SPECIFICATION FOR APPROVAL

Model: MCE0005C8-0160R0TBZ
File Number: JX-YF-S-147.E
File Version: V2017-3

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Features

- Compact, fully enclosed splash proof design
- Over 1,000,000 duty cycles
- High power density

Applications

- Wind turbine
- Industrial
- Heavy duty machinery
- Energy storage system

Specification

**ELECTRICAL**

- **Nominal Capacitance**: 5.8 F
- **Capacitance Tolerance**: 0% / +20%
- **Rated Voltage**: 160 V
- **Surge Voltage**: 162 V
- **ESR, DC**: 200 mΩ
- **Maximum Continuous Current (ΔT=15℃)**: 8 A
- **Maximum Continuous Current (ΔT=40℃)**: 13 A
- **Maximum Peak Current, 1 sec.**: 214 A
- **Leakage Current**: 20 mA
- **Capacitance of Individual Cells**: 350 F
- **Number of Cells**: 60

**Enviroment**

- **Operating Temperature Range**: -40℃ to +65℃
- **Storage Temperature Range**: -40℃ to +70℃
- **Environment Humidity**: ≤85%RH

**PHYSICAL**

- **Weight**: 6 kg
- **Power Terminals**: Terminal Block
- **Recommended Wire Size**: 6mm²
- **Vibration Specification**: IEC 255-21-1
- **Shock Specification**: IEC 255-21-2
- **Environmental Protection**: IP54

**FUNCTION**

- **Cell Voltage Management**: Passive
- **Other Function**: Mid-point Voltage Measurement

**POWER AND ENERGY**

- **Usable Power Density (Pd)**: 2,560 W/kg
- **Impedance Match Power Density (Pmax)**: 5,333 W/kg
- **Gravimetric Energy Density (Emax)**: 3.4 Wh/kg
- **stored Energy**: 20.6 Wh
LIFE  

MCE0005C8-0160R0TBZ  

**High Temperature**  
(at Rated Voltage & Maximum operating Temperature)  
1,500 hours  

- **Capacitance Change**  
  (% decrease from initial measured value)  
  ≤20%  
- **ESR Change**  
  (% increase from specified value)  
  ≤100%  

**Room Temperature**  
(at Rated Voltage at 25°C)  
10 years  

- **Capacitance Change**  
  (% decrease from initial measured value)  
  ≤20%  
- **ESR Change**  
  (% increase from specified value)  
  ≤100%  

**Cycle Life**  
(Number of cycles)  
1,000,000  

- **Capacitance Change**  
  (% decrease from initial measured value)  
  ≤20%  
- **ESR Change**  
  (% increase from specified value)  
  ≤100%  

**Shelf Life**  
(25°C, uncharged)  
4 years  

SAFE  

**Factory High-Pot Test**  
2,500 V DC  

**THERMAL CHARACTERISTICS**  

- Typical Thermal Resistance  
  1.1 °C/W  
- Typical Thermal Capacitance  
  5,500 J/°C  

**Notes**

1. Surge voltage is non-repetitive. The duration must not exceed 1 second.  
2. Maximum peak Current is non-repetitive. The duration must not exceed 1 second.  
3. Formula of maximum peak Current:  
   \[ I_{peak} = \frac{1}{C \times ESR_{dc} + 1} \times \sqrt{2} \]  
   C is rated capacity, V is rated voltage.  
4. Formula of power and energy  
   - **Usable Power Density**  
     \[ P_d = \frac{0.12 V^2}{ESR_{dc} \times mass} \]  
   - **Impedance Match Power Density**  
     \[ P_{\text{max}} = \frac{V^2}{4 ESR_{dc} \times mass} \]  
   - **Gravimetric Energy Density**  
     \[ E_{\text{max}} = \frac{1}{3600 \times mass} \frac{1}{2CV^2} \]  
   - **Stored Energy**  
     \[ E = \frac{1}{3600} \frac{1}{2CV^2} \]
Measuring Method

1) Charge and Discharge procedure
   (Figure 1)
   A) Charge the capacitor using constant current I to rated voltage \( V_0 \)
   B) Keep rated voltage 5 min
   C) Discharge the capacitor using constant current I to half rated voltage, record discharge time \( T_1 \) during voltage change from \( V_1 \) to \( V_2 \)
   D) Rest 2-5s, record voltage change \( \Delta V \)
   E) Discharge it to a very low voltage around 0.01V
   F) \( V_1=85\% \ V_0 \ \ \ \ V_2=50\% \ V_0 \)

2) Capacitance

\[ C = \frac{I \cdot T_1}{(V_1 - V_2)} \]

C: Capacitance (F)
I: Constant Discharge Current (A)
\( T_1 \): Discharge Time (S)
\( V_1-V_2 \): Voltage Change (V)

3) DC ESR

\[ \text{DC ESR} = \frac{\Delta V}{I} \]

DC ESR: DC Equivalent Series Resistance (Ω)
\( \Delta V \): Voltage Change (V)
I: Constant Discharge Current (A)

4) AC ESR

Measure AC ESR using LCR meter
   Frequency: 1KHz
   Voltage: fully discharge
## Dimensions

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Dimension (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCE0005C8-0160R0TBZ</td>
<td>L (±0.5mm)</td>
</tr>
<tr>
<td></td>
<td>367</td>
</tr>
<tr>
<td></td>
<td>W (±0.5mm)</td>
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<tr>
<td></td>
<td>235</td>
</tr>
<tr>
<td></td>
<td>H (±0.7mm)</td>
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<td>79</td>
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