

## WP1.2-6 6V 1.2Ah

### Specifications

Nominal Voltage(V) **6V**

#### Nominal Capacity

20 hour rate	(0.06A to 5.25V)	1.2Ah
10 hour rate	(0.114A to 5.25V)	1.14Ah
5 hour rate	(0.204A to 5.1V)	1.02Ah
1 C	(1.2A to 4.8V)	0.68Ah
3 C	(3.6A to 4.8V)	0.48Ah

Weight **Approx. 297g(0.65Lbs.)**

Internal Resistance (at 1KHz) **Approx. 41 mΩ**

Maximum Discharge Current for 5 seconds: **18A**

#### Charging Methods at 25 (77 )

Cycle use:	
Charging Voltage	<b>7.20 to 7.50V</b>
Coefficient -5.0mV/ /cell	
Maximum Charging Current :	<b>0.36A</b>
Standby use:	
Float Charging Voltage	<b>6.75 to 6.90V</b>
Coefficient -3.0mV/ /cell	

#### Operating Temperature Range

Charge	<b>-15 (5 ) to 40 (104 )</b>
Discharge	<b>-15 (5 ) to 50 (122 )</b>
Storage	<b>-15 (5 ) to 40 (104 )</b>

#### Charge Retention (shelf life) at 20 (68 )

1 month	<b>92%</b>
3 month	<b>90%</b>
6 month	<b>80%</b>

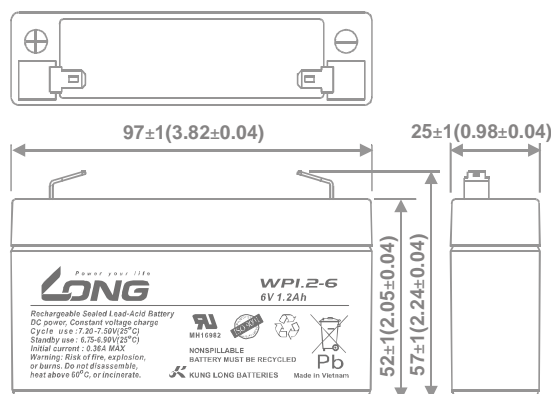
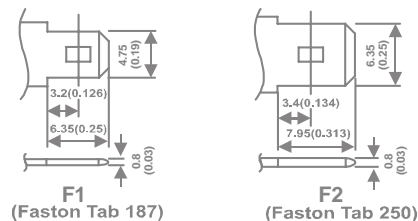
Case Material **ABS UL94 HB**  
Option: Flammability resistance of (UL94 V-0)

Terminal **F1 or F2 (Faston Tab 187 or 250)**

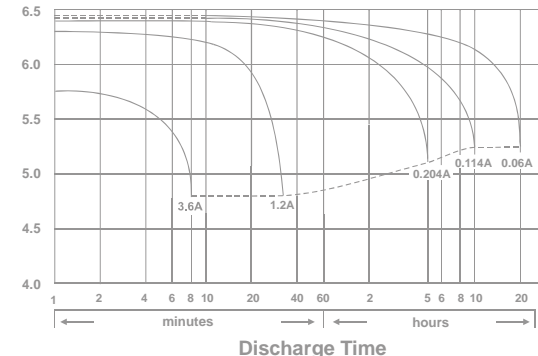


### Dimensions

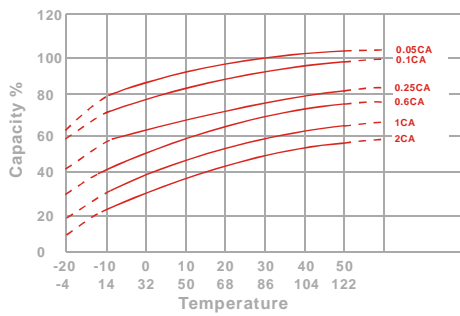
mm(inch)



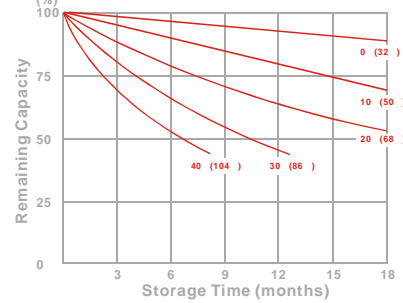
#### (V) FOR 6V BATTERY Discharge Time VS. Discharge Current (25 )



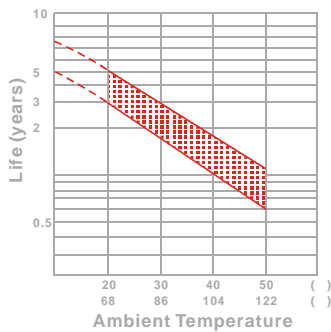
Effect of Temperature on Capacity 25 (77 )



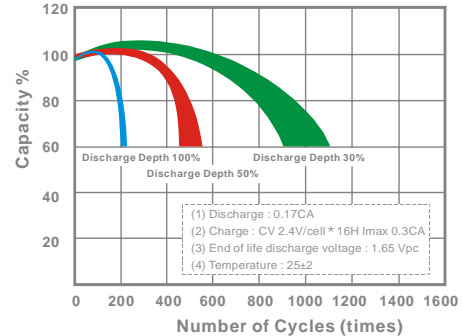
Capacity Retention Characteristic



Trickle (or float) Service Life



Cycle Service Life



## - PERFORMANCE DATA

Discharge Rates in Watts to Various End Voltages at 25 (77 )

Time	End Voltage	1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
5	min	7.18	7.82	8.27	8.65	8.80	8.98	9.28
10	min	4.62	5.00	5.30	5.52	5.58	5.67	5.77
15	min	3.65	3.87	4.05	4.20	4.25	4.32	4.38
30	min	2.15	2.25	2.32	2.37	2.38	2.42	2.45
60	min	1.32	1.39	1.43	1.47	1.48	1.50	1.52
120	min	0.747	0.808	0.847	0.875	0.887	0.900	0.915
180	min	0.533	0.573	0.602	0.623	0.633	0.645	0.657
240	min	0.435	0.470	0.495	0.513	0.520	0.528	0.537
300	min	0.420	0.442	0.457	0.468	0.472	0.477	0.482
600	min	0.220	0.233	0.243	0.250	0.252	0.255	0.258
1200	min	0.123	0.126	0.129	0.130	0.131	0.131	0.132

- Discharge Rates in Amperes to Various End Voltages at 25 (77 )

Time	End Voltage	1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
5	min	3.49	4.11	4.57	4.94	5.09	5.26	5.51
10	min	2.12	2.43	2.63	2.81	2.88	2.96	3.11
15	min	1.71	1.95	2.09	2.20	2.24	2.29	2.35
30	min	0.931	1.06	1.17	1.24	1.26	1.29	1.32
60	min	0.680	0.716	0.735	0.759	0.765	0.772	0.779
120	min	0.392	0.415	0.429	0.440	0.444	0.449	0.456
180	min	0.272	0.291	0.302	0.311	0.314	0.318	0.324
240	min	0.223	0.238	0.247	0.254	0.257	0.260	0.264
300	min	0.207	0.219	0.226	0.231	0.233	0.236	0.238
600	min	0.112	0.117	0.121	0.124	0.125	0.126	0.127
1200	min	0.0615	0.0624	0.0631	0.0637	0.0639	0.0642	0.0646

All data on the spec. sheet is an average value:

The tolerance range : X<6min(+15%~-15%), 6min X<10min(+12%~-12%),10min X < 60min(+8%~-8%), X 60min(+5%~-5%)

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Vietnam Customer Service - TEL: +84-72-3779666 FAX: +84-72-3779476 E-mail: sales@mail.klb.com.tw

## WP4.5-6 6Volt 4.5Ah

### Specifications

Nominal Voltage(V) **6V**

#### Nominal Capacity

20 hour rate	(0.225A to	5.25V)	<b>4.5Ah</b>
10 hour rate	(0.428A to	5.25V)	<b>4.275Ah</b>
5 hour rate	(0.765A to	5.1V)	<b>3.825Ah</b>
1 C	(4.5A to	4.8V)	<b>2.55Ah</b>
3 C	(13.5A to	4.8V)	<b>1.8Ah</b>

Weight **Approx. 820g(1.80Lbs.)**

Internal Resistance (at 1KHz) **Approx. 19 mΩ**

Maximum Discharge Current for 5 seconds: **67.5A**

#### Charging Methods at 25 (77 )

Cycle use:

Charging Voltage **7.20 to 7.50V**

Coefficient -5.0mV/ /cell

Maximum Charging Current : **1.35A**

Standby use:

Float Charging Voltage **6.75 to 6.90V**

Coefficient -3.0mV/ /cell

#### Operating Temperature Range

Charge **-15 (5 ) to 40 (104 )**

Discharge **-15 (5 ) to 50 (122 )**

Storage **-15 (5 ) to 40 (104 )**

#### Charge Retention (shelf life) at 20 (68 )

1 month **92%**

3 month **90%**

6 month **80%**

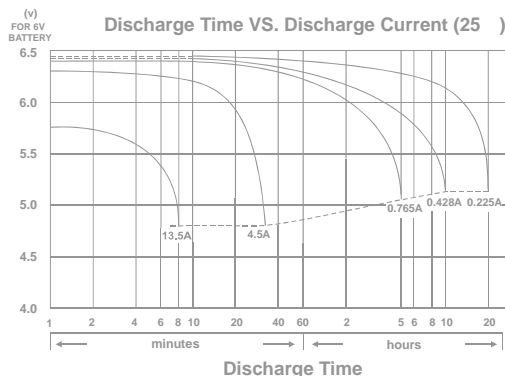
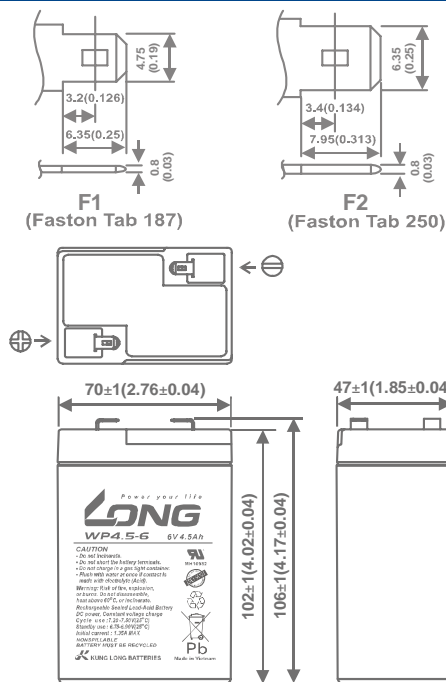
Case Material **ABS UL94 HB**

Option: Flammability resistance of (UL94 V-0)

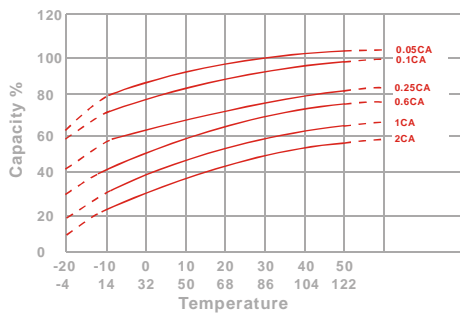
Terminal **F1 or F2 (Faston Tab 187 or 250)**



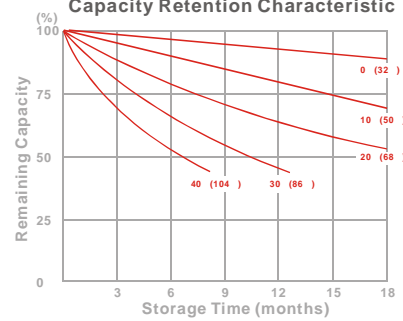
### Dimensions mm(inch)



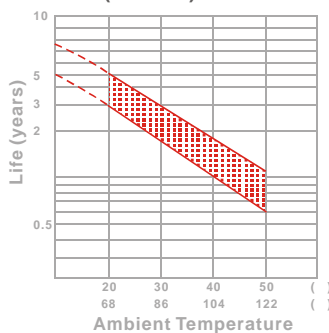
Effect of Temperature on Capacity 25 (77 )



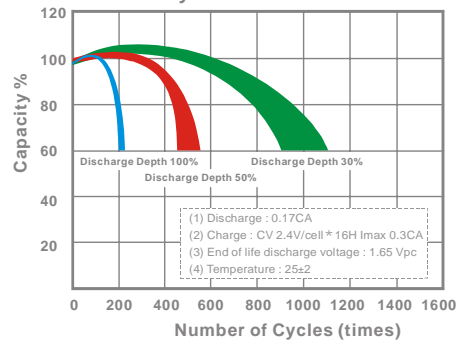
Capacity Retention Characteristic



Trickle (or float) Service Life



Cycle Service Life



## - PERFORMANCE DATA

Discharge Rates in Watts to Various End Voltages at 25 (77 )

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	23.8	26.8	29.0	31.0	31.8	32.8	34.0
10	min	17.0	19.2	20.5	21.5	22.0	22.5	23.0
15	min	14.1	15.6	16.2	16.5	16.7	16.8	17.0
30	min	8.18	9.15	9.52	9.70	9.80	9.92	10.0
60	min	4.20	4.77	5.13	5.43	5.53	5.65	5.73
120	min	2.48	2.77	2.90	3.00	3.05	3.12	3.18
180	min	1.97	2.17	2.27	2.35	2.38	2.43	2.48
240	min	1.60	1.73	1.80	1.85	1.88	1.92	1.95
300	min	1.46	1.56	1.60	1.64	1.65	1.68	1.72
600	min	0.855	0.913	0.940	0.960	0.968	0.978	0.992
1200	min	0.432	0.468	0.498	0.510	0.513	0.520	0.527

- Discharge Rates in Amperes to Various End Voltages at 25 (77 )

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	15.3	17.6	18.9	19.5	19.7	19.9	20.2
10	min	10.5	11.7	11.9	12.1	12.2	12.3	12.4
15	min	7.56	8.22	8.71	8.92	8.99	9.07	9.15
30	min	4.39	4.94	5.11	5.25	5.30	5.35	5.41
60	min	2.36	2.61	2.73	2.84	2.87	2.91	2.94
120	min	1.32	1.44	1.50	1.54	1.55	1.57	1.59
180	min	1.09	1.15	1.18	1.20	1.21	1.22	1.23
240	min	0.835	0.891	0.916	0.942	0.948	0.955	0.963
300	min	0.776	0.812	0.825	0.837	0.841	0.846	0.852
600	min	0.435	0.452	0.464	0.473	0.477	0.481	0.486
1200	min	0.219	0.233	0.241	0.247	0.250	0.253	0.257

All data on the spec. sheet is an average value:

The tolerance range : X<6min(+15%~-15%), 6min X<10min(+12%~-12%),10min X < 60min(+8%~-8%), X 60min(+5%~-5%)

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## WP7-6 6Volt 7Ah

### Specifications

Nominal Voltage(V) **6V**

#### Nominal Capacity

20 hour rate	(0.35A to 5.25V)	7Ah
10 hour rate	(0.665A to 5.25V)	6.65Ah
5 hour rate	(1.19A to 5.1V)	5.95Ah
1 C	(7A to 4.8V)	3.97Ah
3 C	(21A to 4.8V)	2.8Ah

Weight **Approx. 1.2kg(2.64Lbs.)**

Internal Resistance (at 1KHz) **Approx. 12 mΩ**

#### Maximum Discharge Current for

5 seconds: **105A**

#### Charging Methods at 25 (77 )

Cycle use:

Charging Voltage **7.20 to 7.50V**

Coefficient -5.0mV/ /cell

Maximum Charging Current : **2.1A**

Standby use:

Float Charging Voltage **6.75 to 6.90V**

Coefficient -3.0mV/ /cell

#### Operating Temperature Range

Charge **-15 (5 ) to 40 (104 )**

Discharge **-15 (5 ) to 50 (122 )**

Storage **-15 (5 ) to 40 (104 )**

#### Charge Retention (shelf life) at 20 (68 )

1 month **92%**

3 month **90%**

6 month **80%**

Case Material **ABS UL94 HB**

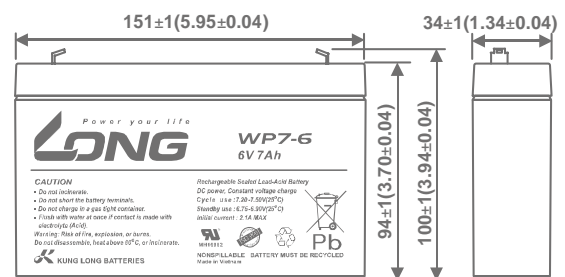
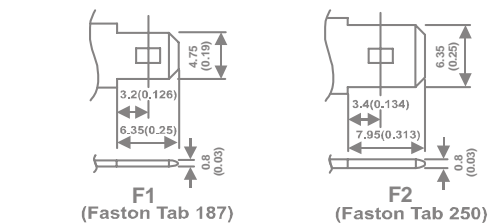
Option: Flammability resistance of (UL94 V-0)

Terminal **F1 or F2 (Faston Tab 187 or 250)**

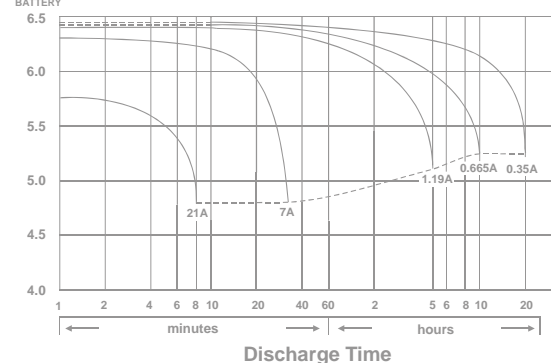


### Dimensions

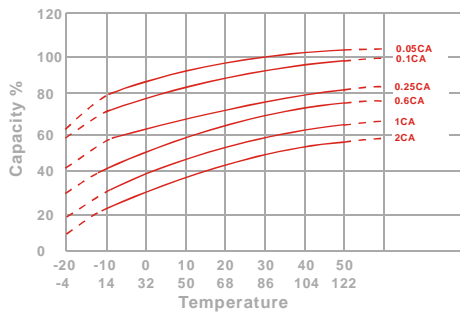
mm(inch)



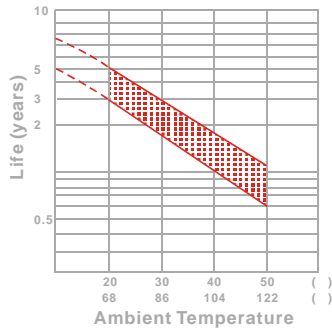
#### Discharge Time VS. Discharge Current (25 )



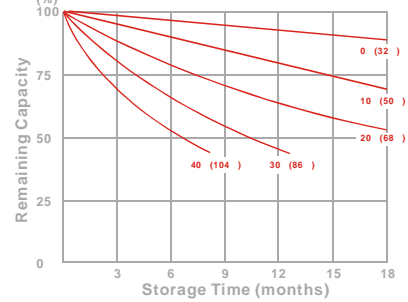
Effect of Temperature on Capacity 25 (77 )



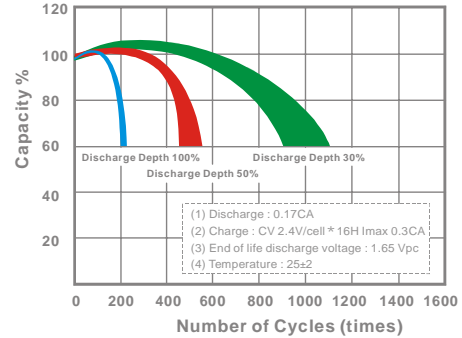
Trickle (or float) Service Life



Capacity Retention Characteristic



Cycle Service Life



**- PERFORMANCE DATA**

Discharge Rates in Watts to Various End Voltages at 25 (77 )

End Voltage		1.85V	1.8V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	45.2	50.3	52.7	54.8	55.8	56.7	58.2
10	min	30.7	32.2	33.7	34.8	35.7	36.2	37.2
15	min	24.5	25.5	26.2	26.8	27.0	27.5	28.2
30	min	13.0	13.7	14.1	14.5	14.6	14.7	14.9
60	min	8.43	8.73	8.97	9.15	9.22	9.30	9.45
120	min	4.21	4.39	4.63	5.22	5.27	5.32	5.40
180	min	3.27	3.45	3.60	3.73	3.77	3.82	3.87
240	min	2.87	3.01	3.10	3.15	3.17	3.20	3.23
300	min	2.47	2.54	2.63	2.68	2.70	2.72	2.73
600	min	1.45	1.50	1.53	1.55	1.56	1.56	1.57
1200	min	0.694	0.718	0.737	0.750	0.755	0.760	0.770

- Discharge Rates in Amperes to Various End Voltages at 25 (77 )

End Voltage		1.85V	1.8V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	23.5	26.4	28.1	29.7	30.5	31.3	32.6
10	min	16.2	17.0	18.2	18.6	18.8	19.1	19.8
15	min	12.5	13.1	13.6	13.9	14.0	14.2	14.5
30	min	6.61	6.92	7.14	7.30	7.38	7.45	7.61
60	min	3.98	4.13	4.25	4.36	4.39	4.42	4.48
120	min	2.05	2.14	2.21	2.27	2.29	2.32	2.35
180	min	1.63	1.69	1.75	1.80	1.82	1.84	1.87
240	min	1.30	1.37	1.42	1.45	1.46	1.47	1.49
300	min	1.11	1.16	1.23	1.25	1.26	1.27	1.28
600	min	0.650	0.680	0.721	0.728	0.732	0.737	0.747
1200	min	0.341	0.357	0.377	0.382	0.384	0.387	0.392

All data on the spec. sheet is an average value:

The tolerance range : X<6min(+15%~-15%), 6min X<10min(+12%~-12%),10min X < 60min(+8% ~-8%), X 60min(+5%~-5%)

211016-1F



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## WP1.2-12 12Volt 1.2Ah

### Specifications

Nominal Voltage(V) **12V**

#### Nominal Capacity

20 hour rate	(0.06A to 10.50V)	<b>1.2Ah</b>
10 hour rate	(0.114A to 10.50V)	<b>1.14Ah</b>
5 hour rate	(0.204A to 10.20V)	<b>1.02Ah</b>
1 C	(1.2A to 9.60V)	<b>0.68Ah</b>
3 C	(3.6A to 9.60V)	<b>0.48Ah</b>

Weight **Approx. 564g(1.24Lbs.)**

Internal Resistance (at 1KHz) **Approx. 75.4 mΩ**

#### Maximum Discharge Current for

5 seconds: **18A**

#### Charging Methods at 25 (77 )

Cycle use:

Charging Voltage **14.4 to 15.0V**

Coefficient -5.0mV/ /cell

Maximum Charging Current : **0.36A**

Standby use:

Float Charging Voltage **13.5 to 13.8V**

Coefficient -3.0mV/ /cell

#### Operating Temperature Range

Charge **-15 (5 ) to 40 (104 )**

Discharge **-15 (5 ) to 50 (122 )**

Storage **-15 (5 ) to 40 (104 )**

#### Charge Retention (shelf life) at 20 (68 )

1 month **92%**

3 month **90%**

6 month **80%**

Case Material **ABS UL94 HB**

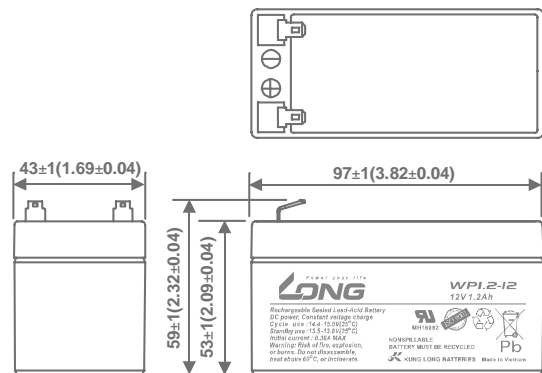
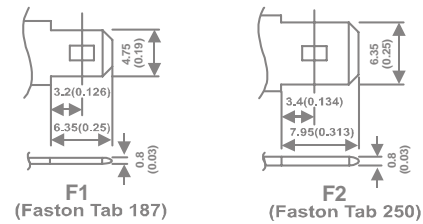
Option: Flammability resistance of (UL94 V-0)

Terminal **F1 or F2 (Faston Tab 187 or 250)**

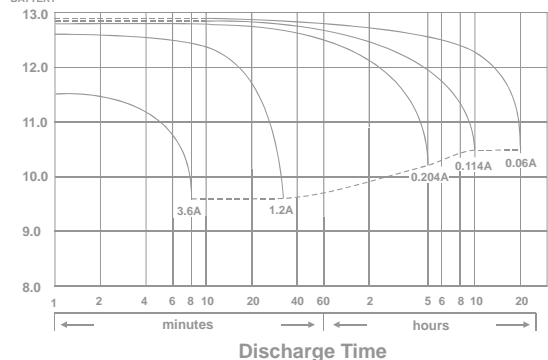


### Dimensions

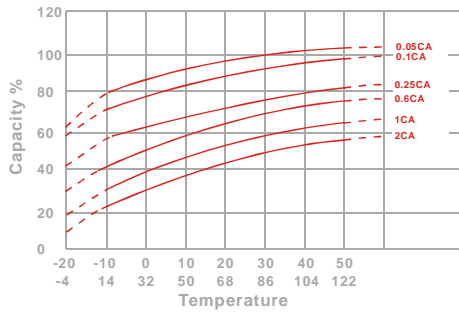
mm(inch)



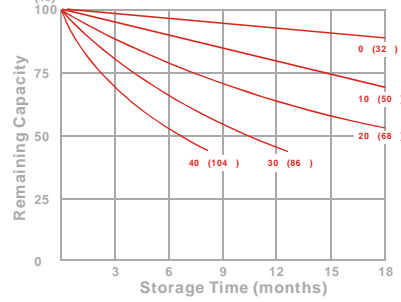
(V) FOR 12V BATTERY Discharge Time VS. Discharge Current (25 )



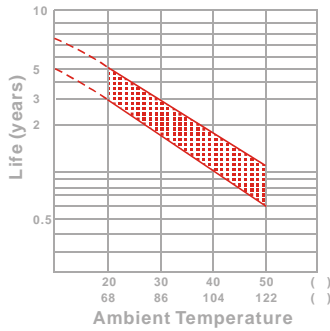
Effect of Temperature on Capacity 25 (77 )



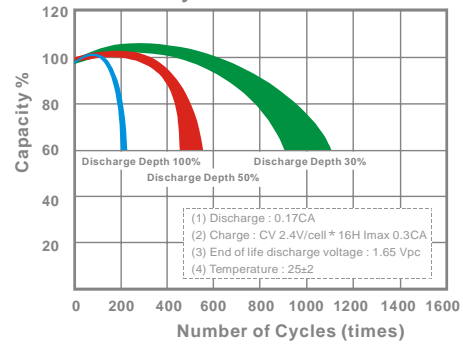
Capacity Retention Characteristic



Trickle (or float) Service Life



Cycle Service Life



## - PERFORMANCE DATA

### Discharge Rates in Watts to Various End Voltages at 25 (77 )

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	7.18	7.82	8.27	8.65	8.80	8.98	9.28
10	min	4.62	5.00	5.30	5.52	5.58	5.67	5.77
15	min	3.65	3.87	4.05	4.20	4.25	4.32	4.38
30	min	2.15	2.25	2.32	2.37	2.38	2.42	2.45
60	min	1.32	1.39	1.43	1.47	1.48	1.50	1.52
120	min	0.747	0.808	0.847	0.875	0.887	0.900	0.915
180	min	0.533	0.573	0.602	0.623	0.633	0.645	0.657
240	min	0.435	0.470	0.495	0.513	0.520	0.528	0.537
300	min	0.420	0.442	0.457	0.468	0.472	0.477	0.482
600	min	0.220	0.233	0.243	0.250	0.252	0.255	0.258
1200	min	0.123	0.126	0.129	0.130	0.131	0.131	0.132

### - Discharge Rates in Amperes to Various End Voltages at 25 (77 )

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	3.49	4.11	4.57	4.94	5.09	5.26	5.51
10	min	2.12	2.43	2.63	2.81	2.88	2.96	3.11
15	min	1.71	1.95	2.09	2.20	2.24	2.29	2.35
30	min	0.931	1.06	1.17	1.24	1.26	1.29	1.32
60	min	0.680	0.716	0.735	0.759	0.765	0.772	0.779
120	min	0.392	0.415	0.429	0.440	0.444	0.449	0.456
180	min	0.272	0.291	0.302	0.311	0.314	0.318	0.324
240	min	0.223	0.238	0.247	0.254	0.257	0.260	0.264
300	min	0.207	0.219	0.226	0.231	0.233	0.236	0.238
600	min	0.112	0.117	0.121	0.124	0.125	0.126	0.127
1200	min	0.0615	0.0624	0.0631	0.0637	0.0639	0.0642	0.0646

All data on the spec. sheet is an average value:

The tolerance range : X < 6min(+15%~-15%), 6min X < 10min(+12%~-12%), 10min X < 60min(+8%~-8%), X < 60min(+5%~-5%)



## WP2.3-12 12Volt 2.3Ah

### Specifications

Nominal Voltage(V) **12V**

#### Nominal Capacity

20 hour rate	(0.115A to 10.50V)	<b>2.3Ah</b>
10 hour rate	(0.219A to 10.50V)	<b>2.185Ah</b>
5 hour rate	(0.39A to 10.20V)	<b>1.955Ah</b>
1 C	(2.3A to 9.60V)	<b>1.303Ah</b>
3 C	(6.9A to 9.60V)	<b>0.92Ah</b>

Weight **Approx. 1.04kg(2.29Lbs.)**

Internal Resistance (at 1KHz) **Approx. 37 mΩ**

#### Maximum Discharge Current for

5 seconds: **34.5A**

#### Charging Methods at 25 (77 )

Cycle use:

Charging Voltage **14.4 to 15.0V**

Coefficient -5.0mV/ /cell

Maximum Charging Current : **0.69A**

Standby use:

Float Charging Voltage **13.5 to 13.8V**

Coefficient -3.0mV/ /cell

#### Operating Temperature Range

Charge **-15 (5 ) to 40 (104 )**

Discharge **-15 (5 ) to 50 (122 )**

Storage **-15 (5 ) to 40 (104 )**

#### Charge Retention (shelf life) at 20 (68 )

1 month **92%**

3 month **90%**

6 month **80%**

Case Material **ABS UL94 HB**

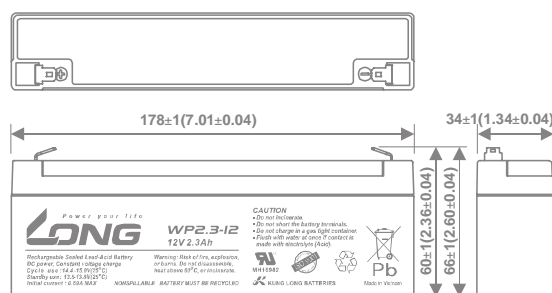
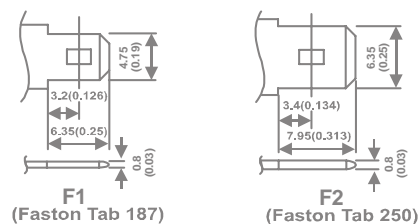
Option: Flammability resistance of (UL94 V-0)

Terminal **F1 or F2 (Faston Tab 187 or 250)**

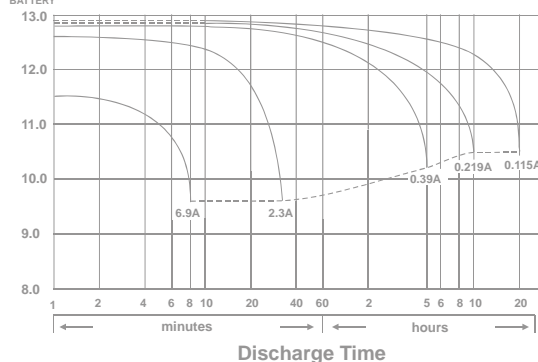


### Dimensions

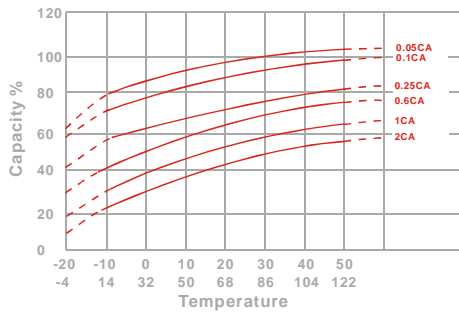
mm(inch)



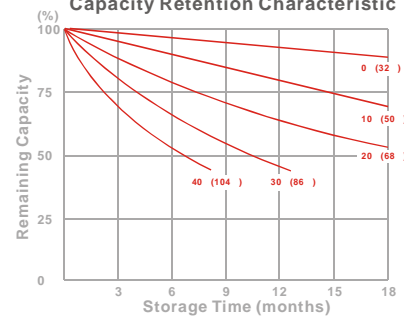
(v) FOR 12V BATTERY Discharge Time VS. Discharge Current (25 )



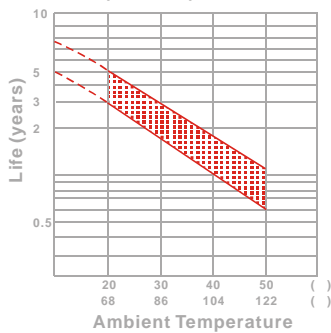
Effect of Temperature on Capacity 25 (77 )



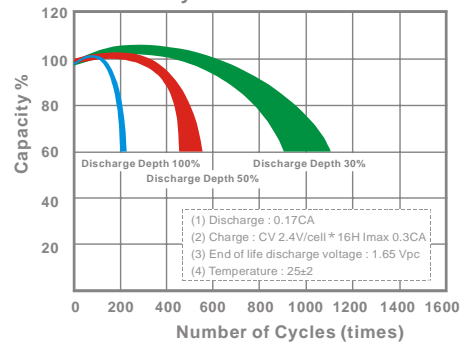
Capacity Retention Characteristic



Trickle (or float) Service Life



Cycle Service Life



## - PERFORMANCE DATA

### Discharge Rates in Watts to Various End Voltages at 25 (77 )

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	11.8	13.9	15.3	16.4	16.7	17.2	17.8
10	min	7.82	9.38	10.1	10.6	10.8	11.1	11.4
15	min	6.87	7.90	8.28	8.53	8.63	8.75	8.90
30	min	3.95	4.25	4.43	4.58	4.63	4.70	4.78
60	min	2.27	2.45	2.60	2.72	2.75	2.80	2.85
120	min	1.36	1.50	1.56	1.62	1.64	1.67	1.70
180	min	1.08	1.21	1.24	1.27	1.28	1.29	1.30
240	min	0.863	0.960	0.988	1.01	1.02	1.03	1.04
300	min	0.702	0.777	0.808	0.837	0.848	0.858	0.869
600	min	0.415	0.453	0.468	0.480	0.483	0.488	0.493
1200	min	0.230	0.242	0.248	0.253	0.255	0.257	0.258

### - Discharge Rates in Amperes to Various End Voltages at 25 (77 )

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	9.08	9.36	9.62	9.82	9.95	10.1	10.4
10	min	4.76	5.45	5.68	5.87	5.94	6.03	6.15
15	min	3.89	4.15	4.27	4.38	4.42	4.47	4.53
30	min	2.02	2.17	2.24	2.30	2.32	2.35	2.39
60	min	1.23	1.34	1.39	1.42	1.43	1.45	1.47
120	min	0.668	0.731	0.765	0.796	0.809	0.826	0.849
180	min	0.508	0.562	0.587	0.609	0.618	0.628	0.643
240	min	0.411	0.449	0.472	0.491	0.497	0.505	0.513
300	min	0.364	0.383	0.396	0.405	0.409	0.414	0.419
600	min	0.217	0.226	0.232	0.237	0.238	0.240	0.242
1200	min	0.114	0.118	0.121	0.123	0.124	0.125	0.126

All data on the spec. sheet is an average value:

The tolerance range : X<6min(+15%~-15%), 6min X<10min(+12%~-12%),10min X < 60min(+8%~-8%), X 60min(+5%~-5%)

211016-1H

## WP3-12 12Volt 3Ah

### Specifications

Nominal Voltage(V) **12V**

#### Nominal Capacity

20 hour rate	(0.15A to 10.50V)	<b>3Ah</b>
10 hour rate	(0.285A to 10.50V)	<b>2.85Ah</b>
5 hour rate	(0.51A to 10.20V)	<b>2.55Ah</b>
1 C	(3A to 9.60V)	<b>1.6Ah</b>
3 C	(9A to 9.60V)	<b>1.05Ah</b>

Weight **Approx. 1.3kg(2.86Lbs.)**

Internal Resistance (at 1KHz) **Approx. 45 mΩ**

Maximum Discharge Current for 5 seconds: **45A**

#### Charging Methods at 25 (77 )

Cycle use:

Charging Voltage **14.4 to 15.0V**

Coefficient -5.0mV/ /cell

Maximum Charging Current : **0.9A**

Standby use:

Float Charging Voltage **13.5 to 13.8V**

Coefficient -3.0mV/ /cell

#### Operating Temperature Range

Charge **-15 (5 ) to 40 (104 )**

Discharge **-15 (5 ) to 50 (122 )**

Storage **-15 (5 ) to 40 (104 )**

#### Charge Retention (shelf life) at 20 (68 )

1 month **92%**

3 month **90%**

6 month **80%**

Case Material **ABS UL94 HB**

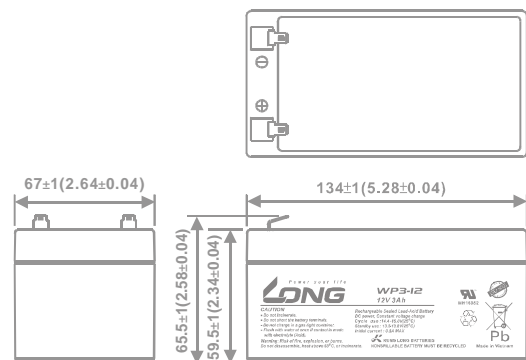
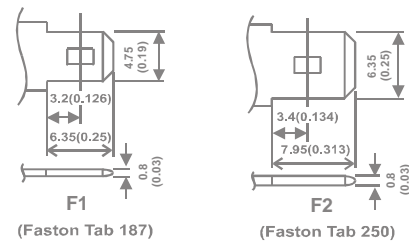
Option: Flammability resistance of (UL94 V-0)

Terminal **F1 or F2 (Faston Tab 187 or 250)**

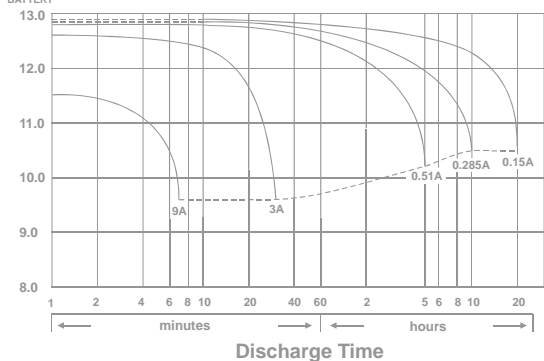


### Dimensions

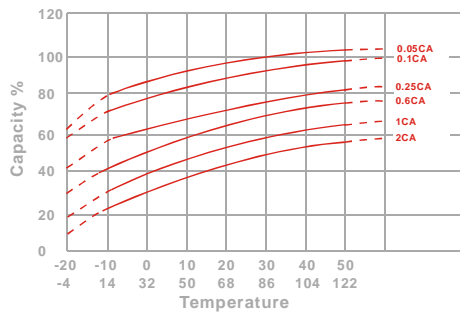
mm(inch)



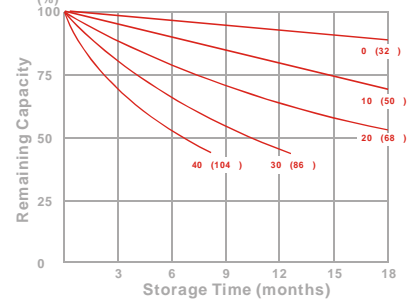
(v) FOR 12V BATTERY Discharge Time VS. Discharge Current (25 )



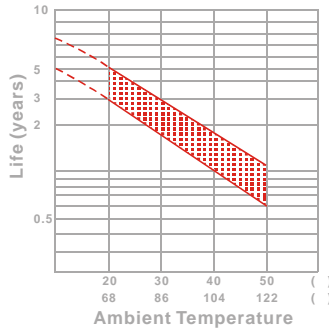
Effect of Temperature on Capacity 25 (77 )



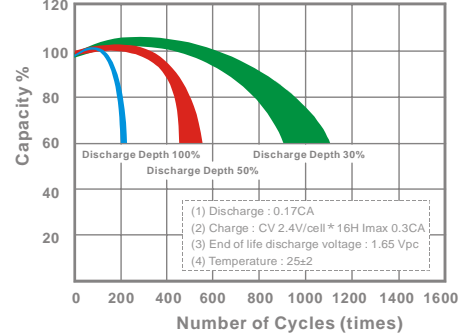
Capacity Retention Characteristic



Trickle (or float) Service Life



Cycle Service Life



## - PERFORMANCE DATA

Discharge Rates in Watts to Various End Voltages at 25 (77 )

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	15.7	17.7	19.0	20.2	20.8	21.4	22.1
10	min	11.4	12.4	13.3	14.0	14.4	14.7	15.0
15	min	8.63	9.61	10.1	10.6	10.9	11.2	11.5
30	min	5.03	5.51	5.82	6.18	6.32	6.43	6.53
60	min	2.88	3.20	3.43	3.63	3.73	3.79	3.88
120	min	1.70	1.85	1.98	2.12	2.18	2.25	2.35
180	min	1.27	1.46	1.56	1.63	1.66	1.70	1.77
240	min	0.968	1.09	1.17	1.21	1.23	1.27	1.33
300	min	0.823	0.926	0.994	1.03	1.05	1.07	1.10
600	min	0.547	0.582	0.597	0.608	0.615	0.620	0.628
1200	min	0.299	0.309	0.317	0.320	0.322	0.324	0.330

- Discharge Rates in Amperes to Various End Voltages at 25 (77 )

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	7.95	9.24	10.3	11.1	11.5	12.0	12.6
10	min	5.87	6.52	7.07	7.46	7.62	7.79	8.08
15	min	4.49	5.03	5.37	5.71	5.86	6.02	6.23
30	min	2.56	2.87	3.03	3.10	3.12	3.14	3.17
60	min	1.54	1.72	1.81	1.88	1.92	1.94	1.99
120	min	0.945	0.993	1.04	1.08	1.10	1.12	1.15
180	min	0.679	0.718	0.752	0.786	0.807	0.826	0.861
240	min	0.556	0.581	0.604	0.625	0.634	0.646	0.663
300	min	0.472	0.493	0.511	0.526	0.533	0.542	0.554
600	min	0.273	0.289	0.301	0.306	0.308	0.311	0.313
1200	min	0.147	0.154	0.158	0.161	0.163	0.165	0.167

All data on the spec. sheet is an average value:

The tolerance range : X<6min(+15%~-15%), 6min X<10min(+12%~-12%),10min X < 60min(+8%~-8%), X 60min(+5%~-5%)

## WP4.5-12 12Volt 4.5Ah

### Specifications

Nominal Voltage(V) **12V**

#### Nominal Capacity

20 hour rate	(0.225A to 10.50V)	<b>4.5Ah</b>
10 hour rate	(0.428A to 10.50V)	<b>4.275Ah</b>
5 hour rate	(0.765A to 10.20V)	<b>3.825Ah</b>
1 C	(4.5A to 9.60V)	<b>2.55Ah</b>
3 C	(13.5A to 9.60V)	<b>1.8Ah</b>

Weight **Approx. 1.62kg(3.56Lbs.)**

Internal Resistance (at 1KHz) **Approx. 34.5 mΩ**

Maximum Discharge Current for 5 seconds: **67.5A**

#### Charging Methods at 25 (77 )

Cycle use:	
Charging Voltage	<b>14.4 to 15.0V</b>
Coefficient	<b>-5.0mV/ /cell</b>
Maximum Charging Current :	<b>1.35A</b>
Standby use:	
Float Charging Voltage	<b>13.5 to 13.8V</b>
Coefficient	<b>-3.0mV/ /cell</b>

#### Operating Temperature Range

Charge	<b>-15 (5 ) to 40 (104 )</b>
Discharge	<b>-15 (5 ) to 50 (122 )</b>
Storage	<b>-15 (5 ) to 40 (104 )</b>

#### Charge Retention (shelf life) at 20 (68 )

1 month	<b>92%</b>
3 month	<b>90%</b>
6 month	<b>80%</b>

Case Material **ABS UL94 HB**

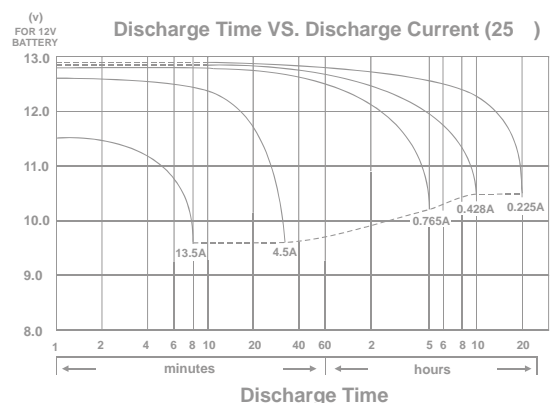
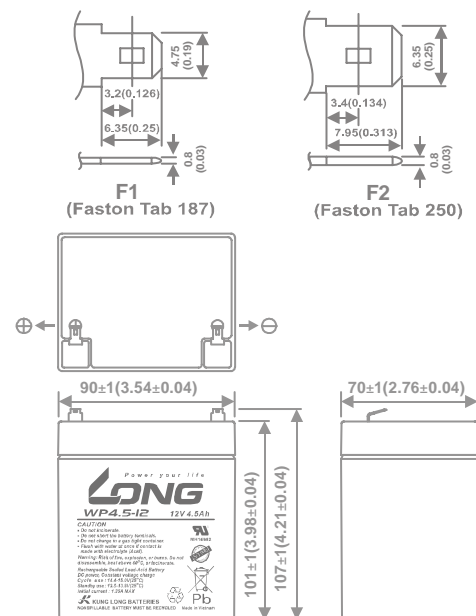
Option: Flammability resistance of (UL94 V-0)

Terminal **F1 or F2 (Faston Tab 187 or 250)**

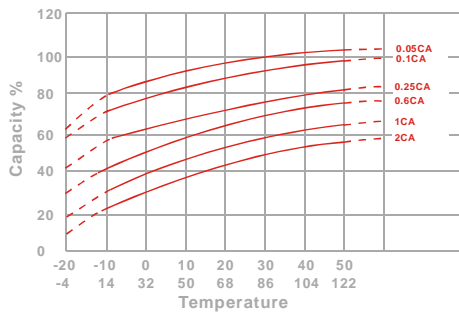


### Dimensions

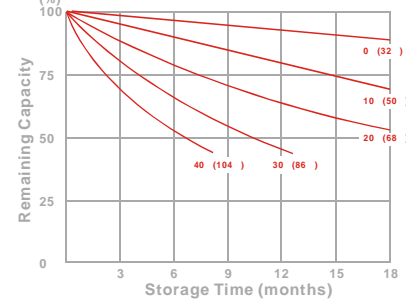
mm(inch)



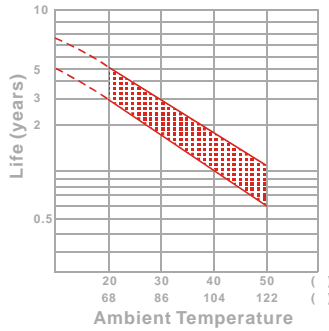
Effect of Temperature on Capacity 25 (77 )



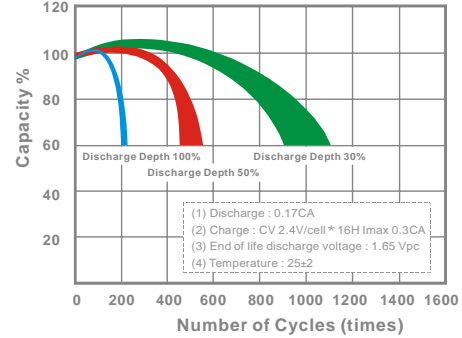
Capacity Retention Characteristic



Trickle (or float) Service Life



Cycle Service Life



## - PERFORMANCE DATA

Discharge Rates in Watts to Various End Voltages at 25 (77 )

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	22.7	25.7	27.8	29.8	30.7	31.7	32.8
10	min	16.4	18.7	20.0	21.0	21.3	21.8	22.3
15	min	13.3	14.8	15.4	15.8	16.0	16.1	16.3
30	min	7.78	8.73	9.08	9.43	9.53	9.65	9.77
60	min	4.38	4.95	5.32	5.62	5.68	5.78	5.87
120	min	2.70	2.97	3.10	3.20	3.25	3.32	3.38
180	min	2.12	2.30	2.40	2.47	2.50	2.55	2.60
240	min	1.72	1.85	1.93	1.98	2.02	2.03	2.07
300	min	1.53	1.64	1.68	1.72	1.73	1.75	1.78
600	min	0.950	1.01	1.03	1.05	1.07	1.09	1.10
1200	min	0.490	0.518	0.538	0.552	0.555	0.562	0.568

- Discharge Rates in Amperes to Various End Voltages at 25 (77 )

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	14.9	17.0	18.3	18.8	19.0	19.2	19.4
10	min	10.0	11.3	11.6	11.8	11.9	12.0	12.1
15	min	7.21	7.83	8.31	8.53	8.58	8.65	8.74
30	min	4.36	4.82	4.97	5.11	5.15	5.21	5.26
60	min	2.53	2.78	2.89	2.97	2.99	3.02	3.05
120	min	1.42	1.54	1.62	1.65	1.66	1.67	1.69
180	min	1.14	1.21	1.23	1.25	1.26	1.27	1.28
240	min	0.889	0.948	0.973	0.996	1.00	1.01	1.02
300	min	0.808	0.839	0.852	0.863	0.867	0.872	0.878
600	min	0.458	0.480	0.495	0.503	0.507	0.511	0.515
1200	min	0.231	0.245	0.257	0.265	0.268	0.272	0.276

All data on the spec. sheet is an average value:

The tolerance range : X < 6min(+15%~-15%), 6min X < 10min(+12%~-12%), 10min X < 60min(+8%~-8%), X < 60min(+5%~-5%)

## WP7-12(28W) 12Volt 28W

### Specifications

Nominal Voltage(V) **12V**

#### Nominal Power

15 mins rate: **28W/cell to 1.60V/cell**

#### Nominal Capacity

20 hour rate	(0.35A to 10.50V)	<b>7Ah</b>
10 hour rate	(0.665A to 10.50V)	<b>6.65Ah</b>
5 hour rate	(1.19A to 10.20V)	<b>5.95Ah</b>
1 C	(7A to 9.60V)	<b>4.43Ah</b>
3 C	(21A to 9.60V)	<b>2.8Ah</b>

Weight **Approx. 2.2kg(4.84Lbs.)**

Internal Resistance (at 1KHz) **Approx. 19 mΩ**

Maximum Discharge Current for 5 seconds: **105A**

#### Charging Methods at 25 (77 )

Cycle use:

Charging Voltage **14.4 to 15.0V**

Coefficient -5.0mV/ /cell

Maximum Charging Current : **2.1A**

Standby use:

Float Charging Voltage **13.5 to 13.8V**

Coefficient -3.0mV/ /cell

#### Operating Temperature Range

Charge **-15 (5 ) to 40 (104 )**

Discharge **-15 (5 ) to 50 (122 )**

Storage **-15 (5 ) to 40 (104 )**

#### Charge Retention (shelf life) at 20 (68 )

1 month **92%**

3 month **90%**

6 month **80%**

Case Material **ABS UL94 HB**

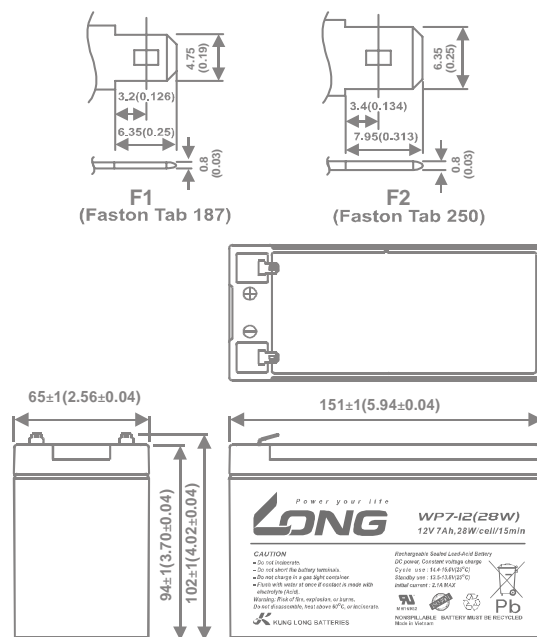
Option: Flammability resistance of (UL94 V-0)

Terminal **F1 or F2 (Faston Tab 187 or 250)**

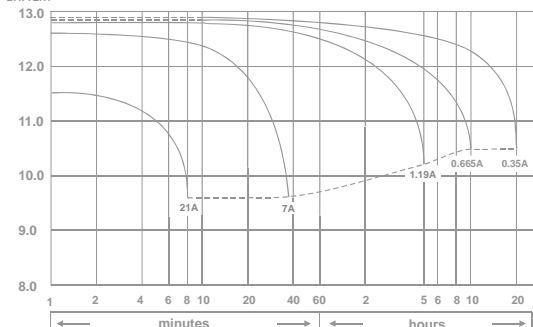


### Dimensions

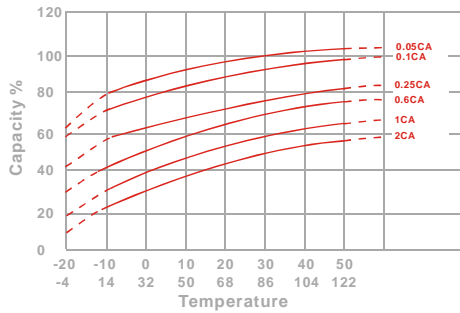
mm(inch)



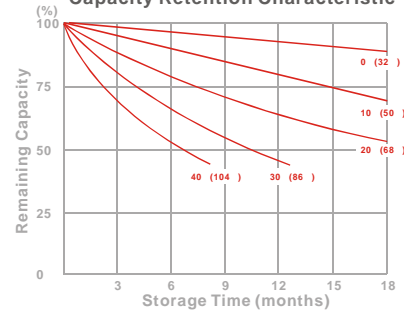
(V) FOR 12V BATTERY Discharge Time VS. Discharge Current (25 )



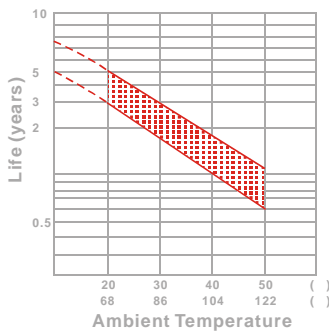
Effect of Temperature on Capacity 25 (77 )



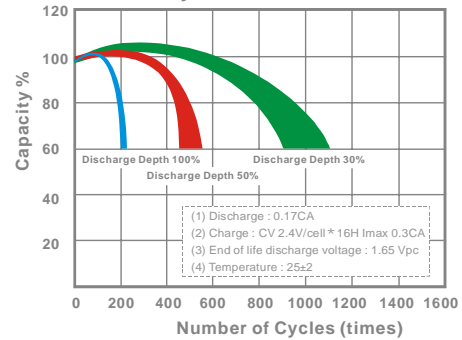
Capacity Retention Characteristic



Trickle (or float) Service Life



Cycle Service Life



**- PERFORMANCE DATA**

Discharge Rates in Watts to Various End Voltages at 25 (77 )

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	43.8	47.0	49.0	51.0	51.8	52.8	54.3
10	min	30.0	31.8	33.2	34.3	34.8	35.5	36.5
15	min	24.0	25.2	25.8	26.5	26.8	27.3	28.0
30	min	12.1	12.9	13.6	14.1	14.3	14.4	14.6
60	min	7.70	8.38	8.63	8.87	8.97	9.08	9.23
120	min	4.10	4.52	4.72	4.92	4.98	5.07	5.20
180	min	3.08	3.32	3.48	3.62	3.67	3.72	3.80
240	min	2.85	2.93	3.00	3.05	3.07	3.10	3.15
300	min	2.47	2.53	2.58	2.62	2.63	2.65	2.68
600	min	1.36	1.40	1.42	1.43	1.44	1.44	1.45
1200	min	0.690	0.705	0.718	0.728	0.732	0.737	0.743

**- Discharge Rates in Amperes to Various End Voltages at 25 (77 )**

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	23.1	26.2	27.8	29.1	29.6	30.5	31.7
10	min	16.1	17.3	18.1	18.6	18.9	19.2	19.8
15	min	12.6	13.1	13.5	13.8	14.0	14.1	14.3
30	min	6.54	7.05	7.28	7.47	7.56	7.68	7.85
60	min	4.02	4.25	4.41	4.52	4.58	4.63	4.71
120	min	2.26	2.38	2.45	2.49	2.51	2.54	2.57
180	min	1.65	1.74	1.79	1.82	1.83	1.85	1.88
240	min	1.35	1.40	1.44	1.47	1.49	1.51	1.53
300	min	1.10	1.16	1.21	1.25	1.27	1.28	1.29
600	min	0.667	0.675	0.682	0.687	0.690	0.694	0.698
1200	min	0.339	0.346	0.350	0.353	0.355	0.357	0.359

All data on the spec. sheet is an average value:

The tolerance range : X<6min(+15%~-15%), 6min X<10min(+12%~-12%), 10min X < 60min(+8%~-8%), X > 60min(+5%~-5%)

260118-1C



## WP12-12A 12Volt 12Ah

### Specifications

Nominal Voltage(V) **12V**

#### Nominal Capacity

20 hour rate (0.6A to 10.50V)	<b>12Ah</b>
10 hour rate (1.14A to 10.50V)	<b>11.4Ah</b>
5 hour rate (2.04A to 10.20V)	<b>10.2Ah</b>
1 C (12A to 9.60V)	<b>6.4Ah</b>
3 C (36A to 9.60V)	<b>4.2Ah</b>

Weight **Approx. 3.75kg(8.25Lbs.)**

Internal Resistance (at 1KHz) **Approx. 13 mΩ**

Maximum Discharge Current for 5 seconds: **180A**

#### Charging Methods at 25 (77 )

Cycle use:

Charging Voltage **14.4 to 15.0V**

Coefficient -5.0mV/ /cell

Maximum Charging Current : **3.6A**

Standby use:

Float Charging Voltage **13.5 to 13.8V**

Coefficient -3.0mV/ /cell

#### Operating Temperature Range

Charge **-15 (5 ) to 40 (104 )**

Discharge **-15 (5 ) to 50 (122 )**

Storage **-15 (5 ) to 40 (104 )**

#### Charge Retention (shelf life) at 20 (68 )

1 month **92%**

3 month **90%**

6 month **80%**

Case Material **ABS UL94 HB**

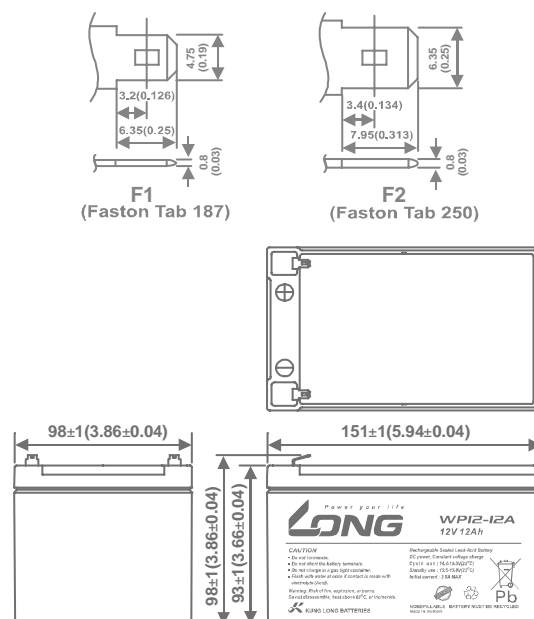
Option: Flammability resistance of (UL94 V-0)

Terminal **F1 or F2 (Faston Tab 187 or 250)**

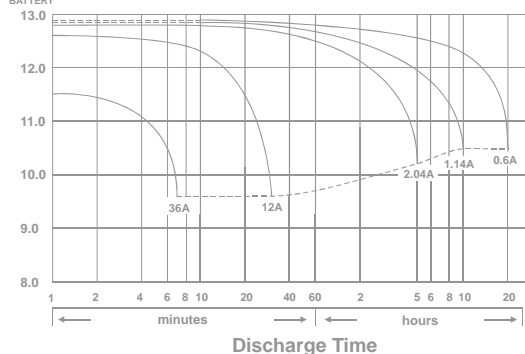


### Dimensions

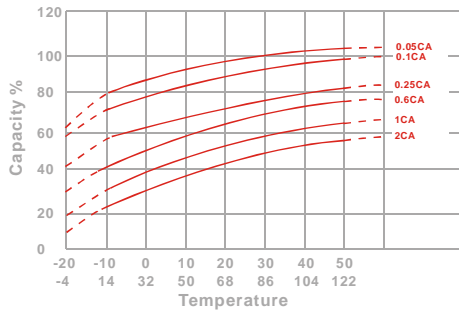
mm(inch)



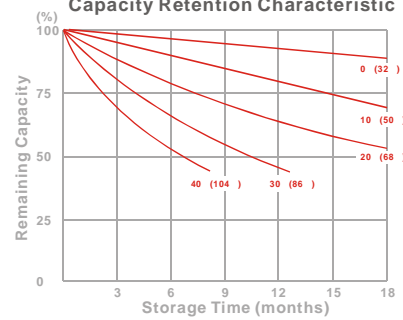
(V) FOR 12V BATTERY Discharge Time VS. Discharge Current (25 )



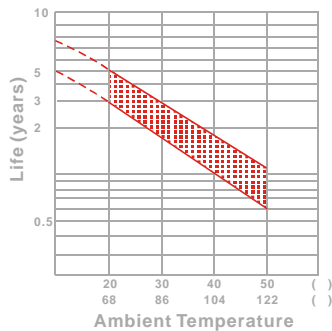
Effect of Temperature on Capacity 25 (77 )



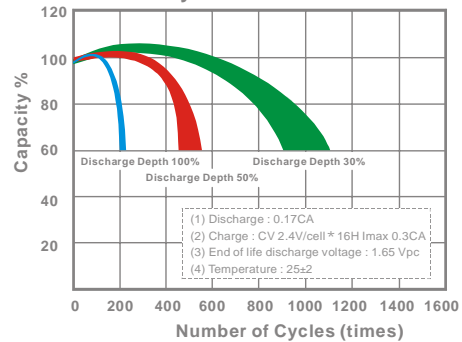
Capacity Retention Characteristic



Trickle (or float) Service Life



Cycle Service Life



## - PERFORMANCE DATA

### Discharge Rates in Watts to Various End Voltages at 25 (77 )

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	67.6	75.2	80.8	86.7	89.3	91.9	97.0
10	min	48.0	52.5	54.9	57.3	58.2	59.5	61.0
15	min	38.6	41.0	42.6	44.1	44.5	45.4	46.6
30	min	22.2	23.6	24.6	25.4	25.7	25.9	26.3
60	min	15.8	16.3	16.7	17.0	17.2	17.3	17.5
120	min	8.63	8.92	9.04	9.14	9.18	9.24	9.32
180	min	5.65	5.87	6.05	6.20	6.27	6.35	6.42
240	min	4.78	4.88	4.96	5.06	5.12	5.20	5.26
300	min	3.96	4.08	4.18	4.30	4.33	4.38	4.48
600	min	2.34	2.40	2.44	2.47	2.48	2.50	2.52
1200	min	1.19	1.21	1.25	1.26	1.28	1.29	1.32

### - Discharge Rates in Amperes to Various End Voltages at 25 (77 )

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	37.2	41.4	44.5	47.7	49.1	50.6	53.4
10	min	25.7	28.1	29.4	30.7	31.2	31.9	32.7
15	min	19.8	21.3	22.1	22.9	23.2	23.5	24.2
30	min	11.4	12.1	12.6	13.0	13.1	13.3	13.5
60	min	8.21	8.40	8.52	8.63	8.68	8.74	8.82
120	min	4.21	4.36	4.47	4.56	4.59	4.63	4.68
180	min	2.87	3.06	3.13	3.19	3.22	3.25	3.29
240	min	2.38	2.43	2.47	2.52	2.55	2.58	2.62
300	min	1.97	2.03	2.08	2.14	2.16	2.19	2.23
600	min	1.16	1.18	1.20	1.22	1.23	1.24	1.25
1200	min	0.592	0.599	0.618	0.627	0.634	0.642	0.656

All data on the spec. sheet is an average value:

The tolerance range : X<6min(+15%~-15%), 6min X<10min(+12%~-12%), 10min X < 60min(+8%~-8%), X 60min(+5%~-5%)

031016-1H

## WP18-12NSHR 12Volt 18Ah

### Specifications

Nominal Voltage(V) **12V**

#### Nominal Capacity

20 hour rate	(0.9A to 10.50V)	<b>18Ah</b>
10 hour rate	(1.71A to 10.50V)	<b>17.1Ah</b>
5 hour rate	(3.06A to 10.20V)	<b>15.3Ah</b>
1 C	(18A to 9.60V)	<b>11.4Ah</b>
3 C	(54A to 9.60V)	<b>7.2Ah</b>

Weight **Approx. 5.6kg(12.32Lbs.)**

Internal Resistance (at 1KHz) **Approx. 10.5 mΩ**

Maximum Discharge Current for 5 seconds: **270A**

#### Charging Methods at 25 (77 )

Cycle use:	
Charging Voltage	<b>14.4 to 15.0V</b>
Coefficient -5.0mV/ /cell	
Maximum Charging Current :	<b>5.4A</b>
Standby use:	
Float Charging Voltage	<b>13.5 to 13.8V</b>
Coefficient -3.0mV/ /cell	

#### Operating Temperature Range

Charge	<b>-15 (5 ) to 40 (104 )</b>
Discharge	<b>-15 (5 ) to 50 (122 )</b>
Storage	<b>-15 (5 ) to 40 (104 )</b>

#### Charge Retention (shelf life) at 20 (68 )

1 month	<b>92%</b>
3 month	<b>90%</b>
6 month	<b>80%</b>

Case Material **ABS UL94 HB**

Option: Flammability resistance of (UL94 V-0)

Terminal **F6**

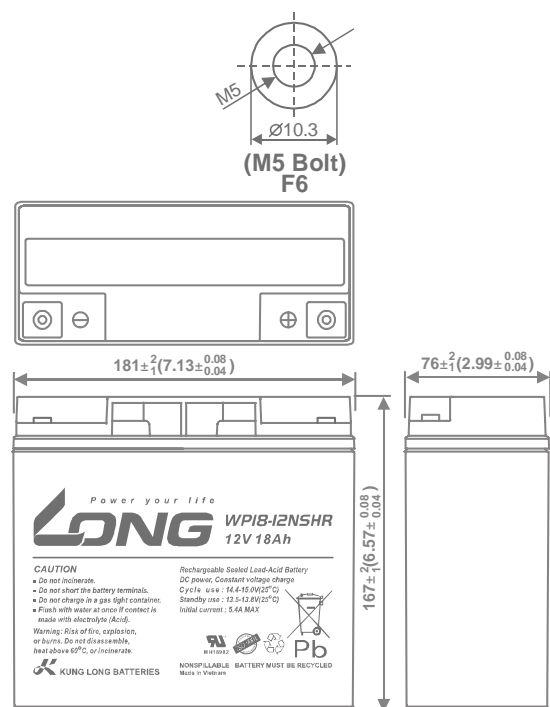
#### Description of torque value of hard ware for the terminals:

Recommended torque value	<b>M5: 5 N-m (51kgf-cm)</b>
Maximum allowable torque value	<b>M5: 6 N-m (61kgf-cm)</b>

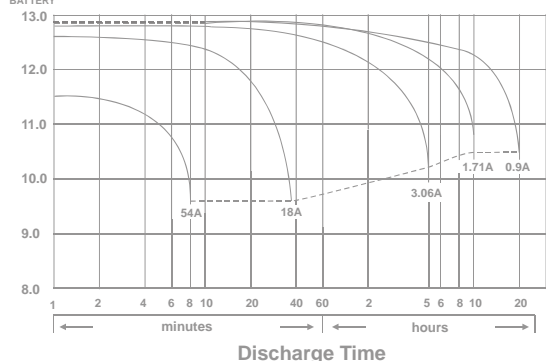


### Dimensions

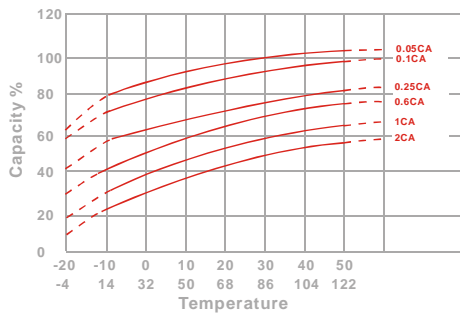
mm(inch)



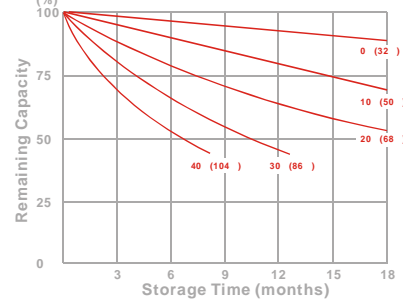
(V) FOR 12V BATTERY Discharge Time VS. Discharge Current (25 )



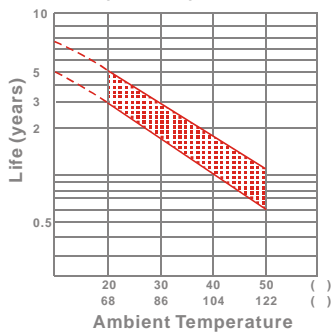
Effect of Temperature on Capacity 25 (77 )



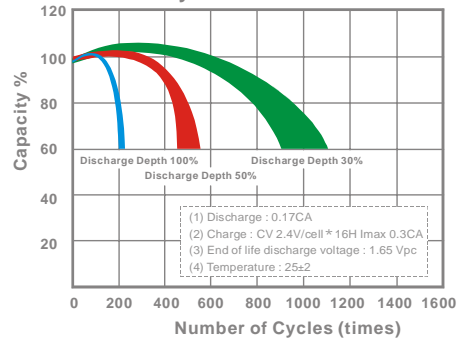
Capacity Retention Characteristic



Trickle (or float) Service Life



Cycle Service Life



## - PERFORMANCE DATA

Discharge Rates in Watts to Various End Voltages at 25 (77 )

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	98.9	116	128	135	137	139	141
10	min	67.0	77.1	84.5	89.1	90.2	91.7	92.9
15	min	57.2	64.5	69.4	72.5	73.3	74.2	75.1
30	min	32.7	35.1	37.7	39.4	39.8	40.3	40.8
60	min	18.8	19.8	20.7	21.3	21.5	21.8	22.2
120	min	11.9	12.4	12.7	13.1	13.2	13.3	13.5
180	min	8.75	9.10	9.33	9.53	9.60	9.68	9.78
240	min	6.63	6.93	7.12	7.27	7.32	7.38	7.46
300	min	5.82	6.05	6.17	6.27	6.30	6.35	6.41
600	min	3.40	3.52	3.60	3.67	3.68	3.72	3.75
1200	min	1.77	1.83	1.88	1.92	1.93	1.95	1.96

- Discharge Rates in Amperes to Various End Voltages at 25 (77 )

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	62.6	68.3	71.9	75.1	76.4	77.8	80.2
10	min	38.6	41.8	44.3	46.5	47.4	48.4	50.1
15	min	31.9	34.6	36.3	37.7	38.2	38.8	39.7
30	min	17.4	18.7	19.8	20.7	21.0	21.4	21.9
60	min	9.74	10.3	10.7	11.0	11.1	11.3	11.5
120	min	5.98	6.23	6.39	6.53	6.58	6.64	6.72
180	min	4.35	4.52	4.64	4.73	4.76	4.80	4.85
240	min	3.43	3.52	3.58	3.62	3.63	3.65	3.68
300	min	2.96	3.02	3.07	3.11	3.12	3.14	3.16
600	min	1.73	1.77	1.80	1.82	1.83	1.84	1.85
1200	min	0.893	0.914	0.931	0.946	0.952	0.959	0.962

All data on the spec. sheet is an average value:

The tolerance range : X<6min(+15%~-15%), 6min X<10min(+12%~-12%), 10min X < 60min(+8%~-8%), X > 60min(+5%~-5%)

031016-11

## WP22-12N 12Volt 22Ah

### Specifications

Nominal Voltage(V) **12V**

#### Nominal Capacity

20 hour rate	(1.1A	to	10.50V)	<b>22Ah</b>
10 hour rate	(2.09A	to	10.50V)	<b>20.9Ah</b>
5 hour rate	(3.74A	to	10.20V)	<b>18.7Ah</b>
1 C	(22A	to	9.60V)	<b>12.47Ah</b>
3 C	(66A	to	9.60V)	<b>8.8Ah</b>

Weight **Approx. 6.9kg(15.18Lbs.)**

Internal Resistance (at 1KHz) **Approx. 9 mΩ**

Maximum Discharge Current for 5 seconds: **330A**

#### Charging Methods at 25 (77 )

##### Cycle use:

Charging Voltage **14.4 to 15.0V**

Coefficient -5.0mV/ /cell

Maximum Charging Current : **6.6A**

##### Standby use:

Float Charging Voltage **13.5 to 13.8V**

Coefficient -3.0mV/ /cell

#### Operating Temperature Range

Charge **-15 (5 ) to 40 (104 )**

Discharge **-15 (5 ) to 50 (122 )**

Storage **-15 (5 ) to 40 (104 )**

#### Charge Retention (shelf life) at 20 (68 )

1 month **92%**

3 month **90%**

6 month **80%**

Case Material **ABS UL94 HB**

Option: Flammability resistance of (UL94 V-0)

Terminal **F8**

#### Description of torque value of hard ware for the terminals:

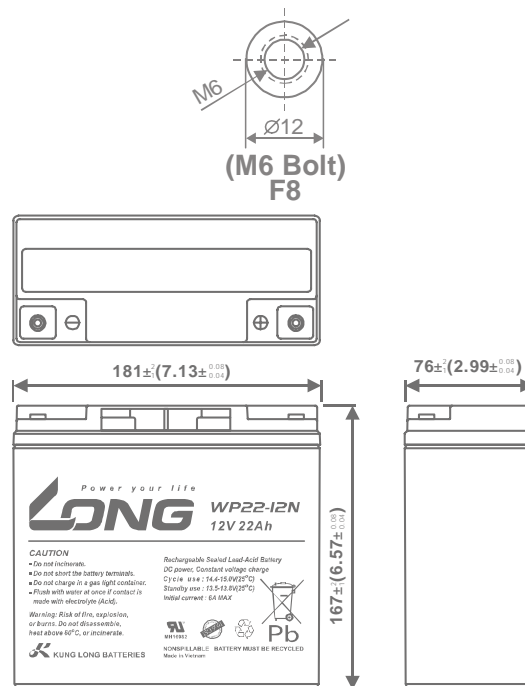
Recommended torque value **M6: 7 N-m (71kgf-cm)**

Maximum allowable torque value **M6: 9 N-m (92kgf-cm)**

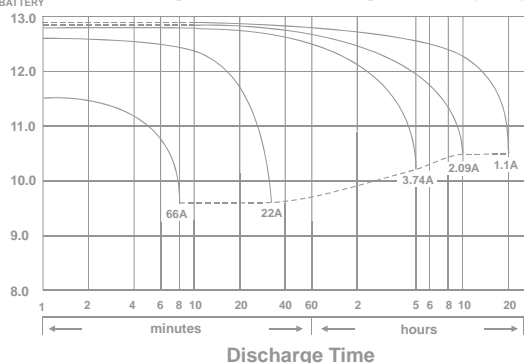


### Dimensions

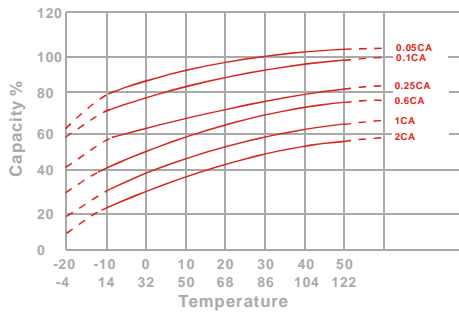
mm(inch)



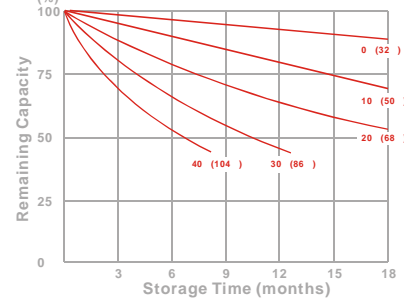
(V) FOR 12V BATTERY Discharge Time VS. Discharge Current (25 )



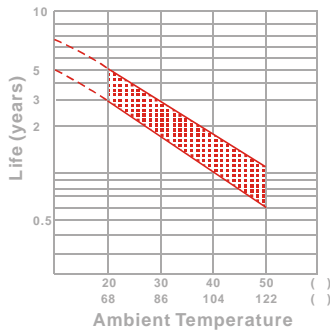
Effect of Temperature on Capacity 25 (77 )



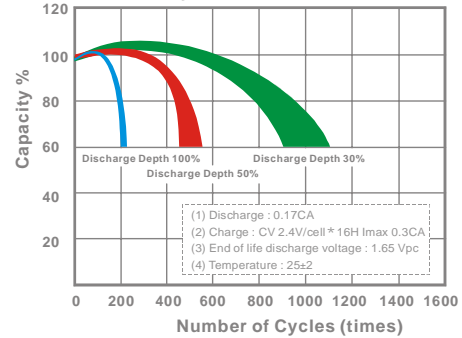
Capacity Retention Characteristic



Trickle (or float) Service Life



Cycle Service Life



## - PERFORMANCE DATA

Discharge Rates in Watts to Various End Voltages at 25 (77 )

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	136	152	164	171	173	175	177
10	min	88.3	99.7	107	112	113	114	116
15	min	67.4	75.1	80.1	83.2	84.1	85.0	85.8
30	min	39.8	43.9	46.6	48.3	48.8	49.3	49.7
60	min	25.2	26.0	26.7	27.1	27.3	27.4	27.6
120	min	15.2	15.5	15.7	15.9	16.0	16.1	16.2
180	min	10.8	11.1	11.3	11.4	11.5	11.5	11.6
240	min	8.60	8.87	9.02	9.14	9.19	9.24	9.31
300	min	7.25	7.48	7.65	7.78	7.84	7.87	7.91
600	min	4.12	4.32	4.47	4.57	4.60	4.63	4.67
1200	min	2.20	2.28	2.35	2.41	2.42	2.44	2.45

- Discharge Rates in Amperes to Various End Voltages at 25 (77 )

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	74.8	83.3	90.1	97.6	99.3	102	105
10	min	48.1	54.0	57.4	59.9	60.8	61.5	62.3
15	min	36.6	41.4	43.1	44.4	44.8	45.3	45.9
30	min	20.0	22.1	23.5	24.2	24.4	24.7	25.1
60	min	12.4	12.8	13.1	13.4	13.5	13.6	13.8
120	min	7.61	7.83	7.98	8.12	8.16	8.21	8.27
180	min	5.32	5.51	5.64	5.75	5.79	5.83	5.88
240	min	4.17	4.33	4.45	4.54	4.58	4.61	4.65
300	min	3.56	3.68	3.77	3.84	3.87	3.89	3.92
600	min	2.06	2.14	2.21	2.26	2.27	2.29	2.31
1200	min	1.07	1.12	1.16	1.19	1.20	1.21	1.22

All data on the spec. sheet is an average value:

The tolerance range : X<6min(+15%~-15%), 6min X<10min(+12%~-12%), 10min X < 60min(+8%~-8%), X 60min(+5%~-5%)

## WP30-12T 12Volt 30Ah

### Specifications

Nominal Voltage(V) **12V**

#### Nominal Capacity

20 hour rate	(1.5A	to	10.50V)	<b>30Ah</b>
10 hour rate	(2.85A	to	10.50V)	<b>28.5Ah</b>
5 hour rate	(5.1A	to	10.20V)	<b>25.5Ah</b>
1 C	(30A	to	9.60V)	<b>17.0Ah</b>
3 C	(90A	to	9.60V)	<b>12.0Ah</b>

Weight **Approx. 10.5kg(23.1Lbs.)**

Internal Resistance (at 1KHz) **Approx. 9 mΩ**

#### Maximum Discharge Current for

5 seconds: **600A**

#### Charging Methods at 25 (77 )

##### Cycle use:

Charging Voltage **14.4 to 15.0V**

Coefficient -5.0mV/ /cell

Maximum Charging Current : **9A**

##### Standby use:

Float Charging Voltage **13.5 to 13.8V**

Coefficient -3.0mV/ /cell

#### Operating Temperature Range

Charge **-15 (5 ) to 40 (104 )**

Discharge **-15 (5 ) to 50 (122 )**

Storage **-15 (5 ) to 40 (104 )**

#### Charge Retention (shelf life) at 20 (68 )

1 month **92%**

3 month **90%**

6 month **80%**

Case Material **ABS UL94 HB**

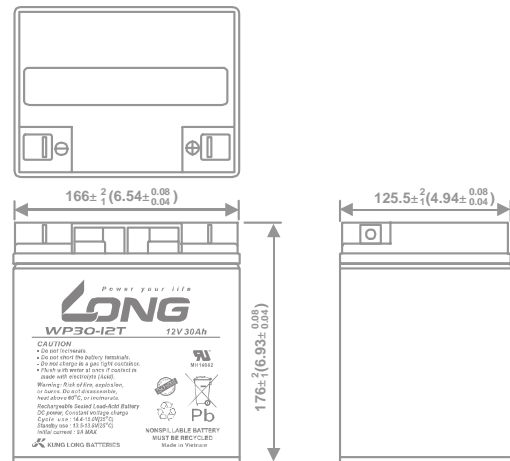
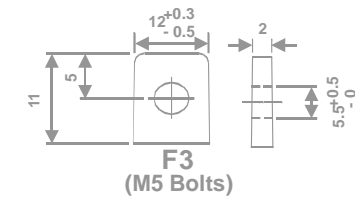
Option: Flammability resistance of (UL94 V-0)

Terminal **F3**

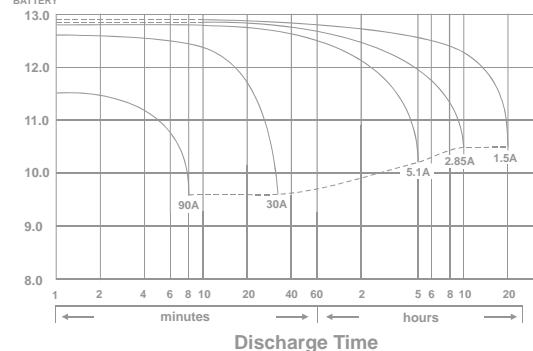


### Dimensions

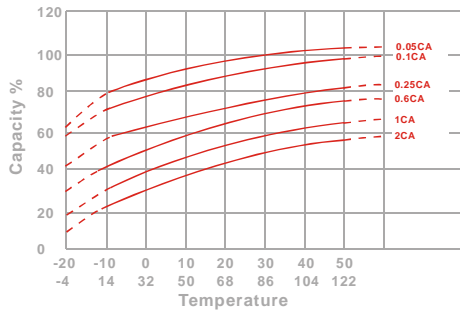
mm(inch)



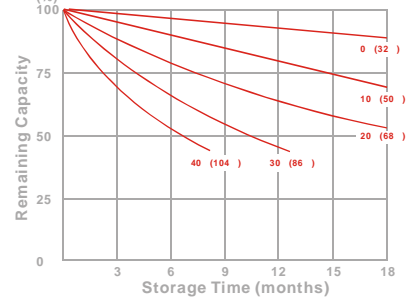
(V) FOR 12V BATTERY Discharge Time VS. Discharge Current (25 )



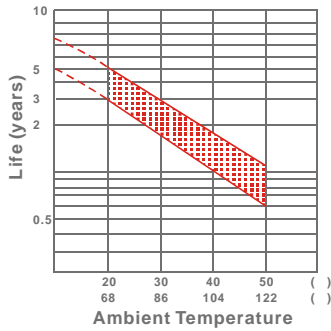
Effect of Temperature on Capacity 25 (77 )



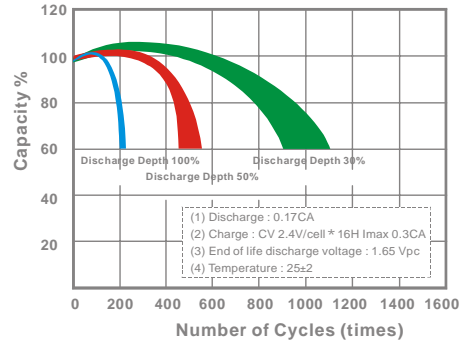
Capacity Retention Characteristic



Trickle (or float) Service Life



Cycle Service Life



## - PERFORMANCE DATA

Discharge Rates in Watts to Various End Voltages at 25 (77 )

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	141	177	198	209	213	217	222
10	min	108	124	135	142	146	149	153
15	min	94.4	105	110	114	116	117	119
30	min	58.4	63.1	65.0	66.5	66.8	67.4	68.1
60	min	34.4	37.1	38.5	39.5	39.8	40.4	40.9
120	min	20.3	21.7	22.5	23.2	23.3	23.7	24.0
180	min	15.5	16.1	16.4	16.7	16.8	17.0	17.2
240	min	12.7	13.2	13.5	13.7	13.7	13.8	14.0
300	min	10.4	10.9	11.1	12.1	11.3	11.4	11.5
600	min	5.81	6.02	6.17	6.30	6.33	6.39	6.45
1200	min	3.13	3.26	3.33	3.38	3.40	3.44	3.47

- Discharge Rates in Amperes to Various End Voltages at 25 (77 )

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	75.3	96.7	110	118	121	124	128
10	min	56.4	65.5	71.8	77.0	78.8	81.0	83.4
15	min	48.6	54.4	57.1	59.7	60.6	61.4	62.7
30	min	29.3	31.8	32.9	33.8	34.1	34.5	34.9
60	min	16.9	18.3	19.2	19.8	20.0	20.2	20.4
120	min	10.4	10.9	11.3	11.6	11.7	11.8	11.9
180	min	7.51	7.83	8.04	8.21	8.28	8.35	8.46
240	min	6.12	6.41	6.54	6.66	6.70	6.74	6.81
300	min	5.09	5.34	5.46	5.55	5.59	5.63	5.68
600	min	2.81	2.92	3.00	3.06	3.08	3.11	3.14
1200	min	1.52	1.57	1.61	1.64	1.65	1.67	1.69

All data on the spec. sheet is an average value:

The tolerance range : X<6min(+15%~-15%), 6min X<10min(+12%~-12%),10min X < 60min(+8%~-8%), X 60min(+5%~-5%)

021216-1E



Head Quarter Service - TEL: +886-49-2254-777 FAX: +886-49-2255-139 E-mail: sales@mail.klb.com.tw  
 USA Customer Service - TEL: +1-949-328-7936 FAX: +1-949-266-9917 E-mail: sales@kunglong.com  
 Vietnam Customer Service - TEL: +84-72-3779666 FAX: +84-72-3779476 E-mail: sales@mail.klb.com.tw



## WP50-12N 12Volt 50Ah

### Specifications

Nominal Voltage(V) **12V**

#### Nominal Capacity

20 hour rate	(2.5A to 10.50V)	50Ah
10 hour rate	(4.75A to 10.50V)	47.5Ah
5 hour rate	(8.5A to 10.20V)	42.5Ah
1 C	(50A to 9.60V)	28.33Ah
3 C	(150A to 9.60V)	20Ah

Weight **Approx. 15.1kg(33.2Lbs.)**

Internal Resistance (at 1KHz) **Approx. 5 mΩ**

#### Maximum Discharge Current for

5 seconds: **600A**

#### Charging Methods at 25 (77 )

##### Cycle use:

Charging Voltage **14.4 to 15.0V**

Coefficient -5.0mV/ /cell

Maximum Charging Current : **15A**

##### Standby use:

Float Charging Voltage **13.5 to 13.8V**

Coefficient -3.0mV/ /cell

#### Operating Temperature Range

Charge **-15 (5 ) to 40 (104 )**

Discharge **-15 (5 ) to 50 (122 )**

Storage **-15 (5 ) to 40 (104 )**

#### Charge Retention (shelf life) at 20 (68 )

1 month **98%**

3 month **94%**

6 month **85%**

Case Material **ABS UL94 HB**

Option: Flammability resistance of (UL94 V-0)

Terminal **F8**

#### Description of torque value of hard ware for the terminals:

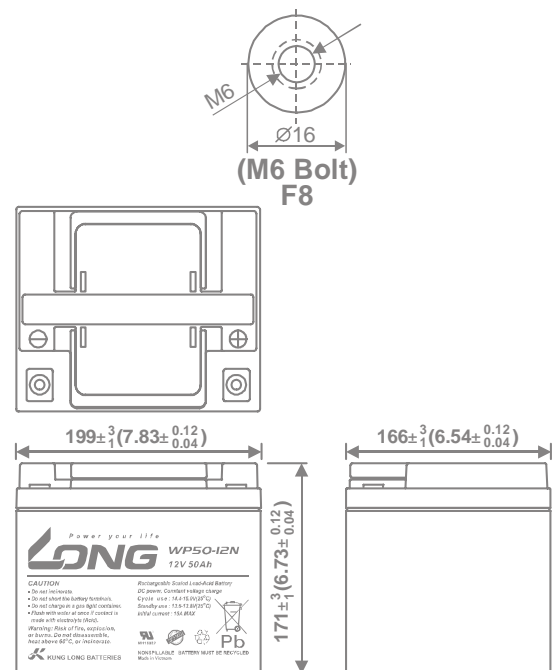
Recommended torque value **M6: 7 N-m (71kgf-cm)**

Maximum allowable torque value **M6: 9 N-m (92kgf-cm)**

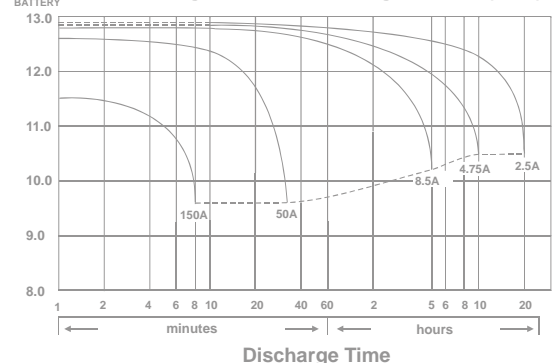


### Dimensions

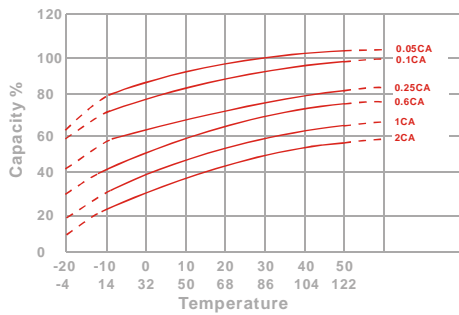
mm(inch)



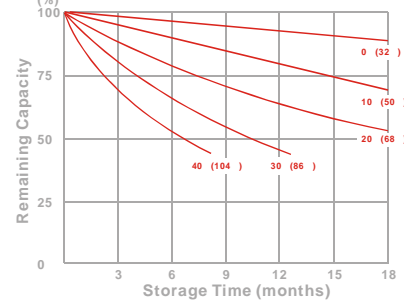
#### (v) FOR 12V BATTERY Discharge Time VS. Discharge Current (25 )



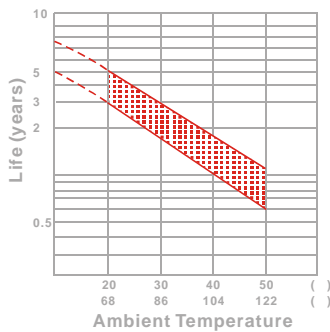
Effect of Temperature on Capacity 25 (77 )



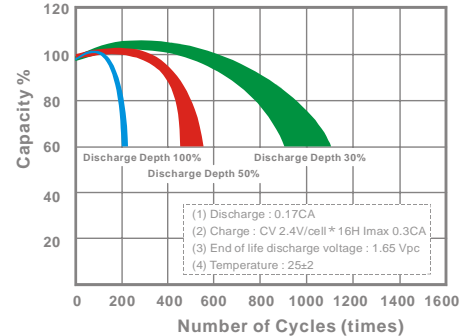
Capacity Retention Characteristic



Trickle (or float) Service Life



Cycle Service Life



## - PERFORMANCE DATA

### Discharge Rates in Watts to Various End Voltages at 25 (77 )

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
<b>Time</b>								
5	min	240	288	322	345	350	356	361
10	min	171	203	223	233	237	241	246
15	min	126	146	160	167	170	172	175
30	min	78.0	89.8	97.2	100	102	103	104
60	min	53.7	56.5	58.2	59.5	60.0	60.7	61.2
120	min	29.2	32.0	33.3	34.5	34.8	35.3	35.8
180	min	20.8	22.7	23.8	24.7	25.0	25.3	25.7
240	min	17.2	18.3	19.0	19.7	19.8	20.2	20.5
300	min	15.9	16.6	17.0	17.3	17.5	17.7	17.8
600	min	8.62	9.10	9.38	9.57	9.62	9.68	9.77
1200	min	4.58	4.87	5.05	5.17	5.20	5.25	5.30

### - Discharge Rates in Amperes to Various End Voltages at 25 (77 )

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
<b>Time</b>								
5	min	139	166	185	199	206	210	214
10	min	88.5	106	117	125	128	131	134
15	min	77.8	84.5	87.6	90.2	90.9	91.8	92.9
30	min	45.4	50.7	52.8	54.4	54.9	55.5	56.2
60	min	26.0	28.8	29.9	30.6	30.8	31.1	31.4
120	min	15.1	16.2	16.8	17.3	17.5	17.7	17.9
180	min	11.0	11.7	12.1	12.4	12.5	12.6	12.7
240	min	8.96	9.44	9.70	9.89	9.96	10.1	10.2
300	min	7.85	8.26	8.50	8.67	8.73	8.80	8.87
600	min	4.41	4.65	4.76	4.82	4.84	4.87	4.91
1200	min	2.32	2.44	2.50	2.55	2.57	2.59	2.61

All data on the spec. sheet is an average value:

The tolerance range : X<6min(+15%~-15%), 6min X<10min(+12%~-12%), 10min X < 60min(+8%~-8%), X 60min(+5%~-5%)

## WP55-12N 12Volt 55Ah

### Specifications

Nominal Voltage(V) **12V**

#### Nominal Capacity

20 hour rate	(2.75A to 10.50V)	55Ah
10 hour rate	(5.225A to 10.50V)	52.25Ah
5 hour rate	(9.35A to 10.20V)	46.75Ah
1 C	(55A to 9.60V)	31.17Ah
3 C	(165A to 9.60V)	22Ah

Weight **Approx. 17.0kg(37.4Lbs.)**

Internal Resistance (at 1KHz) **Approx. 8 mΩ**

Maximum Discharge Current for 5 seconds: **660A**

#### Charging Methods at 25 (77 )

Cycle use:

Charging Voltage **14.4 to 15.0V**

Coefficient -5.0mV/ /cell

Maximum Charging Current : **16.5A**

Standby use:

Float Charging Voltage **13.5 to 13.8V**

Coefficient -3.0mV/ /cell

#### Operating Temperature Range

Charge **-15 (5 ) to 40 (104 )**

Discharge **-15 (5 ) to 50 (122 )**

Storage **-15 (5 ) to 40 (104 )**

#### Charge Retention (shelf life) at 20 (68 )

1 month **98%**

3 month **94%**

6 month **85%**

Case Material **ABS UL94 HB**

Option: Flammability resistance of (UL94 V-0)

Terminal **F8**

Description of torque value of hard ware for the terminals:

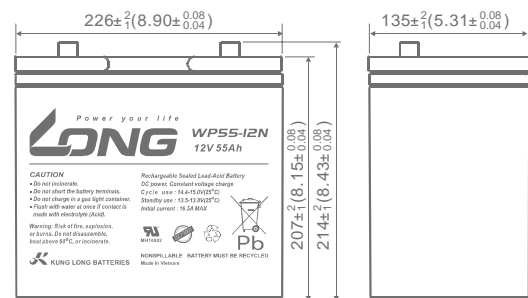
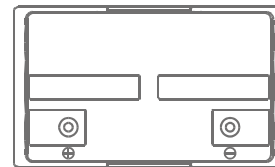
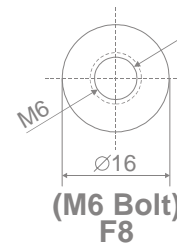
Recommended torque value **M6: 7 N-m (71kgf-cm)**

Maximum allowable torque value **M6: 9 N-m (92kgf-cm)**

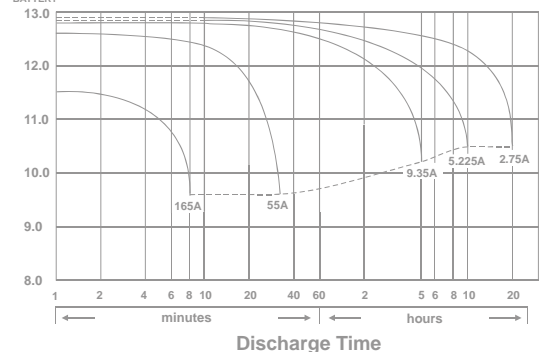


### Dimensions

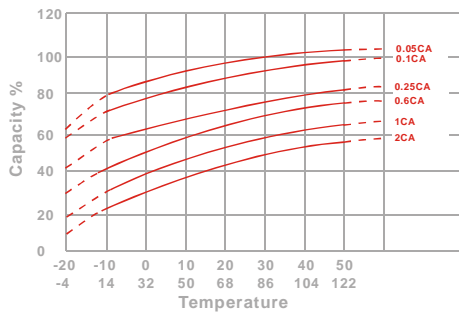
mm(inch)



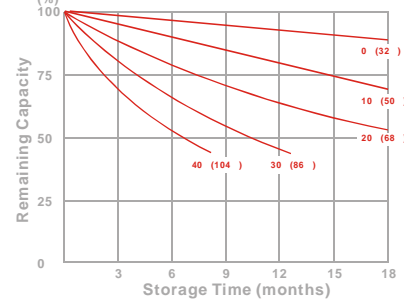
(V) Discharge Time VS. Discharge Current (25 )



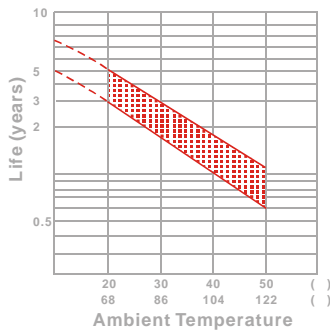
Effect of Temperature on Capacity 25 (77 )



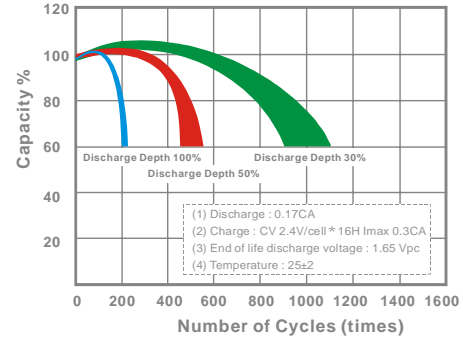
Capacity Retention Characteristic



Trickle (or float) Service Life



Cycle Service Life



## - PERFORMANCE DATA

Discharge Rates in Watts to Various End Voltages at 25 (77 )

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	328	381	413	430	434	438	444
10	min	210	244	265	276	278	281	285
15	min	163	187	202	209	211	213	215
30	min	86.9	99.5	107	111	112	113	115
60	min	64.7	67.5	69.3	70.8	71.3	72.0	72.6
120	min	32.5	34.7	36.2	37.2	37.5	37.8	38.3
180	min	26.3	28.2	29.2	29.8	30.0	30.3	30.6
240	min	21.8	23.0	23.7	24.2	24.3	24.5	24.6
300	min	18.3	19.3	20.0	20.3	20.5	20.7	20.9
600	min	10.6	11.1	11.4	11.6	11.6	11.7	11.7
1200	min	5.48	5.78	5.93	6.05	6.08	6.14	6.18

- Discharge Rates in Amperes to Various End Voltages at 25 (77 )

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	176	204	219	228	231	234	238
10	min	110	127	138	143	145	147	149
15	min	83.5	95.6	103	107	108	109	110
30	min	43.8	50.2	54.1	55.8	56.4	57.0	57.7
60	min	29.4	33.2	34.5	35.4	35.7	36.1	36.5
120	min	16.9	18.4	19.2	19.8	20.0	20.3	20.6
180	min	13.0	13.8	14.3	14.7	14.8	15.0	15.2
240	min	10.9	11.5	11.7	11.9	12.0	12.1	12.2
300	min	9.32	9.74	9.92	10.1	10.2	10.3	10.4
600	min	5.39	5.63	5.65	5.71	5.73	5.76	5.80
1200	min	2.76	2.89	2.96	3.00	3.01	3.03	3.05

All data on the spec. sheet is an average value:

The tolerance range : X<6min(+15%~-15%), 6min X<10min(+12%~-12%),10min X < 60min(+8%~-8%), X 60min(+5%~-5%)

021216-1J

## WPL65-12AN 12Volt 65Ah

### Specifications

Nominal Voltage(V) **12V**

#### Nominal Capacity

20 hour rate	(3.25A to 10.50V)	<b>65Ah</b>
10 hour rate	(6.175A to 10.50V)	<b>61.75Ah</b>
5 hour rate	(11.05A to 10.20V)	<b>55.25Ah</b>
1 C	(65A to 9.60V)	<b>41.17Ah</b>
3 C	(195A to 9.60V)	<b>26Ah</b>

Weight **Approx. 20.9kg(45.98Lbs.)**

Internal Resistance (at 1KHz) **Approx. 7 mΩ**

#### Maximum Discharge Current for

5 seconds: **780A**

#### Charging Methods at 25°C (77°F)

##### Cycle use:

Charging Voltage **14.4 to 15.0V**

Coefficient **-5.0mV/°C/cell**

Maximum Charging Current : **19.5A**

##### Standby use:

Float Charging Voltage **13.5 to 13.8V**

Coefficient **-3.0mV/°C/cell**

#### Operating Temperature Range

Charge **-15°C (5°F) to 40°C (104°F)**

Discharge **-15°C (5°F) to 50°C (122°F)**

Storage **-15°C (5°F) to 40°C (104°F)**

#### Charge Retention (shelf life) at 20°C (68°F)

1 month **98%**

3 month **94%**

6 month **85%**

Case Material **ABS UL94 HB**

Option: Flammability resistance of (UL94 V-0)

Terminal **F8**

#### Description of torque value of hard ware for the terminals:

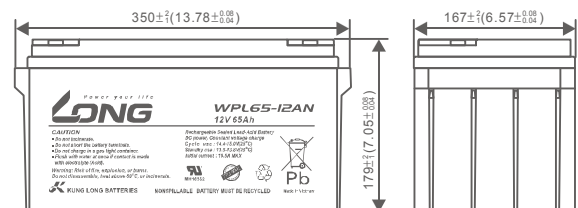
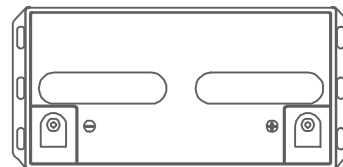
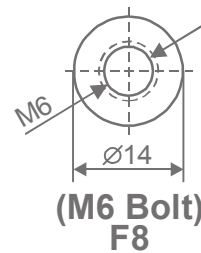
Recommended torque value **M6: 7 N-m (71kgf-cm)**

Maximum allowable torque value **M6: 9 N-m (92kgf-cm)**

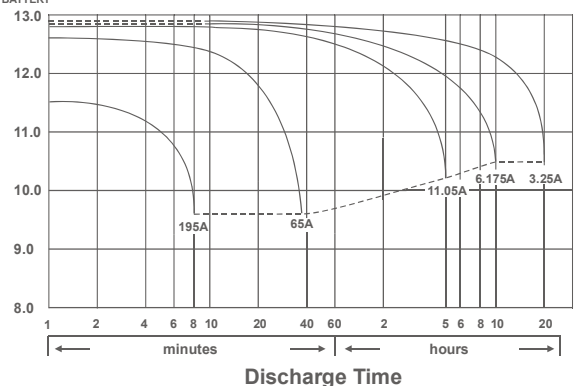


### Dimensions

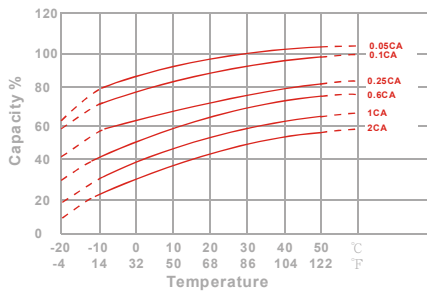
mm(inch)



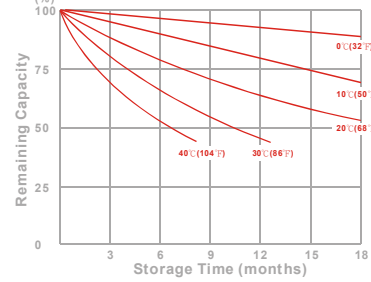
(V) FOR 12V BATTERY **Discharge Time VS. Discharge Current (25°C)**



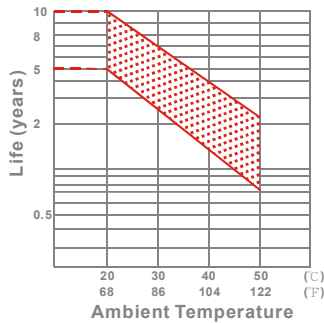
Effect of Temperature on Capacity 25°C (77°F)



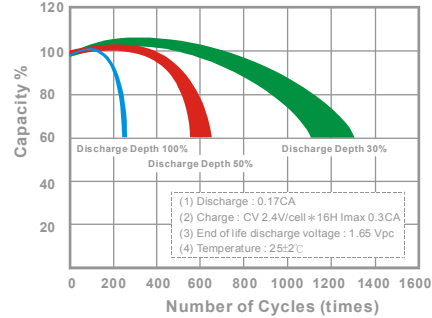
Capacity Retention Characteristic



Trickle (or float) Service Life



Cycle Service Life



## - PERFORMANCE DATA

### Discharge Rates in Watts to Various End Voltages at 25°C (77°F)

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	249	275	320	371	380	396	432
10	min	203	230	251	274	282	290	309
15	min	170	190	207	215	218	224	231
20	min	150	158	171	173	180	185	193
30	min	113	124	134	138	141	143	148
60	min	72.5	76.5	82.3	83.7	84.0	84.3	85.0
90	min	58.3	60.2	61.5	62.0	62.3	62.5	62.8
120	min	46.7	49.0	50.0	50.5	50.7	50.8	51.0
180	min	32.4	33.5	34.0	34.3	34.5	34.7	35.0
240	min	26.0	27.2	27.5	27.7	27.8	28.0	28.2
300	min	21.7	22.6	23.1	23.2	23.3	23.4	23.4
480	min	14.9	15.5	15.8	15.9	16.0	16.0	16.0
600	min	12.5	12.9	13.2	13.2	13.3	13.3	13.3
1200	min	6.54	6.76	6.86	6.87	6.89	6.91	6.94

### - Discharge Rates in Amperes to Various End Voltages at 25°C (77°F)

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	137	151	177	208	213	224	245
10	min	102	123	135	149	154	158	169
15	min	91.0	100	109	116	119	122	129
20	min	61.4	82.5	89.3	92.5	94.0	96.5	101
30	min	50.7	63.6	68.5	71.5	73.4	74.7	77.2
60	min	36.6	38.5	41.5	42.5	43.0	43.6	44.2
90	min	29.5	31.1	31.8	32.2	32.8	33.0	33.4
120	min	23.1	24.3	24.8	25.0	25.3	25.5	25.8
180	min	16.2	17.0	17.3	17.5	17.7	17.8	18.0
240	min	13.0	13.6	13.8	13.9	14.0	14.1	14.2
300	min	10.8	11.3	11.5	11.6	11.7	11.8	11.9
480	min	7.43	7.73	7.87	7.92	7.94	7.96	7.98
600	min	6.19	6.43	6.54	6.58	6.60	6.61	6.63
1200	min	3.24	3.35	3.40	3.41	3.42	3.43	3.44

All data on the spec. sheet is an average value:

The tolerance range :  $X < 6\text{min}$  (+15%~-15%),  $6\text{min} \leq X < 10\text{min}$  (+12%~-12%),  $10\text{min} \leq X < 60\text{min}$  (+8%~-8%),  $X \geq 60\text{min}$  (+5%~-5%)

120916-1F

## KPH75-12N 12Volt 75Ah

### Specifications

Nominal Voltage(V) **12V**

#### Nominal Capacity

10 hour rate	(7.5A to 10.80V)	<b>75Ah</b>
5 hour rate	(12.75A to 10.20V)	<b>63.75Ah</b>
1 hour rate	(45A to 9.60V)	<b>45Ah</b>
1 C	(75A to 9.60V)	<b>47.5Ah</b>

Weight **Approx. 24.2kg(53.24Lbs.)**

Internal Resistance (at 1KHz) **Approx. 5 mΩ**

Maximum Discharge Current for 5 seconds: **900A**

#### Charging Methods at 25 (77 )

Cycle use:

Charging Voltage **14.4 to 15.0V**

Coefficient -5.0mV/ /cell

Maximum Charging Current : **22.5A**

Standby use:

Float Charging Voltage **13.5 to 13.8V**

Coefficient -3.0mV/ /cell

Design Life **12 years**

#### Operating Temperature Range

Charge **-15 (5 ) to 40 (104 )**

Discharge **-15 (5 ) to 50 (122 )**

Storage **-15 (5 ) to 40 (104 )**

#### Charge Retention (shelf life) at 20 (68 )

1 month **98%**

3 month **94%**

6 month **85%**

Case Material **ABS UL94 HB**

Option: Flammability resistance of (UL94 V-0)

Terminal **F8**

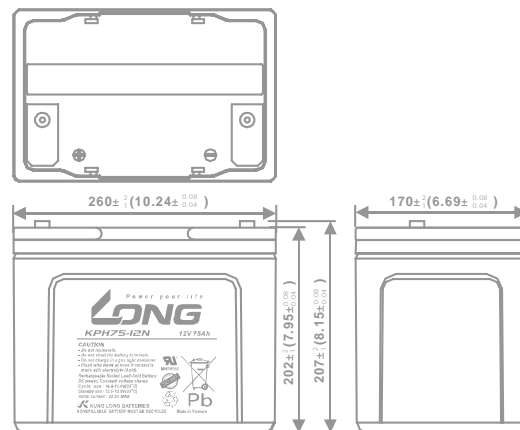
#### Description of torque value of hard ware for the terminals:

Recommended torque value **M6: 7 N-m (71kgf-cm)**

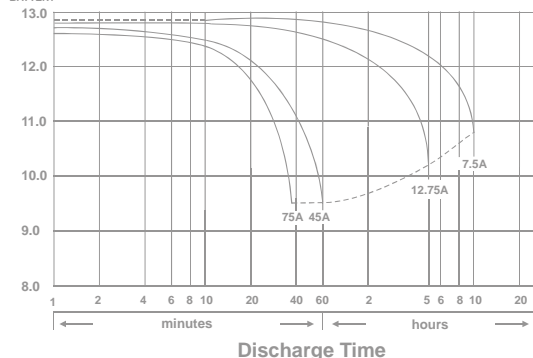
Maximum allowable torque value **M6: 9 N-m (92kgf-cm)**



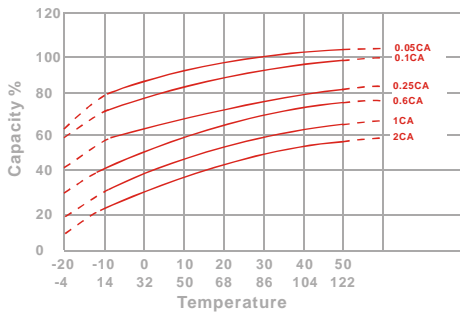
### Dimensions mm(inch)



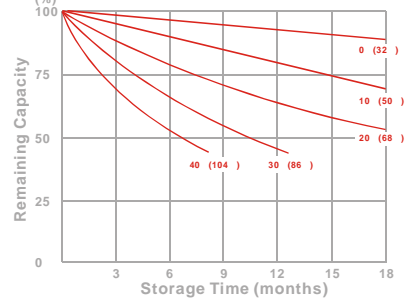
(v) Discharge Time VS. Discharge Current (25 ) FOR 12V BATTERY



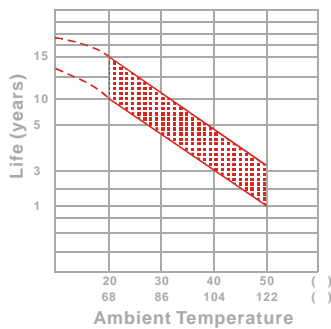
Effect of Temperature on Capacity 25 (77 )



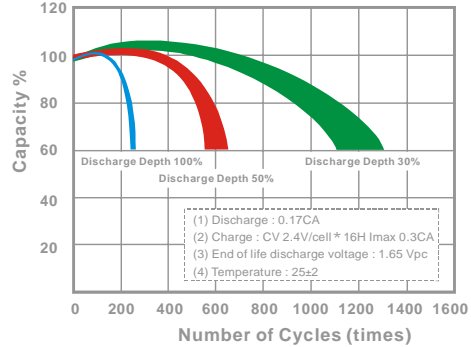
Capacity Retention Characteristic



Trickle (or float) Service Life



Cycle Service Life



## - PERFORMANCE DATA

Discharge Rates in Watts to Various End Voltages at 25 (77 )

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	407	429	491	521	537	552	567
10	min	278	294	336	357	368	378	388
15	min	178	225	240	274	280	287	294
30	min	139	149	155	159	160	162	165
60	min	80.8	85.3	87.8	89.8	90.5	91.3	92.3
120	min	47.2	49.8	51.3	52.7	53.2	53.7	54.3
180	min	34.0	35.8	36.8	37.7	38.0	38.3	38.8
240	min	27.8	28.8	29.7	30.3	30.5	30.8	31.2
300	min	24.8	25.3	25.7	26.0	26.2	26.3	26.5
600	min	15.0	15.2	15.3	15.5	15.5	15.6	15.6
1200	min	7.85	7.97	8.07	8.15	8.20	8.23	8.28

- Discharge Rates in Amperes to Various End Voltages at 25 (77 )

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	178	214	245	272	281	292	304
10	min	112	143	167	186	192	199	207
15	min	90.5	109	124	138	141	145	150
30	min	63.2	72.6	79.4	84.5	85.6	87.2	89.0
60	min	38.6	41.5	43.3	44.8	45.3	45.9	46.7
120	min	20.2	22.4	23.9	25.0	25.4	25.8	26.3
180	min	15.8	17.4	18.4	19.3	19.6	20.0	20.4
240	min	12.9	13.9	14.7	15.3	15.6	15.9	16.2
300	min	11.8	12.6	13.1	13.4	13.6	13.8	14.1
600	min	7.53	7.62	7.69	7.74	7.76	7.81	7.85
1200	min	3.87	3.93	3.98	4.02	4.03	4.05	4.08

All data on the spec. sheet is an average value:

The tolerance range : X<6min(+15%~-15%), 6min X<10min(+12%~-12%), 10min X < 60min(+8%~-8%), X > 60min(+5%~-5%)

100916-11



## KPH80-12N 12Volt 80Ah

### Specifications

Nominal Voltage(V) **12V**

#### Nominal Capacity

10 hour rate	(8A)	to	10.80V)	<b>80Ah</b>
5 hour rate	(13.6A)	to	10.20V)	<b>68Ah</b>
1 hour rate	(48A)	to	9.60V)	<b>48Ah</b>
1 C	(80A)	to	9.60V)	<b>50.67Ah</b>

Weight **Approx. 24.2kg(53.2Lbs.)**

Internal Resistance (at 1KHz) **Approx. 5 mΩ**

#### Maximum Discharge Current for

5 seconds: **960A**

#### Charging Methods at 25 (77 )

##### Cycle use:

Charging Voltage **14.4 to 15.0V**

Coefficient -5.0mV/ /cell

Maximum Charging Current : **24A**

##### Standby use:

Float Charging Voltage **13.5 to 13.8V**

Coefficient -3.0mV/ /cell

Design Life **12 years**

#### Operating Temperature Range

Charge **-15 (5 ) to 40 (104 )**

Discharge **-15 (5 ) to 50 (122 )**

Storage **-15 (5 ) to 40 (104 )**

#### Charge Retention (shelf life) at 20 (68 )

1 month **98%**

3 month **94%**

6 month **85%**

Case Material **ABS UL94 HB**

Option: Flammability resistance of (UL94 V-0)

Terminal **F8**

#### Description of torque value of hard ware for the terminals:

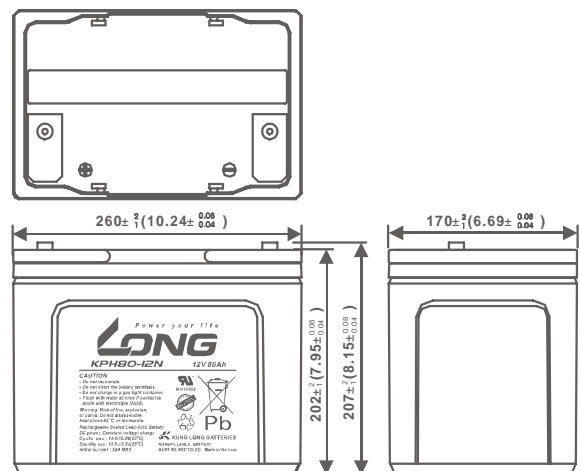
Recommended torque value **M6: 7 N-m (71kgf-cm)**

Maximum allowable torque value **M6: 9 N-m (92kgf-cm)**

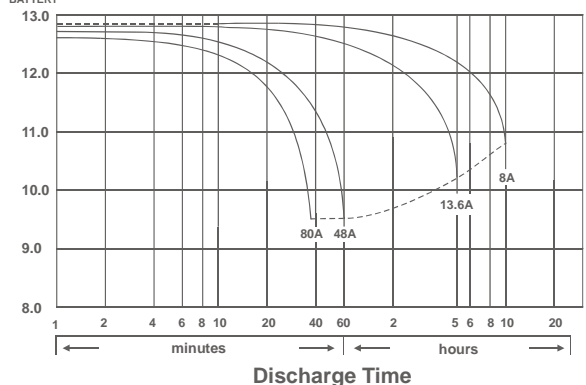


### Dimensions

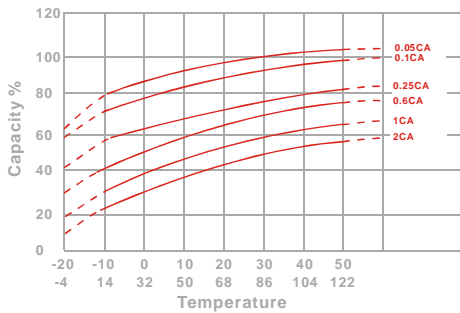
mm(inch)



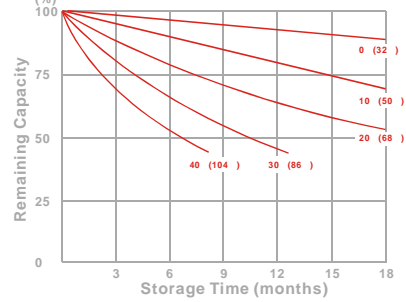
(V) FOR 12V BATTERY Discharge Time VS. Discharge Current (25 )



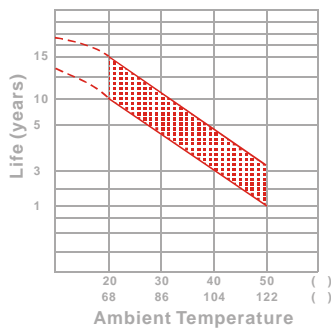
Effect of Temperature on Capacity 25 (77 )



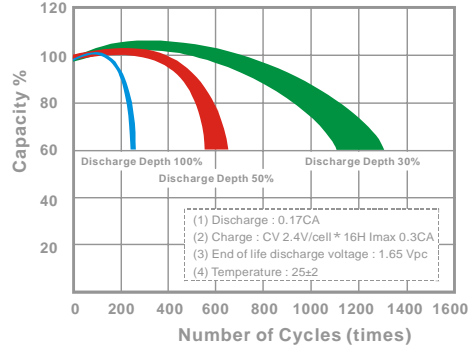
Capacity Retention Characteristic



Trickle (or float) Service Life



Cycle Service Life



## - PERFORMANCE DATA

Discharge Rates in Watts to Various End Voltages at 25 (77 )

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	407	429	491	521	537	552	567
10	min	278	294	336	357	368	378	388
15	min	178	225	240	274	280	287	294
30	min	139	149	155	159	160	162	165
60	min	80.8	85.3	87.8	89.8	90.5	91.3	92.3
120	min	47.2	49.8	51.3	52.7	53.2	53.7	54.3
180	min	34.0	35.8	36.8	37.7	38.0	38.3	38.8
240	min	27.8	28.8	29.7	30.3	30.5	30.8	31.2
300	min	24.8	25.3	25.7	26.0	26.2	26.3	26.5
600	min	15.0	15.2	15.3	15.5	15.5	15.6	15.6
1200	min	7.85	7.97	8.07	8.15	8.20	8.23	8.28

- Discharge Rates in Amperes to Various End Voltages at 25 (77 )

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	178	214	245	272	281	292	304
10	min	112	143	167	186	192	199	207
15	min	90.5	109	124	138	141	145	150
30	min	63.2	72.6	79.4	84.5	85.6	87.2	89.0
60	min	38.6	41.5	43.3	44.8	45.3	45.9	46.7
120	min	20.2	22.4	23.9	25.0	25.4	25.8	26.3
180	min	15.8	17.4	18.4	19.3	19.6	20.0	20.4
240	min	12.9	13.9	14.7	15.3	15.6	15.9	16.2
300	min	11.8	12.6	13.1	13.4	13.6	13.8	14.1
600	min	7.53	7.62	7.69	7.74	7.76	7.81	7.85
1200	min	3.87	3.93	3.98	4.02	4.03	4.05	4.08

All data on the spec. sheet is an average value:

The tolerance range : X<6min(+15%~-15%), 6min X<10min(+12%~-12%), 10min X < 60min(+8%~-8%), X > 60min(+5%~-5%)

## KPH100-12AN 12Volt 100Ah

### Specifications

Nominal Voltage(V) **12V**

#### Nominal Capacity

10 hour rate	(10A	to	10.80V)	<b>100Ah</b>
5 hour rate	(17A	to	10.20V)	<b>85Ah</b>
1 hour rate	(60A	to	9.60V)	<b>60Ah</b>
1 C	(100A	to	9.60V)	<b>63.33Ah</b>

Weight **Approx. 29.5kg(64.9Lbs.)**

Internal Resistance (at 1KHz) **Approx. 5 mΩ**

#### Maximum Discharge Current for

5 seconds: **1200A**

#### Charging Methods at 25 (77 )

##### Cycle use:

Charging Voltage **14.4 to 15.0V**

Coefficient -5.0mV/ /cell

Maximum Charging Current : **30A**

##### Standby use:

Float Charging Voltage **13.5 to 13.8V**

Coefficient -3.0mV/ /cell

Design Life **12 years**

#### Operating Temperature Range

Charge **-15 (5 ) to 40 (104 )**

Discharge **-15 (5 ) to 50 (122 )**

Storage **-15 (5 ) to 40 (104 )**

#### Charge Retention (shelf life) at 20 (68 )

1 month **98%**

3 month **94%**

6 month **85%**

Case Material **ABS UL94 HB**

Option: Flammability resistance of (UL94 V-0)

Terminal **F8**

#### Description of torque value of hard ware for the terminals:

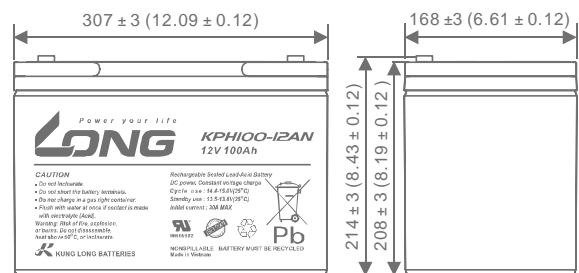
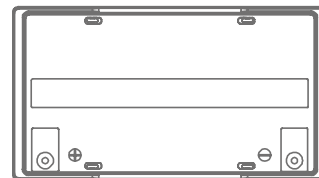
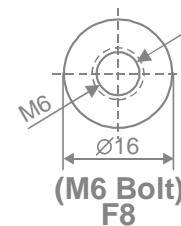
Recommended torque value **M6: 7 N-m (71kgf-cm)**

Maximum allowable torque value **M6: 9 N-m (92kgf-cm)**

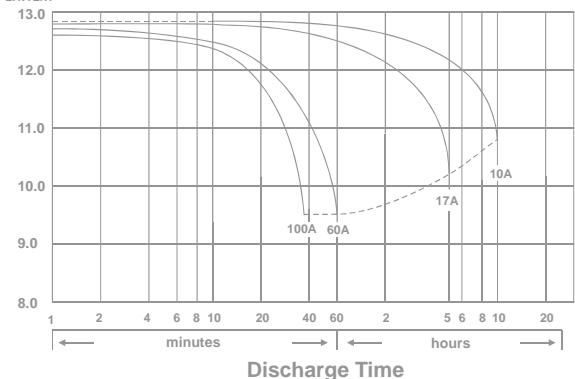


### Dimensions

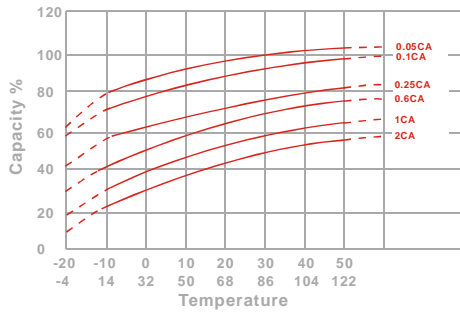
mm(inch)



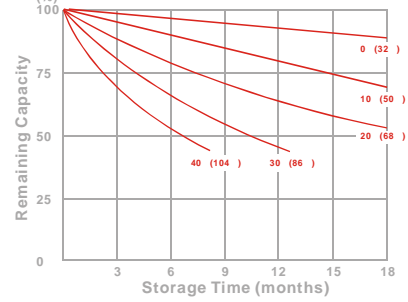
(v) FOR 12V BATTERY Discharge Time VS. Discharge Current (25 )



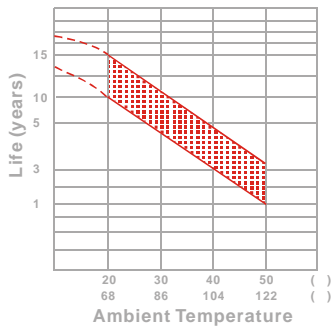
Effect of Temperature on Capacity 25 (77 )



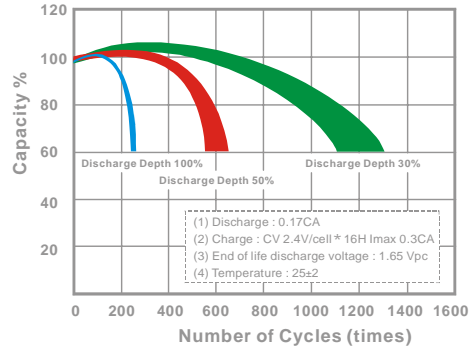
Capacity Retention Characteristic



Trickle (or float) Service Life



Cycle Service Life



## - PERFORMANCE DATA

Discharge Rates in Watts to Various End Voltages at 25 (77 )

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	458	512	549	584	600	617	649
10	min	348	380	407	432	443	455	477
15	min	277	301	320	338	346	354	370
30	min	163	174	183	191	195	199	206
60	min	112	116	119	122	123	125	126
120	min	66.3	69.5	72.0	73.5	74.5	75.7	77.2
180	min	47.2	49.7	51.8	52.2	53.0	54.0	55.2
240	min	35.2	37.3	39.3	41.3	42.0	42.8	43.8
300	min	31.3	32.8	34.2	35.2	35.5	36.0	36.7
600	min	18.0	19.2	20.0	20.8	21.2	21.5	21.8
1200	min	10.4	10.7	11.0	11.2	11.3	11.4	11.5

- Discharge Rates in Amperes to Various End Voltages at 25 (77 )

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	202	267	305	336	346	358	375
10	min	159	188	209	226	234	243	257
15	min	119	146	165	179	184	190	198
30	min	71.2	83.7	92.1	101	103	106	111
60	min	43.6	50.8	56.5	60.6	61.5	63.0	64.9
120	min	25.8	29.3	32.5	35.6	36.4	37.3	38.5
180	min	22.6	23.7	24.8	25.7	26.1	26.5	27.2
240	min	18.3	19.1	19.8	20.5	20.8	21.1	21.6
300	min	16.1	16.7	17.2	17.6	17.8	17.9	18.1
600	min	9.71	10.0	10.2	10.4	10.5	10.6	10.7
1200	min	5.09	5.26	5.38	5.48	5.53	5.57	5.64

All data on the spec. sheet is an average value:

The tolerance range : X<6min(+15%~-15%), 6min X<10min(+12%~-12%), 10min X < 60min(+8%~-8%), X 60min(+5%~-5%)

100916-1G

# VTM 1.2A-12



## Specifications

Nominal Voltage(V) **12V**

### Nominal Capacity

20 hour rate	(0.06A	to	10.50V)	1.2Ah
10 hour rate	(0.114A	to	10.50V)	1.14Ah
5 hour rate	(0.204A	to	10.20V)	1.02Ah
1 C	(1.2A	to	9.60V)	0.68Ah
3 C	(3.6A	to	9.60V)	0.48Ah

Weight **Approx. 564g(1.24Lbs.)**

Internal Resistance (at 1KHz) **Approx. 75.4 mΩ**

### Maximum Discharge Current for

5 seconds: **18A**

### Charging Methods at 25°C (77°F)

Cycle use:

Charging Voltage **14.4 to 15.0V**

Coefficient **-5.0mV/°C/cell**

Maximum Charging Current : **0.36A**

Standby use:

Float Charging Voltage **13.5 to 13.8V**

Coefficient **-3.0mV/°C/cell**

### Operating Temperature Range

Charge **-15°C (5°F) to 40°C (104°F)**

Discharge **-15°C (5°F) to 50°C (122°F)**

Storage **-15°C (5°F) to 40°C (104°F)**

### Charge Retention (shelf life) at 20°C (68°F)

1 month **92%**

3 month **90%**

6 month **80%**

Case Material

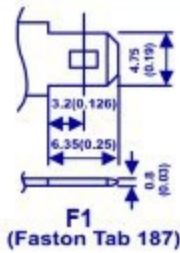
**ABS UL94 HB**

Terminal

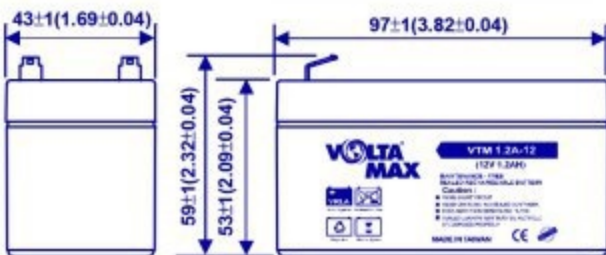
**F1 (Faston Tab 187)**

## Dimensions

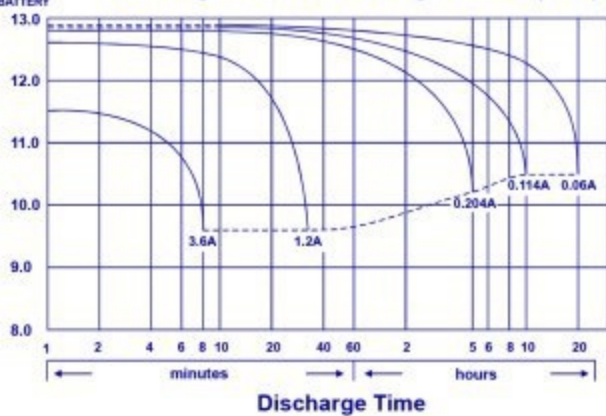
mm(inch)



F1  
(Faston Tab 187)



(V) FOR 12V BATTERY  
Discharge Time VS. Discharge Current (25°C)



**- PERFORMANCE DATA**

**Discharge Rates in Watts to Various End Voltages at 25°C(77°F)**

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	7.18	7.82	8.27	8.65	8.80	8.98	9.28
10	min	4.62	5.00	5.30	5.52	5.58	5.67	5.77
15	min	3.65	3.87	4.05	4.20	4.25	4.32	4.38
30	min	2.15	2.25	2.32	2.37	2.38	2.42	2.45
60	min	1.32	1.39	1.43	1.47	1.48	1.50	1.52
120	min	0.747	0.808	0.847	0.875	0.887	0.900	0.915
180	min	0.533	0.573	0.602	0.623	0.633	0.645	0.657
240	min	0.435	0.470	0.495	0.513	0.520	0.528	0.537
300	min	0.420	0.442	0.457	0.468	0.472	0.477	0.482
600	min	0.220	0.233	0.243	0.250	0.252	0.255	0.258
1200	min	0.123	0.126	0.129	0.130	0.131	0.131	0.132

**- Discharge Rates in Amperes to Various End Voltages at 25°C(77°F)**

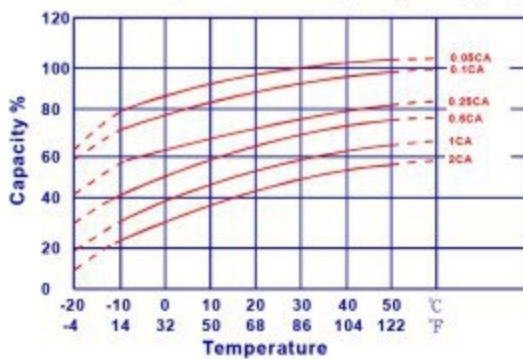
End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	3.49	4.11	4.57	4.94	5.09	5.26	5.51
10	min	2.12	2.43	2.63	2.81	2.88	2.96	3.11
15	min	1.71	1.95	2.09	2.20	2.24	2.29	2.35
30	min	0.931	1.06	1.17	1.24	1.26	1.29	1.32
60	min	0.680	0.716	0.735	0.759	0.765	0.772	0.779
120	min	0.392	0.415	0.429	0.440	0.444	0.449	0.456
180	min	0.272	0.291	0.302	0.311	0.314	0.318	0.324
240	min	0.223	0.238	0.247	0.254	0.257	0.260	0.264
300	min	0.207	0.219	0.226	0.231	0.233	0.236	0.238
600	min	0.112	0.117	0.121	0.124	0.125	0.126	0.127
1200	min	0.0615	0.0624	0.0631	0.0637	0.0639	0.0642	0.0646

All data on the spec. sheet is an average value:

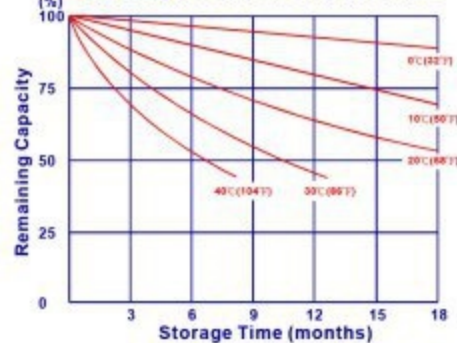
The tolerance range :  $X < 6\text{min}$ (+15%~-15%),  $6\text{min} \leq X < 10\text{min}$ (+12%~-12%),  $10\text{min} \leq X < 60\text{min}$ (+8%~-8%),  $X \geq 60\text{min}$ (+5%~-5%)



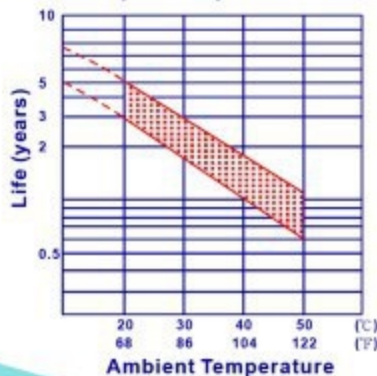
**Effect of Temperature on Capacity 25°C(77°F)**



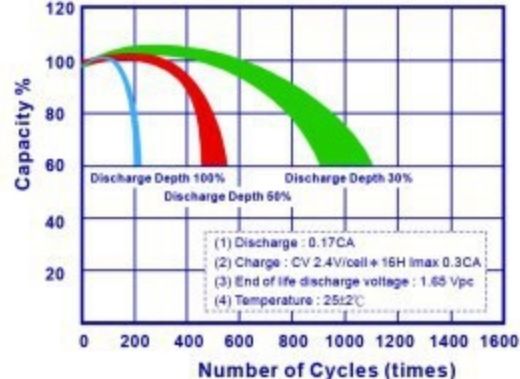
**Capacity Retention Characteristic**



**Trickle (or float) Service Life**



**Cycle Service Life**



# VTM 2.3A-12

## Specifications

Nominal Voltage(V) **12V**

### Nominal Capacity

20 hour rate	(0.115A	to	10.50V)	2.3Ah
10 hour rate	(0.219A	to	10.50V)	2.185Ah
5 hour rate	(0.391A	to	10.20V)	1.955Ah
1 C	(2.3A	to	9.60V)	1.303Ah
3 C	(6.9A	to	9.60V)	0.92Ah

Weight **Approx. 1.04kg(2.29Lbs.)**

Internal Resistance (at 1KHz) **Approx. 37 mΩ**

Maximum Discharge Current for  
5 seconds: **34.5A**

### Charging Methods at 25°C (77°F)

Cycle use:	
Charging Voltage	14.4 to 15.0V
Coefficient	-5.0mV/°C/cell
Maximum Charging Current :	0.69A
Standby use:	
Float Charging Voltage	13.5 to 13.8V
Coefficient	-3.0mV/°C/cell

### Operating Temperature Range

Charge	-15°C (5°F)	to	40°C (104°F)
Discharge	-15°C (5°F)	to	50°C (122°F)
Storage	-15°C (5°F)	to	40°C (104°F)

### Charge Retention (shelf life) at 20°C (68°F)

1 month	92%
3 month	90%
6 month	80%

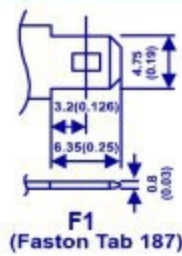
Case Material **ABS UL94 HB**

Terminal **F1 (Faston Tab 187)**

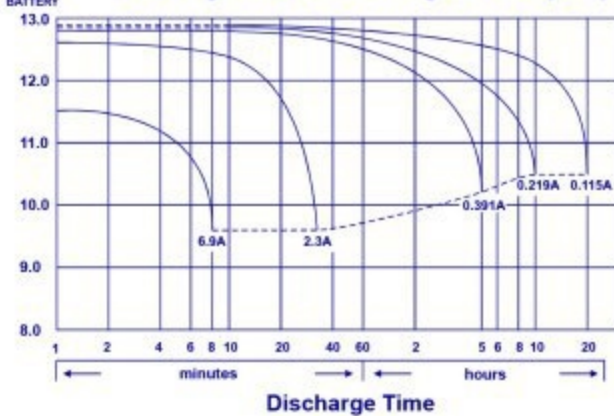


## Dimensions

mm(inch)



(V) FOR 12V BATTERY Discharge Time VS. Discharge Current (25°C)



**- PERFORMANCE DATA**

**Discharge Rates in Watts to Various End Voltages at 25°C (77°F)**

Time		End Voltage	1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
5	min		11.8	13.9	15.3	16.4	16.7	17.2	17.8
10	min		7.82	9.38	10.1	10.6	10.8	11.1	11.4
15	min		6.87	7.90	8.28	8.53	8.63	8.75	8.90
30	min		3.95	4.25	4.43	4.58	4.63	4.70	4.78
60	min		2.27	2.45	2.60	2.72	2.75	2.80	2.85
120	min		1.36	1.50	1.56	1.62	1.64	1.67	1.70
180	min		1.08	1.21	1.24	1.27	1.28	1.29	1.30
240	min		0.863	0.960	0.988	1.01	1.02	1.03	1.04
300	min		0.702	0.777	0.808	0.837	0.848	0.858	0.869
600	min		0.415	0.453	0.468	0.480	0.483	0.488	0.493
1200	min		0.230	0.242	0.248	0.253	0.255	0.257	0.258

**- Discharge Rates in Amperes to Various End Voltages at 25°C (77°F)**

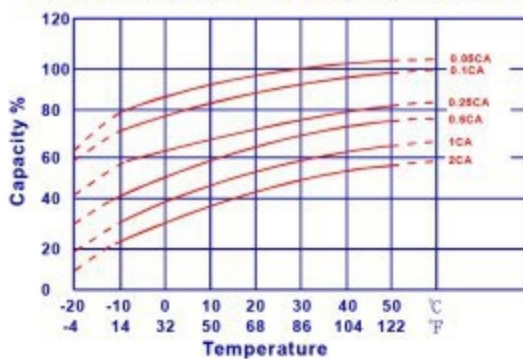
Time		End Voltage	1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
5	min		9.08	9.36	9.62	9.82	9.95	10.1	10.4
10	min		4.76	5.45	5.68	5.87	5.94	6.03	6.15
15	min		3.89	4.15	4.27	4.38	4.42	4.47	4.53
30	min		2.02	2.17	2.24	2.30	2.32	2.35	2.39
60	min		1.23	1.34	1.39	1.42	1.43	1.45	1.47
120	min		0.668	0.731	0.765	0.796	0.809	0.826	0.849
180	min		0.508	0.562	0.587	0.609	0.618	0.628	0.643
240	min		0.411	0.449	0.472	0.491	0.497	0.505	0.513
300	min		0.364	0.383	0.396	0.405	0.409	0.414	0.419
600	min		0.217	0.226	0.232	0.237	0.238	0.240	0.242
1200	min		0.114	0.118	0.121	0.123	0.124	0.125	0.126

All data on the spec. sheet is an average value:

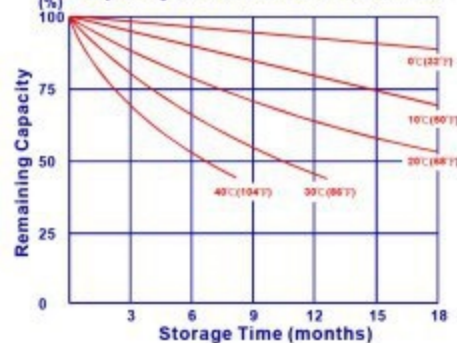
The tolerance range :  $X < 6\text{min}$  (+15%~-15%),  $6\text{min} \leq X < 10\text{min}$  (+12%~-12%),  $10\text{min} \leq X < 60\text{min}$  (+8%~-8%),  $X \geq 60\text{min}$  (+5%~-5%)



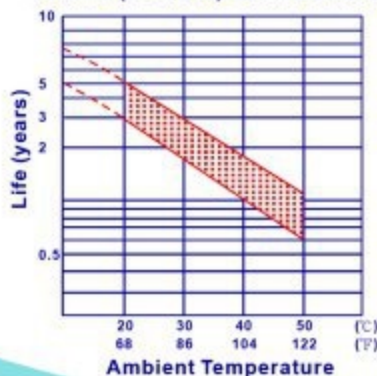
**Effect of Temperature on Capacity 25°C (77°F)**



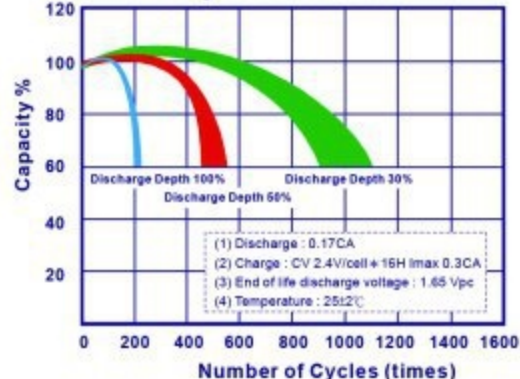
**Capacity Retention Characteristic**



**Trickle (or float) Service Life**



**Cycle Service Life**







# VTM 4.5A-12

## Specifications

Nominal Voltage(V) **12V**

### Nominal Capacity

20 hour rate	(0.225A	to	10.50V)	4.5Ah
10 hour rate	(0.428A	to	10.50V)	4.275Ah
5 hour rate	(0.765A	to	10.20V)	3.825Ah
1 C	(4.5A	to	9.60V)	2.55Ah
3 C	(13.5A	to	9.60V)	1.8Ah

Weight **Approx. 1.60kg(3.52Lbs.)**

Internal Resistance (at 1KHz) **Approx. 35 mΩ**

Maximum Discharge Current for 5 seconds: **67.5A**

### Charging Methods at 25°C (77°F)

Cycle use:	
Charging Voltage	14.4 to 15.0V
Coefficient	-5.0mV/°C/cell
Maximum Charging Current :	1.35A
Standby use:	
Float Charging Voltage	13.5 to 13.8V
Coefficient	-3.0mV/°C/cell

### Operating Temperature Range

Charge	-15°C (5°F)	to	40°C (104°F)
Discharge	-15°C (5°F)	to	50°C (122°F)
Storage	-15°C (5°F)	to	40°C (104°F)

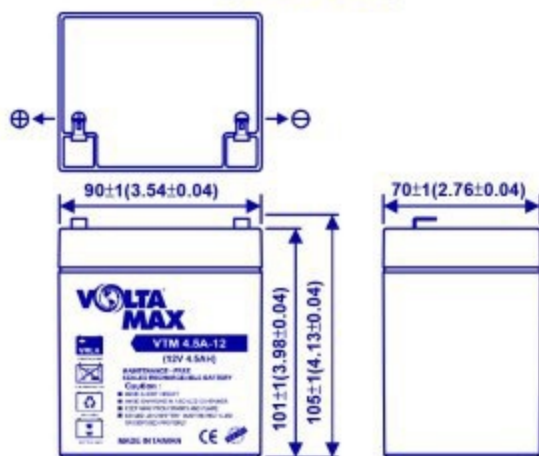
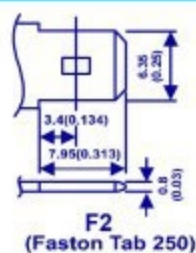
### Charge Retention (shelf life) at 20°C (68°F)

1 month	92%
3 month	90%
6 month	80%

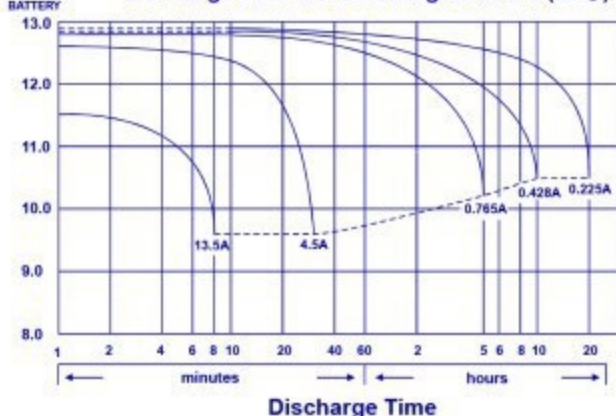
Case Material **ABS UL94 HB**

Terminal **F2 (Faston Tab 250)**

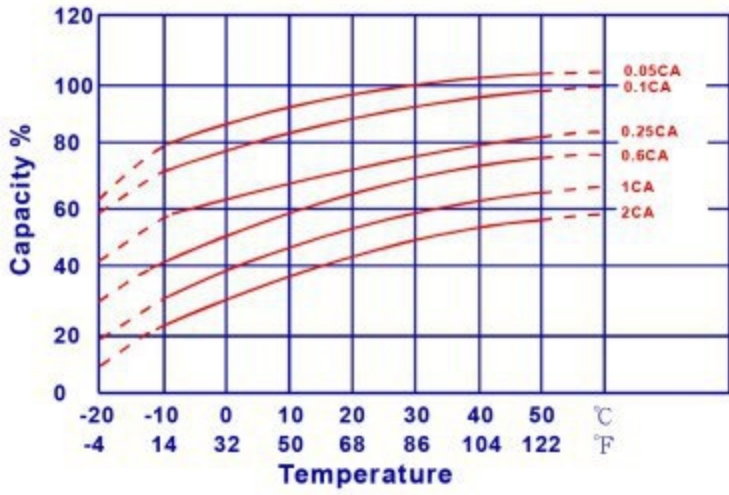
## Dimensions mm(inch)



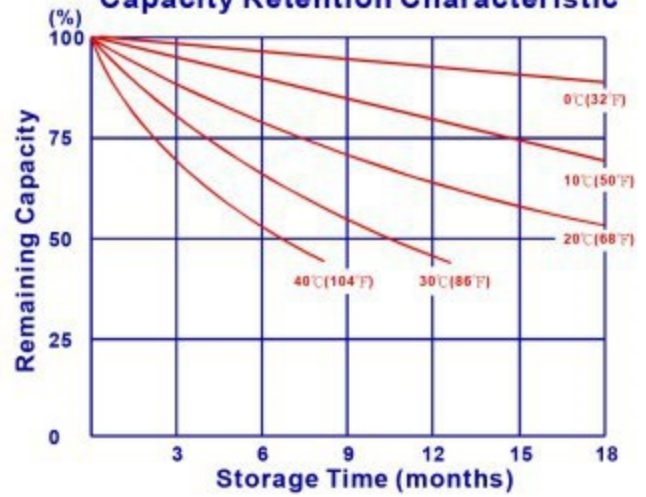
(V) FOR 12V BATTERY Discharge Time VS. Discharge Current (25°C)



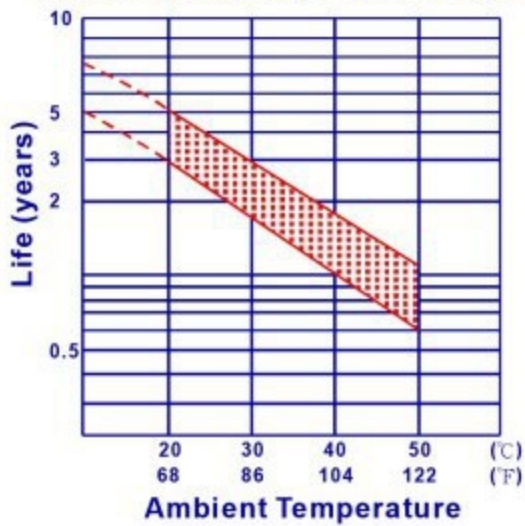
**Effect of Temperature on Capacity 25°C (77°F)**



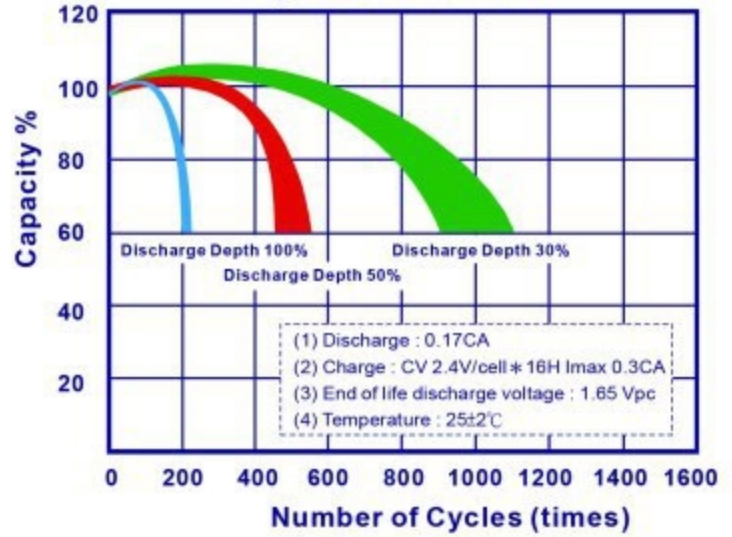
**Capacity Retention Characteristic**



**Trickle (or float) Service Life**



**Cycle Service Life**





# VTM 5A-6

## Specifications

Nominal Voltage(V) **6V**

### Nominal Capacity

20 hour rate	(0.25A	to	5.25V)	5Ah
10 hour rate	(0.475A	to	5.25V)	4.75Ah
5 hour rate	(0.85A	to	5.1V)	4.25Ah
1 C	(5A	to	4.8V)	2.83Ah
3 C	(15A	to	4.8V)	2Ah

Weight **Approx.830g(1.83Lbs.)**

Internal Resistance (at 1KHz) **Approx. 19 mΩ**

Maximum Discharge Current for 5 seconds: **75A**

### Charging Methods at 25°C(77°F)

#### Cycle use:

Charging Voltage **7.20 to 7.50V**  
 Coefficient **-5.0mV/°C /cell**  
 Maximum Charging Current : **1.5A**

#### Standby use:

Float Charging Voltage **6.75 to 6.90V**  
 Coefficient **-3.0mV/°C /cell**

### Operating Temperature Range

Charge	-15°C (5°F)	to	40°C (104°F)
Discharge	-15°C (5°F)	to	50°C (122°F)
Storage	-15°C (5°F)	to	40°C (104°F)

### Charge Retention (shelf life) at 20°C (68°F)

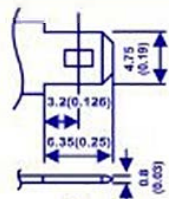
1 month	92%
3 month	90%
6 month	80%

Case Material **ABS UL94 HB**

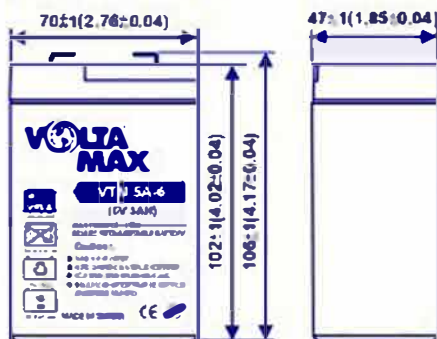
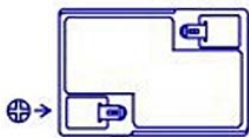
Terminal **F1 (Faston Tab 187)**

## Dimensions

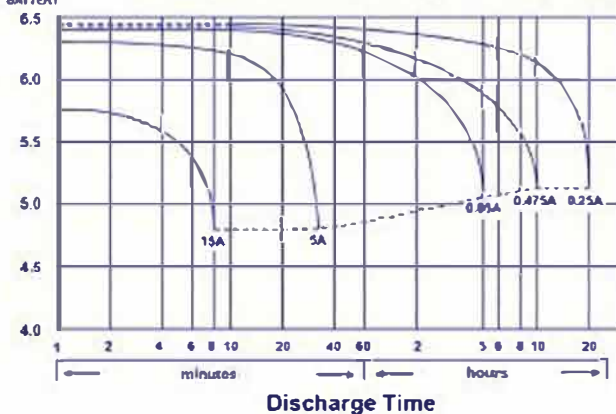
mm(inch)



F1 (Faston Tab 187)



Discharge Time VS. Discharge Current (25°C)



**- PERFORMANCE DATA**

**Discharge Rates in Watts to Various End Voltages at 25°C (77°F)**

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	23.8	26.8	29.0	31.0	31.8	32.8	34.0
10	min	17.0	19.2	20.5	21.5	22.0	22.5	23.0
15	min	14.1	15.6	16.2	16.5	16.7	16.8	17.0
30	min	8.18	9.15	9.52	9.70	9.80	9.92	10.03
60	min	4.20	4.77	5.13	5.43	5.53	5.65	5.73
120	min	2.48	2.77	2.90	3.00	3.05	3.12	3.18
180	min	1.97	2.17	2.27	2.35	2.38	2.43	2.48
240	min	1.60	1.73	1.80	1.85	1.88	1.92	1.95
300	min	1.46	1.56	1.60	1.64	1.65	1.68	1.72
600	min	0.855	0.913	0.940	0.960	0.968	0.978	0.992
1200	min	0.432	0.468	0.498	0.510	0.513	0.520	0.527

**- Discharge Rates in Amperes to Various End Voltages at 25°C (77°F)**

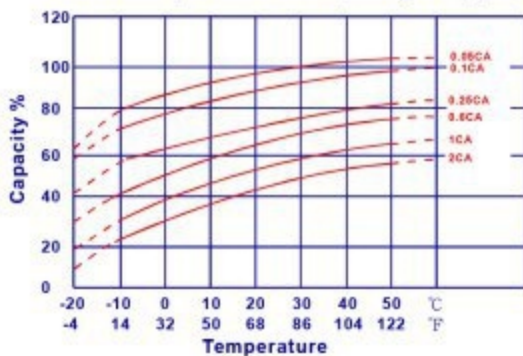
End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	15.3	17.6	18.9	19.5	19.7	19.9	20.2
10	min	10.5	11.7	11.9	12.1	12.2	12.3	12.4
15	min	7.86	8.52	9.01	9.22	9.29	9.37	9.45
30	min	4.39	4.94	5.11	5.25	5.30	5.35	5.41
60	min	2.39	2.64	2.76	2.87	2.9	2.94	2.97
120	min	1.34	1.46	1.52	1.56	1.57	1.59	1.61
180	min	1.10	1.16	1.19	1.21	1.22	1.23	1.24
240	min	0.855	0.911	0.936	0.962	0.968	0.975	0.983
300	min	0.790	0.826	0.839	0.851	0.855	0.860	0.866
600	min	0.437	0.464	0.476	0.485	0.489	0.493	0.498
1200	min	0.229	0.243	0.251	0.257	0.260	0.263	0.267

All data on the spec. sheet is an average value:

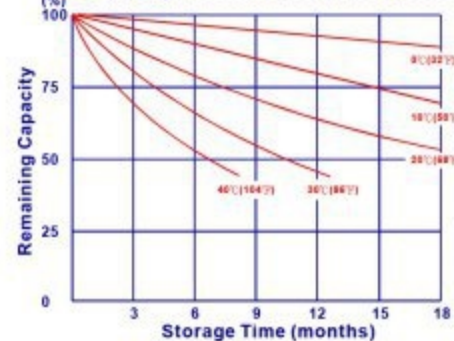
The tolerance range :  $X < 6\text{min}$  (+15%~-15%),  $6\text{min} \leq X < 10\text{min}$  (+12%~-12%),  $10\text{min} \leq X < 60\text{min}$  (+8%~-8%),  $X \geq 60\text{min}$  (+5%~-5%)



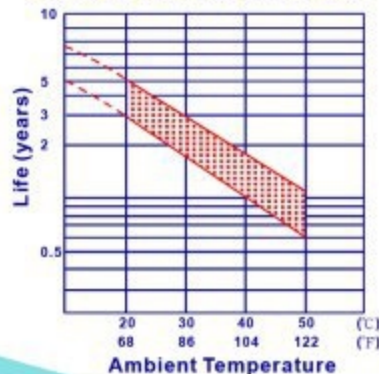
**Effect of Temperature on Capacity 25°C (77°F)**



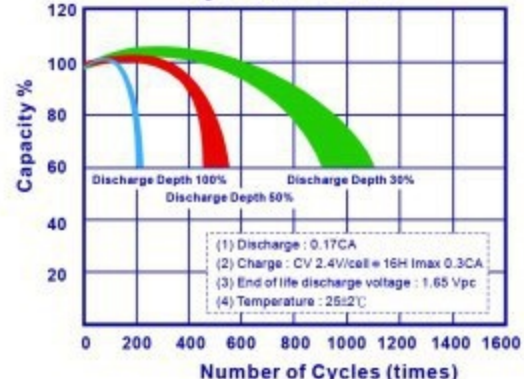
**Capacity Retention Characteristic**



**Trickle (or float) Service Life**



**Cycle Service Life**



# VTM 7.5A-12

## Specifications



Nominal Voltage(V) 12V

### Nominal Capacity

20 hour rate	(0.375A to 10.50V)	7.5Ah
10 hour rate	(0.713A to 10.50V)	7.125Ah
5 hour rate	(1.275A to 10.20V)	6.375Ah
1 C	(7.5A to 9.60V)	4.25Ah
3 C	(22.5A to 9.60V)	3Ah

Weight Approx. 2.3kg(5.06Lbs.)

Internal Resistance (at 1KHz) Approx. 19 mΩ

Maximum Discharge Current for 5 seconds: 112.5A

### Charging Methods at 25°C (77°F)

Cycle use:	
Charging Voltage	14.4 to 15.0V
Coefficient	-5.0mV/°C/cell
Maximum Charging Current :	2.25A
Standby use:	
Float Charging Voltage	13.5 to 13.8V
Coefficient	-3.0mV/°C/cell

### Operating Temperature Range

Charge	-15°C (5°F) to 40°C (104°F)
Discharge	-15°C (5°F) to 50°C (122°F)
Storage	-15°C (5°F) to 40°C (104°F)

### Charge Retention (shelf life) at 20°C (68°F)

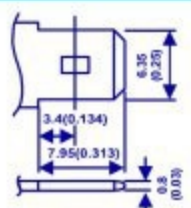
1 month	92%
3 month	90%
6 month	80%

Case Material ABS UL94 HB

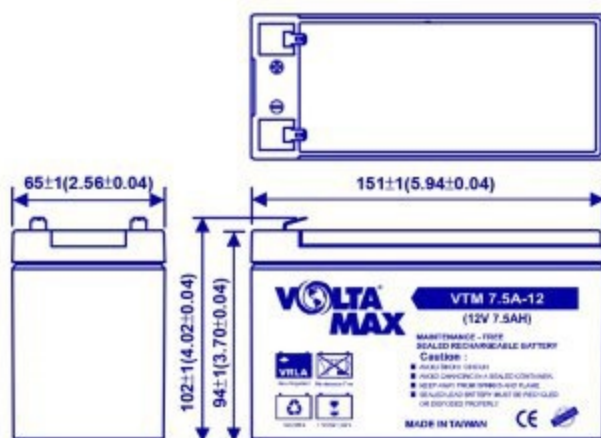
Terminal F2 (Faston Tab 250)

## Dimensions

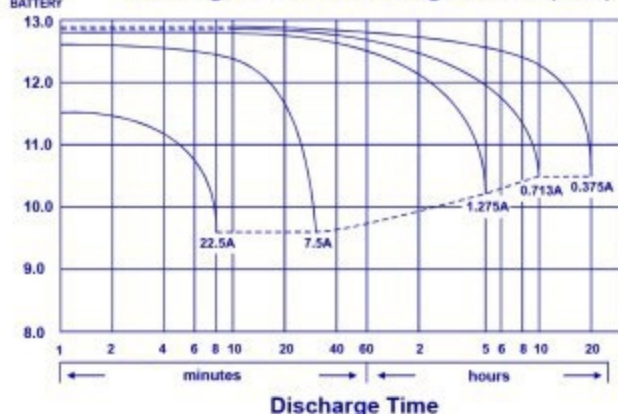
mm(inch)



F2 (Faston Tab 250)



(V) FOR 12V BATTERY Discharge Time VS. Discharge Current (25°C)



**- PERFORMANCE DATA**

**Discharge Rates in Watts to Various End Voltages at 25°C(77°F)**

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	45.0	49.6	53.0	55.9	57.0	58.0	60.5
10	min	33.5	36.7	38.6	38.9	39.4	39.6	40.8
15	min	25.0	27.0	28.5	29.5	29.8	30.1	30.6
30	min	15.7	16.5	17.0	17.5	17.7	17.9	18.1
60	min	9.92	10.2	10.4	10.6	10.6	10.6	10.8
120	min	5.37	5.54	5.65	5.75	5.77	5.83	5.89
180	min	3.82	3.94	4.04	4.13	4.17	4.22	4.26
240	min	2.96	3.09	3.18	3.23	3.25	3.28	3.32
300	min	2.47	2.56	2.65	2.72	2.75	2.77	2.79
600	min	1.38	1.44	1.52	1.54	1.54	1.55	1.57
1200	min	0.728	0.760	0.800	0.808	0.811	0.817	0.826

**- Discharge Rates in Amperes to Various End Voltages at 25°C(77°F)**

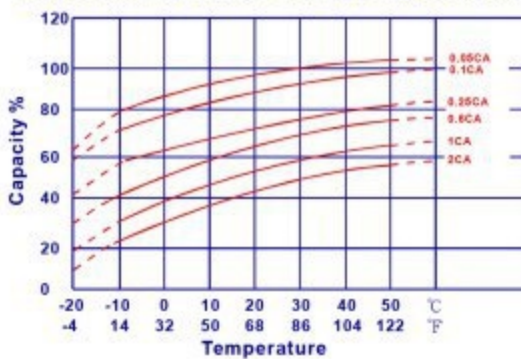
End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	24.8	27.7	30.1	32.2	33.0	33.8	35.6
10	min	17.5	19.2	20.4	20.8	21.0	21.3	22.0
15	min	14.2	15.1	15.6	15.9	16.0	16.2	16.5
30	min	8.61	8.92	9.14	9.30	9.38	9.45	9.61
60	min	4.96	5.11	5.23	5.34	5.37	5.40	5.46
120	min	2.62	2.71	2.78	2.84	2.86	2.89	2.92
180	min	1.83	1.89	1.95	2.00	2.02	2.04	2.07
240	min	1.42	1.49	1.54	1.57	1.58	1.59	1.61
300	min	1.19	1.24	1.31	1.33	1.34	1.35	1.36
600	min	0.654	0.683	0.724	0.732	0.736	0.741	0.751
1200	min	0.339	0.355	0.375	0.380	0.382	0.385	0.390

All data on the spec. sheet is an average value:

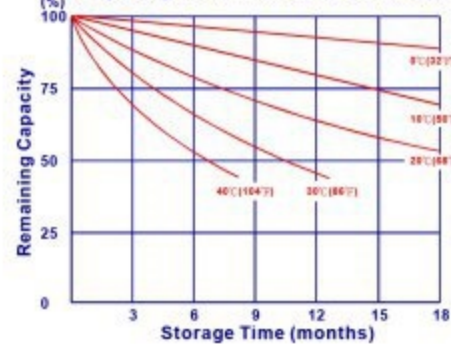
The tolerance range :  $X < 6\text{min}$ (+15%~-15%),  $6\text{min} \leq X < 10\text{min}$ (+12%~-12%),  $10\text{min} \leq X < 60\text{min}$ (+8%~-8%),  $X \geq 60\text{min}$ (+5%~-5%)



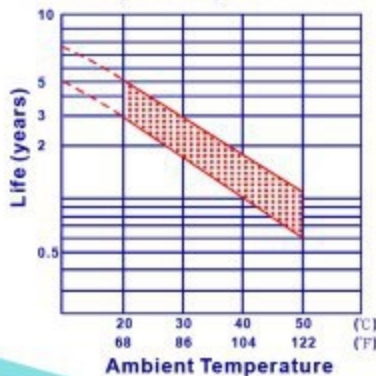
**Effect of Temperature on Capacity 25°C(77°F)**



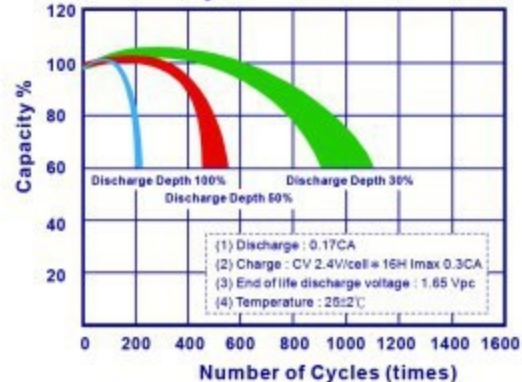
**Capacity Retention Characteristic**



**Trickle (or float) Service Life**



**Cycle Service Life**



# VTM 7A-6

## Specifications

Nominal Voltage(V) **6V**

### Nominal Capacity

20 hour rate	(0.35A	to	5.25V)	7Ah
10 hour rate	(0.665A	to	5.25V)	6.65Ah
5 hour rate	(1.19A	to	5.1V)	5.95Ah
1 C	(7A	to	4.8V)	3.97Ah
3 C	(21A	to	4.8V)	2.8Ah

Weight **Approx.1.2kg(2.64Lbs.)**

Internal Resistance (at 1KHz) **Approx. 12 mΩ**

Maximum Discharge Current for 5 seconds: **105A**

### Charging Methods at 25°C (77°F)

Cycle use:

Charging Voltage **7.20 to 7.50V**

Coefficient **-5.0mV/°C/cell**

Maximum Charging Current : **2.1A**

Standby use:

Float Charging Voltage **6.75 to 6.90V**

Coefficient **-3.0mV/°C/cell**

### Operating Temperature Range

Charge **-15°C (5°F) to 40°C (104°F)**

Discharge **-15°C (5°F) to 50°C (122°F)**

Storage **-15°C (5°F) to 40°C (104°F)**

### Charge Retention (shelf life) at 20°C (68°F)

1 month **92%**

3 month **90%**

6 month **80%**

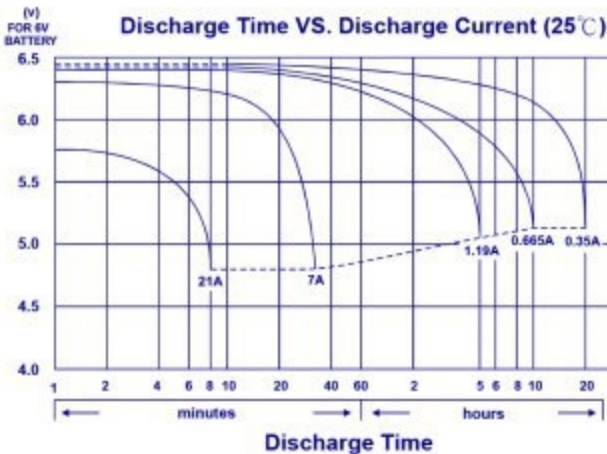
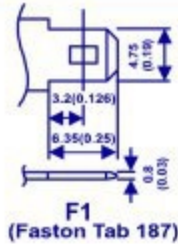
Case Material **ABS UL94 HB**

Terminal **F1 (Faston Tab 187)**



## Dimensions

mm(inch)



**- PERFORMANCE DATA**

**Discharge Rates in Watts to Various End Voltages at 25°C (77°F)**

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	45.2	50.3	52.7	54.8	55.8	56.7	58.2
10	min	30.7	32.2	33.7	34.8	35.7	36.2	37.2
15	min	24.5	25.5	26.2	26.8	27.0	27.5	28.2
30	min	13.0	13.7	14.1	14.5	14.6	14.7	14.9
60	min	8.43	8.73	8.97	9.15	9.22	9.30	9.45
120	min	4.21	4.39	4.63	5.22	5.27	5.32	5.40
180	min	3.27	3.45	3.60	3.73	3.77	3.82	3.87
240	min	2.87	3.01	3.10	3.15	3.17	3.20	3.23
300	min	2.47	2.54	2.63	2.68	2.70	2.72	2.73
600	min	1.45	1.50	1.53	1.55	1.56	1.56	1.57
1200	min	0.694	0.718	0.737	0.750	0.755	0.760	0.770

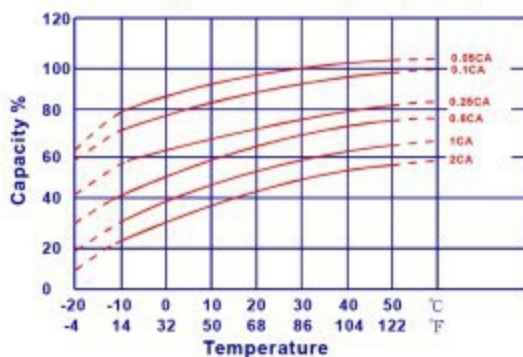
**- Discharge Rates in Amperes to Various End Voltages at 25°C (77°F)**

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	23.5	26.4	28.1	29.7	30.5	31.3	32.6
10	min	16.2	17.0	18.2	18.6	18.8	19.1	19.8
15	min	12.5	13.1	13.6	13.9	14.0	14.2	14.5
30	min	6.61	6.92	7.14	7.30	7.38	7.45	7.61
60	min	3.98	4.13	4.25	4.36	4.39	4.42	4.48
120	min	2.05	2.14	2.21	2.27	2.29	2.32	2.35
180	min	1.63	1.69	1.75	1.80	1.82	1.84	1.87
240	min	1.30	1.37	1.42	1.45	1.46	1.47	1.49
300	min	1.11	1.16	1.23	1.25	1.26	1.27	1.28
600	min	0.650	0.680	0.721	0.728	0.732	0.737	0.747
1200	min	0.341	0.357	0.377	0.382	0.384	0.387	0.392

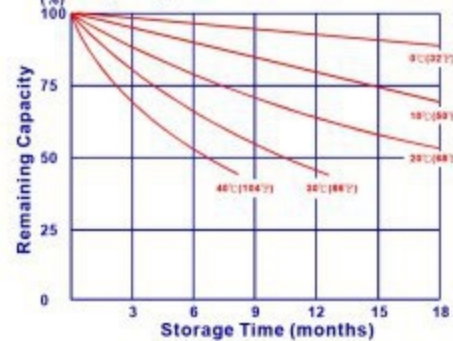
All data on the spec. sheet is an average value:

The tolerance range :  $X < 6\text{min}$  (+15%~-15%),  $6\text{min} \leq X < 10\text{min}$  (+12%~-12%),  $10\text{min} \leq X < 60\text{min}$  (+8%~-8%),  $X \geq 60\text{min}$  (+5%~-5%)

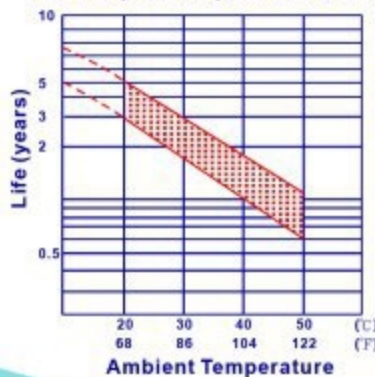
**Effect of Temperature on Capacity 25°C (77°F)**



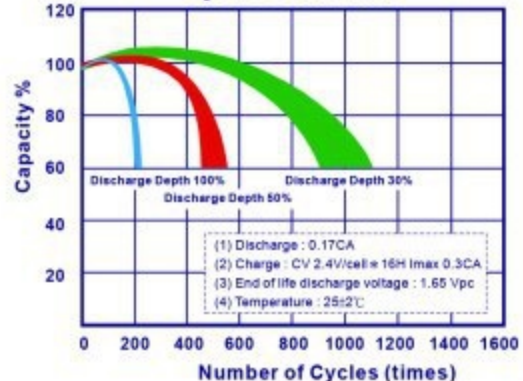
**Capacity Retention Characteristic**



**Trickle (or float) Service Life**



**Cycle Service Life**





# VTM 9A-12



## Specifications

Nominal Voltage(V) **12V**

### Nominal Capacity

20 hour rate	(0.45A	to	10.50V)	9Ah
10 hour rate	(0.855A	to	10.50V)	8.55Ah
5 hour rate	(1.53A	to	10.20V)	7.65Ah
1 C	(9A	to	9.60V)	5.7Ah
3 C	(27A	to	9.60V)	3.6Ah

Weight **Approx. 2.7kg(5.94Lbs.)**

Internal Resistance (at 1KHz) **Approx. 14 mΩ**

Maximum Discharge Current for  
5 seconds: **135A**

### Charging Methods at 25°C (77°F)

Cycle use:	
Charging Voltage	14.4 to 15.0V
Coefficient -5.0mV/°C/cell	
Maximum Charging Current :	2.7A
Standby use:	
Float Charging Voltage	13.5 to 13.8V
Coefficient -3.0mV/°C/cell	

### Operating Temperature Range

Charge	-15°C (5°F)	to	40°C (104°F)
Discharge	-15°C (5°F)	to	50°C (122°F)
Storage	-15°C (5°F)	to	40°C (104°F)

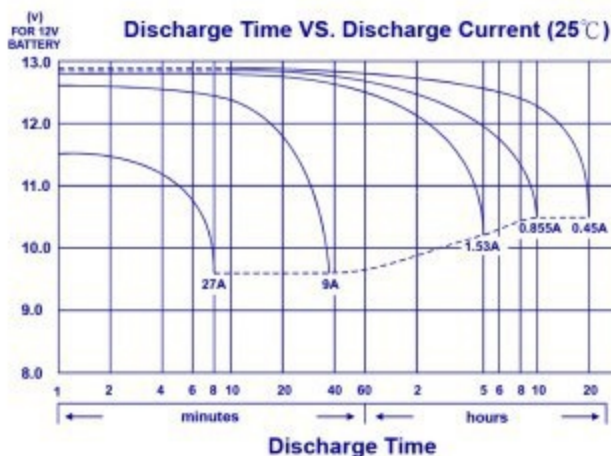
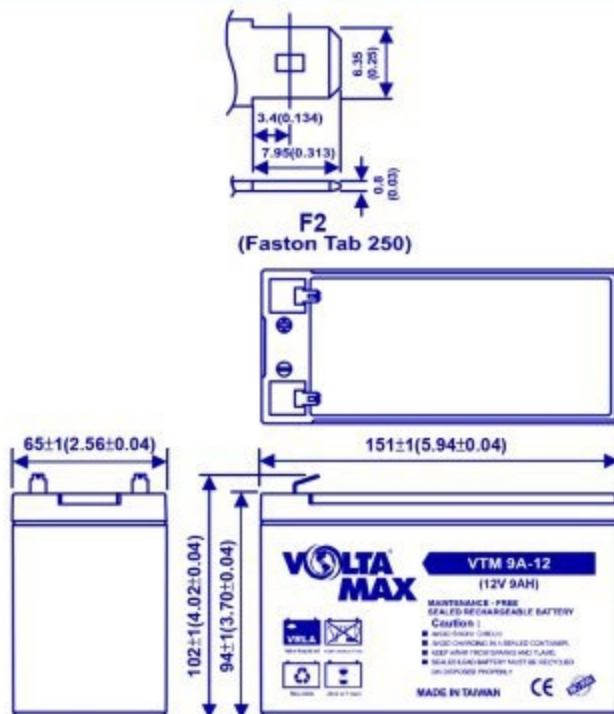
### Charge Retention (shelf life) at 20°C (68°F)

1 month	92%
3 month	90%
6 month	80%

Case Material **ABS UL94 HB**

Terminal **F2 (Faston Tab 250)**

## Dimensions mm(inch)



**- PERFORMANCE DATA**

**Discharge Rates in Watts to Various End Voltages at 25°C (77°F)**

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	342	361	388	407	419	427	448
10	min	219	234	252	264	271	277	290
15	min	181	187	194	200	204	208	216
30	min	94.7	97.3	102	106	107	108	114
60	min	59.8	62.4	64.2	65.8	66.7	67.6	68.8
120	min	32.4	33.4	34.1	34.9	35.2	35.4	35.7
180	min	25.2	26.1	26.9	27.7	28.0	28.5	29.1
240	min	20.4	21.2	21.8	22.4	22.7	23.1	23.5
300	min	17.3	17.9	18.3	18.6	18.7	18.9	19.1
600	min	9.73	10.1	10.3	10.5	10.6	10.7	10.8
1200	min	5.12	5.29	5.41	5.44	5.46	5.48	5.51

**- Discharge Rates in Amperes to Various End Voltages at 25°C (77°F)**

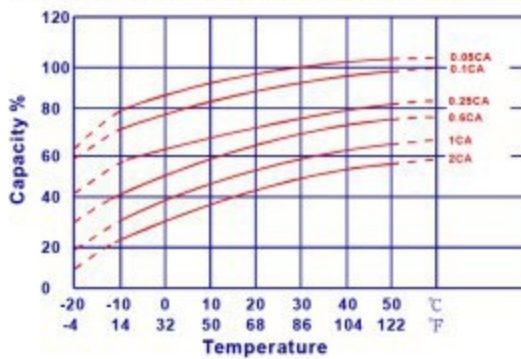
End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	30.4	32.6	35.0	36.7	37.4	38.5	40.3
10	min	19.1	20.4	21.9	22.9	23.4	24.1	25.2
15	min	14.3	14.9	15.8	16.5	16.8	17.3	18.0
30	min	8.09	8.45	8.93	9.35	9.54	9.77	10.2
60	min	5.17	5.29	5.37	5.45	5.48	5.52	5.57
120	min	2.63	2.72	2.78	2.84	2.86	2.89	2.93
180	min	2.12	2.18	2.23	2.27	2.29	2.31	2.34
240	min	1.69	1.74	1.77	1.80	1.81	1.82	1.83
300	min	1.46	1.51	1.53	1.55	1.56	1.57	1.58
600	min	0.827	0.841	0.855	0.866	0.871	0.877	0.884
1200	min	0.427	0.442	0.451	0.456	0.459	0.462	0.466

All data on the spec. sheet is an average value:

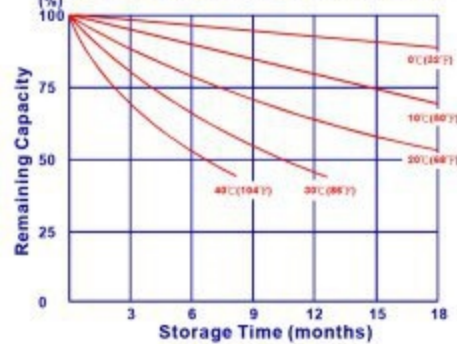
The tolerance range :  $X < 6\text{min}$  (+15%~-15%),  $6\text{min} \leq X < 10\text{min}$  (+12%~-12%),  $10\text{min} \leq X < 60\text{min}$  (+8%~-8%),  $X \geq 60\text{min}$  (+5%~-5%)



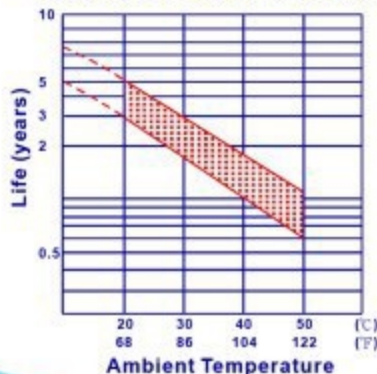
**Effect of Temperature on Capacity 25°C (77°F)**



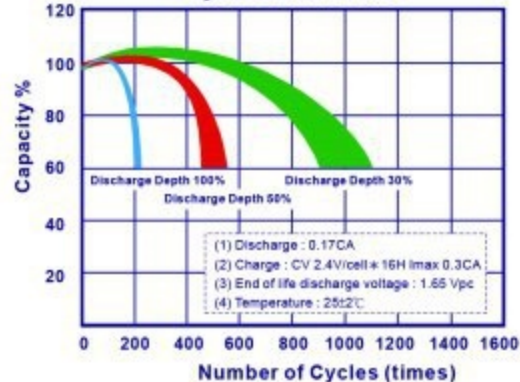
**Capacity Retention Characteristic**



**Trickle (or float) Service Life**



**Cycle Service Life**



# VTM 12A-6



## Specifications

Nominal Voltage(V) **6V**

### Nominal Capacity

20 hour rate	(0.6A	to	5.25V)	12Ah
10 hour rate	(1.14A	to	5.25V)	11.4Ah
5 hour rate	(2.04A	to	5.1V)	10.2Ah
1 C	(12A	to	4.8V)	6.8Ah
3 C	(36A	to	4.8V)	4.8Ah

Weight **Approx. 1.84kg(4.05Lbs.)**

Internal Resistance (at 1KHz) **Approx. 6 mΩ**

Maximum Discharge Current for 5 seconds: **180A**

### Charging Methods at 25°C (77°F)

#### Cycle use:

Charging Voltage **7.20 to 7.50V**

Coefficient **-5.0mV/°C /cell**

Maximum Charging Current : **3.6A**

#### Standby use:

Float Charging Voltage **6.75 to 6.90V**

Coefficient **-3.0mV/°C /cell**

### Operating Temperature Range

Charge **-15°C (5°F) to 40°C (104°F)**

Discharge **-15°C (5°F) to 50°C (122°F)**

Storage **-15°C (5°F) to 40°C (104°F)**

### Charge Retention (shelf life) at 20°C (68°F)

1 month **92%**

3 month **90%**

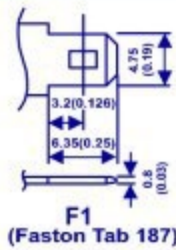
6 month **80%**

Case Material **ABS UL94 HB**

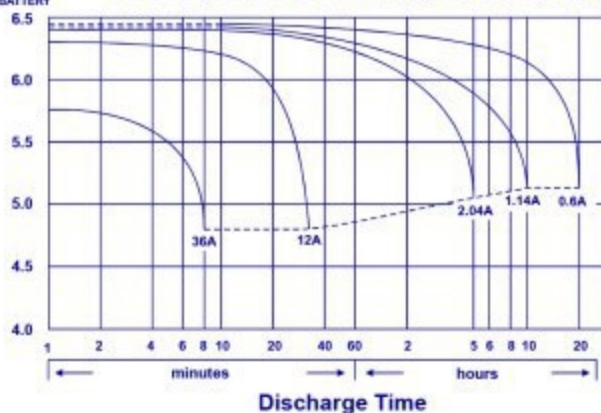
Terminal **F1 (Faston Tab 187)**

## Dimensions

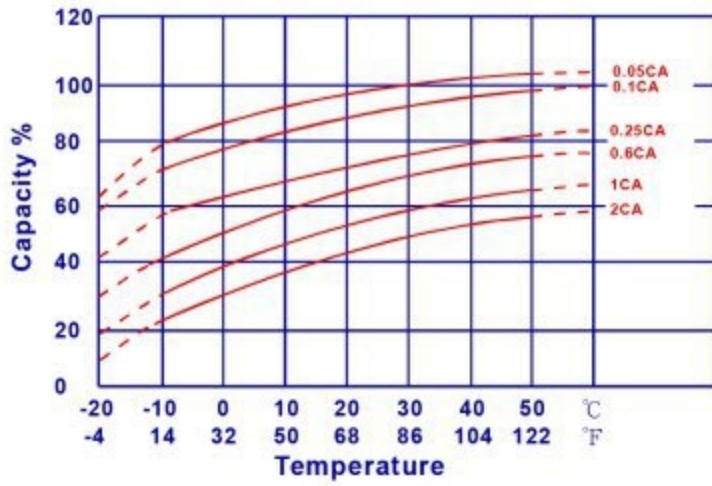
mm(inch)



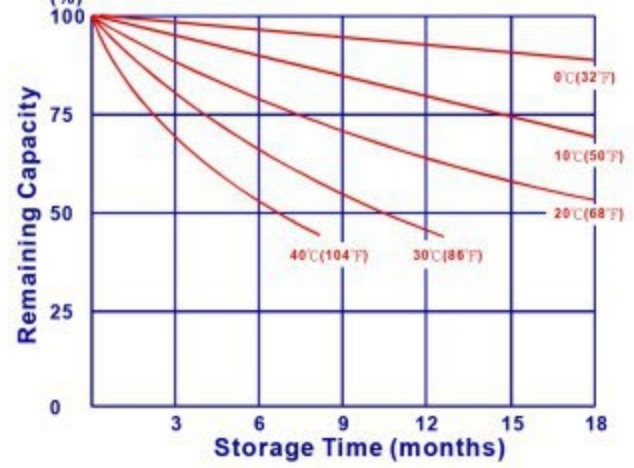
(V) FOR 6V BATTERY Discharge Time VS. Discharge Current (25°C)



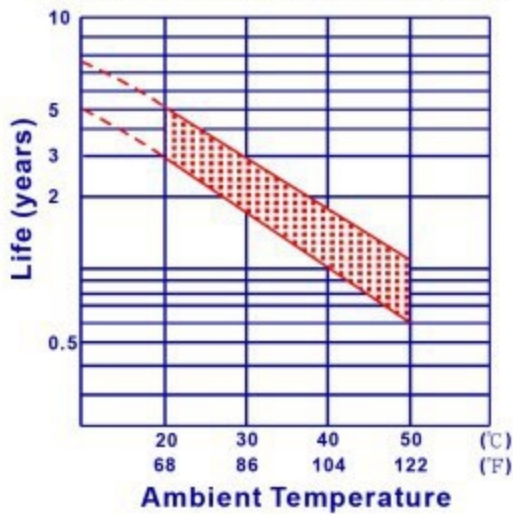
**Effect of Temperature on Capacity 25°C (77°F)**



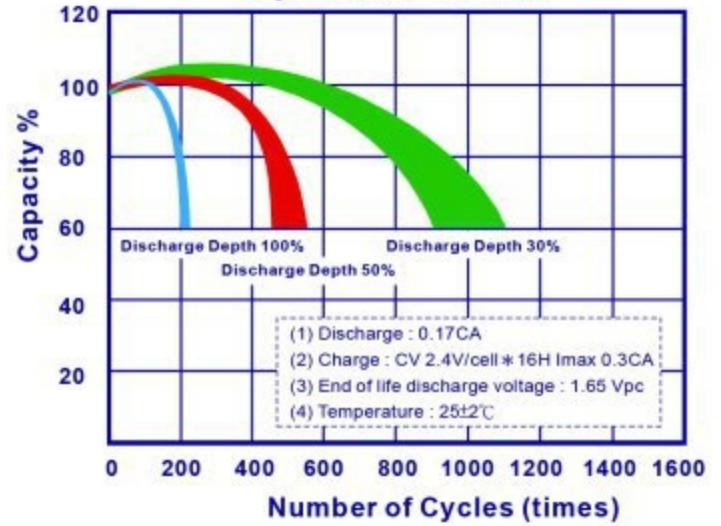
**Capacity Retention Characteristic**



**Trickle (or float) Service Life**



**Cycle Service Life**



# VTM 12A-12



## Specifications

Nominal Voltage(V) **12V**

### Nominal Capacity

20 hour rate	(0.6A	to	10.50V)	12Ah
10 hour rate	(1.14A	to	10.50V)	11.4Ah
5 hour rate	(2.04A	to	10.20V)	10.2Ah
1 C	(12A	to	9.60V)	6.4Ah
3 C	(36A	to	9.60V)	4.2Ah

Weight **Approx. 3.75kg(8.25Lbs.)**

Internal Resistance (at 1KHz) **Approx. 13 mΩ**

Maximum Discharge Current for 5 seconds: **180A**

### Charging Methods at 25°C (77°F)

Cycle use:

Charging Voltage **14.4 to 15.0V**

Coefficient **-5.0mV/°C/cell**

Maximum Charging Current : **3.6A**

Standby use:

Float Charging Voltage **13.5 to 13.8V**

Coefficient **-3.0mV/°C/cell**

### Operating Temperature Range

Charge **-15°C (5°F) to 40°C (104°F)**

Discharge **-15°C (5°F) to 50°C (122°F)**

Storage **-15°C (5°F) to 40°C (104°F)**

### Charge Retention (shelf life) at 20°C (68°F)

1 month **92%**

3 month **90%**

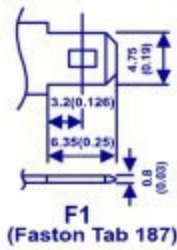
6 month **80%**

Case Material **ABS UL94 HB**

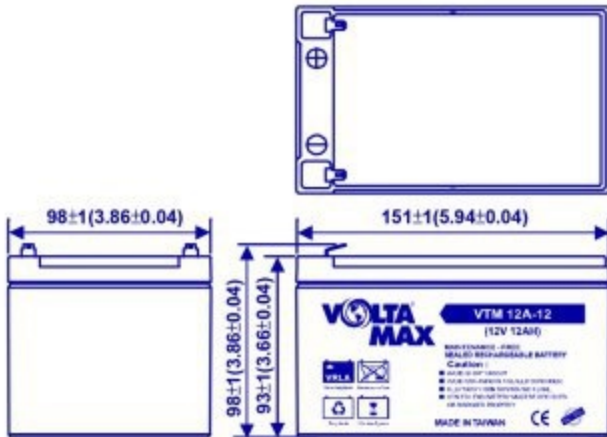
Terminal **F1 (Faston Tab 187)**

## Dimensions

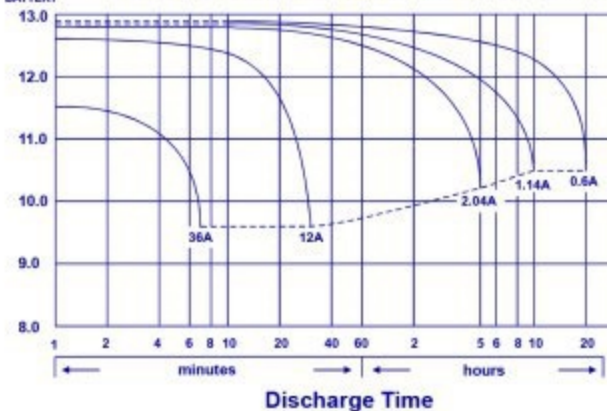
mm(inch)



F1  
(Faston Tab 187)



(V) FOR 12V BATTERY  
Discharge Time VS. Discharge Current (25°C)



**- PERFORMANCE DATA**

**Discharge Rates in Watts to Various End Voltages at 25°C (77°F)**

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	67.6	75.2	80.8	86.7	89.3	91.9	97.0
10	min	48.0	52.5	54.9	57.3	58.2	59.5	61.0
15	min	38.6	41.0	42.6	44.1	44.5	45.4	46.6
30	min	22.2	23.6	24.6	25.4	25.7	25.9	26.3
60	min	15.8	16.3	16.7	17.0	17.2	17.3	17.5
120	min	8.63	8.92	9.04	9.14	9.18	9.24	9.32
180	min	5.65	5.87	6.05	6.20	6.27	6.35	6.42
240	min	4.78	4.88	4.96	5.06	5.12	5.20	5.26
300	min	3.96	4.08	4.18	4.30	4.33	4.38	4.48
600	min	2.34	2.40	2.44	2.47	2.48	2.50	2.52
1200	min	1.19	1.21	1.25	1.26	1.28	1.29	1.32

**- Discharge Rates in Amperes to Various End Voltages at 25°C (77°F)**

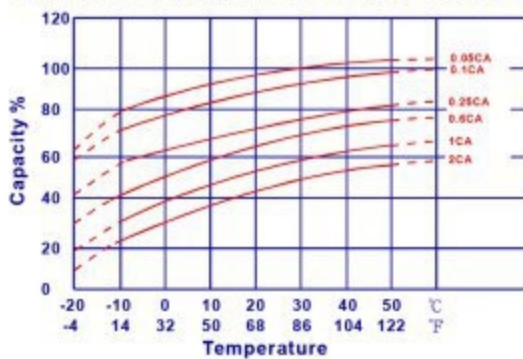
End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	37.2	41.4	44.5	47.7	49.1	50.6	53.4
10	min	25.7	28.1	29.4	30.7	31.2	31.9	32.7
15	min	19.8	21.3	22.1	22.9	23.2	23.5	24.2
30	min	11.4	12.1	12.6	13.0	13.1	13.3	13.5
60	min	8.21	8.40	8.52	8.63	8.68	8.74	8.82
120	min	4.21	4.36	4.47	4.56	4.59	4.63	4.68
180	min	2.87	3.06	3.13	3.19	3.22	3.25	3.29
240	min	2.38	2.43	2.47	2.52	2.55	2.58	2.62
300	min	1.97	2.03	2.08	2.14	2.16	2.19	2.23
600	min	1.16	1.18	1.20	1.22	1.23	1.24	1.25
1200	min	0.592	0.599	0.618	0.627	0.634	0.642	0.656

All data on the spec. sheet is an average value:

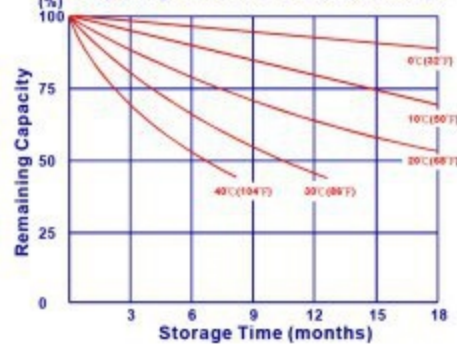
The tolerance range :  $X < 6\text{min}$  (+15%~-15%),  $6\text{min} \leq X < 10\text{min}$  (+12%~-12%),  $10\text{min} \leq X < 60\text{min}$  (+8%~-8%),  $X \geq 60\text{min}$  (+5%~-5%)



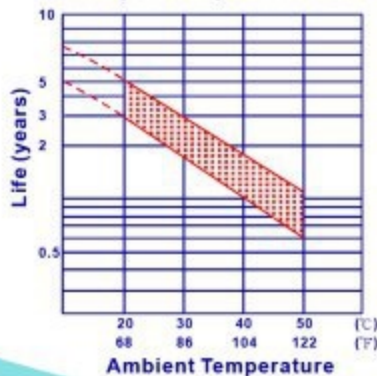
**Effect of Temperature on Capacity 25°C (77°F)**



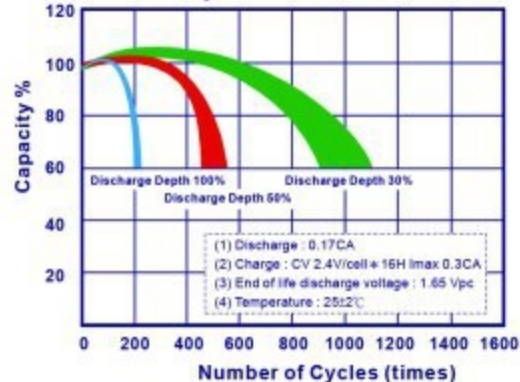
**Capacity Retention Characteristic**



**Trickle (or float) Service Life**



**Cycle Service Life**





# VTM 18A-12

## Specifications

Nominal Voltage(V) **12V**

### Nominal Capacity

20 hour rate	(0.9A	to	10.50V)	18Ah
10 hour rate	(1.71A	to	10.50V)	17.1Ah
5 hour rate	(3.06A	to	10.20V)	15.3Ah
1 C	(18A	to	9.60V)	11.4Ah
3 C	(54A	to	9.60V)	7.2Ah

Weight **Approx. 5.6kg(12.32Lbs.)**

Internal Resistance (at 1KHz) **Approx. 10.5 mΩ**

Maximum Discharge Current for 5 seconds: **270A**

### Charging Methods at 25°C(77°F)

Cycle use:

Charging Voltage **14.4 to 15.0V**  
 Coefficient **-5.0mV/°C/cell**  
 Maximum Charging Current : **5.4A**

Standby use:

Float Charging Voltage **13.5 to 13.8V**  
 Coefficient **-3.0mV/°C/cell**

### Operating Temperature Range

Charge	-15°C (5°F)	to	40°C (104°F)
Discharge	-15°C (5°F)	to	50°C (122°F)
Storage	-15°C (5°F)	to	40°C (104°F)

### Charge Retention (shelf life) at 20°C (68°F)

1 month	<b>92%</b>
3 month	<b>90%</b>
6 month	<b>80%</b>

Case Material **ABS UL94 HB**

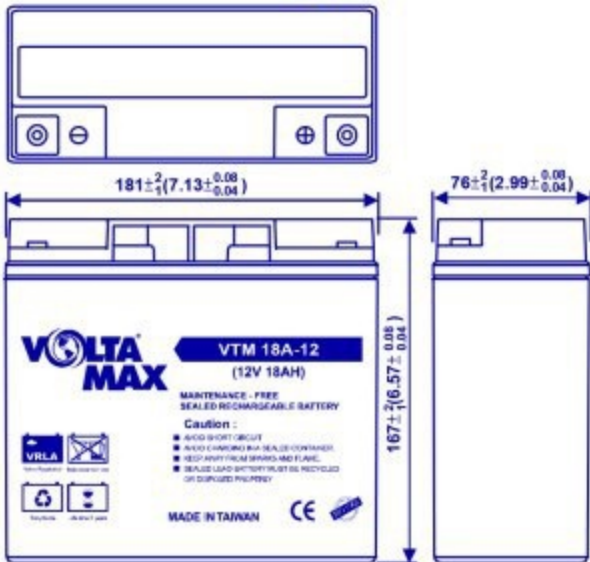
Terminal **F6**

Description of torque value of hard ware for the terminals:

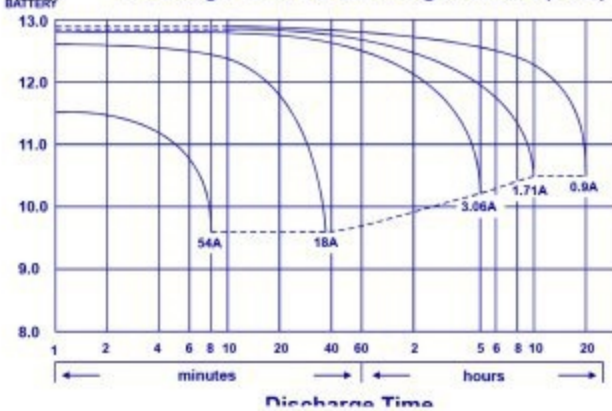
Recommended torque value	<b>M5: 5 N-m (51kgf-cm)</b>
Maximum allowable torque value	<b>M5: 6 N-m (61kgf-cm)</b>

## Dimensions

mm(inch)



(v) FOR 12V BATTERY Discharge Time VS. Discharge Current (25°C)



**- PERFORMANCE DATA**

**Discharge Rates in Watts to Various End Voltages at 25°C (77°F)**

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	98.9	116	128	135	137	139	141
10	min	67.0	77.1	84.5	89.1	90.2	91.7	92.9
15	min	57.2	64.5	69.4	72.5	73.3	74.2	75.1
30	min	32.7	35.1	37.7	39.4	39.8	40.3	40.8
60	min	18.8	19.8	20.7	21.3	21.5	21.8	22.2
120	min	11.9	12.4	12.7	13.1	13.2	13.3	13.5
180	min	8.75	9.10	9.33	9.53	9.60	9.68	9.78
240	min	6.63	6.93	7.12	7.27	7.32	7.38	7.46
300	min	5.82	6.05	6.17	6.27	6.30	6.35	6.41
600	min	3.40	3.52	3.60	3.67	3.68	3.72	3.75
1200	min	1.77	1.83	1.88	1.92	1.93	1.95	1.96

**- Discharge Rates in Amperes to Various End Voltages at 25°C (77°F)**

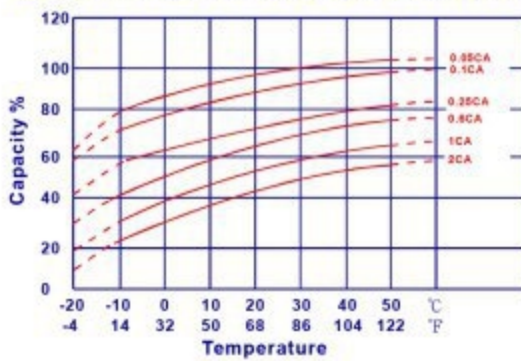
End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	62.6	68.3	71.9	75.1	76.4	77.8	80.2
10	min	38.6	41.8	44.3	46.5	47.4	48.4	50.1
15	min	31.9	34.6	36.3	37.7	38.2	38.8	39.7
30	min	17.4	18.7	19.8	20.7	21.0	21.4	21.9
60	min	9.74	10.3	10.7	11.0	11.1	11.3	11.5
120	min	5.98	6.23	6.39	6.53	6.58	6.64	6.72
180	min	4.35	4.52	4.64	4.73	4.76	4.80	4.85
240	min	3.43	3.52	3.58	3.62	3.63	3.65	3.68
300	min	2.96	3.02	3.07	3.11	3.12	3.14	3.16
600	min	1.73	1.77	1.80	1.82	1.83	1.84	1.85
1200	min	0.893	0.914	0.931	0.946	0.952	0.959	0.962

All data on the spec. sheet is an average value:

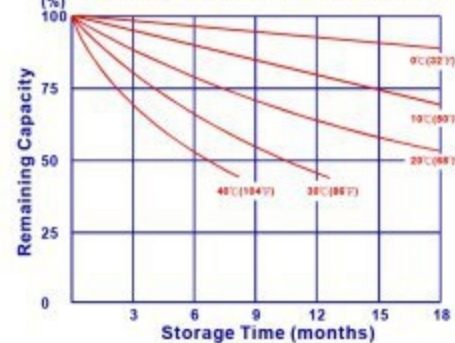
The tolerance range :  $X < 6\text{min}$  (+15%~-15%),  $6\text{min} \leq X < 10\text{min}$  (+12%~-12%),  $10\text{min} \leq X < 60\text{min}$  (+8%~-8%),  $X \geq 60\text{min}$  (+5%~-5%)



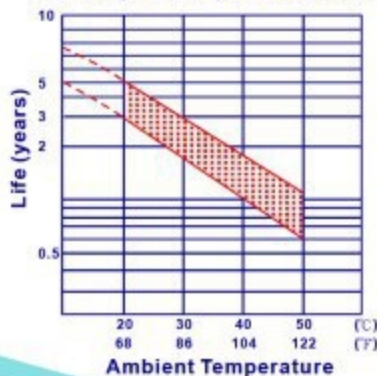
**Effect of Temperature on Capacity 25°C (77°F)**



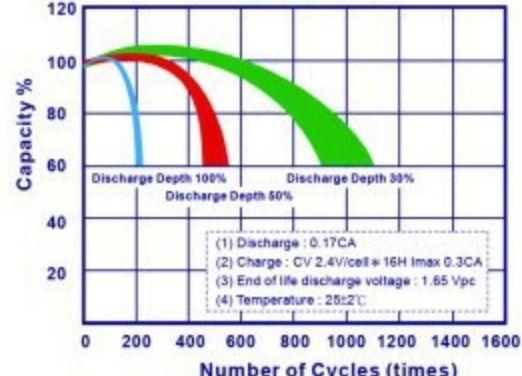
**Capacity Retention Characteristic**



**Trickle (or float) Service Life**



**Cycle Service Life**







# VTM 28A-12

## Specifications

Nominal Voltage(V) **12V**

### Nominal Capacity

20 hour rate	(1.4A	to	10.50V)	28Ah
10 hour rate	(2.66A	to	10.50V)	26.6Ah
5 hour rate	(4.76A	to	10.20V)	23.8Ah
1 C	(28A	to	9.60V)	15.87Ah
3 C	(84A	to	9.60V)	11.2Ah

Weight **Approx. 9.3kg(20.46Lbs.)**

Internal Resistance (at 1KHz) **Approx. 11 mΩ**

Maximum Discharge Current for 5 seconds: **420A**

### Charging Methods at 25°C (77°F)

Cycle use:

Charging Voltage **14.4 to 15.0V**

Coefficient **-5.0mV/°C/cell**

Maximum Charging Current : **8.4A**

Standby use:

Float Charging Voltage **13.5 to 13.8V**

Coefficient **-3.0mV/°C/cell**

### Operating Temperature Range

Charge **-15°C (5°F) to 40°C (104°F)**

Discharge **-15°C (5°F) to 50°C (122°F)**

Storage **-15°C (5°F) to 40°C (104°F)**

### Charge Retention (shelf life) at 20°C (68°F)

1 month **92%**

3 month **90%**

6 month **80%**

Case Material **ABS UL94 HB**

Terminal **F6**

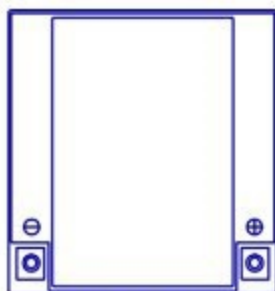
Description of torque value of hard ware for the terminals:

Recommended torque value **M5: 5 N-m (51kgf-cm)**

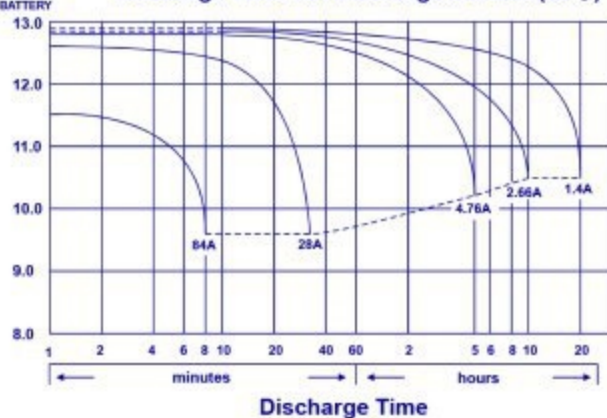
Maximum allowable torque value **M5: 6 N-m (61kgf-cm)**

## Dimensions

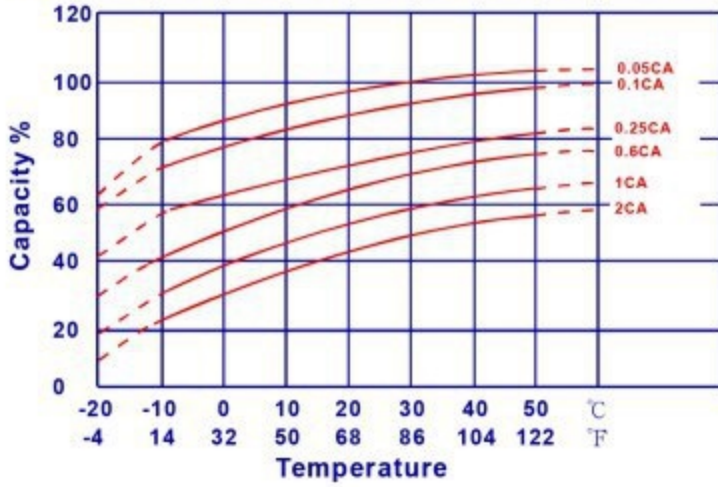
mm(inch)



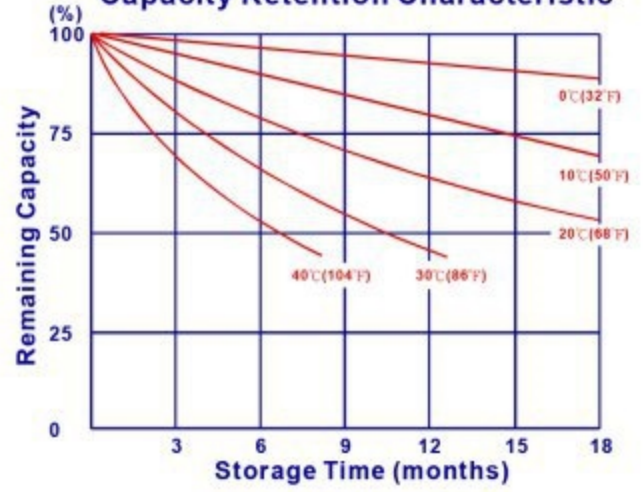
(V) FOR 12V BATTERY Discharge Time VS. Discharge Current (25°C)



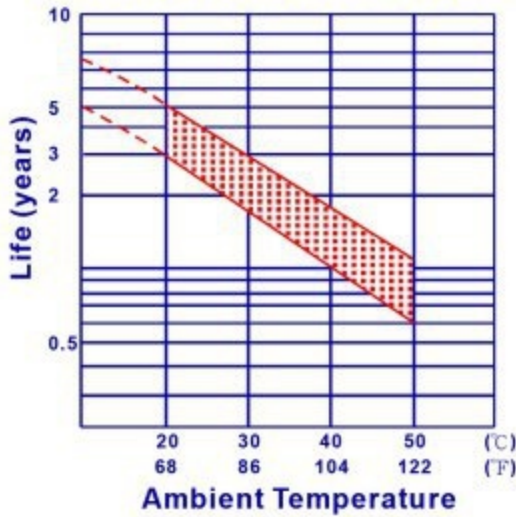
**Effect of Temperature on Capacity 25°C (77°F)**



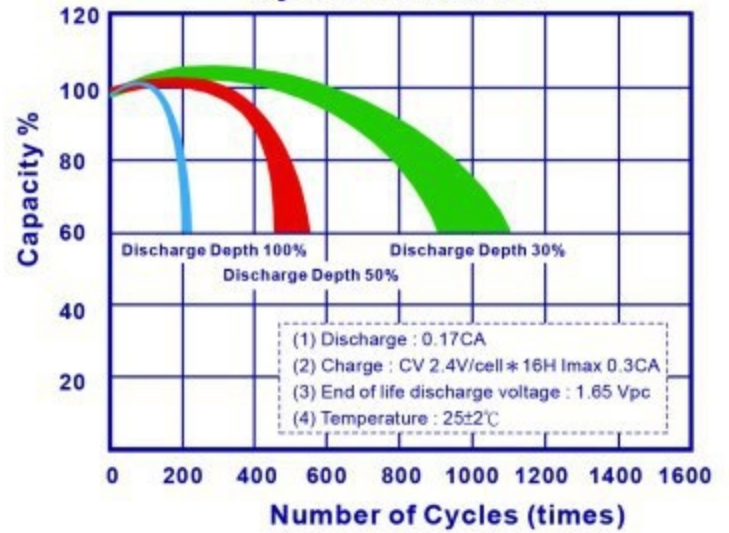
**Capacity Retention Characteristic**



**Trickle (or float) Service Life**



**Cycle Service Life**





# VTM 42A-12

## Specifications

Nominal Voltage(V) **12V**

### Nominal Capacity

20 hour rate	(2.1A	to	10.50V)	42Ah
10 hour rate	(3.99A	to	10.50V)	39.9Ah
5 hour rate	(7.14A	to	10.20V)	35.7Ah
1 C	(42A	to	9.60V)	23.8Ah
3 C	(126A	to	9.60V)	16.8Ah

Weight **Approx. 13.4kg(29.5Lbs.)**

Internal Resistance (at 1KHz) **Approx. 7.5 mΩ**

Maximum Discharge Current for 5 seconds: **630A**

### Charging Methods at 25°C (77°F)

Cycle use:	
Charging Voltage	14.4 to 15.0V
Coefficient	-5.0mV/°C/cell
Maximum Charging Current :	12.6A
Standby use:	
Float Charging Voltage	13.5 to 13.8V
Coefficient	-3.0mV/°C/cell

### Operating Temperature Range

Charge	-15°C (5°F)	to	40°C (104°F)
Discharge	-15°C (5°F)	to	50°C (122°F)
Storage	-15°C (5°F)	to	40°C (104°F)

### Charge Retention (shelf life) at 20°C (68°F)

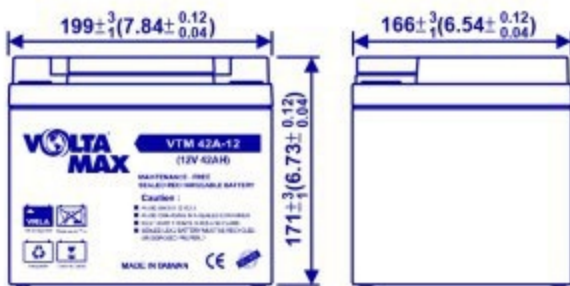
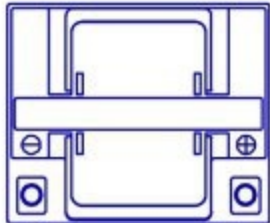
1 month	92%
3 month	90%
6 month	80%

Case Material **ABS UL94 HB**

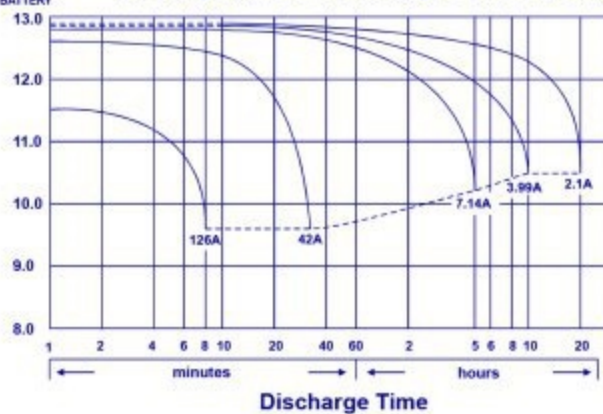
Terminal **F8**

Description of torque value of hard ware for the terminals:  
 Recommended torque value **M6: 7 N-m (71kgf-cm)**  
 Maximum allowable torque value **M6: 9 N-m (92kgf-cm)**

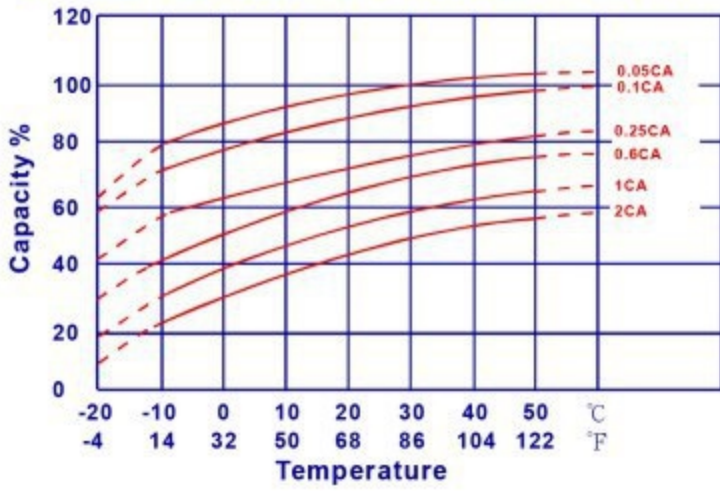
## Dimensions mm(inch)



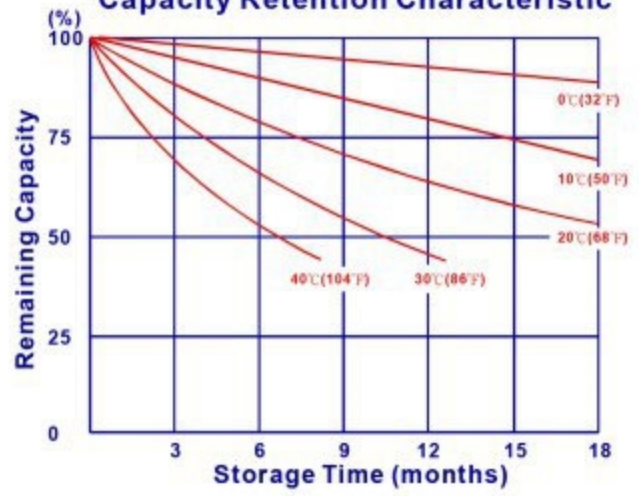
(V) FOR 12V BATTERY Discharge Time VS. Discharge Current (25°C)



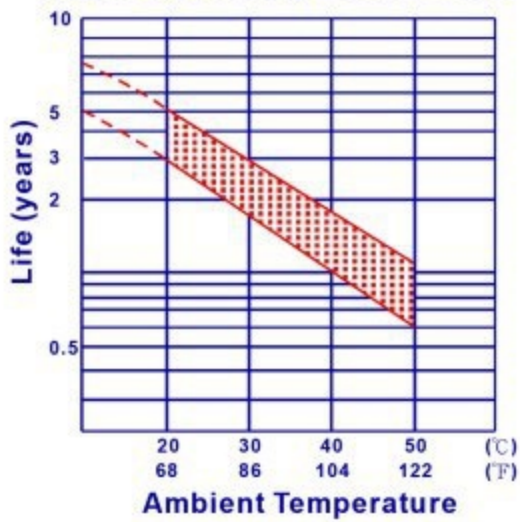
**Effect of Temperature on Capacity 25°C (77°F)**



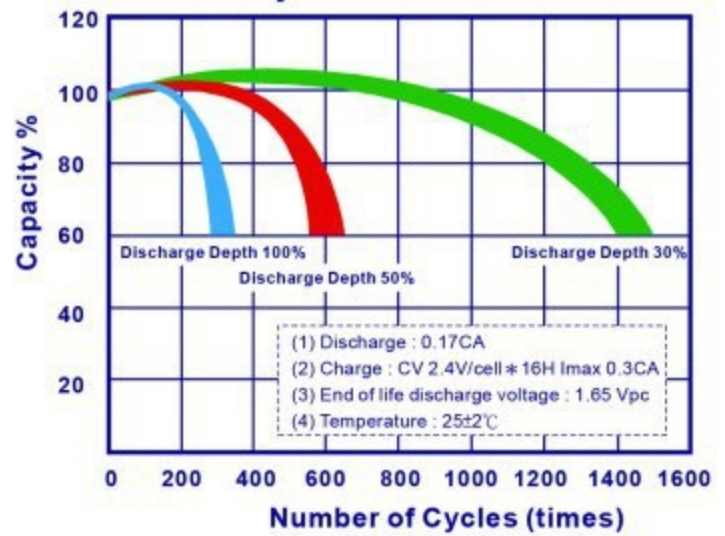
**Capacity Retention Characteristic**



**Trickle (or float) Service Life**



**Cycle Service Life**



(1) Discharge : 0.17CA  
 (2) Charge : CV 2.4V/cell \* 16H I<sub>max</sub> 0.3CA  
 (3) End of life discharge voltage : 1.65 Vpc  
 (4) Temperature : 25±2°C

# VTM 65A-12

## Specifications

Nominal Voltage(V) 12V

### Nominal Capacity

20 hour rate	(3.25A	to	10.50V)	65Ah
10 hour rate	(6.175A	to	10.50V)	61.75Ah
5 hour rate	(11.05A	to	10.20V)	55.25Ah
1 C	(65A	to	9.60V)	41.17Ah
3 C	(195A	to	9.60V)	26Ah

Weight Approx. 20.9kg(45.98Lbs.)

Internal Resistance (at 1KHz) Approx. 7 mΩ

Maximum Discharge Current for 5 seconds: 780A

### Charging Methods at 25°C(77°F)

Cycle use:

Charging Voltage 14.4 to 15.0V

Coefficient -5.0mV/°C/cell

Maximum Charging Current : 19.5A

Standby use:

Float Charging Voltage 13.5 to 13.8V

Coefficient -3.0mV/°C/cell

### Operating Temperature Range

Charge -15°C(5°F) to 40°C(104°F)

Discharge -15°C(5°F) to 50°C(122°F)

Storage -15°C(5°F) to 40°C(104°F)

### Charge Retention (shelf life) at 20°C(68°F)

1 month 98%

3 month 94%

6 month 85%

Case Material ABS UL94 HB

Terminal F8

Description of torque value of hard ware for the terminals:

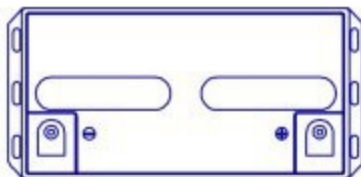
Recommended torque value M6: 7 N-m (71kgf-cm)

Maximum allowable torque value M6: 9 N-m (92kgf-cm)

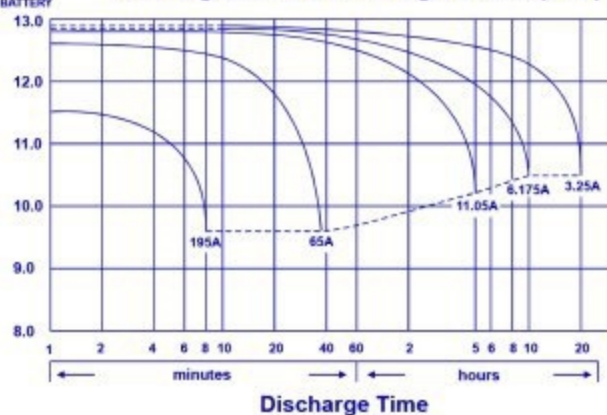


## Dimensions

mm(inch)



(V) FOR 12V BATTERY Discharge Time VS. Discharge Current (25°C)



**- PERFORMANCE DATA**

**Discharge Rates in Watts to Various End Voltages at 25°C (77°F)**

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	249	275	320	371	380	396	432
10	min	203	230	251	274	282	290	309
15	min	170	190	207	215	218	224	231
20	min	150	158	171	173	180	185	193
30	min	113	124	134	138	141	143	148
60	min	72.5	76.5	82.3	83.7	84.0	84.3	85.0
90	min	58.3	60.2	61.5	62.0	62.3	62.5	62.8
120	min	45.7	48.0	49.0	49.5	49.7	49.8	50.0
180	min	32.4	33.5	34.0	34.3	34.5	34.7	35.0
240	min	26.0	27.2	27.5	27.7	27.8	28.0	28.2
300	min	21.7	22.6	23.1	23.2	23.3	23.4	23.4
480	min	14.9	15.5	15.8	15.9	16.0	16.0	16.0
600	min	12.5	12.9	13.2	13.2	13.3	13.3	13.3
1200	min	6.54	6.76	6.86	6.87	6.89	6.91	6.94

**- Discharge Rates in Amperes to Various End Voltages at 25°C (77°F)**

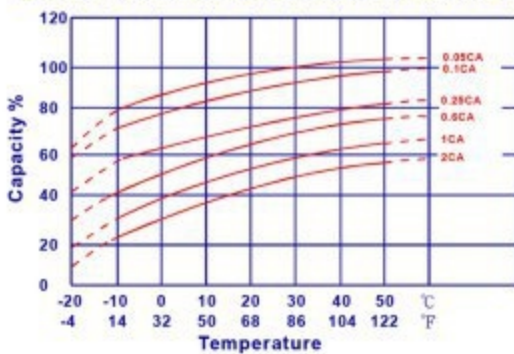
End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	137	151	177	208	213	224	245
10	min	102	123	135	149	154	158	169
15	min	91.0	100	109	116	119	122	129
20	min	61.4	82.5	89.3	92.5	94.0	96.5	101
30	min	50.7	63.6	68.5	71.5	73.4	74.7	77.2
60	min	36.6	38.5	41.5	42.5	43.0	43.6	44.2
90	min	29.5	31.1	31.8	32.2	32.8	33.0	33.4
120	min	23.1	24.3	24.8	25.0	25.3	25.5	25.8
180	min	16.2	17.0	17.3	17.5	17.7	17.8	18.0
240	min	13.0	13.6	13.8	13.9	14.0	14.1	14.2
300	min	10.8	11.3	11.5	11.6	11.7	11.8	11.9
480	min	7.43	7.73	7.87	7.92	7.94	7.96	7.98
600	min	6.19	6.43	6.54	6.58	6.60	6.61	6.63
1200	min	3.24	3.35	3.40	3.41	3.42	3.43	3.44

All data on the spec. sheet is an average value:

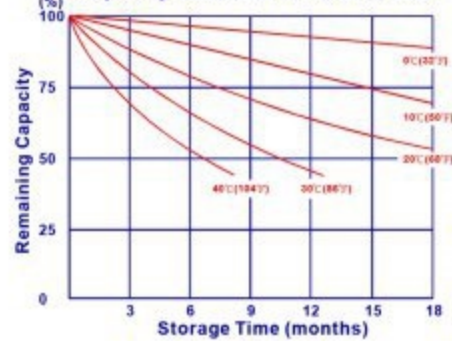
The tolerance range :  $X < 6\text{min}$ (+15%~-15%),  $6\text{min} \leq X < 10\text{min}$ (+12%~-12%),  $10\text{min} \leq X < 60\text{min}$ (+8%~-8%),  $X \geq 60\text{min}$ (+5%~-5%)



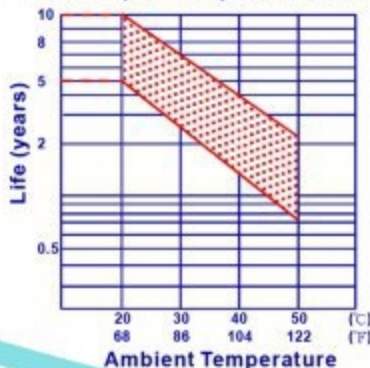
**Effect of Temperature on Capacity 25°C (77°F)**



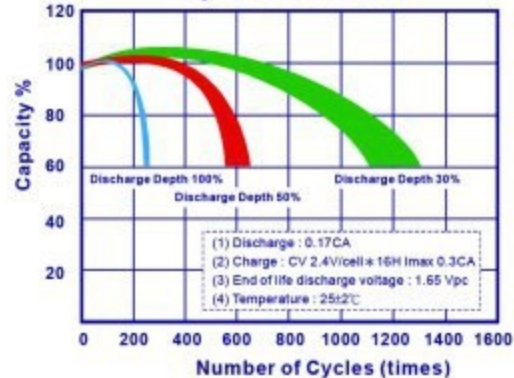
**Capacity Retention Characteristic**



**Trickle (or float) Service Life**



**Cycle Service Life**





# VTM 100A-12

## Specifications

Nominal Voltage(V) **12V**

### Nominal Capacity

10 hour rate	(10A)	to	10.80V)	100Ah
5 hour rate	(17A)	to	10.20V)	85Ah
1 hour rate	(60A)	to	9.60V)	60Ah
1 C	(100A)	to	9.60V)	63.33Ah

Weight **Approx. 29.5kg(64.9Lbs.)**

Internal Resistance (at 1KHz) **Approx. 5 mΩ**

Maximum Discharge Current for 5 seconds: **1200A**

### Charging Methods at 25°C (77°F)

Cycle use:	
Charging Voltage	14.4 to 15.0V
Coefficient	-5.0mV/°C/cell
Maximum Charging Current :	30A
Standby use:	
Float Charging Voltage	13.5 to 13.8V
Coefficient	-3.0mV/°C/cell

Design Life **12 years**

### Operating Temperature Range

Charge	-15°C (5°F)	to	40°C (104°F)
Discharge	-15°C (5°F)	to	50°C (122°F)
Storage	-15°C (5°F)	to	40°C (104°F)

### Charge Retention (shelf life) at 20°C (68°F)

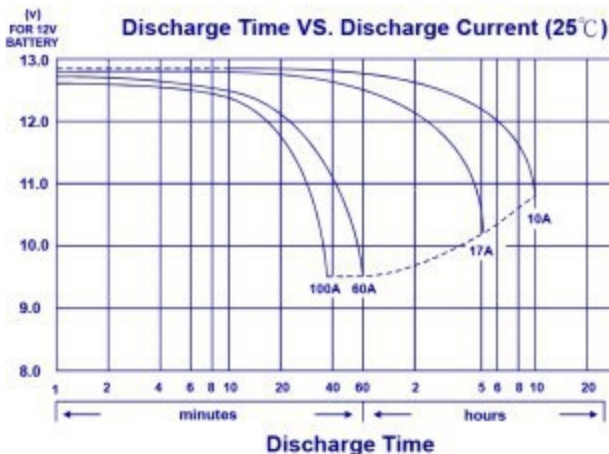
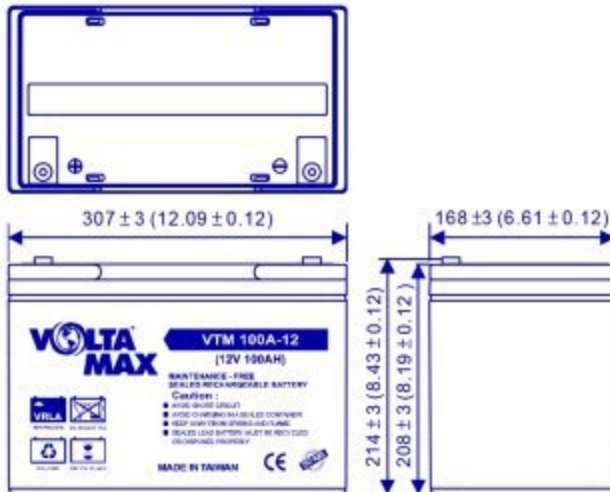
1 month	98%
3 month	94%
6 month	85%

Case Material **ABS UL94 HB**

Terminal **F8**

Description of torque value of hard ware for the terminals:  
 Recommended torque value **M6: 7 N-m (71kgf-cm)**  
 Maximum allowable torque value **M6: 9 N-m (92kgf-cm)**

## Dimensions mm(inch)



**- PERFORMANCE DATA**

**Discharge Rates in Watts to Various End Voltages at 25°C (77°F)**

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	458	512	549	584	600	617	649
10	min	348	380	407	432	443	455	477
15	min	277	301	320	338	346	354	370
30	min	163	174	183	191	195	199	206
60	min	112	116	119	122	123	125	126
120	min	66.3	69.5	72.0	73.5	74.5	75.7	77.2
180	min	47.2	49.7	51.8	52.2	53.0	54.0	55.2
240	min	35.2	37.3	39.3	41.3	42.0	42.8	43.8
300	min	31.3	32.8	34.2	35.2	35.5	36.0	36.7
600	min	18.0	19.2	20.0	20.8	21.2	21.5	21.8
1200	min	10.4	10.7	11.0	11.2	11.3	11.4	11.5

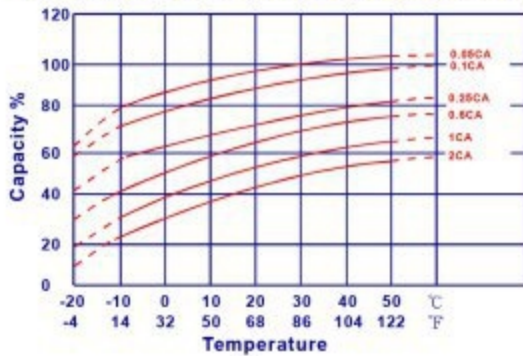
**- Discharge Rates in Amperes to Various End Voltages at 25°C (77°F)**

End Voltage		1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
Time								
5	min	202	267	305	336	346	358	375
10	min	159	188	209	226	234	243	257
15	min	119	146	165	179	184	190	198
30	min	71.2	83.7	92.1	101	103	106	111
60	min	43.6	50.8	56.5	60.6	61.5	63.0	64.9
120	min	25.8	29.3	32.5	35.6	36.4	37.3	38.5
180	min	22.6	23.7	24.8	25.7	26.1	26.5	27.2
240	min	18.3	19.1	19.8	20.5	20.8	21.1	21.6
300	min	16.1	16.7	17.2	17.6	17.8	17.9	18.1
600	min	9.71	10.0	10.2	10.4	10.5	10.6	10.7
1200	min	5.09	5.26	5.38	5.48	5.53	5.57	5.64

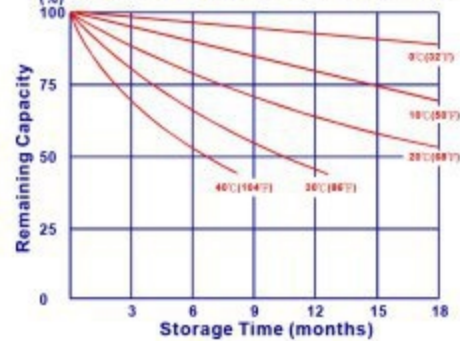
All data on the spec. sheet is an average value:

The tolerance range :  $X < 6\text{min}$  (+15%~-15%),  $6\text{min} \leq X < 10\text{min}$  (+12%~-12%),  $10\text{min} \leq X < 60\text{min}$  (+8%~-8%),  $X \geq 60\text{min}$  (+5%~-5%)

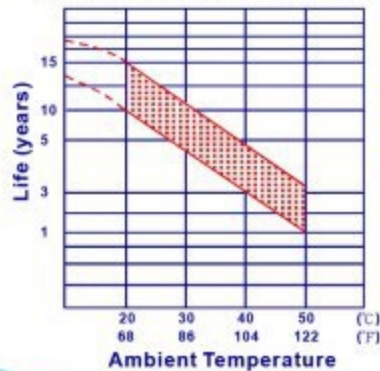
**Effect of Temperature on Capacity 25°C (77°F)**



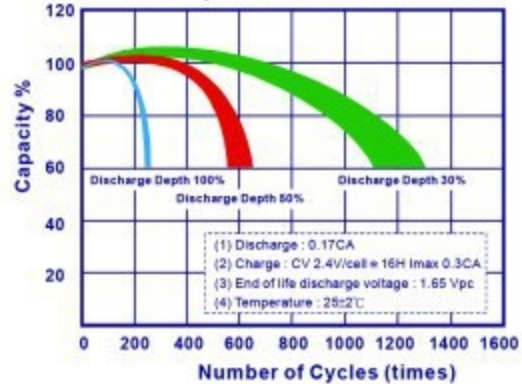
**Capacity Retention Characteristic**



**Trickle (or float) Service Life**



**Cycle Service Life**





### Lithium Iron Phosphate (LiFePO4) Battery

#### VTM1230(12.8V30Ah)

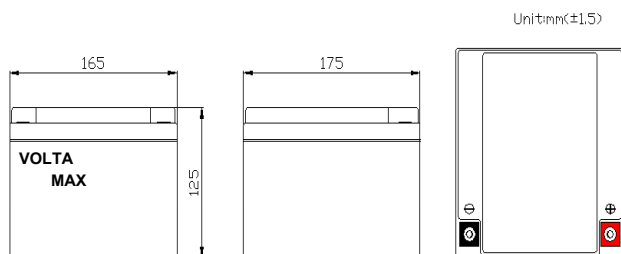
#### Features

- ◆ Using the technology of lithium iron phosphate cell, superior safety, thousands of cycles, 100%DOD, under normal conditions.
- ◆ Built-in automatic protection for over-charge, over discharge, over current and over temperature.
- ◆ Free of maintenance .
- ◆ Internal cell balancing.
- ◆ Lighter weight: About 40% ~50% of the weight of a comparable lead acid battery.
- ◆ Replacement for lead-acid battery.
- ◆ Wider temperature range:-20℃~60℃.
- ◆ Support for Series application expansion (up to 51.2V) or two in parallel.



#### Application

- ◆ UPS
- ◆ Solar & Wind Power System
- ◆ Golf Cart
- ◆ Electric Vehicle , E-bike, E-rickshaw etc.
- ◆ Lighting



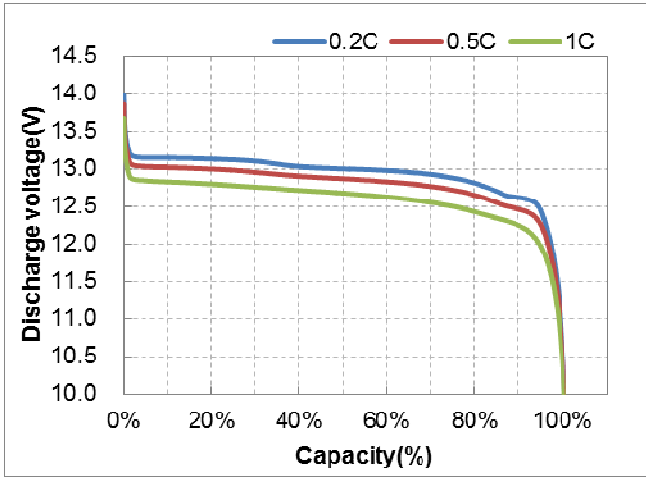
#### General Specifications

Electrical Characteristics	Nominal Voltage	12.8V
	Nominal Capacity	30Ah@0.2C
	Min. Capacity	29Ah@0.2C
	Energy	384Wh
	Internal Resistance	≤30mΩ
	Cycle Life	2000 Cycles @ 6A Charging/Discharging ,Until 70% Capacity
	Self Discharge	≤3.5% per month at 25℃
Standard Charging	Max.Charging Voltage	14.0~14.4V
	Charging Mode	At 0℃~45℃ temperature, charged to 14.4V at a constant current of 6A, and then,changed continuously with constant voltage of 14.4V until the current was not more than 0.6A
	Charging Current	6A
	Max.Charging Current	15A
Standard Discharging	Discharging Current	6A
	Max. Continuous Current	30A
	Max.Pulse Current	60A(<3S)
	Discharging Cut-off Voltage	10.0V
Operating Condition	Charge Temperature	0℃ to 45℃ (32℉ to 113℉) @60±25% Relative Humidity
	Discharge Temperature	-20℃ to 60℃ (-4℉ to 140℉) @60±25% Relative Humidity
	Storage Temperature	0℃ to 45℃ (32℉ to 113℉) @60±25% Relative Humidity
	Water Dust Resistance	IP55
Structure	Cell & Format	IFR32700 N60&4S5P
	Casing	Plastic
	Dimension(L*W*H*TH)	165*175*125*125mm
	Weight	Approx. 3.75Kg
	Terminal	M5

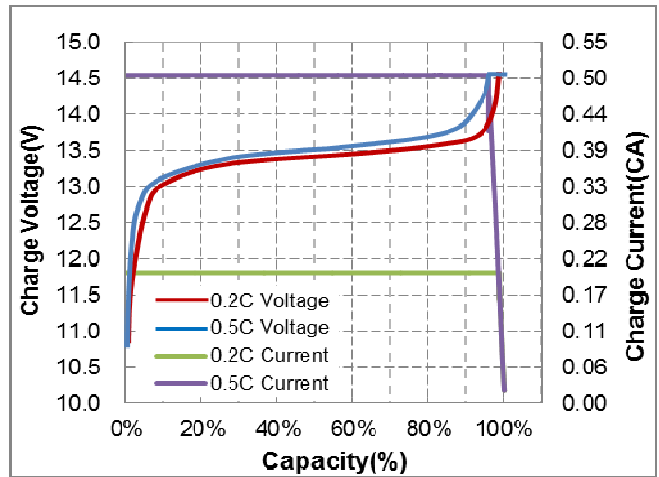
### Lithium Iron Phosphate (LiFePO4) Battery

#### VTM(1230)12.8V30Ah

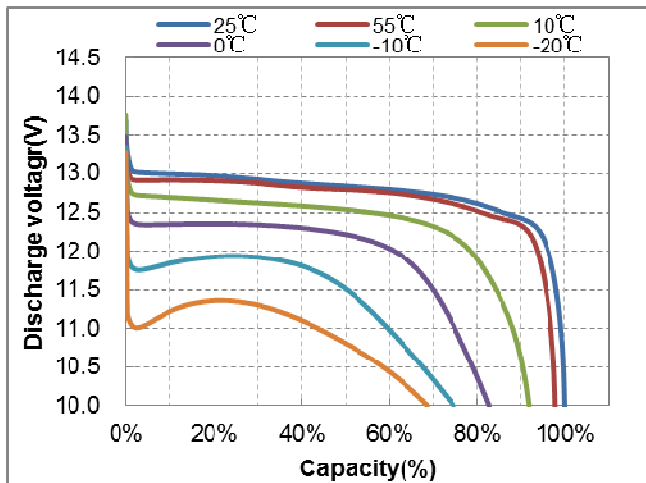
Different Rate Discharge Curve @25°C



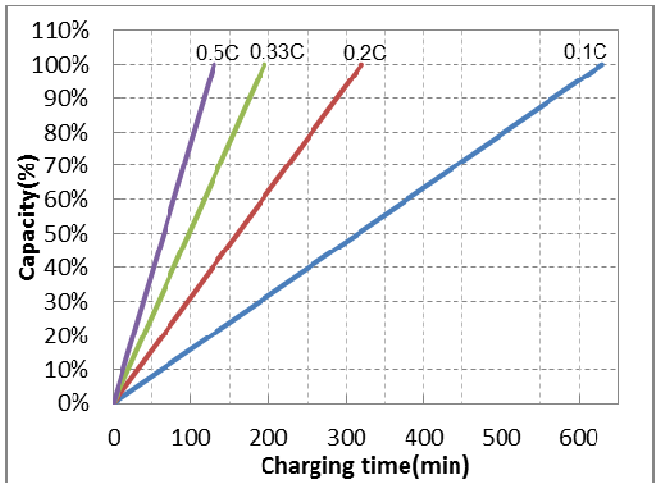
Charge Characteristics of capacity-voltage@0.2C&0.5C, 25°C



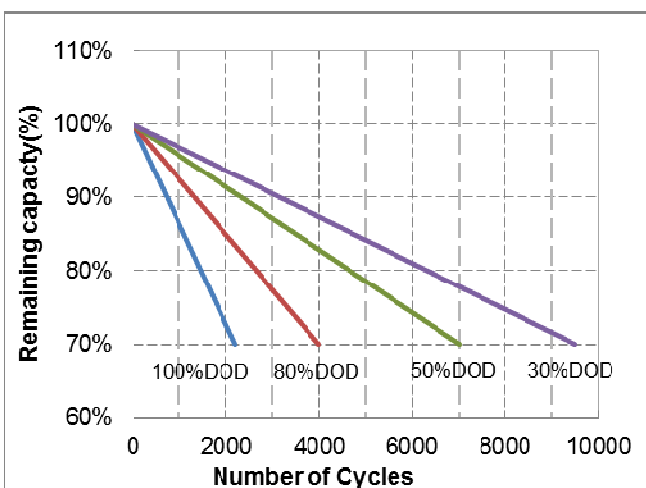
Different Temperature Discharge Curve @0.5C



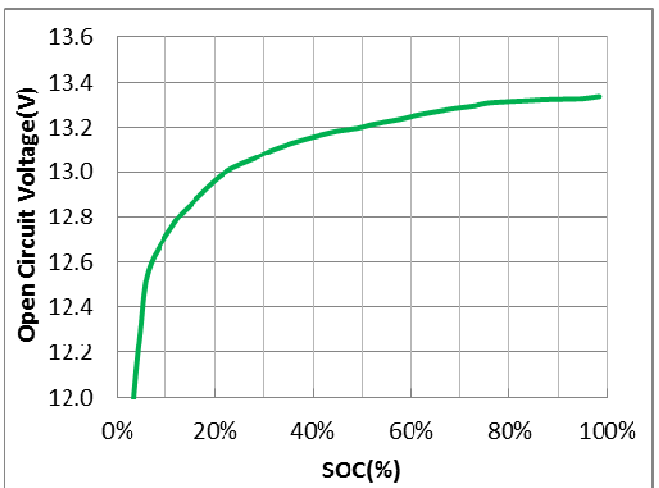
Charge Characteristics of time-voltage@ 25°C



Different DOD Discharge Cycle Life Curve @0.2C,25°C



Open circuit voltage VS SOC%@25°C



### Lithium Iron Phosphate (LiFePO4) Battery

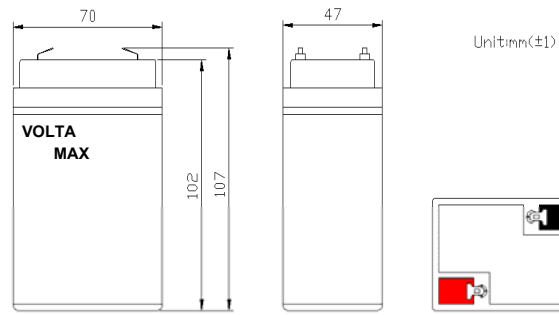
#### VTM660(6.4V6AH)

#### Features

- ◆ Using the technology of lithium iron phosphate cell, superior safety, thousands of cycles, 100%DOD, under normal conditions
- ◆ Built-in automatic protection for over-charge, over discharge, over current and over temperature
- ◆ Free of maintenance
- ◆ Internal cell balancing
- ◆ Lighter weight: About 40% ~50% of the weight of a comparable lead acid battery.
- ◆ Can be charged using most standard lead-acid charges (set)
- ◆ Wider temperature range:-20℃~60℃
- ◆ Support for Series application expansion (up to 51.2V) and two in parallel

#### Application

- ◆ UPS
- ◆ Solar & Wind Power System
- ◆ Golf Cart
- ◆ Electric Vehicle , E-bike, E-rickshaw etc.
- ◆ Lighting



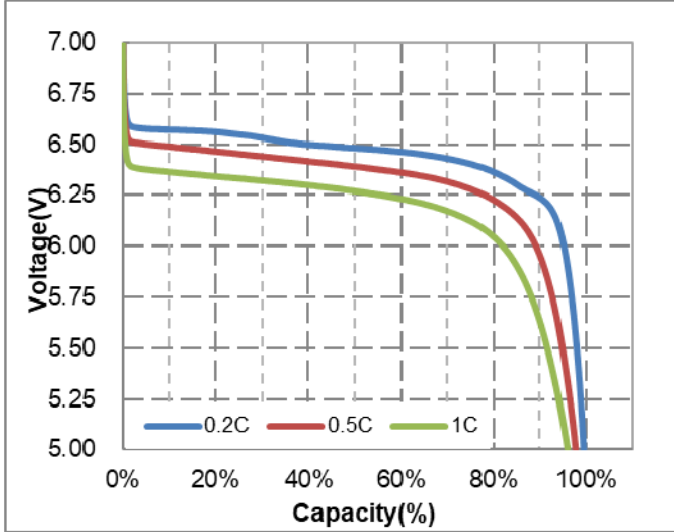
#### General Specifications

Electrical Characteristics	Nominal Voltage	6.4V
	Nominal Capacity	6Ah@0.2C
	Energy	38.4Wh
	Internal Resistance	90≤mΩ
	Cycle Life	>2000 Cycles @ 0.2C Charging/Discharging at 90%DOD, Until 70% Capacity.
	Self Discharge	≤3.5% per month at 25℃
Standard Charging	Charging Voltage	7.3±0.1V
	Charging Mode (CC/CV)	At 0℃~45℃ temperature, charged to 14.6V at a constant current of 0.2C5A, and then, changed continuously with constant voltage of 14.6V until the current was not more than 0.02C5A.
	Charging Current	1.2A
	Max.Charging Current	3A
Standard Discharging	Discharging Current	1.2A
	Max. Continuous Current	6A
	Max.Pulse Current	20A(<3S)
	Discharging Cut-off Voltage	5.0V
Operating Condition	Charge Temperature	0℃ to 45℃(32℉ to 113℉) @60±25% Relative Humidity
	Discharge Temperature	-20℃ to 60℃(-4℉ to 140℉) @60±25% Relative Humidity
	Storage Temperature	0℃ to 45℃(32℉ to 113℉) @60±25% Relative Humidity
	Water Dust Resistance	IP55
Structure	Cell & Format	IFR32700 N60,2S1P
	Casing	Plastic
	Dimension(L*W*H*TH)	70*47*102*107mm
	Weight	Approx. 0.4Kg
	Terminal	F1

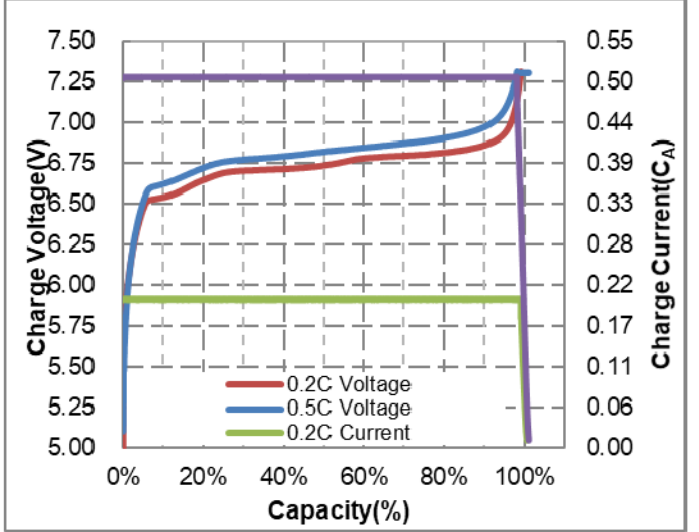
## Lithium Iron Phosphate (LiFePO<sub>4</sub>) Battery

### VTM660(6.4V6AH)

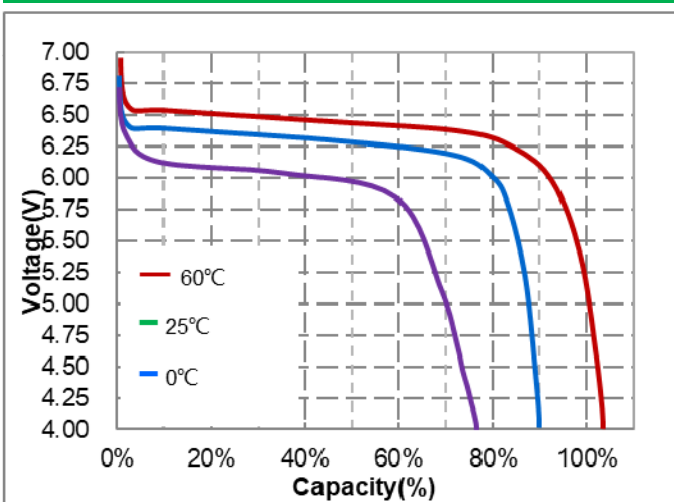
#### Different Rate Discharge Curve @25°C



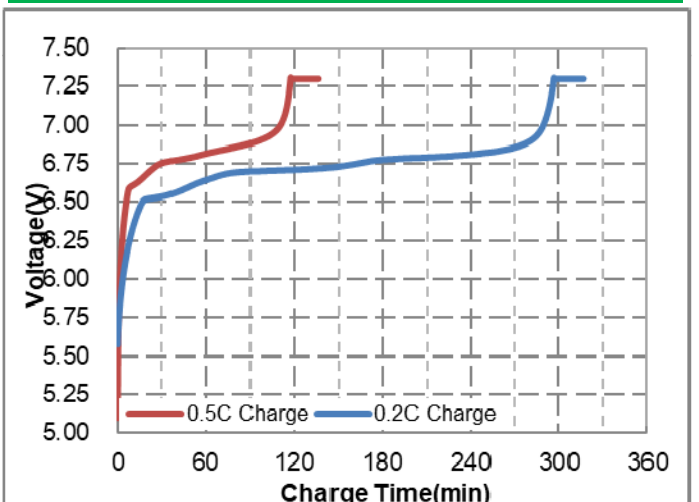
#### Charge Characteristics of capacity-voltage@0.2C&0.5C



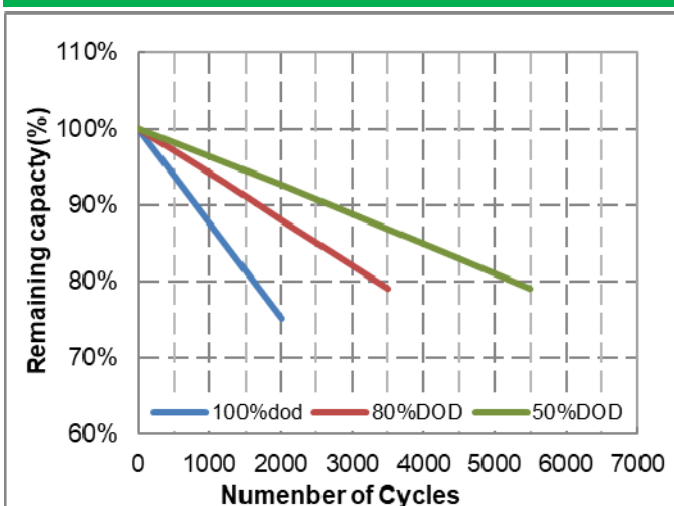
#### Different Temperature Discharge Curve @0.5C



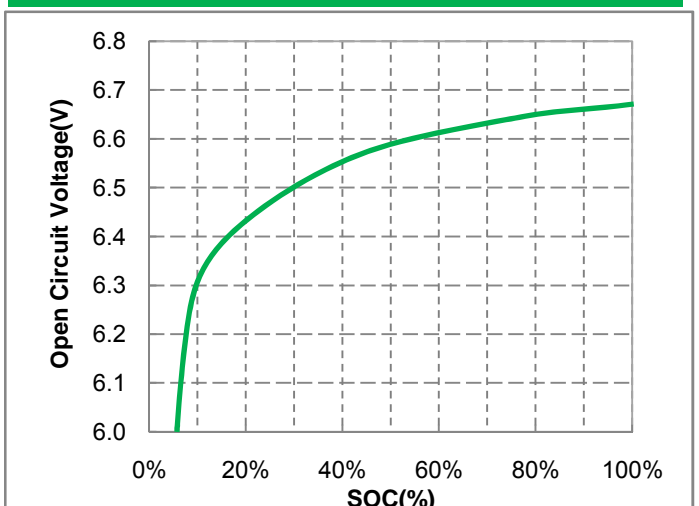
#### Charge Characteristics of time-voltage@ 25°C



#### Different DOD Discharge Cycle Life Curve @0.2C,25°C



#### Open circuit voltage VS SOC%@25°C



### Lithium Iron Phosphate (LiFePO4) Battery

#### VTM1290(12.8V9AH)

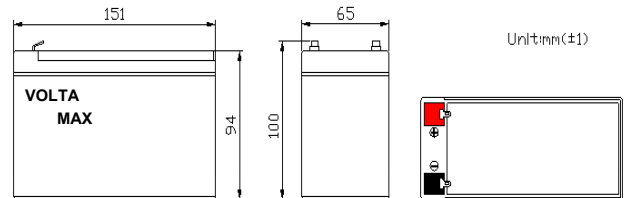
#### Features

- ◆ Using the technology of lithium iron phosphate cell, superior safety, thousands of cycles, 100%DOD, under normal conditions.
- ◆ Built-in automatic protection for over-charge, over discharge, over current and over temperature.
- ◆ Free of maintenance .
- ◆ Internal cell balancing.
- ◆ Lighter weight: About 40% ~50% of the weight of a comparable lead acid battery.
- ◆ Replacement for lead-acid battery.
- ◆ Wider temperature range:-20℃~60℃.
- ◆ Support for Series application expansion (up to 51.2V) or two in parallel.



#### Application

- ◆ UPS
- ◆ Solar & Wind Power System
- ◆ Golf Cart
- ◆ Electric Vehicle , E-bike, E-rickshaw etc.
- ◆ Lighting



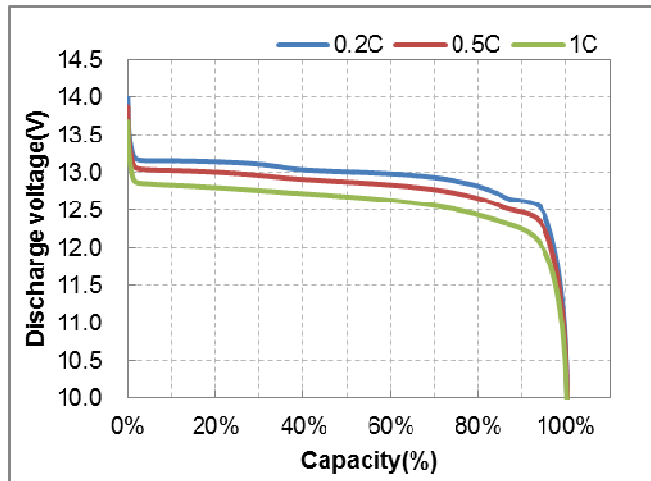
#### General Specifications

Electrical Characteristics	Nominal Voltage	12.8V
	Nominal Capacity	9Ah@0.2C
	Min. Capacity	8.8Ah@0.2C
	Energy	128Wh
	Internal Resistance	≤45mΩ
	Cycle Life	2000 Cycles @ 1.8A Charging/Discharging ,Until 70% Capacity
	Self Discharge	≤3.5% per month at 25℃
Standard Charging	Max.Charging Voltage	14.0~14.4V
	Charging Mode	At 0℃~45℃ temperature, charged to 14.4V at a constant current of 1.8A, and then,changed continuously with constant voltage of 14.4V until the current was not more than 0.18A
	Charging Current	1.8A
	Max.Charging Current	4.5A
Standard Discharging	Discharging Current	1.8A
	Max. Continuous Current	10A
	Max.Pulse Current	20A(<3S)
	Discharging Cut-off Voltage	10.0V
Operating Condition	Charge Temperature	0℃ to 45℃(32℉ to 113℉) @60±25% Relative Humidity
	Discharge Temperature	-20℃ to 60℃(-4℉ to 140℉) @60±25% Relative Humidity
	Storage Temperature	0℃ to 45℃(32℉ to 113℉) @60±25% Relative Humidity
	Water Dust Resistance	IP55
Structure	Cell & Format	IFR26650 N30&4S3P
	Casing	Plastic
	Dimension(L*W*H*TH)	151*65*94mm
	Weight	Approx. 1.28Kg
	Terminal	F2

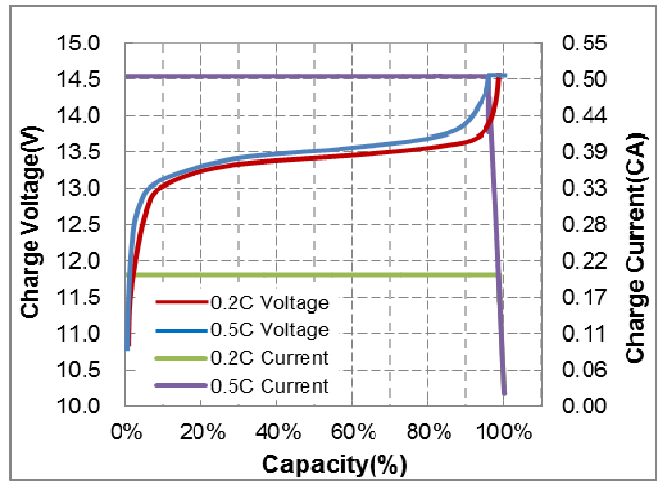
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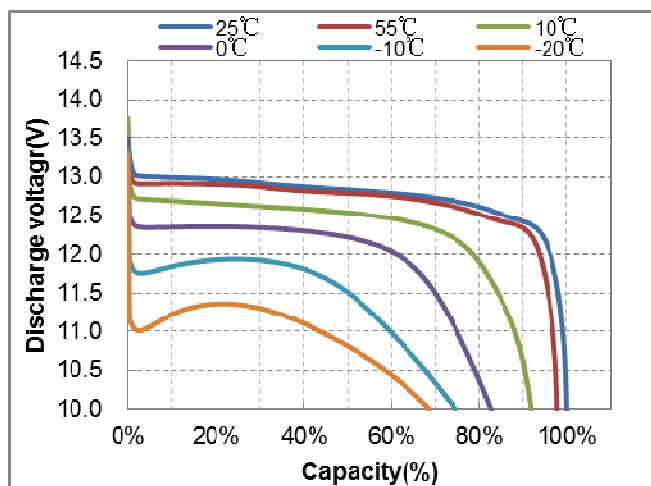
Different Rate Discharge Curve @25°C



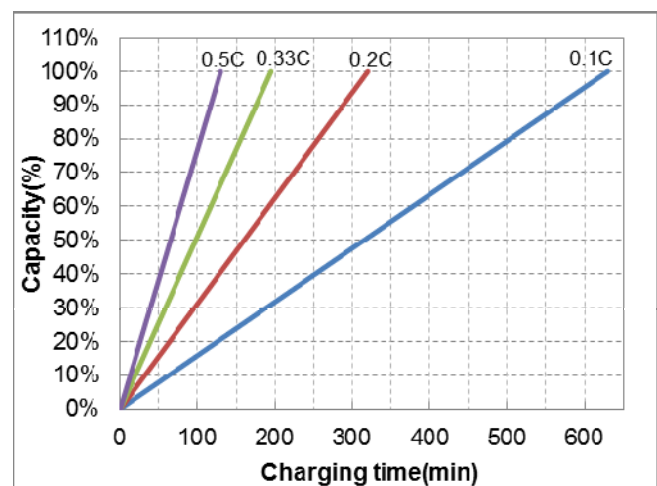
Charge Characteristics of capacity-voltage@0.2C&0.5C, 25°C



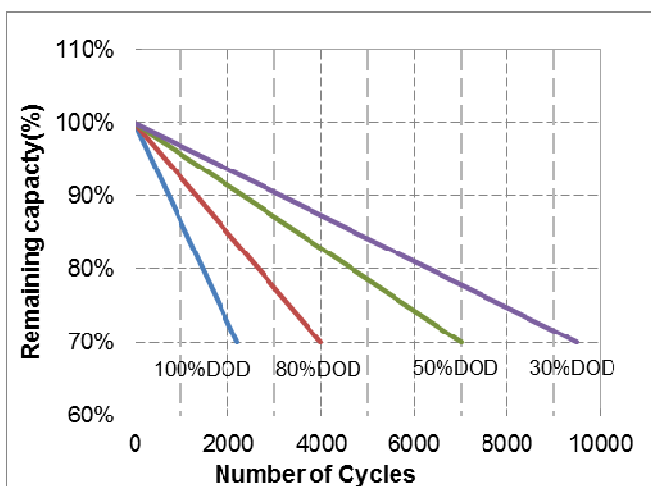
Different Temperature Discharge Curve @0.5C



Charge Characteristics of time-voltage@ 25°C



Different DOD Discharge Cycle Life Curve @0.2C,25°C



Open circuit voltage VS SOC%@25°C

