



Specification No. JECXDE-9004E

Product Specification

Issued Date: 17 / Dec. / 2014

Part Description: Supercapacitor (EDLC)

Customer Part No.: _____

MURATA Part No.: DMT334R2S474M3DTA0

Acknowledgement of reception

We have received the attached specification

Date:

Company:

Dept.:

Representative

Received by

(Signature)
(Type)

(Signature)
(Type)

Technical Dept.

Prepared by

(Signature)
(Type)

Murata Manufacturing Co., Ltd.
High Performance Power Device Department
Planning and Promotion Sec.

Representative

(Company name/Dept.)

(Signature)
(Type)

1. Scope

This product specification is applied to supercapacitor (EDLC) used for energy backup purpose for consumer and industrial electronics market.

Please contact us when using this product for any other applications than described in the above.

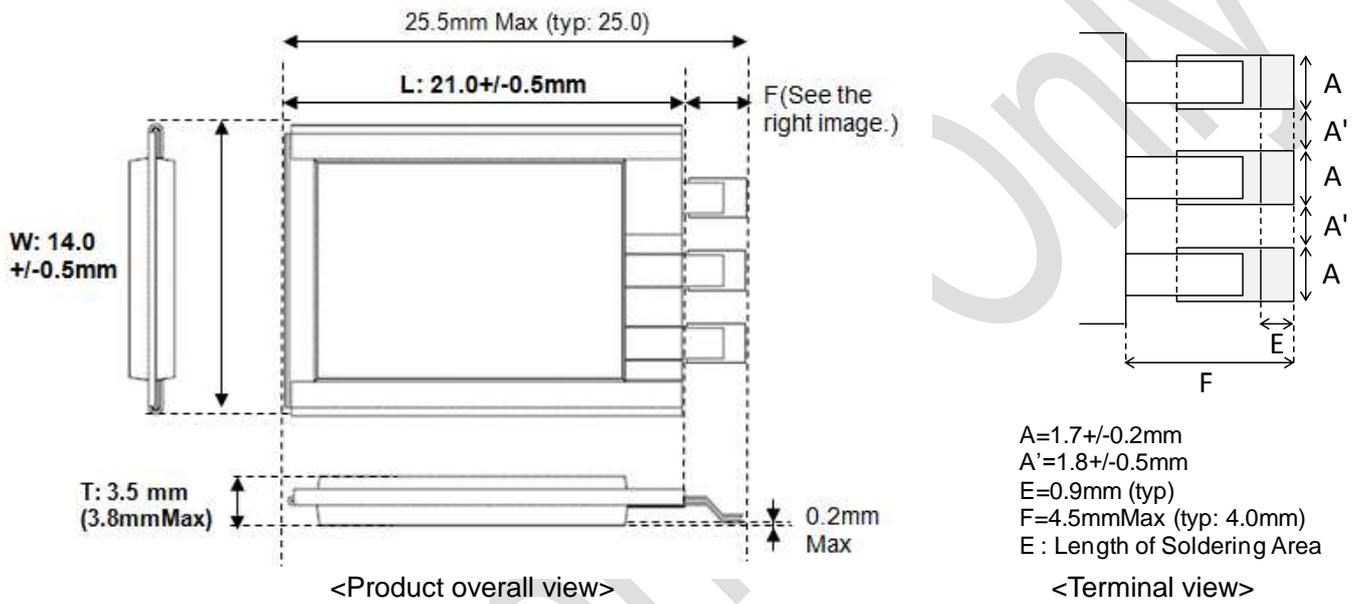
2. Part Number

2-1 Murata Part Number : DMT334R2S474M3DTA0

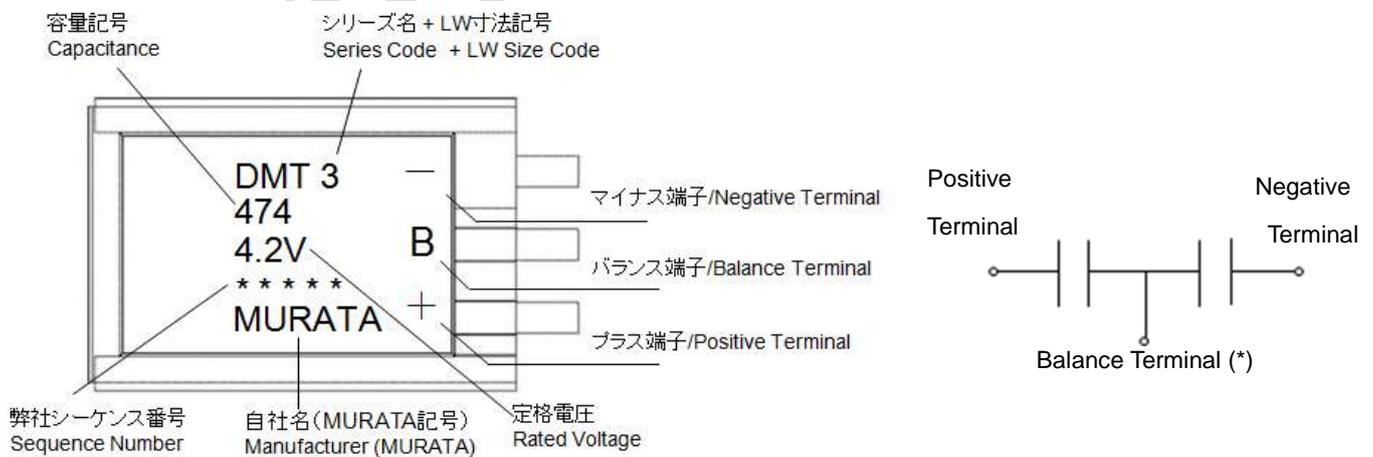
2-2 Customer Part Number :

2-3 Customer Specification Number :

3. Appearance / Dimensions



4. Marking



(*) Balance terminal is used for balance control. Balance control is necessary for this product. For details, please see section 10.3(1).

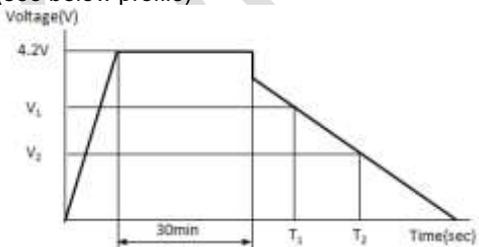
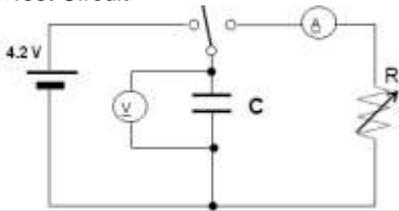
5. Rated Value

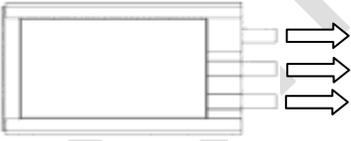
Part Number	Rated Voltage ^(*)	Operating Voltage Range	Capacitance @25°C	ESR ⁽²⁾ @1kHz 25°C	Max. Charge /Discharge Current	Operating Temp. Range	Storage Temp. Range
DMT334R2S474M3DTA0	4.2V	0~4.2V	470mF +/-20%	130mΩ (150mΩMax)	10A	-40°C~+85°C	-40°C~+85°C

Note1: (*) Absolute maximum rated voltage, applicable with limited operating time. Please refer to Section 10.3 for cautions related to voltage, such as operating times of each voltage and balance control.

Note2: (2) Please refer to Section 6-6 for temperature characteristics of capacitance and ESR.

6. Characteristics

No	Item	Characteristics	Test Conditions
1	Appearance	No defects or abnormalities	Visual
2	Dimension	See Section 3	Microscope, Vernier Caliper Thickness is measured by Φ10mm plate with 0.9N which does not overstress the package.
3	Capacitance	The value of Section 5 is satisfied.	<p>Measurement method: four-terminal method Measurement temperature: 25+/-2°C Charge capacitor for 30min at 4.2V, then discharge. Charge current: 500mA (see below profile)</p>  <p>V1: 80% of 4.2V V2: 40% of 4.2V T1: Time with voltage V1 T2: Time with voltage V2 I : Discharge current: 100mA</p> <p><Applying Formula> $C = \frac{I \times (T_2 - T_1)}{V_1 - V_2}$</p> <p><Test Circuit></p> 
4	ESR	The value of Section 5 is satisfied.	<p><Impedance Method> Measurement method: four-terminal method Measurement temperature: 25+/-2°C Measured at AC1kHz. Charge current:10mA</p>
5	Leakage Current	5.0uA max @ 96hours	<p>Measurement temperature: 25+/-2°C Charge voltage: 4.2V Charge time: 96 hours Charge up to 4.2V and keep the voltage. Measure the current value after 96 hours from the time capacitor voltage reaches 4.2V.</p>

No	Item	Characteristics	Test Conditions																								
6	Temperature Characteristics	<p>Capacitance</p> <table border="1" data-bbox="336 219 884 405"> <thead> <tr> <th>Temperature(°C)</th> <th>Change @25°C</th> </tr> </thead> <tbody> <tr> <td>85 (Max.)</td> <td>+/-10%</td> </tr> <tr> <td>40(Ref.)</td> <td>+/-10%</td> </tr> <tr> <td>25</td> <td>Standard value</td> </tr> <tr> <td>0(Ref.)</td> <td>-20/+10%</td> </tr> <tr> <td>-40 (Min.)</td> <td>-35/+10%</td> </tr> </tbody> </table> <p>ESR(@1kHz)</p> <table border="1" data-bbox="336 456 884 642"> <thead> <tr> <th>Temperature(°C)</th> <th>Change @25°C</th> </tr> </thead> <tbody> <tr> <td>85 (Max.)</td> <td>Less than standard value</td> </tr> <tr> <td>40(Ref.)</td> <td>Less than standard value</td> </tr> <tr> <td>25</td> <td>Standard value</td> </tr> <tr> <td>0(Ref.)</td> <td>+100% max.</td> </tr> <tr> <td>-40 (Min.)</td> <td>+1000% max.</td> </tr> </tbody> </table>	Temperature(°C)	Change @25°C	85 (Max.)	+/-10%	40(Ref.)	+/-10%	25	Standard value	0(Ref.)	-20/+10%	-40 (Min.)	-35/+10%	Temperature(°C)	Change @25°C	85 (Max.)	Less than standard value	40(Ref.)	Less than standard value	25	Standard value	0(Ref.)	+100% max.	-40 (Min.)	+1000% max.	<p>Temperature setting value +/- 2°C. Capacitance measured with discharge method is specified in Section 6.3. ESR measured with AC 1kHz is specified in Section 6.4. (Temperature switch : after 30 min at each temperature)</p>
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7-1	Terminal strength 1	No break or crack on any terminal by applying less than 5N.	 <p>Hold the body and pull terminal by tension tester</p>																								
7-2	Terminal Strength 2	No break or crack on any terminal by applying less than 1N.	 <p>Hold the body and pull terminal by tension tester</p>																								
8	Vibration Resistance	<table border="1" data-bbox="336 1137 874 1384"> <thead> <tr> <th>Item</th> <th>Specification</th> </tr> </thead> <tbody> <tr> <td>Capacitance</td> <td>-20% of initial value</td> </tr> <tr> <td>ESR</td> <td>+20% of initial value</td> </tr> <tr> <td>Leakage current</td> <td>Satisfy initial standard value</td> </tr> <tr> <td>Thickness @25°C</td> <td>Satisfy initial standard value</td> </tr> <tr> <td>Appearance</td> <td>No abnormality and No electrolyte leakage.</td> </tr> </tbody> </table>	Item	Specification	Capacitance	-20% of initial value	ESR	+20% of initial value	Leakage current	Satisfy initial standard value	Thickness @25°C	Satisfy initial standard value	Appearance	No abnormality and No electrolyte leakage.	<p>Charge up to 4.2V prior to measurement. Vibration : 10~500Hz/10G Amplitude : 1.5mm max, 1 octave/min 10 times/ Z(thickness) direction 10 times/ X, Y and Z directions Sweep Time : LOG 11mins /direction Fix on substrate by double-stick tape so that vibration stress is applied to the inside of the capacitor package. Double Stick Tape : Nitto Denko Corp No.5000NS 10.0x7.0mm Characteristics are measured at 25°C, normal humidity.</p>												
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9	Solder Wettability	Min 75% of terminal electrode should be covered by new solder.	<p>Pre-conditioning : PCT105°C/Relative humidity 100%/ 1.22x10⁵Pa for 4 hours Immersion Depth (flux and solder): Up to 1.0~2.0mm from terminal head. Solder temperature: 245+/-3°C Sn-3Ag-0.5Cu Immersing Time : 2~3 sec Immersing Speed : 25+/-2.5mm/s</p>																								
10	Heat Cycle Test	<table border="1" data-bbox="336 1765 874 1928"> <thead> <tr> <th>Item</th> <th>Specification</th> </tr> </thead> <tbody> <tr> <td>Capacitance</td> <td>-20% of initial value</td> </tr> <tr> <td>ESR</td> <td>+20% of initial value</td> </tr> <tr> <td>Appearance</td> <td>No abnormality and No electrolyte leakage.</td> </tr> </tbody> </table>	Item	Specification	Capacitance	-20% of initial value	ESR	+20% of initial value	Appearance	No abnormality and No electrolyte leakage.	<p>Temperature: -40°C ~ +85°C, 30 min each. (Temperature switch : within 5 min) Test Cycles: 256 cycles</p> <table border="1" data-bbox="927 1865 1433 1951"> <thead> <tr> <th></th> <th>Temperature</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-40 +2/- 0°C</td> </tr> <tr> <td>2</td> <td>85 +0/-2°C</td> </tr> </tbody> </table> <p>Pre-conditioning: No charge required. Characteristics are measured at 25°C Allow device to sit for 2hrs min at 25°C prior to measurement.</p>		Temperature	1	-40 +2/- 0°C	2	85 +0/-2°C										
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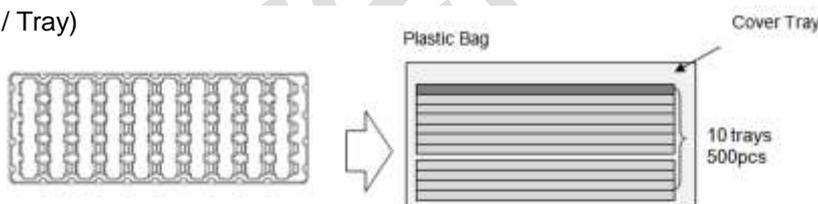
7. Safety Test

No	Item	Specification	Test Condition
1	Puncture	No smoke, ignition or rupture	Pre-conditioning: Charge up to 4.2V at 25°C Fully penetrate the center of capacitor by a 2.5φ needle. Temperature: 85°C
2	Compression	No smoke, ignition or rupture	Pre-conditioning: Charge up to 4.2V at 25°C. Press the center of the capacitor with 10φ round bar and bend it at 90 degrees. (X and Y directions, Both sides) at 85°C.
3	External Short Circuit	No leakage, smoke, ignition or rupture	Pre-conditioning: Charge up to 4.2V at 25°C. Connect positive and negative terminals by external resistance of 80+/- 20mΩ Temperature: 85°C
4	Heating	No smoke, no ignition.	Pre-conditioning: Charge up to 4.2V at 25°C. Allow capacitor to sit at 150°C for 3 hours.
5	Static Electricity Test (ESD)	No leakage, smoke, ignition or rupture	<HBM>C=150pF, R=150ohm, 1kV, 10 times Test Object: Balance Terminal, Positive Terminal, upper and under sides of package Temperature: 25°C
6	Safety Standards	Received UL 810A certification	-

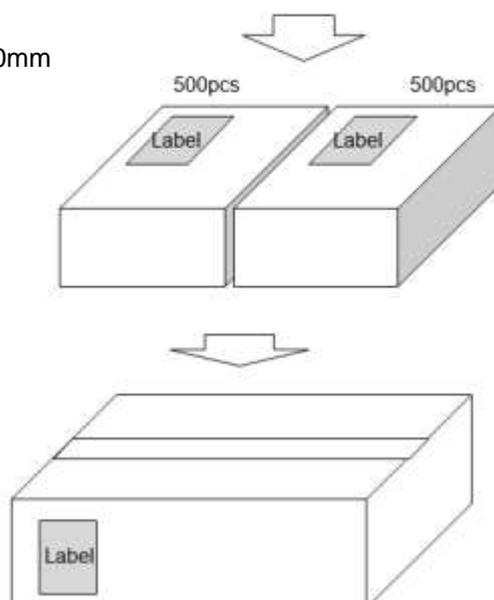
8. Packaging and Minimum order quantity

Package type	Minimum order quantity
tray(50pcs/ tray)	500pcs

Tray (50pcs / Tray)



Tray Dimension (LxW):
320 +/-2.0 mm x 120 +/-2.0mm



9. Quality Assurance

- (1) Murata's responsibility for the quality of this product shall be limited to those specified in this document.
- (2) It is a customer's responsibility to judge fitness of this product for assembly process, end use and operating environment.
- (3) Please keep product in sealed plastic package before use.

10. Caution for Use

 Caution

10.1 Limitation of Applications

Please contact us before using our products for the applications listed below which require especially high reliability for the prevention of defects which might directly cause damage to the third party's life, body or property.

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

Please do not use this product for any applications related to the followings.

- ① Military equipment

 Caution

10.2 Storage Condition

10.2.1 Term of warranty for this product is one year after packaging in a plastic bag, under the conditions below with sealed package.

Recommended storage environment: Room temperature: 30 °C
Humidity: No more than 60%RH

This product cannot be baked.

10.2.2 Storage conditions after opening plastic bag.

- (1) Term of warranty of this product is 3 months after opening sealed package.
- (2) Please keep product under the following conditions in sealed package.
Temperature: 5-35°C
Humidity: No more than 70%RH. No condensation.
Avoid any acidic or alkaline environment.
Avoid excessive external force on this product while in storage.
- (3) Please keep product in sealed plastic package before use.

⚠ Caution

10.3. Cautions for design

(1) Voltage balance control

This product consists of two individual cells connected electrically in series. When in use, please be sure to control the voltage of each cell and keep capacitor voltage within operating voltage range(0~4.2V). Balance control is needed in order to prevent the excessive voltage (over 1/2 voltage of applied voltage) being applied to either cell. Excessive voltage of either cell may shorten the lifetime of capacitor, distort the capacitor shape or cause electrolyte leakage.

Please refer to attached "C2M1CXS-027Supercapacitor (EDLC), Recommended Balance Condition" for details.

(2) Polarity

This product has polarity. Please do not reverse polarity when in use. Reverse polarity may damage electrolyte or the electrode inside. Please verify the orientation of the capacitor before use in accordance with the Markings of polarity on the product. For marking details, please refer to Section 4 "Markings".

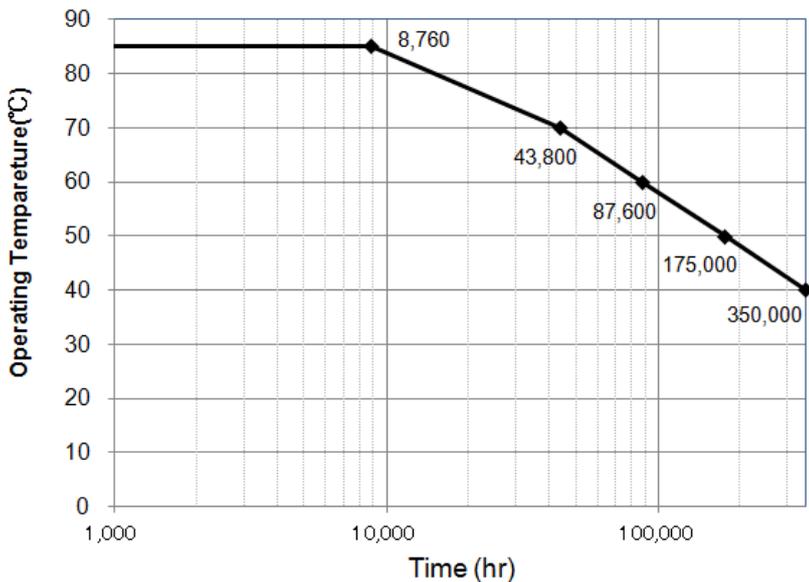
(3) Considerations for operation on AC

When using this product on AC, not only the effective voltage but also peak voltage should be within operating voltage range(0~4.2V).

(4) Limited Operating Life (Derating)

The lifetime of this product depends on temperature and voltage condition.

Please refer to the following operating lifetime.



(5) Self heating temperature

When repeating charge and discharge in a short cycle, self heating is generated by internal resistance.

The product temperature should not exceed 85°C, including any self heating.

(6) The capacitor package is covered by insulation layer. In some part, however, metal is exposed. Please keep this product from coming in contact with other device or circuit.

(7) This product cannot be used under any acidic or alkaline environment.

(8) At extremely low pressure, this product may not be able to provide expected performance. If you would like to use this product at low pressure environment continuously, please consult us first.

⚠ Caution

10.4. Soldering and Assembling

- (1) Reflow and flow soldering cannot be used because a capacitor body temperature will rise beyond maximum allowable temperature. Please use other mounting methods. These may include hand soldering, connector mounting, etc.
- (2) Please do not 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.

(3) Manual Soldering

The following conditions are recommended;

Solder Type: Resin flux cored solder wire ($\phi 1.2\text{mm}$)

Solder: Lead-free solder: Sn-3Ag-0.5Cu

Soldering iron temperature at $350\text{ }^{\circ}\text{C} \pm 10\text{ }^{\circ}\text{C}$

Solder Iron wattage: 70W max.

Soldering time: 3~4 sec per one terminal

Allowable soldering frequencies: 3 times maximum per one terminal.

Allowable cumulative soldering time per capacitor: 15 sec max total.

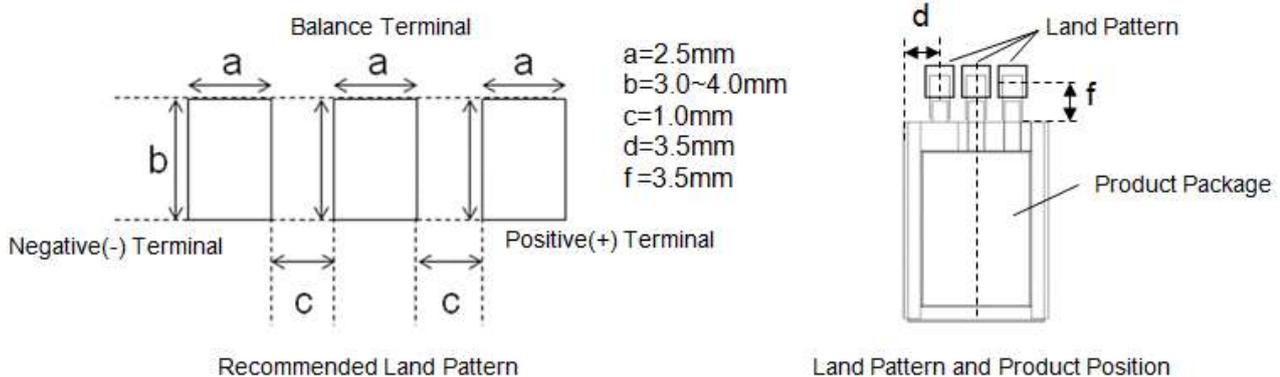
Please do not touch laminate package directly by solder iron.

In order to ensure the connectivity, please apply preparatory solder on the land.

When soldering, please apply flux or flux solder, heating the preparatory solder.

- (4) Applying thermal stress by spot heater or soldering iron to the capacitor or surrounding devices may result in electrical characteristics degradation. Please be careful not to apply thermal stress to the capacitor when repairing.

(5) Recommended Land Pattern



- (6) Please do not wash the device after soldering.

⚠ Caution

10.5 Fixing product

If mechanical stress can be applied on a product due to drop or vibration, please fix products by resin coating or double-sided tape. If you have any questions or problems about product fixing, please contact us.

(1) Resin Coating

If coating/molding the device with resin, there is a risk that some resins may erode metal, or cure-stress of resin may distort terminal or package shape. So please pay careful attention in selecting resin.

Prior to use, please make the reliability evaluation with the device mounted in your application set.

(2) Fixing on Substrate with Double-Sided Tape

When fixing product on substrate using double-sided tape, please do not overstress the package. Strong press may distort terminal or package shape.

Removing fixed device from substrate may detach device and tape, or distort terminal or package shape. Please do not use sharp tools when removing device from substrate.

⚠ Caution

10.6 Markings

Contact of organic solvent (such as IPA) or removing double sided tape from the capacitor marking area (see Section 4) may erase markings on the device. If sequence number is erased, it will prevent us from tracking manufacturing record. Please be careful not to erase markings on the device.

⚠ Caution

10.7 Disassembly

Please do not disassemble this product. It may cause electrolyte leakage or failure.

⚠ Caution

10.8 Disposal

This device should be disposed of as industrial waste in accordance with local laws and regulations. Never throw this device into fire.

10.9 Response to IATA Dangerous Goods Regulations

According to 54th Edition of IATA Dangerous Goods Regulations effective from January 1, 2013, supercapacitor (EDLC) with an energy storage capacity greater than 0.3Wh is treated as dangerous goods and introduced as UN3499 in Class 9.

However, an energy storage capacity of each Murata's supercapacitor is not greater than 0.3Wh. Therefore, Murata's supercapacitors are not covered by this regulation.

11. Proposal

- (1) When you use, please evaluate in a state mounted by your product
- (2) Please do not use this product other than the mentioned contents of this specification.
- (3) Please return one duplicate of this product specification to us with your signature to acknowledge your receipt. If the duplicate is not returned by appointed day (YYYY/MM/DD), the product specification will be deemed to have been received by you.
- (4) We consider it not appropriate to include any terms and conditions with regard to the business transaction in the product specifications, drawings or other technical documents. Therefore, if your technical documents as above include such terms and conditions such as warranty clause, product liability clause, intellectual property infringement liability clause, or export control clause, they will be deemed to be invalid.

電気二重層キャパシタ 推奨バランス制御
Supercapacitor (EDLC)
Recommended Balance Condition
【 DMT series 】

＜弊社推奨バランス制御及び、バランス抵抗の抵抗値＞

当製品は、2セルを直列に接続して構成されています。

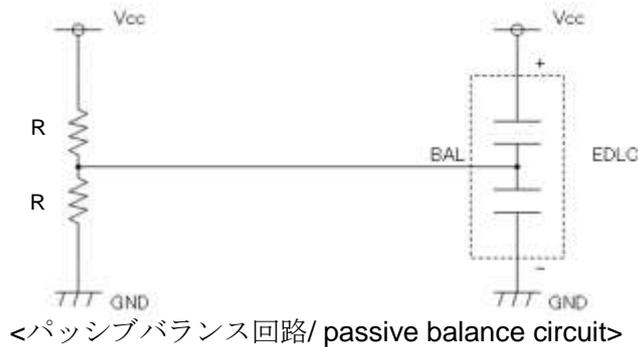
当製品をご使用の際は、必ず各セルの電圧バランスを制御した上で、使用電圧範囲内(0~4.2V)で使用してください。バランス制御が必要な理由は、片側のセルに設定(印加電圧の1/2の電圧)以上の電圧がかかることで、製品寿命が短くなったり、部品の変形や液漏れなどが発生したりするおそれがあるためです。

バランス抵抗の抵抗値は下記の値を上限に、許容可能なできるだけ小さい抵抗値を使用して下さい。

＜Recommended Balance Condition＞

This product consists of two individual cells connected electrically in series. When in use, please be sure to control the voltage of each cell and keep capacitor voltage within operating voltage range(0~4.2V). Balance control is need in order to prevent the excessive voltage (over 1/2 voltage of applied voltage) being applied to either cell. Excessive voltage of either cell may shorten the lifetime of capacitor, distort the capacitor shape or cause electrolyte leakage.

The values shown in below table are upper limits. After checking them, please use allowable minimum resistance value.



印加電圧/ Applied voltage	バランス抵抗の抵抗値/ Recommended Balance Condition
~3.0V	4.7MΩ
~3.2V	2.2MΩ
~3.6V	1.0MΩ
~4.0V	220kΩ
~4.2V	4.7kΩ

想定条件: 常時温度 70°C以下、5年以内 (想定劣化率: 容量 30%Down 以内、ESR50%up 以内)
 常時 70°C以上で使用される場合は、弊社営業又は技術担当へお問合わせ下さい。

- Operating Condition: Nominal Temperature 70°C max, within five years.
- Expected degradation rate: Capacitance decrease: 30% max., ESR increase: 50% max. of specified value.)
- If using capacitor at above 70°C environment, please contact our sales representatives or product engineers.

製品印字の変更について／電気二重層キャパシタ DMT シリーズ Product Marking Change of Supercapacitor DMT series

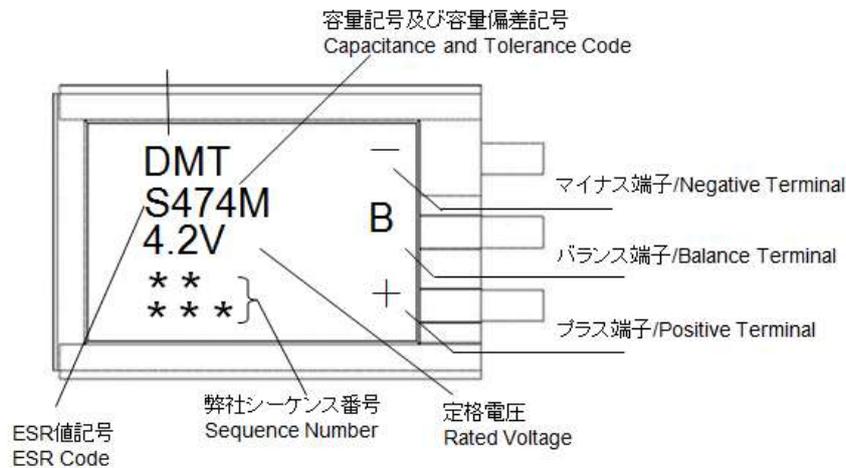
この度、電気二重層キャパシタ DMT シリーズの製品の印字内容について、安全規格(UL810A)の認証取得のため、下記のとおり変更を予定しております。しばらくの間は、旧印字の製品がサンプルとして出荷される場合がありますので、印字内容を識別情報として使用される場合にはご注意ください。

We plan to change the marking on our supercapacitor, DMT series in order to receive the safety standard (UL 810A) certification. Please note that old marking products may be shipped as sample for some time. Details of the changes are shown below.

記

1. 対象品名/ Part Number : DMT334R2S474M3DTA0
2. 変更時期/ Date of change : 2015年2月生産分 より
/ From production in February, 2015
3. 変更内容/ Contents of change

<旧印字 (2014年1月以前) / Old marking (before February, 2015)>



<新印字 (2014年2月以降) / New marking (from February, 2015)>

