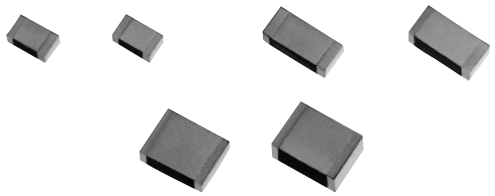
# Stacked Metallized PPS Film Chip Capacitor

## Type: ECHU(X)

Stacked metallized PPS film as dielectric with simple mold-less construction



### ■Features

- Small in size (minimum size 1.6 mm × 0.8 mm)
- 85 ℃, 85 %RH, W.V. × 1.0 for 500 hours
- For reflow soldering
- RoHS directive compliant

### ■Recommended Applications

- Time-constant
- Filtering
- Oscillation and resonance

### ■Explanation of Part Numbers

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| E | C | H | U | | | | | | | X | |

Product code: E C

Dielectric & construction: H U

Rated voltage:

| | |
|---|---|
| 1C | 16 VDC |
| 1H | 50 VDC |

Capacitance: 5 6 7 8 9

Cap. Tol.: 10

| | |
|---|---|
| G | ±2 % |
| J | ±5 % |

Suffix: 11 = X

Suffix: 12

| | Tape width / Reel diameter |
|---|---|
| 5 | 8 mm / size ø180 mm |
| 9 | 12 mm / size ø330 mm |

❊ Tape width 8 mm and diameter ø330 mm reel is prepared.

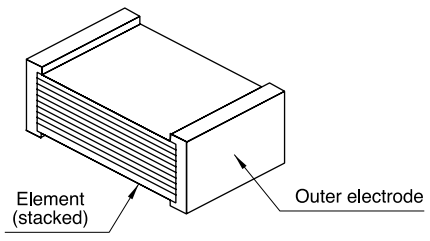
### ■Specifications

| | |
|---|---|
| Category temp. range (Including temperature-rise on unit surface) | −55 ℃ to +125 ℃ |
| Rated voltage | 16 VDC, 50 VDC<br>(50 VDC: 0.12 µF or more: Derating or rated voltage by 1.25 % / ℃ at more than 105 ℃) |
| Capacitance range | 0.00010 µF to 0.22 µF (E12) |
| Capacitance tolerance | ±2 %(G), ±5 %(J) |
| Withstand voltage | Between terminals : Rated volt. (VDC)×150 % 60 s |
| Dissipation factor (tan$\delta$) | tan $\delta$ ≦0.6 % (20 ℃, 1 kHz) |
| Insulation resistance (IR) | 16 VDC : IR≧3000 MΩ (20 ℃, 10 VDC, 60 s)<br>50 VDC : IR≧3000 MΩ (20 ℃, 50 VDC, 60 s) |
| Soldering conditions | Reflow soldering : 260 ℃ max. and 95 sec max. at more than 220 ℃ (Temp. at cap. surface) |

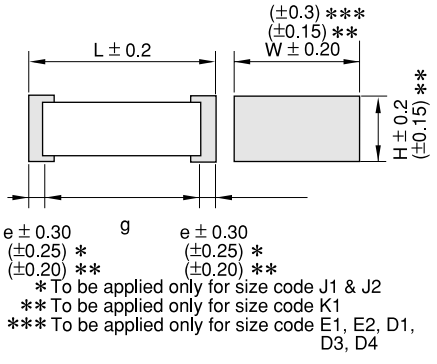
❊ Please consult us for flow soldering

❊ In case of applying voltage in alternating current (50 Hz or 60 Hz sine wave) to a capacitor with DC rated voltage, please refer to the page of “Permissible voltage (R.M.S) in alternating current corresponding to DC rated voltage”.

### ■Construction




### ■Dimensions in mm (not to scale)




∗ To be applied only for size code J1 & J2
∗∗ To be applied only for size code K1
∗∗∗ To be applied only for size code E1, E2, D1, D3, D4

| saize code | L | W | H | e | g |
|---|---|---|---|---|---|
| K1 | 1.6 | 0.8 | 0.7 | 0.35 | ≧0.4 |
| J1 | 2.0 | 1.25 | 0.9 | 0.45 | ≧0.6 |
| J2 | 2.0 | 1.25 | 1.1 | 0.45 | ≧0.6 |
| H1 | 3.2 | 1.6 | 0.9 | 0.65 | ≧1.0 |
| H2 | 3.2 | 1.6 | 1.1 | 0.65 | ≧1.0 |
| H3 | 3.2 | 1.6 | 1.5 | 0.65 | ≧1.0 |
| G1 | 3.2 | 2.5 | 1.1 | 0.65 | ≧1.0 |
| G2 | 3.2 | 2.5 | 1.5 | 0.65 | ≧1.0 |
| G3 | 3.2 | 2.5 | 2.1 | 0.65 | ≧1.0 |
| E1 | 4.8 | 3.3 | 1.5 | 0.80 | ≧2.0 |
| E2 | 4.8 | 3.3 | 2.1 | 0.80 | ≧2.0 |
| D1 | 6.0 | 4.1 | 1.9 | 0.80 | ≧2.0 |
| D3 | 6.0 | 4.1 | 2.5 | 0.80 | ≧2.0 |
| D4 | 6.0 | 4.1 | 2.8 | 0.80 | ≧2.0 |

Design, Specifications are subject to change without notice. Ask factory for technical specifications before purchase and/or use.
Whenever a doubt about safety arises from this product, please inform us immediately for technical consultation without fail.

■Taping Specification for Automatic Mounting
Refer to the page of taping specifications

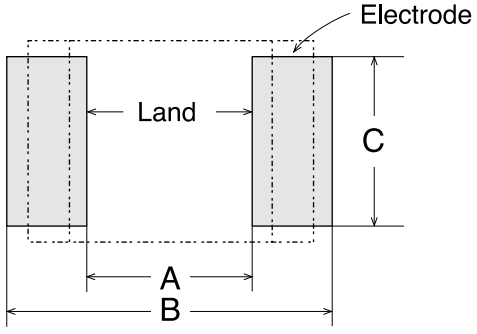
■Rating, Dimensions & Quantity/Reel

●Capacitance tolerance : ±2 %(G), ±5 %(J)

| Cap. (μF) | Rated volt. 16 VDC | | | | | | Rated volt. 50 VDC | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Part No. | Dimensions (mm) | | | Size Code | Q'ty | Part No. | Dimensions (mm) | | | Size Code | Q'ty |
| | | L | W | H | | | | L | W | H | | |
| 0.00010 | ECHU1C101□X5 | 1.6 | 0.8 | 0.7 | K1 | 4000 | ECHU1H101□X5 | 2.0 | 1.25 | 0.9 | J1 | 3000 |
| 0.00012 | ECHU1C121□X5 | 1.6 | 0.8 | 0.7 | K1 | | ECHU1H121□X5 | 2.0 | 1.25 | 0.9 | J1 | |
| 0.00015 | ECHU1C151□X5 | 1.6 | 0.8 | 0.7 | K1 | | ECHU1H151□X5 | 2.0 | 1.25 | 0.9 | J1 | |
| 0.00018 | ECHU1C181□X5 | 1.6 | 0.8 | 0.7 | K1 | | ECHU1H181□X5 | 2.0 | 1.25 | 0.9 | J1 | |
| 0.00022 | ECHU1C221□X5 | 1.6 | 0.8 | 0.7 | K1 | | ECHU1H221□X5 | 2.0 | 1.25 | 0.9 | J1 | |
| 0.00027 | ECHU1C271□X5 | 1.6 | 0.8 | 0.7 | K1 | | ECHU1H271□X5 | 2.0 | 1.25 | 0.9 | J1 | |
| 0.00033 | ECHU1C331□X5 | 1.6 | 0.8 | 0.7 | K1 | | ECHU1H331□X5 | 2.0 | 1.25 | 0.9 | J1 | |
| 0.00039 | ECHU1C391□X5 | 1.6 | 0.8 | 0.7 | K1 | | ECHU1H391□X5 | 2.0 | 1.25 | 0.9 | J1 | |
| 0.00047 | ECHU1C471□X5 | 1.6 | 0.8 | 0.7 | K1 | | ECHU1H471□X5 | 2.0 | 1.25 | 0.9 | J1 | |
| 0.00056 | ECHU1C561□X5 | 1.6 | 0.8 | 0.7 | K1 | | ECHU1H561□X5 | 2.0 | 1.25 | 0.9 | J1 | |
| 0.00068 | ECHU1C681□X5 | 1.6 | 0.8 | 0.7 | K1 | | ECHU1H681□X5 | 2.0 | 1.25 | 0.9 | J1 | |
| 0.00082 | ECHU1C821□X5 | 1.6 | 0.8 | 0.7 | K1 | | ECHU1H821□X5 | 2.0 | 1.25 | 0.9 | J1 | |
| 0.0010 | ECHU1C102□X5 | 1.6 | 0.8 | 0.7 | K1 | | ECHU1H102□X5 | 2.0 | 1.25 | 0.9 | J1 | |
| 0.0012 | ECHU1C122□X5 | 1.6 | 0.8 | 0.7 | K1 | | ECHU1H122□X5 | 2.0 | 1.25 | 0.9 | J1 | |
| 0.0015 | ECHU1C152□X5 | 1.6 | 0.8 | 0.7 | K1 | | ECHU1H152□X5 | 2.0 | 1.25 | 0.9 | J1 | |
| 0.0018 | ECHU1C182□X5 | 1.6 | 0.8 | 0.7 | K1 | | ECHU1H182□X5 | 2.0 | 1.25 | 0.9 | J1 | |
| 0.0022 | ECHU1C222□X5 | 1.6 | 0.8 | 0.7 | K1 | | ECHU1H222□X5 | 2.0 | 1.25 | 0.9 | J1 | |
| 0.0027 | ECHU1C272□X5 | 1.6 | 0.8 | 0.7 | K1 | | ECHU1H272□X5 | 2.0 | 1.25 | 0.9 | J1 | |
| 0.0033 | ECHU1C332□X5 | 2.0 | 1.25 | 0.9 | J1 | 3000 | ECHU1H332□X5 | 3.2 | 1.6 | 0.9 | H1 | |
| 0.0039 | ECHU1C392□X5 | 2.0 | 1.25 | 0.9 | J1 | | ECHU1H392□X5 | 3.2 | 1.6 | 0.9 | H1 | |
| 0.0047 | ECHU1C472□X5 | 2.0 | 1.25 | 0.9 | J1 | | ECHU1H472□X5 | 3.2 | 1.6 | 0.9 | H1 | |
| 0.0056 | ECHU1C562□X5 | 2.0 | 1.25 | 0.9 | J1 | | ECHU1H562□X5 | 3.2 | 1.6 | 0.9 | H1 | |
| 0.0068 | ECHU1C682□X5 | 2.0 | 1.25 | 0.9 | J1 | | ECHU1H682□X5 | 3.2 | 1.6 | 0.9 | H1 | |
| 0.0082 | ECHU1C822□X5 | 2.0 | 1.25 | 1.1 | J2 | | ECHU1H822□X5 | 3.2 | 1.6 | 1.1 | H2 | |
| 0.010 | ECHU1C103□X5 | 2.0 | 1.25 | 1.1 | J2 | | ECHU1H103□X5 | 3.2 | 1.6 | 1.1 | H2 | |
| 0.012 | ECHU1C123□X5 | 3.2 | 1.6 | 0.9 | H1 | | ECHU1H123□X5 | 3.2 | 2.5 | 1.1 | G1 | 2000 |
| 0.015 | ECHU1C153□X5 | 3.2 | 1.6 | 0.9 | H1 | | ECHU1H153□X5 | 3.2 | 2.5 | 1.1 | G1 | |
| 0.018 | ECHU1C183□X5 | 3.2 | 1.6 | 0.9 | H1 | | ECHU1H183□X5 | 3.2 | 2.5 | 1.5 | G2 | |
| 0.022 | ECHU1C223□X5 | 3.2 | 1.6 | 0.9 | H1 | | ECHU1H223□X5 | 3.2 | 2.5 | 1.5 | G2 | |
| 0.027 | ECHU1C273□X5 | 3.2 | 1.6 | 1.1 | H2 | | ECHU1H273□X5 | 3.2 | 2.5 | 1.5 | G2 | |
| 0.033 | ECHU1C333□X5 | 3.2 | 1.6 | 1.1 | H2 | | ECHU1H333□X5 | 3.2 | 2.5 | 2.1 | G3 | |
| 0.039 | ECHU1C393□X5 | 3.2 | 1.6 | 1.5 | H3 | 2000 | ECHU1H393□X5 | 3.2 | 2.5 | 2.1 | G3 | |
| 0.047 | ECHU1C473□X5 | 3.2 | 1.6 | 1.5 | H3 | | ECHU1H473□X9 | 4.8 | 3.3 | 1.5 | E1 | 3000 |
| 0.056 | ECHU1C563□X5 | 3.2 | 2.5 | 1.5 | G2 | | ECHU1H563□X9 | 4.8 | 3.3 | 1.5 | E1 | |
| 0.068 | ECHU1C683□X5 | 3.2 | 2.5 | 1.5 | G2 | | ECHU1H683□X9 | 4.8 | 3.3 | 1.5 | E1 | |
| 0.082 | ECHU1C823□X5 | 3.2 | 2.5 | 2.1 | G3 | | ECHU1H823□X9 | 4.8 | 3.3 | 2.1 | E2 | |
| 0.10 | ECHU1C104□X5 | 3.2 | 2.5 | 2.1 | G3 | | ECHU1H104□X9 | 4.8 | 3.3 | 2.1 | E2 | |
| 0.12 | | | | | | | ECHU1H124□X9 | 6.0 | 4.1 | 1.9 | D1 | |
| 0.15 | | | | | | | ECHU1H154□X9 | 6.0 | 4.1 | 1.9 | D1 | |
| 0.18 | | | | | | | ECHU1H184□X9 | 6.0 | 4.1 | 2.5 | D3 | 2000 |
| 0.22 | | | | | | | ECHU1H224□X9 | 6.0 | 4.1 | 2.8 | D4 | |

Cap. tol. code

■Recommended for Land Dimensions (mm)




| Size Code | Land dimensions | | |
|---|---|---|---|
| | Reflow soldering | | |
| | A | B | C |
| K1 | 0.6 | 2.0 | 0.7 |
| J1,J2 | 0.8 | 2.4 | 1.1 |
| H1,H2,H3 | 1.8 | 3.6 | 1.4 |
| G1,G2,G3 | 1.8 | 3.6 | 2.3 |
| E1,E2 | 3.0 | 5.6 | 3.0 |
| D1,D3,D4 | 4.0 | 7.0 | 3.8 |

❊ It is not warrantable that you can mount the capacitor without trouble under all the mounting condition when "Recommender for Land dimensions" is adopted.

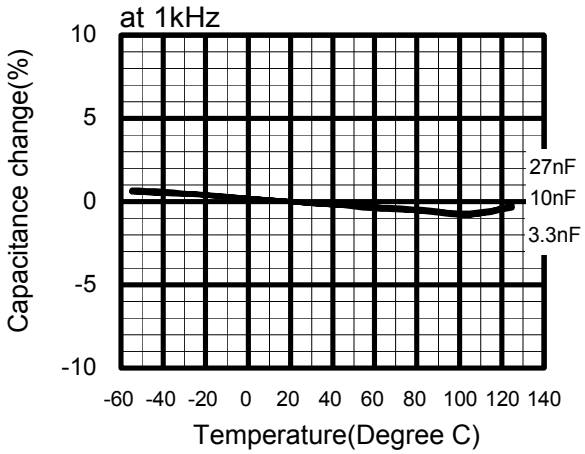
Design, Specifications are subject to change without notice. Ask factory for technical specifications before purchase and/or use.
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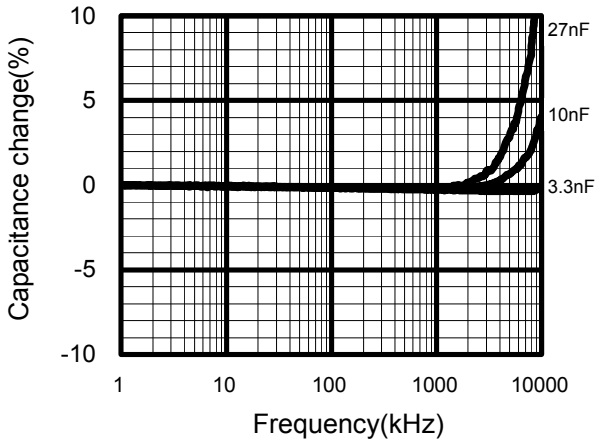
# ECHU (X) Type DC10V series (Stacked Metallized Film)

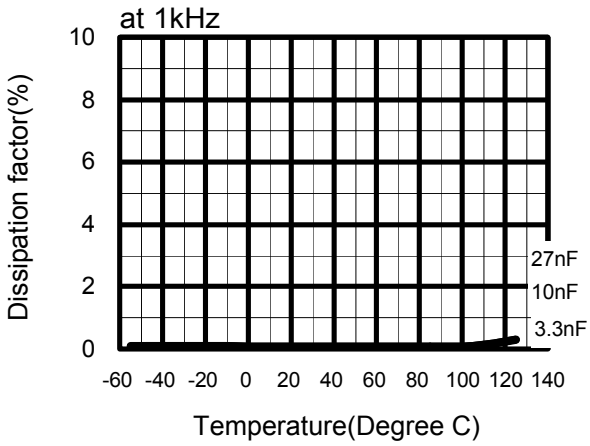
## Electrical Characteristics <Typical Data >

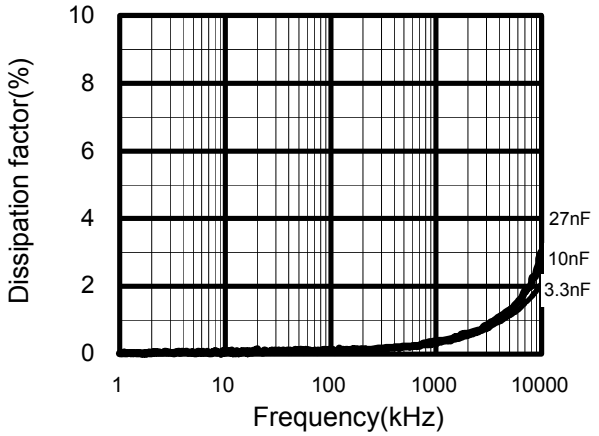
### Temperature Characteristics

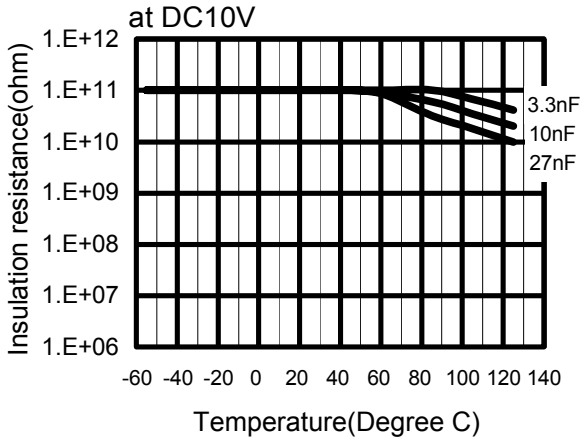


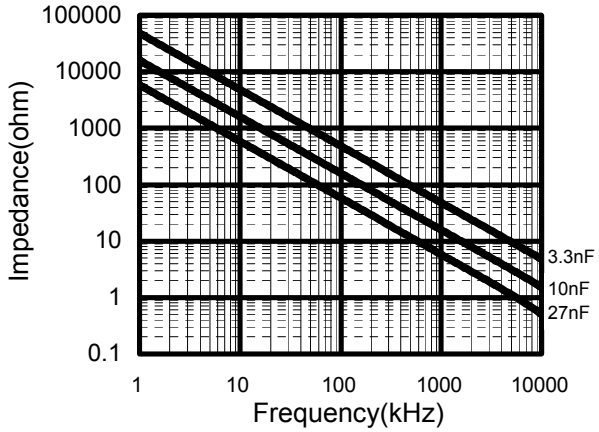

### Frequency Characteristics



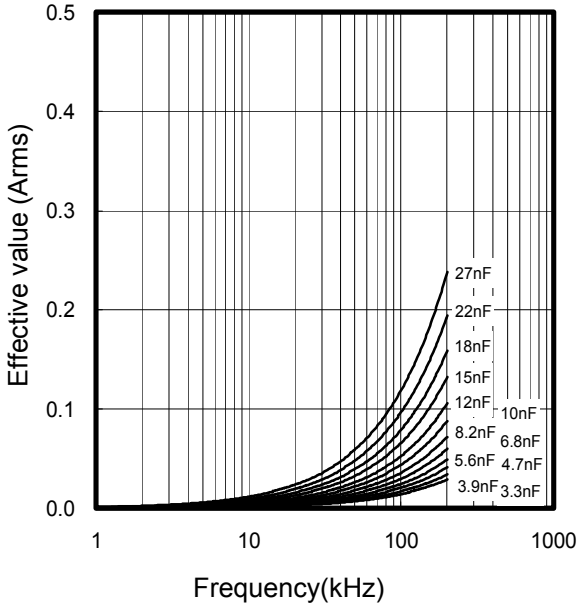



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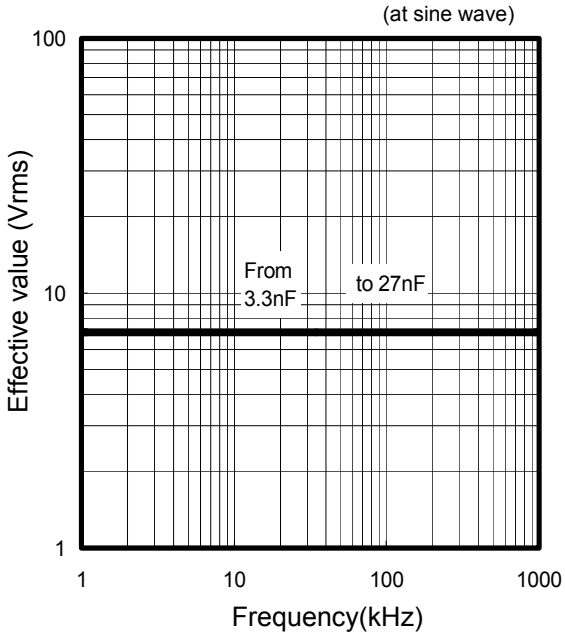
# ECHU (X) Type DC10V series (Stacked Metallized Film)

## Applicable Specifications

### Permissible Current




### Permissible Voltage

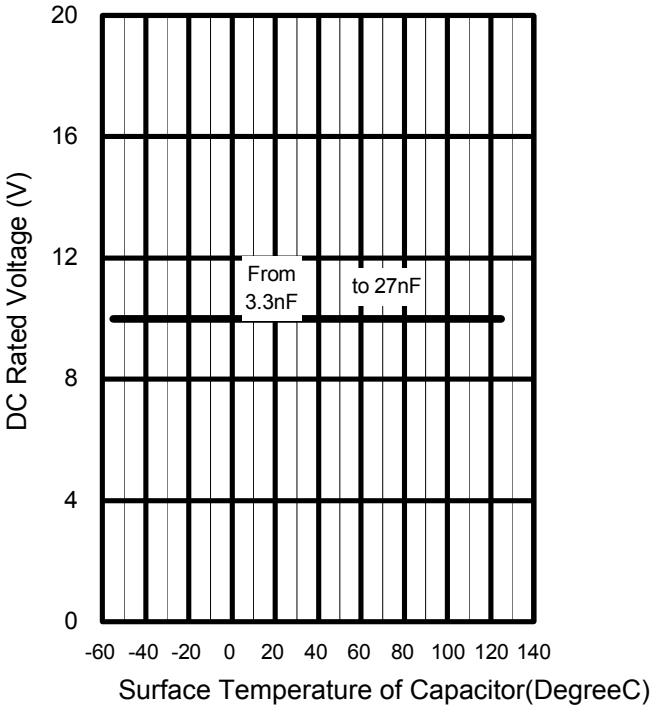



### Pulse Handling Capability (dv/dt)

**(Max 10000cycles)**

| Rating Voltage | Capacitance Value(uF) | code | dV/dt (V/us) | Current(0-P) (A) |
|---|---|---|---|---|
| DC 10V | 0.0033 | 332 | 47 | 0.16 |
| | 0.0039 | 392 | 44 | 0.17 |
| | 0.0047 | 472 | 40 | 0.19 |
| | 0.0056 | 562 | 37 | 0.21 |
| | 0.0068 | 682 | 34 | 0.23 |
| | 0.0082 | 822 | 31 | 0.25 |
| | 0.01 | 103 | 28 | 0.28 |
| | 0.012 | 123 | 26 | 0.31 |
| | 0.015 | 153 | 24 | 0.36 |
| | 0.018 | 183 | 22 | 0.40 |
| | 0.022 | 223 | 20 | 0.44 |
| | 0.027 | 273 | 18 | 0.49 |

### Voltage Derating by Temperature



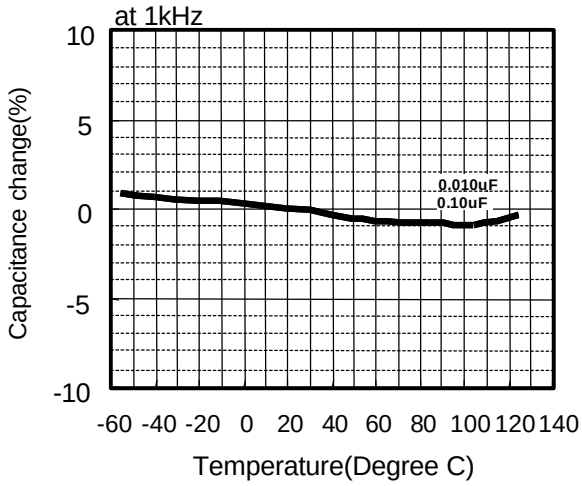

* Please consult Panasonic if your condition exceeds the above
*Permissible voltage graph is the case of sine waveform. When you use this product, peak voltage must not exceed DC rated voltage.
*The current(0-P) value is calculated using nominal capacitance.

Panasonic

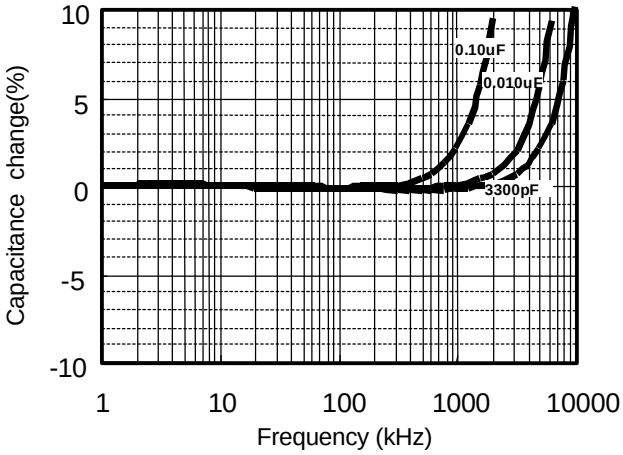
# ECHU (X) Type DC16V series (Stacked Metallized Film)

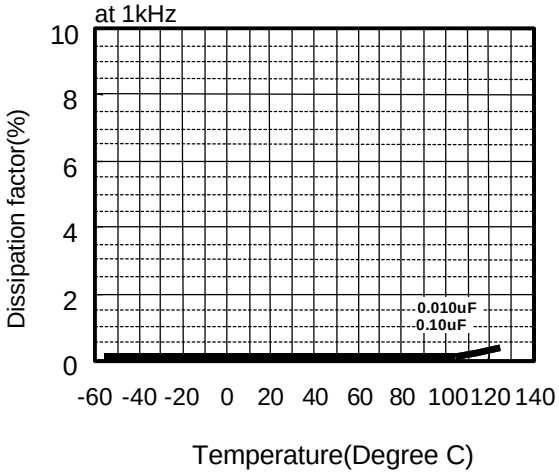
## Electrical Characteristics < Typical Data >

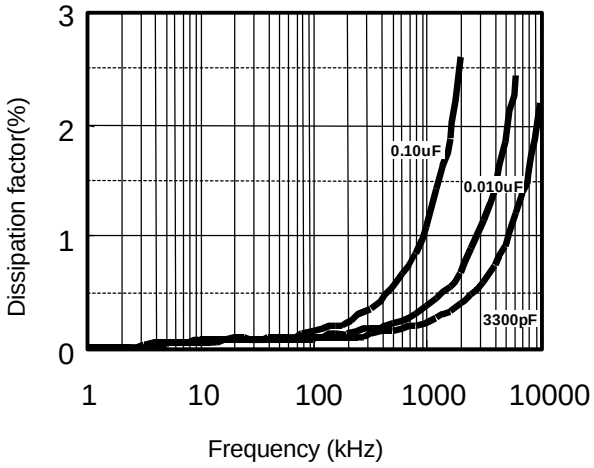
### Temperature Characteristics

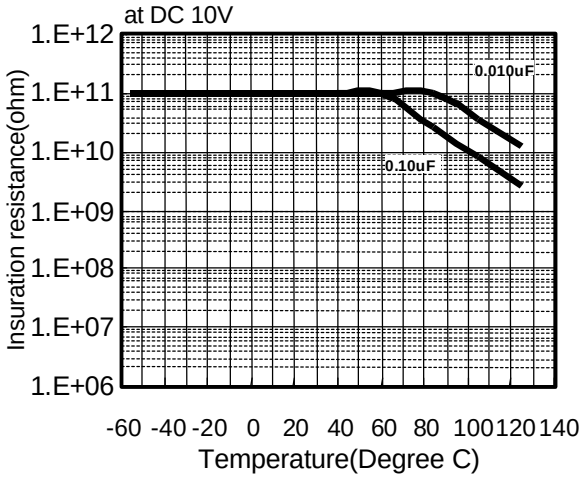


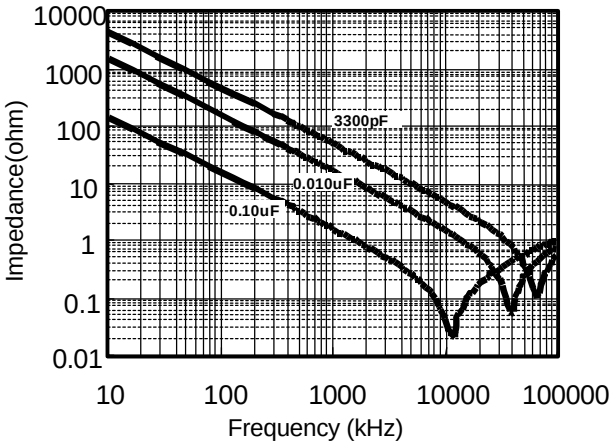

### Frequency Characteristics



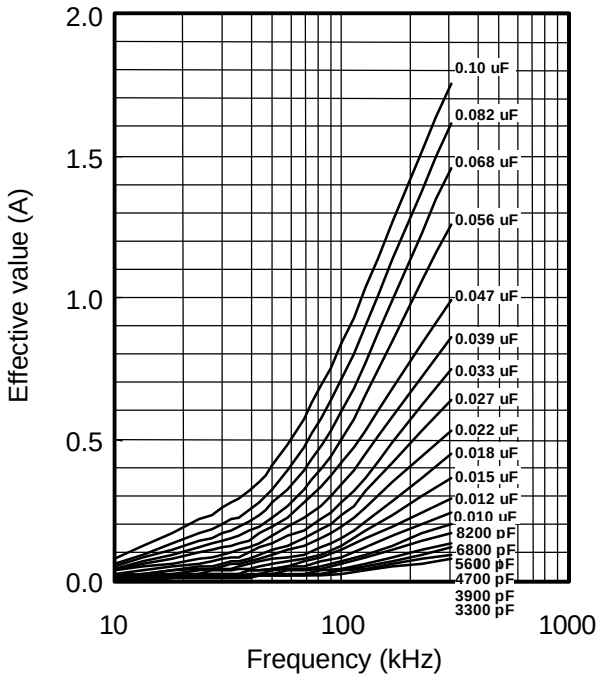



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# ECHU (X) Type DC16V series (Stacked Metallized Film)

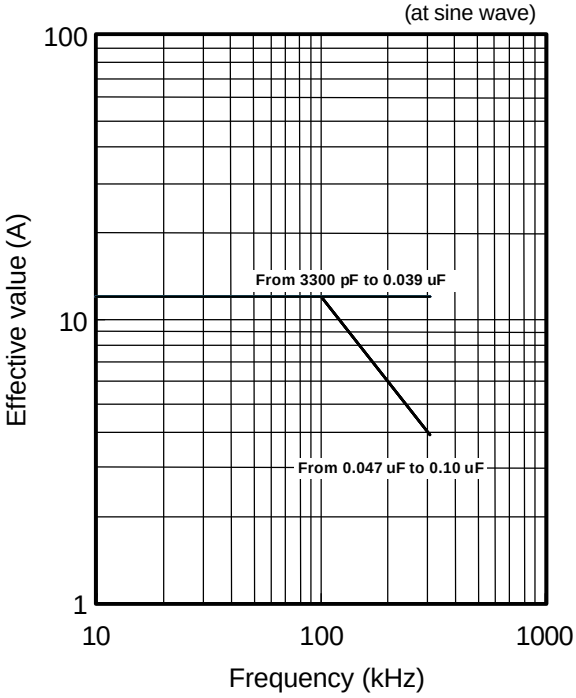
## Applicable Specifications

### Permissible Current




### Permissible Voltage

(at sine wave)

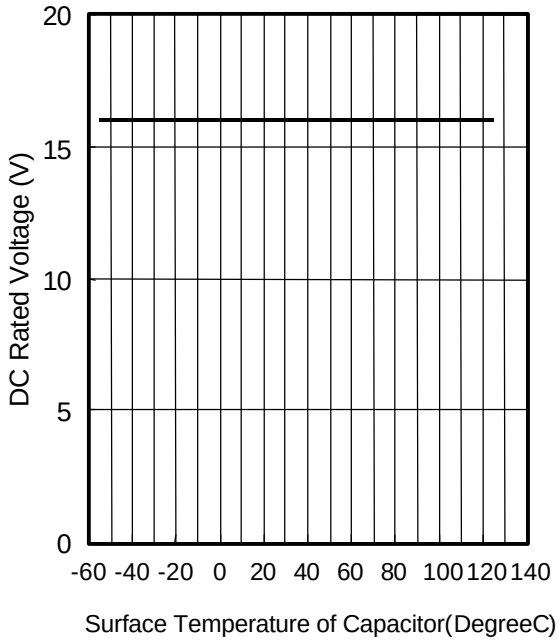



### Pulse Handling Capability (dv/dt)

**(Max 10000cycles)**

| Rating Voltage | Capacitance Value(uF) | Code | dv/dt(V/us) | Current($_{0\text{-}P}$) (A) |
|---|---|---|---|---|
| DC 16V | 0.0033 | 332 | 86 | 0.28 |
| | 0.0039 | 392 | 80 | 0.31 |
| | 0.0047 | 472 | 74 | 0.35 |
| | 0.0056 | 562 | 68 | 0.38 |
| | 0.0068 | 682 | 62 | 0.42 |
| | 0.0082 | 822 | 58 | 0.48 |
| | 0.010 | 103 | 52 | 0.52 |
| | 0.012 | 123 | 48 | 0.58 |
| | 0.015 | 153 | 43 | 0.65 |
| | 0.018 | 183 | 40 | 0.72 |
| | 0.022 | 223 | 37 | 0.81 |
| | 0.027 | 273 | 33 | 0.89 |
| | 0.033 | 333 | 31 | 1.02 |
| | 0.039 | 393 | 28 | 1.09 |
| | 0.047 | 473 | 26 | 1.22 |
| | 0.056 | 563 | 24 | 1.34 |
| | 0.068 | 683 | 22 | 1.50 |
| | 0.082 | 823 | 20 | 1.64 |
| | 0.10 | 104 | 19 | 1.90 |

### Voltage Derating by Temperature




* Please consult Panasonic if your condition exceeds the above spec.

*Permissible voltage graph is the case of sine waveform. When you use this product, peak voltage must not exceed DC rated voltage.

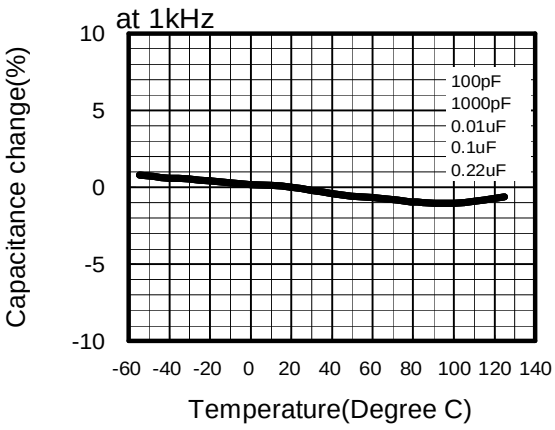
*The current($_{0\text{-}P}$) value is calculated using nominal capacitance.

Panasonic

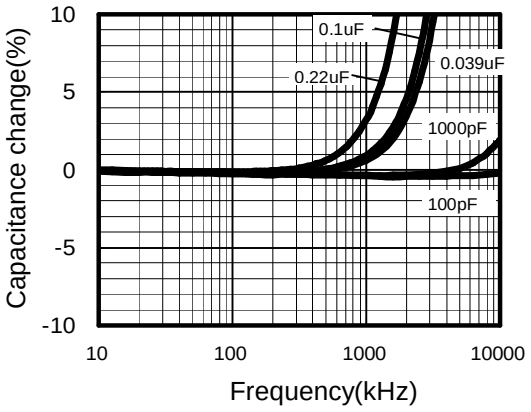
# ECHU (X) Type DC50V series (Stacked Metallized Film)

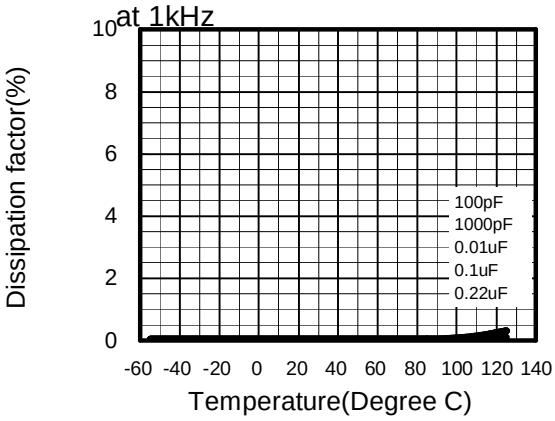
## Electrical Characteristics <Typical Data >

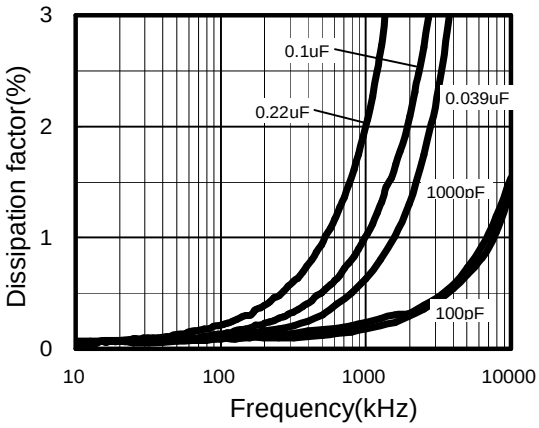
### Temperature Characteristics

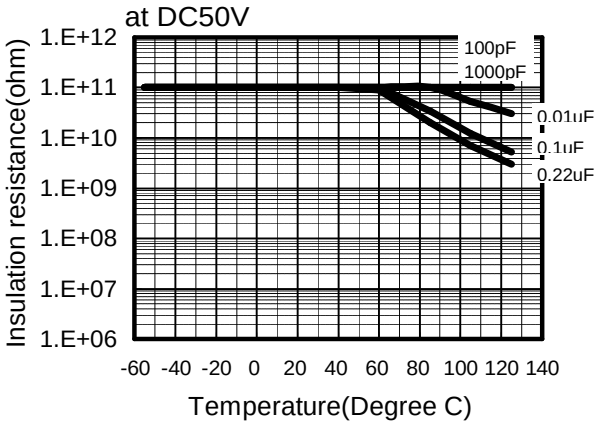


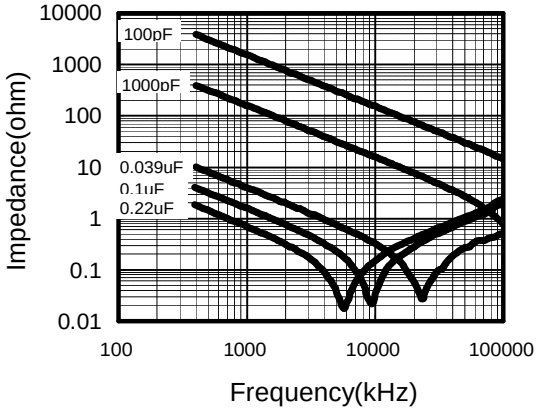

### Frequency Characteristics



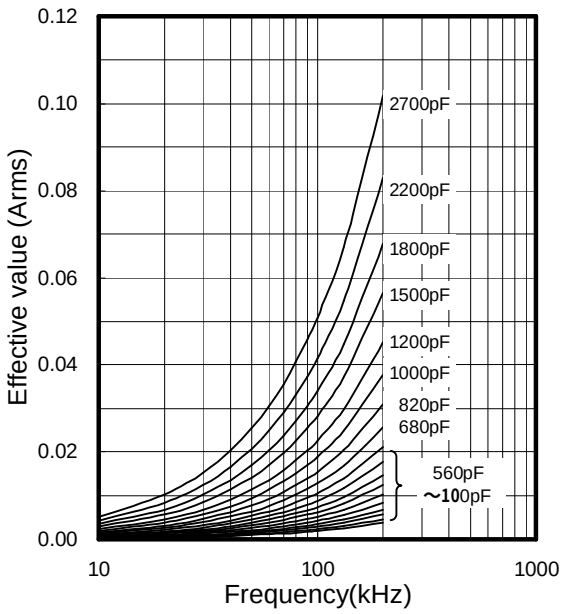



Panasonic

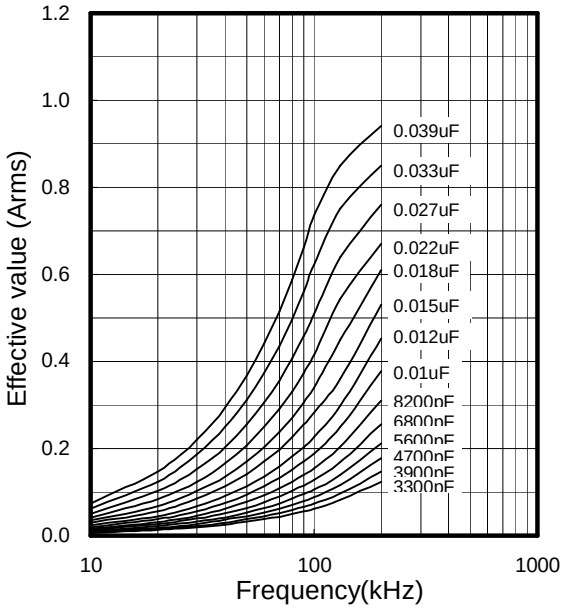
# ECHU (X) Type DC50V series (Stacked Metallized Film)

## Applicable Specifications

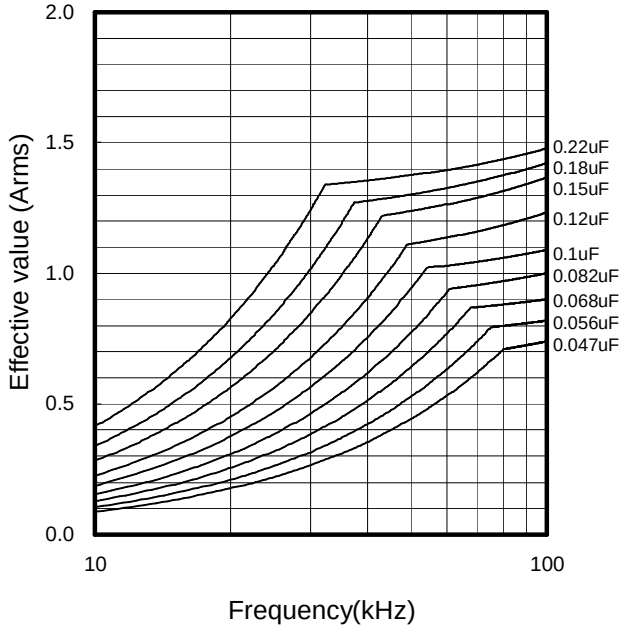
### Permissible Current



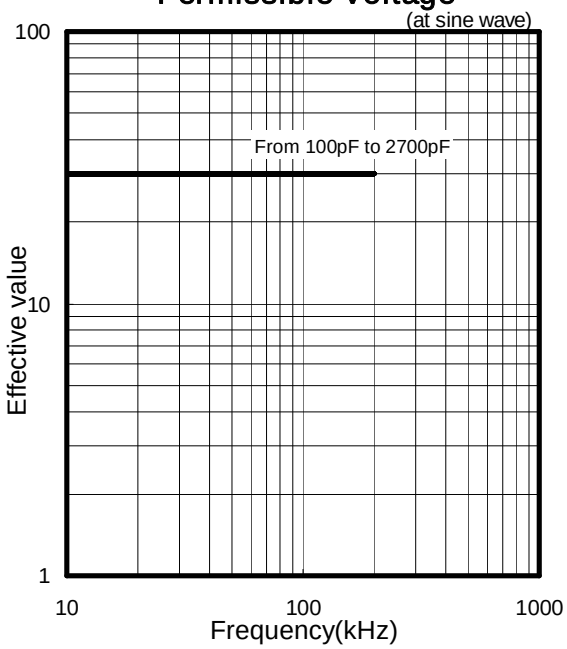

### Permissible Current




### Permissible Current




### Permissible Voltage



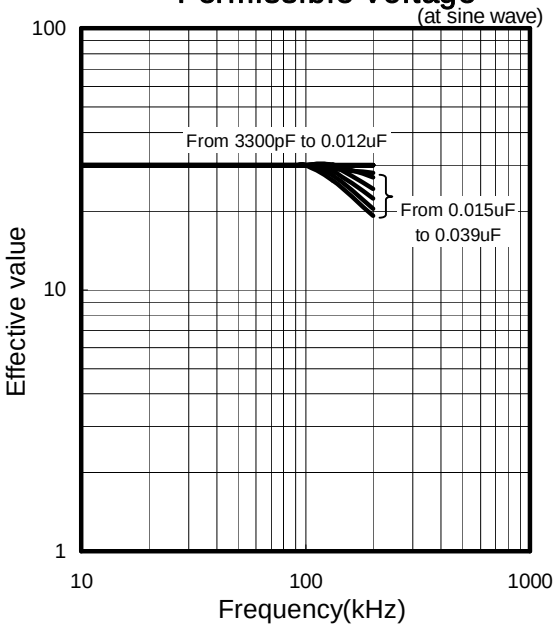

*Please consult Panasonic if your condition exceeds the above
*Permissible voltage graph is the case of sine waveform. When you use this product, peak voltage must not exceed DC rated voltage.
*The current(0-P) vlue is calculated using nominal capacitance.

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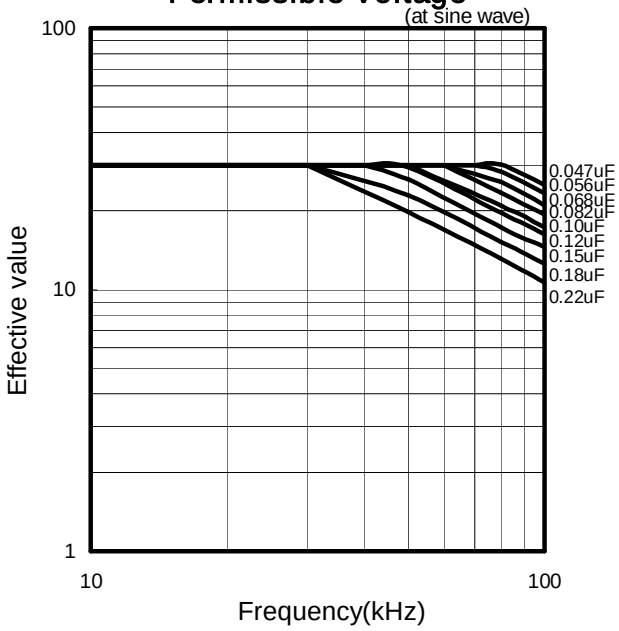
# ECHU (X) Type DC50V series (Stacked Metallized Film)

## Applicable Specifications

### Permissible Voltage




### Permissible Voltage




### Pulse Handling Capability (dv/dt)

(Max 10000cycles)

| Rating Voltage | Capacitance Value(uF) | code | dV/dt (V/us) | Current (Ao-p) |
|---|---|---|---|---|
| DC 50V | 0.00010 | 101 | 1100 | 0.11 |
| | 0.00012 | 121 | 1050 | 0.13 |
| | 0.00015 | 151 | 940 | 0.14 |
| | 0.00018 | 181 | 890 | 0.16 |
| | 0.00022 | 221 | 800 | 0.18 |
| | 0.00027 | 271 | 730 | 0.20 |
| | 0.00033 | 331 | 690 | 0.23 |
| | 0.00039 | 391 | 610 | 0.24 |
| | 0.00047 | 471 | 580 | 0.27 |
| | 0.00056 | 561 | 520 | 0.29 |
| | 0.00068 | 681 | 480 | 0.33 |
| | 0.00082 | 821 | 440 | 0.36 |
| | 0.0010 | 102 | 400 | 0.40 |
| | 0.0012 | 122 | 370 | 0.44 |
| | 0.0015 | 152 | 340 | 0.51 |
| | 0.0018 | 182 | 310 | 0.56 |
| | 0.0022 | 222 | 270 | 0.59 |
| | 0.0027 | 272 | 260 | 0.70 |

### Pulse Handling Capability (dv/dt)

(Max 10000cycles)

| Rating Voltage | Capacitance Value(uF) | code | dV/dt (V/us) | Current (Ao-p) |
|---|---|---|---|---|
| DC 50V | 0.0033 | 332 | 240 | 0.79 |
| | 0.0039 | 392 | 220 | 0.86 |
| | 0.0047 | 472 | 200 | 0.94 |
| | 0.0056 | 562 | 190 | 1.06 |
| | 0.0068 | 682 | 170 | 1.16 |
| | 0.0082 | 822 | 160 | 1.31 |
| | 0.010 | 103 | 145 | 1.45 |
| | 0.012 | 123 | 135 | 1.62 |
| | 0.015 | 153 | 120 | 1.80 |
| | 0.018 | 183 | 110 | 1.98 |
| | 0.022 | 223 | 100 | 2.20 |
| | 0.027 | 273 | 94 | 2.54 |
| | 0.033 | 333 | 86 | 2.84 |
| | 0.039 | 393 | 78 | 3.04 |

*Please consult Panasonic if your condition exceeds the above
*Permissible voltage graph is the case of sine waveform. When you use this product, peak voltage must not exceed DC rated voltage.
*The current(0-P) value is calculated using nominal capacitance.

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# ECHU (X) Type DC50V series (Stacked Metallized Film)

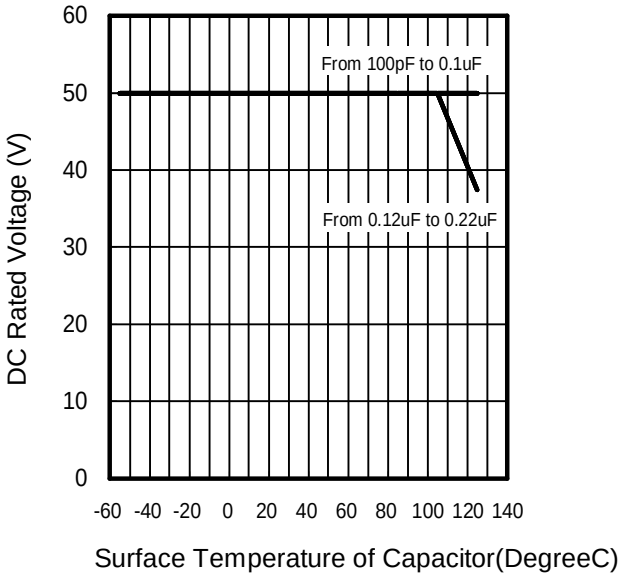
## Applicable Specifications

### Pulse Handling Capability (dv/dt)

(Max 10000cycles)

| Rating Voltage | Capacitance Value(uF) | code | dV/dt (V/us) | Current (Ao-p) |
|---|---|---|---|---|
| DC 50V | 0.047 | 473 | 72 | 3.38 |
| | 0.056 | 563 | 68 | 3.81 |
| | 0.068 | 683 | 62 | 4.22 |
| | 0.082 | 823 | 56 | 4.59 |
| | 0.10 | 104 | 52 | 5.20 |
| | 0.12 | 124 | 48 | 5.76 |
| | 0.15 | 154 | 44 | 6.60 |
| | 0.18 | 184 | 40 | 7.20 |
| | 0.22 | 224 | 36 | 7.92 |

### Voltage Derating by Temperature




*Please consult Panasonic if your condition exceeds the above
*Permissible voltage graph is the case of sine waveform. When you use this product, peak voltage must not exceed DC rated voltage.
*The current(0-P) value is calculated using nominal capacitance.