

- Rated voltage 3V DC
- 280F capacitance
- High cycle life of 1 million cycles
- Very high power density
- Radial terminals for PCB mounting
- Green and Environmental protection
- Using activated carbon electrodes



ELECTRICAL SPECIFICATIONS

Type	C35S-3R0-0280
Rated Voltage V_R	3.00 V
Surge Voltage V_S^1	3.10 V
Rated Capacitance C^2	280 F
Capacitance Tolerance 3	-0% / +20 %
DC ESR 2	≤0.8 mΩ
Leakage Current, typical I_L^4	<1.0 mA
Self-discharge Rate, typical 5	<20 %
Constant Current $I_{MCC}(\Delta T = 15^\circ C)^6$	40 A
Max Current I_{Max}^7	343 A
Short Current I_S^8	3.75 kA
Stored Energy E^9	0.35 Wh
Energy Density E_d^{10}	5.5 Wh/kg
Usable Power Density P_d^{11}	21.1 kW/kg
Matched Impedance Power Density P_{dMax}^{12}	44 kW/kg

THERMAL CHARACTERISTICS

Type	C35S-3R0-0280
Working Temperature	-40 ~ 65°C
Storage Temperature 13	-40 ~ 70°C
Thermal Resistance R_{Th}^{14}	11.74 K/W
Thermal Capacitance C_{th}^{15}	73.3 J/K

LIFETIME CHARACTERISTICS

Type	C35S-3R0-0280
DC Life at High Temperature 16	1500 hours
DC Life at RT 17	10 years
Cycle Life 18	1'000'000 cycles
Shelf Life 19	4 years

SAFETY & ENVIRONMENTAL SPECIFICATIONS

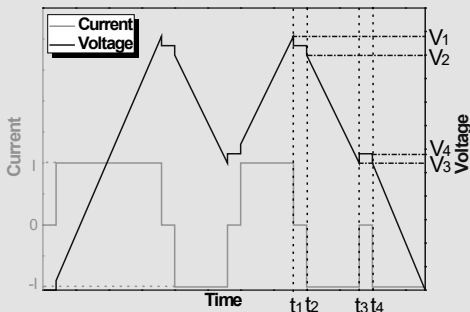
Type	C35S-3R0-0280
Safety	RoHS, REACH and UL810
Vibration	ISO16750 Table 12 IEC 60068-2-64(table A.5/A.6)
Shock	IEC 60068-2-27

PHYSICAL PARAMETERS

Type	C35S-3R0-0280
Mass typical M	64 g
Terminals ²⁰	Solderable
Dimensions ²¹ Height	62.7 mm
Diameter	35 mm

Notes:

- Surge voltage V_S : Absolute maximum voltage, non-repetitive, The duration must not exceed 1 second.
- Capacitance C: The test current is 0.1 A/F, if the calculated current is >100A, then apply 100A.

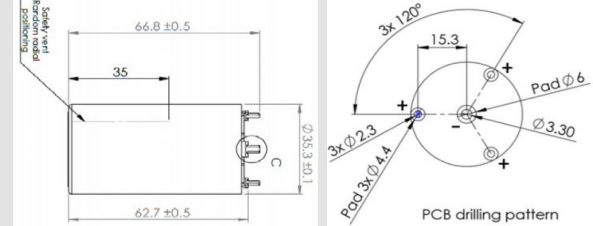


$$V_1 = 2V_3 = V_R \quad t_2 - t_1 = t_3 - t_2 = 5 \text{ s}$$

$$C = I \cdot (t_3 - t_2) / (V_2 - V_3) \quad ESR = (V_4 - V_3) / I$$

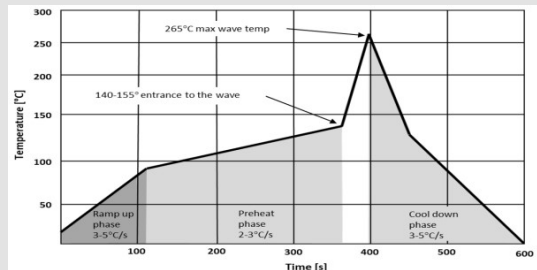
- Capacitance tolerance: Initially +0%~+20%.
- Leakage current rate measurement procedure: 1) Charge the capacitor to V_R with a constant current (0.1 A/F, if the calculated current >100A, then apply 100A). 2) Hold the voltage at V_R for 72h. 3) The current to maintain V_R after 72h is the leakage current.
- Self-discharge rate measurement procedure: 1) Charge the capacitor to V_R with a constant current (0.1 A/F, if the calculated current >100A, then apply 100A). 2) Hold the voltage at V_R for 8h. 3) Floating for 72h. 4) Measure the voltage after 72 h
- Max constant working current: $I_{MCC} = \sqrt{\Delta T / (ESR \cdot R_{Th})}$
- Max current: $I_{Max} = 0.5C \cdot V_R / (\Delta t + ESR \cdot C)$, discharge from V_R to $V_R/2$ in 1 second.
- Short current: $I_S = V_R / ESR$
- Stored energy: $E = 0.5C \cdot V^2 / 3600$.
- Energy density: $E_d = E / M$.
- Usable power density: $E = 0.5C \cdot V^2 / 3600$.
- Matched impedance power density: $P_{dMax} = 0.25V_R^2 / (ESR \cdot M)$
- Storage temperature: Storage in discharge state.
- Thermal resistance: $R_{Th} = 1 / (h \cdot A)$, where $h=10 \text{ W/(m}^2 \cdot \text{K)}$, A is the surface area of the capacitor.
- Thermal capacitance: For the whole capacitor
- DC life at high temperature: Hold the capacitor charged at rated voltage at 65°C for 1500h. The capacitance shall be >80% of the rated value, the ESR shall be <200% of the rated value.
- DC life at RT: Hold the capacitor charged at rated voltage at room temperature RT, the capacitance shall be >80% of the rated value, the ESR shall be <200% of the rated value.
- Cycle life: Charge and discharged the capacitor in the range between V_R to $V_R/2.5$ seconds waiting period between charge and discharge. The constant test current is 0.1A/F (if the calculated current > 100A, then apply 100A).
- Shelf life: Discharged and no load applied at RT.

Dimensions, PCB drilling pattern and potential indication.



- Standard markings:
 - + Name of manufacturer, part number, serial number
 - + Rated voltage and capacitance, negative and positive terminals, warning marking
 - + Stored energy in watt-hours.
- Mounting recommendations:
 - + Mounting without applying undue mechanical stress on the terminals
 - + Provide adequate spacing in between cells to secure required insulation strength
 - + Provide clearance around the safety vent and do not position anything above the safety vent that may be damaged in an event of vent rupture.

- Recommended wave soldering profile for printed circuit assembly with use of lead-free alloy:



Total soldering process time from room temperature to peak temperature 265°C and cool down is 10 minutes max. The time to reach the required temperature depends on the design of the application and on the power of pre-heating section of the soldering machine. All temperatures are measured on the cell leads on top of the PCB. Recommend thickness for PCB=2.4 to 3.2mm.

Solder:	Lead-free (Sn96.5/Ag 3.0/Cu0.5) liquidus point 217°C
Recommend Flux:	Kester 979T
Ramp Up Rate:	3°C~5°C/sec. Max
Preheat:	140 to 155°C 2-3°C/sec on top of board
Temperature entrance into wave:	140°C to 150°C on top of board
Ramp to peak temp:	200°C/sec
Peak Temp:	265°C for 1.5 to 5sec. Max
Cool Down Rate:	3°C~5°C/sec. Max
Conveyor Speed:	40-50 cm/min

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