INNOVATOR IN ELECTRONICS

Polymer Aluminum Electrolytic Capacitors

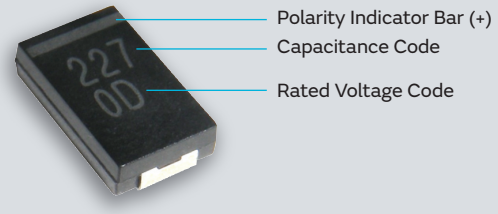
- ECAS series -

C90E.pdf
Jun. 7,2023

Description

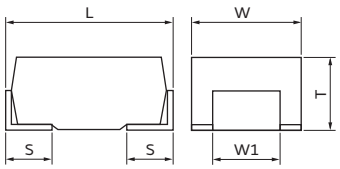
Murata Manufacturing Co., Ltd.'s ECAS series of polymer aluminum electrolytic capacitors realize low ESR, low impedence and high capacitance by means of multilayered aluminum foil for anode, solid conductive polymer for cathode. With no bias characteristics and stable temperature characteristics, ECAS 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 reduction of the number of parts, or reduction of substrate area.

Appearance



Ex.) 220µF/2V

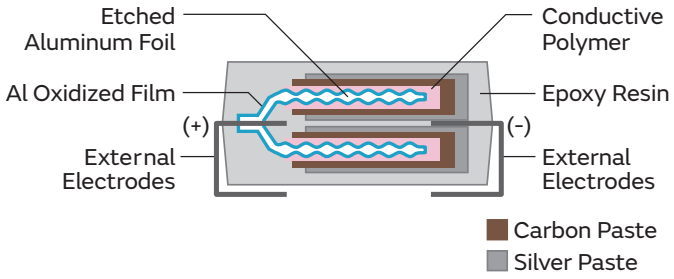
External Dimensions



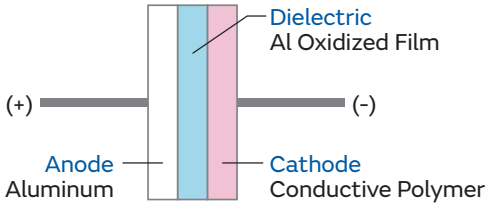
(in mm)

Case Size	EIA Metric	L	W	T	W1	S
D3	7343	7.3±0.3	4.3±0.2	1.4±0.1	2.4±0.2	1.3±0.2
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

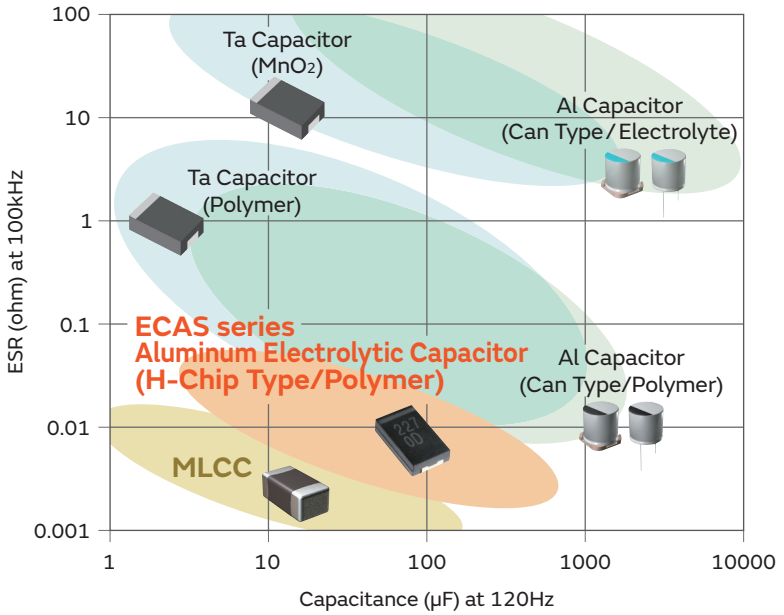
Example of Structure



Capacitor Model



Capacitor Map (Cap & ESR)



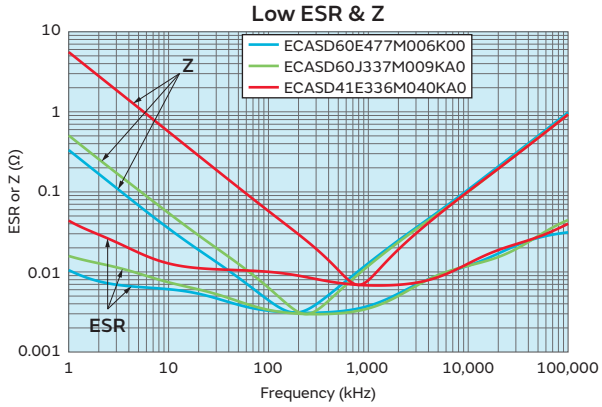
Specifications

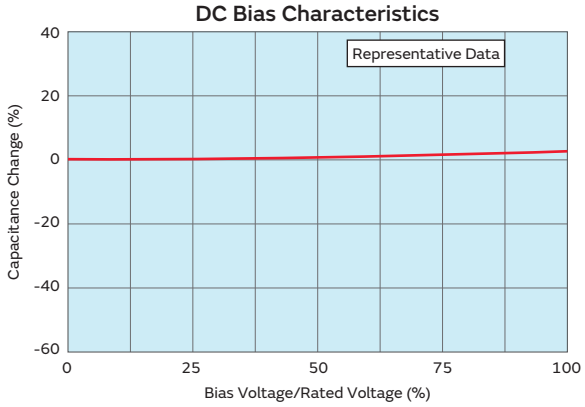
- Capacitance Range : 15 to 470µF
- Operating Temperature: -55°C (-40°C) to +105°C
- Rated Voltage : 2 to 25Vdc
- ESR : 4.5 to 40mΩ

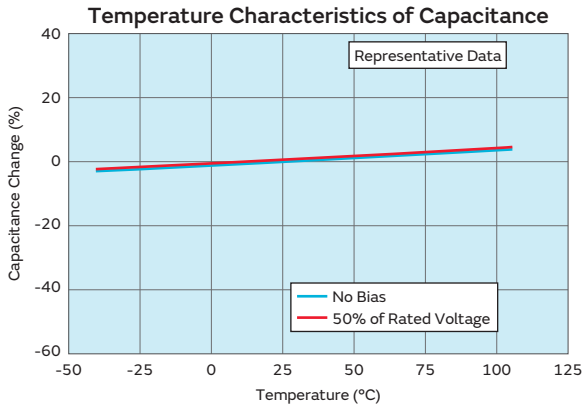
Features

- 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
- MSL 3 packaging

Characteristics







Design Support Tool - SimSurfing

https://www.murata.com/simsurfing/

- Frequency responses (Z, ESR, ESL) of ECAS Series are available.
- Netlist and S-parameter can be downloaded.
- The software "SimSurfing" is also available for your simulation on the go where no internet connection is available.

⚠Note • Please read rating and ⚠CAUTION (for storage and usage environment, rating, soldering, mounting and handling) in this catalog to prevent smoking and/or burning, etc.
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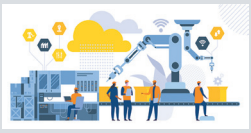
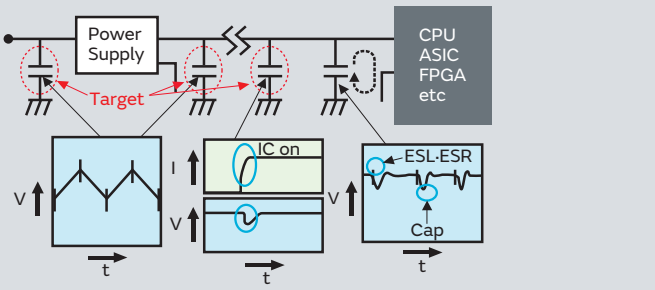
Applications

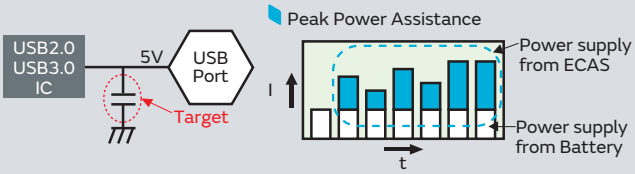
Market	Set/Application
Consumer 	Notebook/Ultrabook
	CPU/GPU_PC
	Panel_TV/Display (LCD/OLE)
	Game Console
	Wireless Charger
	IoT (UWB)
	Drone
Enterprise 	Server
	Enterprise HDD/SSD
	Enterprise Display (LED)
	Security (Camera/Home)
	Multi Function Printer
	Smart Meter
	POS/Handy Terminal
Industrial 	Production Equipment/Module
	PLC
	Industrial PC
	Robotics
	Power Tool
Network 	Base Station (Wireless)
	G-PON (Optical)
	PoE
	Switch/ Router
Others	Medical Equipment
	IVI, V2X

Ex.1) Power Supply line around IC etc...



Eliminates Ripple Smoothes Voltage Source | Stabilizes Voltage Source | Eliminates High Frequency Noise from IC

Ex.2) USB bus power line



Part Numbering

(Part Number)

ECAS	D4	0D	227	M	009	K	00
❶	❷	❸	❹	❺	❻	❼	❽

❶Series

Product ID	
ECAS	Polymer AI Electrolytic Capacitor

❷Dimension (LxWxT) (mm)

Code	L	W	T
D3	7.3±0.3	4.3±0.2	1.4±0.1
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

❸Rated Voltage

Code	Rated Voltage
0D	DC 2V
0E	DC 2.5V
0J	DC 6.3V
1A	DC 10V
1C	DC 16V
1E	DC 25V

❹Capacitance
Expressed by three-digit numeric code. 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.
Ex.)

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

❺Capacitance Tolerance

Code	Capacitance Tolerance
M	±20%

❻ESR
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".
Ex.)

Code	ESR
4R5	4.5mΩ
009	9mΩ
010	10mΩ

❼Packaging

Code	Packaging
K	ø330mm Embossed Taping

❽Individual Specification Code
Expressed by two figures.

Specifications and Test Methods

No.	Item		Characteristics	Test Conditions
1	Operating Temperature Range		-55°C (-40°C) to +105°C	—
2	Leakage Current		≦The value of "Part Number Listing"	Series resistor : 1000 ohm Applied voltage: Rated Voltage Measuring after 2 minutes of application Please conduct pre-conditioning below, if you have a doubt. Pre-conditioning: Apply rated DC voltage for 1 hour at 105°C through 1000 ohm series resistor. Then discharge and keep in the room temperature for 4 to 24 hours.
3	Capacitance Tolerance		Please refer to "Part Number Listing"	Measuring frequency : 120Hz ±10% Measuring circuit : Equivalent series circuit Measuring voltage : +1Vr.m.s. 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 +1Vr.m.s. Measuring temperature: 25°C
6	Allowable Ripple Current		Please refer to "Part Number Listing"	Measuring frequency: 100kHz ±10%
7	Solderability		More than 75% of each terminal face is covered by new solder	Lead Free Solder : Sn/3.0Ag/0.5Cu Flux : Rosin 25%, IPA 75% Solder temperature: 245 ±3°C Immersing time : 3 ±0.3s
8	Moisture Resistance Under No Bias	Leakage Current	≦300% of initial specified value (There are some exceptions)	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 : 500+24, -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 : 2000+48, -0h Applied voltage : Rated Voltage
		Capacitance Change	±20% 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 16V to 25V products Applied voltage: Rated voltage x1.25 Current limiting resistance: 33 ohm (in series) for 2V to 10V products 1k ohm (in series) for 16V to 25V products Discharge resistance: 33 ohm (in series) for 2V to 10V products 1k ohm (in series) for 16V to 25V 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	

(The measurement condition in No.2 to 4 applies to No.8 to 12.)

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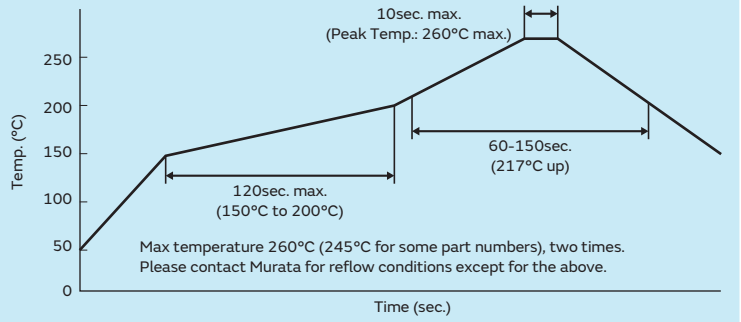
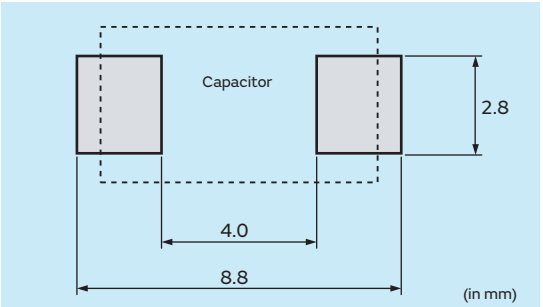
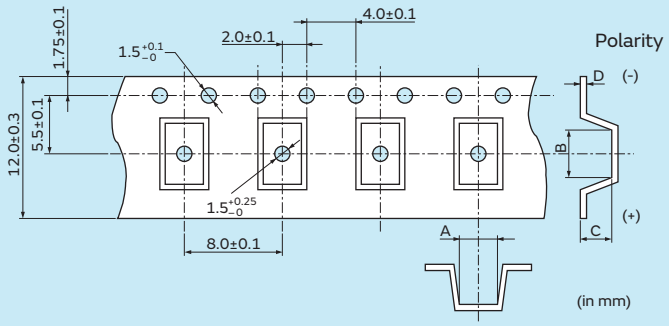
Recommended Reflow Profile

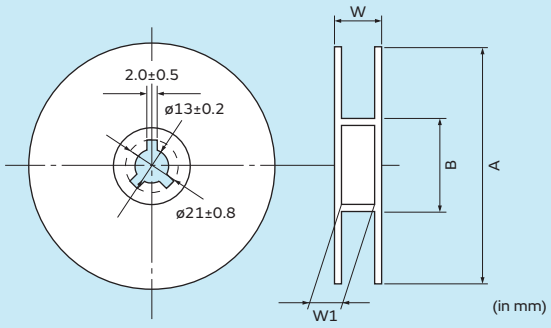


Land Pattern Design



Packaging





Case Size	Cavity Size (mm)				Minimum Qty. (pcs.)
	A*	B*	C*	D*	
D3, D4	4.60	7.65	2.16	0.23	3,000
D6	4.60	7.65	3.20	0.27	2,500

* Nominal values

Reel Size	Tape Width	A	B	W	W1
ø330	12	330.0±2.0	100.0±1.0	17.4±1.5	13.4±1.5

Part Number Listing

Part Number	Rated Voltage (V.DC)	Cap. (µF)	Cap. Tolerance (%)	Case Size			ESR Max. (mΩ) 100kHz /+25°C	Leakage Current (µA)	Ripple Current (Arms) 100kHz	Min. Packaging Quantity (pcs)
				Code	L x W (mm)	T (mm)				
ECASD40D227M009K00	2	220	±20	D4	7343	1.9	9	44.0	3.0	3,000
ECASD40E337M006KA0	2.5	330	±20	D4	7343	1.9	6	82.5	3.0	3,000
ECASD40E477M006KA0	2.5	470	±20	D4	7343	1.9	6	117.5	3.5	3,000
ECASD60E477M006K00	2.5	470	±20	D6	7343	2.8	6	117.5	3.5	2,500
ECASD60E477M4R5K00	2.5	470	±20	D6	7343	2.8	4.5	117.5	4.0	2,500
ECASD40J107M015K00	6.3	100	±20	D4	7343	1.9	15	63.0	2.0	3,000
ECASD40J157M015K00	6.3	150	±20	D4	7343	1.9	15	94.5	2.0	3,000
ECASD40J227M010KA0	6.3	220	±20	D4	7343	1.9	10	138.6	3.0	3,000
ECASD60J337M009KA0	6.3	330	±20	D6	7343	2.8	9	207.9	3.5	2,500
ECASD31A686M040KA0	10	68	±20	D3	7343	1.4	40	204.0	1.6	3,000
ECASD41A107M040KA0	10	100	±20	D4	7343	1.9	40	300.0	1.6	3,000
ECASD61A157M010KA0	10	150	±20	D6	7343	2.8	10	150.0	3.0	2,500
ECASD31C476M040KA0	16	47	±20	D3	7343	1.4	40	225.6	1.6	3,000
ECASD41C686M040KA0	16	68	±20	D4	7343	1.9	40	326.4	1.6	3,000
ECASD61C107M012KA0	16	100	±20	D6	7343	2.8	12	480.0	2.5	2,500
ECASD31D476M040KA0	20	47	±20	D3	7343	1.4	40	282.0	1.6	3,000
ECASD41D476M040KA0	20	47	±20	D4	7343	1.9	40	282.0	1.6	3,000
ECASD31E156M040KA0	25	15	±20	D3	7343	1.4	40	112.5	1.6	3,000
ECASD31E226M040KA0	25	22	±20	D3	7343	1.4	40	165.0	1.6	3,000
ECASD41E336M040KA0	25	33	±20	D4	7343	1.9	40	247.5	1.6	3,000

Cautions for Use

Cautions

<1> Prohibited Circuits For Use
Do not use the capacitor with the following circuits.
①Time-constant circuit ②Coupling circuits ③2 or more capacitors connected serially
④Circuit which are 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 even momentary, 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.

<6> Operating Temperature
The operating temperature limit depends on the capacitor.
①Do 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.
②Consider 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.
①Being spattered with water or oil. ②Being exposed to direct sunlight. ③Being exposed to Ozone, ultraviolet rays or radiation.
④Being exposed to toxic gas (e.g., hydrogen sulfide, sulfur dioxide, chlorine, ammonia gas, etc.)
⑤Being exposed to excessive vibrations or mechanical shocks. ⑥Being exposed to condensable environments.

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.

<5> The capacitors should be kept dry using desiccators or any other methods after unsealing the moisture-proof packaging. If more than one week has passed under the recommended storage environment specified above after unsealing the packaging, it is recommended to bake under the conditions below.
Recommended baking conditions Temperature: 60 (+0, -5) °C Time: 168 hours

<6> This product meets MSL-3.

EU RoHS Compliant

- All the products in this catalog comply with EU RoHS.
- EU RoHS is "the European Directive 2011/65/EU 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/en-us/support/compliance/rohs).

Global Locations

For details please visit www.murata.com

Cat. No. C90E-9

⚠Precautions for use

1 The products listed in our catalog or our webpage (hereinafter the product(s) is called as the "Product(s)", and the catalog and the website are collectively called as "Our Catalog") are designed and manufactured for particular applications specified in Our Catalog, specification forms, datasheets, and/or other documents officially issued by us. (hereinafter called as the "Particular Application").
We shall not warrant anything in connection with the Products including fitness, performance, adequateness, safety, or quality, in the case of applications listed in from ① to ⑪ written at the end of this precautions, which may generally require high performance, function, quality, management of production or safety. Therefore, the Product shall be applied in compliance with the Particular Application.*
WE DISCLAIM ANY LOSS AND DAMAGES ARISING FROM OR IN CONNECTION WITH THE PRODUCTS INCLUDING BUT NOT LIMITED TO THE CASE SUCH LOSS AND DAMAGES CAUSED BY THE UNEXPECTED ACCIDENT, IN EVENT THAT (i) THE PRODUCT IS APPLIED FOR THE PURPOSE WHICH IS NOT SPECIFIED AS THE PARTICULAR APPLICATION FOR THE PRODUCT, AND/OR (ii) THE PRODUCT IS APPLIED FOR ANY FOLLOWING APPLICATION PURPOSES FROM ① to ⑪ (EXCEPT THAT SUCH APPLICATION PURPOSE IS UNAMBIGUOUSLY SPECIFIED AS PARTICULAR APPLICATION FOR THE PRODUCT IN OUR CATALOG SPECIFICATION FORMS, DATASHEETS, OR OTHER DOCUMENTS OFFICIALLY ISSUED BY US**).

- ① Aircraft equipment
- ② Aerospace equipment
- ③ Undersea equipment
- ④ Power plant control equipment
- ⑤ Medical equipment
- ⑥ Transportation equipment
- ⑦ Traffic signal equipment
- ⑧ Disaster prevention/security equipment
- ⑨ Industrial data-processing equipment
- ⑩ Combustion/explosion control equipment
- ⑪ Equipment with complexity and/or required reliability equivalent to the applications listed in the above.

For exploring information of the Products which will be compatible with the particular purpose other than those specified in Our Catalog, please contact our sales offices, distribution agents, or trading companies with which you make a deal, or via our web contact form.
Contact form: https://www.murata.com/contactform

* In case the Particular Application is not specified in Our Catalog, please see our specification forms, datasheets, and/or other documents officially issued by us.

** We may design and manufacture particular Products for applications listed in ① to ⑪. Provided that, in such case we shall unambiguously specify such particular application in Our Catalog, specification forms, datasheets, and/or other documents officially issued by us without any exception. Therefore, any other documents and/or performances, whether exist or non-exist, shall not be deemed as the evidence to imply that we accept the applications listed in ① to ⑪.

2 The contents in this catalog are as of June 2023. The contents are subject to change without notice for improvement or the products in it may be stopped without notice, so please confirm when ordering.
If there are any questions, please contact our sales offices, distribution agents, or trading companies with which you make a deal, or via our web contact form.
Contact form: https://www.murata.com/contactform

3 Please read rating and ⚠CAUTION (for storage and usage environment, rating, soldering, mounting and handling) in this catalog to prevent smoking and/or burning, etc.

4 This catalog has only typical specifications. Therefore, please check the details of the delivery specifications before ordering.

5 This catalog has only typical 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 Manufacturing Co., Ltd.

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