

## TUS SERIES BATTERY

TUS series battery has high power output characteristics which more than 25% higher than traditional VRLA. It has very good cycle life and higher energy density. TUS series can be faster recharged even better than Li-on battery. It is recommended to use for EPS / UPS with 1-15min back up & FM energy storage with high power output.

## TECHNICAL SPECIFICATIONS

|                                 |                                                              |
|---------------------------------|--------------------------------------------------------------|
| Nominal Voltage (V)             | 12 (6 cells per unit)                                        |
| Power(25°C)                     | 600W @ 10min to 1.67Vpc                                      |
| Designed Floating Life (20°C)   | 12 Years                                                     |
| Dimensions                      | L394mm x W177mm x H190(194)mm                                |
| Approx. Weight                  | 32.5 kg                                                      |
| Terminal Type                   | M8 Copper Insert(torque: 12-13N.m)                           |
| Internal Resistance             | Approx. 1.5mOhm (fully charged @ 25°C)                       |
| Ambient Temperature             | Discharge: -40~60°C<br>Charge: -25~60°C<br>Storage: -25~40°C |
| Self Discharge                  | Approx. 3% per month @ 20°C                                  |
| Float Charge Voltage (25°C)     | 13.5V(-3mV /°C/cell)                                         |
| Equalize Charge Voltage (25 °C) | 14.1V                                                        |
| Container Material              | ABS(UL94-V0 is optional)                                     |

**High Current Capability**  
more than 20C supported

**High Power Density**  
30% Higher than Traditional

**High Discharge Voltage Platform**  
Around 0.8~1V Higher

**12 V**  
Voltage

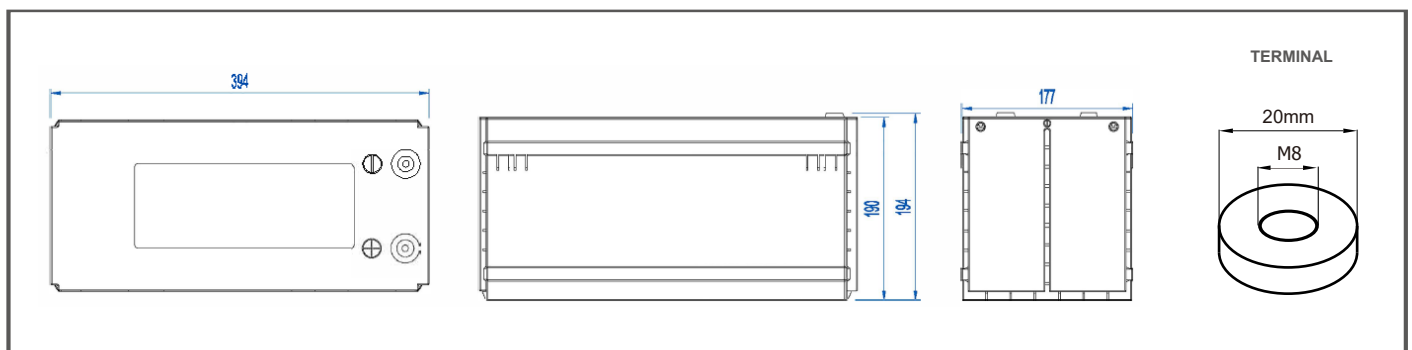
**600W**  
10min Rate

**Horizontal Bipolar**  
Technology



- IEC 60896-21/22
- JIS C8704
- BS6290 part 4
- EUROBAT guide
- UL1989

## BATTERY DIMENSIONS



## BATTERY DISCHARGE TABLE

Constant Current Discharge Characteristics: Amps (25°C)

| F.V/Time | 1Min | 5Min | 10Min | 15Min | 30Min | 1h   | 2h   | 3h   | 5h   | 8h   | 10h  | 20h  |
|----------|------|------|-------|-------|-------|------|------|------|------|------|------|------|
| 1.60V    | 1220 | 493  | 294   | 231   | 136   | 78.7 | 44.0 | 30.5 | 19.7 | 12.8 | 10.3 | 5.36 |
| 1.67V    | 1113 | 486  | 289   | 227   | 134   | 78.0 | 43.8 | 30.4 | 19.4 | 12.7 | 10.2 | 5.30 |
| 1.70V    | 995  | 474  | 285   | 221   | 131   | 77.1 | 43.1 | 30.3 | 19.3 | 12.6 | 10.1 | 5.25 |
| 1.75V    | 857  | 454  | 276   | 215   | 128   | 76.0 | 42.5 | 30.1 | 19.2 | 12.5 | 10.0 | 5.20 |
| 1.80V    | 748  | 441  | 265   | 209   | 126   | 74.6 | 42.1 | 29.5 | 19.0 | 12.3 | 9.89 | 5.15 |
| 1.85V    | 632  | 417  | 246   | 198   | 122   | 72.9 | 40.7 | 28.7 | 18.5 | 12.0 | 9.60 | 5.00 |

**Constant Power Discharge Characteristics**  
917 Wpc@5min (to 1.67V)

**Constant Power Discharge Characteristics**  
451 Wpc@15min (to 1.67V)

Constant Power Discharge Characteristics: W/cell (25°C)

| F.V/Time | 1Min | 5Min | 10Min | 15Min | 30Min | 1h  | 2h   | 3h   | 5h   | 8h   | 10h  | 20h  |
|----------|------|------|-------|-------|-------|-----|------|------|------|------|------|------|
| 1.60V    | 2067 | 907  | 599   | 456   | 269   | 155 | 88.5 | 61.5 | 39.5 | 25.6 | 20.7 | 10.8 |
| 1.67V    | 1962 | 899  | 594   | 451   | 265   | 153 | 87.2 | 61.0 | 38.9 | 25.4 | 20.5 | 10.7 |
| 1.70V    | 1798 | 891  | 576   | 444   | 262   | 153 | 86.4 | 60.8 | 38.7 | 25.1 | 20.3 | 10.6 |
| 1.75V    | 1574 | 866  | 561   | 436   | 259   | 151 | 85.3 | 60.5 | 38.3 | 24.7 | 20.1 | 10.5 |
| 1.80V    | 1394 | 851  | 541   | 427   | 255   | 148 | 84.4 | 59.9 | 37.9 | 24.3 | 19.7 | 10.2 |
| 1.85V    | 1198 | 805  | 507   | 406   | 247   | 144 | 82.2 | 59.0 | 37.3 | 23.9 | 19.5 | 10.1 |

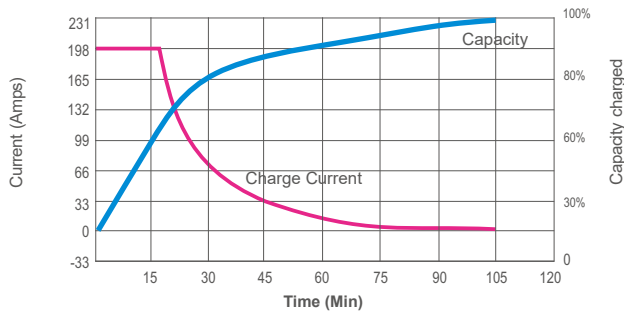
**High Capacity at Low Temperature**  
75% Capacity at -18°C

**Strong Shock Resistance**  
Safe and Maintenance Free

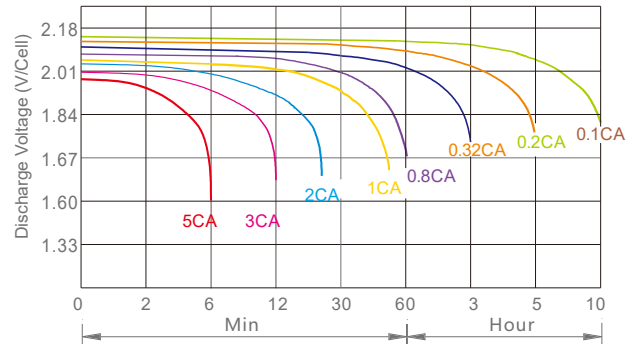
## Characteristics

**2C Fast Charge Characteristic**

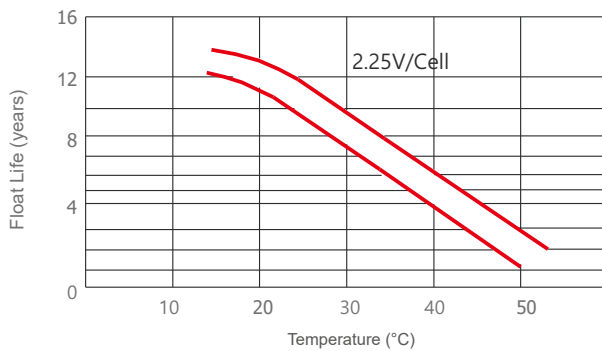
(Charging voltage limit: 14.4V)



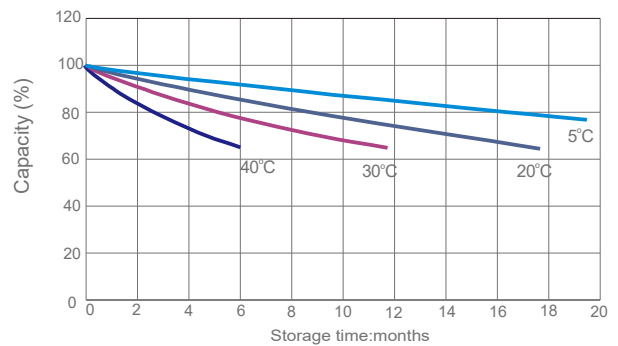
**Discharge Characteristic (25°C)**



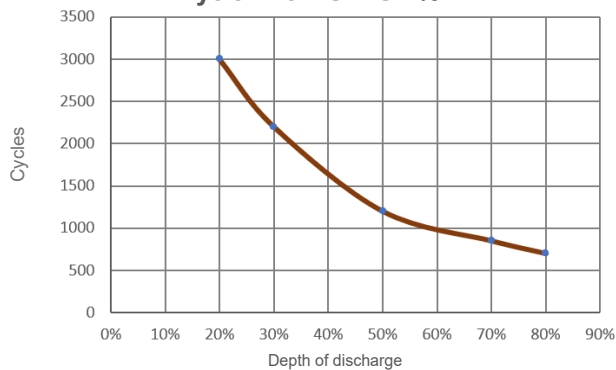
**Temperature vs Float Life**



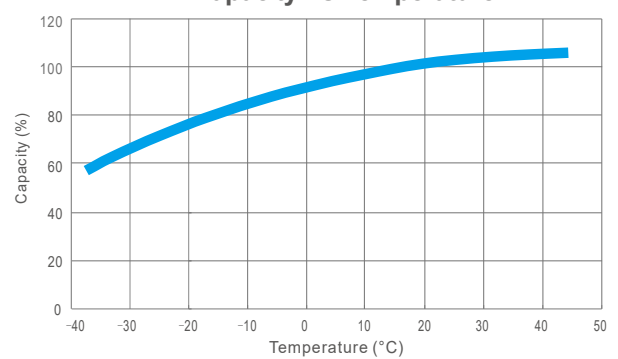
**Self Discharge Characteristics**



**Cycle Life VS DOD%**



**Capacity vs Temperature**



## Final Voltage Settings Recommend According to Discharge Current:

| Discharge Current I(A) | $I < 0.08C$       | $0.08C \leq I < 0.2C$ | $0.2C \leq I < 0.6C$ | $0.6C \leq I < 1.0C$ | $1.0C \leq I < 3.0C$ | $I \geq 3.0C$     |
|------------------------|-------------------|-----------------------|----------------------|----------------------|----------------------|-------------------|
| Final of Voltage       | $\geq 1.85V_{pc}$ | $\geq 1.80V_{pc}$     | $\geq 1.75V_{pc}$    | $\geq 1.70V_{pc}$    | $\geq 1.60V_{pc}$    | $\geq 1.20V_{pc}$ |

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TUS series battery has high power output characteristics which more than 30% higher than traditional VRLA. It has very good cycle life and high energy density. TUS series can be faster recharged even better than a Li-ion battery. It is recommended to use for EPS / UPS with 1-10min back up.

**Bipolar Technology**

**High Power Density**

30%+ Higher than Traditional

**High Discharge Voltage Platform**

Around 0.8~1V Higher

**12 V**  
Voltage

**1125W**  
10min Rate

**1551W**  
5min Rate

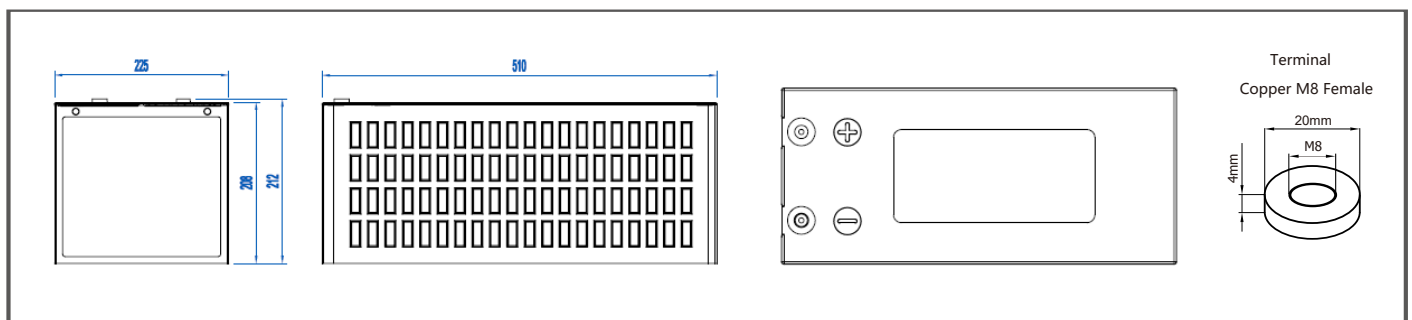


- IEC 60896-21/22
- GB/T19638
- JIS C8704
- BS6290 part 4
- EUROBAT guide
- UL1989

## TECHNICAL SPECIFICATIONS

|                                 |                                                              |
|---------------------------------|--------------------------------------------------------------|
| Nominal Voltage (V)             | 12 (6 cells per unit)                                        |
| Power(25°C)                     | 1125W @ 10min to 1.67Vpc                                     |
| Capacity@C3(25°C)               | 180Ah to 10.5V cut off                                       |
| Designed Floating Life (20°C)   | 12 Years                                                     |
| Dimensions                      | L510mm x W225mm x H212mm                                     |
| Approx. Weight                  | 60.5kg                                                       |
| Terminal Type                   | M8 Copper Insert (torque: 12-13N.m)                          |
| Internal Resistance             | Approx. 1.25mΩ (fully charged @ 25°C)                        |
| Short Circuit Current           | 9200A                                                        |
| Ambient Temperature             | Discharge: -45~60°C<br>Charge: -30~60°C<br>Storage: -25~35°C |
| Self Discharge                  | Approx. 3 % per month @ 20°C                                 |
| Float Charge Voltage (25°C)     | 13.5V(-18mV / °C)                                            |
| Equalize Charge Voltage (25 °C) | 14.1-14.3V (Max. charge current 200A)                        |
| Container Material              | ABS(UL94-V0 is optional)                                     |

## BATTERY DIMENSIONS



## BATTERY DISCHARGE TABLE

Constant Current Discharge Characteristics: Amps (25°C)

| F.V/Time | 5min | 10min | 15min | 20min | 30min | 45min | 1h  | 2h   | 3h   | 5h   | 8h   | 10h  |
|----------|------|-------|-------|-------|-------|-------|-----|------|------|------|------|------|
| 1.60V    | 877  | 607   | 473   | 392   | 281   | 198   | 155 | 84.2 | 60.8 | 40.0 | 25.4 | 20.5 |
| 1.67V    | 824  | 589   | 454   | 380   | 274   | 192   | 152 | 83.3 | 60.1 | 39.0 | 24.9 | 20.3 |
| 1.70V    | 780  | 558   | 433   | 366   | 263   | 184   | 149 | 82.1 | 59.1 | 38.4 | 24.6 | 20.2 |
| 1.75V    | 719  | 520   | 410   | 344   | 250   | 174   | 144 | 81.0 | 58.1 | 37.5 | 24.3 | 20.0 |
| 1.80V    | 649  | 485   | 384   | 321   | 237   | 164   | 136 | 77.5 | 56.4 | 36.6 | 23.6 | 19.7 |

**Constant Power Discharge Characteristics**  
1551Wpc@5min (to 1.67V)

**Constant Power Discharge Characteristics**  
870Wpc@15min (to 1.67V)

Constant Power Discharge Characteristics: W/cell (25°C)

| F.V/Time | 5min | 10min | 15min | 20min | 30min | 45min | 1h  | 2h  | 3h  | 5h   | 8h   | 10h  |
|----------|------|-------|-------|-------|-------|-------|-----|-----|-----|------|------|------|
| 1.60V    | 1612 | 1142  | 888   | 748   | 542   | 380   | 296 | 161 | 116 | 77.5 | 50.2 | 41.2 |
| 1.67V    | 1551 | 1125  | 870   | 730   | 532   | 370   | 292 | 159 | 115 | 76.1 | 49.3 | 40.8 |
| 1.70V    | 1474 | 1066  | 835   | 709   | 511   | 357   | 288 | 157 | 113 | 75.1 | 48.8 | 40.5 |
| 1.75V    | 1374 | 999   | 791   | 671   | 487   | 341   | 280 | 155 | 111 | 73.6 | 48.2 | 40.2 |
| 1.80V    | 1242 | 936   | 746   | 634   | 464   | 320   | 266 | 149 | 108 | 72.0 | 46.7 | 39.7 |

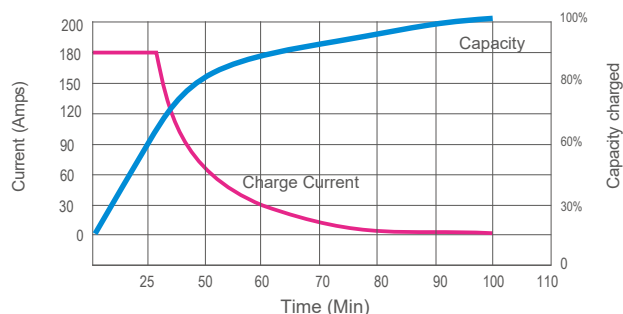
**High Capacity at Low Temperature**  
75% Capacity at -18°C

**Strong Shock Resistance**  
Safe and Maintenance Free

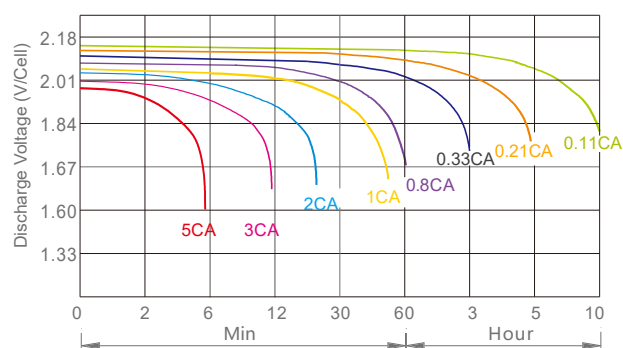
## Characteristics

### 1C Fast Charge Characteristic

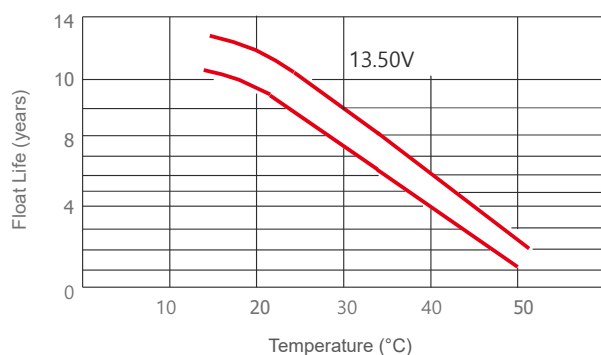
(Charging voltage limit: 14.2V)



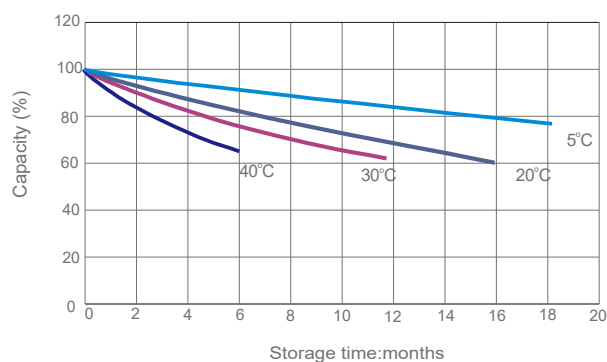
### Discharge Characteristic (25°C)



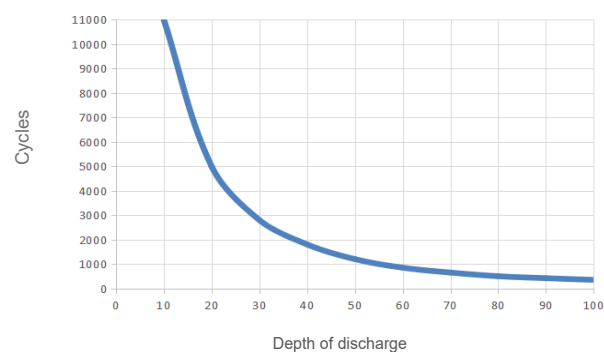
### Temperature vs Float Life



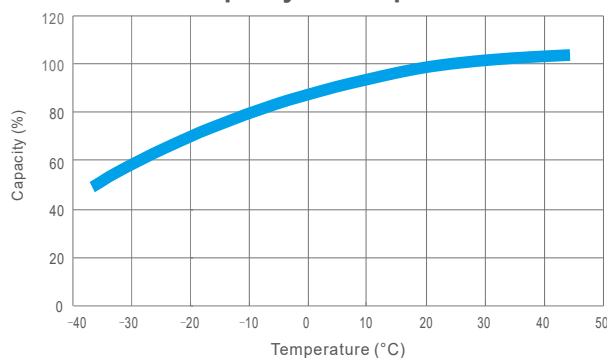
### Self Discharge Characteristics



### Cycle Life vs DOD%



### Capacity vs Temperature



## Final Voltage Settings Recommend According to Discharge Current:

| Discharge Current I(A) | $I < 0.08C$       | $0.08C \leq I < 0.2C$ | $0.2C \leq I < 0.6C$ | $0.6C \leq I < 1.0C$ | $1.0C \leq I < 3.0C$ | $I \geq 3.0C$     |
|------------------------|-------------------|-----------------------|----------------------|----------------------|----------------------|-------------------|
| Final of Voltage       | $\geq 1.85V_{pc}$ | $\geq 1.80V_{pc}$     | $\geq 1.75V_{pc}$    | $\geq 1.70V_{pc}$    | $\geq 1.60V_{pc}$    | $\geq 1.20V_{pc}$ |