

# UL4.5-4

4V 4.5  
General

# Ultracell®

'Quality in Every Language'

## UL4.5-4



## Physical Specification

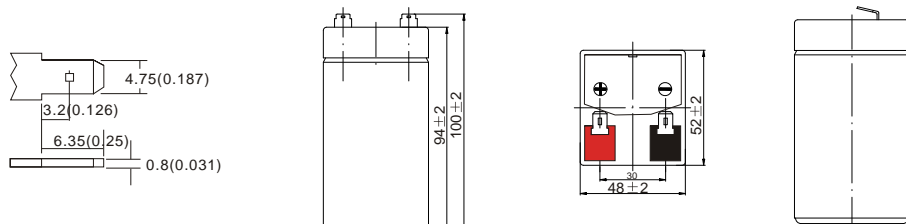
Part Number	UL4.5-4
Length	52.5 ± 2 mm
Width	48 ± 2 mm
Container Height	94 ± 2 mm
Total Height (with terminal)	100 ± 2 mm
Approx Weight	0.60 kg

## Specifications

	Nominal Voltage	4V
	Nominal Capacity (20HR)	4.5AH
Terminal Type	Standard Terminal	F1
	Optional Terminal	F2
Container Material	Standard Option	ABS
	Flame Retardant Option (FR)	UL94:VO
Rated Capacity	20hr, 1.80V/cell, 25°C	4.50 AH/0.225A
	10hr, 1.80V/cell, 25°C	4.19 AH/0.419A
	5hr, 1.75V/cell, 25°C	3.85 AH/0.77A
	1hr, 1.60V/cell, 25°C	2.65 AH/2.65A
Max Discharge Current	67.5A (5s)	
Internal Resistance	15mΩ	
Discharge Characteristics	Operating Temp. Range	Discharge: -15 ~ 50°C
		Charge: 0 ~ 40°C
		Storage: -15 ~ 40°C
	Nominal Operating Temp. Range	25 ± 3°C
	Cycle Use	Initial Charging Current less than 1.35A. Voltage 4.8V ~ 5.0V Temp. Coefficient -10mV/°C
	Standby Use	No limit on Initial Charging Current Voltage 4.5V ~ 4.6V Temp. Coefficient -6mV/°C
Capacity affect by Temperature	40°C	103%
	25°C	100%
	0°C	86%
Design Floating Life at 20°C	5 Years	
Self Discharge	Ultracell batteries may be stored for up to 6 months at 25°C(77°F) and then a refresh charge is required. For higher temperatures the time interval will be shorter.	

## Dimensions

### F1 Terminal



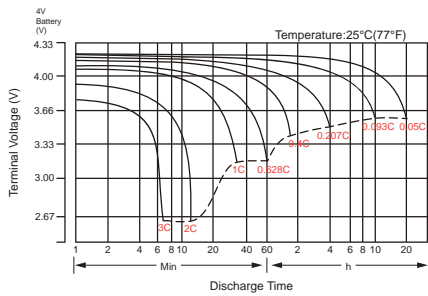
## Constant Current Discharge (Amperes) at 20°C

F.V/Time	5 min	10 min	15 min	20 min	30 min	45 min	1h	2h	3h	4h	5h	6h	8h	10h	20h
1.85V/cell	8.57	6.58	5.45	4.71	3.64	2.68	2.26	1.34	1.05	0.85	0.69	0.60	0.486	0.406	0.223
1.80V/cell	11.5	8.41	6.59	5.57	4.30	3.12	2.53	1.46	1.13	0.91	0.75	0.65	0.515	0.419	0.225
1.75V/cell	13.0	9.24	7.19	5.99	4.46	3.24	2.65	1.51	1.15	0.93	0.77	0.66	0.524	0.430	0.227
1.70V/cell	14.3	10.1	7.68	6.30	4.65	3.37	2.74	1.55	1.18	0.95	0.78	0.68	0.532	0.438	0.231
1.65V/cell	15.7	10.9	8.17	6.69	4.90	3.45	2.80	1.58	1.23	0.99	0.81	0.69	0.540	0.447	0.234
1.60V/cell	17.4	11.8	8.73	7.13	5.18	3.60	2.83	1.64	1.27	1.02	0.83	0.71	0.545	0.452	0.236

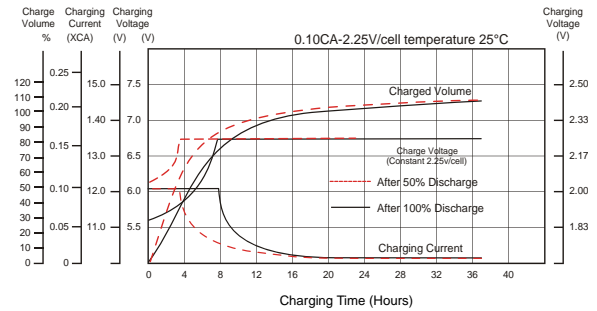
## Constant Power Discharge (Watts) at 20°C

F.V/Time	5 min	10 min	15 min	20 min	30 min	45 min	1h	2h	3h	4h	5h	6h	8h	10h	20h
1.85V/cell	15.7	12.2	10.2	8.88	6.95	5.16	4.37	2.60	2.04	1.66	1.36	1.18	0.959	0.803	0.441
1.80V/cell	20.8	15.4	12.1	10.3	8.07	5.96	4.86	2.82	2.18	1.77	1.45	1.27	1.014	0.827	0.445
1.75V/cell	23.0	16.6	13.1	11.0	8.31	6.12	5.06	2.91	2.22	1.80	1.49	1.30	1.030	0.848	0.449
1.70V/cell	24.6	17.7	13.8	11.5	8.60	6.34	5.21	2.98	2.27	1.85	1.52	1.32	1.043	0.864	0.457
1.65V/cell	26.7	18.9	14.5	12.1	9.00	6.44	5.29	3.00	2.36	1.90	1.56	1.35	1.057	0.881	0.462
1.60V/cell	28.8	20.1	15.3	12.8	9.43	6.68	5.31	3.12	2.42	1.96	1.61	1.37	1.065	0.889	0.464

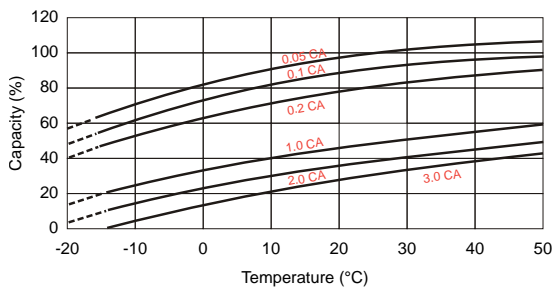
## Discharge Characteristics



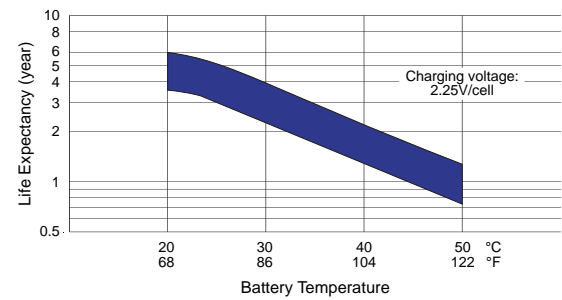
## Float Charging Characteristics



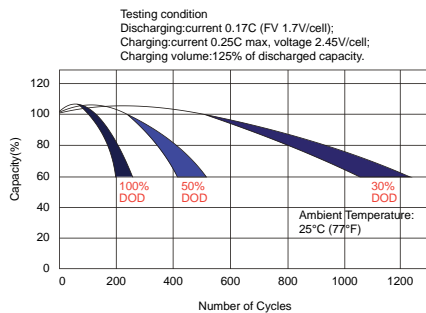
## Temperature Effects in Relation to Battery Capacity



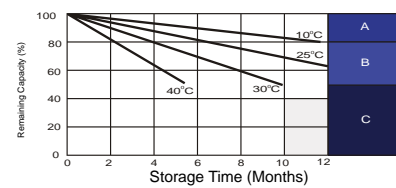
## Effect of Temperature on Long Term Float Life



## Cycle Life in Relation to Depth of Discharge



## General Relation of Capacity VS. Storage Time



- A** No supplementary required  
(Carryout supplementary charge before use if 100% capacity is required.)
- B** Supplementary charge required before use. Optional charging way as below:  
1. Charged for above 3 days at limited current 0.25CA and constant voltage 2.25V/cell.  
2. Charged for above 20 hours at limited current 0.25CA and constant voltage 2.25V/cell.  
3. Charged for 8 - 10 hours at limited current 0.05 CA.
- C** Supplementary charge may often fail to recover the capacity.  
The battery should never be left standing till this is reached.