MDCL0036C0-0048R0SHC DATASHEET

MODEL	MDCL0036C0-0048R0SHC

Version	Revision of historical records
V2019-1 Trial Version	First Edition
V2020-1	Version Update

FEATURES

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

APPLICATIONS

- Automotive
- Railway transportation
- Heavy duty machinery
- Energy storage system

SPECIFICATIONS

Electrical	Characteristics
Nominal Capacitance	36 F
Capacitance Tolerance	0% / +20%
Rated Voltage	48 V
Surge Voltage	51 V
ESR,DC	16 mΩ
Maximum Continuous Current （ΔT=40℃）	60 A
Maximum Peak Current,1sec.	500 A
Leakage Current(25℃, after 72 h,Excluding equalizing current)	1.8 mA
Equalizing current	125 mA
Cell	CDCL0650C0-0002R7WLH
Number of Cells	18
Environment	
Operating Temperature Range	-40 ℃ ~+65 ℃
Storage Temperature Range	-40 ℃ ~+70 ℃
Environment Humidity	≤90%RH
Physical	
Weight	8.5 kg
Power Terminals	M8/M10
Recommended Torque-Terminal	20/30 N·m
Vibration Specification	GB/T 11287-2000
Shock Specification	GB/T 14537-1993
Environment Protection	IP54
Monitoring	
Cell Voltage Monitoring	Overvoltage Alarm
Temperature	NTC Thermistor

SPECIFICATIONS

Power And Energy	
Usable Power Density (Pd)	2032 W/kg
Impedance Match Power Density(Pmax)	4235 W/kg
Gravimetric Energy Density(Emax)	1.36 Wh/kg
Stored Energy	11.5 Wh
Life	
High Temperature Life (at Rated Voltage & Maximum Operating Temperature)	1500 hours
Capacitance Change (%decrease from initial measured value)	⩽20%
ESR Change (%increase from specified value)	⩽100%
Room Temperature Life (at Rated Voltage at 25℃)	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℃, uncharged)	2 years
Safe	
Factory High-Pot Test	2500 VDC

NOTES

1.Surge voltage is non-repetitive. The duration must not exceed 1second.

2.Maximum peak current in non-repetitive. The duration must not exceed 1second.

3.Formula of maximum peak current:

$$Ipeak = \frac{1/2CV}{C \times ESR_{DC} + 1}$$

C is rated capacity, V is rated voltage.

4.Formula of power and energy:

Usable Power Density：

$$P_d = \frac{0.12V^2}{ESR_{DC} \times mass}$$

Impedance Match Power Density：

$$P_{max} = \frac{V^2}{4ESR_{DC} \times mass}$$

Gravimetric Energy Density：

$$E_{max} = \frac{1/2CV^2}{3600 \times mass}$$

Stored Energy：

$$E = \frac{1/2CV^2}{3600}$$

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 ΔV;
   e) Discharge it to a very low voltage around 0.01V;
   f) V_1=80% V_0-50% V_0.

2) Capacitance
   $C=I*T_1/(V_1-V_2)$
   C: Capacitance(F);
   I : Constant Discharge Current(A);
   T_1: Discharge Time(s);
   V_1-V_2: Voltage Change (V).

3) DC ESR
   DC ESR=ΔV/I
   DC ESR: DC Equivalent Series Resistance(Ω)
   ΔV: Voltage Change(V);
   I: Constant Discharge Current (A);

4) AC ESR
   Measure AC ESR using LCR meter
   Frequency: 1 KHz;
   Voltage: fully discharge

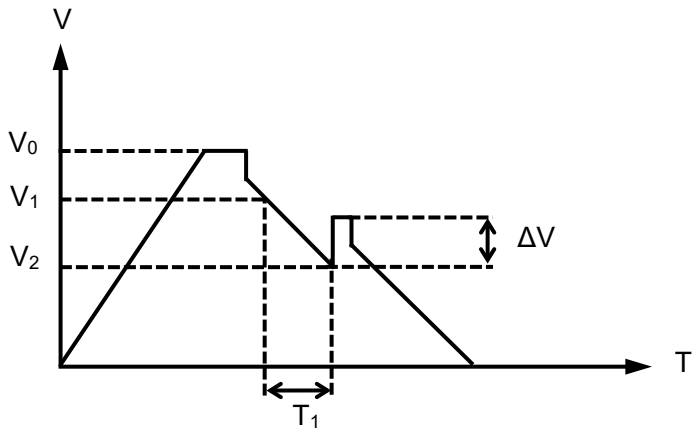
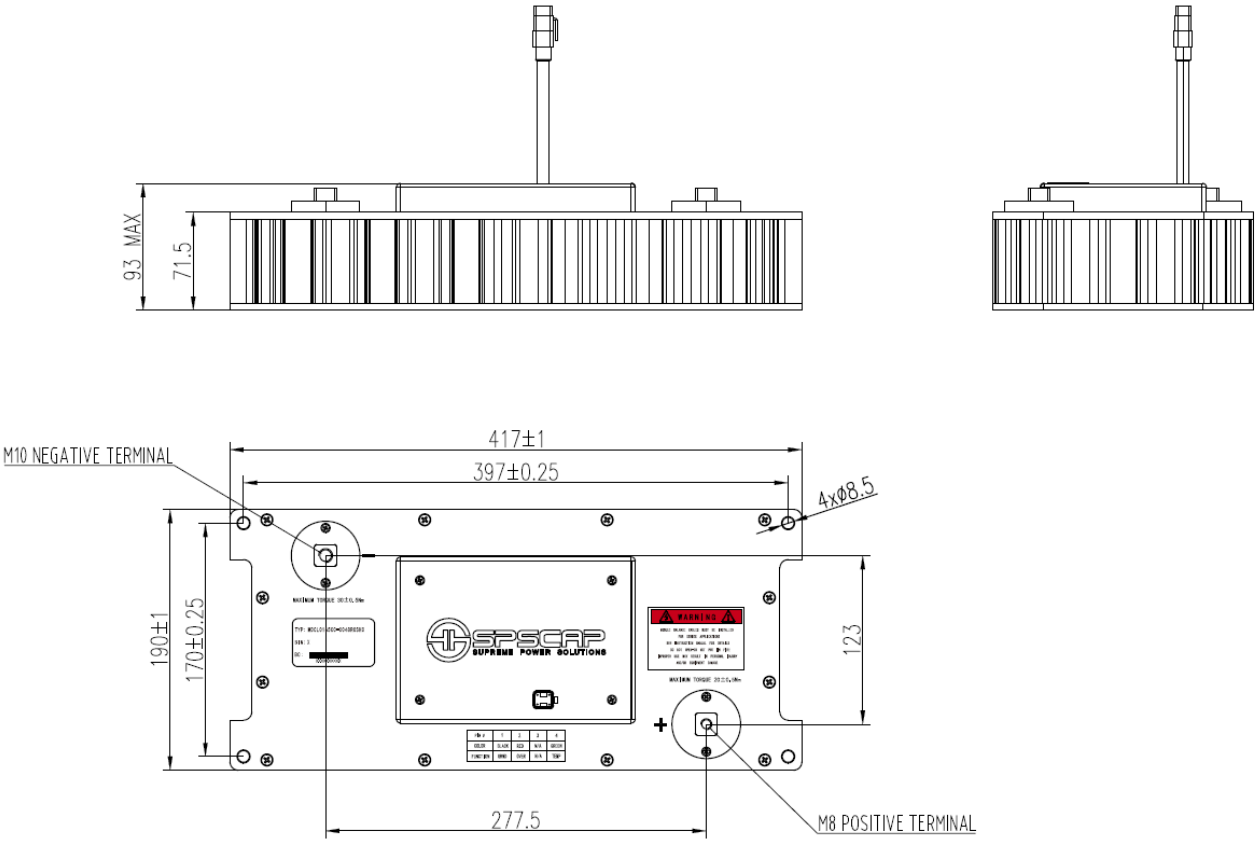


Figure 1

Pin Number	Wire Color	Definition	Remarks
1	Black	GND	
2	Red	Overvoltage Alarm	High - Inactive
			Low - Active
3	Void	Void	
4	Green	Temperature	

DIMENSIONS



MODEL	Dimension(mm)		
	L(±1)	W(±1)	H(Max.)
MDCL0036C0-0048R0SHC	417	190	93

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