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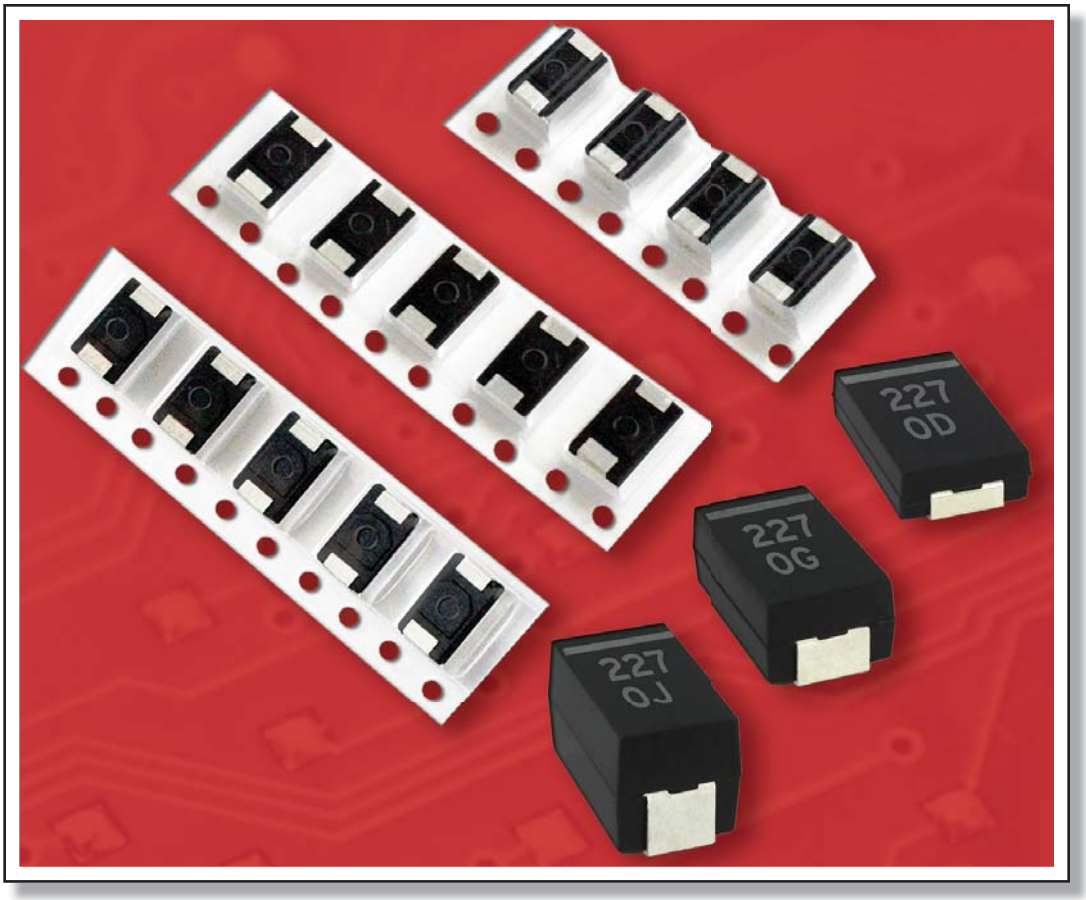
Innovator in Electronics

Product Guide

POLYMER Aluminum Electrolytic Capacitors

ECAS Series



Murata Manufacturing Co., Ltd.'s ECAS series of polymer aluminum electrolytic capacitors realize low ESR, low impedence and high capacitance by means of multilayered aluminum foil for anode, solid conductive polymer for cathode.

With no bias characteristics and stable temperature characteristics, ECAS series have excellent performance in ripple absorption, smoothing and transient response suitable for numerous applications. Therefore, it is suitable for smoothing of input-output current of various power supply circuits, and the backup use over the load change of the CPU circumference.

This contributes to a reduction of the number of parts, or reduction of substrate area.

Specifications and Features

Specifications

- Capacitance Range: 6.8 to 470µF
- Rated Voltage: 2 to 16VDC
- ESR: 6 to 70mΩ
- Operating Temperature: -40 to 105°C

Features

- High capacitance and Low ESR
- Stable capacitance with applied DC voltage/ temperature/high frequencies
- Excellent ripple absorption, smoothing, transient response
- No voltage derating required
- Polarity bar (positive) noted on product
- Surface mount construction
- RoHS compliant
- Halogen free
- Moisture Sensitivity Level (MSL) 3 packaging

Design Support Tool – SimSurfing

- www.murata.com/simsurfing/
- Frequency responses (Z, ESR, ESL) of ECAS Series are available
- Netlist and S-paramater can be downloaded

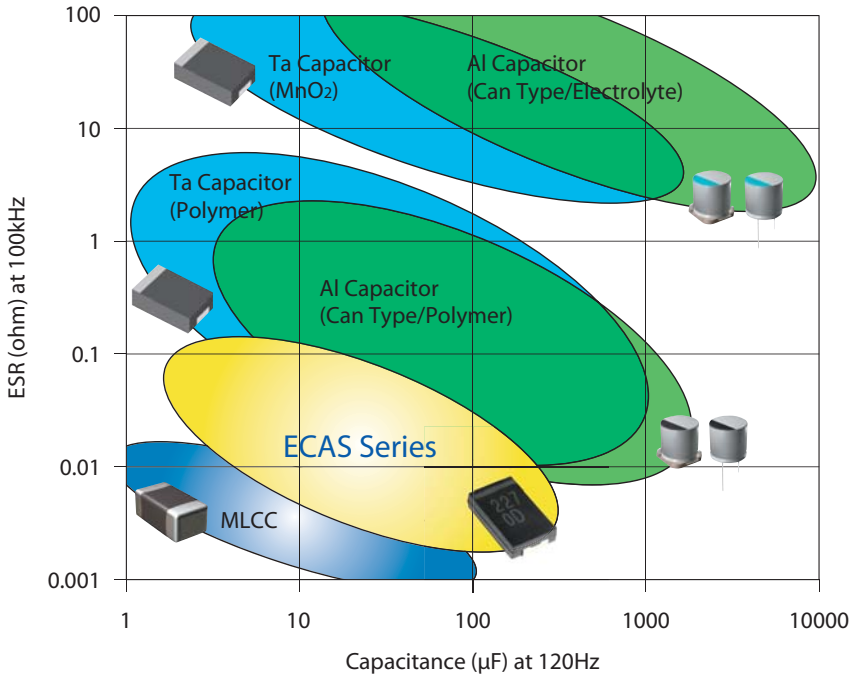
Product Lineup

Voltage (VDC)	Capacitance Value (µF)														
	6.8	10	15	22	33	47	56	68	82	100	150	180	220	330	470
2		POLYMER & MLCC SOLUTIONS								D4 16	D4 9		D4 9	D6 7	D6 6
4								D4 20	D4 16		D4 16	D6 12	D6 10	D9 8	
6.3		D4 55		D4 45	D4 25	D4 25		D4 15		D4 15	D6 10	D6 10 NEW!	D9 10		
10		D4 55		D4 28	D4 25	D4 25 NEW!		D6 15		D9 10	D9 10				
12.5		D4 55	D4 45	D4 30	D4 25 NEW!	D6 20	D6 20 NEW!			D9 12		POLYMER SOLUTIONS			
16	D4 70	D4 60	D4 40	D6 30											

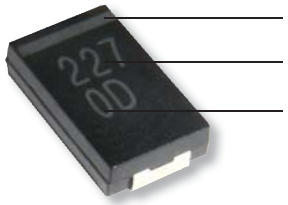
D4 / 6 — Case Size Code / ESR (mΩ)

Mass Production

Capacitor Map (Cap & ESR)



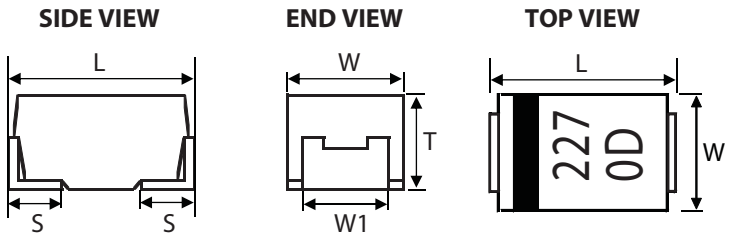
Appearance



Polarity Indicator Bar (+)
Capacitance Code
Rated Voltage Code

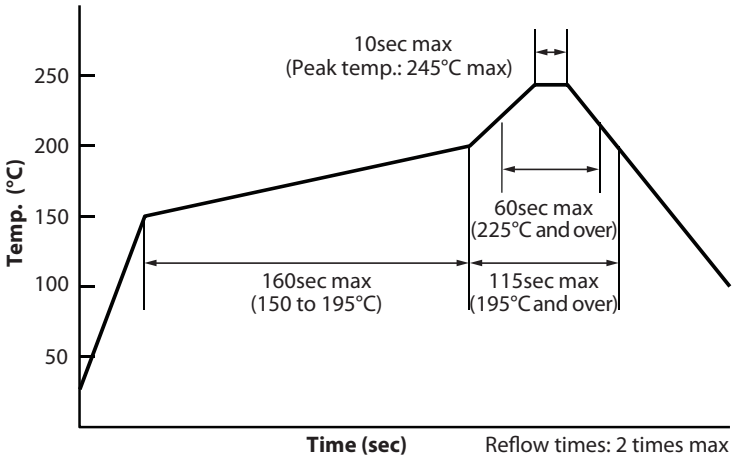
Ex. 220uF/2V

Dimensions (mm)



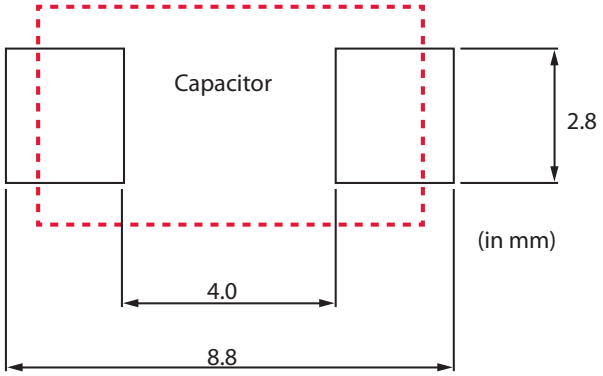
Case Size	EIA Metric	L	W	T	W1	S
D4	7343	7.3 ± 0.3	4.3 ± 0.2	1.9 ± 0.1	2.4 ± 0.2	1.3 ± 0.2
D6	7343	7.3 ± 0.3	4.3 ± 0.2	2.8 ± 0.3	2.4 ± 0.2	1.3 ± 0.2
D9	7343	7.3 ± 0.3	4.3 ± 0.3	4.2 ± 0.3	2.4 ± 0.2	1.3 ± 0.2

Recommended Reflow Profile



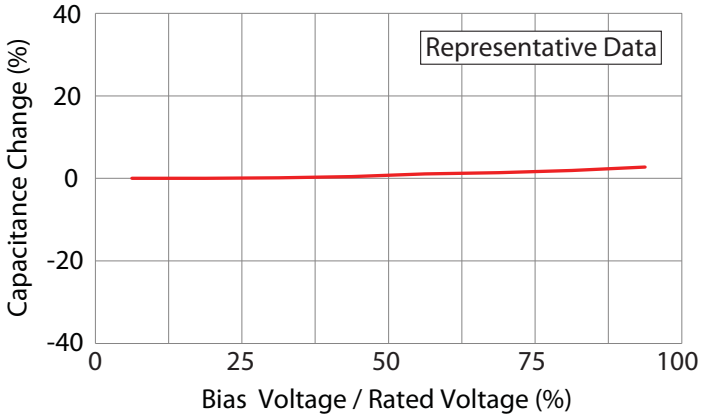
Reflow times: 2 times max

Land Pattern Design

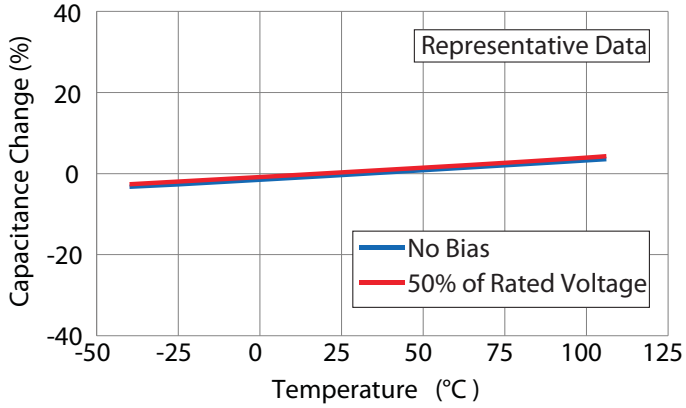


Characteristics

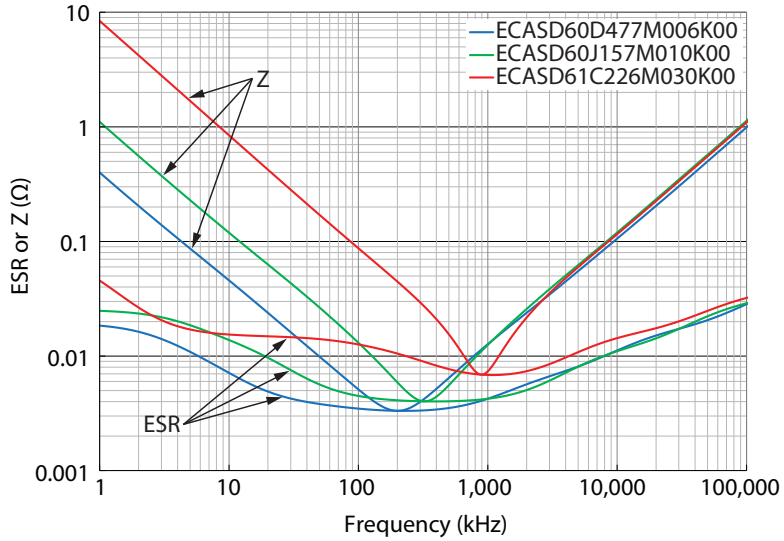
DC Bias Characteristics



Temperature Characteristics of Capacitance



Low ESR & Z



Part Number Listing

Murata Part Number	Rated Voltage (VDC)	Cap. (µF) 120Hz/ 25°C	Cap Tolerance (%)	Case Size			ESR (mΩ) 100kHz /+25°C	Leakage Current (µA)	Ripple Current (Arms) 100kHz	Min. Packaging Quantity (pcs)
				Code	L x W (mm)	T (mm)				
ECASD40D107M016K00	2	100	±20	D4	7343	1.9	16	8.0	2.0	3,000
ECASD40D157M009K00	2	150	±20	D4	7343	1.9	9	12.0	3.0	3,000
ECASD40D227M009K00	2	220	±20	D4	7343	1.9	9	17.6	3.0	3,000
ECASD60D337M007K00	2	330	±20	D6	7343	2.8	7	26.4	3.5	2,500
ECASD60D477M006K00	2	470	±20	D6	7343	2.8	6	37.6	3.5	2,500
ECASD40G686M020K00	4	68	±20	D4	7343	1.9	20	10.9	1.9	3,000
ECASD40G826M016K00	4	82	±20	D4	7343	1.9	16	13.2	2.1	3,000
ECASD40G157M016K00	4	150	±20	D4	7343	1.9	16	24.0	2.1	3,000
ECASD60G187M012K00	4	180	±20	D6	7343	2.8	12	28.8	2.5	2,500
ECASD60G227M010K00	4	220	±20	D6	7343	2.8	10	35.2	3.0	2,500
ECASD90G337M008K00	4	330	±20	D9	7343	4.2	8	52.8	3.3	2,000
ECASD40J106M055K00	6.3	10	±20	D4	7343	1.9	55	2.6	1.0	3,000
ECASD40J226M045K00	6.3	22	±20	D4	7343	1.9	45	5.6	1.0	3,000
ECASD40J336M025K00	6.3	33	±20	D4	7343	1.9	25	8.4	1.8	3,000
ECASD40J476M025K00	6.3	47	±20	D4	7343	1.9	25	11.9	1.8	3,000
ECASD40J686M015K00	6.3	68	±20	D4	7343	1.9	15	17.2	2.0	3,000
ECASD40J107M015K00	6.3	100	±20	D4	7343	1.9	15	25.2	2.0	3,000
ECASD60J157M010K00	6.3	150	±20	D6	7343	2.8	10	37.8	3.0	2,500
ECASD60J187M010K00 ***NEW***	6.3	180	±20	D6	7343	2.8	10	45.4	3.0	2,500
ECASD90J227M010K00	6.3	220	±20	D9	7343	4.2	10	55.5	3.0	2,000
ECASD41A106M055K00	10	10	±20	D4	7343	1.9	55	4.0	1.0	3,000
ECASD41A226M028K00	10	22	±20	D4	7343	1.9	28	8.8	1.6	3,000
ECASD41A336M025K00	10	33	±20	D4	7343	1.9	25	13.2	1.8	3,000
ECASD41A476M025K00 ***NEW***	10	47	±20	D4	7343	1.9	25	18.8	1.8	3,000
ECASD61A686M015K00	10	68	±20	D6	7343	2.8	15	27.2	2.0	2,500
ECASD91A107M010K00	10	100	±20	D9	7343	4.2	10	40.0	3.0	2,000
ECASD91A157M010K00	10	150	±20	D9	7343	4.2	10	60.0	3.0	2,000
ECASD41B106M055K00	12.5	10	±20	D4	7343	1.9	55	12.5	1.0	3,000
ECASD41B156M045K00	12.5	15	±20	D4	7343	1.9	45	18.8	1.0	3,000
ECASD41B226M030K00	12.5	22	±20	D4	7343	1.9	30	27.5	1.6	3,000
ECASD41B336M025K00 ***NEW****	12.5	33	±20	D4	7343	1.9	25	41.3	1.8	3,000
ECASD61B476M020K00	12.5	47	±20	D6	7343	2.8	20	58.8	2.0	2,500
ECASD61B566M020K00 ***NEW****	12.5	56	±20	D6	7343	2.8	20	70.0	2.0	2,500
ECASD91B107M012K00	12.5	100	±20	D9	7343	4.2	12	125.0	2.5	2,000
ECASD41C685M070K00	16	6.8	±20	D4	7343	1.9	70	10.9	1.0	3,000
ECASD41C106M060K00	16	10	±20	D4	7343	1.9	60	16.0	1.0	3,000
ECASD41C156M040K00	16	15	±20	D4	7343	1.9	40	24.0	1.0	3,000
ECASD61C226M030K00	16	22	±20	D6	7343	2.8	30	35.2	1.6	2,500

***Reduced Thickness** – ECASD41B336M025K00 (12.5V/33uF → D4), ECASD61B566M020K00 (12.5V/56uF → D6)

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Part Number Description

ECAS	D4	0D	227	M	009	K	00
①	②	③	④	⑤	⑥	⑦	⑧

① Series

ECAS	Polymer Al Electrolytic Capacitor

② Dimension (L×W×T) (mm)

Code	L	W	T
D4	7.3 ± 0.3	4.3 ± 0.2	1.9 ± 0.1
D6	7.3 ± 0.3	4.3 ± 0.2	2.8 ± 0.3
D9	7.3 ± 0.3	4.3 ± 0.3	4.2 ± 0.3

③ Rated Voltage

Code	Rated Voltage
0D	DC 2V
0G	DC 4V
0J	DC 6.3V
1A	DC 10V
1B	DC 12.5V
1C	DC 16V

④ Capacitance

Expressed by three-digit numeric code. The unit is microfarad (μF). The first and second figures are significant digits, and the third figure expresses the number of zeros that follow the two figures.

Code	Capacitance
476	47μF
107	100μF
227	220μF
477	470μF

⑤ Capacitance Tolerance

	Code	Capacitance Tolerance
Ex.	M	±20%

⑥ ESR

Expressed by three-digit alphanumerics. The unit is milli-ohm (mΩ). If there is a decimal point, it is expressed by the capital letter "R."

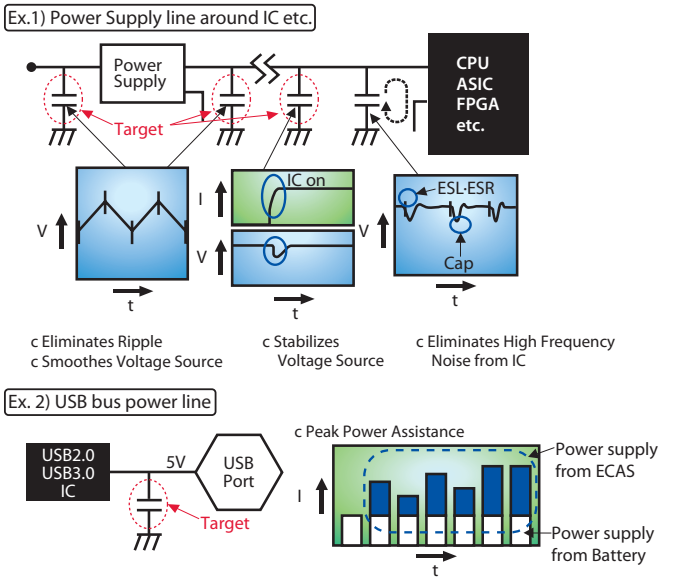
	Code	ESR
Ex.	4R5	4.5mΩ
	009	9mΩ
	010	10mΩ

⑦ Packaging

Code	Packaging
K	ø330mm Embossed Tape

⑧ Inhouse Specification Code Expressed by two figures.

Applications

Market	Set/Application	Overall Power Management
Computer 	Notebook/Netbook	
	Server	
	Motherboard/Graphics Card	
	Multifunction Peripheral (Copier/Printer)	
Digital AV 	Digital TV (LCD/Plasma)	
	Game Console	
	Set Top Box	
Telecom 	Network/Switch/Router	
	Base Station	

Specifications and Test Methods

No.	Item		Characteristics	Test Conditions
1	**Operating Temperature Range**		-40°C to +105°C	
2	**Leakage Current**		≤The value of "Part Number Listing"	Series resistor: 1000 ohm Applied voltage: Rated voltage Measured after 2 minutes of application. Please conduct pre-conditioning below, if in doubt. Pre-conditioning: ·Temperature: room temp. Applied voltage: Rated voltage ·Series resistor: 1000 ohm ·Charge time: 30 min.
3	**Capacitance Tolerance**		Please refer to "Part Number Listing"	Measuring frequency: 120Hz ±10% Measuring circuit: Equivalent series circuit Measuring voltage: +1Vrms Measuring temperature: 25°C
4	**Dissipation Factor**		≤0.06	
5	**ESR**		≤The value of "Part Number Listing"	Measuring frequency: 100kHz ±10% Measuring voltage: no more than +1Vrms Measuring temperature: 25°C
6	**Allowable Ripple Current**		Please refer to "Part Number Listing"	Measuring frequency: 100kHz ±10%
7	**Solderability**		More than 95% of each terminal face is covered by new solder	Eutectic solder: H60A Flux: Ethanol solution of 25% rosin Solder temperature: 235 ±5°C Immersing time: 5 ±0.5s
8	**Moisture Resistance Under No Bias**	Leakage Current	≤750% of initial specified value for 2V to 10V products ≤300% of initial specified value for 12.5V to 16V products	Test temperature: 60±2°C Relative humidity: 90 to 95%RH Test time: 500+24, -0h
		Capacitance Change	-20% and +50% of initial measured value	
		Dissipation Factor	≤0.12	
		Appearance	No defects or abnormalities	
9	**Moisture Resistance Under Load**	Leakage Current	≤The value of "Part Number Listing"	Test temperature: 60±2°C Relative humidity: 90 to 95%RH Test time: 1000+48, -0h Applied voltage: Rated voltage
		Capacitance Change	-20% and +50% of initial measured value	
		Dissipation Factor	≤0.12	
		Appearance	No defects or abnormalities	
10	**Shelf life**	Leakage Current	≤The value of "Part Number Listing"	Test temperature: 105±2°C Test time: 1000+48, -0h
		Capacitance Change	±10% of initial measured value	
		Dissipation Factor	≤0.06	
		Appearance	No defects or abnormalities	
11	**Endurance**	Leakage Current	≤The value of "Part Number Listing"	Test temperature: 105±2°C Test time: 1000+48, -0h Applied voltage: Rated voltage
		Capacitance Change	±10% of initial measured value	
		Dissipation Factor	≤0.06	
		Appearance	No defects or abnormalities	
12	**Surge**	Leakage Current	≤The value of "Part Number Listing"	Temperature: +85°C for 2V to 10V products Room temp. for 12.5V to 16V products Applied voltage: Rated voltage x1.25 for 2V to 10V products Rated voltage x1.15 for 12.5V to 16V products Current limiting resistance: 33 ohm (in series) for 2V to 10V products 1k ohm (in series) for 12.5V to 16V products Discharge resistance: 33 ohm (in series) for 2V to 10V products 1k ohm (in series) for 12.5V to 16V products Charge on/off: 30 sec. each, 1000 times
		Capacitance Change	±10% of initial measured value	
		Dissipation Factor	≤0.06	
		Appearance	No defects or abnormalities	

Caution Before Use

CAUTIONS

1. Prohibited Circuits

ECAS series cannot be used on the following circuits.

① Time constant circuits
② Coupling circuits
③ The circuits in which two or more ECAS series are connected in a series so as to raise the endurance voltage
④ Circuits greatly affected by leakage current

2. Polarity

Polymer aluminum electrolytic capacitor is polarized. Please not to reverse the polarity when using. If reverse voltage is applied, it may damage the oxide film and the capacitor itself.

3. 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.

4. Inrush Current

Extreme inrush current may cause short circuit or leakage current increase. If the inrush current exceeds 20A, adding protection circuit is recommended.

5. Allowable Ripple Current

Please not to apply ripple current exceeding the allowable value specified in this document. If excessive current is applied, it may generate heat and the heat may damage the capacitor. The sum of DC voltage and the peak AC voltage shall not exceed the rated voltage. The sum of the DC voltage and the peak AC voltage shall not allow a voltage reversal.

Maximum allowable ripple current = Allowable Ripple Current x *Temperature Compensation Coefficient

*Temperature Compensation Coefficient = 1.00(TB45°C), 0.70(45°C<TB85°C), 0.25(85°C<TB105°C)

6. Operating Temperature

The operating temperature limit depends on the capacitor.

① Do not apply temperature exceeding the upper operating temperature. It is necessary to select a capacitor with a suitable rated temperature that will cover the operating temperature range. Also it is necessary to consider the temperature distribution in equipment and the seasonal temperature variable factor.

② Consider the self-heating of the capacitor. The surface temperature of the capacitor shall be the upper operating temperature or less when including the self-heating factors.

7. Reflow Soldering

Please not to apply excessive force to the capacitor during insertion as well as after soldering. The excessive force may result in damage to electrode terminals and/or degradation of electrical performance.

8. Operating Environment

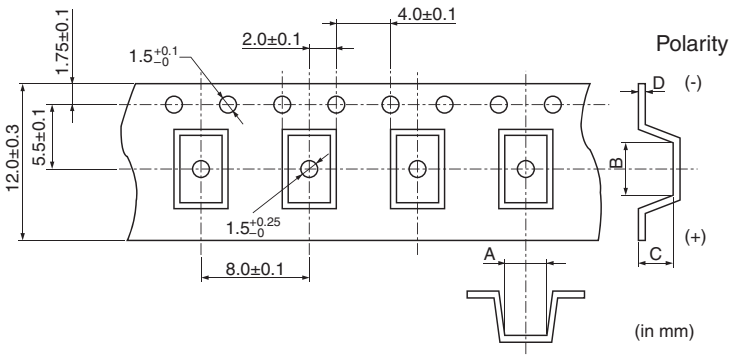
Confirm the environment in which the equipment will operate is under the specified conditions. Do not use the equipment under the following environments.

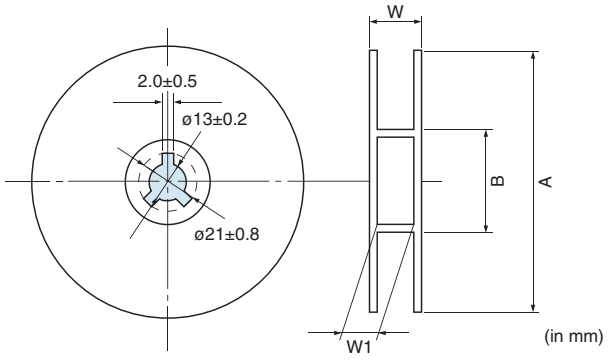
① Being spattered with water or oil.
② Being exposed to direct sunlight.
③ Being exposed to Ozone, ultraviolet rays or radiation.
④ Being exposed to toxic gas (e.g., hydrogen sulfide, sulfur dioxide, chlorine, ammonia gas, etc.)
⑤ Being exposed to excessive vibrations or mechanical shocks.
⑥ Being exposed to condensable environments.

9. Failure Rate

The failure rate is 0.5%/1,000h (60% Reliability) based on JIS C 5003.

Packaging





Type	Cavity Size (mm)				Minimum Qty. (pcs.)
	A±0.2	B±0.2	C±0.2	D	
D4	4.5	7.6	2.2	0.4 max.	3,000
D6	4.5	7.6	3.2	0.4 max.	2,500
D9	4.5	7.6	4.6	0.4 max.	2,000

Reel Size	Tape Width	A	B	W	W1
ø330	12	330.0±2.0	100.0±1.0	17.5±1.5	13.5±1.5

STORAGE CONDITIONS

1. Term of warranty for this product is two years after packaging in a moisture-proof bag, under the conditions below with sealed packaging.
Recommended storage environment: Room temperature: 5-30°C; Humidity: no more than 60%RH

2. Polymer aluminum electrolytic capacitors should not be stored in an atmosphere consisting of corrosive gas (e.g., hydrogen sulfide, sulfur dioxide, chlorine, ammonia gas, etc.).

3. Polymer aluminum electrolytic capacitors should be stored in a dry atmosphere, avoiding direct sunlight and condensation. If capacitors are kept at a higher humidity, the following problems may occur: ①Leakage current will increase at the beginning of use and damage the circuit. ②Moisture absorbed in a resin will evaporate and expand with heat of mounting and damage the mold resin.

4. Please confirm a dry state with a humidity indicator card after open immediately. If 20% indication was in a pink state after opened, it is recommended to bake under the conditions below as countermeasures against the problems ① and ② in item 3 above respectively.

5. The capacitors should be kept dry using desiccators or any other methods after unsealing the moisture-proof packaging. If more than two weeks has passed under the recommended storage environment specified above after unsealing the packaging, it is recommended to apply voltage and to bake under the conditions below, as countermeasures against the problems ① and ② in item 3 above respectively.

① Recommended voltage conditions:
Applied voltage: rated voltage
Time: 30 minutes
Temperature: room temperature
Current limiting resistance: 1000Ω (series connection)

② Recommended baking conditions:
Temperature: 60 (+0, -5) °C
Time: 168 hours

6. This product meets Moisture Sensitivity Level (MSL) 3 packaging.

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Supplier Series Cross Reference

Manufacturer	P/N Prefix / Series	Brand	MuRata	Series Name
Panasonic	EEF	SP-Cap	MuRata	ECAS
Kemet	A700	AO-CAP	MuRata	ECAS
Showa Denko	A705	SDK-CAP	MuRata	ECAS
Rubycon	SXB, SXE, SW	PC-CON	MuRata	ECAS
NIC	NSP, NPC	-	MuRata	ECAS
Cornell Dublier	ESR, SPA, SPSX, SPCX	-	MuRata	ECAS

Notes

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⚠ Note:

1. Export Control
   <For customers outside Japan> Murata products should not be used or sold for use in the development, production, stockpiling or utilization of any conventional weapons or mass-destructive weapons (nuclear weapons, chemical or biological weapons, or missiles), or any other weapons.
   <For customers in Japan> For products which are controlled items subject to the "Foreign Exchange and Foreign Trade Law" of Japan, the export license specified by the law is required for export.
2. Please contact our sales representatives or product engineers before using 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 ④ Power plant equipment
   ⑤ Medical equipment ⑥ Transportation equipment (vehicles, trains, ships, etc.)
   ⑦ Traffic signal equipment ⑧ Disaster prevention / crime prevention equipment
   ⑨ Data-processing equipment ⑩ Application of similar complexity and/or reliability requirements to the applications listed above.
3. Product specifications are subject to change or our products may be discontinued without advance notice. Please check with our sales representatives or product engineers before ordering.
4. Please read rating and ⚠ CAUTION (for storage, operating, rating, soldering, mounting and handling) to prevent smoking and/or burning, etc.
5. Please approve our product specifications or complete 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.
8. For status of RoHS compliance of our products, please consult our website.

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