B	N3A
DEF1XLH150J□□□	6300	15 ±5%	7	7.5	6.0	A3B	J3B	N3A
DEF1XLH180J□□□	6300	18 ±5%	7	7.5	6.0	A3B	J3B	N3A
DEF1XLH220J□□□	6300	22 ±5%	7	7.5	6.0	A3B	J3B	N3A
DEF1XLH270J□□□	6300	27 ±5%	8	7.5	6.0	A3B	J3B	N3A
DEF1XLH330J□□□	6300	33 ±5%	9	7.5	6.0	A3B	J3B	N3A
DEF1XLH390J□□□	6300	39 ±5%	9	7.5	6.0	A3B	J3B	N3A
DEF1XLH470J□□□	6300	47 ±5%	9	7.5	6.0	A3B	J3B	N3A

Three blank columns are filled with the lead and packaging codes. Please refer to the three columns on the right for the appropriate code.

CH Characteristics

Part Number	Rated Voltage (Vp-p)	Capacitance (pF)	Body Dia. D (mm)	Lead Spacing F (mm)	Body Thickness T (mm)	Lead Package Long Bulk	Lead Package Short Bulk	Lead Package Taping
DEF2CLH020C□□□	6300	2 ±0.25pF	7	7.5	6.0	A3B	J3B	N3A
DEF2CLH030C□□□	6300	3 ±0.25pF	7	7.5	6.0	A3B	J3B	N3A
DEF2CLH040C□□□	6300	4 ±0.25pF	7	7.5	6.0	A3B	J3B	N3A
DEF2CLH050D□□□	6300	5 ±0.5pF	7	7.5	6.0	A3B	J3B	N3A
DEF2CLH060D□□□	6300	6 ±0.5pF	7	7.5	6.0	A3B	J3B	N3A
DEF2CLH070D□□□	6300	7 ±0.5pF	8	7.5	6.0	A3B	J3B	N3A
DEF2CLH080D□□□	6300	8 ±0.5pF	8	7.5	6.0	A3B	J3B	N3A
DEF2CLH090D□□□	6300	9 ±0.5pF	8	7.5	6.0	A3B	J3B	N3A
DEF2CLH100J	6300	10 ±5%	8	7.5	6.0	A3B	J3B	N3A

Three blank columns are filled with the lead and packaging codes. Please refer to the three columns on the right for the appropriate code.

DEF Series Specifications and Test Methods

No.	lo. Item		Specifications	Test Method		
1	Operating Temper	ature Range	-25 to +105°C			
2	2 Appearance and Dimensions		No marked defect on appearance form and dimensions are within specified range.	The capacitor should be visually inspected for evidence of defect. Dimensions should be measured with slide calipers.		
3	Marking		To be easily legible	The capacitor should be visually inspected.		
	Between Lead Wires		No failure	The capacitor should not be damaged when DC12.6kV is applied between the lead wires for 1 to 5 sec. (Charge/Discharge current≦50mA)		
4	Dielectric Strength	Body Insulation	No failure	The capacitor is placed in the container with metal balls of diameter 1mm so that each lead wire, short circuited, is kept about 2.0mm off the metal balls as shown in the figure at right, and DC voltage of 1.3kV is applied for 1 to 5 sec. between capacitor lead wires and metal balls. (Charge/Discharge current≦50mA)		
5	Insulation Resistance (I.R.)	Between Lead Wires	10000MΩ min.	The insulation resistance should be measured with DC500±50V within 60±5 sec. of charging.		
6	Capacitance		Within specified tolerance	The capacitance should be measured at 20°C with 1±0.2MHz and AC5V(r.m.s.) max.		
7	Q		400+20C*2min. (30pF under) 1000 min. (30pF min.)	The Q should be measured at 20°C with 1±0.2MHz and AC5V(r.m.s.) max.		
8	8 Temperature Characteristics		Char. CH: 0±60ppm/°C Char. SL: +350 to -1000ppm/°C (Temp. range: +20 to +85°C)	The capacitance measurement should be made at each step specified in Table.		
	·		Step 1 Temp. (°C) 20±2	2 3 4 5 -25±3 20±2 85±2 20±2		
9	Strength of Lead	Pull Lead wire should not be cut off. Capacitor should not be broken.		As shown in the figure at right, fix the body of the capacitor and apply a tensile weight gradually to each lead wire in the radial direction of the capacitor up to 10N and keep it for 10±1 sec.		
		Bending		Each lead wire should be subjected to 5N of weight and bent 90° at the point of egress, in one direction, then returned to its original position and bent 90° in the opposite direction at the rate of one bend in 2 to 3 sec.		
		Appearance	No marked defect	The capacitor should be firmly soldered to the supporting lead		
10	Vibration	Capacitance	Within specified tolerance	wire and vibrated at a frequency range of 10 to 55Hz, 1.5mm in total amplitude, with about a 1 minute rate of vibration change		
	Resistance		400+20C*2min. (30pF under) 1000 min. (30pF min.)	from 10Hz to 55Hz and back to 10Hz. Apply for a total of 6 hrs., 2 hrs. each in 3 mutually perpendicular directions.		
11	11 Solderability of Leads		Lead wire should be soldered with uniform coating on the axial direction over 3/4 of the circumferential direction.	The lead wire of a capacitor should be dipped into a ethanol solution of 25wt% rosin and then into molten solder for 2±0.5 sec. In both cases the depth of dipping is up to about 1.5 to 2.0mm from the root of lead wires. Temp. of solder: Lead Free Solder (Sn-3Ag-0.5Cu) 245±5°C H63 Eutectic Solder 235±5°C		
		Appearance	No marked defect			
12	Soldering Effect	Capacitance Change	Within ±2.5%	The lead wire should 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 sec.		
12	(Non-Preheat)	Dielectric Strength (Between Lead Wires)	Per item 4.	Post-treatment: Capacitor should be stored for 1 to 2 hrs. at room condition*1.		

^{*1 &}quot;room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa





 $^{^{\}star_2}$ "C" expresses nominal capacitance value (pF).

\vee	Cc

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No.	o. Item		Specifications	Test Method		
		Appearance Capacitance Change	No marked defect Within ±2.5%	First the capacitor should be stored at 120+0/-5°C for 60+0/-5 sec. Thermal Screen Screen 1.5		
13	Soldering Effect (On-Preheat)	Dielectric Strength (Between Lead Wires)	Per item 4.	Then, as in figure, the lead wires should be immersed in solder of 260+0/-5°C up to 1.5 to 2.0mm from the root of terminal for 7.5+0/-1 sec. Post-treatment: Capacitor should be stored for 1 to 2 hrs. at room condition*¹.		
		Appearance	No marked defect	The capacitor should be subjected to 5 temperature cycles,		
		Capacitance Change	Within ±3%	then consecutively to 2 immersion cycles.		
		Q	200+10C*2min. (10pF under) 275+5/2C*2min. (10pF min. and 30pF under) 350 min. (30pF min.)	 <temperature cycle=""></temperature> Step Temperature (°C) Time (min) 1 -25±3 30 2 Room Temp. 3 		
	Temperature	I.R.	2000MΩ min.	3 105±3 30 4 Room Temp. 3		
14	and Immersion Cycle	Dielectric Strength (Between Lead Wires)	Per item 4.	Cycle time: 5 cycle <immersion cycle=""> Step Temperature (°C) Time (min) Immersion Water 1 65+5/-0 15 Clean water 2 0±3 15 Salt water Cycle time: 2 cycle Post-treatment: Capacitor should be stored for 4 to 24 hrs. at room condition*1.</immersion>		
		Appearance	No marked defect			
	Humidity (Under	Capacitance Change	Within ±5%	Set the capacitor for 500 +24/-0 hrs. at 40±2°C in 90 to 95% relative humidity.		
15	Steady State)			Post-treatment: Capacitor should be stored for 1 to 2 hrs. at		
		I.R.	1000MΩ min.			
		Appearance	No marked defect	Apply 6.3kVp-p at the frequency in Table for 1000+48/-0 hrs. at		
	Life	Capacitance Change	Within ±3%	105±2°C with a relative humidity of 50% max. (Charge/Discharge current≦50mA.)		
16		Q	200+10C*2min. (10pF under) 275+5/2C*2min. (10pF min. and 30pF under) 350 min. (30pF min.)	to 10 100 100 12 to 22 45		
		I.R.	2000MΩ min.	27 to 47 33 Post-treatment: Capacitor should be stored for 1 to 2 hrs. at room condition*1.		

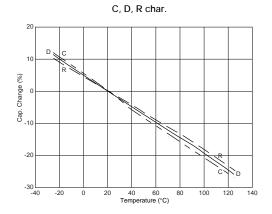
^{*1 &}quot;room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa

^{*2 &}quot;C" expresses nominal capacitance value (pF).

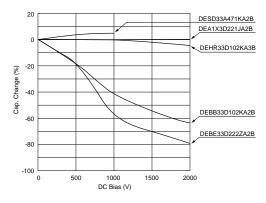
High Voltage Ceramic Capacitors Characteristics Data (Typical Example)

■ Capacitance - Temperature Characteristics

CH, SL, B, E, F char. -10 Cap. Change (%) -20 -30 -60 -70 -80 -90 -100 -40 40 Temp. (°C) 100 -20



■ Capacitance - DC Bias Characteristics

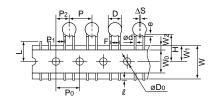




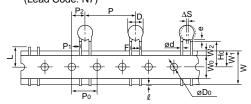
High Voltage Ceramic Capacitors Packaging

■ Taping Specifications

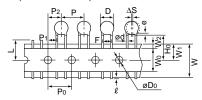
• 15.0mm pitch / lead spacing 7.5mm taping Straight type (Lead Code: P3)



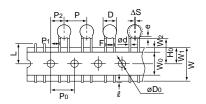
• 30.0mm pitch / lead spacing 7.5mm taping Vertical crimp type (Lead Code: N7)



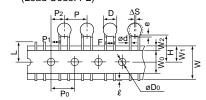
• 12.7mm pitch / lead spacing 5.0mm taping Vertical crimp type (Lead Code: N2)

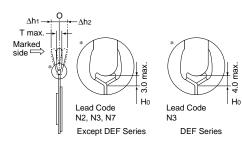


• 15.0mm pitch / lead spacing 7.5mm taping Vertical crimp type (Lead Code: N3)



• 12.7mm pitch / lead spacing 5.0mm taping Straight type (Lead Code: P2)







Item	Code	P3	N3	N7	P2	N2
Pitch of component	Р	15.0 30.0		12.7		
Pitch of sprocket hole	P ₀		15.0±0.3		12.7±0.3	
Lead spacing	F		7.5±1.0		5.0)+0.8 -0.2
Length from hole center to component center	P ₂		7.5±1.5		6.35	±1.3
Length from hole center to lead	P ₁		3.75±1.0		3.85	±0.7
Body diameter	D		See the indi	vidual product sp	ecifications.	
Deviation along tape, left or right	ΔS		0±2.0		0±	1.0
Carrier tape width	W			18.0±0.5		
Position of sprocket hole	W1		9.0±0.5			
Lead distance between reference	Н	20.0+1.5	_		20.0 +1.5	_
and bottom planes	Ho	_	18.0) + 2.0	_	18.0 ^{+2.0}
Protrusion length	ℓ	+0.5 to -1.0				
Diameter of sprocket hole	φDo	4.0±0.1				
Lead diameter	φd	0.6±0.05				
Total tape thickness	t1	0.6±0.3				
Total thickness, tape and lead wire	t2	1.5 max.				
Body thickness	Т	See the individual product specifications.				
Portion to cut in case of defect	L	11.0 +0				
Hold down tape width	Wo			11.5 min.		
Hold down tape position	W2	1.5±1.5				
Coating extension on lead	е	3.0 max. (Vertical crimp type: Up to the end of crimp)				
Deviation across tape, front	Δh1		2.0 may		101	

(in:mm)

Continued on the following page.

1.0 max.



 Δh_2

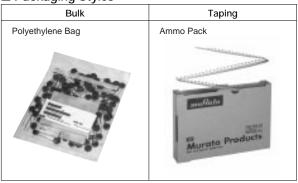
2.0 max.

Deviation across tape, rear

High Voltage Ceramic Capacitors Packaging

Continued from the preceding page.

■ Packaging Styles



■ Minimum Quantity (Order in Sets Only)

[Bulk] 1,000 pcs.

[Taping]

1,500 pcs. (Lead Code: P2, N2) 1,000 pcs. (Lead Code: P3, N3*) 500 pcs. (Lead Code: N7)

* 900 pcs. for 2kV, 3.15kV and DEF Series

■ Minimum Order Quantity

[Bulk] 3,000 pcs.

[Taping]

3,000 pcs. (Lead Code: P2, N2) 3,000 pcs. (Lead Code: P3, N3*) 2,000 pcs. (Lead Code: N7)

* 2,700 pcs. for 2kV, 3.15kV and DEF Series

"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.)



High Voltage Ceramic Capacitors (1) Caution

■ ①Caution (Rating)

<DES/DEH/DEA/DEB/DEC Series>

1. Operating Voltage

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

When the voltage is applied to the circuit, starting or stopping may generate irregular voltage for a transit period because of resonance or switching. Be sure to use a capacitor with a rated voltage range that includes these irregular voltages.

When using the low-dissipation DEA (SL Char.) /DEC (SL Char.) /DEH (C, R Char.) /DES (D Char.) series in a highfrequency and high-voltage circuit, be sure to read the instructions in item 4.

When DC-rated capacitors are to be used in input circuits from commercial power source (AC filter), be sure to use Safety Certified Capacitors because various regulations on withstand voltage or impulse withstand established for each equipment should be taken into considerations.

Voltage	DC Voltage	DC+AC Voltage	AC Voltage	Pulse Voltage (1)	Pulse Voltage (2)
Positional Measurement	Vo-p	Vo-p	Vp-p	Vp-p	Vp-p

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 highfrequency current, pulse current or similar current, it may self-generate heat due to dielectric loss. The frequency of the applied sine wave voltage should be less than 300kHz. The applied voltage load (*) should be such that the capacitor's self-generated heat is within 20°C in an atmosphere temperature of 25°C. When measuring, use a thermocouple of small thermal capacity-K of ø0.1mm in conditions where the capacitor is not affected by radiant heat from other components or surrounding ambient fluctuations.

Excessive heat may lead to deterioration of the capacitor's characteristics and reliability. (Never attempt to perform measurement with the cooling fan running. Otherwise, accurate measurement cannot be ensured.)

*Before using the low-dissipation DEA/DEC (SL Char.) /DEH/DES series, be sure to read the instructions in item 4.

3. Fail-Safe

When capacitor is broken, failure may result in a short circuit. Be sure to provide an appropriate fail-safe function like a fuse on your product if failure would follow an electric shock, fire or fume.



High Voltage Ceramic Capacitors (1) Caution

Continued from the preceding page.

4. Load Reduction and Self-generated Heat During Application of High-frequency and High-voltage Due to the low self-heating characteristics of lowdissipation capacitors, the allowable electric power of these capacitors is generally much higher than that of B characteristic capacitors. However, in case the selfheating temperature is 20°C under a high-frequency voltage whose peak-to-peak value equals the capacitor's rated voltage, the capacitor's power consumption may exceed its allowable electric power.

Therefore, when using the DEA/DEC (SL Char.) /DEH /DES series in a high-frequency and high-voltage circuit with a frequency of 1kHz or higher, make sure that the Vp-p values including the DC bias, do not exceed the applied voltage value specified in Table 1. Also make sure that the self-heating temperature (the difference between the capacitor's surface temperature and the capacitor's ambient temperature) at an ambient temperature of 25°C does not exceed the value specified in Table 1.

As shown in Fig. 2, the self-heating temperature depends on the ambient temperature. Therefore, if you are not able to set the ambient temperature to approximately 25°C, please contact our sales representatives or product engineers.

<Table 1> Allowable Conditions at High-frequency

C. d.	Temp. Char.	DC	Allowab at High	Capacitor's Ambient		
Series		Rated Voltage	Applied Voltage (Max.)	Self-heating Temp. (25°C Ambient Temp.) *1	Temp. *2	
	R	250V	250Vp-p	10°C Max.		
	С	500V	500Vp-p	20°C Max.		
		1kV	800Vp-p	20°C Max.		
DEH		IKV	1000Vp-p	5°C Max.		
DEH	R	2kV	1400Vp-p	20°C Max.		
	K	ZKV	2000Vp-p	5°C Max.		
		3.15kV	1600Vp-p	20°C Max.		
		3. ISKV	3150Vp-p	5°C Max.	-25 to +85°C	
		1kV	1000Vp-p			
DEA	SL	2kV	2000Vp-p	5°C Max.		
		3.15kV	3150Vp-p			
DEC	SL	6.3kV	6300Vp-p	5°C Max.		
DES		500V	500Vp-p	15°C Max.	1	
	D	1kV	800Vp-p	10 C IVIAX.		
		IKV	1000Vp-p	5°C Max.		

^{*1} Fig. 1 shows the relationship between the applied voltage and the allowable selfheating temperature regarding 1 to 3.15kV rated voltage of the DEH series R characteristic and 1kV rated voltage of the DES series D characteristic.

We are offering free software, The Capacitor Selection Tool: by Voltage Form* which will assist you in selecting a suitable capacitor.

The software can be downloaded from Murata's Internet Web site.

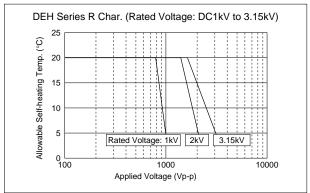
(http://www.murata.com/designlib/mmcsv_e.html) By inputting capacitance values and applied voltage waveform of the specific capacitor series, this software will calculate the capacitor's power consumption and list suitable capacitors.

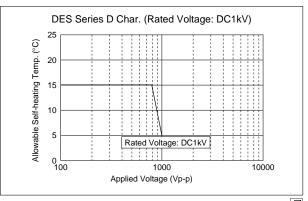
When the result of this software is different from the measurement result of the self-heating temperature on your side, please contact our sales representatives or product engineers.

- * Subject series are below.
- · DEA/DEC (SL char.) /DEH/DES/DEF Series

FAILURE TO FOLLOW THE ABOVE CAUTIONS (ITEMS 1 TO 4) MAY RESULT, WORST CASE, IN A SHORT CIRCUIT AND CAUSE FUMING OR PARTIAL DISPERSION WHEN THE PRODUCT IS USED.

<Fig. 1> Relationship Between Applied Voltage and Self-heating Temperature (Allowable Self-heating Temp. at 25°C Ambient Temp.)









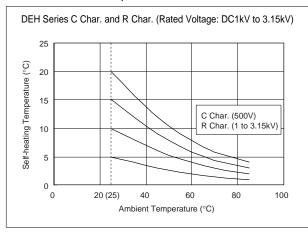
^{*2} When the ambient temperature is 85 to 125°C, the applied voltage needs to be further reduced. If the DEA/DEH/DES series needs to be used at an ambient temperature of 85 to 125°C, please contact our sales representatives or product engineers.

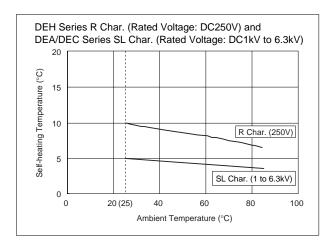
^{*3} Fig. 3 shows reference data on the allowable voltage - frequency characteristics for a sine wave voltage

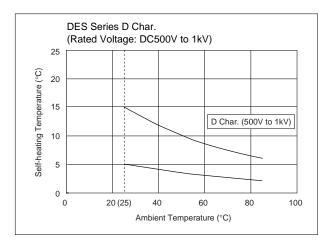
High Voltage Ceramic Capacitors 🗘 Caution

Continued from the preceding page.

<Fig. 2> Dependence of Self-heating Temperature on **Ambient Temperature**









sales representatives or product engineers before ordering. • This PDF catalog has only typical specifications because there is no space for detailed specifications. Therefore, please approve our product specifications or transact the approval sheet for product specifications because

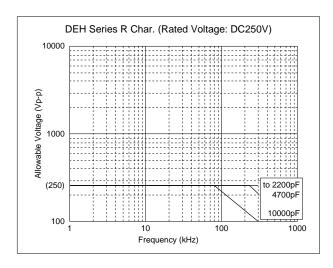
High Voltage Ceramic Capacitors (1) Caution

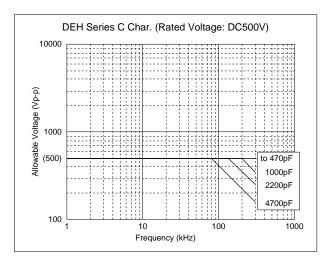
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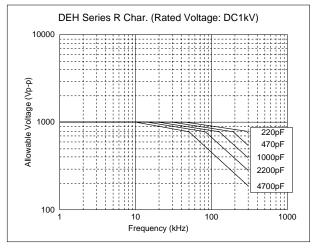
< Fig. 3> Allowable Voltage (Sine Wave Voltage) - Frequency Characteristics (At Ambient Temperature of 85°C or less) Because of the influence of harmonics, when the applied voltage is a rectangular wave or pulse wave voltage (instead of a sine wave voltage), the heat generated by the capacitor is higher than the value obtained by application of the sine wave with the same fundamental frequency.

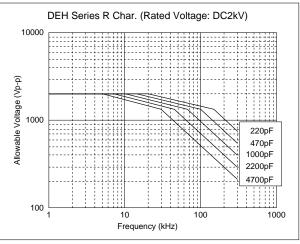
Roughly calculated for reference, the allowable voltage for a rectangular wave or pulse wave corresponds approximately

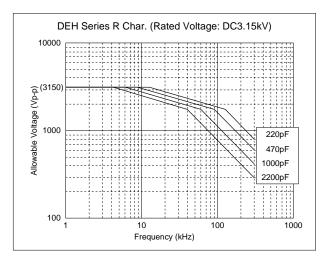
to the allowable voltage for a sine wave whose fundamental frequency is twice as large as that of the rectangular wave or pulse wave. This allowable voltage, however, varies depending on the voltage and current waveforms. Therefore, you are requested to make sure that the selfheating temperature is not higher than the value specified in Table 1.











High Voltage Ceramic Capacitors (1) Caution

Continued from the preceding page

<Fig. 3 (continued)> Allowable Voltage (Sine Wave Voltage) -**Frequency Characteristics** (At Ambient Temperature of 85°C or less)

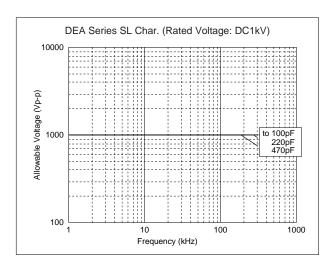
Because of the influence of harmonics, when the applied voltage is a rectangular wave or pulse wave voltage (instead of a sine wave voltage), the heat generated by the capacitor is higher than the value obtained by application of the sine wave with the same fundamental frequency.

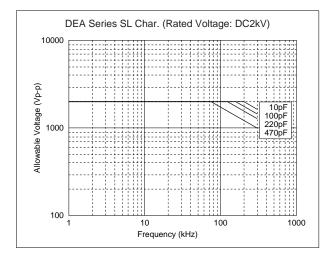
Roughly calculated for reference, the allowable voltage for a rectangular wave or pulse wave corresponds

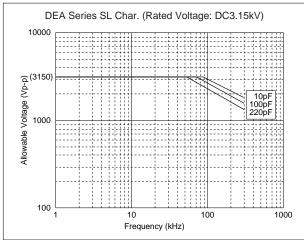
approximately to the allowable voltage for a sine wave whose fundamental frequency is twice as large as that of the rectangular wave or pulse wave.

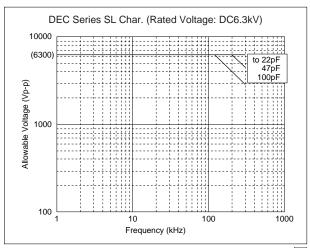
This allowable voltage, however, varies depending on the voltage and current waveforms.

Therefore, you are requested to make sure that the selfheating temperature is not higher than the value specified in Table 1.











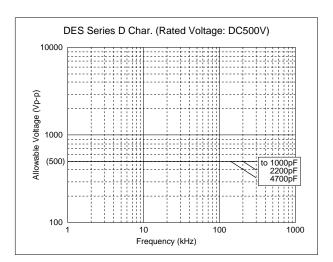
High Voltage Ceramic Capacitors **△Caution**

Continued from the preceding page.

< Fig. 3 (continued) > Allowable Voltage (Sine Wave Voltage) -**Frequency Characteristics** (At Ambient Temperature of 85°C or less)

Because of the influence of harmonics, when the applied voltage is a rectangular wave or pulse wave voltage (instead of a sine wave voltage), the heat generated by the capacitor is higher than the value obtained by application of the sine wave with the same fundamental frequency.

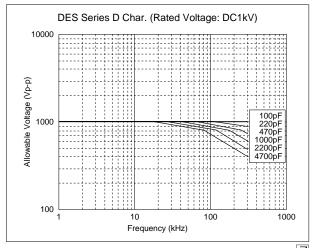
Roughly calculated for reference, the allowable voltage for a rectangular wave or pulse wave corresponds



approximately to the allowable voltage for a sine wave whose fundamental frequency is twice as large as that of the rectangular wave or pulse wave.

This allowable voltage, however, varies depending on the voltage and current waveforms.

Therefore, you are requested to make sure that the selfheating temperature is not higher than the value specified in Table 1.





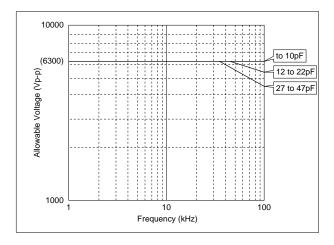
High Voltage Ceramic Capacitors (1) Caution

Continued from the preceding page

<DEF Series>

1. Operating Voltage

The frequency of the applied sine wave voltage should be less than 100kHz. The applied voltage should be less than the value shown in figure below. In case of non-sine wave which includes a harmonic frequency, please contact our sales representatives or product engineers.



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 highfrequency current, pulse current or similar current, it may self-generate heat due to dielectric loss. Excessive heat may lead to deterioration of the capacitor's characteristics and reliability. (Never attempt to perform measurement with the cooling fan running. Otherwise, accurate measurement cannot be ensured.)

3. Fail-Safe

When capacitor is broken, failure may result in a short circuit. Be sure to provide an appropriate fail-safe function like a fuse on your product if failure could result in an electric shock, fire or fume.

The temperature of the surface of capacitor: below the upper limit of its rated operating temperature range (including self-heating.)

The capacitor can be applied maximum 6.3kVp-p at 100kHz when lamp turn on.

Voltage	AC Voltage		
Positional Measurement	Vp-p		

• This PDF catalog has only typical specifications because there is no space for detailed specifications. Therefore, please approve our product specifications or transact the approval sheet for product specifications before ordering. • Report the data of the product specification of the product specifica

High Voltage Ceramic Capacitors (1) Caution

■ ① Caution (Storage and Operating 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. 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 after delivery.

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.

■ ①Caution (Soldering and Mounting)

1. Vibration and Impact Do not expose a capacitor or its leads to excessive shock or vibration during use.

2. Solderina

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.

When soldering capacitor with a soldering iron, it should be performed in following conditions.

Temperature of iron-tip: 400 degrees C. max. Soldering iron wattage: 50W max. Soldering time: 3.5 sec. max.

3. Bonding, Resin Molding and Coating Before bonding, molding or coating this product, verify that these processes do not affect the quality of capacitor by testing the performance

of the bonded, molded or coated product in the intended equipment.

In case the amount of applications, dryness/hardening conditions of adhesives and molding resins containing organic solvents (ethyl acetate, methyl ethyl ketone, toluene, etc.) are unsuitable, the outer coating resin of a capacitor is damaged by the organic solvents and it may result, worst case, in a short circuit. The variation in thickness of adhesive, molding resin or coating may cause outer coating resin cracking and/or ceramic element cracking of a capacitor in a temperature cycling.

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.

■ ①Caution (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.



High Voltage Ceramic Capacitors Notice

■ 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: 5 min. 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. DEA/DEC/DEF Series (Temp. Char. CH, SL) Capacitance might change a little depending on the surrounding temperature or an applied voltage. Please contact us if you intend to use this product in a strict time constant circuit.
- 2. DEB/DEC Series (Temp. Char. B, E, F) Capacitors have an aging characteristic, whereby the capacitor continually decreases its capacitance slightly if the capacitor is left on for a long time. Moreover, capacitance might

change greatly depending on the surrounding temperature or an applied voltage. So, it is not likely to be suitable for use in a time constant circuit.

Please contact us if you need detailed information.

3. DEH/DES Series

Capacitance might change greatly depending on the surrounding temperature or an applied voltage. So, it is not likely to be suitable for use in a time constant circuit. Please contact us if you need detailed information.



Safety Certified Ceramic Capacitors/High Voltage Ceramic Capacitors ISO9000 Certifications

Manufacturing plants which produce the products in this catalog have obtained the ISO9000 quality system certificate.

Plant	Applied Standard
Izumo Murata Manufacturing Co., Ltd.	ISO9001
Murata Electronics (Thailand), Ltd.	ISO9001
Taiwan Murata Electronics Co., Ltd.	ISO9001



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⚠Note:

1. Export Control

<For customers outside Japan>

No muRata products should be used or sold, through any channels, for use in the design, development, production, utilization, maintenance or operation of, or otherwise contribution to (1) any weapons (Weapons of Mass Destruction [nuclear, chemical or biological weapons or missiles] or conventional weapons) or (2) goods or systems specially designed or intended for military end-use or utilization by military end-users. <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 the products in this catalog for the applications listed below, which require especially high reliability for the prevention of defects which might directly damage a third party's life, body or property, or when one of our products is intended for use in applications other than those specified in this catalog.
 - 1 Aircraft equipment
- 2 Aerospace equipment
- ③ Undersea equipment (5) Medical equipment
- 4 Power plant equipment 6 Transportation equipment (vehicles, trains, ships, etc.)
- (7) Traffic signal equipment
- (8) Disaster prevention / crime prevention equipment
- Data-processing equipment
- (1) Application of similar complexity and/or reliability requirements to the applications listed above
- 3. Product specifications in this catalog are as of September 2008. 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 ordering. If there are any questions, please contact our sales representatives or product
- 4. Please read rating and 🐧 CAUTION (for storage, operating, rating, soldering, mounting and handling) in this catalog to prevent smoking and/or burning, etc.
- 5. This catalog has only typical specifications because there is no space for detailed specifications. Therefore, please approve our product specifications or transact the approval sheet for product specifications before ordering.
- 6. 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 a third party's intellectual property rights and other related rights in consideration of your use of 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.
- 7. No ozone depleting substances (ODS) under the Montreal Protocol are used in our manufacturing process.

muRata Murata Manufacturing Co., Ltd.

http://www.murata.com/

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