

FEATURES

- High power,high energy density
- Low leakage current, long life
- Plastic, Moisture Resistant Version
- High Reliability

APPLICATIONS

- Consumer electronics
- GSM/GPRS Pulse Applications
- Back up power
- Stand alone or augment existing
- energy/power source



OPERATING TEMPERATURE RANGE

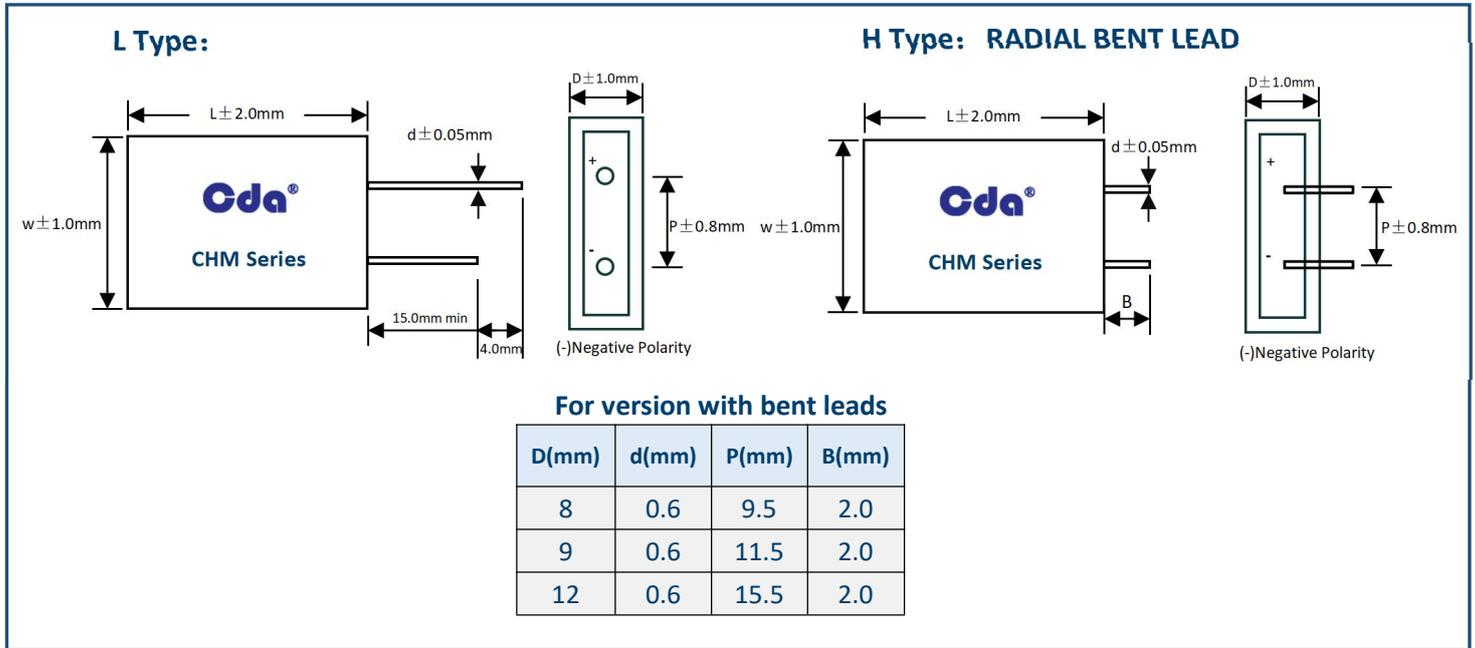
Operating temperature	5.5V Series		6.0V Series		7.5V Series		8.1V Series		9.0V Series	
	Balanced	Unbalanced								
-40°C to +65°C	5.5V	5.1V	6.0V	5.6V	7.5V	7.1V	8.1V	7.7V	9.0V	8.6V
-40°C to +85°C	4.6V	4.2V	5.2V	4.8V	6.6V	6.2V	7.3V	6.9V	/	/

*With appropriate voltage operating temperature can be extended to 85°C

GENERAL SPECIFICATIONS

Item	Performance
Operating temperature	-40°C to +65°C
Capacitance range	0.22F to 5.0F
Capacitance tolerance	-10%~+30%; -0%~+100%
Rated voltage	5.5 V;6.0V;7.5V;8.1V;9.0V
High Temperature Load Life	Temperature:+65°C Voltage:Rated Voltage Test Duration:1,500 hours
Endurance (At rated voltage & max. operating temp)	After 1500 hours: Capacitance change: ±30% of initial rated value Internal resistance: Within 2 times of initial specified value
Projected cycle life (From rated voltage to 1/2 rated voltage at 25°C)	After 500,000 cycles: Capacitance change: Within ±30 % of initial rated value Internal resistance: Within 2 times of initial specified value
Humidity	Voltage:Rated Voltage RH:90% Temperature:+60°C ; Test Duration:1,500 hours

DIMENSIONS(5.5V/6.0V)

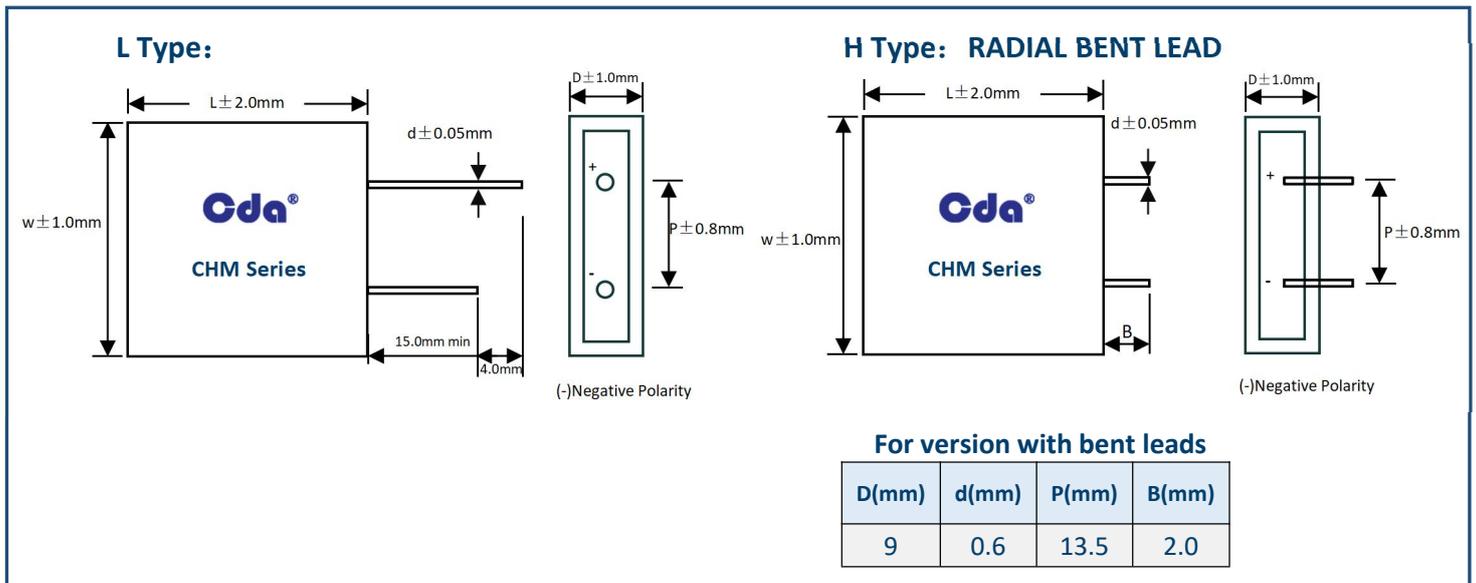


STANDARD PRODUCTS (5.5V/6.0V)

Part Number	Rated Voltage (V)	Rated Cap. (F)	Size	Max.ESR	Maximum Endurance Current(A)	Maximum Peak Current(A)	Maximum Leakage Current (72hrs/mA)	Power Density (W/Kg)	Maximum Energy (W.h)	Energy Density (Wh/kg)
			ΦWxDxL (mm)	ESRAC (1kHz/mΩ)						
CHM-5R5L224R-TW	5.5	0.22	15X8X16	700	0.16	0.37	0.003	403	0.0009	0.31
CHM-5R5L334R-TW		0.33	18X9X16	600	0.21	0.51	0.003	398	0.0014	0.36
CHM-5R5L474R-TW		0.47	18X9X16	380	0.26	0.75	0.003	541	0.0020	0.51
CHM-5R5L474R-TWX		0.47	15X8X16	500	0.18	0.61	0.003	648	0.0020	0.71
CHM-5R5L105R-TW		1.0	18X9X20	250	0.44	1.59	0.007	1096	0.0042	0.98
CHM-5R5L155R-TW		1.5	18X9X24	200	0.54	2.24	0.012	1179	0.0063	1.15
CHM-5R5L255R-TW		2.5	23X12X25	180	0.75	3.45	0.020	1114	0.0105	1.16
CHM-5R5L355R-TW		3.5	23X12X25	160	0.79	3.65	0.023	1078	0.0147	1.57
CHM-5R5L505R-TW		5.0	23X12X25	150	1.17	5.35	0.028	2063	0.0147	2.70
CHM-6R0L224R-TW		6.0	0.22	15X8X16	700	0.18	0.42	0.003	502	0.0013
CHM-6R0L334R-TW	0.33		18X9X16	600	0.26	0.58	0.003	614	0.0017	0.46
CHM-6R0L474R-TW	0.47		18X9X16	380	0.32	0.78	0.007	1029	0.0024	0.60
CHM-6R0L474R-TWX	0.47		15X8X16	500	0.25	0.69	0.003	1196	0.0024	0.85
CHM-6R0L105R-TW	1.0		18X9X20	250	0.51	1.74	0.012	1304	0.0050	1.09
CHM-6R0L155R-TW	1.5		18X9X24	200	0.59	2.45	0.018	1403	0.0075	1.36
CHM-6R0L255R-TW	2.5		23X12X25	180	0.81	3.59	0.020	2488	0.0125	2.42

CHM-6R0L355R-TW	6.0	3.5	23X12X25	160	0.87	3.88	0.023	2762	0.0205	2.72
CHM-6R0L505R-TW		5.0	23X12X25	150	1.32	6.52	0.028	3151	0.0250	3.68

DIMENSIONS(7.5V/8.1V/9.0V)



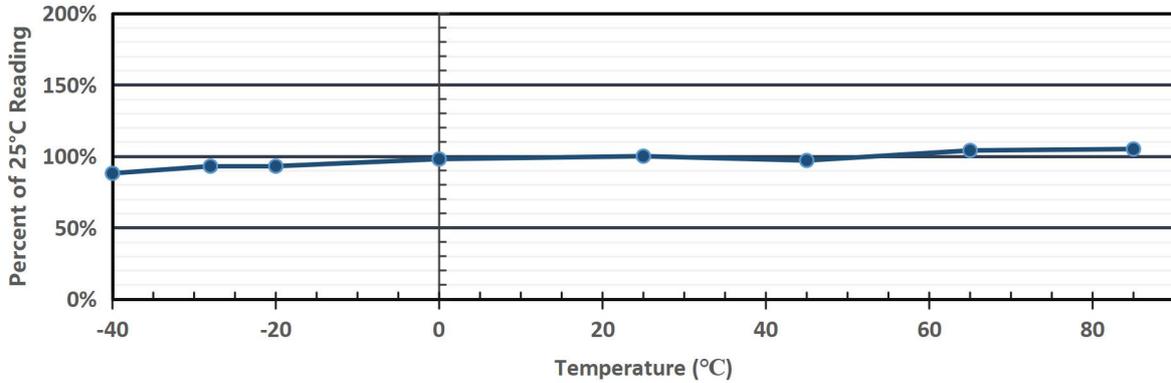
STANDARD PRODUCTS(7.5V/8.1V/9.0V)

Part Number	Rated Voltage (V)	Rated Cap. (F)	Size	Max.ESR	Maximum Endurance Current(A)	Maximum Peak Current(A)	Maximum Leakage Current (72hrs/mA)	Power Density (W/Kg)	Maximum Energy (W.h)	Energy Density (Wh/kg)
			ΦWxDxL (mm)	ESRAC (1kHz/mΩ)						
CHM-7R5L334R-TW	7.5	0.33	26X9X16	600	0.26	0.75	0.006	511	0.0026	0.47
CHM-7R5L604R-TWX		0.6	26X9X16	460	0.26	1.04	0.008	544	0.0047	0.79
CHM-7R5L604R-TW		0.6	26X9X20	350	0.44	1.59	0.008	698	0.0047	0.68
CHM-7R5L105R-TW		1	26X9X24	285	0.54	2.32	0.012	1058	0.0078	0.92
CHM-8R1L334R-TW	8.1	0.33	26X9X16	500	0.26	0.69	0.003	498	0.0030	0.54
CHM-8R1L604R-TW		0.6	26X9X20	400	0.43	1.47	0.070	1063	0.0055	0.80
CHM-8R1L105R-TW		1.0	26X9X24	350	0.53	2.20	0.012	1129	0.0091	1.11
CHM-9R0L334R-TW	9.0	0.33	26X9X16	500	0.26	0.77	0.007	598	0.0037	0.65
CHM-9R0L604R-TW		0.6	26X9X20	400	0.43	1.64	0.012	1286	0.0068	0.96
CHM-9R0L105R-TW		1.0	26X9X24	350	0.53	2.53	0.018	1361	0.0113	1.32
CHM-9R0L155R-TW		1.5	26X9X24	300	0.54	3.13	0.014	1227	0.0169	1.92

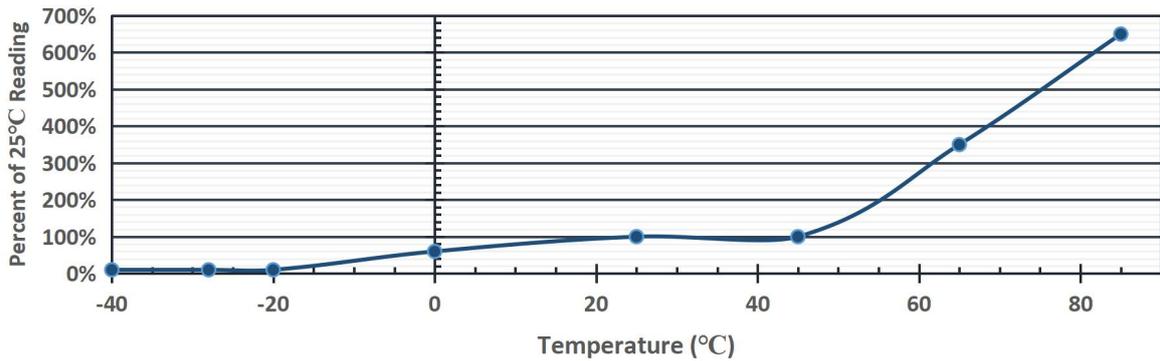
Note: Adds passive balance. Balance options can be provided upon request. Customers can choose according to the applicati

QUALITY AND RELIABILITY

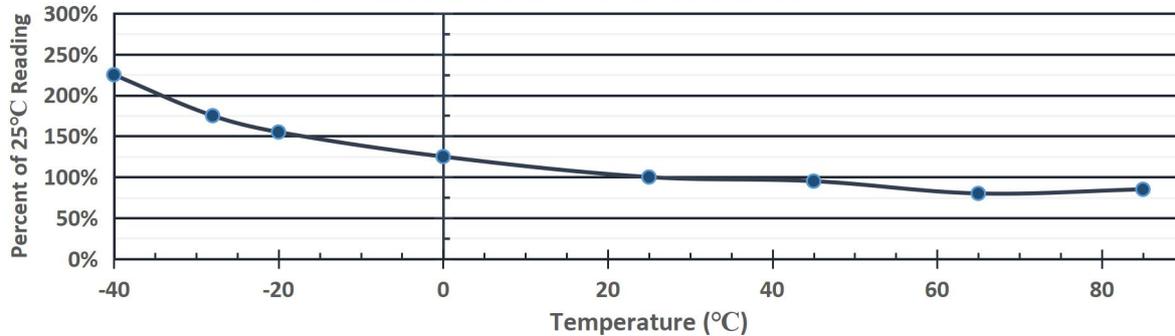
CAPACITANCE VS. TEMPERATURE



LEAKAGE CURRENT VS. TEMPERATURE



EQUIVALENT SERIES RESISTANCE VS. TEMPERATURE



LIFE TIME AND TEMPERATURE PERFORMANCE

The life of a Super Capacitor is impacted by a combination of operating voltage and the operating temperature according to the following equation :

$$LS = L_R \times 2^X \times 2^Y$$

Which is $X = (T_m - T_a) / 10$ $Y = (V_r - V_a) / 0.2$

L_s = Expected life of the super capacitor in the application

L_R = Load life rating of the super capacitor

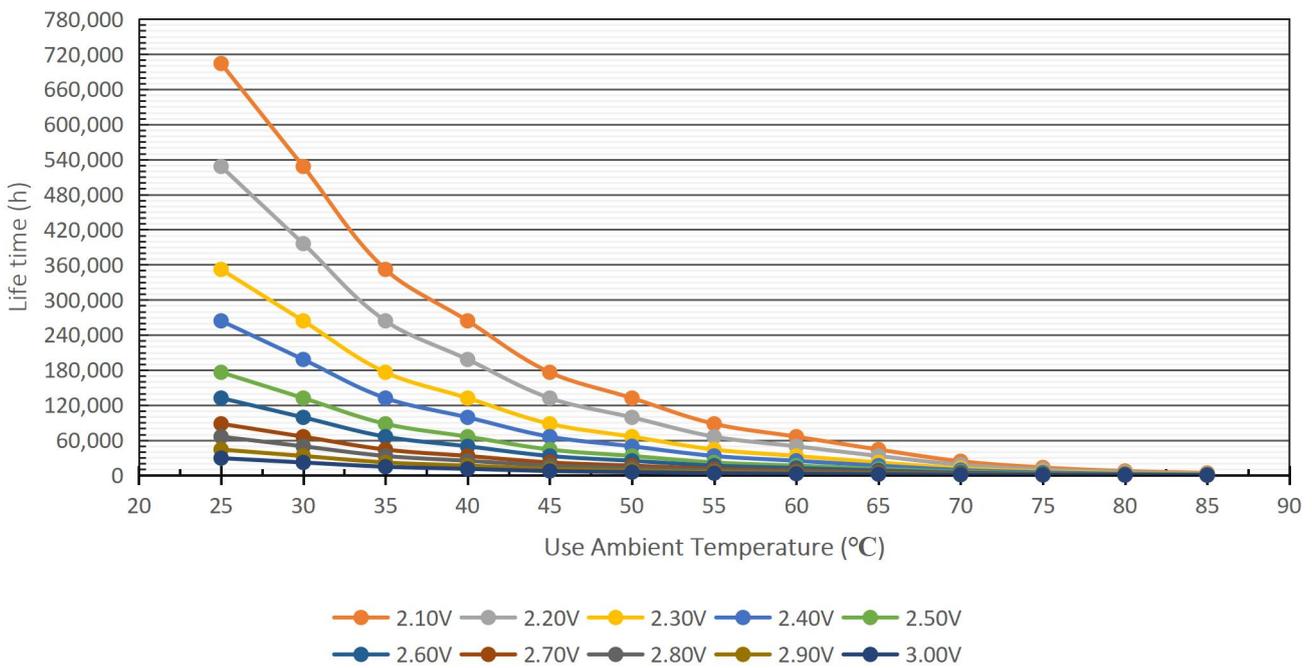
T_m = Max temperature rating of the super capacitor

T_a = Ambient temperature of the application

V_r = Rated voltage of the super capacitor

V_a = Maximum applied voltage on the super capacitor in the application

Expected Lifetime at Various Voltages



SAFETY RECOMMENDATIONS

WARNINGS

- To Avoid Short Circuit, after usage or test, SuperCapacitors voltage needs to discharge to $\leq 0.1V$
- Do not Apply Overvoltage, Reverse Charge, Burn or Heat Higher than $150^{\circ}C$, explosion-proof valve may break open
- Do not Press, Damage or disassemble the SuperCapacitor, housing could heat to high temperature causing Burns
- If you observe Overheating or Burning Smell from the capacitor disconnect Power immediately, and do not touch

PRECAUTIONS FOR WELDING

When soldering supercapacitors to a PCB, the temperature & time that the body of the supercapacitor sees during soldering can have a negative effect on performance. We advise following these guidelines:

- Do not immerse the supercapacitors in solder. Only the leads should come in contact with the solder.
- Ensure that the body of the supercapacitor is never in contact with the molten solder, the PCB or other components during soldering.
- Excessive temperatures or excessive temperature cycling during soldering may cause the safety vent to burst or the case to shrink or crack, potentially damaging the PCB or other components, and significantly reduce the life of the capacitor.

HAND SOLDERING

Keep distance between the supercapacitor body and the tip of the soldering iron and the tip should never touch the body of the capacitor. Contact between supercapacitor body and soldering iron will cause extensive damage to the supercapacitor, and change its electrical properties. It is recommended that the soldering iron temperature should be less than $350^{\circ}C$, and contact time should be limited to less than 4 seconds. Too much exposure to terminal heat during soldering can cause heat to transfer to the body of the supercapacitor, potentially damaging the electrical properties of the supercapacitor.

REGULATORY

- MSDS
- RoHS Compliant
- Reach Compliant

TRANSPORTATION

Not subjected to US DOT or IATA regulations
UN3499, <10Wh, Non-Hazardous Goods
International shipping description –
“Electronic Products – Capacitor”

WAVE SOLDERING

Only use wave soldering on Radial type supercapacitors. The PCB should be preheated only from the bottom and for less than 60 seconds, with temperature at, or below, $100^{\circ}C$ on the top side of the board for PCBs equal to or greater than 0.8 mm thick.

Solder Temperature ($^{\circ}C$)	Suggested Solder Time (s)	Maximum Solder Time (s)
220	7	9
240	7	9
250	5	7
260	3	5

REFLOW SOLDERING

Infrared or conveyor over reflow techniques can be used on these supercapacitors. Do not use a traditional reflow oven without clear rated reflow temperature for supercapacitors.