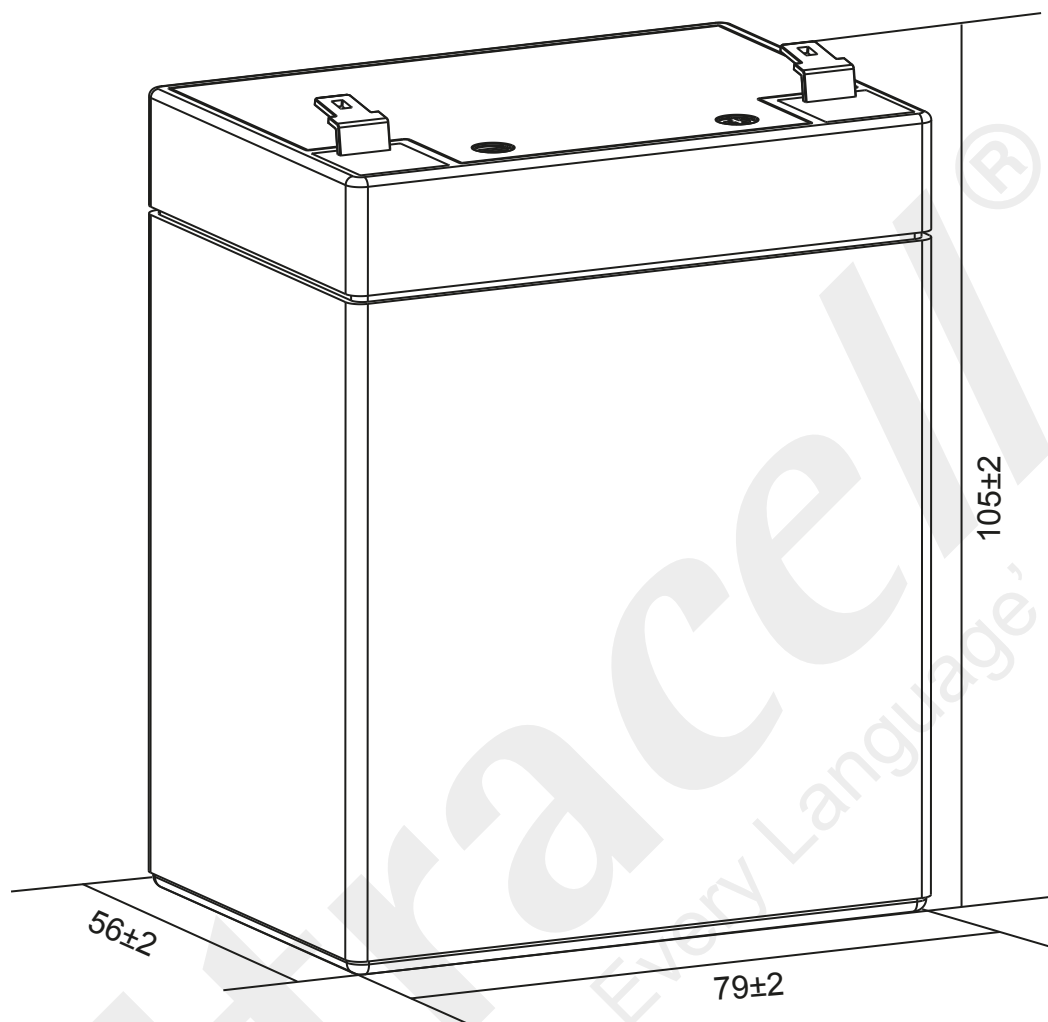
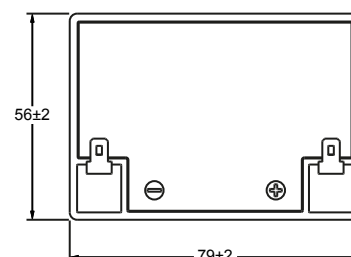
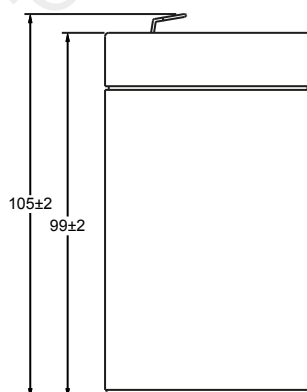
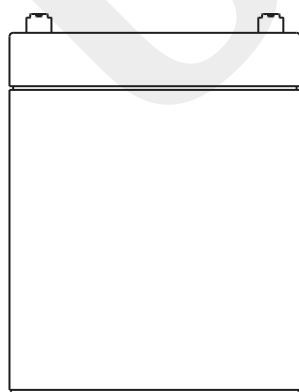




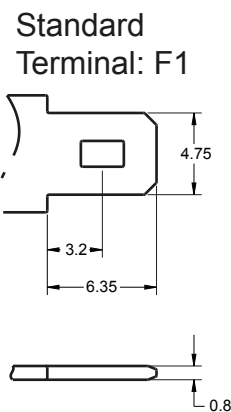
## Technical Dimensions (mm)



## Image



## Terminal Dimensions (mm)



## Technical Specification

|                              |                                  |                                                                                                      |
|------------------------------|----------------------------------|------------------------------------------------------------------------------------------------------|
| Output                       | Nominal Voltage                  | 12V                                                                                                  |
|                              | Nominal Capacity (20HR)          | 2.9Ah                                                                                                |
| Terminal Type                | Standard Terminal                | F1                                                                                                   |
| Container Material           | Standard Option                  | ABS                                                                                                  |
|                              | Flame Retardant Option (FR)      | ABS (UL94:VO)                                                                                        |
| Rated Capacity               | (20HR 1.80V/cell, 25°C)          | 2.90 Ah/0.145A                                                                                       |
|                              | (10HR 1.80V/cell, 25°C)          | 2.70 Ah/0.270A                                                                                       |
|                              | (5HR 1.75V/cell, 25°C)           | 2.44 Ah/0.487A                                                                                       |
|                              | (3HR 1.75V/cell, 25°C)           | 2.13 Ah/0.710A                                                                                       |
|                              | (1HR 1.60V/cell, 25°C)           | 1.76 Ah/1.76A                                                                                        |
|                              |                                  |                                                                                                      |
| Max Discharge Current        | 43.5A (5s)                       |                                                                                                      |
| Internal Resistance          | Approx 55mΩ                      |                                                                                                      |
| 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 0.87A.<br>Voltage 14.4V ~ 15.0V @ 25°C Temp. Coefficient -30mV/°C |
|                              | Standby Use                      | No limit on initial charging current.<br>Voltage 13.5V ~ 13.8V @ 25°C Temp. Coefficient -20mV/°C     |
|                              | Capacity affected by Temperature | 40°C 103%                                                                                            |
|                              |                                  | 25°C 100%                                                                                            |
|                              |                                  | 0°C 86%                                                                                              |
| Design Floating Life at 20°C | 5 Years                          |                                                                                                      |

## Self Discharge

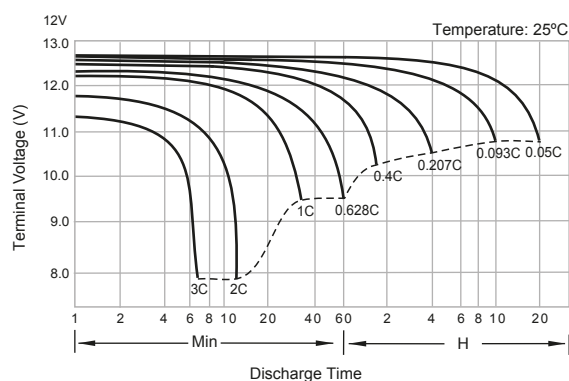
Ultracell® UL batteries may be stored for up to 6 months at 25°C and then a refresh charge is required. For higher temperatures the time intervals will be shorter.

## Constant Current Discharge / Constant Power Discharge At 25°C (Amperes & Watts/Cell)

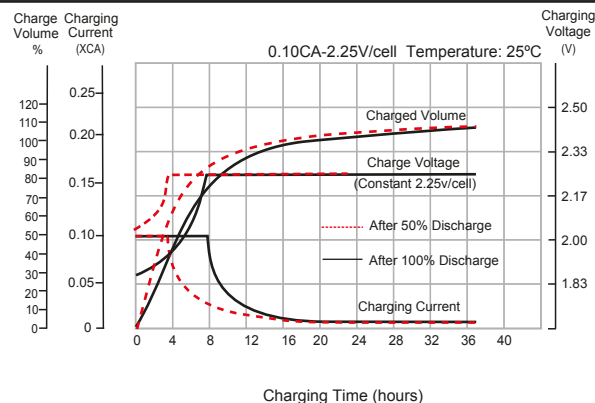
A = Amperes W = Watts

| F.V/TIME   | 5 min | 10 min | 15 min | 20 min | 30 min | 45 min | 60 min | 2 hours | 3 hours | 4 hours | 5 hours | 6 hours | 8 hours | 10 hours | 20 hours |
|------------|-------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|----------|----------|
| A          | W     |        |        |        |        |        |        |         |         |         |         |         |         |          |          |
| 1.85V/cell | 5.57  | 3.88   | 3.20   | 2.78   | 2.23   | 1.71   | 1.40   | 0.856   | 0.652   | 0.536   | 0.455   | 0.394   | 0.313   | 0.260    | 0.144    |
|            | 10.5  | 7.39   | 6.16   | 5.38   | 4.35   | 3.36   | 2.76   | 1.69    | 1.30    | 1.07    | 0.910   | 0.790   | 0.630   | 0.525    | 0.290    |
| 1.80V/cell | 6.85  | 4.63   | 3.71   | 3.14   | 2.47   | 1.87   | 1.51   | 0.909   | 0.685   | 0.563   | 0.474   | 0.411   | 0.325   | 0.270    | 0.145    |
|            | 12.8  | 8.74   | 7.07   | 6.04   | 4.77   | 3.64   | 2.95   | 1.79    | 1.35    | 1.12    | 0.943   | 0.820   | 0.649   | 0.540    | 0.291    |
| 1.75V/cell | 8.11  | 5.24   | 4.09   | 3.42   | 2.63   | 1.98   | 1.59   | 0.948   | 0.710   | 0.581   | 0.487   | 0.421   | 0.334   | 0.275    | 0.146    |
|            | 14.9  | 9.78   | 7.73   | 6.52   | 5.07   | 3.84   | 3.09   | 1.86    | 1.39    | 1.14    | 0.963   | 0.835   | 0.663   | 0.547    | 0.292    |
| 1.70V/cell | 9.20  | 5.78   | 4.43   | 3.67   | 2.77   | 2.06   | 1.65   | 0.987   | 0.733   | 0.595   | 0.499   | 0.432   | 0.339   | 0.280    | 0.149    |
|            | 16.8  | 10.7   | 8.29   | 6.95   | 5.29   | 3.97   | 3.20   | 1.92    | 1.43    | 1.17    | 0.981   | 0.850   | 0.669   | 0.553    | 0.296    |
| 1.65V/cell | 10.1  | 6.21   | 4.69   | 3.85   | 2.88   | 2.14   | 1.72   | 1.02    | 0.751   | 0.608   | 0.510   | 0.440   | 0.344   | 0.283    | 0.151    |
|            | 18.2  | 11.3   | 8.67   | 7.22   | 5.46   | 4.10   | 3.32   | 1.97    | 1.46    | 1.19    | 0.998   | 0.863   | 0.676   | 0.558    | 0.298    |
| 1.60V/cell | 10.6  | 6.47   | 4.88   | 3.98   | 2.96   | 2.19   | 1.76   | 1.05    | 0.769   | 0.623   | 0.521   | 0.449   | 0.351   | 0.288    | 0.152    |
|            | 18.8  | 11.7   | 8.93   | 7.37   | 5.56   | 4.15   | 3.36   | 2.01    | 1.49    | 1.21    | 1.01    | 0.875   | 0.687   | 0.565    | 0.299    |

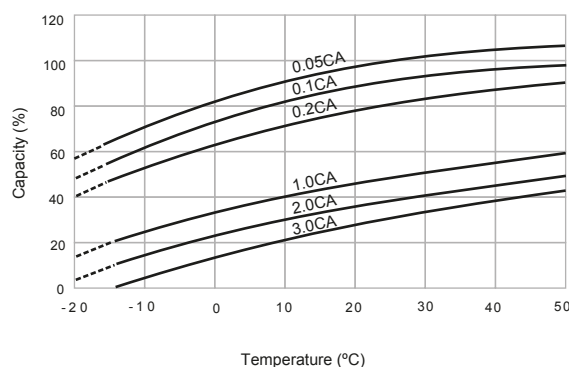
## Discharge Characteristics



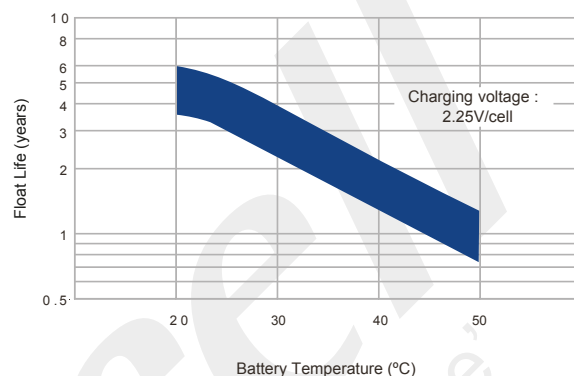
## Float Charging Characteristics



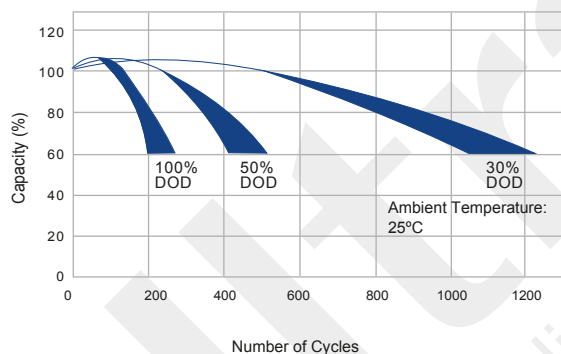
## Temperature Effects in Relation to Battery Capacity



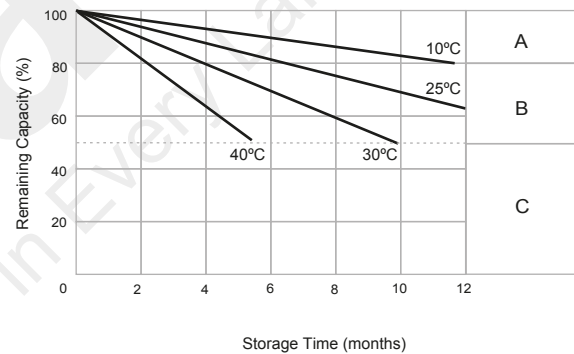
## Effects of Temperature on Long Term Float Life



## Cycle Life in Relation to Depth of Discharge



## General Relation of Capacity vs. Storage Time



## General Relation of Capacity vs. Storage Time (Notes)

- A) No supplementary charge 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.