



– Powering the world future –

KSTAR **Battery Catalogue**

KSTAR

— Stock code: 002518 —

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Version number: KSD/DC 2018-06

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COMPANY PROFILE



① ②
③

- ① KSTAR Industrial Park at Guangming Hi-Tech Zone, Shenzhen, China
- ② KSTAR Industrial Park at Zhongkai Hi-Tech Zone, Huizhou, China
- ③ KSTAR Industrial Park at Guanlan Fuyuan industrial Zone, Shenzhen, China

Shenzhen KSTAR Science and Technology Co., Ltd. (stock code: 002518), founded in 1993, is a high-tech enterprise, a leading brand in UPS manufacturing in China, a professional integrator and manufacturer of the data center infrastructure, and a leading company in PV inverter.

KSTAR has not only dedicated to the product range of the data center infrastructure, such as UPS, precision cooling air conditioner, power distribution device, battery, network server cabinet, and as well as environmental monitoring system, but also devoted to the innovation and development of the thorough solution for product lines relevant to renewable energy solution, such as PV inverter, PV Array Smart Combiner Box, anti-feedback boxes, DC distribution cabinets, power storage, and monitoring.

KSTAR offers high quality products and full service to more than 90 countries all over the world.

KSTAR batteries—the Best Choice among Chinese first-tier enterprises

In China, KSTAR Battery with national unified certification for the large-scale industry issued by three major application domains, finance, telecommunications, government, is considered as a significant symbol for the mainstream battery brand to indicate its overall strength in the market.

KSTAR with the comprehensive predominance has gotten numerous VRLA batteries national unified certification for the large-scale industry, from those three major domains, including the Ministry of Education, the State Administration of Taxation, Industrial and Commercial Bank of China, China Mobile, China Unicom, Beijing Bank, CITIC Bank, Shenzhen Development Bank. Moreover, Kstar also applied them to the 2008 Beijing Olympics and the 2010 Shanghai World Expo, the Three Gorges Project, the Qinghai-Tibet railway and other projects.

In the China market, KSTAR battery implements to the UPS for years and its quality level of the product has already won the trust of the users.



KSTAR UPS supporting battery has a long application history and wide application ranges, its high quality have won great trust and support from all users.

CONTENTS

Company Profile	01
KSTAR Manufacture Base	03
Product Applications	06
General Features	06
Construction	06
Principle Operation Of Valve	07
Regulated Lwad Acid Battery	07
Nominal Capacity	07
Storage	07
Battery Discharging	08
Charging Characteristics	09
Battery Life	09
Terminal Data	10
Battery Index	11
FM Small Series	15
FM Regular Series	23
FMH Series	33
FML Series	37
2V Series (GFM)	41
Solar Deep Cycle Series	47
Colloid Battery Series (AGM)	55
High Rate Series	63



Accumulator cell production workshop glimpse



KSTAR MANUFACTURE BASE

For more than 20-year experience, Kstar has not only become a flagship enterprise in UPS industry, but also has transformed into one of technology-wised leading enterprises in energy provider, such as PV Inverter, EV charger, etc.. The R&D and manufacturing foundation of Kstar battery is located at Zhongkai National Hi-Tech Development Zone, Kstar Industrial Park, Huizhou City, Guangdong Province, covering nearly 120,000 square meters with advanced manufacturing equipment and quality control processes as the base, and providing full series of high-quality of VRLA battery, GEL battery products.



Accumulator cell production workshop glimpse



Green Earth, Our Common Family

As an enterprise citizen, Kstar fully understands that the environment will impact on enterprise's sustainable development and Human being's future living greatly. Therefore, products and services from KSTAR group are safe and environmental-friendly throughout all life cycle. With environmental responsibilities on shoulder, KSTAR supplies customer with ECO-Product, and provides staff with a healthy and safe working environment. In order to make greater contributes to the sustainable development of both enterprise and society, KSTAR commits itself to reduce environmental pollution by variety ways.

PRODUCT APPLICATIONS

A partial list of common applications includes:

- Communications Equipment.
- Emergency Alarms And Security Systems.
- Emergency Lighting Systems.
- Electric Wheelchairs.
- Electronic Equipment.
- Geophysical Equipment.
- Medical Equipment.
- Power Tools.
- Solar Powered Systems.
- Telecommunications Systems.
- Toys.
- Uninterruptible Power Supplies.

Value Regulated (Sealed) Construction

The KSTAR valve regulated AGM rechargeable lead acid battery allows safe, trouble free operation in any position. There is never any requirement to refill electrolyte in normal operation. The KSTAR battery is leak-proof.

Ease of Shipment

Sealed construction, the batteries can be shipped by sea, road or air without special handling and packaging precautions.

Maintenance Free Operation

During the float service life, the KSTAR batteries not to be needed to check the specific gravity of the electrolyte or add water.

Cycle or Float Service

Batteries are suitable for either cycling or floating service

Heavy Duty Grids

KSTAR batteries utilize heavy duty calcium-tin alloy grids to extend service life.

Compact Design

Utilizing the best possible raw materials to build a high power-to-weight ratio battery.

Low Self Discharge

KSTAR lead calcium grids minimize capacity loss during storage periods. So the batteries can be stored for long periods of time without recharge at room temperature.

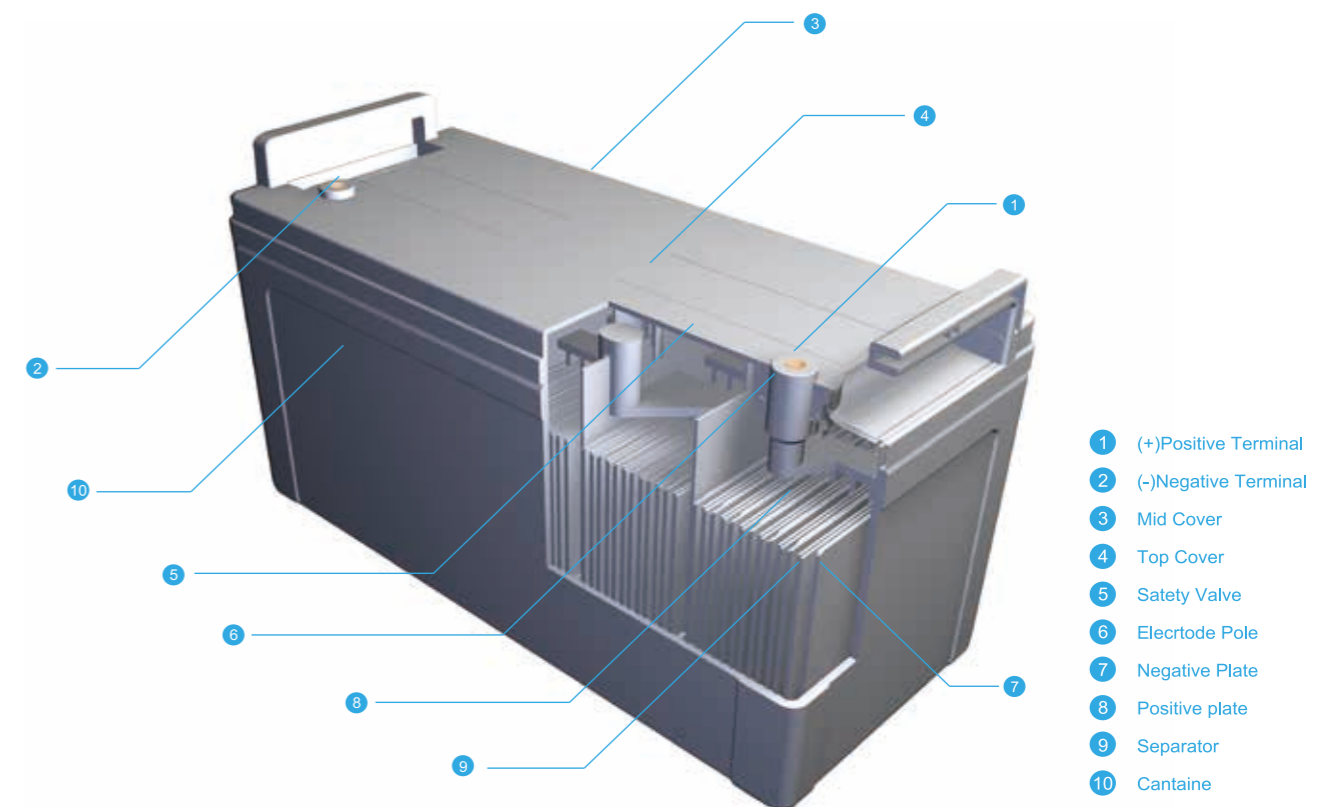
Wide Operating Temperature

KSTAR batteries may be operated over a broad range of ambient temperatures.

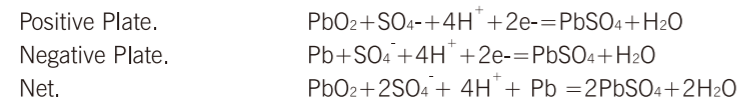
High Impact Case

KSTAR batteries utilize high impact resistant and non-conductive plastic cast.

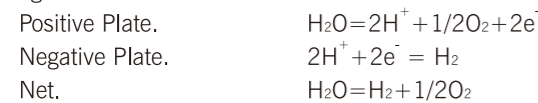
CONSTRUCTION



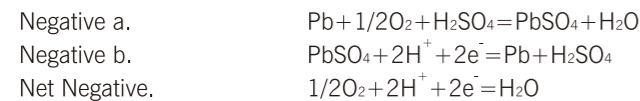
PRINCIPLE OPERATION OF VALVE REGULATED LEAD ACID BATTERY



The gassing and water loss reactions are as follows:



It is noted that the gassing reaction only generally occurs to any extent when the battery is almost totally charged. In the valve regulated battery it is obvious that water loss must be avoided. This is done by limiting the escape of hydrogen and oxygen from the battery. The design therefore accomplishes the recombination of the oxygen formed at the positive plate with the hydrogen formed at the negative plate. The reaction is as follows.



This virtually eliminates the production of free hydrogen at the negative plate to the action of recombination. However it is necessary to ensure that correct charging voltages are used. Because the construction provides a means of recombining the internally generated hydrogen and oxygen and the suppression of the evolution of hydrogen gas to limit the consumption of water from the electrolyte. Therefore the battery requires no addition of water during its normal life time.

Valve regulated batteries are sealed with the exception of a valve that opens when excess pressure builds up inside the battery. The valve automatically reseals itself. The recombination of charge gases is accomplished by allowing oxygen produced at the positive plate to pass through the separator material to the negative plates where the recombination reaction occurs. The valve controls the internal of the battery to optimize this efficiency of the recombination reaction and minimise the possible expense of electrolyte.

NOMINAL CAPACITY

The capacity of an KSTAR battery is the available amount of electrical energy which can be obtained from a fully charged cell. The capacity of a cell is expressed in ampere hours (AH). Which is a current-time product. The capacity value is dependent upon the discharge current, the temperature during discharge, the final cut-off voltage and the general history. The nominal capacity of an KSTAR battery is measured at the 10 hour or 20 hour rate according to types at 25°C to a cut-off voltage of 1.75 volts per cell.

STORAGE

During storage, batteries gradually lose their capacity due to their self-discharge, their self-discharge rate is low and is typically less than 3% per month at 25°C, Although the self-discharge rate is low, specific precautions must be taken against the battery over discharging itself by self-discharge when in storage or not operating.

Precautions Against Over Self-discharge

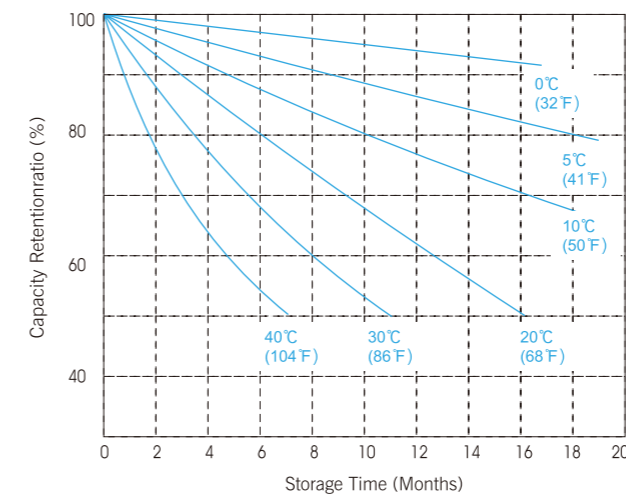
- The batteries should be stored in a clean, cool and dry place.
- Storage place should not be affected by sources of radiant heat such as sunshine, heating units, radiators or steam pipes.
- The recommendable storage temperature: 10~20°C.
- The recommendable storage humidity: as low as possible.

Charge Advice

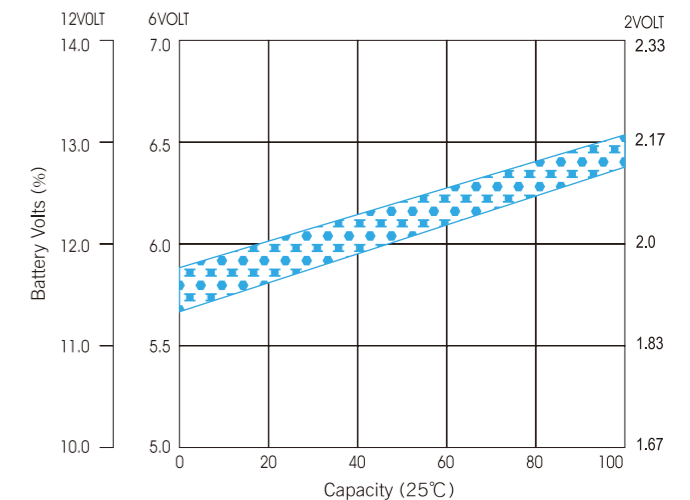
Storage Temperature	Charging Interval
20°C or less	9 months
20~30°C	6 months
30~40°C	3 months

Temperature above 40°C should be avoided. After long term storage, all batteries deliver less than the rated capacity. Full capacity will be obtained through several charge/discharge cycles. For longest life, KSTAR battery should be fully charged before going into storage.

Self-Discharge Characteristics



Open Circuit Voltage and Remaining Capacity



BATTERY DISCHARGING

The capacity of an KSTAR battery is the available amount of electrical energy which can be obtained from a fully charged cell.

The capacity of a battery is expressed in ampere-hours(AH), which is a current-time product. The capacity value is dependent upon the discharge current, the temperature during discharge, the final cut-off voltage and the general history. The nominal capacity of an KSTAR battery is measured at the 10 hour or 20 hour rate according to types at 25°C to a cut-off voltage of 1.80 volts or 1.75 volts per cell.

Battery Selection

The battery discharge curve may be utilised in battery selection. However it is suggested that a review is made of the data sheet for each battery size or the chart showing the actual ampere hour capacity of each battery size at various discharge times.

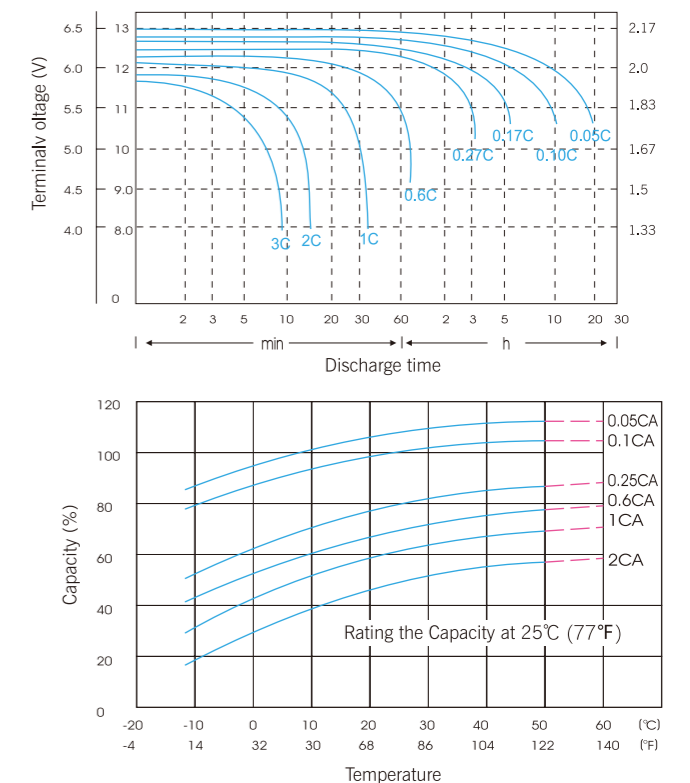
Temperature Effect on discharge Capacity

The discharge capacity varies according to the temperature during discharge. At low temperature the discharge capacity decreases and at high temperature it increases. The temperature effects on the discharge capacity at various discharge current rates are shown in the graph.

Final Acceptable Discharge Voltages

battery cut-off voltage is the volts per cell to which a battery may be discharged safely to maximise battery life, this value is specified according to the actual discharge load and run time. As a rule of thumb high amp loads and short run times will tolerate a lower cut off voltage, whereas a low amps long run time discharge will require a higher cut off voltage.

Discharge Characteristic Curve

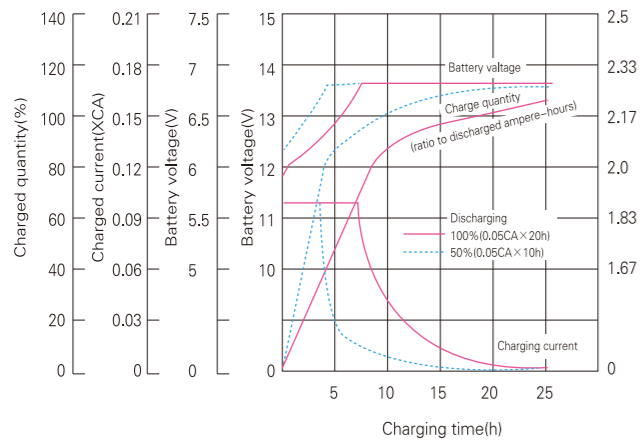


Discharge current	Cut off Volts/Cell
3CA	1.30
1CA	1.30
0.5-1.0 CA	1.55
0.2-0.5 CA	1.70
0.05-0.2CA CA	1.75

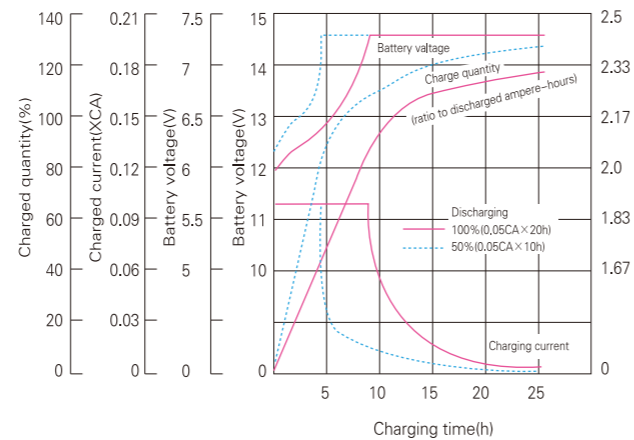
CHARGING CHARACTERISTICS

Charging characteristics by constant voltage which is the most recommendable for KSTAR battery are shown in the graph.

Standby Use



Cycle Use



Application	Cyclic Operation	Float Operation	Refresh Charge During storage
Charging method			
Constant Voltage	2.40~2.45vpc Initial current 0.3CA or less	2.25~2.30vpc Initial current 0.3CA or less	2.40~2.45vpc Initial current 0.3CA or less
Constat Current	Charging current approx.0.1CA Charging time control is recommended because an overcharge is more likely to occur.	Not applicable	Charging current: approx. 0.1CA

Charging Method

Ambient Temperature:25°C

Note: it is necessary to ensure that the voltage is correctly set. A voltage set too high will increase the corrosion of the positive plates and shorten battery life. A voltage set too low will lead to sulphation of the plates causing loss of capacity and ultimately shortening the life of the battery.

Effect of Temperature on Charging Voltage

Within the normal operating parameters of 20°C~30°C voltage compensation for operating temperature may not be necessary.

However, to maximise the life of the battery, temperature compensation for operating temperatures outside this temperature range should be considered.

Charging voltage compensation for battery temperature:

1.Float operation: $V_t = V - 0.003(t - 25)$

2.Cyclic operation: $V_t = V - 0.005(t - 25)$

(V=Charging voltage at 25°C,

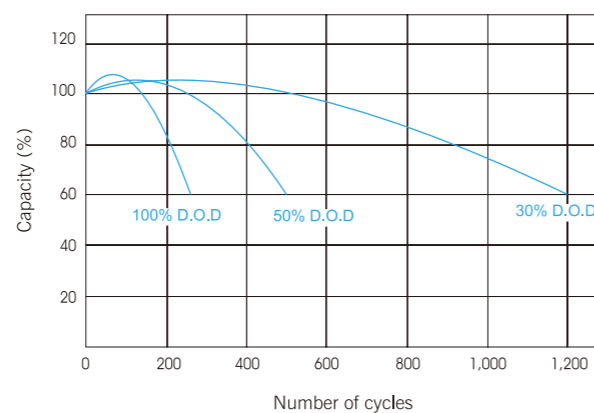
t=Temperature, V_t =Charging voltage at t°C)

BATTERY LIFE

Cyclic Use

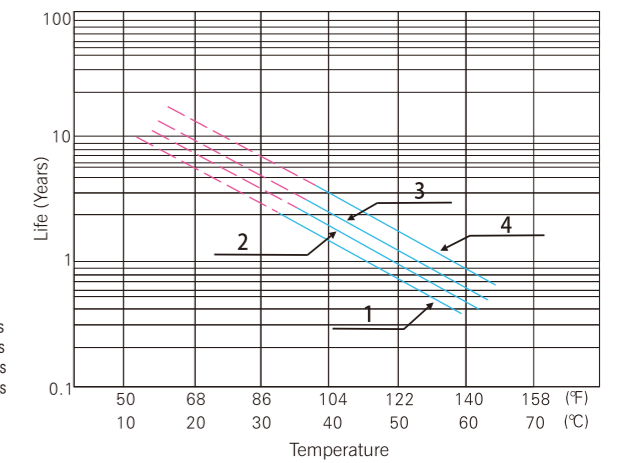
The cycle life is very dependent on the depth of discharge which the battery experiences during each cycle.

The various number of cycles relating to the depth of discharge is shown in the graph.

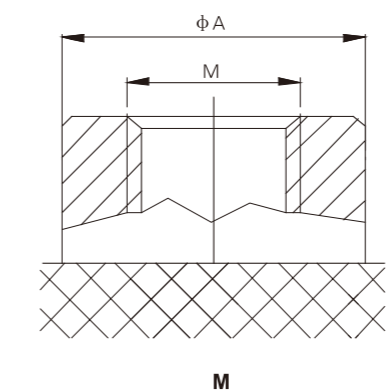
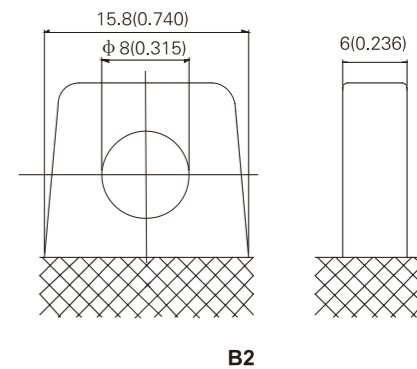
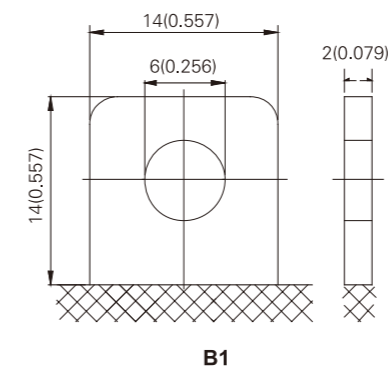
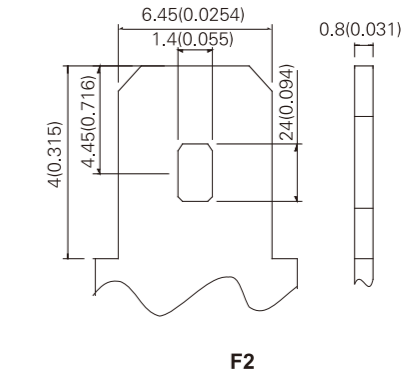
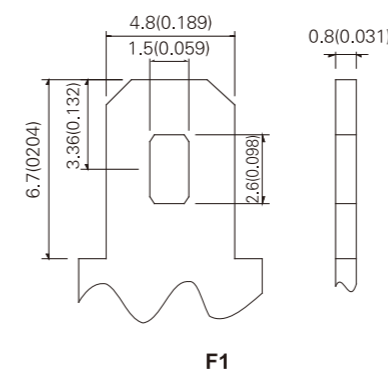


Floating Use

The float use life is very dependent on the temperature at which the battery is float charged. The float life is very long at low temperature (10~20°C)but at higher temperature the float life is shortened.



TERMINAL DATA



Items Type		φ A		M
M1	14	0.551"	6	0.236"
M2	16	0.630"	6	0.236"
M3	20	0.787"	8	0.315"
M4	12	0.47"	5	0.20"
M5	18	0.71"	8	0.31"
M6	18	0.71"	6	0.236"

BATTERY INDEX

FM Series Battery For General Use

Type	Nominal Voltage (V)	Rated Capacity(Ah)				Dimensions(mm)				Weight Appox (kg)	Terminal type
		20HR	10HR	5HR	1HR	Length	Width	Height	Total Height		
		1.75V/C	1.75V/C	1.75V/C	1.75V/C						
3-FM-1.2	6	1.2	1.1	1.00	0.72	97.5	24.0	52.0	58.0	0.31	F1
3-FM-3	6	3.0	2.7	2.55	1.8	135.0	35.0	60.0	66.0	0.71	F1
3-FM-4	6	4.0	3.7	3.4	2.4	70.0	47.0	100.0	106.0	0.81	F1
3-FM-7	6	7.0	6.5	5.6	4.2	151.0	34.0	95.0	101.0	1.15	F1/F2
6-FM-1.9	12	1.9	1.7	1.6	1.14	178.5	35.0	60.5	66.5	0.90	F1
6-FM-3	12	3.0	2.7	2.55	1.8	135.0	67.5	61.0	67.0	1.28	F1
6-FM-4	12	4.0	3.7	3.4	2.4	90.0	70.0	101.0	107.0	1.44	F1
6-FM-4.5	12	4.5	4.2	3.6	2.7	90.0	70.0	101.0	107.0	1.50	F1/F2
6-FM-5A	12	5.0	4.7	4.0	3.0	90.0	70.0	101.0	107.0	1.61	F1/F2
6-FM-5B	12	5.0	4.7	4.0	3.0	151.5	51.5	93.0	99.0	1.82	F1/F2
6-FM-6	12	6.0	5.6	4.8	3.6	151.0	65.0	94.0	100.0	2.00	F1/F2
6-FM-6.5	12	6.5	6.0	5.2	3.9	151.0	65.0	94.0	100.0	2.10	F1/F2
6-FM-7	12	7.0	6.5	5.6	4.2	151.0	65.0	94.0	100.0	2.20	F1/F2
6-FM-7.2A	12	7.2	6.7	5.7	4.3	151.0	65.0	94.0	100.0	2.22	F1/F2
6-FM-7.2B	12	7.2	6.7	5.7	4.3	139.5	48.0	118.0	118.0	2.20	F1/F2
6-FM-7.5	12	7.5	6.9	6.0	4.5	151.0	65.0	94.0	100.0	2.35	F1/F2
6-FM-9	12	9.0	8.3	7.2	5.4	151.0	65.0	94.0	100.0	2.50	F1/F2
6-FM-9S	12	9.0	8.4	7.5	5.9	151.0	65.0	94.0	100.0	2.68	F1/F2
6-FM-12	12	12.0	11.2	9.6	7.2	151.0	98.0	94.0	100.0	3.80	F2
6-FM-14	12	14.0	13.0	11.2	8.4	151.0	98.0	94.0	100.0	4.00	F2
6-FM-15	12	15.0	13.9	12.0	9.0	181.0	77.0	167.0	167.0	4.90	B1/M4
6-FM-17	12	17.0	15.8	13.6	10.2	181.0	77.0	167.0	167.0	5.20	B1/M4
6-FM-18	12	18.0	16.7	14.4	10.8	181.0	77.0	167.0	167.0	5.20	B1/M4
6-FM-20	12	20.0	18.6	16.0	12.0	181.5	77.0	167.0	167.0	6.00	M4
6-FM-22	12	22.0	20.5	17.6	13.2	181.5	77.0	167.0	167.0	6.40	M4
6-FM-24A	12	24.0	22.3	19.2	14.4	166.0	126.0	174.0	174/179	8.00	M1
6-FM-24B	12	24.0	22.3	19.2	14.4	177.0	167.0	126.0	126.0	8.00	B1/M4
6-FM-24C	12	24.0	22.3	19.2	14.4	166.0	126.0	174.0	174.0	8.00	M1
6-FM-26	12	26.0	24.1	20.8	15.6	177.0	167.0	126.0	126.0	8.15	B1/M4
6-FM-28	12	28.0	26.0	22.4	16.8	166.0	126.0	174.0	174.0	9.10	M1

FM Series Battery For General Use

Type	Nominal Voltage (V)	Rated Capacity(Ah)				Dimensions(mm)				Weight Appox (kg)	Terminal type
		20HR	10HR	5HR	1HR	Length	Width	Height	Total Height		
		1.75V/C	1.75V/C	1.75V/C	1.75V/C						
3-FM-180	6	180.0	165.0	144.0	108.0	323.0	178.0	226.0	231.0	27.7	M5
3-FM-200	6	200.0	184.0	160.0	120.0	323.0	178.0	226.0	231.0	28.8	M5
6-FM-33	12	33.0	30.5	26.4	19.8	196.0	131.0	155.0	169.0	10.1	M1
6-FM-36	12	36.0	33.1	28.9	21.7	196.0	131.0	155.0	169.0	11.4	M1
6-FM-38A	12	38.0	35.0	30.4	22.8	198.0	166.0	170.0	170.0	12.0	M1
6-FM-38B	12	38.0	35.0	30.4	22.8	198.0	166.0	175.0	175.0	12.0	M1
6-FM-40	12	40.0	36.8	32.0	24.0	198.0	166.0	170.0	170.0	12.7	M1
6-FM-45A	12	45.0	41.4	36.0	27.0	198.0	166.0	170.0	170.0	13.7	M1
6-FM-45B	12	45.0	41.4	36.0	27.0	229.0	138.0	208.0	213.0	15.6	M1
6-FM-50	12	50.0	46.0	40.0	30.0	229.0	138.0	208.0	213.0	16.0	M1
6-FM-55	12	55.0	50.6	44.0	33.0	229.0	138.0	212.0	217.0	18.5	M1
6-FM-65A	12	65.0	59.8	52.0	39.0	350.0	167.0	177.0	177.0	19.7	M2/B5/B11
6-FM-65B	12	65.0	59.8	52.0	39.0	330.0	173.0	171.0	176.0	19.7	M2/B5/B11
6-FM-70	12	70.0	64.4	56.0	42.0	260.0	169.0	211.0	216.0	21.4	M1
6-FM-75	12	75.0	69.0	60.0	45.0	260.0	169.0	211.0	216.0	22.3	M1
6-FM-80	12	80.0	73.6	64.0	48.0	260.0	169.0	211.0	216.0	23.6	M1
6-FM-85	12	85.0	78.2	68.0	51.0	260.0	169.0	211.0	216.0	24.7	M1
6-FM-90	12	90.0	82.8	72.0	54.0	307.0	169.0	211.0	216.0	26.8	M2
6-FM-100	12	100.0	92.0	80.0	60.0	407.0	174.0	208.0	236.0	33.0	M3
6-FM-120A	12	120.0	110.0	96.0	72.0	407.0	174.0	208.0	236.0	34.5	M3
6-FM-120B	12	120.0	110.0	96.0	72.0	409.0	177.0	225.0	225.0	34.5	M2
6-FM-150	12	150.0	138.0	120.0	90.0	532.0	207.0	214.0	219.0	47.5	M3
6-FM-150B	12	150.0	138.0	120.0	90.0	483.0	170.0	241.0	241.0	44.5	M2
6-FM-160	12	160.0	147.0	128.0	96.0	341.0	173.0	281.0	288.0	43.8	M2
6-FM-200	12	200.0	184.0	160.0	120.0	523.0	240.0	225.0	230.0	58.5	M3
6-FM-250	12	250.0	230.0	200.0	150.0	520.0	269.0	220.0	225.0	69.2	M5

FMH Series For Front Terminal

6-FMH-50	12	50.0	46.0	40.0	30.0	277.0	106.0	222.0	222.0	16.0	M1
6-FMH-100	12	100.0	92.0	80.0	60.0	395.0	110.0	286.0	286.0	35.0	M6
6-FMH-150	12	150.0	138.0	120.0	90.0	551.0	110.0	288.0	288.0	45.9	M6

FML Series For High Cycle Use

Type	Nominal Voltage (V)	Rated Capacity(Ah)			Dimensions(mm)				Weight Appox (kg)	Terminal type
		10HR	5HR	1HR	Length	Width	Height	Total Height		
		1.80V/C	1.80V/C	1.75V/C						
6-FML-38	12	38.0	30.4	22.8	198	166	170	170	13.2	M1
6-FML-65	12	65.0	52.0	39.0	350	167	177	177	21.5	M2
6-FML-100	12	100.0	80.0	60.0	407	174	208	236	32.6	M3
6-FML-150	12	150.0	120.0	90.0	532	207	214	219	50.0	M3
6-FML-200	12	200.0	160.0	120.0	523	240	225	230	62.5	M3

BATTERY INDEX

GFM For Long Life Standby Use

Type	Nominal Voltage (V)	Rated Capacity(Ah)			Dimensions(mm)				Weight Appox (kg)	Terminal type
		10HR	5HR	1HR	Length	Width	Height	Total Height		
		1.80V/C	1.80V/C	1.75V/C						
GFM100	2	100	85	55	171	72	205	210	5.9	M3
GFM200	2	200	170	110	172	111	329	365	13.0	M3
GFM300	2	300	255	165	171	151	330	366	18.0	M3
GFM400	2	400	340	220	210	171	329	363	24.5	M3
GFM500	2	500	425	275	241	172	331	366	29.0	M3
GFM600	2	600	510	330	301	175	331	366	35.0	M3
GFM800	2	800	680	440	410	175	330	365	49.5	M3
GFM1000	2	1000	850	550	475	175	328	365	58.0	M3
GFM1200	2	1200	1020	660	401	351	342	378	82.5	M3
GFM1500	2	1500	1275	825	401	351	342	378	90.5	M3
GFM2000	2	2000	1700	1100	491	351	343	383	120.0	M3
GFM2500	2	2500	2125	1375	712	353	341	382	157.0	M3
GFM3000	2	3000	2550	1650	712	353	341	382	174.0	M3

Gel Battery Series(AGM)

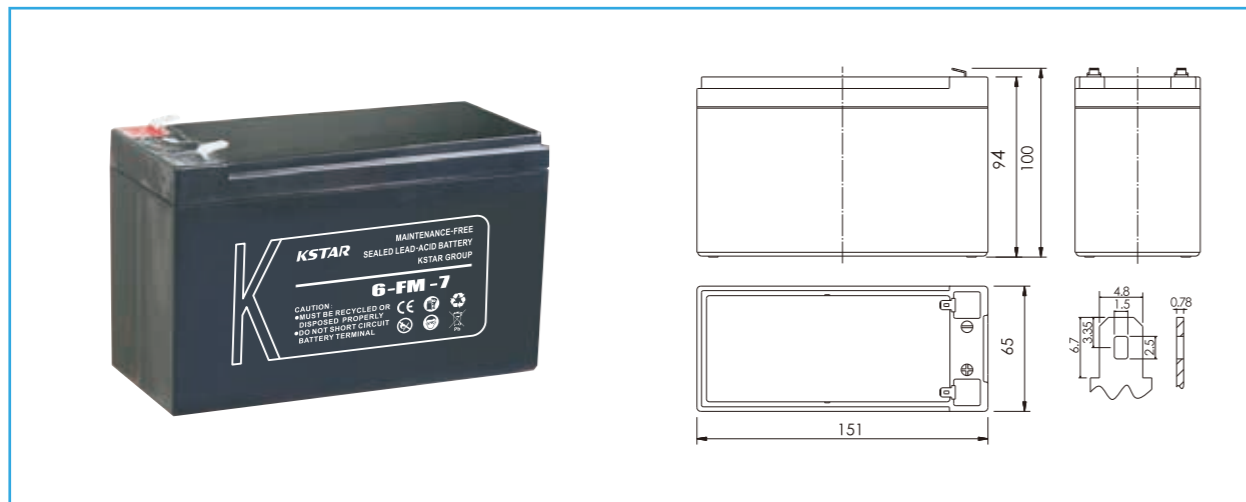
Type	Nominal Voltage (V)	Rated Capacity(Ah)			Dimensions(mm)				Weight Appox (kg)	Terminal type
		10HR	5HR	1HR	Length	Width	Height	Total Height		
		1.80V/C	1.75V/C	1.75V/C						
6-FM-38J	12	35.0	30.4	22.8	198	166	170	170	12.2	M1
6-FM-65J	12	59.8	52	39	350	167	177	177	20.3	M2
6-FM-100J	12	92	80	60	406	173	212	219	33.0	M3
6-FM-150J	12	138	120	90	532	207	214	219	48.6	M3
6-FM-200J	12	184	160	120	523	240	225	230	58.5	M3
GFM200J	2	200	170	110	172	111	329	365	13.3	M3
GFM300J	2	300	225	165	171	151	330	366	18.3	M3
GFM400J	2	400	340	220	210	171	329	363	25.4	M3
GFM500J	2	500	425	275	241	172	331	366	29.5	M3
GFM600J	2	600	510	330	301	175	331	366	35.6	M3
GFM800J	2	800	680	440	410	175	330	365	50.3	M3
GFM1000J	2	1000	850	550	475	175	328	365	59.0	M3
GFM1500J	2	1500	1275	825	401	351	342	378	94.0	M3
GFM2000J	2	2000	1700	1100	491	351	343	383	124.5	M3
GFM3000J	2	3000	2550	1650	712	353	341	382	177.0	M3

Solar Energy Deep Circulation Series

Type	Nominal Voltage (V)	Rated Capacity(Ah)			Dimensions(mm)				Weight Appox (kg)	Terminal type
		10HR	5HR	1HR	Length	Width	Height	Total Height		
		1.80V/C	1.75V/C	1.75V/C						
6-FM-38T	12	35.0	30.4	22.8	198	166	170	170	12.0	M1
6-FM-65T	12	59.8	52	39	350	167	177	177	20.0	M2
6-FM-100T	12	92	80	60	407	174	208	236	32.5	M3
6-FM-150T	12	138	120	90	532	207	214	219	47.8	M3
6-FM-200T	12	184	160	120	523	240	225	230	57.5	M3
GFM200T	2	200	170	110	172	111	329	365	13.1	M3
GFM300T	2	300	255	165	171	151	330	366	18.0	M3
GFM400T	2	400	340	220	210	171	329	363	25.0	M3
GFM500T	2	500	425	275	241	172	331	366	29.0	M3
GFM600T	2	600	510	330	301	175	331	366	35.0	M3
GFM800T	2	800	680	440	410	175	330	365	49.5	M3
GFM1000T	2	1000	850	550	475	175	328	365	58.0	M3
GFM1500T	2	1500	1275	825	401	351	342	378	92.6	M3
GFM2000T	2	2000	1700	1100	491	351	343	383	122.5	M3
GFM3000T	2	3000	2550	1650	712	353	341	382	174.0	M3

FMS Series For High discharge Use

Type	Nominal Voltage (V)	Rated Capacity(Ah)		Dimensions(mm)				Weight Appox (kg)	Terminal type
		10HR	1HR	Length	Width	Height	Total Height		
		1.80V/C	1.75V/C						
6-FM-65S	12	65.0	42.0	350	167	177	177	20.5	M2
6-FM-100S	12	100	70.0	407	174	208	236	34.0	M3
6-FM-150S	12	150	102	532	207	216	221	48.5	M3
6-FM-180S	12	180	128	523	240	225	230	57.0	M3
6-FM-200S	12	200	135	523	240	225	230	63.0	M3
GFM200S	2	200	119	172	111	329	365	13.1	M3
GFM300S	2	300	167	171	151	330	366	18.0	M3
GFM400S	2	400	222	210	171	329	363	25.0	M3
GFM500S	2	500	267	241	172	331	366	29.0	M3
GFM600S	2	600	334	301	175	331	366	35.0	M3
GFM800S	2	800	445	410	175	330	365	49.5	M3
GFM1000S	2	1000	534	475	175	328	365	60.0	M3



Specifications

Nominal Voltage	12V	
Rated Capacity (20 hour rate)	7.0Ah	
Dimensions	Total Height (with terminals)	3.94 inches(100mm)
	Height	3.70 inches(94mm)
	length	5.94 inches(151mm)
	width	2.56 inches(65mm)
Weight	Approx.4.84 Pound(2.20kg)	

Characteristics

Capacity 77°F(25°C)	20 hour rate (0.35A)	7.0 Ah
	10 hour rate (0.65A)	6.5 Ah
	5 hour rate (1.12A)	5.6 Ah
	1hour rate (4.20 A)	4.2 Ah
	15Minute Rate (12.3 A)	3.1 Ah
Internal Resistance	Full charged Battery 77°F(25°C)	22mΩ
	104°F(40°C)	102%
	77°F(25°C)	100%
	32°F(0°C)	85%
Capacity affected by Temperature (20hour rate)	5°F(-15°C)	65%
	Capacity after 3 month storage	91%
	Capacity after 6 month storage	81%
Self-Discharge 77°F(25°C)	Capacity after 12 month storage	60%
	Max. Discharge Current 77°F(25°C)	105A(5S)
Terminal	F1 \ F2	
Charge (Constant Voltage)	Cycle	Initial Charging Current less than 2.1A Voltage 14.4~14.7 V / 77°F(25°C)
	Float	Voltage 13.5~13.8V / 77°F(25°C)

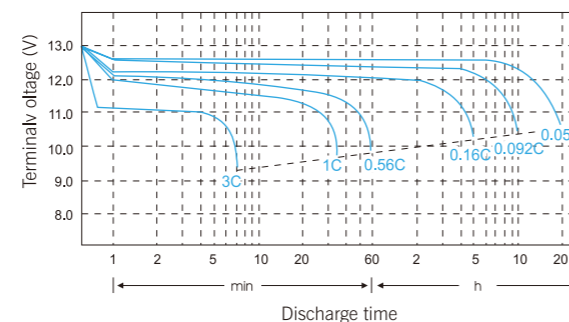
Constant Current Discharge (AMPERES @25°C)

F.V/Time	5Min	10Min	15Min	30Min	60Min	2H	3H	4H	5H	10H	20H
1.60	26.7	16.9	12.3	7.56	4.45	2.61	1.80	1.40	1.15	0.669	0.359
1.65	26.0	16.5	11.9	7.36	4.37	2.52	1.77	1.37	1.14	0.653	0.356
1.70	24.9	15.8	11.4	7.22	4.29	2.49	1.76	1.36	1.14	0.653	0.353
1.75	23.8	15.1	11.2	7.14	4.20	2.46	1.76	1.34	1.12	0.650	0.350
1.80	22.4	15.0	10.9	6.94	4.12	2.38	1.73	1.33	1.10	0.638	0.342

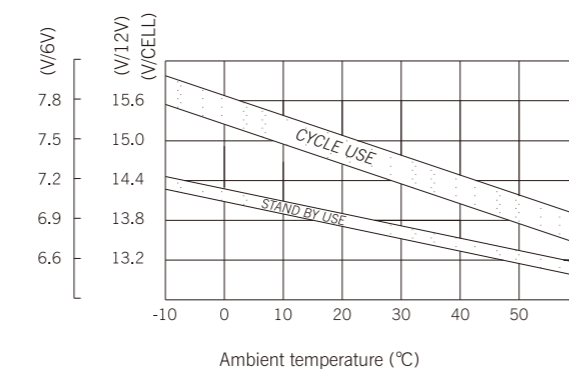
Constant Power Discharge (WATTS PER CELL@25°C)

F.V/Time	5Min	10Min	15Min	30Min	60Min	2H	3H	4H	5H	10H	20H
1.60	49.5	31.6	23.4	14.4	8.06	5.08	3.58	2.79	2.29	1.32	0.710
1.65	48.5	30.9	22.6	14.0	7.96	4.93	3.53	2.73	2.26	1.31	0.708
1.70	46.1	29.6	21.7	13.8	7.81	4.85	3.50	2.72	2.27	1.31	0.705
1.75	44.3	28.5	21.3	13.7	7.63	4.80	3.50	2.69	2.24	1.31	0.703
1.80	41.7	28.3	20.8	13.2	7.51	4.67	3.45	2.66	2.21	1.28	0.690

Discharge Curves 77°F (25°C)

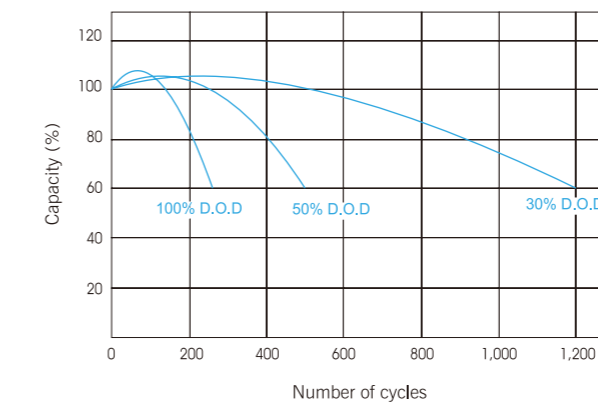


Relationship between charge voltage and temperature

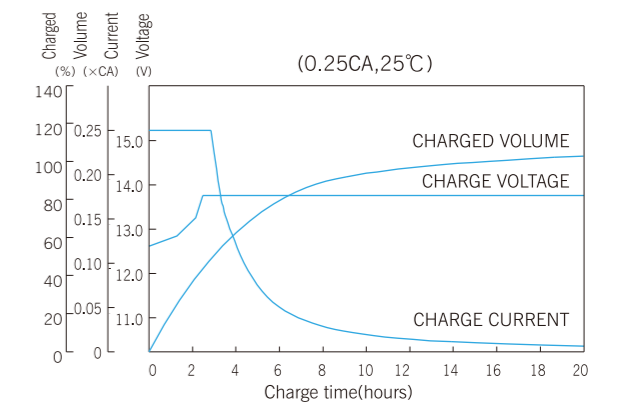


The operating environment temperature above 40°C should be avoided. After long term storage, The battery actual capacity would be less than the rated capacity. Full capacity will be obtained through several charge/discharge cycles. To get the longest life, KSTAR battery should be fully charged before storage.

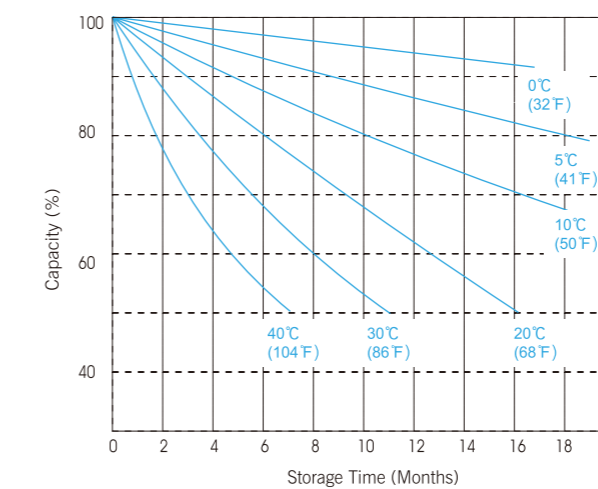
Cycle service life in relation to depth of discharge



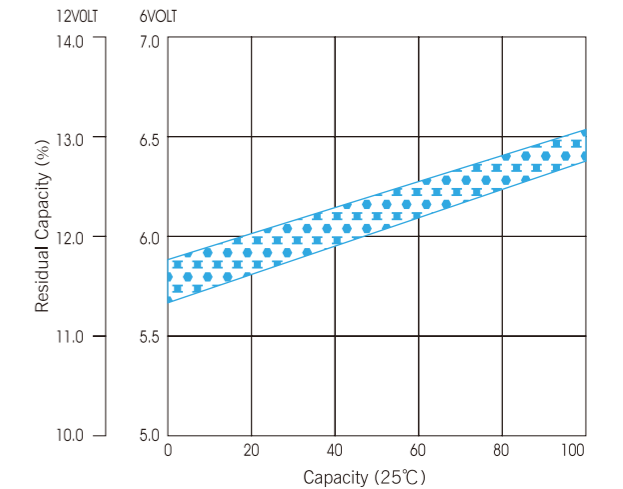
Constant voltage charge characteristic



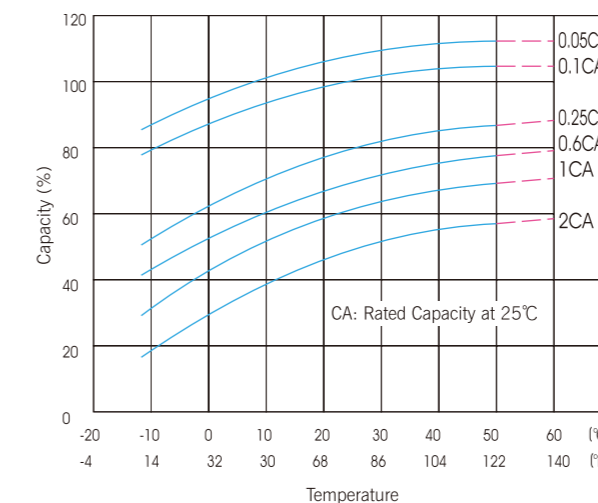
Self-Discharge Characteristics



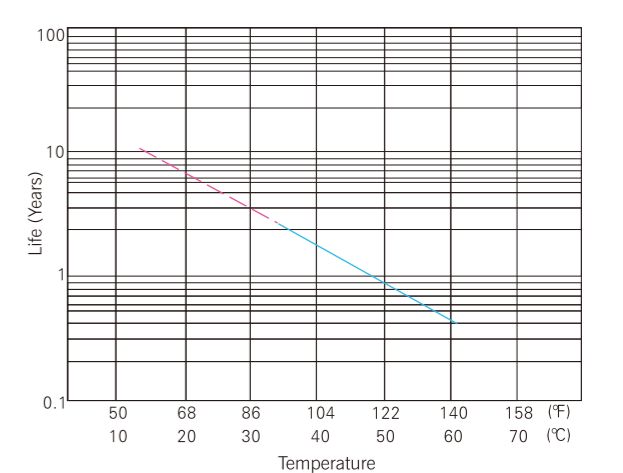
Relationship of OCV and Residual Capacity % (25°C)

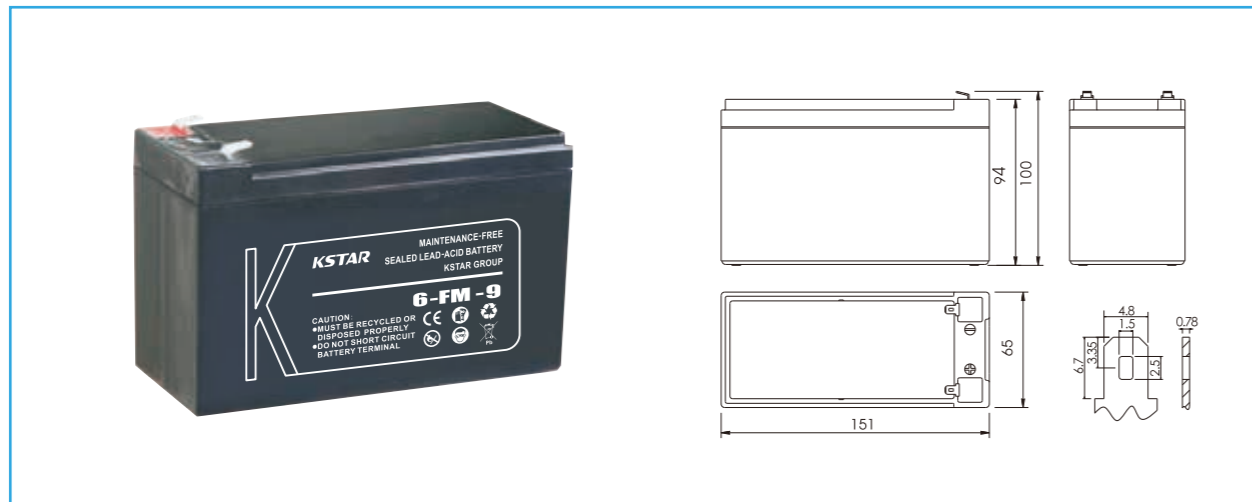


Temperature effects on capacity



Temperature effects float life





Specifications

Nominal Voltage	12V	
Rated Capacity (20 hour rate)	9Ah	
Dimensions	Total Height (with terminals)	3.94 inches(100mm)
	Height	3.70 inches(94mm)
	length	5.94 inches(151mm)
	width	2.56 inches(65mm)
Weight	Approx.5.72 Pound(2.50kg)	

Characteristics

Capacity 77°F(25°C)	20 hour rate (0.45A)	9.0 Ah
	10 hour rate (0.83A)	8.3 Ah
	5 hour rate (1.44A)	7.2 Ah
	1hour rate (5.40 A)	5.4 Ah
	15Minute Rate (15.6 A)	3.9 Ah
Internal Resistance	Full charged Battery 77°F(25°C)	18 mΩ
	104°F(40°C)	102%
	77°F(25°C)	100%
Capacity affected by Temperature (20hour rate)	32°F(0°C)	85%
	5°F(-15°C)	65%
	Capacity after 3 month storage	91%
Self-Discharge 77°F(25°C)	Capacity after 6 month storage	81%
	Capacity after 12 month storage	60%
	Max. Discharge Current 77°F(25°C)	135A(5S)
Terminal	F1 \ F2	
Charge (Constant Voltage)	Cycle	Initial Charging Current less than 27A Voltage 14.4~14.7 V / 77°F(25°C)
	Float	Voltage 13.5~13.8V / 77°F(25°C)

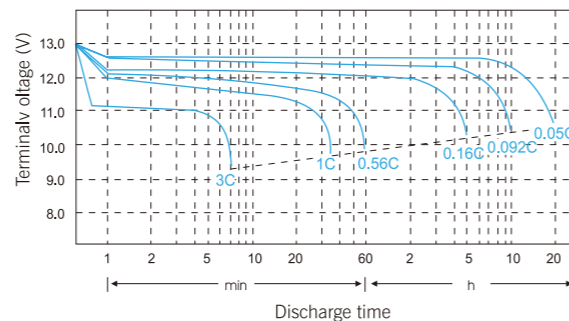
Constant Current Discharge (AMPERES @25°C)

F.V/Time	5Min	10Min	15Min	30Min	60Min	2H	3H	4H	5H	10H	20H
1.60	34.3	21.8	15.6	9.72	5.72	3.36	2.32	1.80	1.48	0.850	0.462
1.65	33.5	21.2	15.1	9.46	5.62	3.24	2.28	1.76	1.46	0.830	0.458
1.70	32.0	20.3	14.5	9.28	5.51	3.20	2.26	1.75	1.46	0.830	0.454
1.75	30.6	19.4	14.2	9.18	5.40	3.16	2.26	1.73	1.44	0.830	0.450
1.80	28.8	19.3	13.9	8.92	5.30	3.06	2.22	1.71	1.42	0.810	0.440

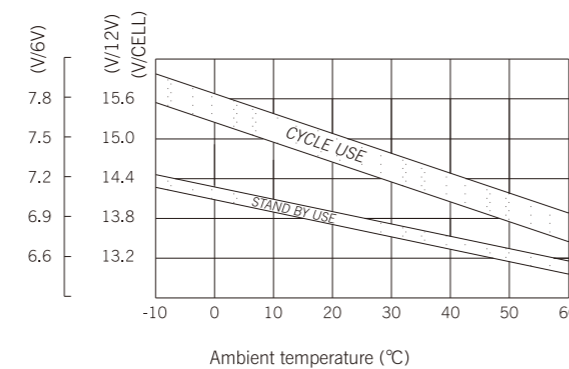
Constant Power Discharge (WATTS PER CELL@25°C)

F.V/Time	5Min	10Min	15Min	30Min	60Min	2H	3H	4H	5H	10H	20H
1.60	63.7	40.7	30.1	18.5	10.4	6.53	4.60	3.58	2.95	1.70	0.913
1.65	62.3	39.7	29.0	18.0	10.2	6.33	4.53	3.51	2.91	1.69	0.910
1.70	59.3	38.0	27.9	17.7	10.0	6.23	4.50	3.49	2.92	1.68	0.907
1.75	57.0	36.7	27.4	17.6	9.80	6.17	4.50	3.46	2.88	1.68	0.903
1.80	53.7	36.3	26.7	17.0	9.65	6.00	4.43	3.42	2.84	1.64	0.887

Discharge Curves 77°F (25°C)

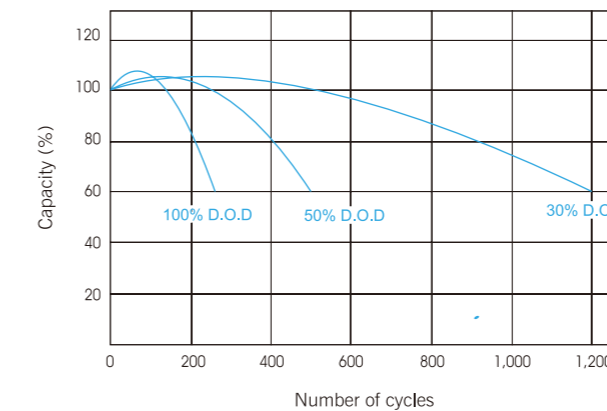


Relationship between charge voltage and temperature

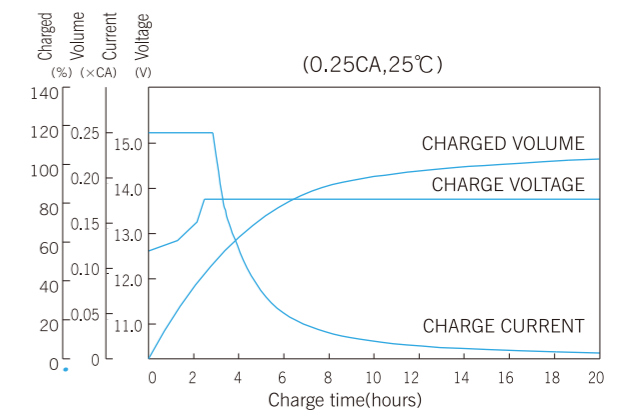


The operating environment temperature above 40°C should be avoided ,After long term storage, The battery actual capacity would be less than the rated capacity. Full capacity will be obtained through several charge/discharge cycles. To get the longest life, KSTAR battery should be fully charged before storage.

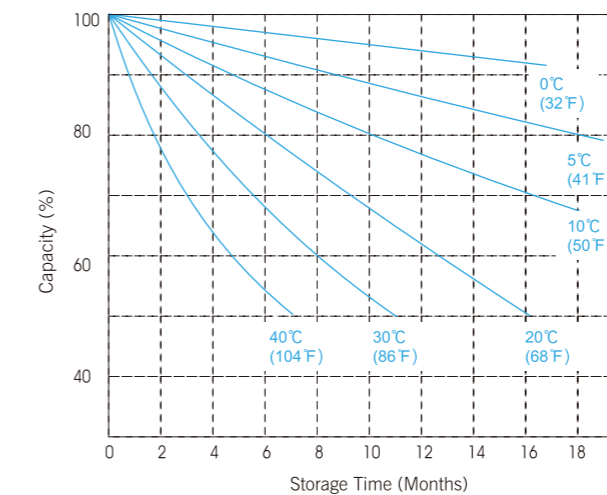
Cycle service life in relation to depth of discharge



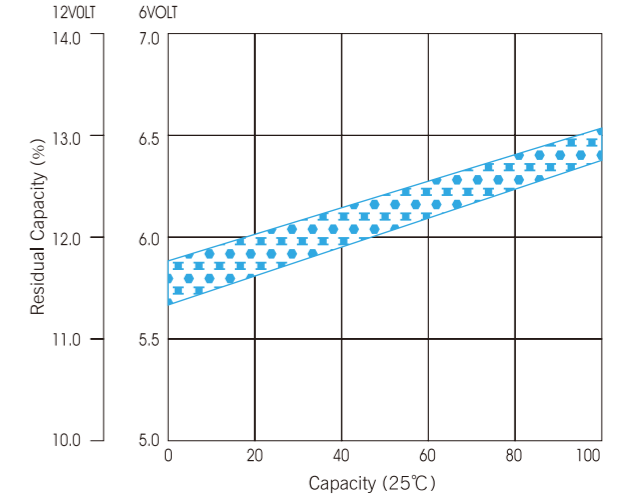
Constant voltage charge characteristic



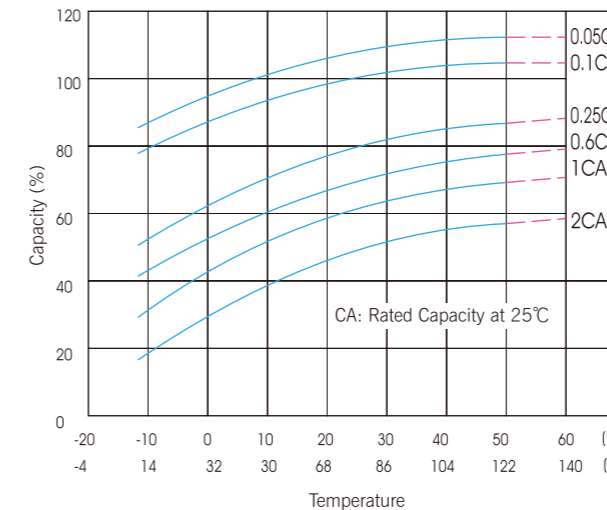
Self-Discharge Characteristics



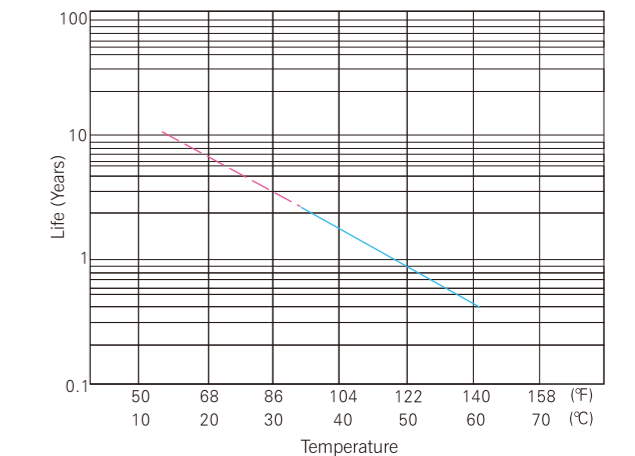
Relationship of OCV and Residual Capacity % (25°C)

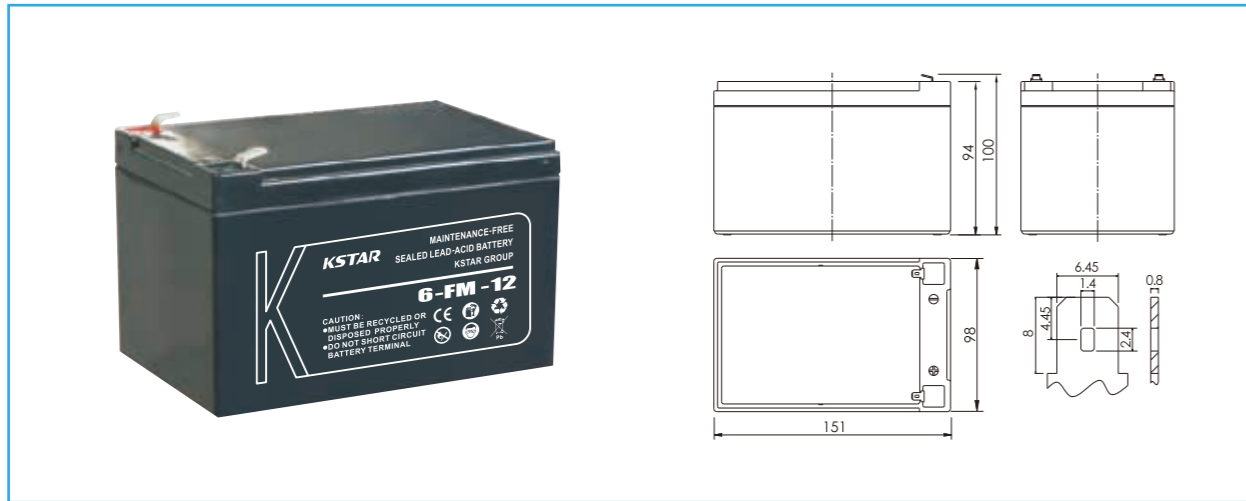


Temperature effects on capacity



Temperature effects float life





Specifications

Nominal Voltage	12V	
Rated Capacity (20 hour rate)	12Ah	
Dimensions	Total Height (with terminals)	3.94 inches(100mm)
	Height	3.70 inches(94mm)
	length	5.94 inches(151mm)
	width	3.86 inches(98mm)
Weight	Approx.8.37 Pound(3.80kg)	

Characteristics

Capacity 77°F(25°C)	20 hour rate (600mA)	12.0 Ah
	10 hour rate (1.12A)	11.2 Ah
	5 hour rate (1.92A)	9.6 Ah
	1hour rate (7.20A)	7.2 Ah
	15Minute Rate (21.1A)	5.3 Ah
Internal Resistance	Full charged Battery 77°F(25°C)	17 mΩ
	104°F(40°C)	102%
	77°F(25°C)	100%
Capacity affected by Temperature (20hour rate)	32°F(0°C)	85%
	5°F(-15°C)	65%
	Capacity after 3 month storage	91%
Self-Discharge 77°F(25°C)	Capacity after 6 month storage	81%
	Capacity after 12 month storage	60%
	Max. Discharge Current 77°F(25°C)	180A(5S)
Terminal	F2	
Charge (Constant Voltage)	Cycle	Initial Charging Current less than 3.6A Voltage 14.4~14.7 V / 77°F(25°C)
	Float	Voltage 13.5~13.8V / 77°F(25°C)

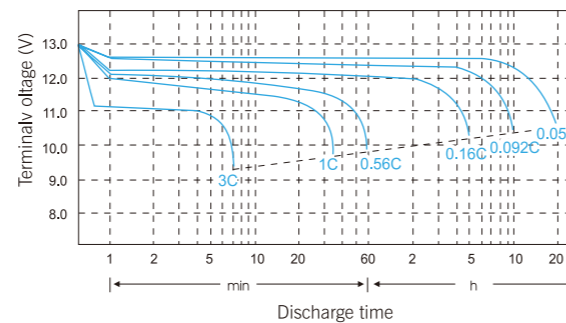
Constant Current Discharge (AMPERES @25°C)

F.V/Time	5Min	10Min	15Min	30Min	60Min	2H	3H	4H	5H	10H	20H
1.60	45.7	29.0	21.2	13.0	7.63	4.48	3.09	2.40	1.97	1.15	0.616
1.65	44.6	28.2	20.4	12.6	7.49	4.32	3.04	2.35	1.95	1.12	0.611
1.70	42.6	27.0	19.6	12.4	7.35	4.27	3.01	2.33	1.95	1.12	0.605
1.75	40.8	25.9	19.3	12.2	7.20	4.21	3.01	2.30	1.92	1.12	0.600
1.80	38.4	25.7	18.8	11.9	7.07	4.08	2.96	2.28	1.89	1.09	0.587

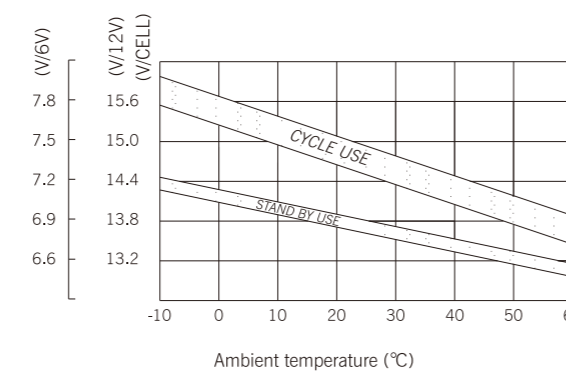
Constant Power Discharge (WATTS PER CELL@25°C)

F.V/Time	5Min	10Min	15Min	30Min	60Min	2H	3H	4H	5H	10H	20H
1.60	84.9	54.2	40.1	24.6	13.8	8.71	6.13	4.78	3.93	2.27	1.22
1.65	83.1	52.9	38.7	24.0	13.6	8.44	6.04	4.68	3.87	2.25	1.21
1.70	79.1	50.7	37.1	23.6	13.4	8.31	6.00	4.66	3.89	2.24	1.21
1.75	76.0	48.9	36.5	23.4	13.1	8.22	6.00	4.61	3.84	2.24	1.20
1.80	71.6	48.4	35.6	22.7	12.9	8.00	5.91	4.56	3.79	2.19	1.18

Discharge Curves 77°F (25°C)

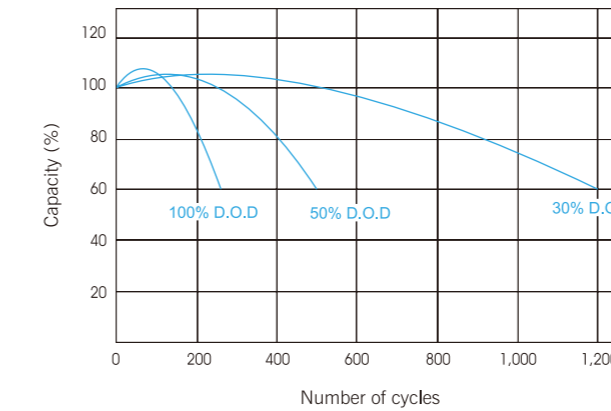


Relationship between charge voltage and temperature

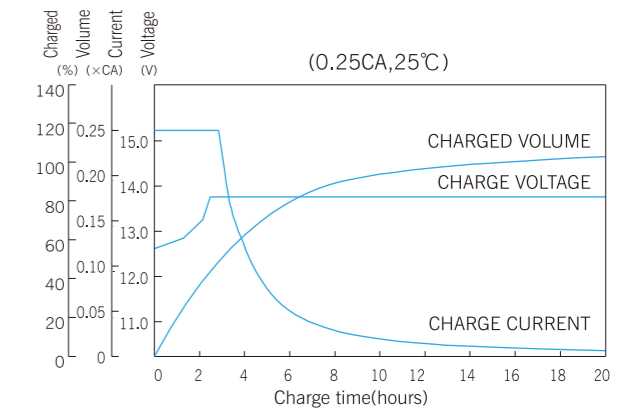


The operating environment temperature above 40°C should be avoided ,After long term storage, The battery actual capacity would be less than the rated capacity. Full capacity will be obtained through several charge/discharge cycles. To get the longest life, KSTAR battery should be fully charged before storage.

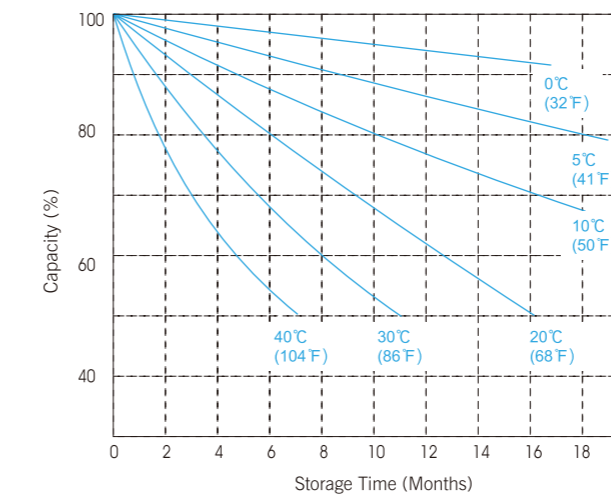
Cycle service life in relation to depth of discharge



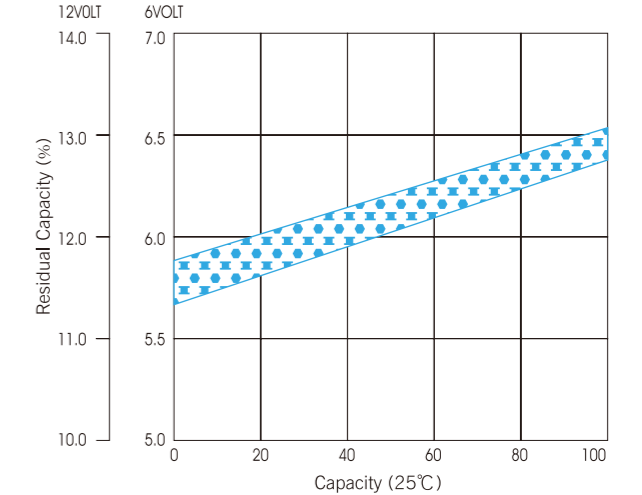
Constant voltage charge characteristic



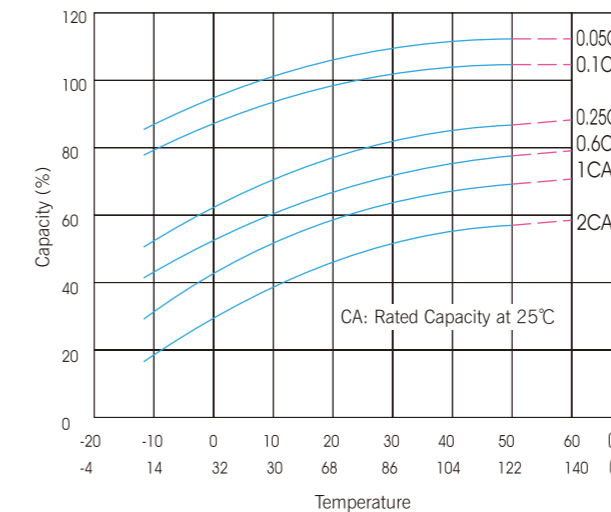
Self-Discharge Characteristics



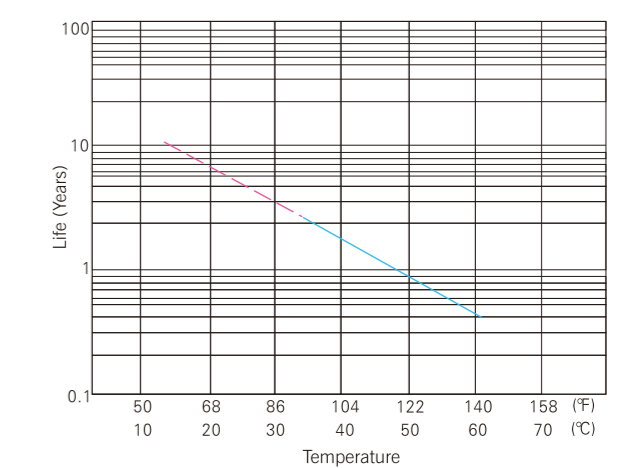
Relationship of OCV and Residual Capacity % (25°C)

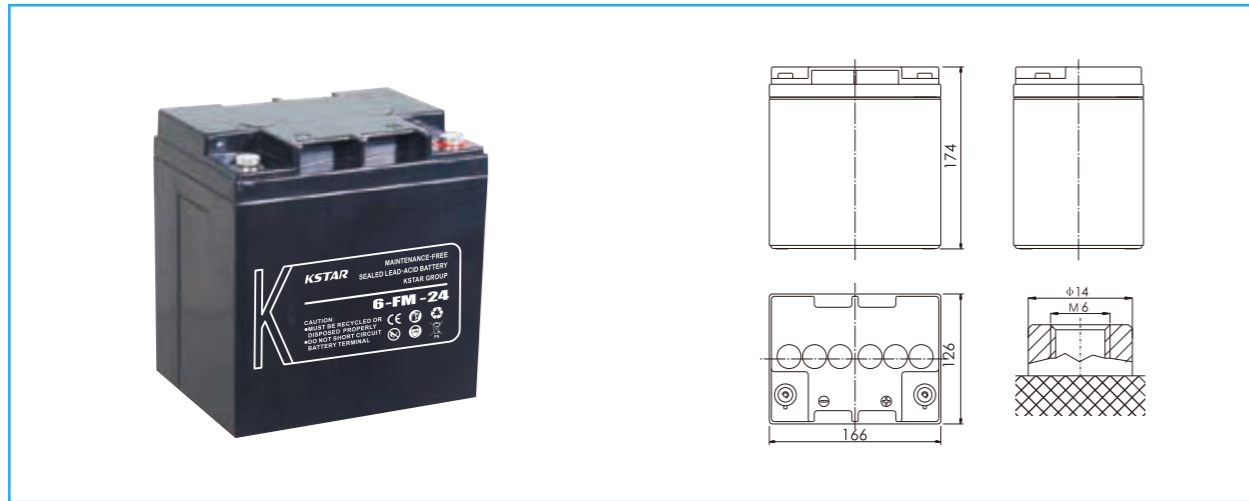


Temperature effects on capacity



Temperature effects float life





Specifications

Nominal Voltage	12V	
Rated Capacity (20 hour rate)	24Ah	
Dimensions	Total Height (with terminals)	6.85 inches(174mm)
	Height	6.85 inches(174mm)
	length	6.54 inches(166mm)
	width	4.96 inches(126mm)
Weight	Approx.17.6 Pound(8.0kg)	

Characteristics

Capacity 77°F(25°C)	20 hour rate (1.20A)	24 Ah
	10 hour rate (2.23A)	22.3 Ah
	5 hour rate (3.84A)	19.2 Ah
	1hour rate (14.4A)	14.4 Ah
	15Minute Rate (42.2A)	10.5Ah
Internal Resistance	Full charged Battery 77°F(25°C)	12 mΩ
	104°F(40°C)	102%
	77°F(25°C)	100%
Capacity affected by Temperature (20hour rate)	32°F(0°C)	85%
	5°F(-15°C)	65%
	Capacity after 3 month storage	91%
Self-Discharge 77°F(25°C)	Capacity after 6 month storage	81%
	Capacity after 12 month storage	60%
	Max. Discharge Current 77°F(25°C)	360A(5S)
Terminal	M1	
Charge (Constant Voltage)	Cycle	Initial Charging Current less than 7.2A Voltage 14.4~14.7 V / 77°F(25°C)
	Float	Voltage 13.5~13.8V / 77°F(25°C)

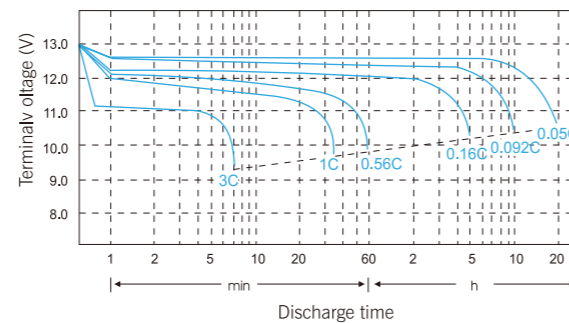
Constant Current Discharge (AMPERES @25°C)

F.V/Time	5Min	10Min	15Min	30Min	60Min	2H	3H	4H	5H	10H	20H
1.60	91.5	58.1	42.0	25.9	15.3	8.96	6.19	4.80	3.95	2.28	1.23
1.65	89.3	56.4	40.5	25.2	15.0	8.64	6.08	4.70	3.89	2.23	1.22
1.70	85.2	54.0	38.9	24.7	14.7	8.53	6.03	4.66	3.89	2.23	1.21
1.75	81.6	51.8	38.3	24.5	14.4	8.43	6.03	4.61	3.84	2.23	1.20
1.80	76.8	51.4	37.3	23.8	14.1	8.16	5.92	4.56	3.79	2.18	1.17

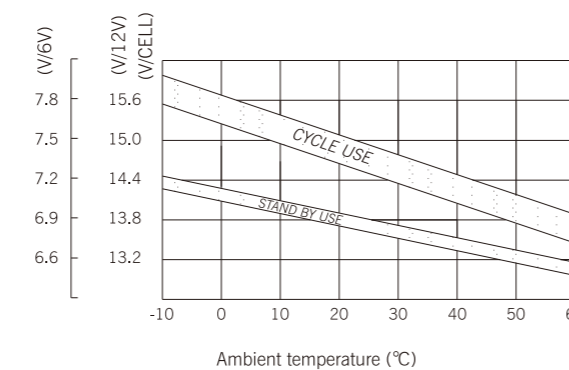
Constant Power Discharge (WATTS PER CELL@25°C)

F.V/Time	5Min	10Min	15Min	30Min	60Min	2H	3H	4H	5H	10H	20H
1.60	170	108	80.3	49.2	27.6	17.4	12.3	9.55	7.85	4.54	2.44
1.65	166	106	77.3	48.1	27.3	16.9	12.1	9.36	7.75	4.51	2.43
1.70	158	101	74.3	47.2	26.8	16.6	12.0	9.31	7.79	4.48	2.42
1.75	152	97.8	73.1	46.8	26.1	16.4	12.0	9.22	7.68	4.48	2.41
1.80	143	96.9	71.2	45.4	25.7	16.0	11.8	9.12	7.57	4.37	2.36

Discharge Curves 77°F (25°C)

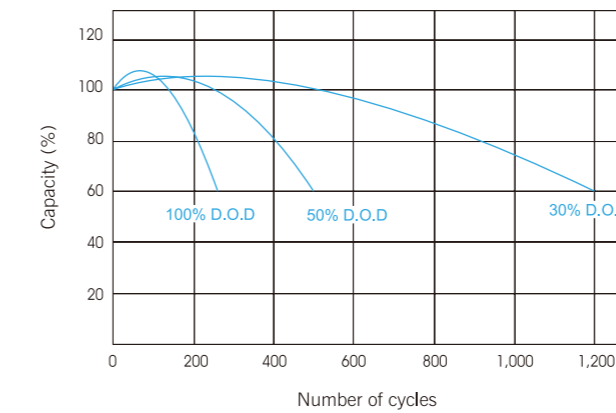


Relationship between charge voltage and temperature

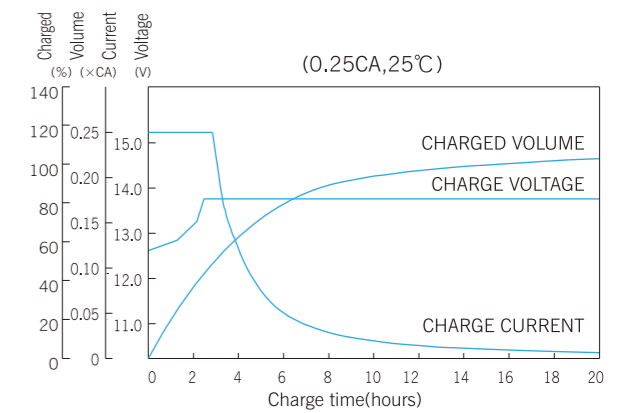


The operating environment temperature above 40°C should be avoided ,After long term storage, The battery actual capacity would be less than the rated capacity. Full capacity will be obtained through several charge/discharge cycles. To get the longest life, KSTAR battery should be fully charged before storage.

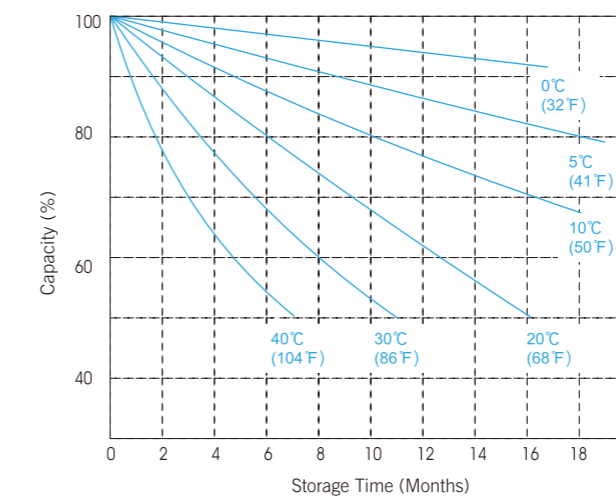
Cycle service life in relation to depth of discharge



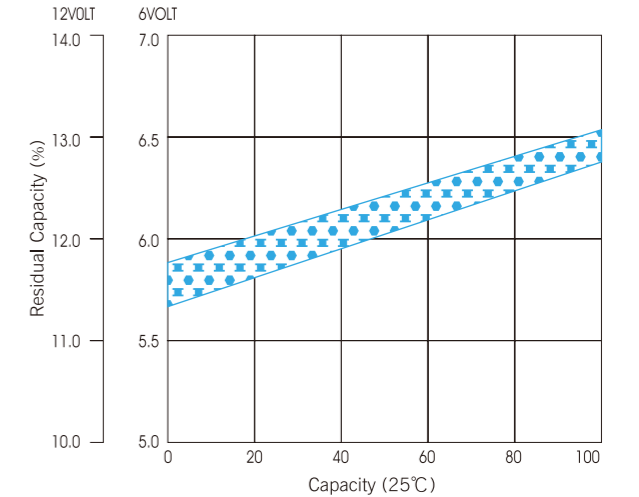
Constant voltage charge characteristic



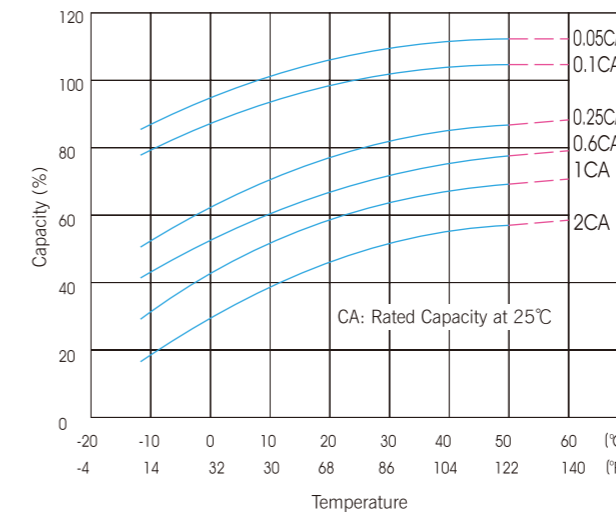
Self-Discharge Characteristics



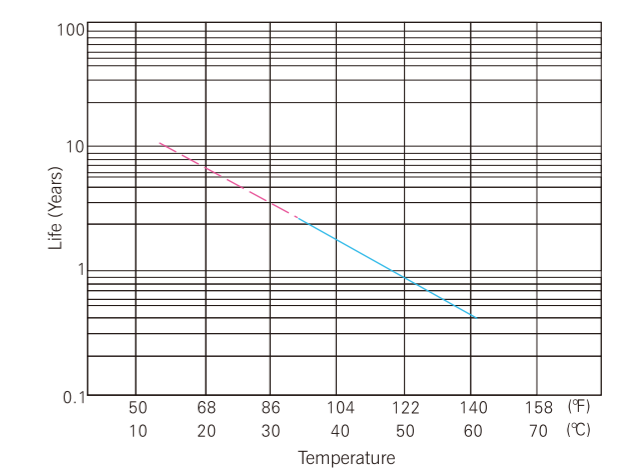
Relationship of OCV and Residual Capacity % (25°C)

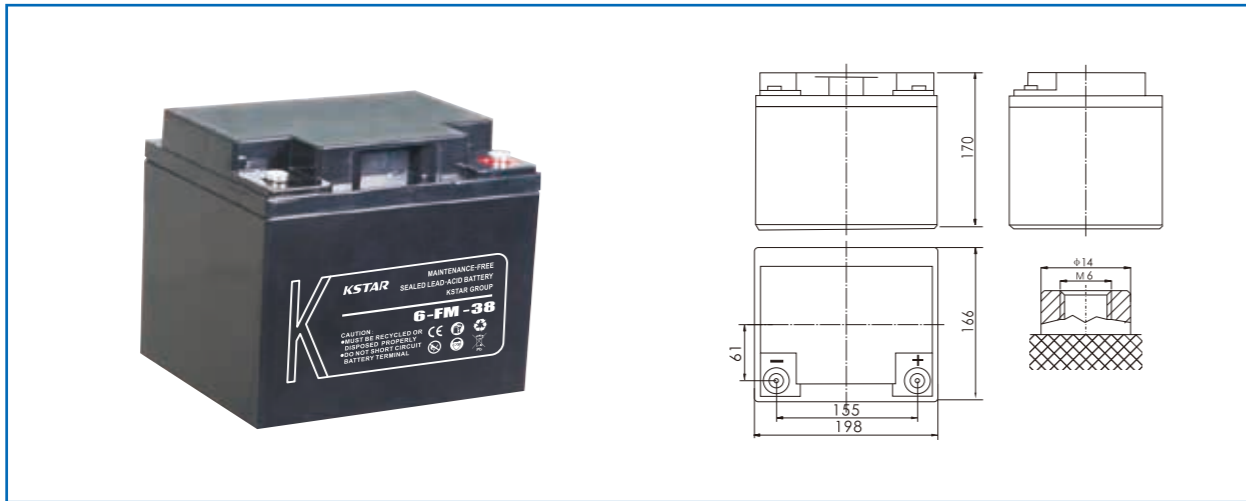


Temperature effects on capacity



Temperature effects float life





Specifications

Nominal Voltage	12V	
Rated Capacity (20 hour rate)	38Ah	
Dimensions	Total Height (with terminals)	6.70 inches(170mm)
	Height	6.70 inches(170mm)
	length	7.80 inches(198mm)
	width	6.54 inches(166mm)
Weight	Approx.24.86 Pound(12.0kg)	

Characteristics

Capacity 77°F(25°C)	20 hour rate (1.90A)	38.0 Ah
	10 hour rate (3.50A)	35.0 Ah
	5 hour rate (6.08A)	30.4 Ah
	1hour rate (22.8A)	22.8 Ah
	15Minute Rate (62.8A)	15.7 Ah
Internal Resistance	Full charged Battery 77°F(25°C)	12 mΩ
	104°F(40°C)	102%
	77°F(25°C)	100%
Capacity affected by Temperature (20hour rate)	32°F(0°C)	85%
	5°F(-15°C)	65%
	Capacity after 3 month storage	91%
Self-Discharge 77°F(25°C)	Capacity after 6 month storage	81%
	Capacity after 12 month storage	60%
	Max. Discharge Current 77°F(25°C)	380A(5S)
Terminal	M1	
Charge (Constant Voltage)	Cycle	Initial Charging Current less than 11.4A Voltage 14.4~14.7 V / 77°F(25°C)
	Float	Voltage 13.5~13.8V / 77°F(25°C)

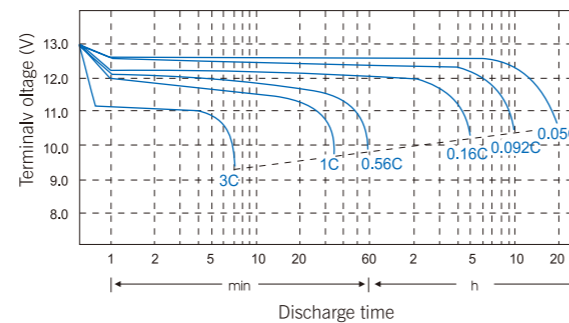
Constant Current Discharge (AMPERES @25°C)

F.V/Time	10Min	15Min	30Min	60Min	2H	3H	4H	5H	8H	10H	20H
1.60	80.7	62.8	39.8	24.5	13.9	9.89	7.72	6.53	4.61	3.77	1.98
1.65	77.6	60.4	38.3	23.6	13.4	9.79	7.64	6.47	4.56	3.73	1.96
1.70	73.1	57.3	36.2	23.3	13.0	9.50	7.38	6.21	4.48	3.66	1.95
1.75	63.6	50.9	34.6	22.8	13.0	9.39	7.27	6.08	4.37	3.50	1.90
1.80	61.2	48.9	33.3	21.9	12.5	9.03	6.99	5.85	4.20	3.37	1.83
1.85	50.2	42.5	30.6	20.1	12.0	8.58	6.64	5.56	3.99	3.20	1.74

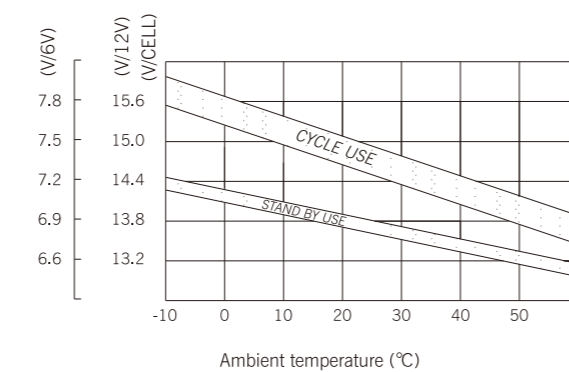
Constant Power Discharge (WATTS PER CELL@25°C)

F.V/Time	10Min	15Min	30Min	60Min	2H	3H	4H	5H	8H	10H	20H
1.60	143	113	70.2	44.6	25.3	18.0	14.3	12.1	8.00	6.76	3.50
1.65	139	110	69.7	43.2	24.5	17.8	14.1	11.9	7.94	6.70	3.48
1.70	135	106	67.6	41.9	24.2	17.5	13.8	11.6	7.75	6.56	3.37
1.75	127	102	67.4	41.6	24.0	17.4	13.7	11.5	7.68	6.50	3.31
1.80	117	94.1	64.1	40.9	23.6	17.0	13.4	11.3	7.42	6.28	3.22
1.85	96.9	82.7	58.3	38.0	22.7	16.5	12.9	10.7	7.21	6.00	3.12

Discharge Curves 77°F (25°C)

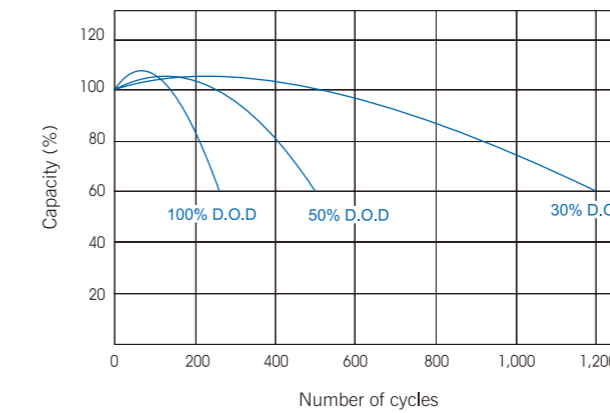


Relationship between charge voltage and temperature

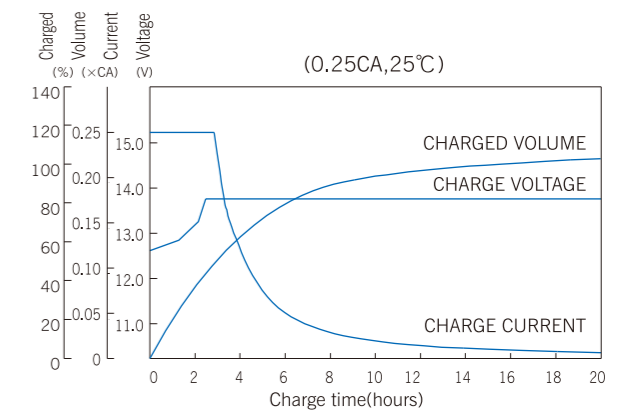


The operating environment temperature above 40°C should be avoided ,After long term storage, The battery actual capacity would be less than the rated capacity. Full capacity will be obtained through several charge/discharge cycles. To get the longest life, KSTAR battery should be fully charged before storage.

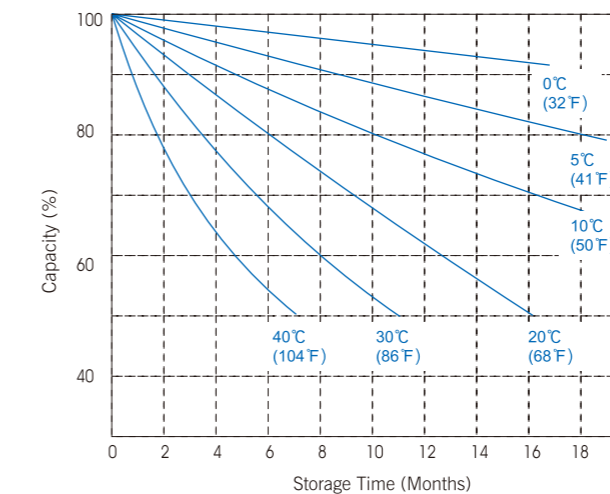
Cycle service life in relation to depth of discharge



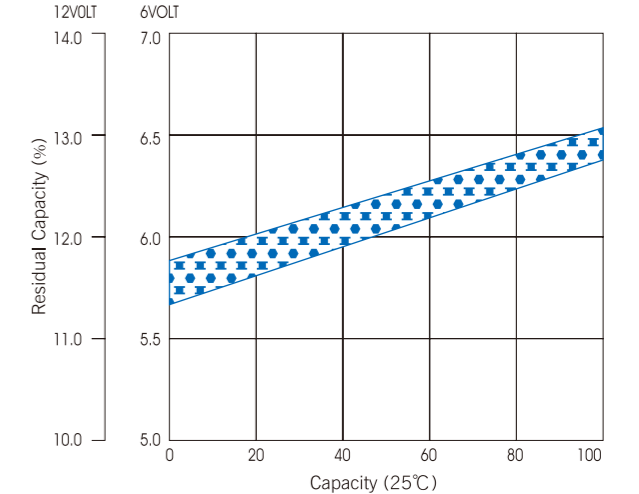
Constant voltage charge characteristic



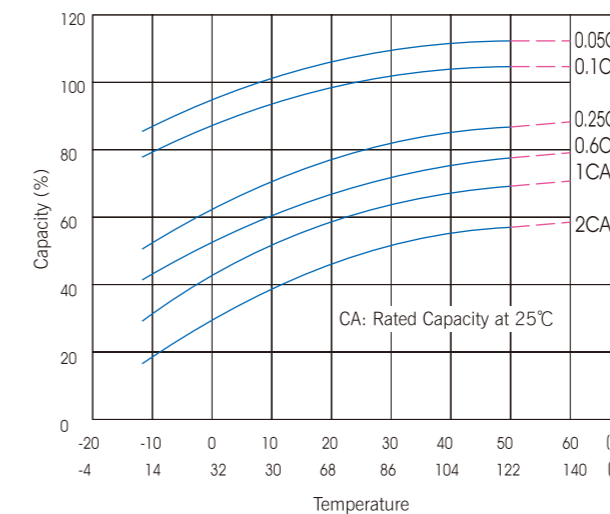
Self-Discharge Characteristics



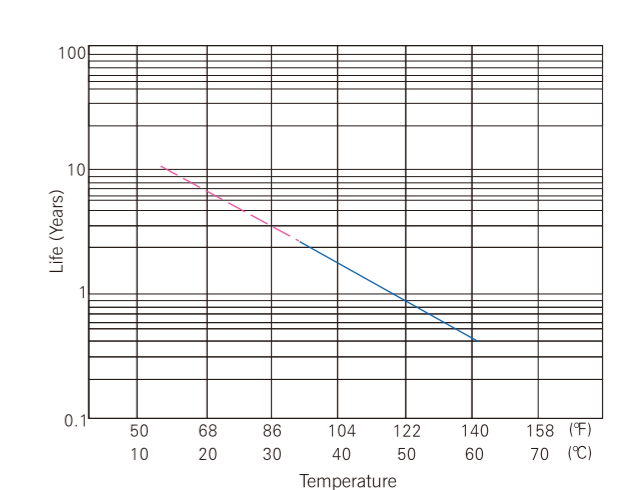
Relationship of OCV and Residual Capacity % (25°C)

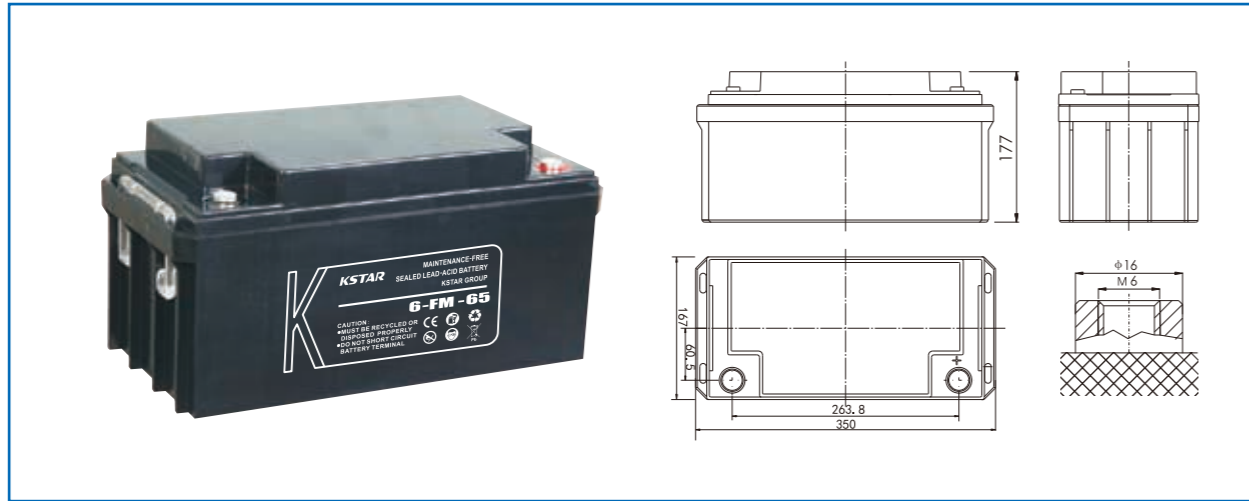


Temperature effects on capacity



Temperature effects float life





Specifications

Nominal Voltage	12V	
Rated Capacity (20 hour rate)	65Ah	
Dimensions	Total Height (with terminals)	6.97 inches(177mm)
	Height	6.97 inches(177mm)
	length	13.8 inches(350mm)
	width	6.57 inches(167mm)
Weight	Approx.43.34 Pound(19.7kg)	

Characteristics

Capacity 77°F(25°C)	20 hour rate (3.25A)	65 Ah
	10 hour rate (6.10A)	59.8 Ah
	5 hour rate (10.4A)	52 Ah
	1hour rate (39.0A)	39 Ah
	15Minute Rate (107A)	26.8 Ah
Internal Resistance	Full charged Battery 77°F(25°C)	7.0 mΩ
Capacity affected by Temperature (20hour rate)	104°F(40°C)	102%
	77°F(25°C)	100%
	32°F(0°C)	85%
Self-Discharge 77°F(25°C)	Capacity after 3 month storage	91%
	Capacity after 6 month storage	81%
	Capacity after 12 month storage	60%
Max. Discharge Current 77°F(25°C)	650A(5S)	
Terminal	M2 / B5 / B11	
Charge (Constant Voltage)	Cycle	Initial Charging Current less than 19.5A Voltage 14.4~14.7 V / 77°F(25°C)
	Float	Voltage 13.5~13.8V / 77°F(25°C)

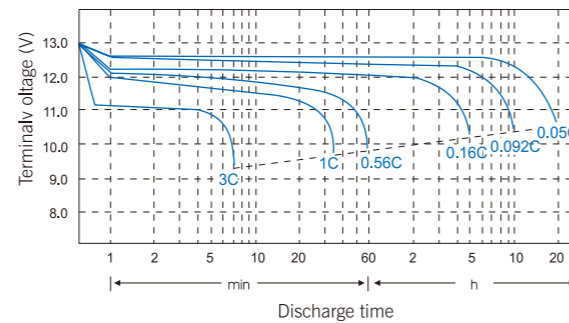
Constant Current Discharge (AMPERES @25°C)

F.V/Time	10Min	15Min	30Min	60Min	2H	3H	4H	5H	8H	10H	20H
1.60	146	107	70.9	41.6	24.5	16.8	13.2	11.4	7.73	6.48	3.39
1.65	140	103	68.2	40.0	23.6	16.6	13.1	11.3	7.65	6.42	3.36
1.70	133	101	64.8	39.2	23.2	16.3	12.8	10.9	7.43	6.26	3.34
1.75	116	91.9	56.2	39.0	22.5	15.9	12.4	10.4	7.34	5.98	3.25
1.80	112	88.4	54.0	37.5	21.6	15.3	11.9	10.0	7.06	5.75	3.13
1.85	91.8	76.9	49.7	34.5	20.7	14.5	11.3	9.50	6.71	5.46	2.97

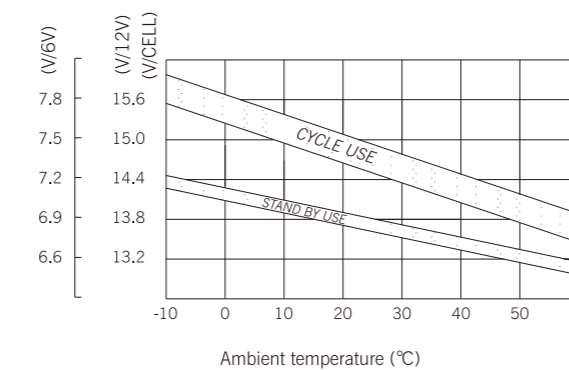
Constant Power Discharge (WATTS PER CELL@25°C)

Cut off voltage V/cell	10Min	15Min	30Min	60Min	2H	3H	4H	5H	8H	10H	20H
1.60	254	194	127	77.2	45.3	31.8	25.0	20.9	14.2	11.8	6.42
1.65	251	192	124	76.4	44.7	31.5	24.8	20.7	14.1	11.6	6.40
1.70	246	187	121	75.0	43.6	31.2	24.5	20.3	13.9	11.3	6.35
1.75	230	182	111	74.8	43.1	30.8	24.2	20.1	13.8	11.2	6.32
1.80	214	170	104	74.4	42.4	30.1	23.8	20.0	13.5	11.0	6.30
1.85	177	149	96.0	69.2	41.4	29.7	23.2	19.1	13.0	10.9	5.94

Discharge Curves 77°F (25°C)

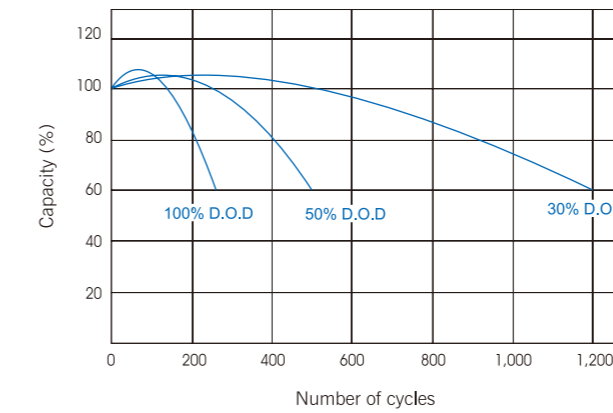


Relationship between charge voltage and temperature

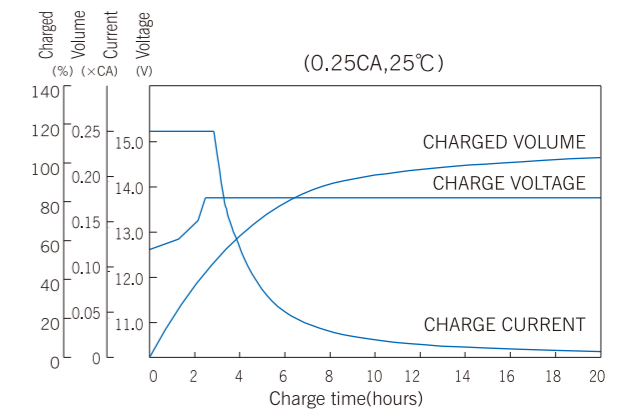


The operating environment temperature above 40°C should be avoided. After long term storage, The battery actual capacity would be less than the rated capacity. Full capacity will be obtained through several charge/discharge cycles. To get the longest life, KSTAR battery should be fully charged before storage.

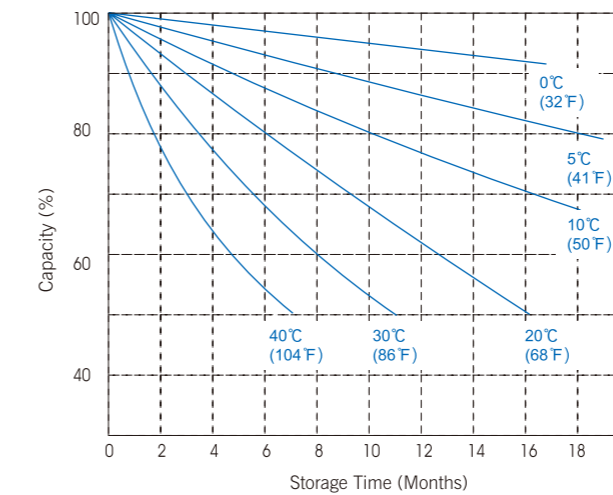
Cycle service life in relation to depth of discharge



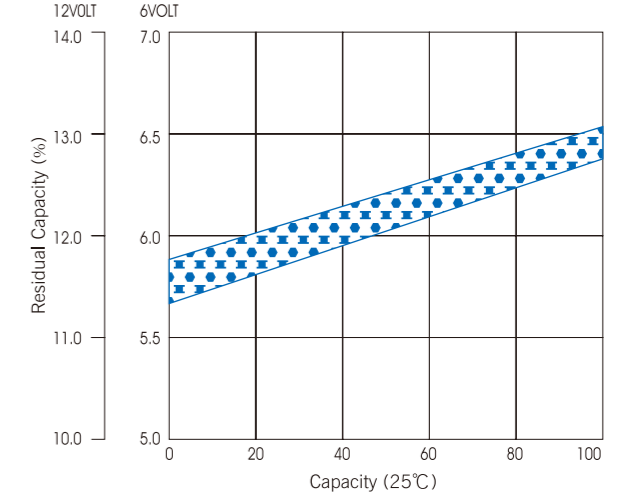
Constant voltage charge characteristic



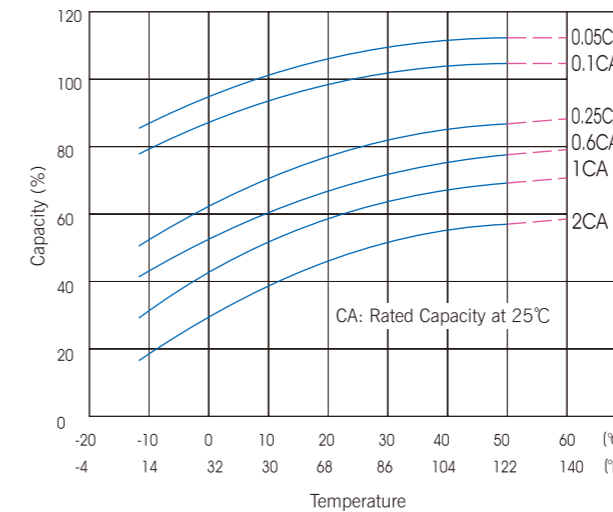
Self-Discharge Characteristics



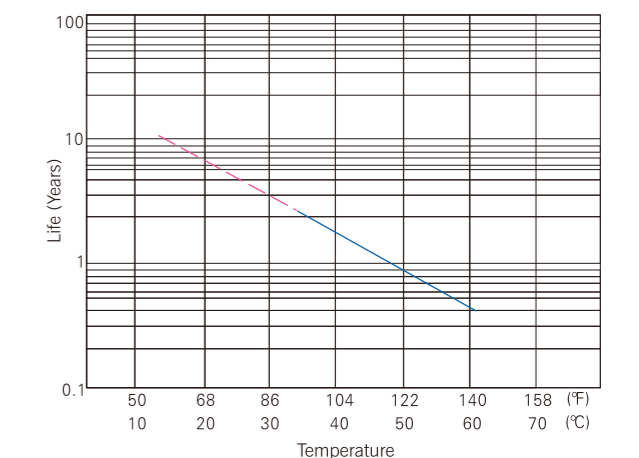
Relationship of OCV and Residual Capacity % (25°C)

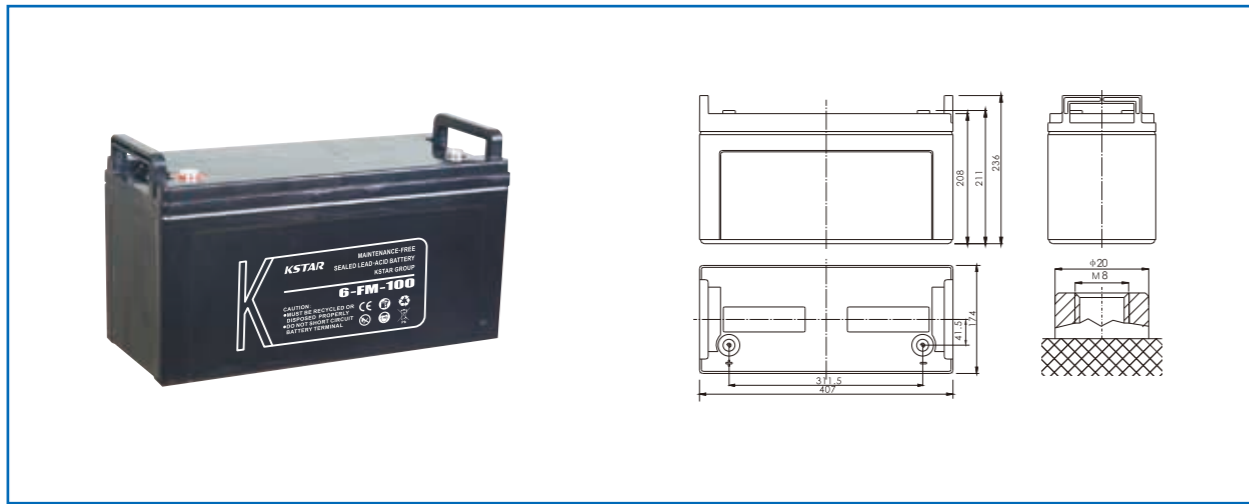


Temperature effects on capacity



Temperature effects float life





Specifications

Nominal Voltage	12V	
Rated Capacity (20 hour rate)	100Ah	
Dimensions	Total Height (with terminals)	9.29 inches(236mm)
	Height	8.19 inches(208mm)
	length	16.02 inches(407mm)
	width	6.85 inches(174mm)
Weight	Approx.72.6 Pound(33.0kg)	

Characteristics

Capacity 77°F(25°C)	20 hour rate (5.0A)	100 Ah
	10 hour rate (9.2A)	92 Ah
	5 hour rate (16.0A)	80 Ah
	1hour rate (60.0A)	60 Ah
	15Minute Rate (164A)	41 Ah
Internal Resistance	Full charged Battery	
	77°F(25°C)	5 mΩ
	104°F(40°C)	102%
Capacity affected by Temperature (20hour rate)	77°F(25°C)	100%
	32°F(0°C)	85%
	5°F(-15°C)	65%
Self-Discharge 77°F(25°C)	Capacity after 3 month storage	91%
	Capacity after 6 month storage	81%
	Capacity after 12 month storage	60%
Max. Discharge Current 77°F(25°C)	800A(5S)	
Terminal	M3	
Charge (Constant Voltage)	Cycle	Initial Charging Current less than 30A Voltage 14.4~14.7 V / 77°F(25°C)
	Float	Voltage 13.5~13.8V / 77°F(25°C)

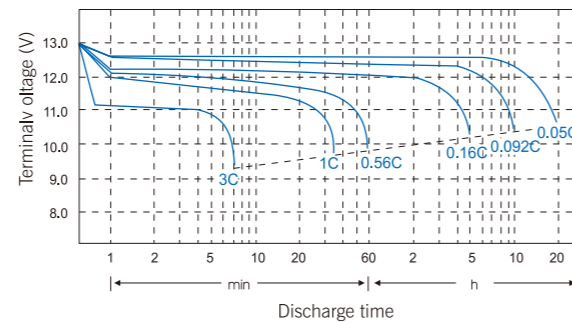
Constant Current Discharge (AMPERES @25°C)

F.V/Time	10Min	15Min	30Min	60Min	2H	3H	4H	5H	8H	10H	20H
1.60	226	164	106	63.4	36.9	25.8	20.6	17.7	12.1	9.90	5.17
1.65	217	158	102	61.0	35.5	25.5	20.4	17.5	12.0	9.80	5.12
1.70	205	151	86.8	60.5	34.6	25.0	19.9	16.9	11.9	9.59	5.06
1.75	180	142	81.5	60.0	34.3	24.5	19.3	16.0	11.6	9.20	5.00
1.80	173	137	78.4	57.7	33.0	23.6	18.5	15.4	11.2	8.85	4.81
1.85	142	119	72.1	53.1	31.7	22.4	17.6	14.6	10.6	8.41	4.57

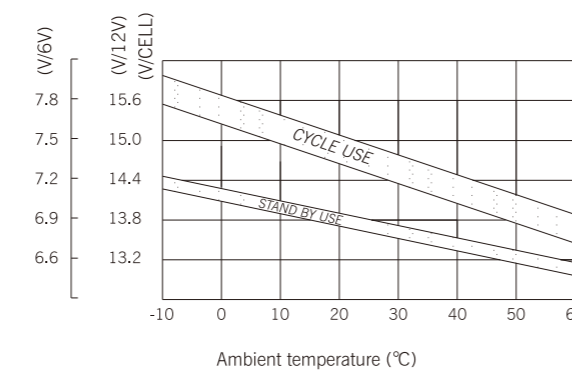
Constant Power Discharge (WATTS PER CELL@25°C)

F.V/Time	10Min	15Min	30Min	60Min	2H	3H	4H	5H	8H	10H	20H
1.60	394	307	191	119	70.0	49.1	38.7	32.4	22.9	18.3	9.73
1.65	389	304	185	115	69.1	49.0	38.6	32.2	22.8	18.2	9.72
1.70	379	291	162	111	68.4	47.7	37.7	31.6	22.3	18.1	9.68
1.75	346	274	156	108	67.9	46.4	36.8	31.0	21.7	18.0	9.67
1.80	330	264	151	107	66.6	46.1	36.4	30.5	21.4	17.7	9.65
1.85	273	231	141	104	64.2	45.0	35.4	29.6	20.1	16.9	9.14

Discharge Curves 77°F (25°C)

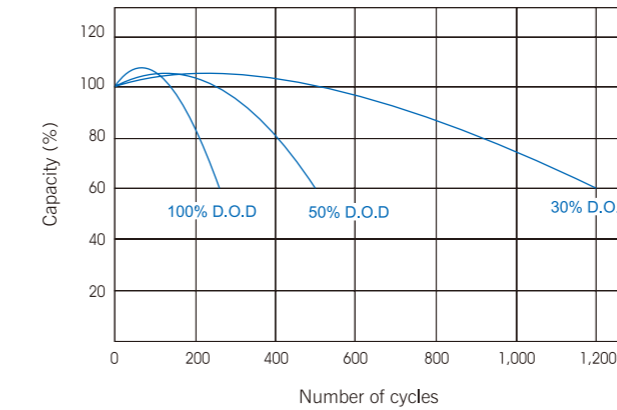


Relationship between charge voltage and temperature

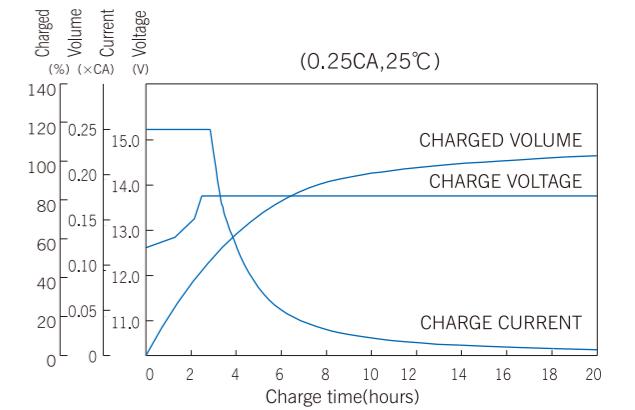


The operating environment temperature above 40°C should be avoided ,After long term storage, The battery actual capacity would be less than the rated capacity. Full capacity will be obtained through several charge/discharge cycles. To get the longest life, KSTAR battery should be fully charged before storage.

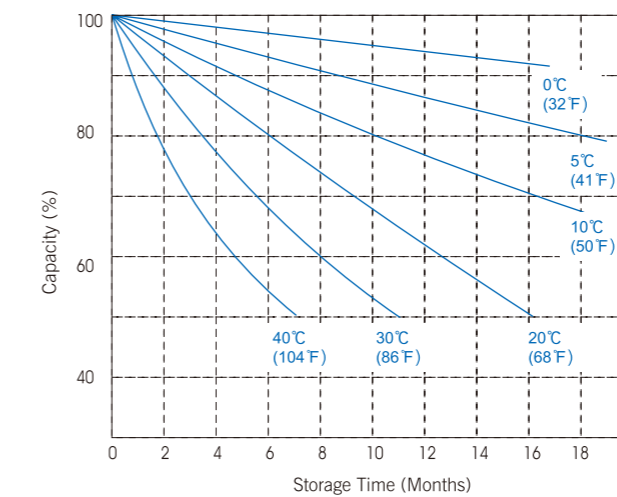
Cycle service life in relation to depth of discharge



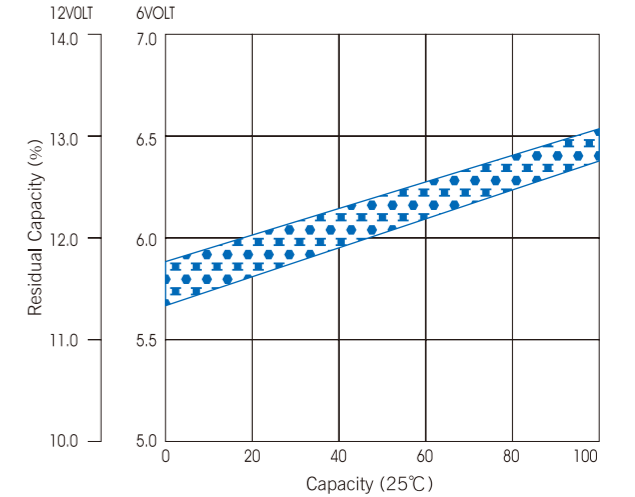
Constant voltage charge characteristic



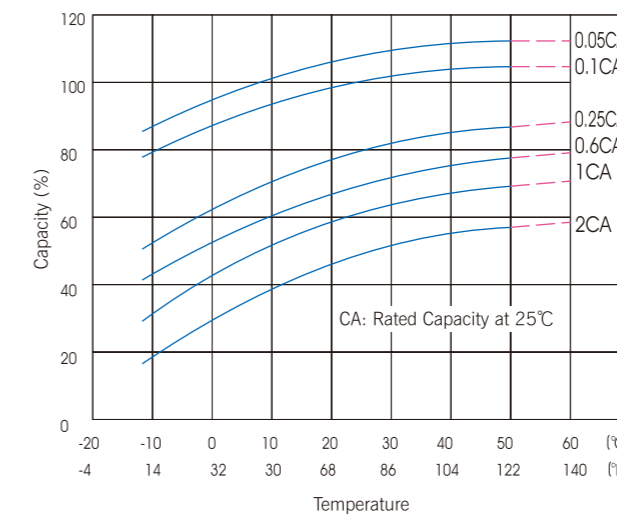
Self-Discharge Characteristics



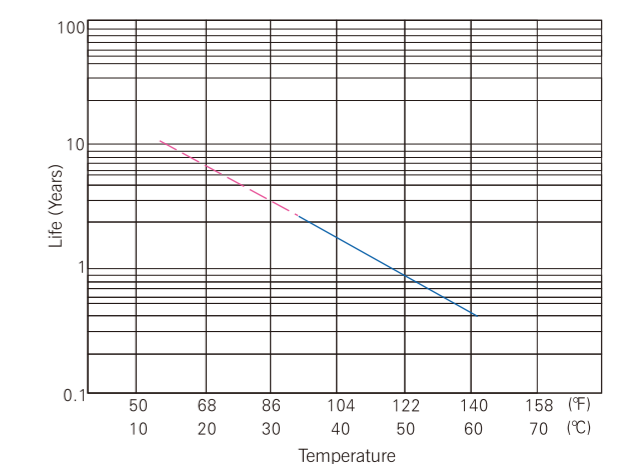
Relationship of OCV and Residual Capacity % (25°C)

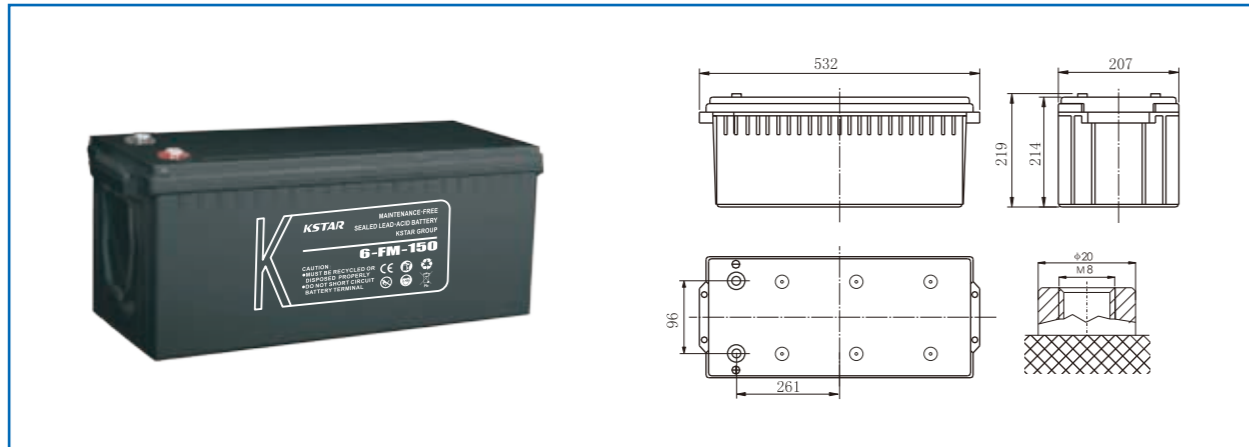


Temperature effects on capacity



Temperature effects float life





Specifications

Nominal Voltage	12V	
Rated Capacity (20 hour rate)	150Ah	
Dimensions	Total Height (with terminals)	8.62 inches(219mm)
	Height	8.43 inches(214mm)
	length	20.94 inches(532mm)
	width	8.15 inches(207mm)
Weight	Approx.104.5 Pound(47.5kg)	

Characteristics

Capacity 77°F(25°C)	20 hour rate (7.5A)	150 Ah
	10 hour rate (13.8A)	138 Ah
	5 hour rate (24.0A)	120 Ah
	1hour rate (90.0A)	90 Ah
	15Minute Rate (246A)	61.5 Ah
Internal Resistance	Full charged Battery	
	77°F(25°C)	3.5 mΩ
	104°F(40°C)	102%
Capacity affected by Temperature (20hour rate)	77°F(25°C)	100%
	32°F(0°C)	85%
	5°F(-15°C)	65%
Self-Discharge 77°F(25°C)	Capacity after 3 month storage	91%
	Capacity after 6 month storage	81%
	Capacity after 12 month storage	60%
Max. Discharge Current 77°F(25°C)	1000A(5S)	
Terminal	M3	
Charge (Constant Voltage)	Cycle	Initial Charging Current less than 45A Voltage 14.4~14.7 V / 77°F(25°C)
	Float	Voltage 13.5~13.8V / 77°F(25°C)

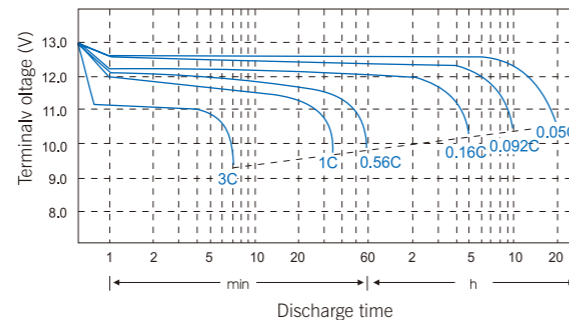
Constant Current Discharge (AMPERES @25°C)

F.V/Time	10Min	15Min	30Min	60Min	2H	3H	4H	5H	8H	10H	20H
1.60	339	246	159	94.2	55.6	39.5	31.0	26.5	18.0	14.8	7.70
1.65	326	237	153	90.6	53.5	39.2	30.7	26.3	17.8	14.7	7.62
1.70	308	236	130	90.2	53.2	37.5	29.5	25.4	17.6	14.4	7.58
1.75	270	214	122	90.0	53.0	36.8	28.6	24.0	17.5	13.8	7.50
1.80	260	206	118	86.5	51.0	35.4	27.5	23.1	16.8	13.3	7.21
1.85	213	179	108	79.6	49.0	33.6	26.1	21.9	16.0	12.6	6.85

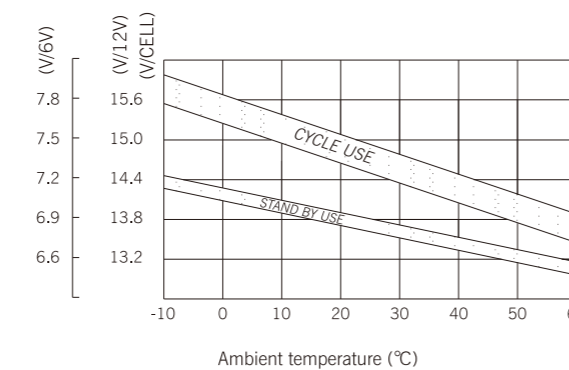
Constant Power Discharge (WATTS PER CELL@25°C)

F.V/Time	10Min	15Min	30Min	60Min	2H	3H	4H	5H	8H	10H	20H
1.60	583	454	286	178	106	73.7	58.1	48.6	33.5	27.8	14.6
1.65	576	451	282	175	104	72.0	57.0	48.1	33.4	27.6	14.5
1.70	560	441	247	168	102	70.4	55.8	47.1	33.1	27.2	14.3
1.75	519	411	234	162	101	69.6	55.1	46.5	32.5	27.0	14.2
1.80	487	391	214	159	100	68.7	54.1	45.2	32.1	26.5	13.9
1.85	404	342	208	148	95.5	67.8	53.1	44.0	29.9	25.2	13.7

Discharge Curves 77°F (25°C)

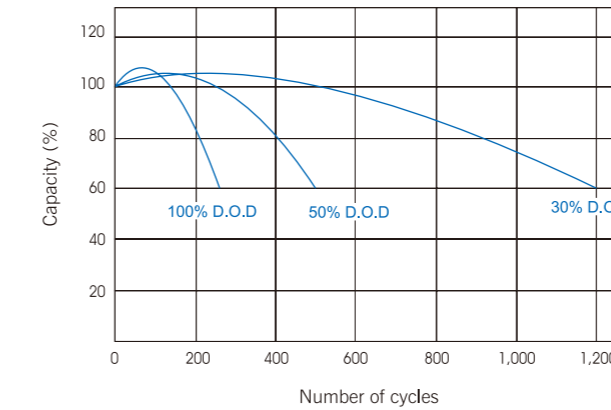


Relationship between charge voltage and temperature

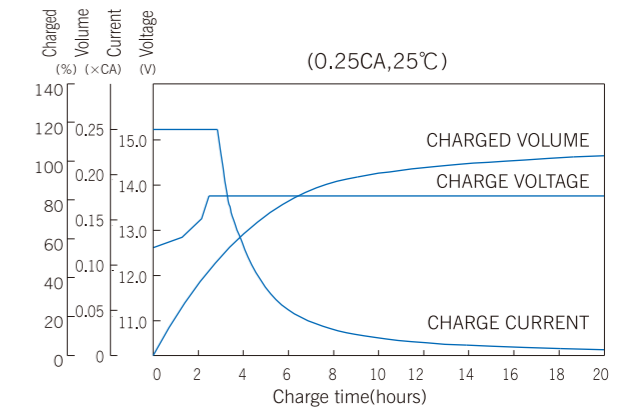


The operating environment temperature above 40°C should be avoided. After long term storage, The battery actual capacity would be less than the rated capacity. Full capacity will be obtained through several charge/discharge cycles. To get the longest life, KSTAR battery should be fully charged before storage.

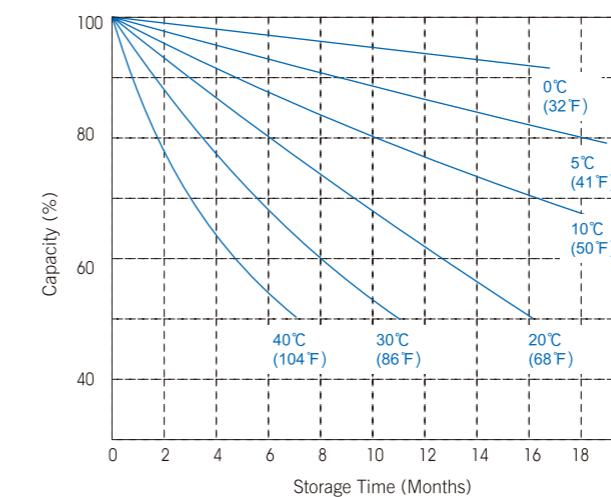
Cycle service life in relation to depth of discharge



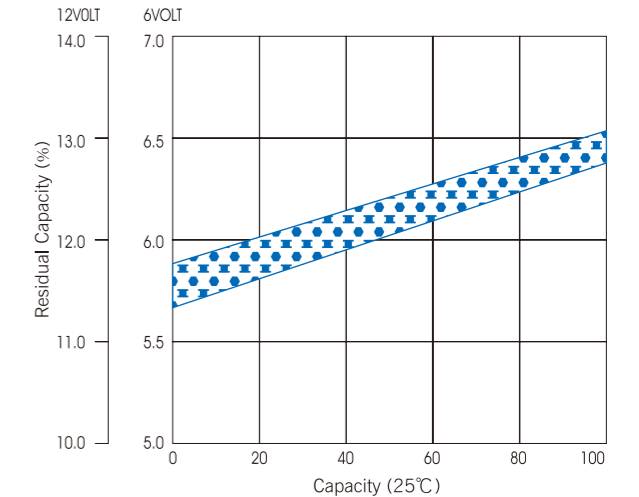
Constant voltage charge characteristic



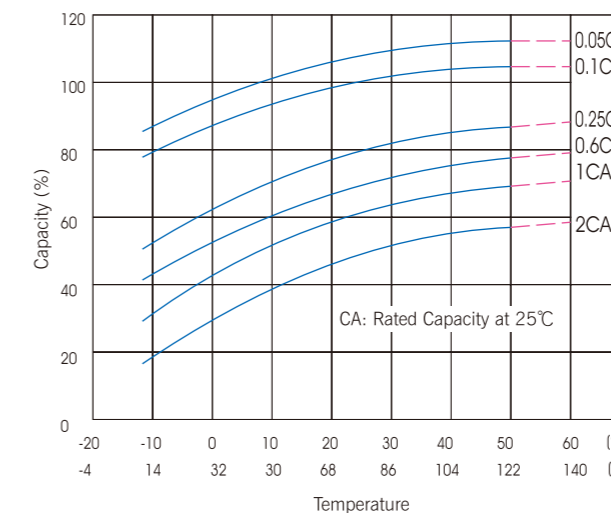
Self-Discharge Characteristics



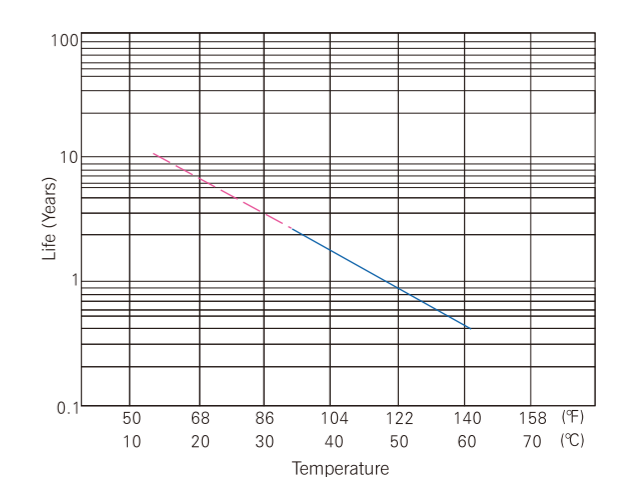
Relationship of OCV and Residual Capacity % (25°C)

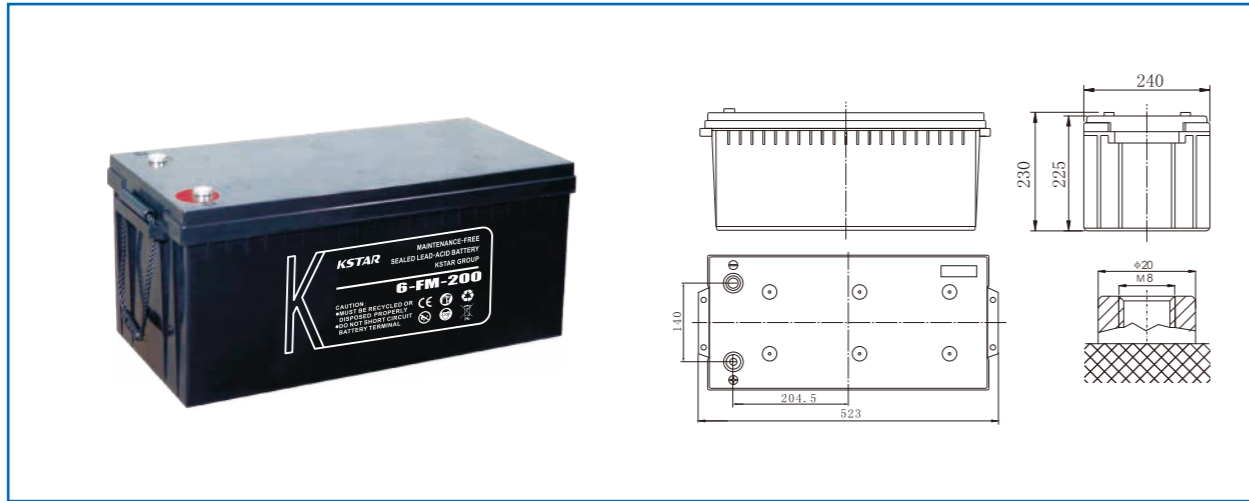


Temperature effects on capacity



Temperature effects float life





Specifications

Nominal Voltage	12V	
Rated Capacity (20 hour rate)	200Ah	
Dimensions	Total Height (with terminals)	9.06 inches(230mm)
	Height	8.86 inches(225mm)
	length	20.59 inches(523mm)
	width	9.45 inches(240mm)
Weight	Approx.128.7 Pound(58.5kg)	

Characteristics

Capacity 77°F(25°C)	20 hour rate (10.0A)	200 Ah
	10 hour rate (18.4A)	184 Ah
	5 hour rate (32.0A)	160 Ah
	1 hour rate (120.0A)	120 Ah
	15Minute Rate (328A)	82.0 Ah
Internal Resistance	Full charged Battery	3.5 mΩ
	77°F(25°C)	
	104°F(40°C)	102%
Capacity affected by Temperature (20hour rate)	77°F(25°C)	100%
	32°F(0°C)	85%
	5°F(-15°C)	65%
Self-Discharge 77°F(25°C)	Capacity after 3 month storage	91%
	Capacity after 6 month storage	81%
	Capacity after 12 month storage	60%
Max. Discharge Current 77°F(25°C)	1333A(5S)	
Terminal	M3	
Charge (Constant Voltage)	Cycle	Initial Charging Current less than 60A Voltage 14.4~14.7 V / 77°F(25°C)
	Float	Voltage 13.5~13.8V / 77°F(25°C)

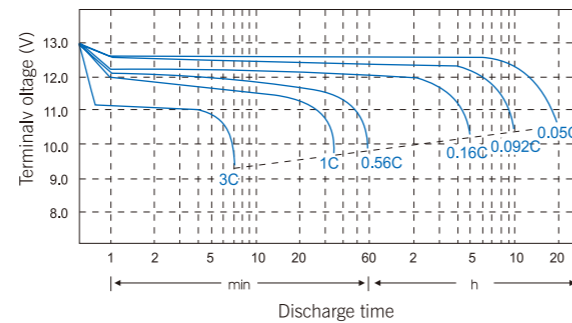
Constant Current Discharge (AMPERES @25°C)

F.V/Time	10Min	15Min	30Min	60Min	2H	3H	4H	5H	8H	10H	20H
1.60	401	328	197	127	73.1	52.0	40.7	34.5	23.8	19.4	10.4
1.65	386	315	189	122	70.3	51.5	40.3	34.2	23.5	19.2	10.3
1.70	364	286	177	121	69.2	50.0	39.2	33.5	23.0	18.6	10.1
1.75	317	254	152	120	68.8	49.9	38.5	32.0	22.7	18.4	10.0
1.80	305	244	146	115	66.2	48.0	37.0	30.8	21.8	17.7	9.62
1.85	250	212	134	106	63.6	45.6	35.2	29.3	20.7	16.8	9.14

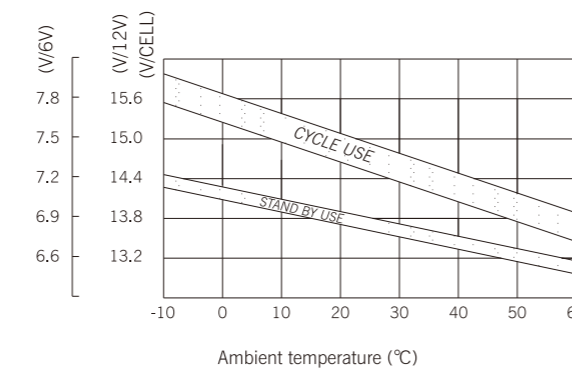
Constant Power Discharge (WATTS PER CELL@25°C)

F.V/Time	10Min	15Min	30Min	60Min	2H	3H	4H	5H	8H	10H	20H
1.60	697	545	349	231	138	95.8	75.5	63.2	43.5	37.3	19.0
1.65	691	541	343	228	136	94.6	74.9	63.0	43.3	36.8	18.7
1.70	672	529	331	219	134	93.2	74.0	62.6	43.0	36.0	18.5
1.75	629	499	296	216	133	92.8	73.5	62.0	42.5	35.1	18.4
1.80	584	469	281	211	130	92.1	72.9	61.4	41.7	34.4	18.1
1.85	485	410	257	207	124	89.3	69.6	57.2	38.9	32.8	17.8

Discharge Curves 77°F (25°C)

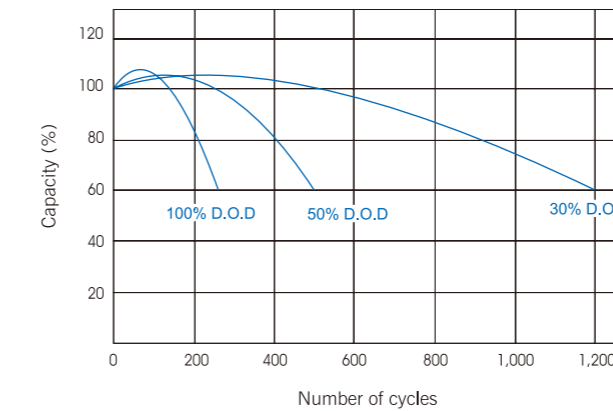


Relationship between charge voltage and temperature

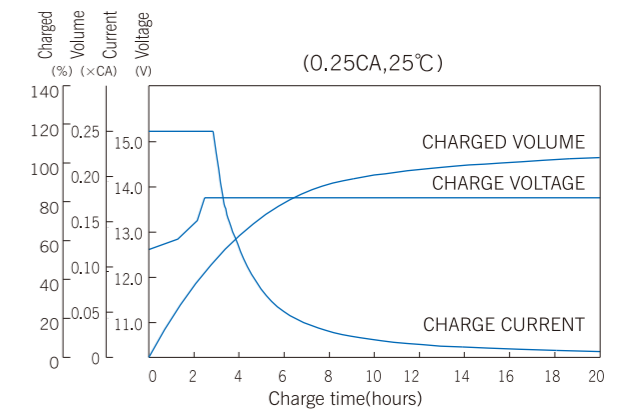


The operating environment temperature above 40°C should be avoided. After long term storage, the battery actual capacity would be less than the rated capacity. Full capacity will be obtained through several charge/discharge cycles. To get the longest life, KSTAR battery should be fully charged before storage.

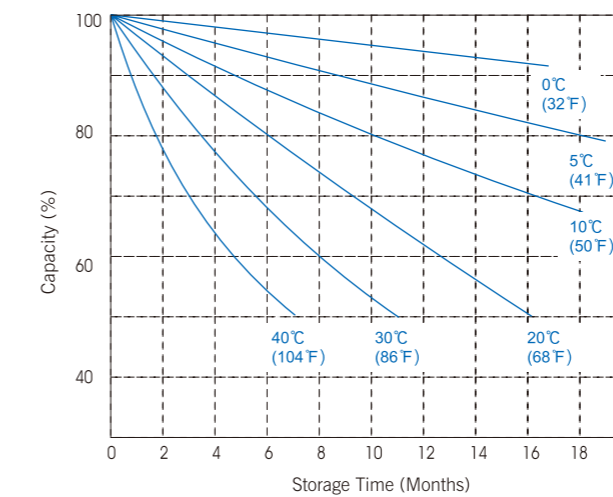
Cycle service life in relation to depth of discharge



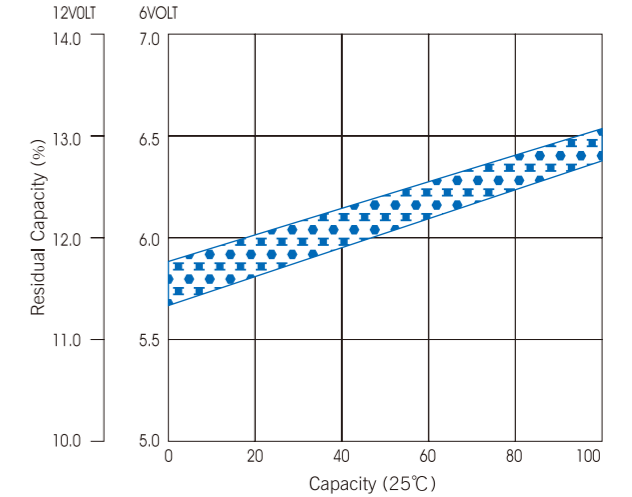
Constant voltage charge characteristic



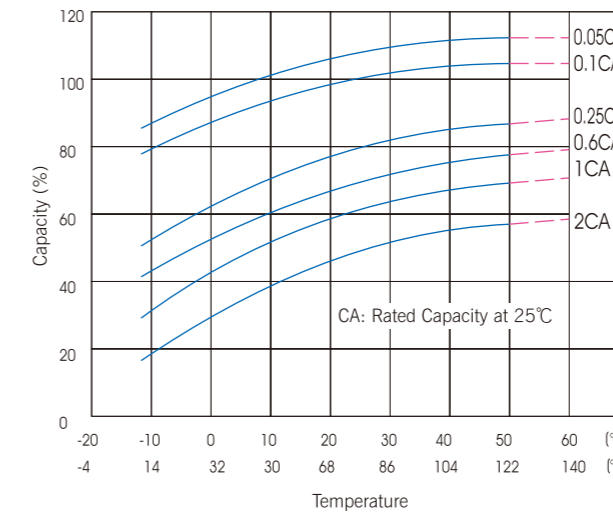
Self-Discharge Characteristics



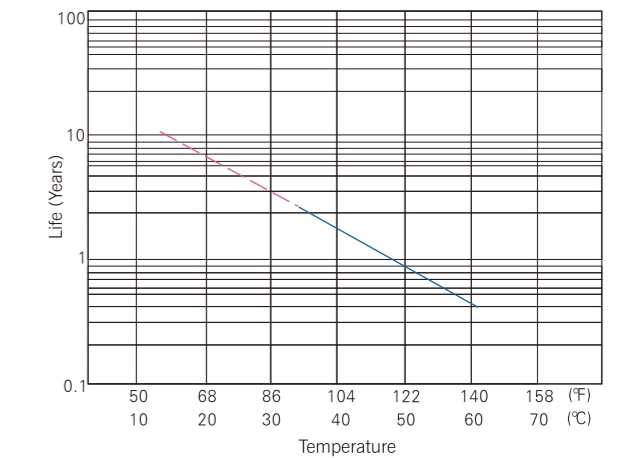
Relationship of OCV and Residual Capacity % (25°C)

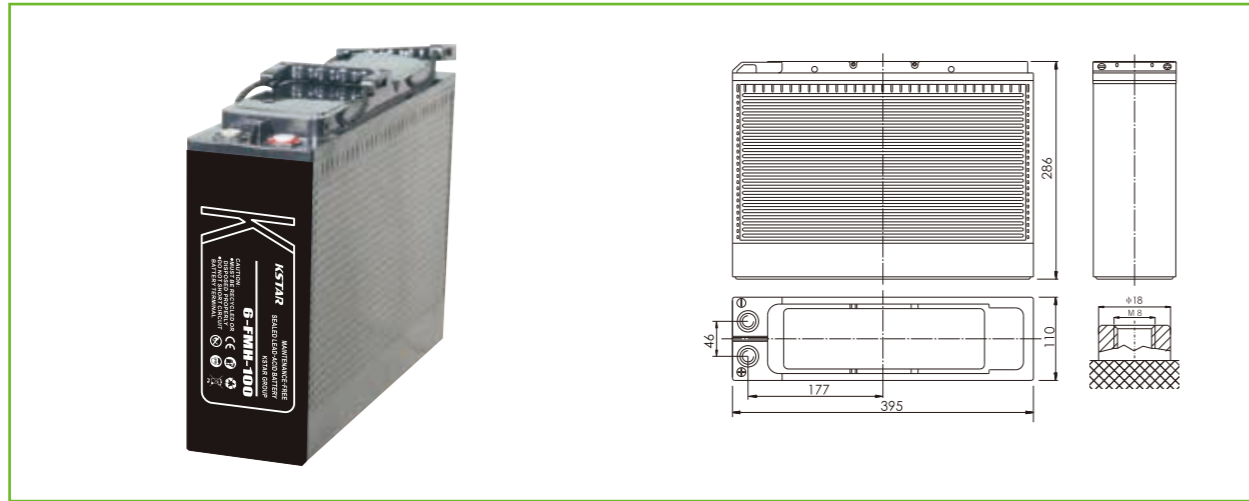


Temperature effects on capacity



Temperature effects float life





Specifications

Nominal Voltage	12V	
Rated Capacity (20 hour rate)	100Ah	
Dimensions	Total Height (with terminals)	11.26 inches(286mm)
	Height	11.26 inches(286mm)
	length	15.55 inches(395mm)
	width	4.33 inches(110mm)
Weight	Approx.77.0Pound(35.0kg)	

Characteristics

Capacity 77°F(25°C)	20 hour rate (5.0A)	100 Ah	
	10 hour rate (9.2A)	92 Ah	
	5 hour rate (16.0A)	80 Ah	
	1hour rate (60.0A)	60 Ah	
	15Minute Rate (164A)	41 Ah	
Internal Resistance	Full charged Battery 77°F(25°C)		4.5 mΩ
	104°F(40°C)		102%
	77°F(25°C)		100%
Capacity affected by Temperature (20hour rate)	32°F(0°C)		85%
	5°F(-15°C)		65%
	Capacity after 3 month storage		91%
Self-Discharge 77°F(25°C)	Capacity after 6 month storage		81%
	Capacity after 12 month storage		60%
	Max. Discharge Current 77°F(25°C)		
Terminal		M6	
Charge (Constant Voltage)	Cycle	Initial Charging Current less than 30A Voltage 14.4~14.7 V / 77°F(25°C)	
	Float	Voltage 13.5~13.8V / 77°F(25°C)	

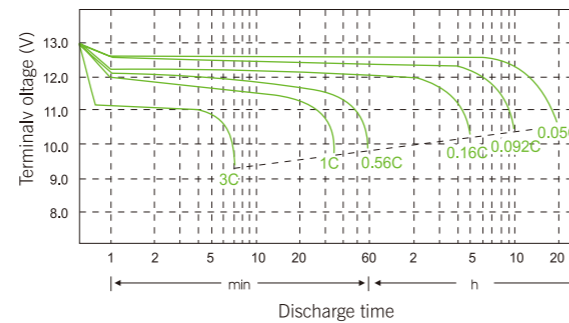
Constant Current Discharge (AMPERES @25°C)

F.V/Time	10Min	15Min	30Min	60Min	2H	3H	4H	5H	8H	10H	20H
1.60	226	164	106	63.4	36.9	25.8	20.6	17.7	12.1	9.90	5.17
1.65	217	158	102	61.0	35.5	25.5	20.4	17.5	12.0	9.80	5.12
1.70	205	151	86.8	60.5	34.6	25.0	19.9	16.9	11.9	9.59	5.06
1.75	180	142	81.5	60.0	34.3	24.5	19.3	16.0	11.6	9.20	5.00
1.80	173	137	78.4	57.7	33.0	23.6	18.5	15.4	11.2	8.85	4.81
1.85	142	119	72.1	53.1	31.7	22.4	17.6	14.6	10.6	8.41	4.57

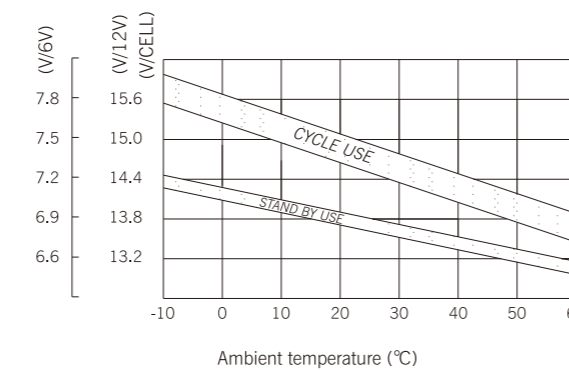
Constant Power Discharge (WATTS PER CELL@25°C)

F.V/Time	10Min	15Min	30Min	60Min	2H	3H	4H	5H	8H	10H	20H
1.60	394	307	191	119	70.0	49.1	38.7	32.4	22.9	18.3	9.73
1.65	389	304	185	115	69.1	49.0	38.6	32.2	22.8	18.2	9.72
1.70	379	291	162	111	68.4	47.7	37.7	31.6	22.3	18.1	9.68
1.75	346	274	156	108	67.9	46.4	36.8	31.0	21.7	18.0	9.67
1.80	330	264	151	107	66.6	46.1	36.4	30.5	21.4	17.7	9.65
1.85	273	231	141	104	64.2	45.0	35.4	29.6	20.1	16.9	9.14

Discharge Curves 77°F (25°C)

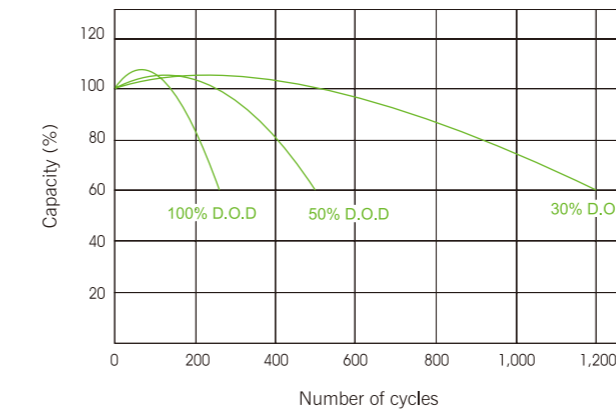


Relationship between charge voltage and temperature

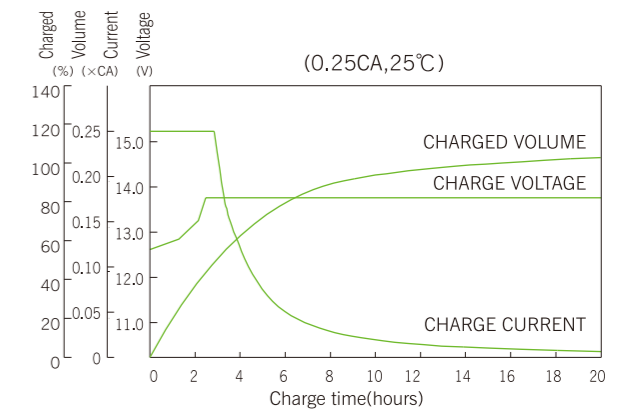


The operating environment temperature above 40°C should be avoided ,After long term storage, The battery actual capacity would be less than the rated capacity. Full capacity will be obtained through several charge/discharge cycles. To get the longest life, KSTAR battery should be fully charged before storage.

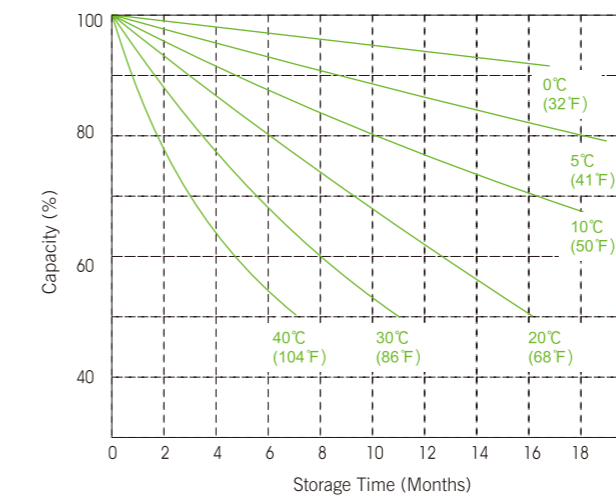
Cycle service life in relation to depth of discharge



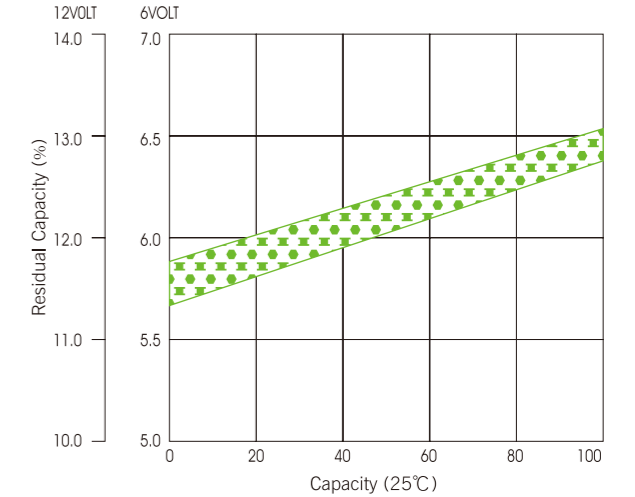
Constant voltage charge characteristic



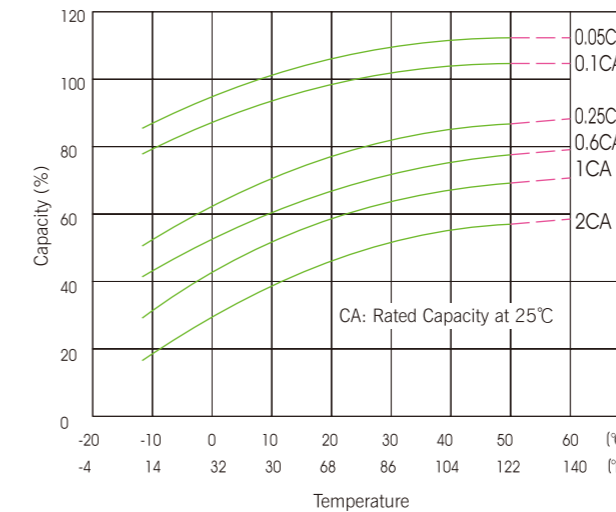
Self-Discharge Characteristics



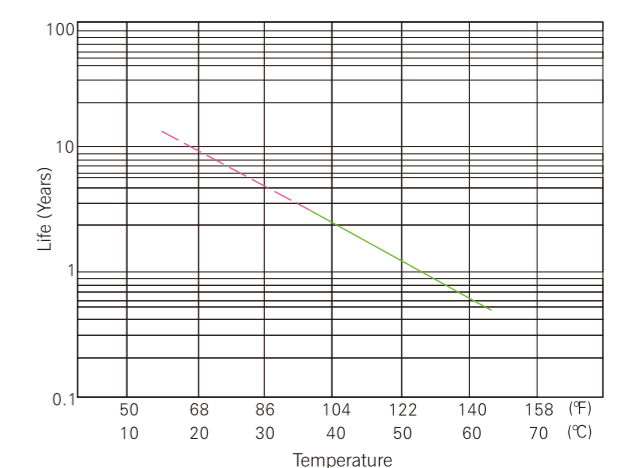
Relationship of OCV and Residual Capacity % (25°C)



Temperature effects on capacity



Temperature effects float life

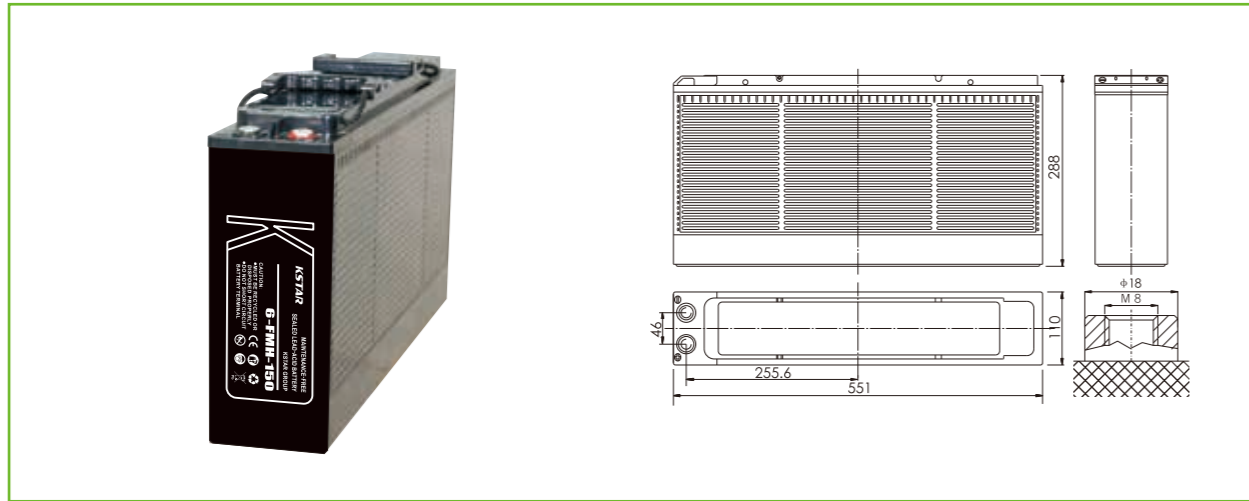


6-FMH-150

FMH Series
For Front Terminal

FMH Series
For Front Terminal

6-FMH-150



Specifications

Nominal Voltage	12V	
Rated Capacity (20 hour rate)	150Ah	
Dimensions	Total Height (with terminals)	11.34 inches(288mm)
	Height	11.34 inches(288mm)
	length	21.69 inches(551mm)
	width	4.33 inches(110mm)
Weight	Approx.100.98 Pound(45.9kg)	

Characteristics

Capacity 77°F(25°C)	20 hour rate (7.5A)	150 Ah
	10 hour rate (13.8A)	138 Ah
	5 hour rate (24.0A)	120 Ah
	1hour rate (90.0A)	90 Ah
	15Minute Rate (246A)	61.5 Ah
Internal Resistance	Full charged Battery 77°F(25°C)	3.0 mΩ
	104°F(40°C)	102%
	77°F(25°C)	100%
Capacity affected by Temperature (20hour rate)	32°F(0°C)	85%
	5°F(-15°C)	65%
	Capacity after 3 month storage	91%
Self-Discharge 77°F(25°C)	Capacity after 6 month storage	81%
	Capacity after 12 month storage	60%
	Max. Discharge Current 77°F(25°C)	1000A(5S)
Terminal	M6	
Charge (Constant Voltage)	Cycle	Initial Charging Current less than 45A Voltage 14.4~14.7 V / 77°F(25°C)
	Float	Voltage 13.5~13.8V / 77°F(25°C)

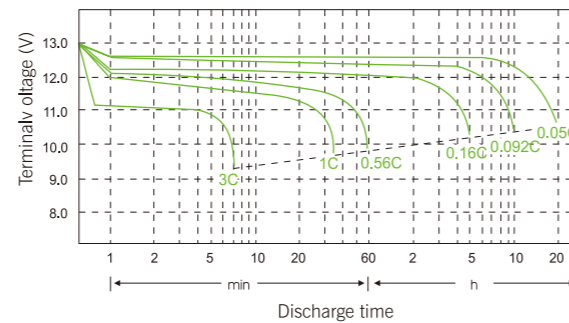
Constant Current Discharge (AMPERES @25°C)

F.V/Time	10Min	15Min	30Min	60Min	2H	3H	4H	5H	8H	10H	20H
1.60	339	246	159	94.2	55.6	39.5	31.0	26.5	18.0	14.8	7.70
1.65	326	237	153	90.6	53.5	39.2	30.7	26.3	17.8	14.7	7.62
1.70	308	236	130	90.2	53.2	37.5	29.5	25.4	17.6	14.4	7.58
1.75	270	214	122	90.0	53.0	36.8	28.6	24.0	17.5	13.8	7.50
1.80	260	206	118	86.5	51.0	35.4	27.5	23.1	16.8	13.3	7.21
1.85	213	179	108	79.6	49.0	33.6	26.1	21.9	16.0	12.6	6.85

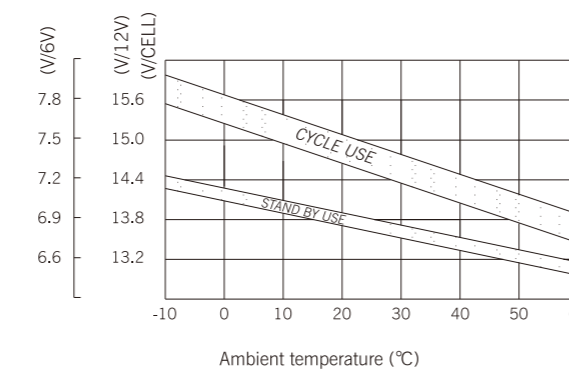
Constant Power Discharge (WATTS PER CELL@25°C)

F.V/Time	10Min	15Min	30Min	60Min	2H	3H	4H	5H	8H	10H	20H
1.60	583	454	286	178	106	73.7	58.1	48.6	33.5	27.8	14.6
1.65	576	451	282	175	104	72.0	57.0	48.1	33.4	27.6	14.5
1.70	560	441	247	168	102	70.4	55.8	47.1	33.1	27.2	14.3
1.75	519	411	234	162	101	69.6	55.1	46.5	32.5	27.0	14.2
1.80	487	391	214	159	100	68.7	54.1	45.2	32.1	26.5	13.9
1.85	404	342	208	148	95.5	67.8	53.1	44.0	29.9	25.2	13.7

Discharge Curves 77°F (25°C)

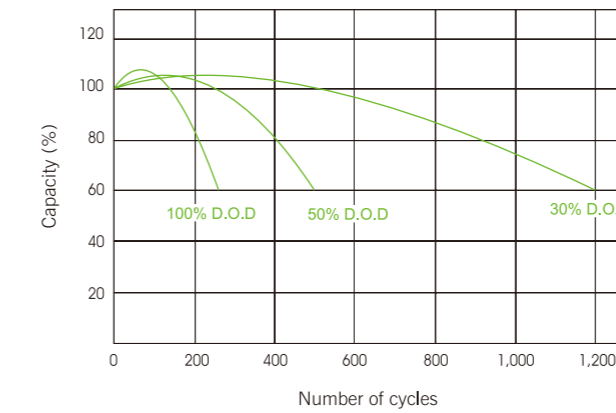


Relationship between charge voltage and temperature

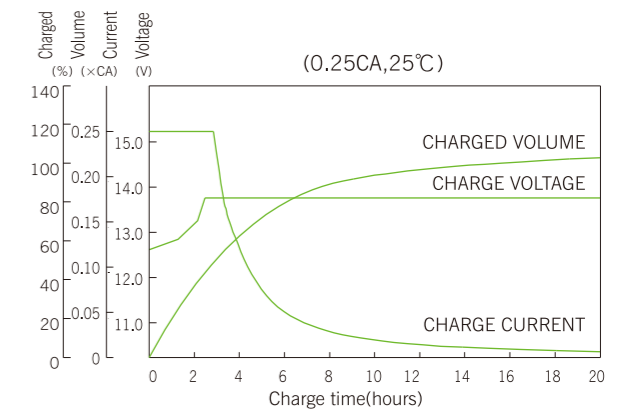


The operating environment temperature above 40°C should be avoided ,After long term storage, The battery actual capacity would be less than the rated capacity. Full capacity will be obtained through several charge/discharge cycles. To get the longest life, KSTAR battery should be fully charged before storage.

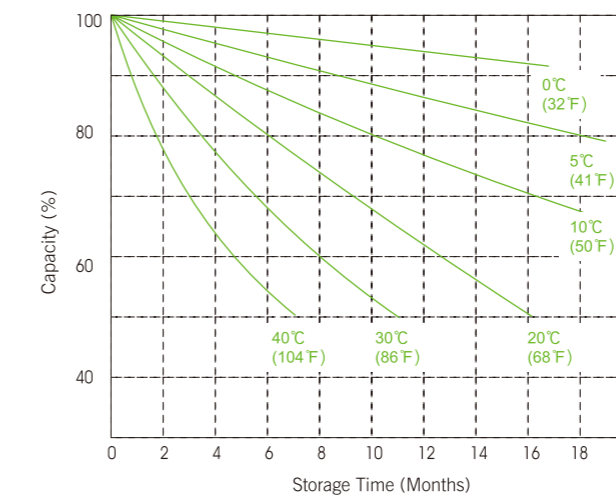
Cycle service life in relation to depth of discharge



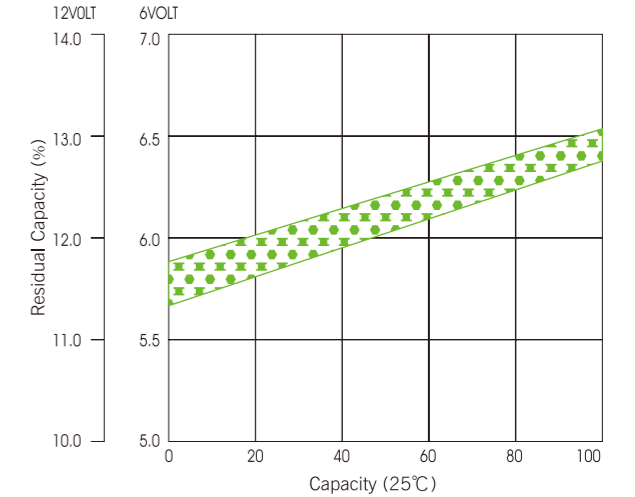
Constant voltage charge characteristic



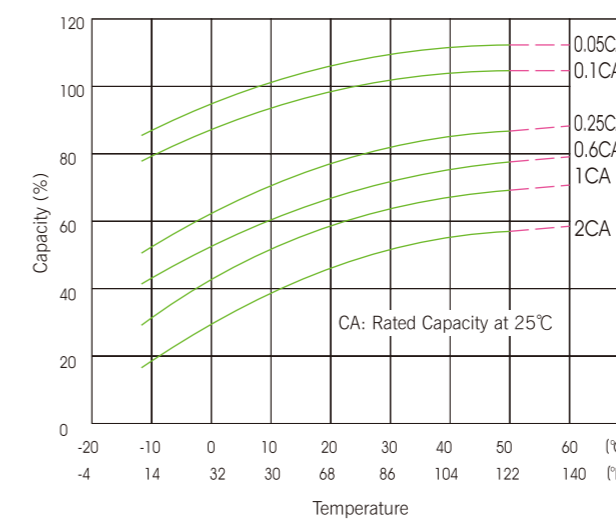
Self-Discharge Characteristics



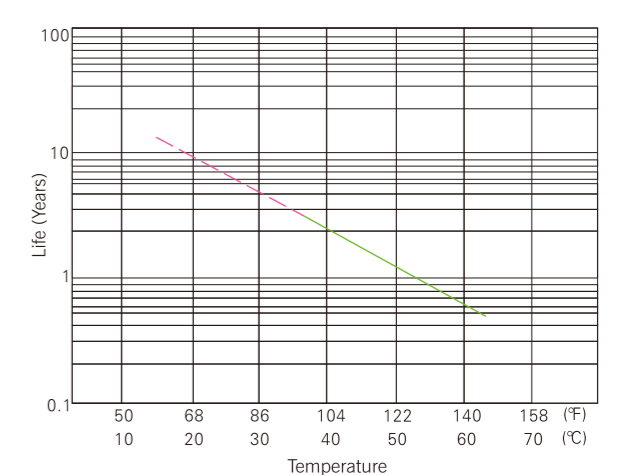
Relationship of OCV and Residual Capacity % (25°C)

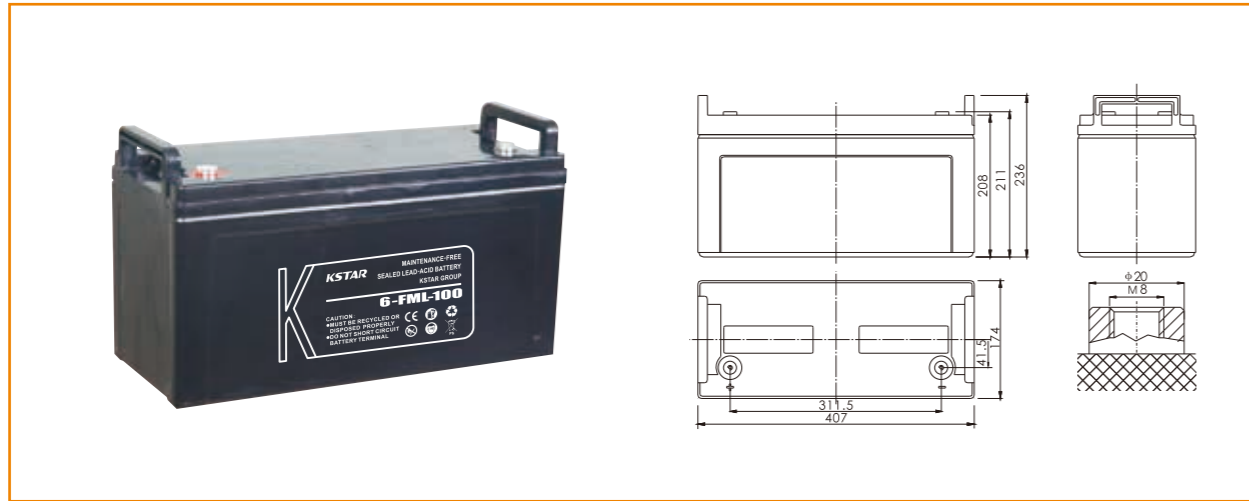


Temperature effects on capacity



Temperature effects float life





Specifications

Nominal Voltage	12V	
Rated Capacity (20 hour rate)	100Ah	
Dimensions	Total Height (with terminals)	9.29 inches(236mm)
	Height	8.19 inches(208mm)
	length	16.02 inches(407mm)
Weight	width	6.85 inches(174mm)
	Approx.71.72 Pound(32.6kg)	

Characteristics

Capacity 77°F(25°C)	10 hour rate (10.0A)	100 Ah
	5 hour rate (16.0A)	80 Ah
	1 hour rate (60.0A)	60 Ah
	15Minute Rate (164A)	41.0 Ah
Internal Resistance	Full charged Battery	
	77°F(25°C)	4.5 mΩ
	104°F(40°C)	102%
Capacity affected by Temperature (20hour rate)	77°F(25°C)	100%
	32°F(0°C)	85%
	5°F(-15°C)	65%
Self-Discharge 77°F(25°C)	Capacity after 3 month storage	91%
	Capacity after 6 month storage	81%
	Capacity after 12 month storage	60%
Max. Discharge Current 77°F(25°C)	800A(5S)	
Terminal	M3	
Charge (Constant Voltage)	Cycle	Initial Charging Current less than 30A Voltage 14.4~14.7 V / 77°F(25°C)
	Float	Voltage 13.5~13.8V / 77°F(25°C)

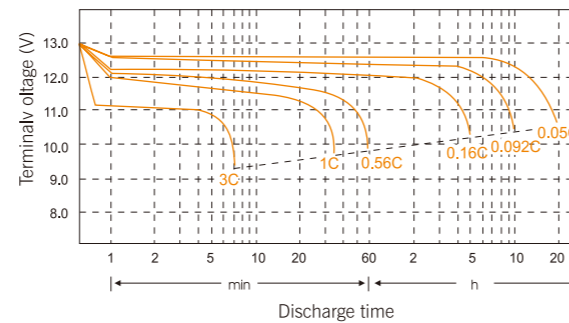
Constant Current Discharge (AMPERES @25°C)

F.V/Time	10Min	15Min	30Min	60Min	2H	3H	4H	5H	8H	10H	20H
1.60	226	164	106	63.4	37.7	26.3	20.8	17.7	12.3	10.4	5.61
1.65	217	158	102	61.0	36.2	26.0	20.6	17.5	12.2	10.3	5.56
1.70	205	151	86.8	60.5	35.3	25.5	20.3	16.9	12.0	10.2	5.49
1.75	180	142	81.5	60.0	35.0	25.0	19.7	16.0	11.8	10.1	5.47
1.80	173	137	78.4	57.7	33.7	24.1	18.9	15.4	11.6	10.0	5.40
1.85	142	119	72.1	53.1	32.3	22.9	18.0	14.6	11.2	9.50	5.13

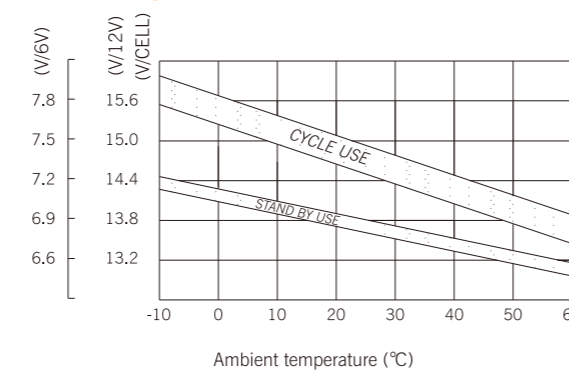
Constant Power Discharge (WATTS PER CELL@25°C)

F.V/Time	10Min	15Min	30Min	60Min	2H	3H	4H	5H	8H	10H	20H
1.60	394	307	191	119	71.4	50.1	39.5	32.4	24.0	20.7	11.2
1.65	389	304	185	115	70.5	50.0	39.3	32.2	23.9	20.6	11.1
1.70	379	291	162	111	69.8	48.7	38.4	31.6	23.4	20.5	11.0
1.75	346	274	156	108	69.3	47.3	37.5	31.0	22.8	20.3	11.0
1.80	330	264	151	107	67.9	47.0	37.1	30.5	22.5	20.0	10.8
1.85	273	231	141	104	65.5	45.9	36.1	29.6	21.1	19.1	10.3

Discharge Curves 77°F (25°C)

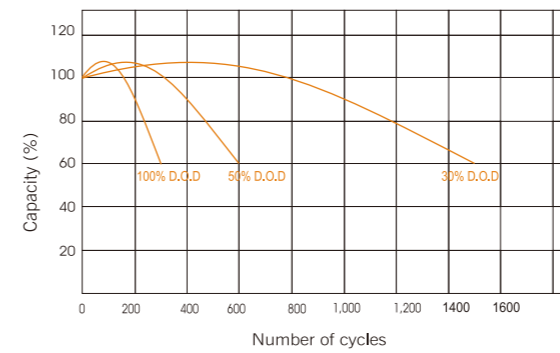


Relationship between charge voltage and temperature

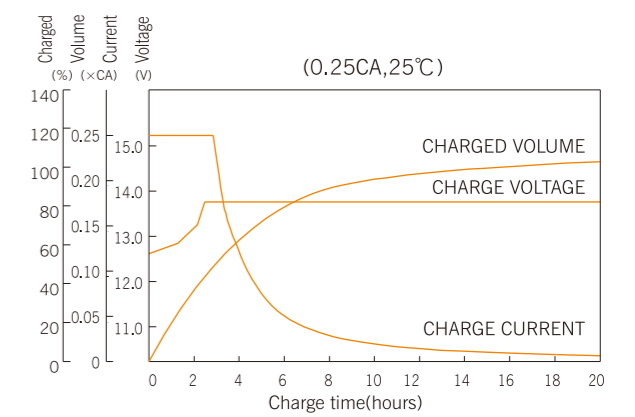


The operating environment temperature above 40°C should be avoided. After long term storage, The battery actual capacity would be less than the rated capacity. Full capacity will be obtained through several charge/discharge cycles. To get the longest life, KSTAR battery should be fully charged before storage.

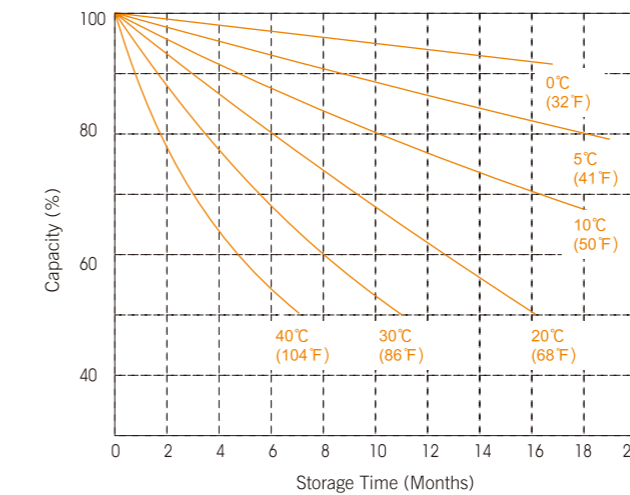
Cycle service life in relation to depth of discharge



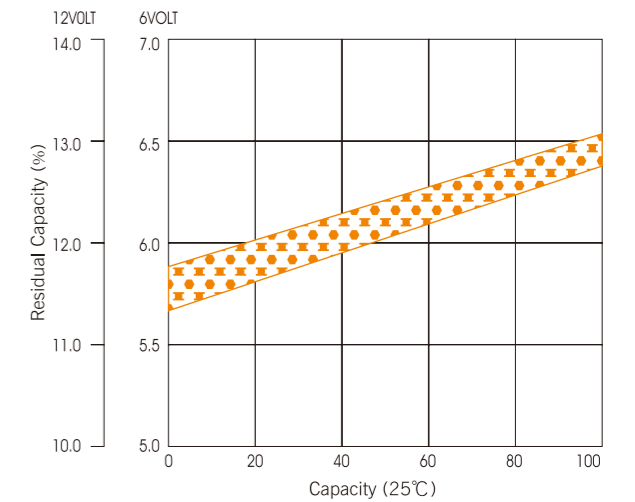
Constant voltage charge characteristic



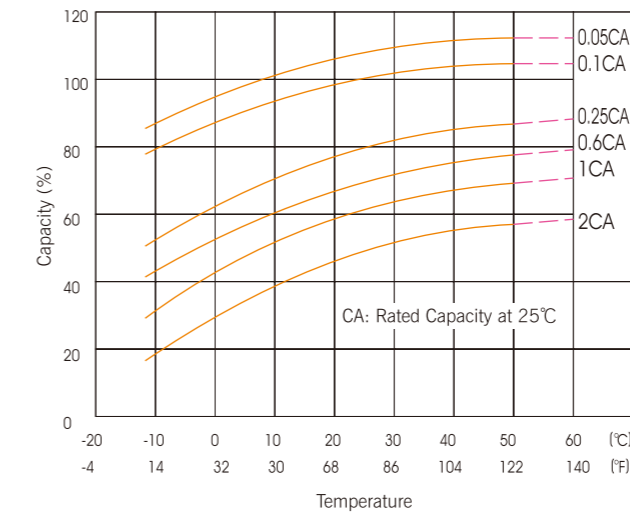
Self-Discharge Characteristics



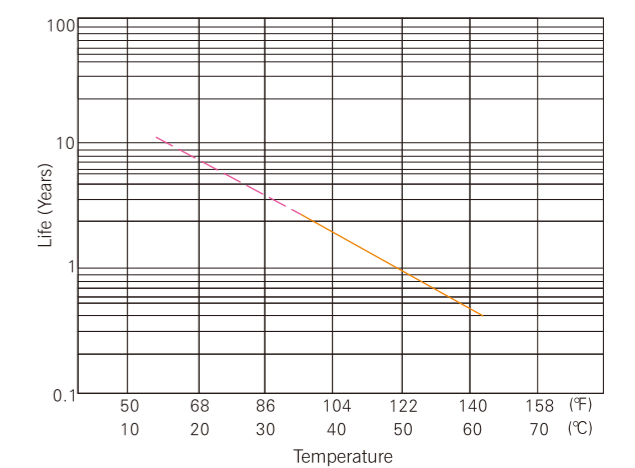
Relationship of OCV and Residual Capacity % (25°C)



Temperature effects on capacity



Temperature effects float life

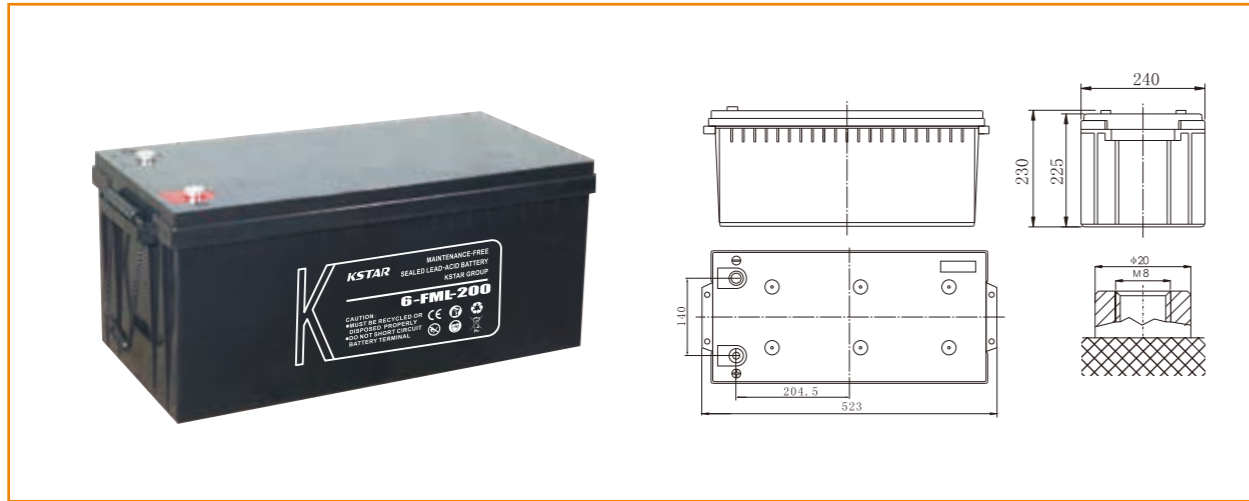


6-FML-200

FML Series
For High Cycle Use

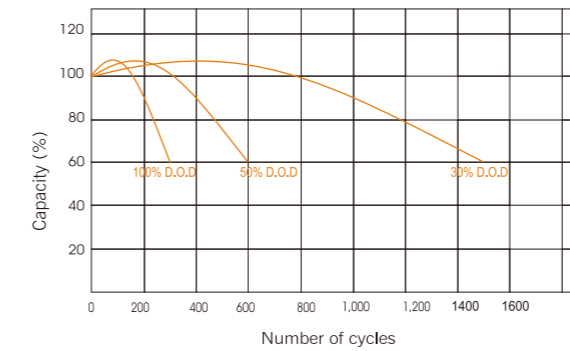
FML Series
For High Cycle Use

6-FML-200

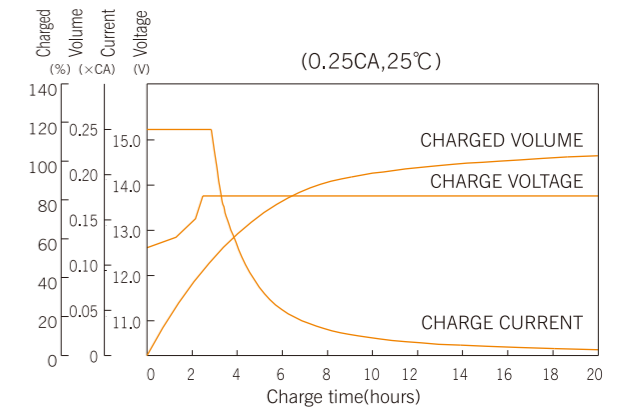


The operating environment temperature above 40°C should be avoided. After long term storage, The battery actual capacity would be less than the rated capacity. Full capacity will be obtained through several charge/discharge cycles. To get the longest life, KSTAR battery should be fully charged before storage.

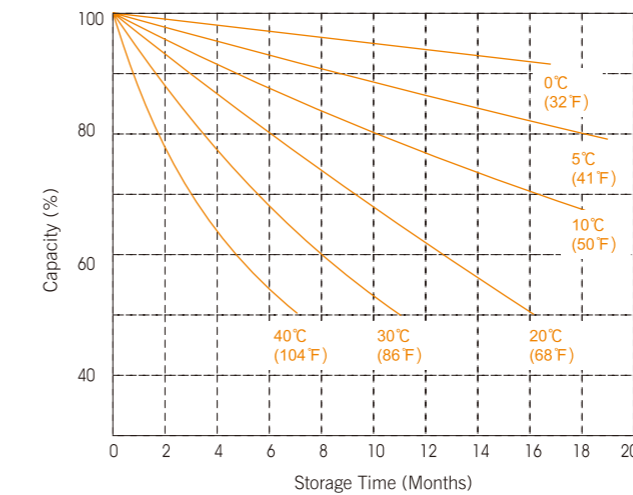
Cycle service life in relation to depth of discharge



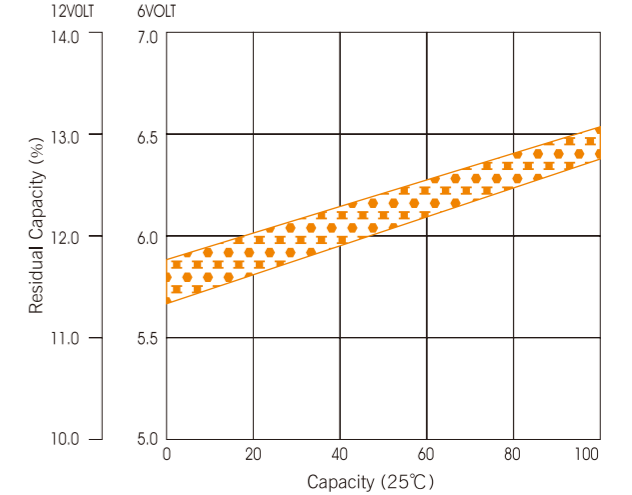
Constant voltage charge characteristic



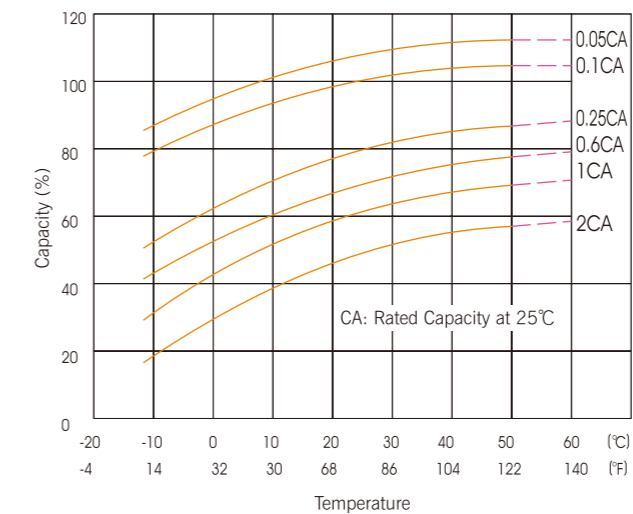
Self-Discharge Characteristics



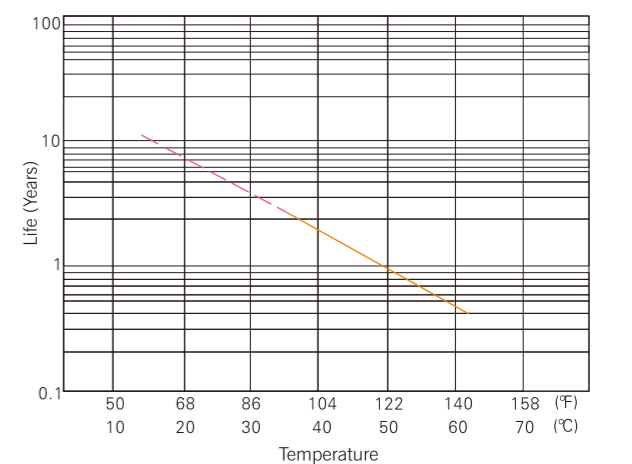
Relationship of OCV and Residual Capacity % (25°C)



Temperature effects on capacity



Temperature effects float life



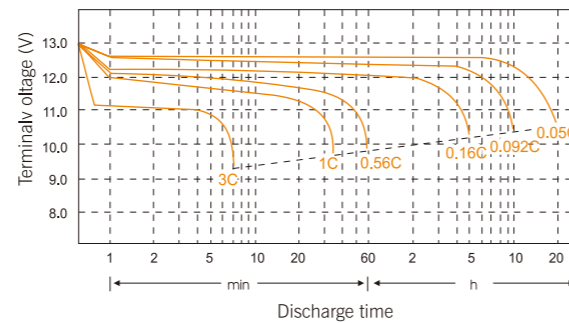
Specifications

Nominal Voltage	12V	
Rated Capacity (20 hour rate)	200Ah	
Dimensions	Total Height (with terminals)	9.06 inches(230mm)
	Height	8.86 inches(225mm)
	length	20.59 inches(523mm)
	width	9.45 inches(240mm)
Weight	Approx.137.5 Pound(62.5kg)	

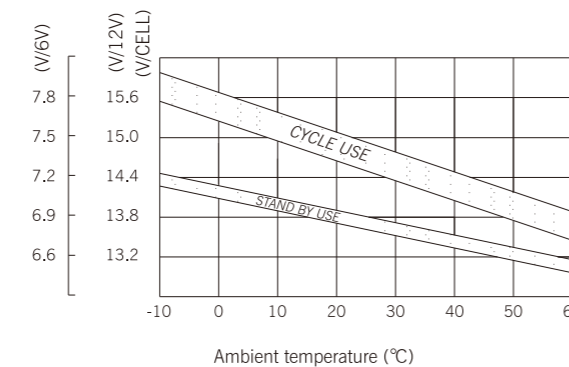
Characteristics

Capacity 77°F(25°C)	10 hour rate (20.0A)	200 Ah
	5 hour rate (32.0A)	160 Ah
	1 hour rate (120.0A)	120 Ah
	15Minute Rate (328A)	82.0 Ah
Internal Resistance	Full charged Battery 77°F(25°C)	3.0 mΩ
	104°F(40°C)	102%
	77°F(25°C)	100%
Capacity affected by Temperature (20hour rate)	32°F(0°C)	85%
	5°F(-15°C)	65%
	Capacity after 3 month storage	91%
Self-Discharge 77°F(25°C)	Capacity after 6 month storage	81%
	Capacity after 12 month storage	60%
	Max. Discharge Current 77°F(25°C)	1333A(5S)
Terminal	M3	
Charge (Constant Voltage)	Cycle	Initial Charging Current less than 60A Voltage 14.4~14.7 V / 77°F(25°C)
	Float	Voltage 13.5~13.8V / 77°F(25°C)

Discharge Curves 77°F (25°C)



Relationship between charge voltage and temperature

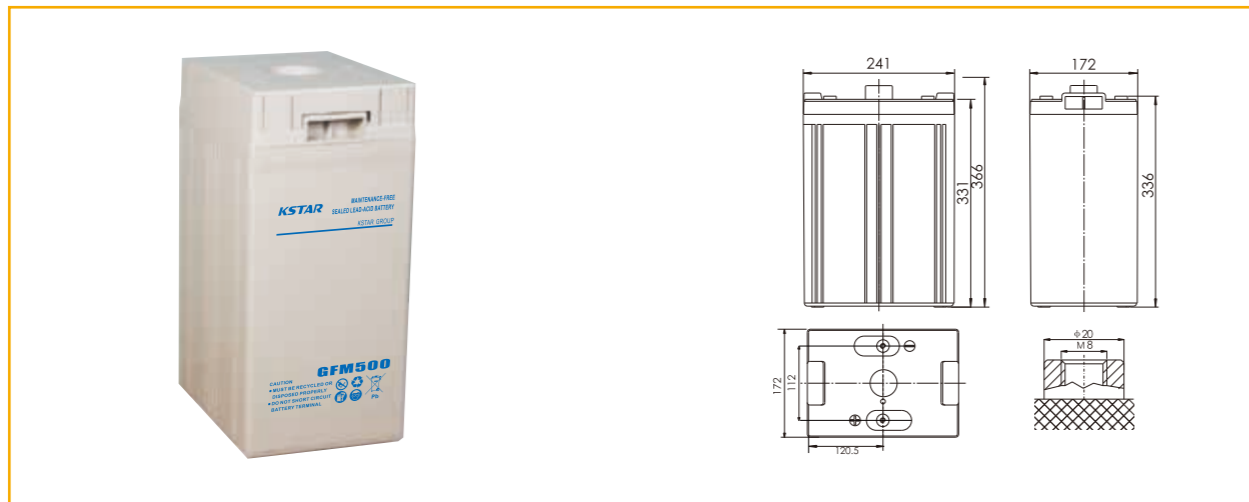


Constant Current Discharge (AMPERES @25°C)

F.V/Time	10Min	15Min	30Min	60Min	2H	3H	4H	5H	8H	10H	20H
1.60	401	328	197	127	74.6	53.1	41.2	34.5	24.2	20.6	11.1
1.65	386	315	189	122	71.7	52.5	40.8	34.2	23.8	20.4	11.0
1.70	364	286	177	121	70.6	51.0	40.0	33.5	23.6	20.3	10.9
1.75	317	254	152	120	70.2	51.2	39.4	32.0	23.2	20.2	10.9
1.80	305	244	146	115	67.5	49.3	37.9	30.8	22.9	20.0	10.8
1.85	250	212	134	106	64.8	46.8	36.0	29.3	21.8	19.0	10.3

Constant Power Discharge (WATTS PER CELL@25°C)

F.V/Time	10Min	15Min	30Min	60Min	2H	3H	4H	5H	8H	10H	20H
1.60	697	545	349	231	141	97.7	77.0	63.2	45.7	42.1	22.8
1.65	691	541	343	228	139	96.5	76.4	63.0	45.4	41.6	22.5
1.70	672	529	331	219	137	95.1	75.5	62.6	45.2	40.7	22.0
1.75	629	499	296	216	136	94.7	75.0	62.0	44.6	39.7	21.4
1.80	584	469	281	211	133	93.9	74.4	61.4	43.8	38.9	21.0
1.85	485	410	257	207	126	91.1	71.0	57.2	40.8	37.1	20.0



Specifications

Nominal Voltage	2V	
Rated Capacity (10 hour rate)	500Ah	
Dimensions	Total Height (with terminals)	14.41 inches(366mm)
	Height	13.03 inches(331mm)
	length	9.49 inches(241mm)
	width	6.77 inches(172mm)
Weight	Approx.63.8 Pound(29.0kg)	

Characteristics

Capacity 77°F(25°C)	10 hour rate (50.0A)	500 Ah
	5 hour rate (85A)	425 Ah
	1 hour rate (275A)	275 Ah
Internal Resistance	Full charged Battery 77°F(25°C)	0.6 mΩ
Capacity affected by Temperature (20hour rate)	104°F(40°C)	102%
	77°F(25°C)	100%
	32°F(0°C)	85%
Self-Discharge 77°F(25°C)	Capacity after 3 month storage	91%
	Capacity after 6 month storage	81%
	Capacity after 12 month storage	60%
Max. Discharge Current 77°F(25°C)	3500A(5S)	
Terminal	M3	
Charge (Constant Voltage)	Cycle	Initial Charging Current less than 100A Voltage 2.40~2.45 V / 77°F(25°C)
	Float	Voltage 2.23~2.27V / 77°F(25°C)

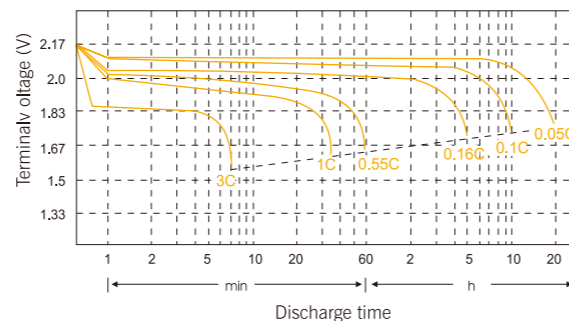
Constant Current Discharge (AMPERES @25°C)

F.V/Time	10Min	15Min	30Min	1Hour	3Hour	5Hour	10Hour	20Hour
1.60	841	691	467	282	128	94.1	52.9	28.6
1.75	769	650	439	275	126	90.7	51.5	27.5
1.80	709	605	399	248	125	85.0	50.0	26.6

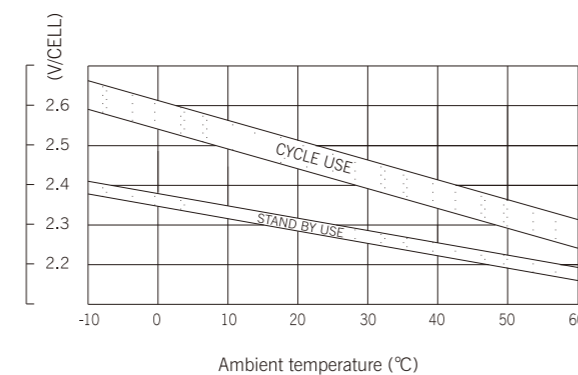
Constant Power Discharge (WATTS PER CELL@25°C)

F.V/Time	10Min	15Min	30Min	1Hour	3Hour	5Hour	10Hour	20Hour
1.60	1506	1250	850	590	265	179	100	53.0
1.75	1420	1201	820	554	263	175	99.0	52.0
1.80	1355	1163	769	516	260	171	98.0	51.0

Discharge Curves 77°F (25°C)

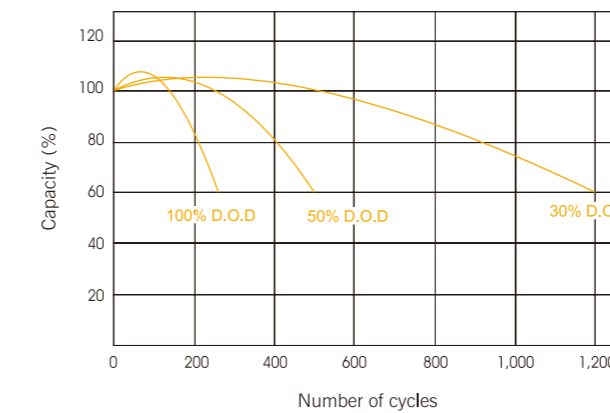


Relationship between charge voltage and temperature

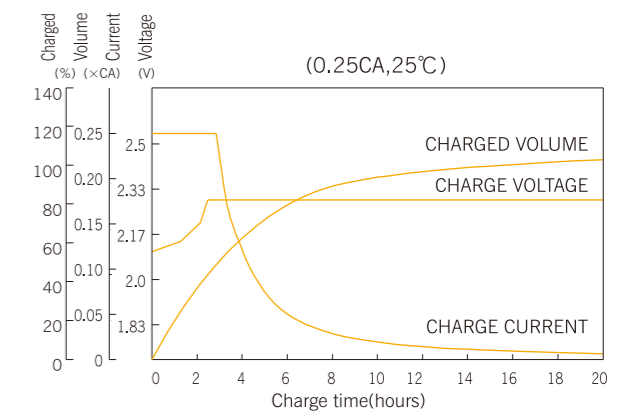


The operating environment temperature above 40°C should be avoided ,After long term storage, The battery actual capacity would be less than the rated capacity. Full capacity will be obtained through several charge/discharge cycles. To get the longest life, KSTAR battery should be fully charged before storage.

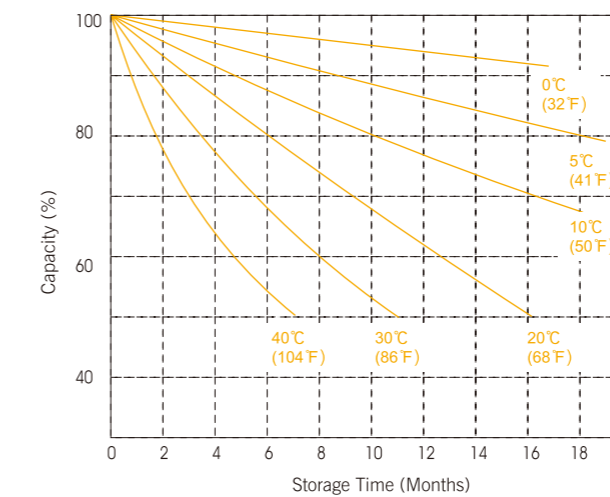
Cycle service life in relation to depth of discharge



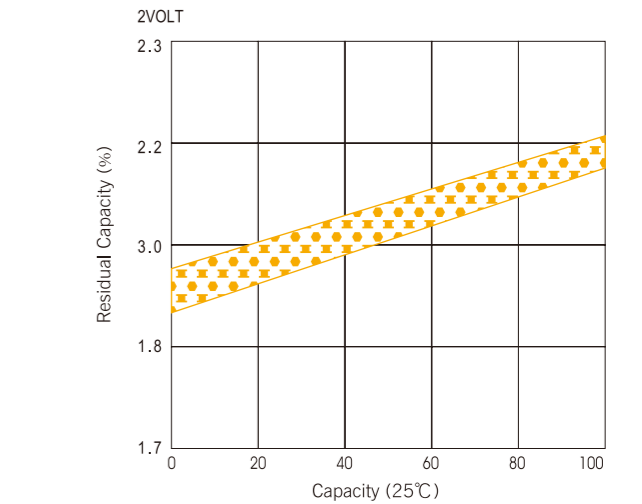
Constant voltage charge characteristic



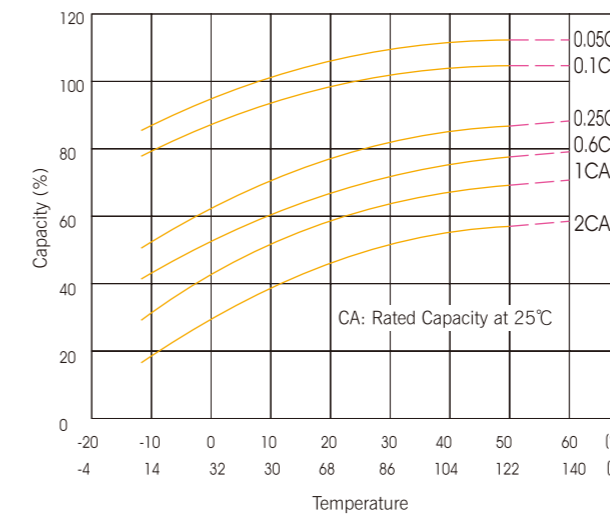
Self-Discharge Characteristics



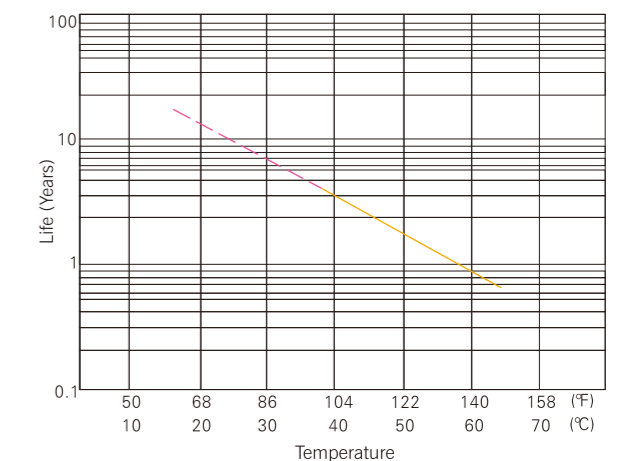
Relationship of OCV and Residual Capacity % (25°C)

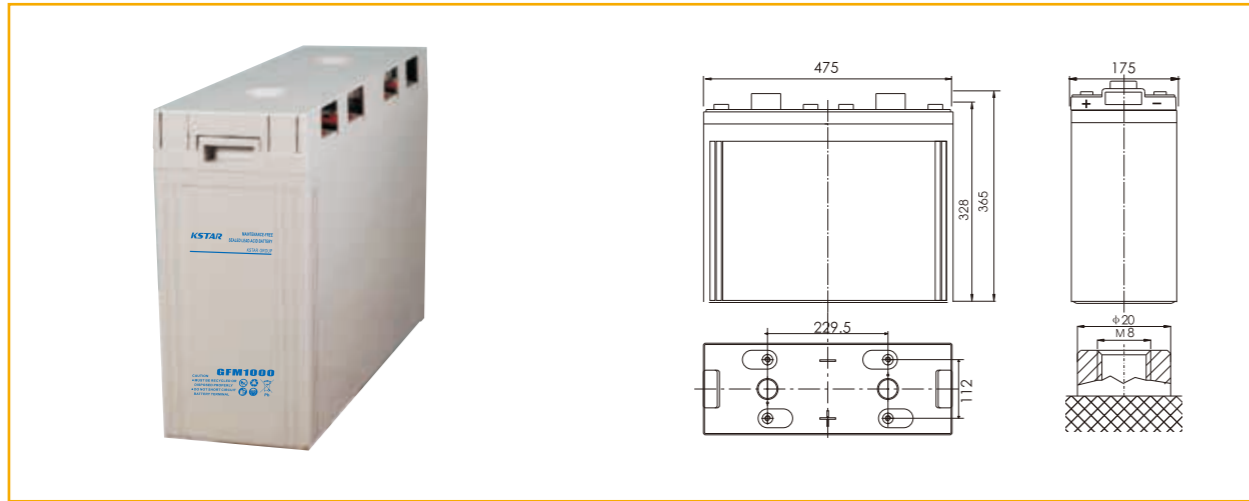


Temperature effects on capacity



Temperature effects float life





Specifications

Nominal Voltage	2V	
Rated Capacity (10 hour rate)	1000Ah	
Dimensions	Total Height (with terminals)	14.38 inches(365mm)
	Height	12.92 inches(328mm)
	length	18.71 inches(475mm)
	width	6.89 inches(175mm)
Weight	Approx.127.6Pound(58.0kg)	

Characteristics

Capacity 77°F(25°C)	10 hour rate (100A)	1000 Ah
	5 hour rate (170A)	850 Ah
	1hour rate (550A)	550 Ah
Internal Resistance	Full charged Battery 77°F(25°C)	0.3 mΩ
Capacity affected by Temperature (20hour rate)	104°F(40°C)	102%
	77°F(25°C)	100%
	32°F(0°C)	85%
Self-Discharge 77°F(25°C)	Capacity after 3 month storage	91%
	Capacity after 6 month storage	81%
	Capacity after 12 month storage	60%
Max. Discharge Current 77°F(25°C)	7000A(5S)	
Terminal	M3	
Charge (Constant Voltage)	Cycle	Initial Charging Current less than 200A Voltage 2.40~2.45 V / 77°F(25°C)
	Float	Voltage 2.23~2.27V / 77°F(25°C)

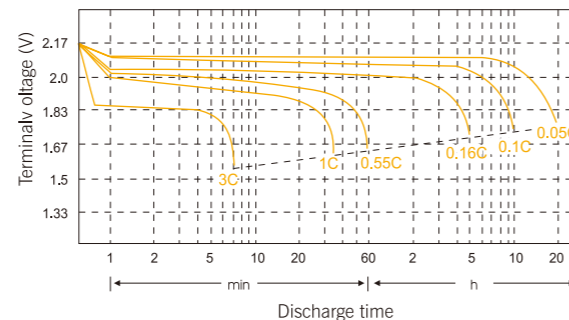
Constant Current Discharge (AMPERES @25°C)

F.V/Time	10Min	15Min	30Min	1Hour	3Hour	5Hour	10Hour	20Hour
1.60	1682	1383	935	563	256	185	106	57.1
1.75	1538	1299	878	550	252	177	103	55.1
1.80	1417	1210	799	495	250	170	100	53.2

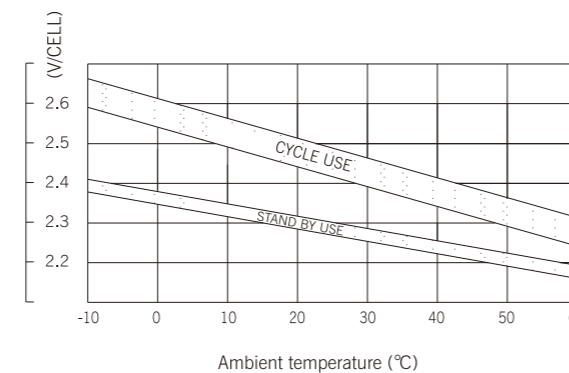
Constant Power Discharge (WATTS PER CELL@25°C)

F.V/Time	10Min	15Min	30Min	1Hour	3Hour	5Hour	10Hour	20Hour
1.60	3012	2500	1700	1180	530	358	200	106
1.75	2840	2402	1640	1108	524	350	198	104
1.80	2710	2326	1538	1034	519	344	196	102

Discharge Curves 77°F (25°C)

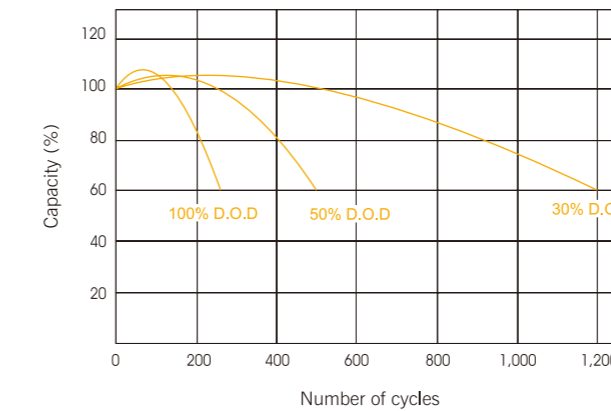


Relationship between charge voltage and temperature

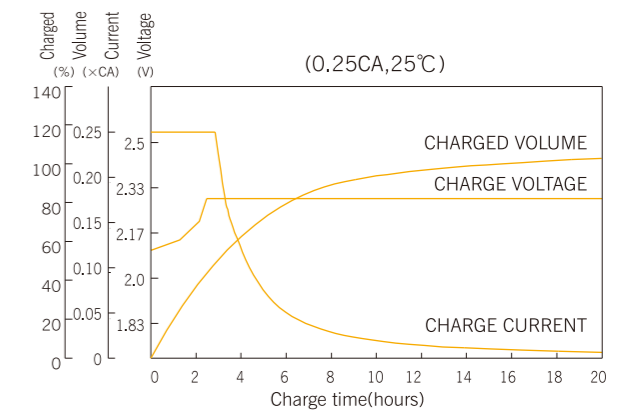


The operating environment temperature above 40°C should be avoided ,After long term storage, The battery actual capacity would be less than the rated capacity. Full capacity will be obtained through several charge/discharge cycles. To get the longest life, KSTAR battery should be fully charged before storage.

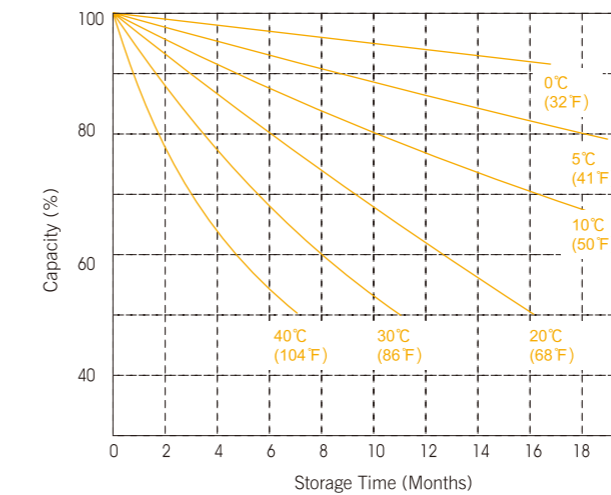
Cycle service life in relation to depth of discharge



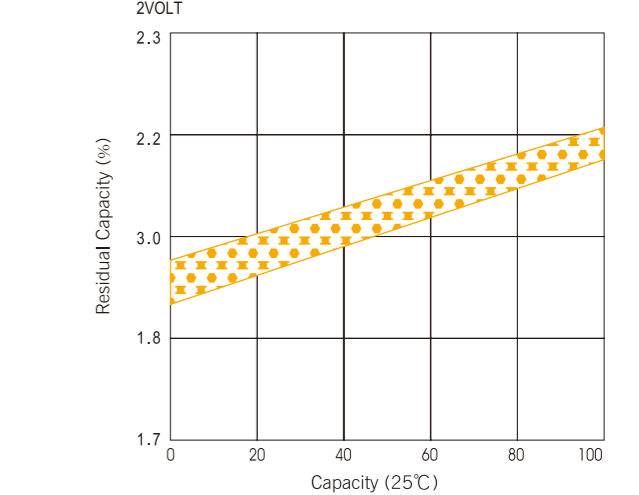
Constant voltage charge characteristic



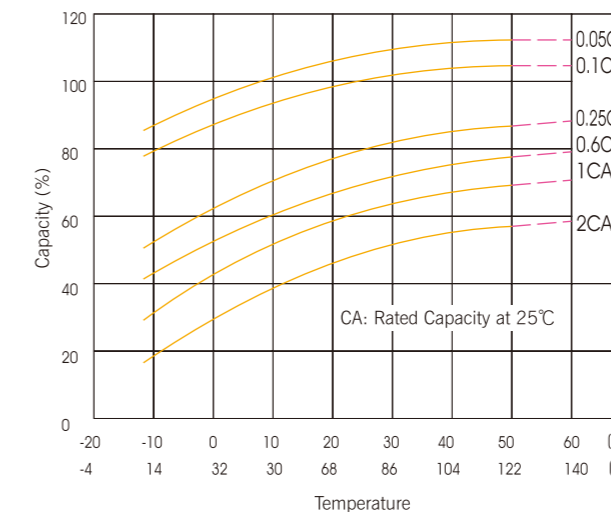
Self-Discharge Characteristics



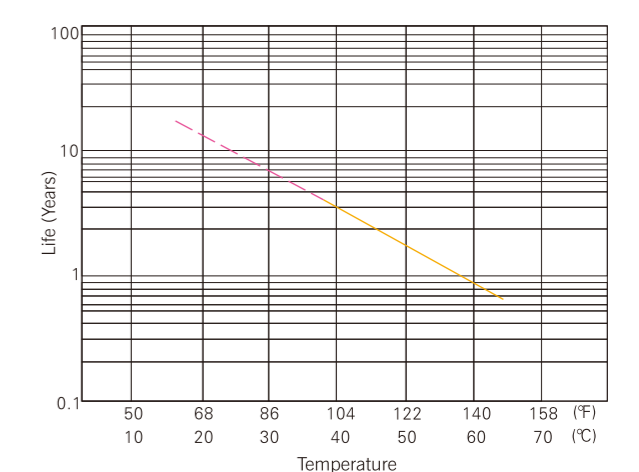
Relationship of OCV and Residual Capacity % (25°C)

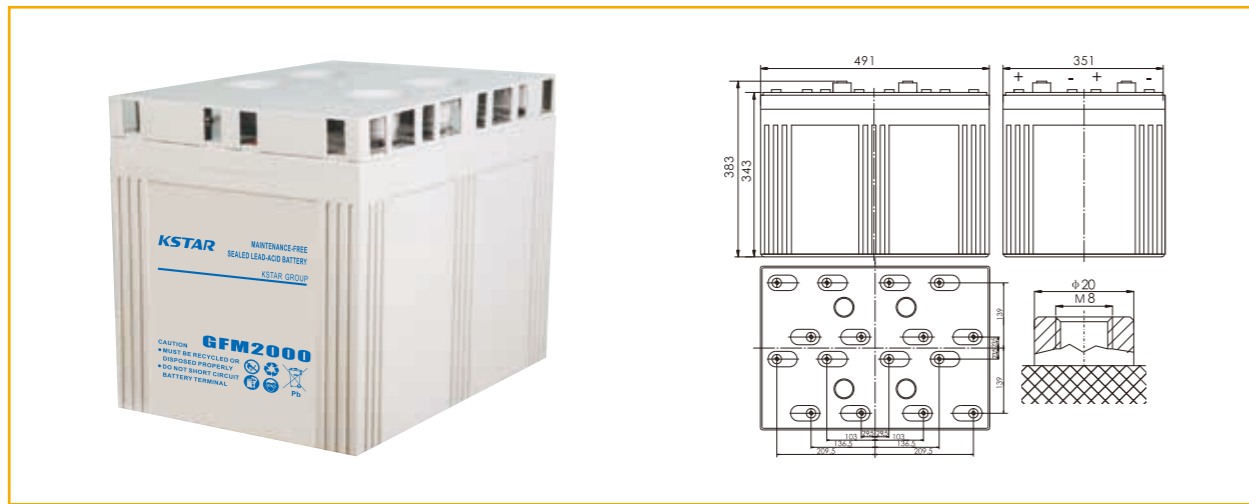


Temperature effects on capacity



Temperature effects float life





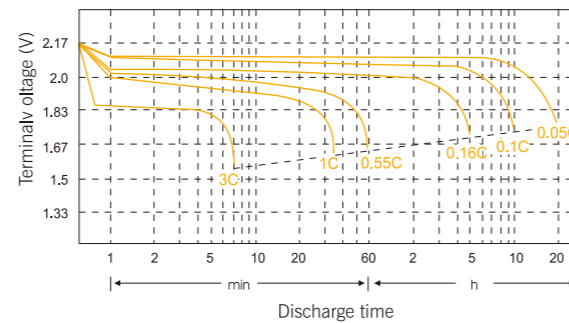
Specifications

Nominal Voltage	2V	
Rated Capacity (10 hour rate)	2000Ah	
Dimensions	Total Height (with terminals)	15.08inches(383mm)
	Height	13.05 inches(343mm)
	length	19.33 inches(491mm)
	width	13.82 inches(351mm)
Weight	Approx.264 Pound(120.0kg)	

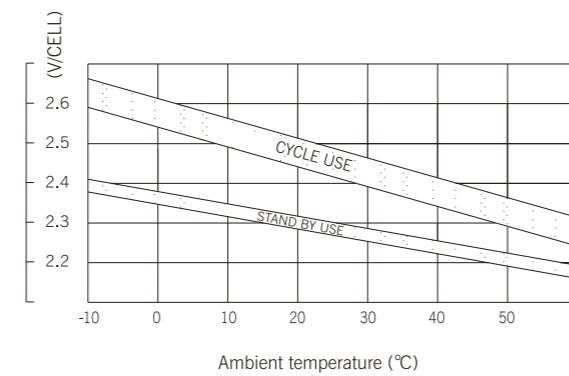
Characteristics

Capacity 77°F(25°C)	10 hour rate (200A)	2000 Ah
	5 hour rate (340A)	1700 Ah
	1hour rate (1100A)	1100 Ah
Internal Resistance	Full charged Battery 77°F(25°C)	0.18 mΩ
Capacity affected by Temperature (20hour rate)	104°F(40°C)	102%
	77°F(25°C)	100%
	32°F(0°C)	85%
Self-Discharge 77°F(25°C)	Capacity after 3 month storage	91%
	Capacity after 6 month storage	81%
	Capacity after 12 month storage	60%
Max. Discharge Current 77°F(25°C)	11000A(5S)	
Terminal	M3	
Charge (Constant Voltage)	Cycle	Initial Charging Current less than 400A Voltage 2.40~2.45 V / 77°F(25°C)
	Float	Voltage 2.23~2.27V / 77°F(25°C)

Discharge Curves 77°F (25°C)



Relationship between charge voltage and temperature



Constant Current Discharge (AMPERES @25°C)

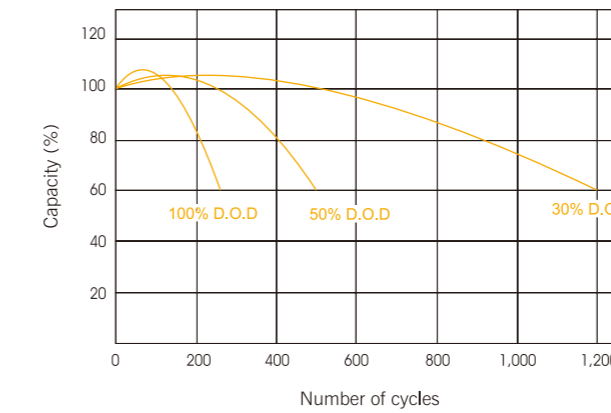
F.V/Time	10Min	15Min	30Min	1Hour	3Hour	5Hour	10Hour	20Hour
1.60	3363	2765	1869	1125	513	376	211	114
1.75	3077	2598	1757	1100	502	365	206	110
1.80	2835	2419	1598	986	500	340	200	107

Constant Power Discharge (WATTS PER CELL@25°C)

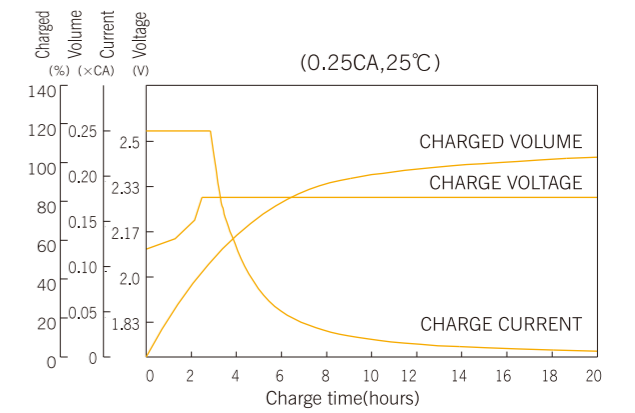
F.V/Time	10Min	15Min	30Min	1Hour	3Hour	5Hour	10Hour	20Hour
1.60	6024	5000	3400	2360	1060	716	400	212
1.75	5680	4804	3280	2216	1048	700	396	208
1.80	5420	4652	3076	2068	1038	688	392	205

The operating environment temperature above 40°C should be avoided ,After long term storage, The battery actual capacity would be less than the rated capacity. Full capacity will be obtained through several charge/discharge cycles. To get the longest life, KSTAR battery should be fully charged before storage.

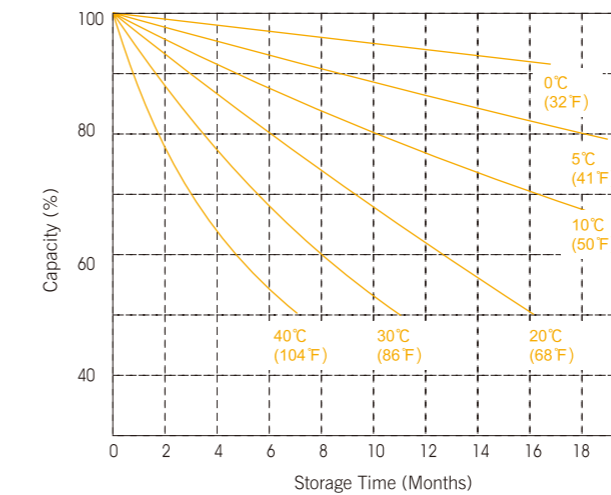
Cycle service life in relation to depth of discharge



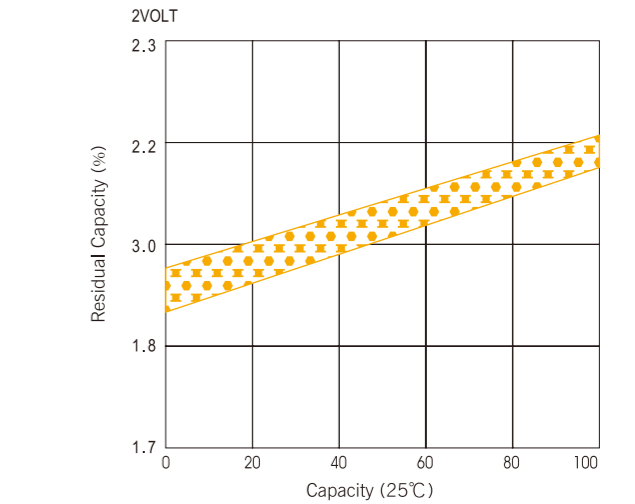
Constant voltage charge characteristic



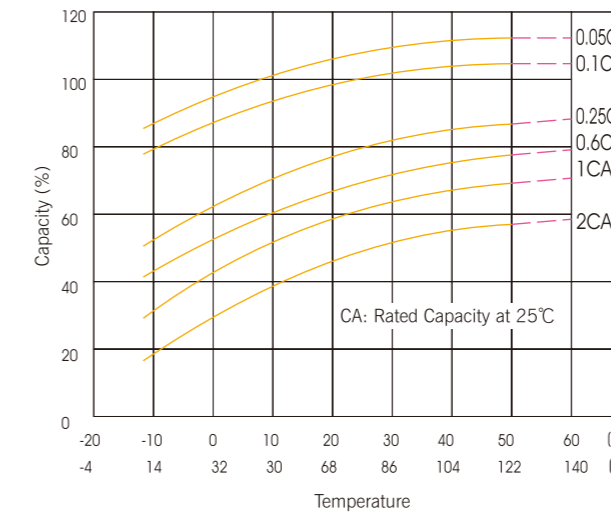
Self-Discharge Characteristics



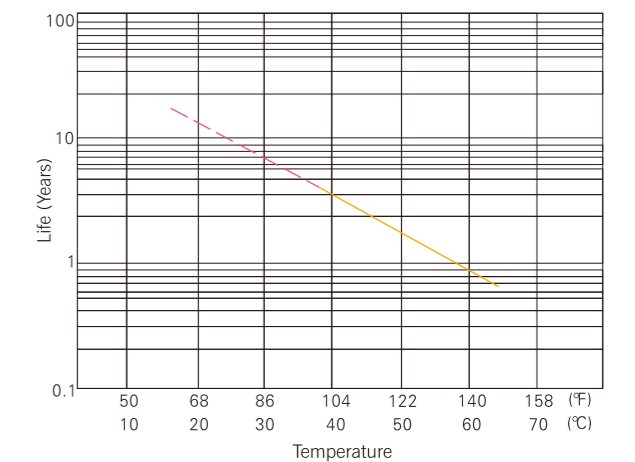
Relationship of OCV and Residual Capacity % (25°C)

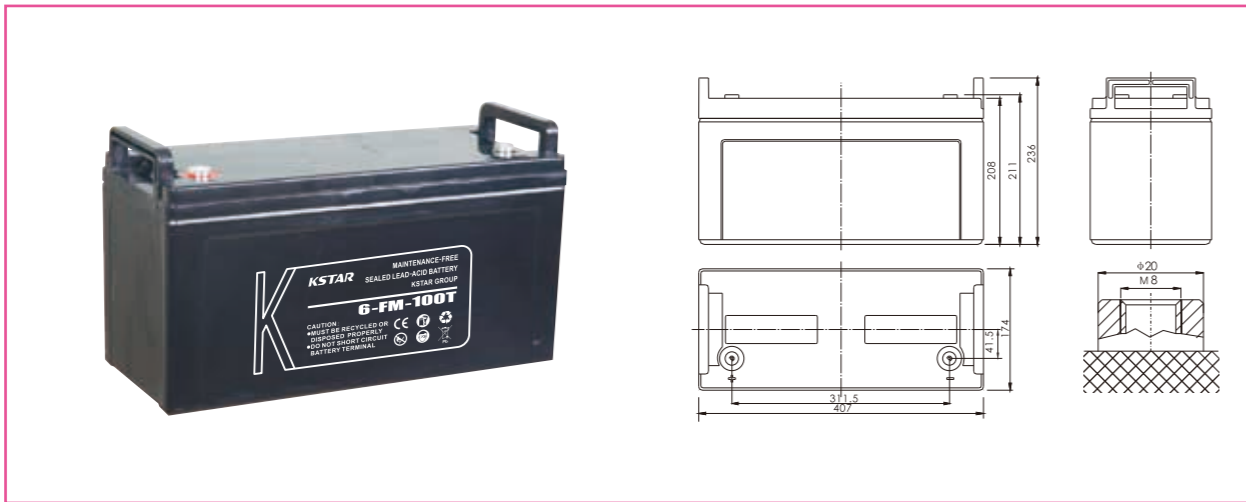


Temperature effects on capacity



Temperature effects float life





Specifications

Nominal Voltage	12V	
Rated Capacity (20 hour rate)	100Ah	
Dimensions	Total Height (with terminals)	9.29 inches(236mm)
	Height	8.19 inches(208mm)
	length	16.02 inches(407mm)
	width	6.85 inches(174mm)
Weight	Approx.71.5 Pound(32.5kg)	

Characteristics

Capacity 77°F(25°C)	20 hour rate (5.0A)	100 Ah
	10 hour rate (9.20A)	92 Ah
	5 hour rate (16.0A)	80 Ah
	1 hour rate (60.0A)	60 Ah
	15Minute Rate (164A)	41 Ah
Internal Resistance	Full charged Battery 77°F(25°C)	5.0 mΩ
	104°F(40°C)	102%
	77°F(25°C)	100%
Capacity affected by Temperature (20hour rate)	32°F(0°C)	85%
	5°F(-15°C)	65%
	Capacity after 3 month storage	91%
Self-Discharge 77°F(25°C)	Capacity after 6 month storage	81%
	Capacity after 12 month storage	60%
	Max. Discharge Current 77°F(25°C)	800A(5S)
Terminal	M3	
Charge (Constant Voltage)	Cycle	Initial Charging Current less than 30A Voltage 14.4~14.7 V / 77°F(25°C)
	Float	Voltage 13.5~13.8V / 77°F(25°C)

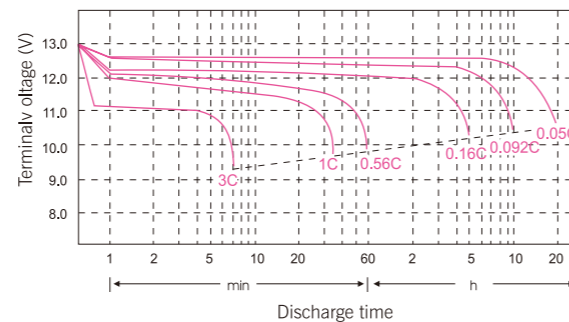
Constant Current Discharge (AMPERES @25°C)

F.V/Time	10Min	15Min	30Min	60Min	2H	3H	4H	5H	8H	10H	20H
1.60	226	164	106	63.4	36.9	25.8	20.6	17.7	12.1	9.90	5.17
1.65	217	158	102	61.0	35.5	25.5	20.4	17.5	12.0	9.80	5.12
1.70	205	151	86.8	60.5	34.6	25.0	19.9	16.9	11.9	9.59	5.06
1.75	180	142	81.5	60.0	34.3	24.5	19.3	16.0	11.6	9.20	5.00
1.80	173	137	78.4	57.7	33.0	23.6	18.5	15.4	11.2	8.85	4.81
1.85	142	119	72.1	53.1	31.7	22.4	17.6	14.6	10.6	8.41	4.57

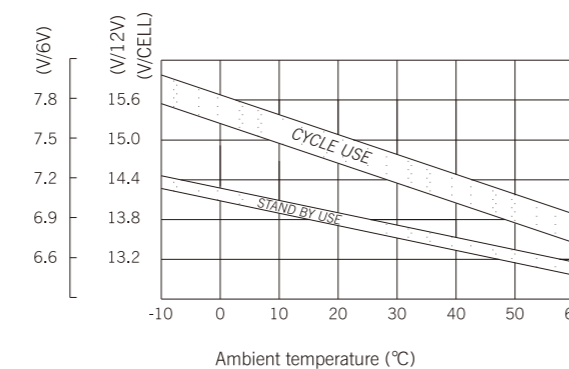
Constant Power Discharge (WATTS PER CELL@25°C)

F.V/Time	10Min	15Min	30Min	60Min	2H	3H	4H	5H	8H	10H	20H
1.60	394	307	191	119	70.0	49.1	38.7	32.4	22.9	18.3	9.73
1.65	389	304	185	115	69.1	49.0	38.6	32.2	22.8	18.2	9.72
1.70	379	291	162	111	68.4	47.7	37.7	31.6	22.3	18.1	9.68
1.75	346	274	156	108	67.9	46.4	36.8	31.0	21.7	18.0	9.67
1.80	330	264	151	107	66.6	46.1	36.4	30.5	21.4	17.7	9.65
1.85	273	231	141	104	64.2	45.0	35.4	29.6	20.1	16.9	9.14

Discharge Curves 77°F (25°C)

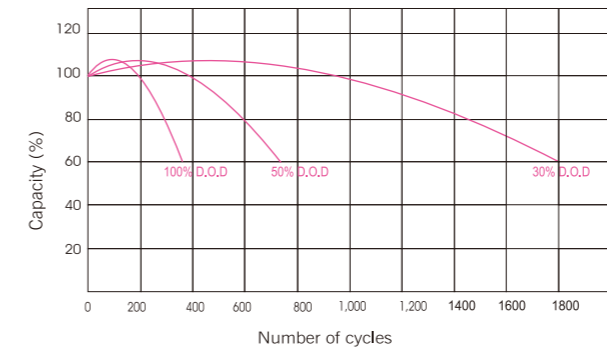


Relationship between charge voltage and temperature

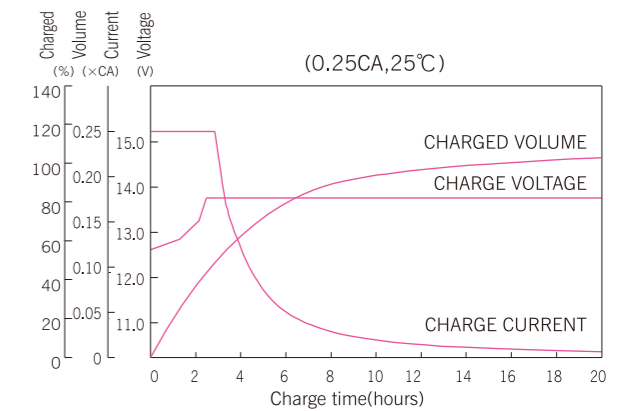


The operating environment temperature above 40°C should be avoided ,After long term storage, The battery actual capacity would be less than the rated capacity. Full capacity will be obtained through several charge/discharge cycles. To get the longest life, KSTAR battery should be fully charged before storage.

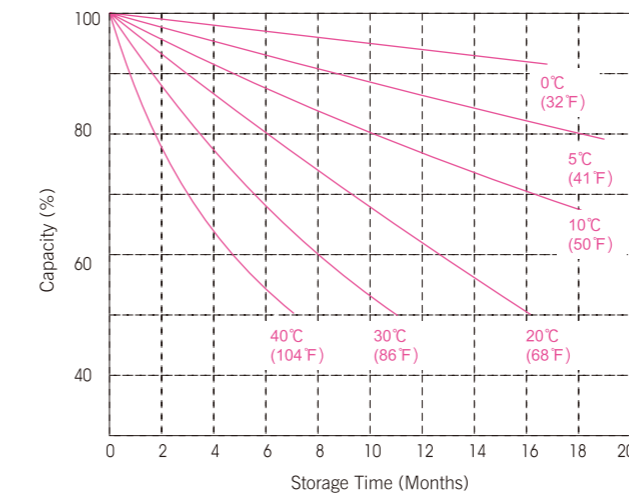
Cycle service life in relation to depth of discharge



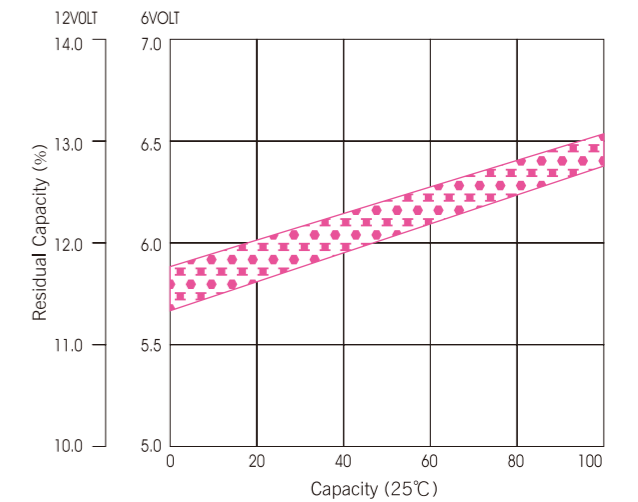
Constant voltage charge characteristic



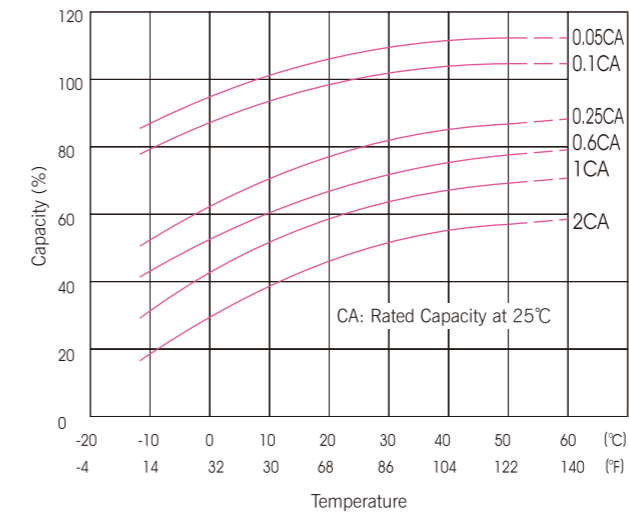
Self-Discharge Characteristics



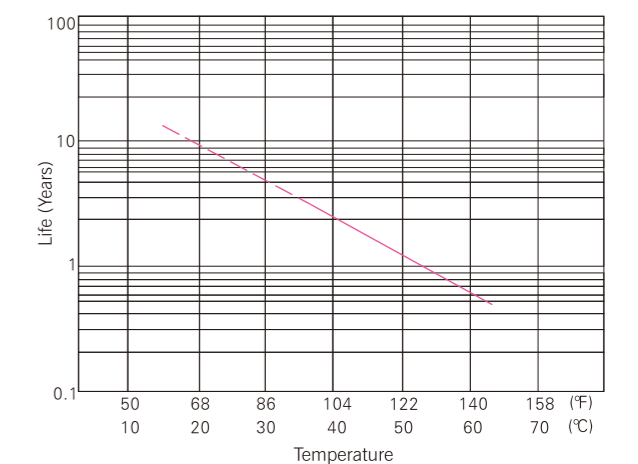
Relationship of OCV and Residual Capacity % (25°C)

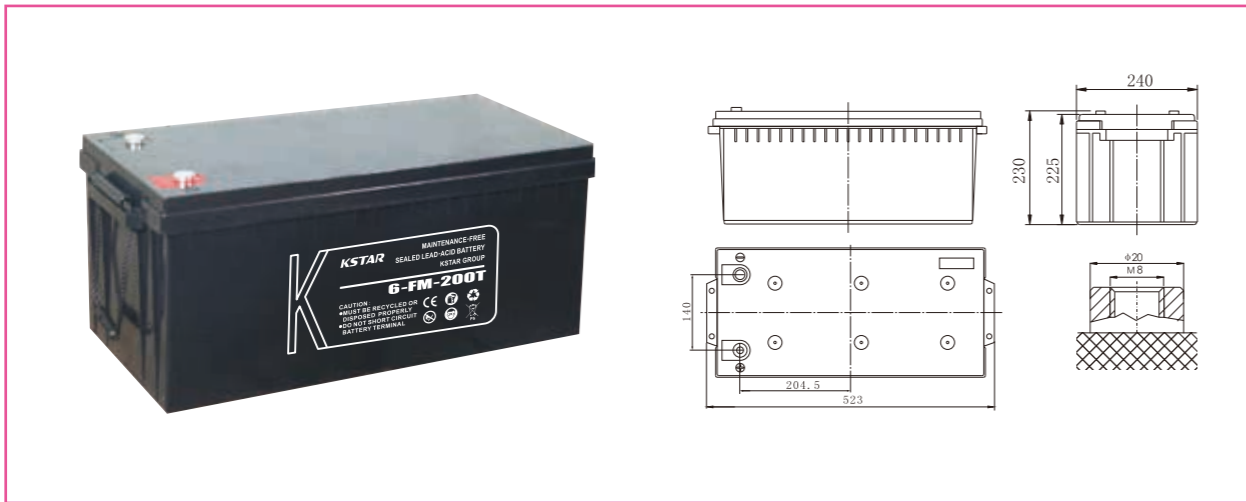


Temperature effects on capacity



Temperature effects float life





Specifications

Nominal Voltage	12V	
Rated Capacity (20 hour rate)	200Ah	
Dimensions	Total Height (with terminals)	9.06 inches(230mm)
	Height	8.86 inches(225mm)
	length	20.59 inches(523mm)
	width	9.45 inches(240mm)
Weight	Approx.132.66 Pound(57.5kg)	

Characteristics

Capacity 77°F(25°C)	20 hour rate (10.0A)	200 Ah
	10 hour rate (18.4A)	184 Ah
	5 hour rate (32.0A)	160 Ah
	1 hour rate (120.0A)	120 Ah
	15Minute Rate (328A)	82.0 Ah
Internal Resistance	Full charged Battery 77°F(25°C)	3 mΩ
	104°F(40°C)	102%
	77°F(25°C)	100%
Capacity affected by Temperature (20hour rate)	32°F(0°C)	85%
	5°F(-15°C)	65%
	Capacity after 3 month storage	91%
Self-Discharge 77°F(25°C)	Capacity after 6 month storage	81%
	Capacity after 12 month storage	60%
	Max. Discharge Current 77°F(25°C)	1333A(5S)
Terminal	M3	
Charge (Constant Voltage)	Cycle	Initial Charging Current less than 30A Voltage 14.4~14.7 V / 77°F(25°C)
	Float	Voltage 13.5~13.8 V / 77°F(25°C)

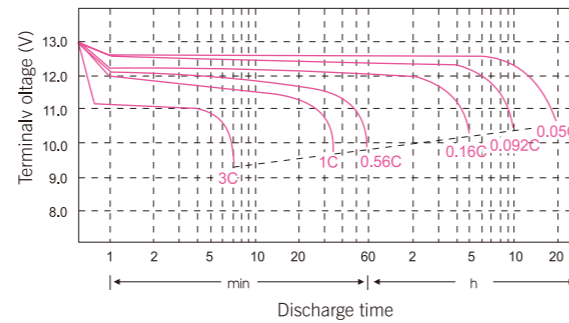
Constant Current Discharge (AMPERES @25°C)

F.V/Time	10Min	15Min	30Min	60Min	2H	3H	4H	5H	8H	10H	20H
1.60	401	328	197	127	73.1	52.0	40.7	34.5	23.8	19.4	10.4
1.65	386	315	189	122	70.3	51.5	40.3	34.2	23.5	19.2	10.3
1.70	364	286	177	121	69.2	50.0	39.2	33.5	23.0	18.6	10.1
1.75	317	254	152	120	68.8	50.2	38.7	32.0	22.7	18.4	10.0
1.80	305	244	146	115	66.2	48.3	37.2	30.8	21.8	17.7	9.62
1.85	250	212	134	106	63.6	45.9	35.3	29.3	20.7	16.8	9.14

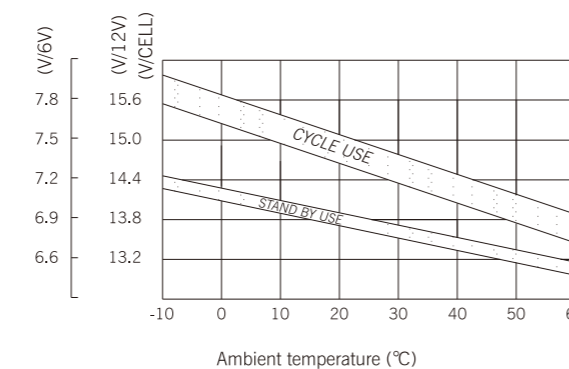
Constant Power Discharge (WATTS PER CELL@25°C)

F.V/Time	10Min	15Min	30Min	60Min	2H	3H	4H	5H	8H	10H	20H
1.60	697	545	349	231	138	95.8	75.5	63.2	43.5	37.3	19.0
1.65	691	541	343	228	136	94.6	74.9	63.0	43.3	36.8	18.7
1.70	672	529	331	219	134	93.2	74.0	62.6	43.0	36.0	18.5
1.75	629	499	296	216	133	92.8	73.5	62.0	42.5	35.1	18.4
1.80	584	469	281	211	130	92.1	72.9	61.4	41.7	34.4	18.1
1.85	485	410	257	207	124	89.3	69.6	57.2	38.9	32.8	17.8

Discharge Curves 77°F (25°C)

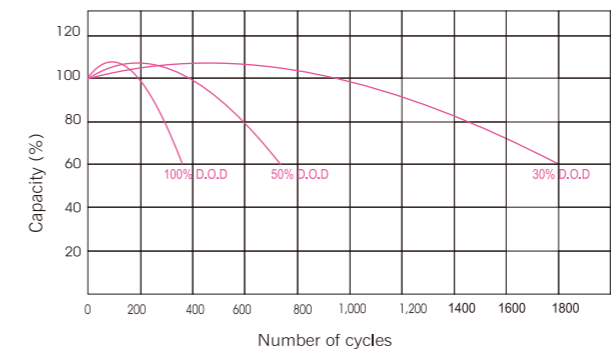


Relationship between charge voltage and temperature

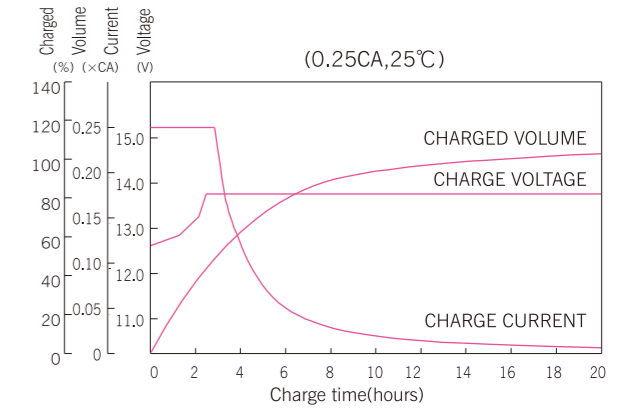


The operating environment temperature above 40°C should be avoided. After long term storage, The battery actual capacity would be less than the rated capacity. Full capacity will be obtained through several charge/discharge cycles. To get the longest life, KSTAR battery should be fully charged before storage.

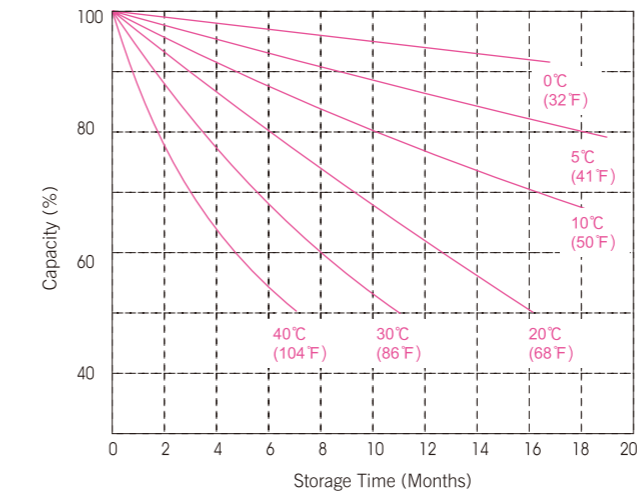
Cycle service life in relation to depth of discharge



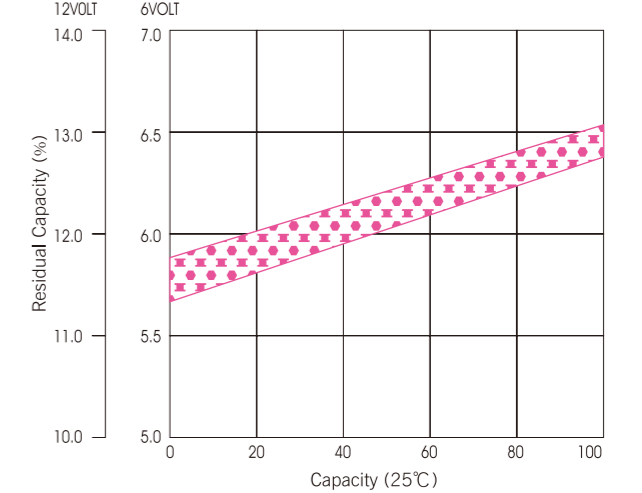
Constant voltage charge characteristic



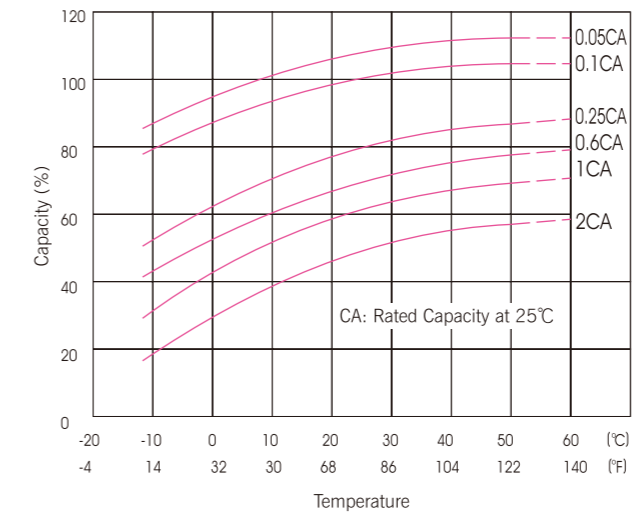
Self-Discharge Characteristics



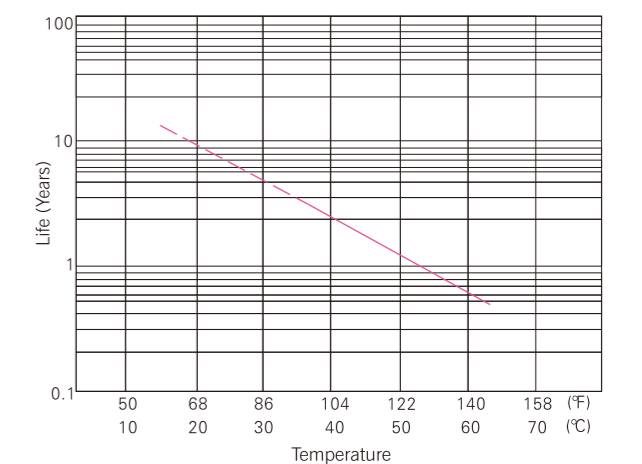
Relationship of OCV and Residual Capacity % (25°C)

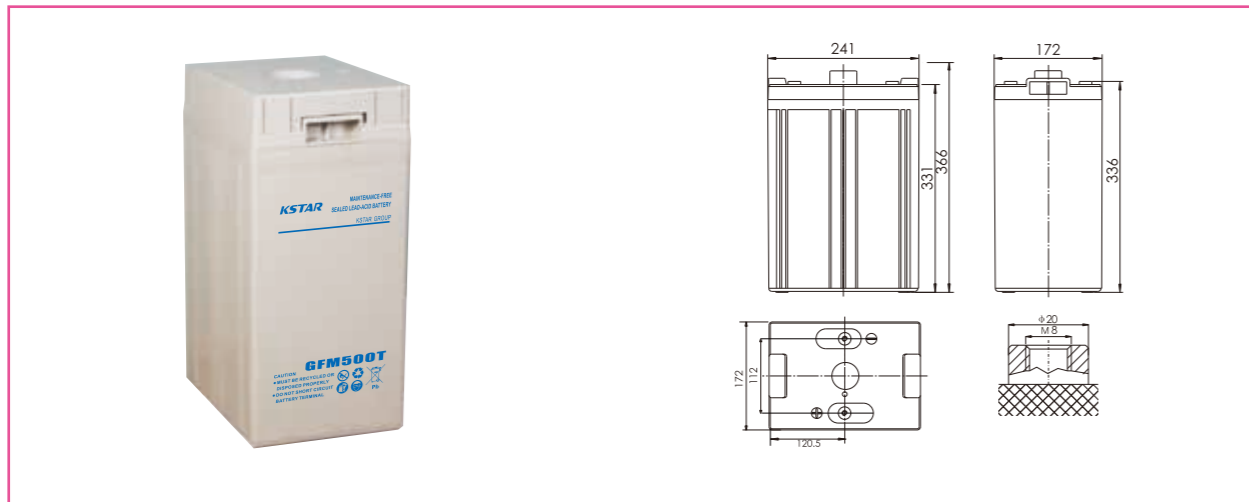


Temperature effects on capacity



Temperature effects float life





Specifications

Nominal Voltage	2V	
Rated Capacity (10 hour rate)	500Ah	
Dimensions	Total Height (with terminals)	14.41 inches(366mm)
	Height	13.03 inches(331mm)
	length	9.49 inches(241mm)
	width	6.77 inches(172mm)
Weight	Approx.63.8 Pound(29.0kg)	

Characteristics

Capacity 77°F(25°C)	10 hour rate (50.0A)	500 Ah
	5 hour rate (85.0A)	425 Ah
	1hour rate (275A)	275 Ah
Internal Resistance	Full charged Battery 77°F(25°C)	0.5 mΩ
Capacity affected by Temperature (20hour rate)	104°F(40°C)	102%
	77°F(25°C)	100%
	32°F(0°C)	85%
Self-Discharge 77°F(25°C)	Capacity after 3 month storage	91%
	Capacity after 6 month storage	81%
	Capacity after 12 month storage	60%
Max. Discharge Current 77°F(25°C)	3500A(5S)	
Terminal	M3	
Charge (Constant Voltage)	Cycle	Initial Charging Current less than 100A Voltage 2.40~2.45 V / 77°F(25°C)
	Float	Voltage 2.23~2.27V / 77°F(25°C)

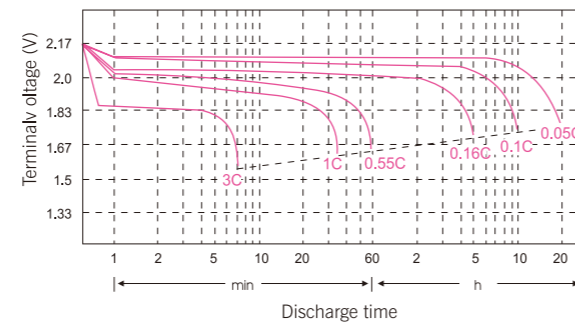
Constant Current Discharge (AMPERES @25°C)

F.V/Time	5Min	10Min	15Min	30Min	1Hour	3Hour	5Hour	10Hour
1.60	841	691	467	282	128	94.1	52.9	28.6
1.75	769	650	439	275	126	90.7	51.5	27.5
1.80	709	605	399	248	125	85.0	50.0	26.6

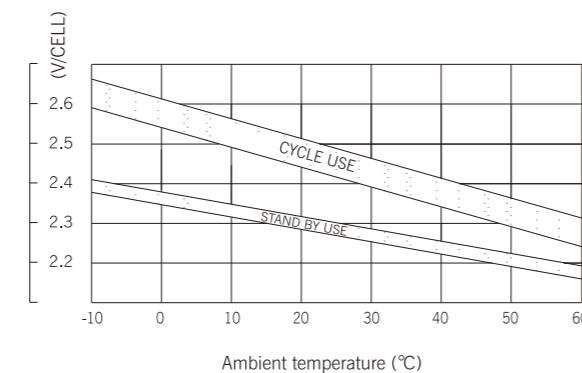
Constant Power Discharge (WATTS PER CELL@25°C)

F.V/Time	5Min	10Min	15Min	30Min	1Hour	3Hour	5Hour	10Hour
1.60	1506	1250	850	590	265	179	100	53.0
1.75	1420	1201	820	554	263	175	99.0	52.0
1.80	1355	1163	769	516	260	171	98.0	51.0

Discharge Curves 77°F(25°C)

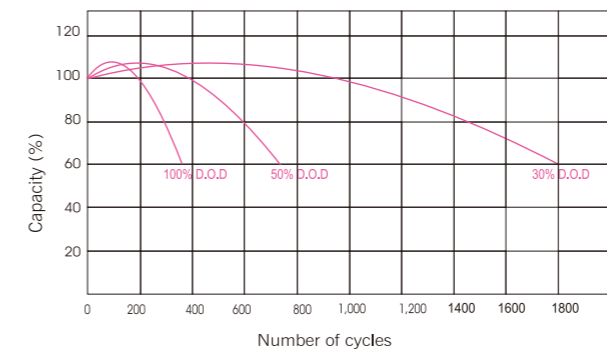


Relationship between charge voltage and temperature

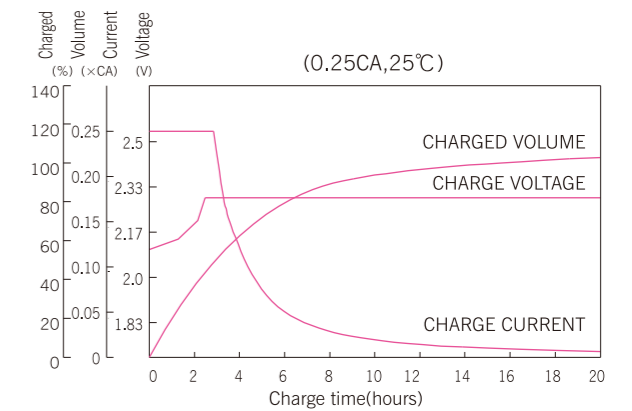


The operating environment temperature above 40°C should be avoided ,After long term storage, The battery actual capacity would be less than the rated capacity. Full capacity will be obtained through several charge/discharge cycles. To get the longest life, KSTAR battery should be fully charged before storage.

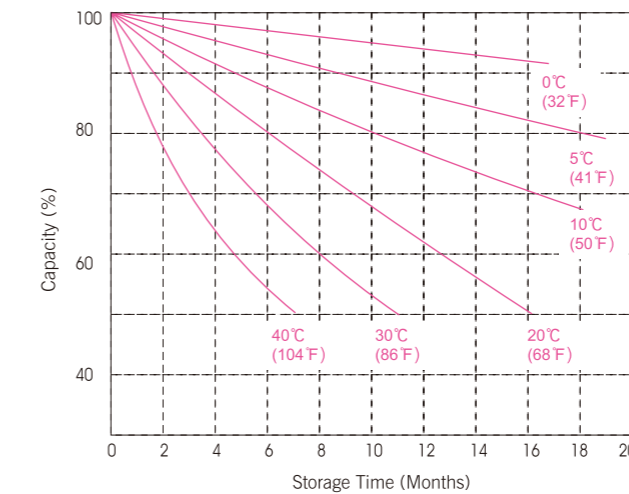
Cycle service life in relation to depth of discharge



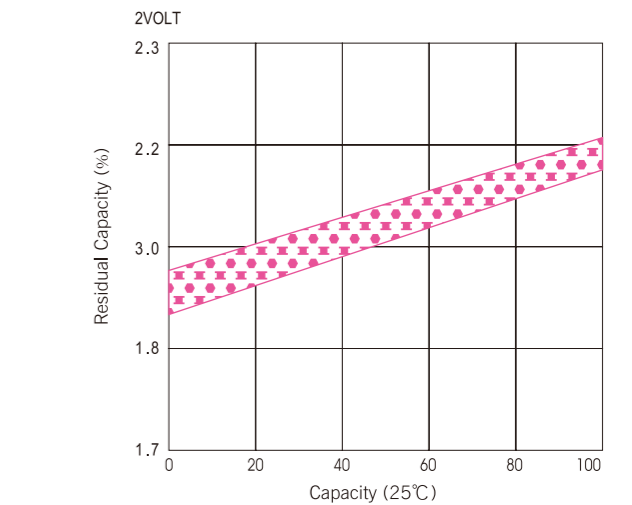
Constant voltage charge characteristic



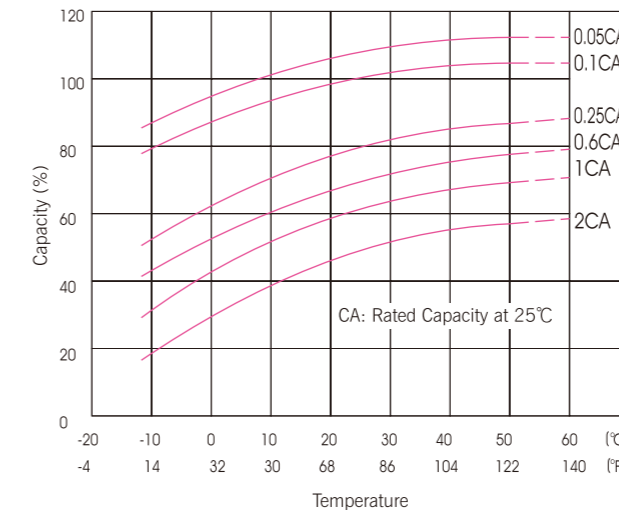
Self-Discharge Characteristics



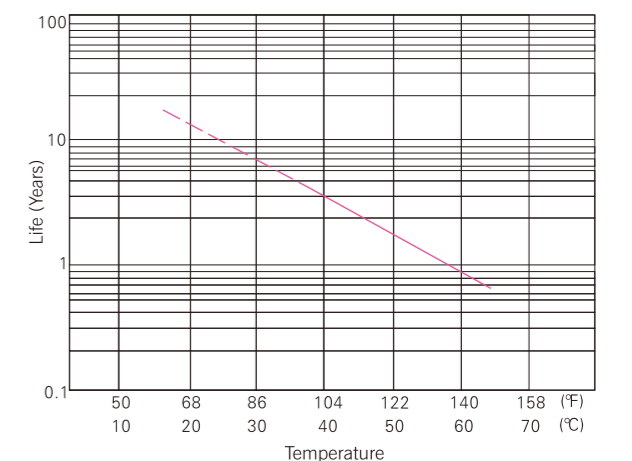
Relationship of OCV and Residual Capacity % (25°C)

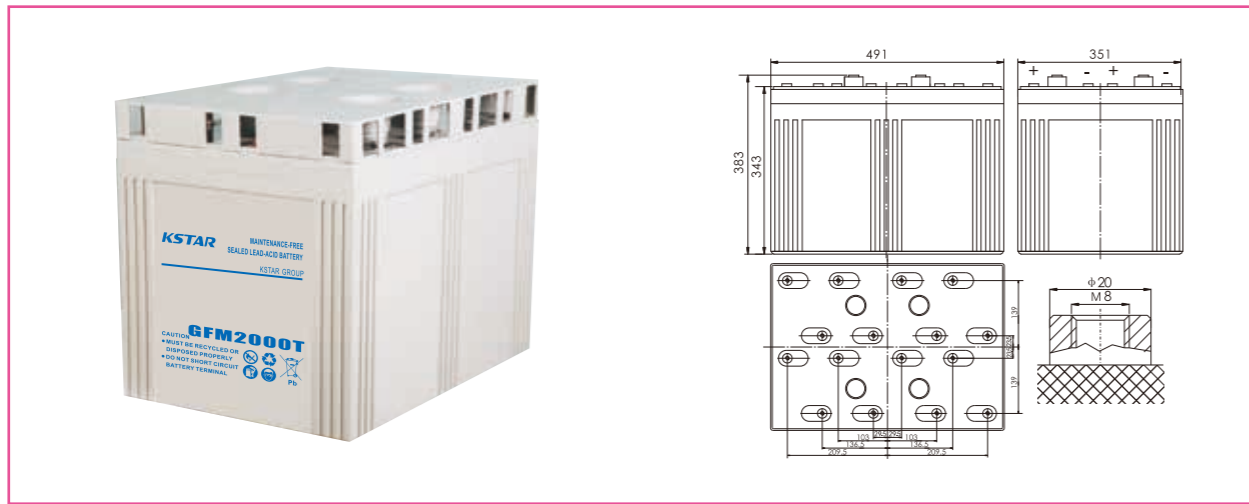


Temperature effects on capacity



Temperature effects float life





Specifications

Nominal Voltage	2V	
Rated Capacity (10 hour rate)	2000Ah	
Dimensions	Total Height (with terminals)	15.08 inches(383mm)
	Height	13.05 inches(343mm)
	length	19.33 inches(491mm)
	width	13.82 inches(351mm)
Weight	Approx.269.5 Pound(122.5kg)	

Characteristics

Capacity 77°F(25°C)	10 hour rate (200A)	2000 Ah
	5 hour rate (340A)	1700 Ah
	1hour rate (1100A)	1100 Ah
Internal Resistance	Full charged Battery 77°F(25°C)	0.12 mΩ
Capacity affected by Temperature (20hour rate)	104°F(40°C)	102%
	77°F(25°C)	100%
	32°F(0°C)	85%
Self-Discharge 77°F(25°C)	Capacity after 3 month storage	91%
	Capacity after 6 month storage	81%
	Capacity after 12 month storage	60%
Max. Discharge Current 77°F(25°C)	11000A(5S)	
Terminal	M3	
Charge (Constant Voltage)	Cycle	Initial Charging Current less than 400A
		Voltage 2.40~2.45 V / 77°F(25°C)
	Float	Voltage 2.23~2.27V / 77°F(25°C)

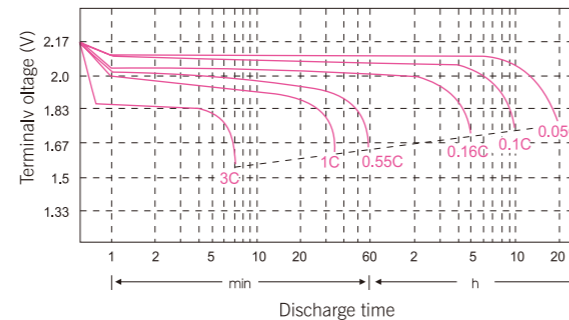
Constant Current Discharge (AMPERES @25°C)

FV/Time	5Min	10Min	15Min	30Min	1Hour	3Hour	5Hour	10Hour
1.60	3363	2765	1869	1125	513	376	211	114
1.75	3077	2598	1757	1100	502	365	206	110
1.80	2835	2419	1598	986	500	340	200	107

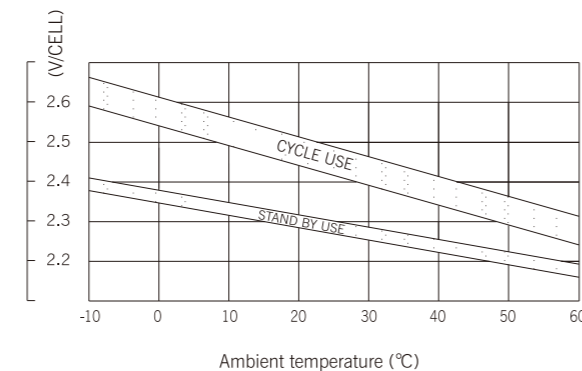
Constant Power Discharge (WATTS PER CELL@25°C)

FV/Time	5Min	10Min	15Min	30Min	1Hour	3Hour	5Hour	10Hour
1.60	6024	5000	3400	2360	1060	716	400	212
1.75	5680	4804	3280	2216	1048	700	396	208
1.80	5420	4652	3076	2068	1038	688	392	205

Discharge Curves 77°F(25°C)

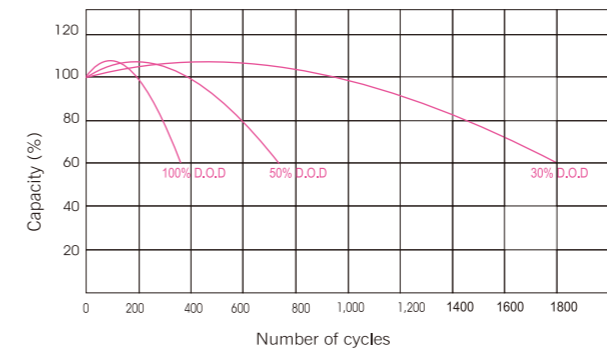


Relationship between charge voltage and temperature

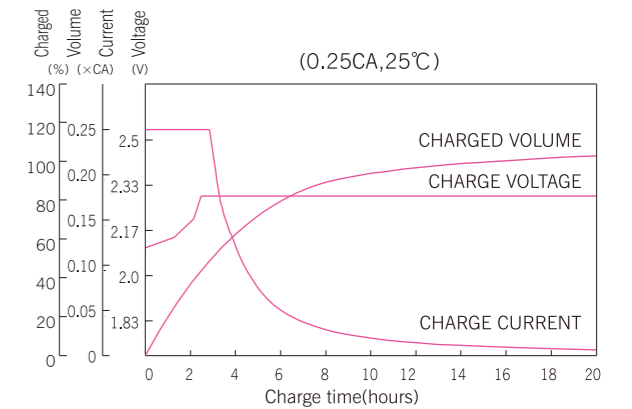


The operating environment temperature above 40°C should be avoided. After long term storage, The battery actual capacity would be less than the rated capacity. Full capacity will be obtained through several charge/discharge cycles. To get the longest life, KSTAR battery should be fully charged before storage.

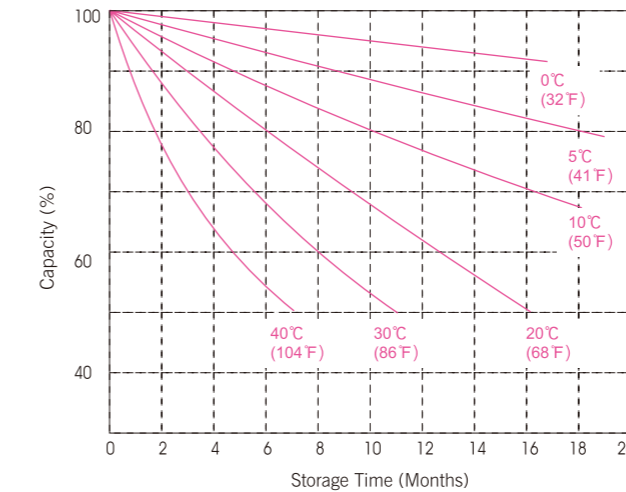
Cycle service life in relation to depth of discharge



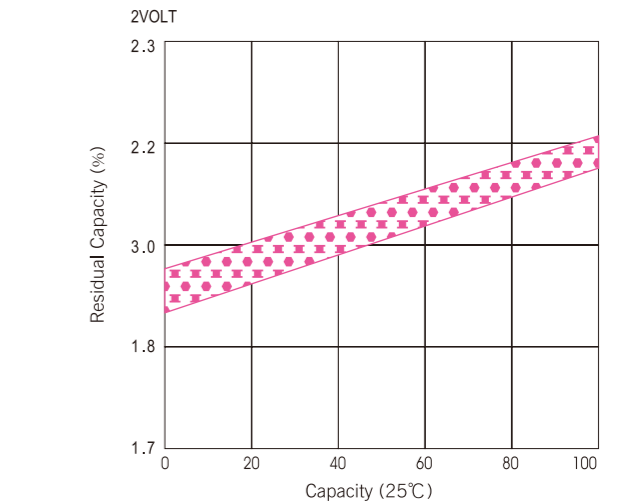
Constant voltage charge characteristic



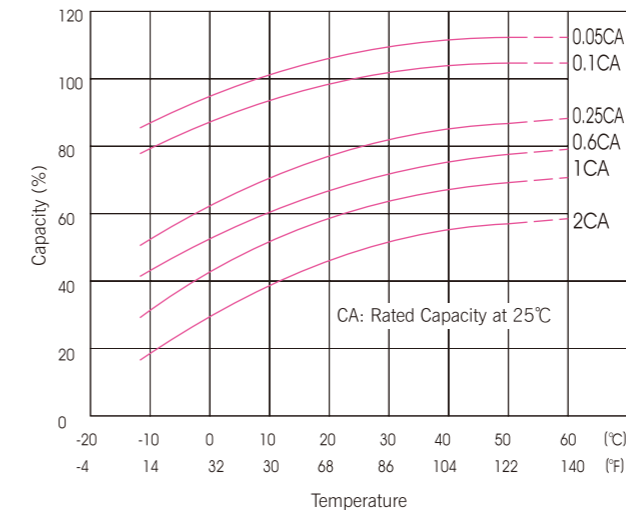
Self-Discharge Characteristics



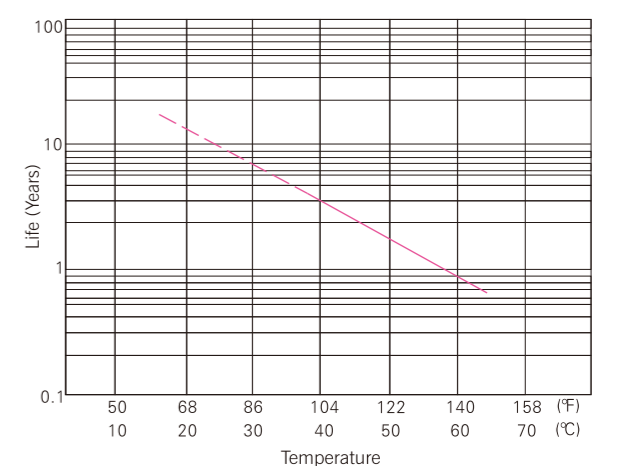
Relationship of OCV and Residual Capacity % (25°C)

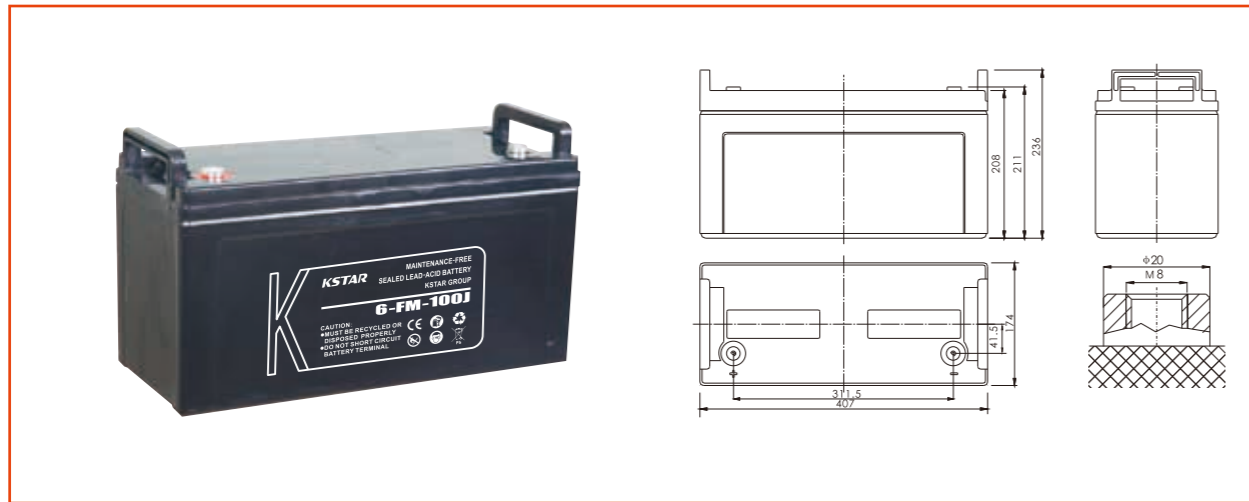


Temperature effects on capacity



Temperature effects float life





Specifications

Nominal Voltage	12V	
Rated Capacity (20 hour rate)	100Ah	
Dimensions	Total Height (with terminals)	8.62 inches(219mm)
	Height	8.35 inches(212mm)
	length	15.98 inches(406mm)
	width	6.81 inches(173mm)
Weight	Approx.72.6 Pound(33.0kg)	

Characteristics

Capacity 77°F(25°C)	20 hour rate (5.0A)	100 Ah
	10 hour rate (9.20A)	92 Ah
	5 hour rate (16.0A)	80 Ah
	1 hour rate (60.0A)	60 Ah
	15Minute Rate (164A)	41 Ah
Internal Resistance	Full charged Battery 77°F(25°C)	4.5 mΩ
	104°F(40°C)	102%
	77°F(25°C)	100%
Capacity affected by Temperature (20hour rate)	32°F(0°C)	85%
	5°F(-15°C)	65%
	Capacity after 3 month storage	91%
Self-Discharge 77°F(25°C)	Capacity after 6 month storage	81%
	Capacity after 12 month storage	60%
	Max. Discharge Current 77°F(25°C)	800A(5S)
Terminal	M3	
Charge (Constant Voltage)	Cycle	Initial Charging Current less than 30A Voltage 14.4~14.7 V / 77°F(25°C)
	Float	Voltage 13.5~13.8V / 77°F(25°C)

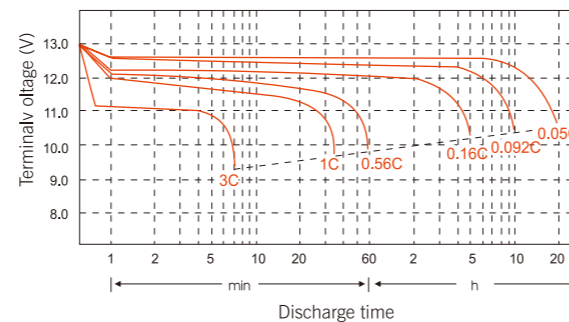
Constant Current Discharge (AMPERES @25°C)

F.V/Time	10Min	15Min	30Min	60Min	2H	3H	4H	5H	8H	10H	20H
1.60	226	164	106	63.4	36.9	25.8	20.6	17.7	12.1	9.90	5.17
1.65	217	158	102	61.0	35.5	25.5	20.4	17.5	12.0	9.80	5.12
1.70	205	151	86.8	60.5	34.6	25.0	19.9	16.9	11.9	9.59	5.06
1.75	180	142	81.5	60.0	34.3	24.5	19.3	16.0	11.6	9.20	5.00
1.80	173	137	78.4	57.7	33.0	23.6	18.5	15.4	11.2	8.85	4.81
1.85	142	119	72.1	53.1	31.7	22.4	17.6	14.6	10.6	8.41	4.57

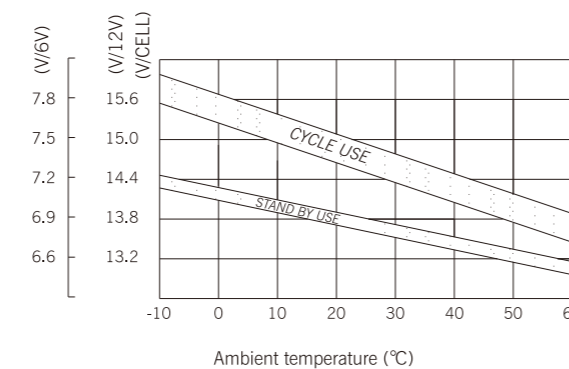
Constant Power Discharge (WATTS PER CELL@25°C)

Cut off voltage V/cell	10Min	15Min	30Min	60Min	2H	3H	4H	5H	8H	10H	20H
1.60	394	307	191	119	70.0	49.1	38.7	32.4	22.9	18.3	9.73
1.65	389	304	185	115	69.1	49.0	38.6	32.2	22.8	18.2	9.72
1.70	379	291	162	111	68.4	47.7	37.7	31.6	22.3	18.1	9.68
1.75	346	274	156	108	67.9	46.4	36.8	31.0	21.7	18.0	9.67
1.80	330	264	151	107	66.6	46.1	36.4	30.5	21.4	17.7	9.65
1.85	273	231	141	104	64.2	45.0	35.4	29.6	20.1	16.9	9.14

Discharge Curves 77°F (25°C)

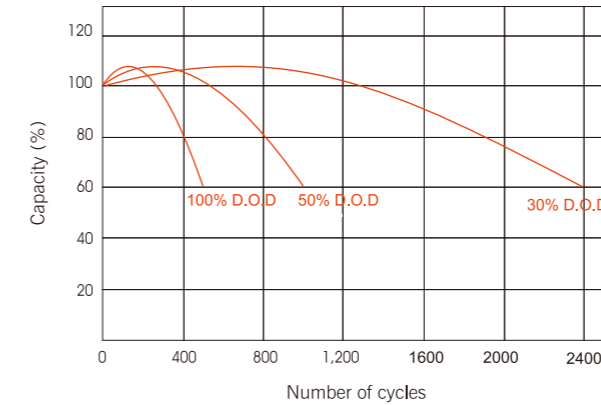


Relationship between charge voltage and temperature

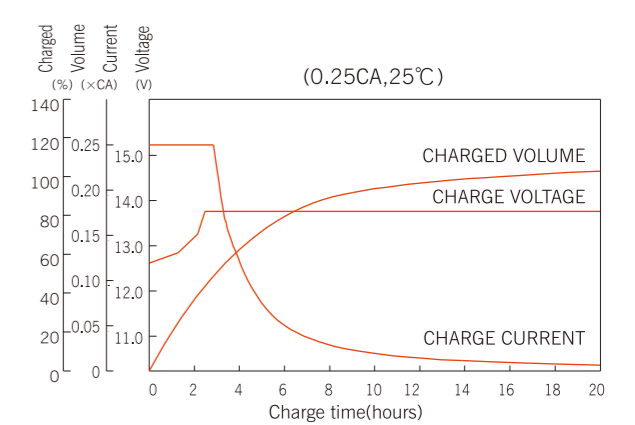


The operating environment temperature above 40°C should be avoided. After long term storage, The battery actual capacity would be less than the rated capacity. Full capacity will be obtained through several charge/discharge cycles. To get the longest life, KSTAR battery should be fully charged before storage.

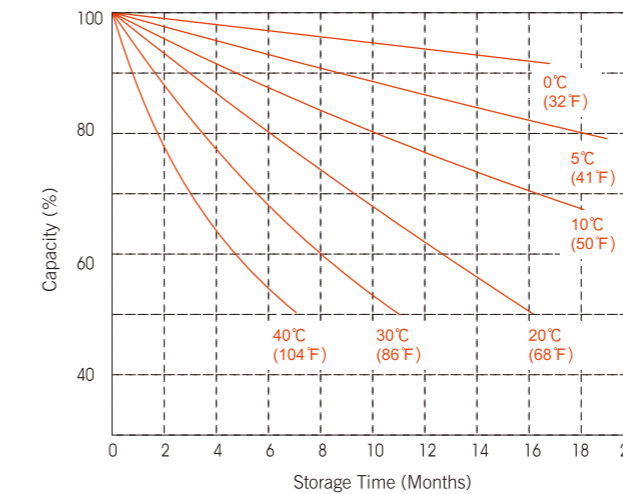
Cycle service life in relation to depth of discharge



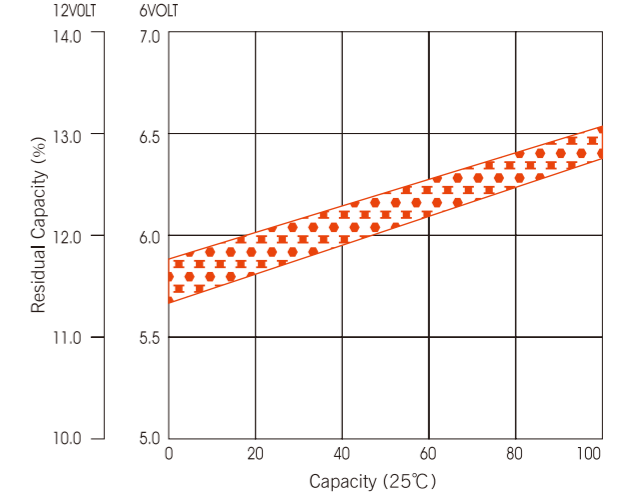
Constant voltage charge characteristic



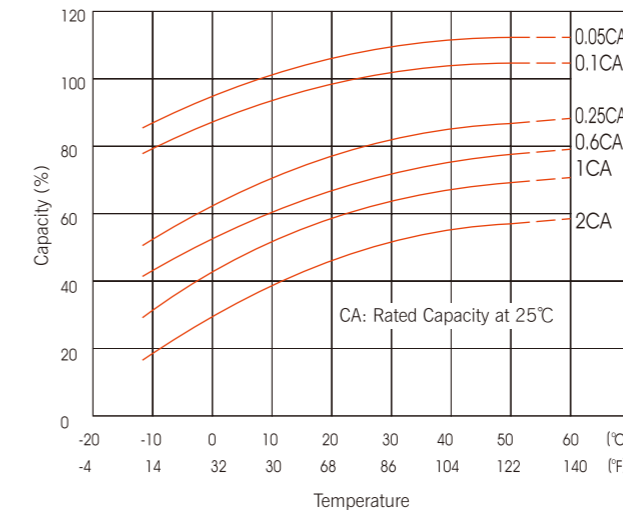
Self-Discharge Characteristics



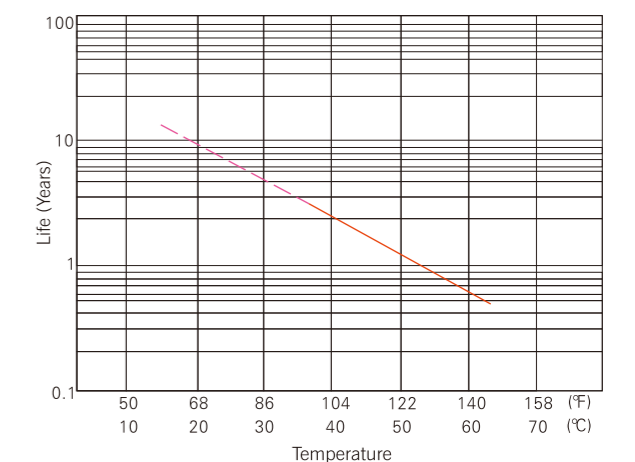
Relationship of OCV and Residual Capacity % (25°C)

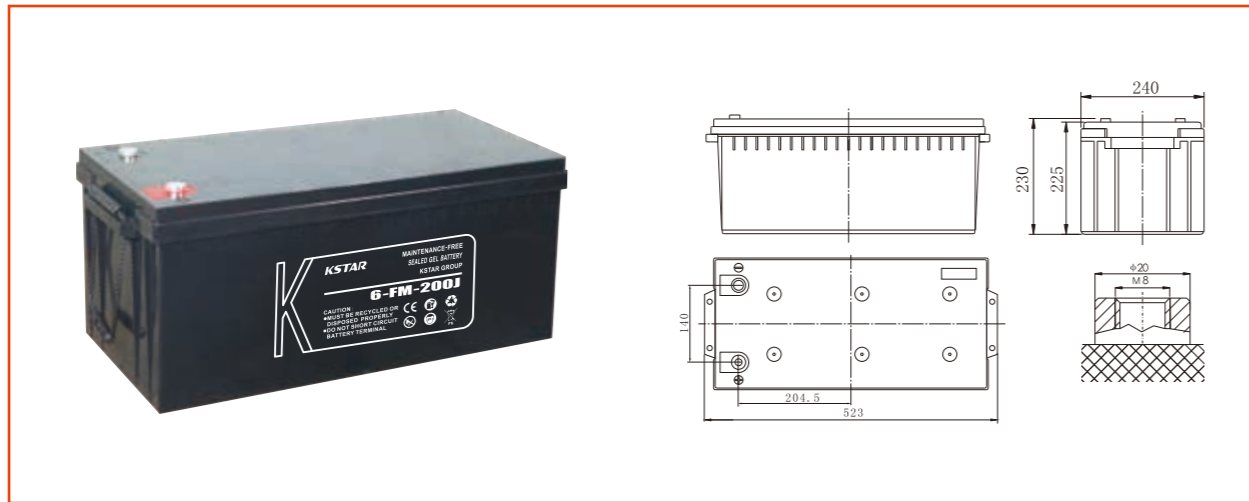


Temperature effects on capacity



Temperature effects float life





Specifications

Nominal Voltage	12V	
Rated Capacity (20 hour rate)	200Ah	
Dimensions	Total Height (with terminals)	9.06 inches(230mm)
	Height	8.86 inches(225mm)
	length	20.59 inches(523mm)
	width	9.45 inches(240mm)
Weight	Approx.128.7 Pound(58.5kg)	

Characteristics

Capacity 77°F(25°C)	20 hour rate (10.0A)	200 Ah
	10 hour rate (18.4A)	184 Ah
	5 hour rate (32.0A)	160 Ah
	1 hour rate (120.0A)	120 Ah
	15 Minute Rate (328A)	82.0 Ah
Internal Resistance	Full charged Battery 77°F(25°C)	3.0 mΩ
	104°F(40°C)	102%
	77°F(25°C)	100%
Capacity affected by Temperature (20hour rate)	32°F(0°C)	85%
	5°F(-15°C)	65%
	Capacity after 3 month storage	91%
Self-Discharge 77°F(25°C)	Capacity after 6 month storage	81%
	Capacity after 12 month storage	60%
	Max. Discharge Current 77°F(25°C)	1333A(5S)
Terminal	M3	
Charge (Constant Voltage)	Cycle	Initial Charging Current less than 60A Voltage 14.4~14.7 V / 77°F(25°C)
	Float	Voltage 13.5~13.8V / 77°F(25°C)

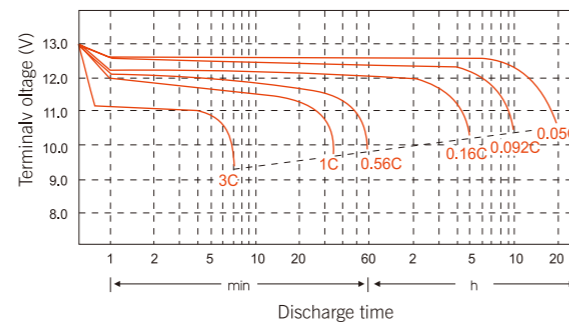
Constant Current Discharge (AMPERES @25°C)

FV/Time	10Min	15Min	30Min	60Min	2H	3H	4H	5H	8H	10H	20H
1.60	401	328	197	127	73.1	52.0	40.7	34.5	23.8	19.4	10.4
1.65	386	315	189	122	70.3	51.5	40.3	34.2	23.5	19.2	10.3
1.70	364	286	177	121	69.2	50.0	39.2	33.5	23.0	18.6	10.1
1.75	317	254	152	120	68.8	50.2	38.7	32.0	22.7	18.4	10.0
1.80	305	244	146	115	66.2	48.3	37.2	30.8	21.8	17.7	9.62
1.85	250	212	134	106	63.6	45.9	35.3	29.3	20.7	16.8	9.14

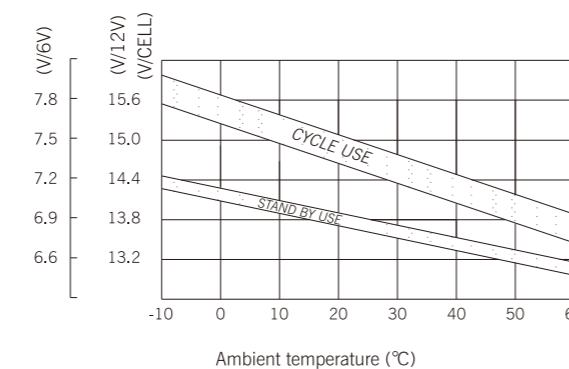
Constant Power Discharge (WATTS PER CELL@25°C)

Cut off voltage V/cell	10Min	15Min	30Min	60Min	2H	3H	4H	5H	8H	10H	20H
1.60	697	545	349	231	138	95.8	75.5	63.2	43.5	37.3	19.0
1.65	691	541	343	228	136	94.6	74.9	63.0	43.3	36.8	18.7
1.70	672	529	331	219	134	93.2	74.0	62.6	43.0	36.0	18.5
1.75	629	499	296	216	133	92.8	73.5	62.0	42.5	35.1	18.4
1.80	584	469	281	211	130	92.1	72.9	61.4	41.7	34.4	18.1
1.85	485	410	257	207	124	89.3	69.6	57.2	38.9	32.8	17.8

Discharge Curves 77°F (25°C)

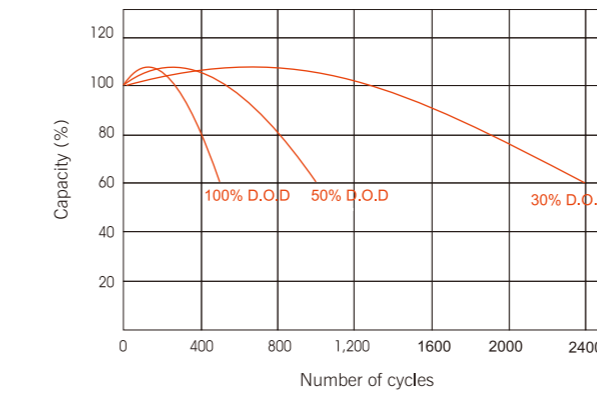


Relationship between charge voltage and temperature

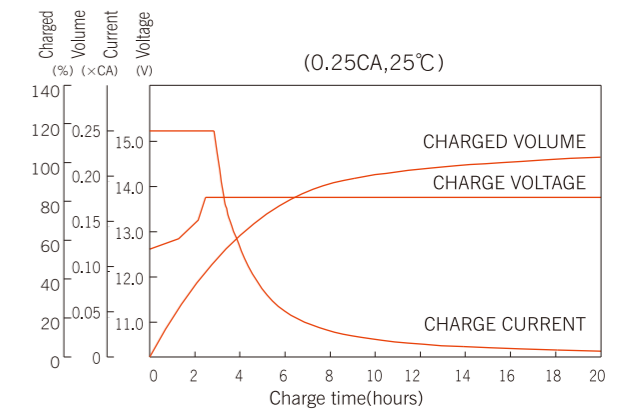


The operating environment temperature above 40°C should be avoided. After long term storage, the battery actual capacity would be less than the rated capacity. Full capacity will be obtained through several charge/discharge cycles. To get the longest life, KSTAR battery should be fully charged before storage.

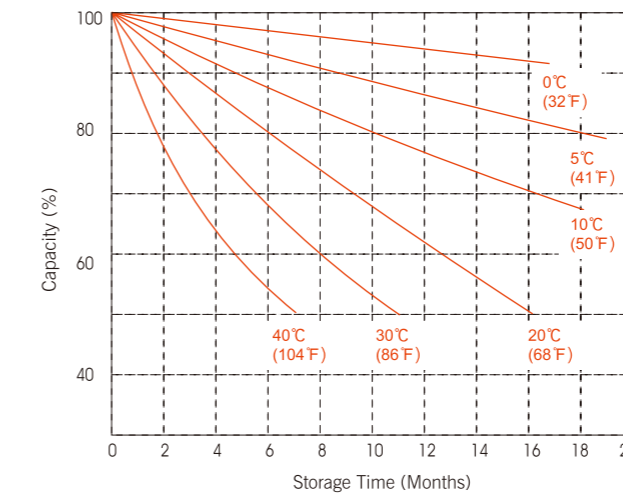
Cycle service life in relation to depth of discharge



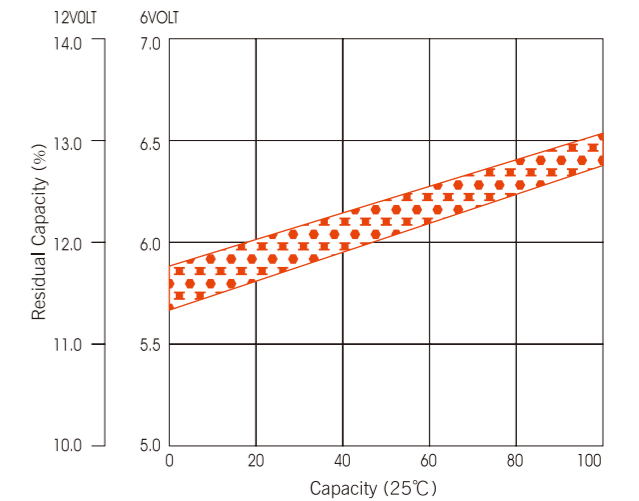
Constant voltage charge characteristic



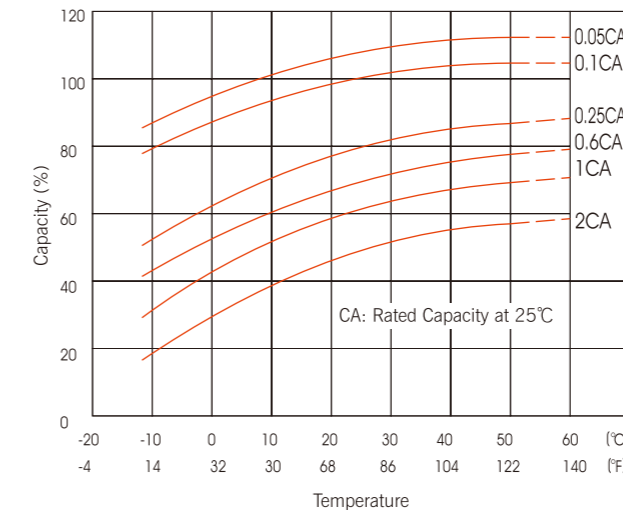
Self-Discharge Characteristics



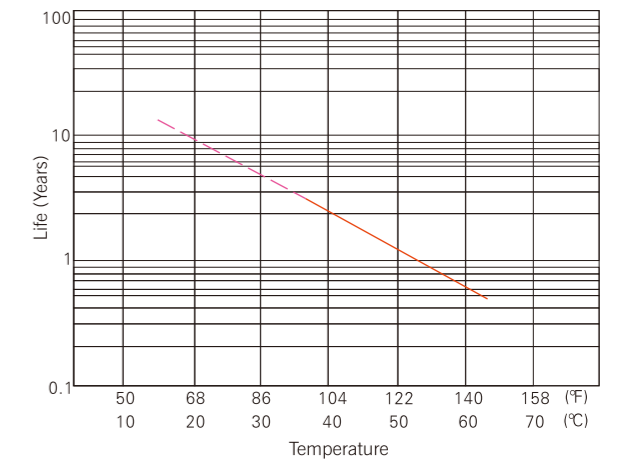
Relationship of OCV and Residual Capacity % (25°C)

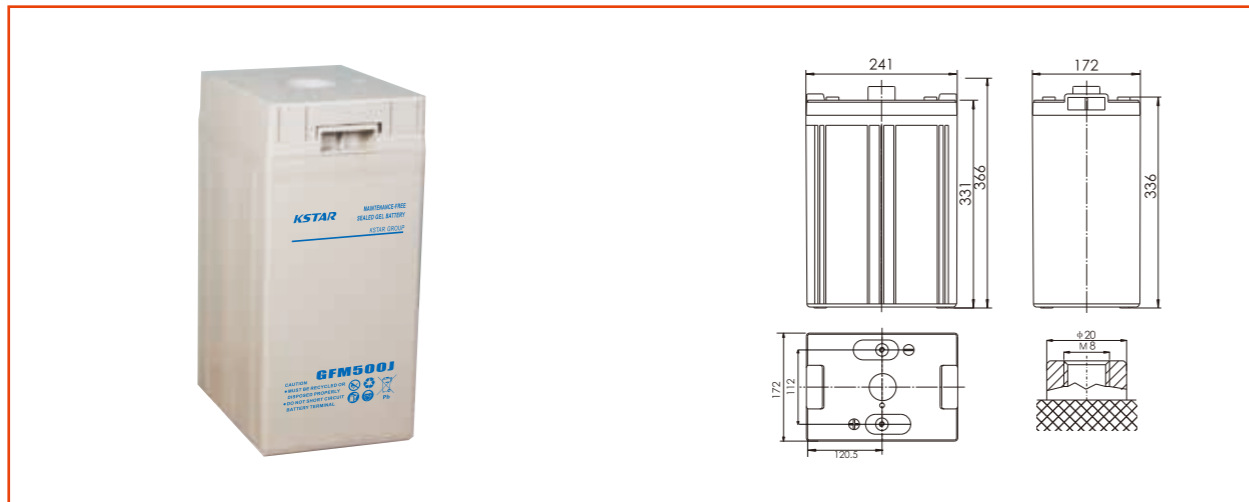


Temperature effects on capacity



Temperature effects float life





Specifications

Nominal Voltage	2V	
Rated Capacity (10 hour rate)	500Ah	
Dimensions	Total Height (with terminals)	14.41 inches(366mm)
	Height	13.03 inches(331mm)
	length	9.49 inches(241mm)
	width	6.77 inches(172mm)
Weight	Approx.64.9 Pound(29.5kg)	

Characteristics

Capacity 77°F(25°C)	10 hour rate (50.0A)	500 Ah
	5 hour rate (85A)	425 Ah
	1hour rate (275A)	275 Ah
Internal Resistance	Full charged Battery 77°F(25°C)	0.5 mΩ
Capacity affected by Temperature (20hour rate)	104°F(40°C)	102%
	77°F(25°C)	100%
	32°F(0°C)	85%
Self-Discharge 77°F(25°C)	Capacity after 3 month storage	91%
	Capacity after 6 month storage	81%
	Capacity after 12 month storage	60%
Max. Discharge Current 77°F(25°C)	3500A(5S)	
Terminal	M3	
Charge (Constant Voltage)	Cycle	Initial Charging Current less than 100A Voltage 2.40~2.45 V / 77°F(25°C)
	Float	Voltage 2.23~2.27V / 77°F(25°C)

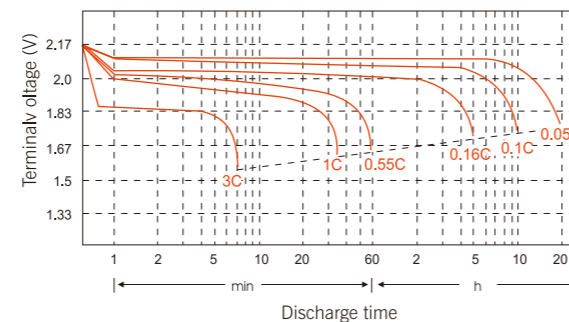
Constant Current Discharge (AMPERES @25°C)

F.V/Time	10Min	15Min	30Min	1Hour	3Hour	5Hour	10Hour	20Hour
1.60	841	691	467	282	128	94.1	52.9	28.6
1.75	769	650	439	275	126	90.7	51.5	27.5
1.80	709	605	399	248	125	85.0	50.0	26.6

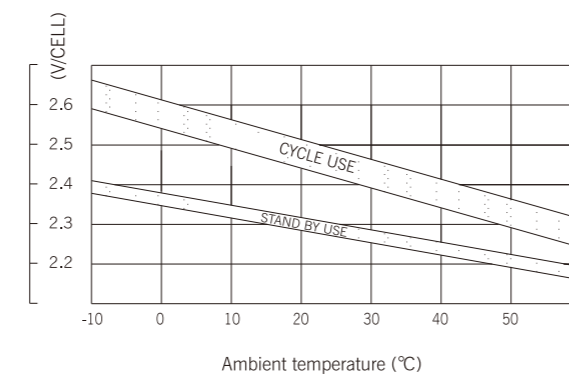
Constant Power Discharge (WATTS PER CELL@25°C)

F.V/Time	10Min	15Min	30Min	1Hour	3Hour	5Hour	10Hour	20Hour
1.60	1506	1250	850	590	265	179	100	53.0
1.75	1420	1201	820	554	263	175	99.0	52.0
1.80	1355	1163	769	516	260	171	98.0	51.0

Discharge Curves 77°F(25°C)

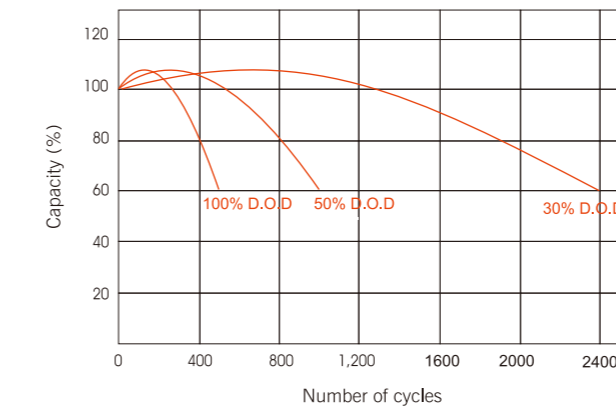


Relationship between charge voltage and temperature

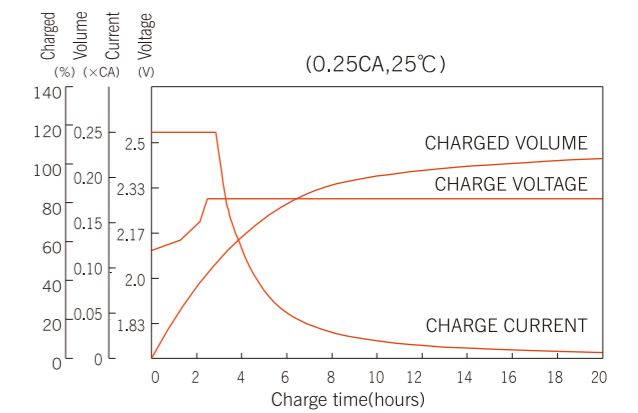


The operating environment temperature above 40°C should be avoided ,After long term storage, The battery actual capacity would be less than the rated capacity. Full capacity will be obtained through several charge/discharge cycles. To get the longest life, KSTAR battery should be fully charged before storage.

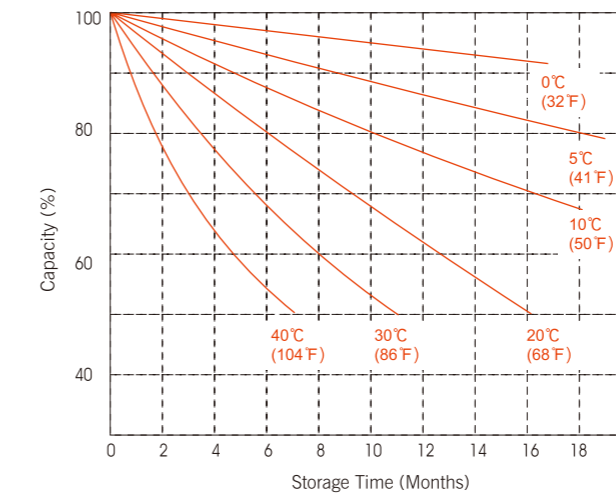
Cycle service life in relation to depth of discharge



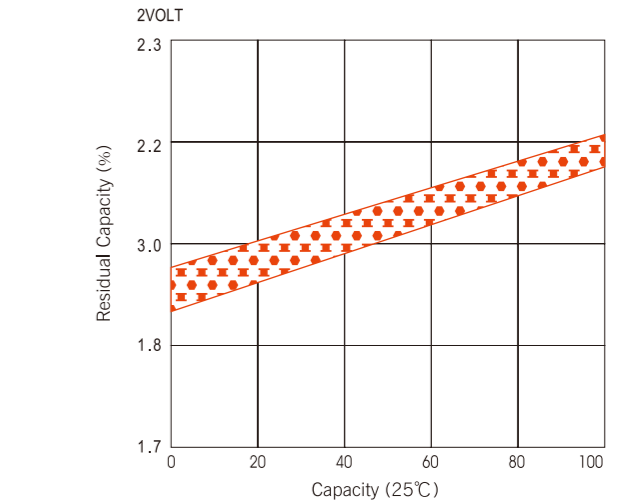
Constant voltage charge characteristic



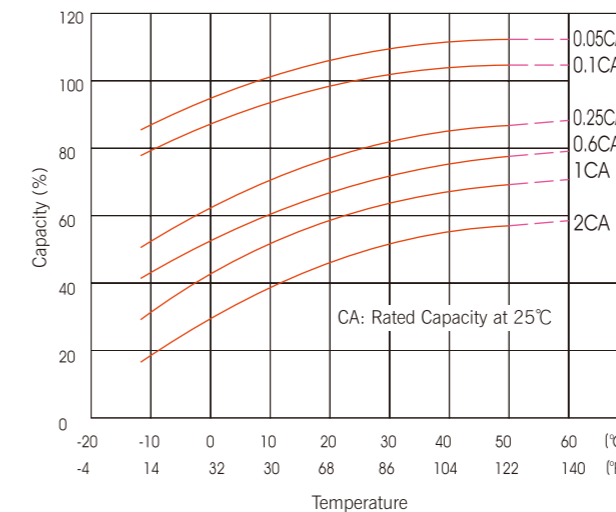
Self-Discharge Characteristics



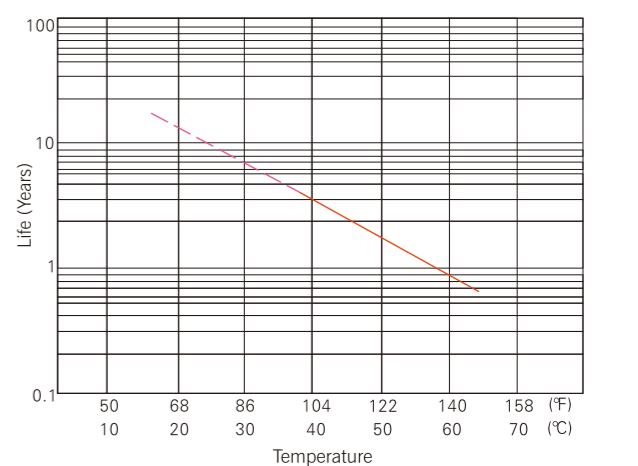
Relationship of OCV and Residual Capacity % (25°C)

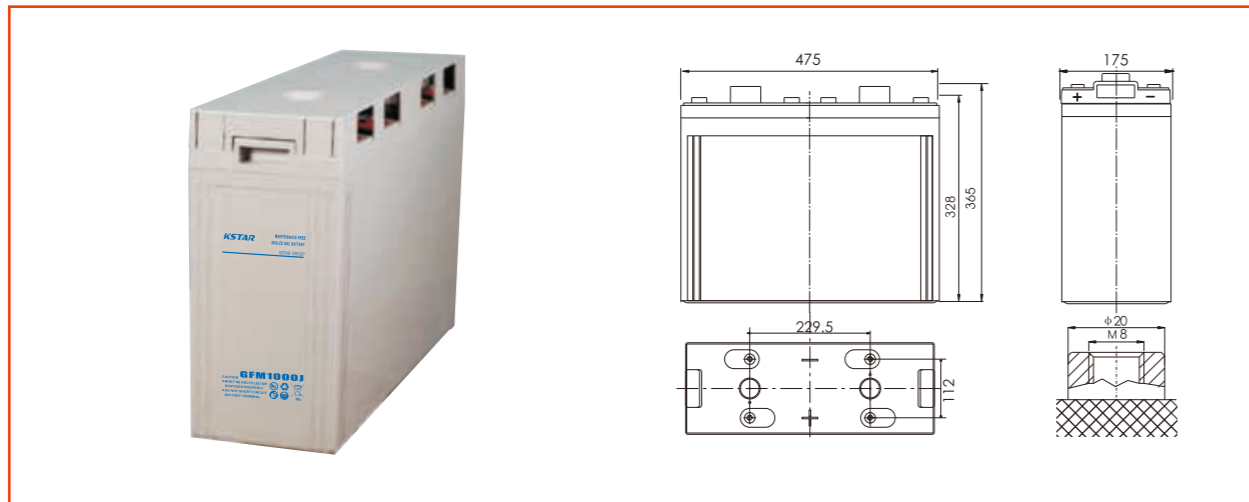


Temperature effects on capacity



Temperature effects float life





Specifications

Nominal Voltage	2V	
Rated Capacity (10 hour rate)	1000Ah	
Dimensions	Total Height (with terminals)	14.38 inches(365mm)
	Height	12.92 inches(328mm)
	length	18.71 inches(475mm)
	width	6.89 inches(175mm)
Weight	Approx.129.8 Pound(59.0kg)	

Characteristics

Capacity 77°F(25°C)	10 hour rate (100A)	1000 Ah
	5 hour rate (170A)	850 Ah
	1 hour rate (550A)	550 Ah
Internal Resistance	Full charged Battery 77°F(25°C)	0.2 mΩ
Capacity affected by Temperature (20hour rate)	104°F(40°C)	102%
	77°F(25°C)	100%
	32°F(0°C)	85%
Self-Discharge 77°F(25°C)	Capacity after 3 month storage	91%
	Capacity after 6 month storage	81%
	Capacity after 12 month storage	60%
Max. Discharge Current 77°F(25°C)	7000A(5S)	
Terminal	M3	
Charge (Constant Voltage)	Cycle	Initial Charging Current less than 200A Voltage 2.40~2.45 V / 77°F(25°C)
	Float	Voltage 2.23~2.27V / 77°F(25°C)

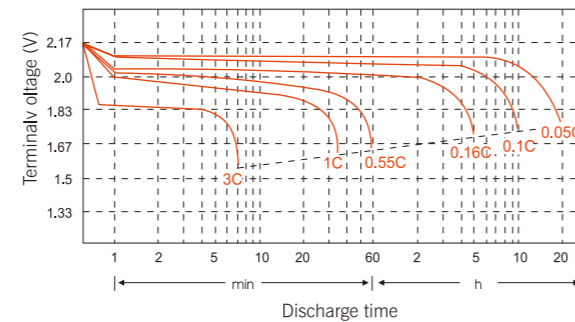
Constant Current Discharge (AMPERES @25°C)

F.V/Time	10Min	15Min	30Min	1Hour	3Hour	5Hour	10Hour	20Hour
1.60	1682	1383	935	563	256	185	106	57.1
1.75	1538	1299	878	550	252	177	103	55.1
1.80	1417	1210	799	495	250	170	100	53.2

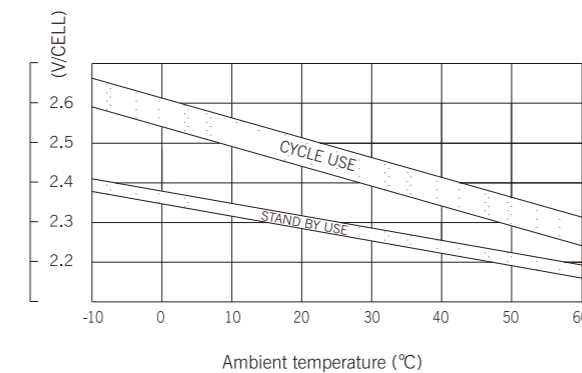
Constant Power Discharge (WATTS PER CELL@25°C)

F.V/Time	10Min	15Min	30Min	1Hour	3Hour	5Hour	10Hour	20Hour
1.60	3012	2500	1700	1180	530	358	200	106
1.75	2840	2402	1640	1108	524	350	198	104
1.80	2710	2326	1538	1034	519	344	196	102

Discharge Curves 77°F (25°C)

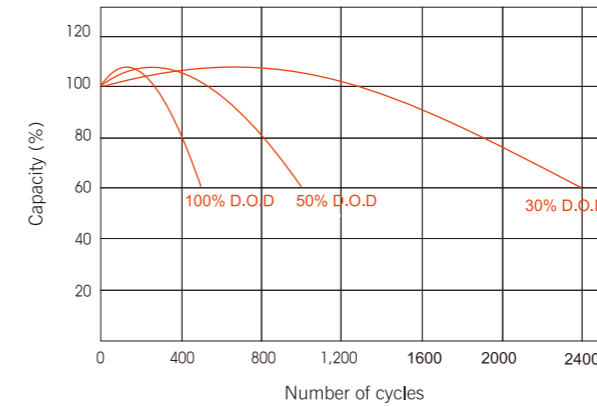


Relationship between charge voltage and temperature

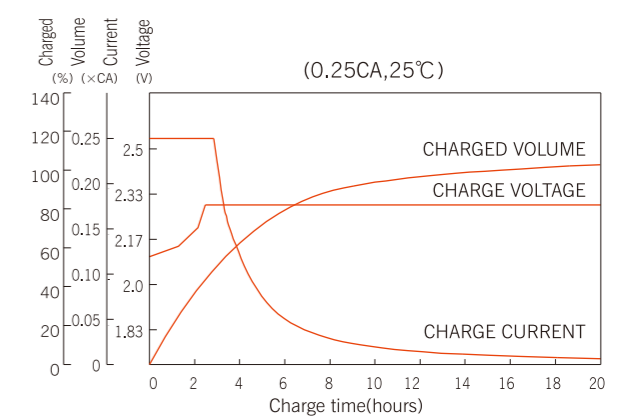


The operating environment temperature above 40°C should be avoided. After long term storage, The battery actual capacity would be less than the rated capacity. Full capacity will be obtained through several charge/discharge cycles. To get the longest life, KSTAR battery should be fully charged before storage.

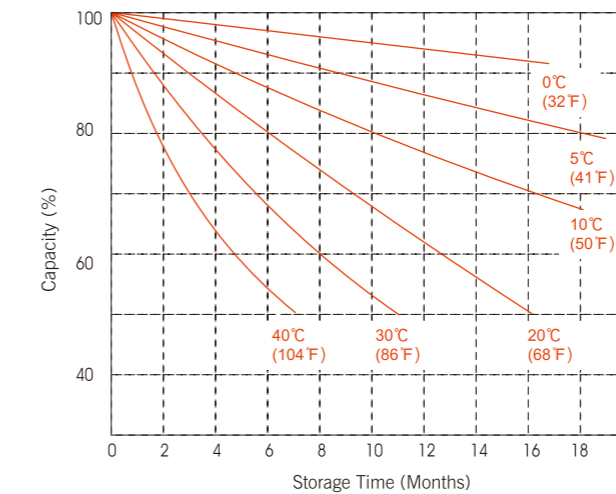
Cycle service life in relation to depth of discharge



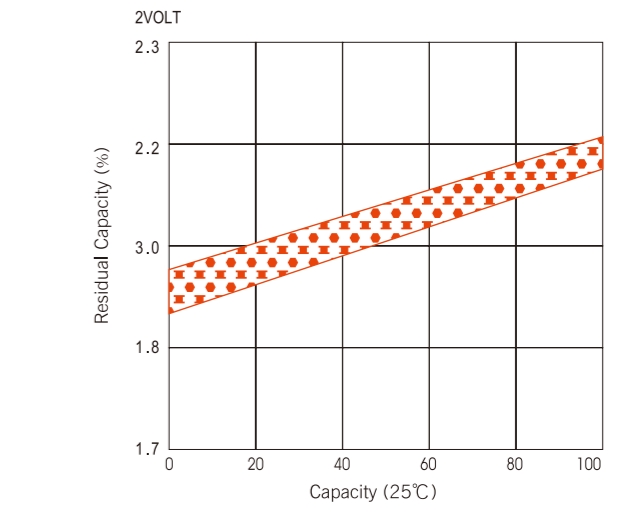
Constant voltage charge characteristic



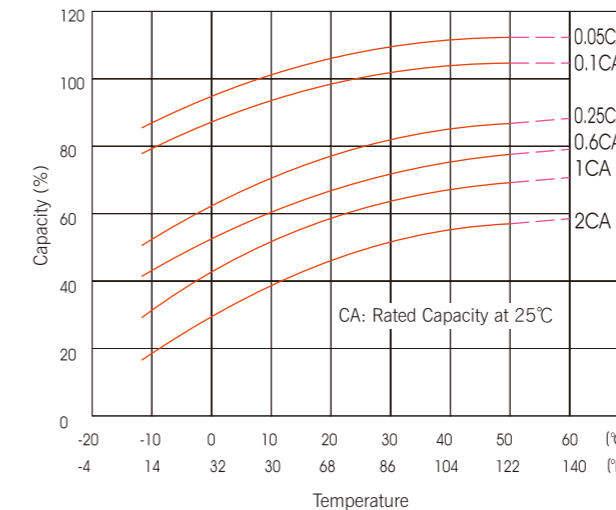
Self-Discharge Characteristics



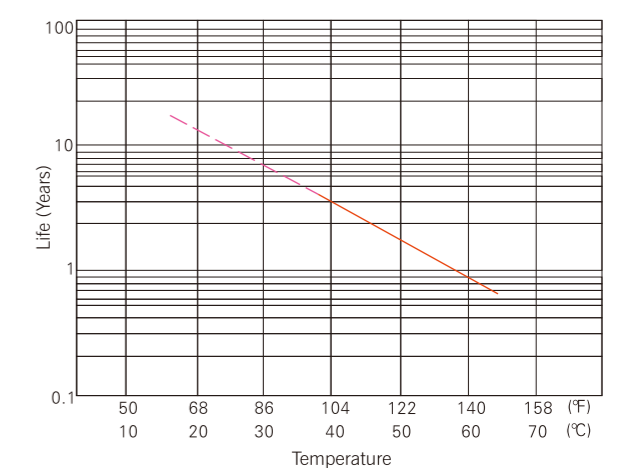
Relationship of OCV and Residual Capacity % (25°C)



Temperature effects on capacity



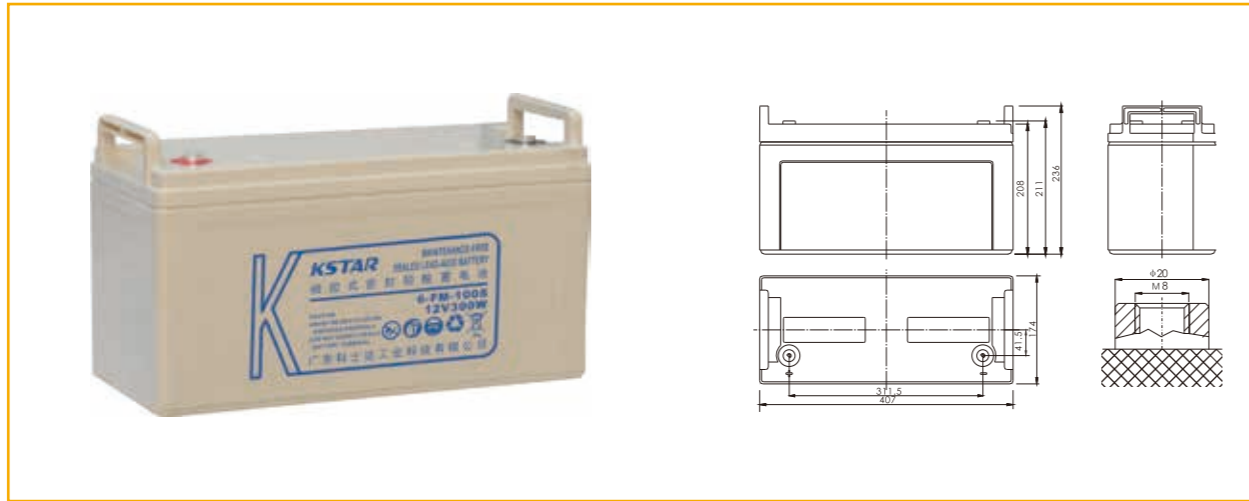
Temperature effects float life



6-FM-100S

12V300W

FMS
For High discharge Use



Specifications

Nominal Voltage	12V	
Rated Capacity (1.75V/15min)	300W	
Dimensions	Total Height (with terminals)	9.29inches(236mm)
	Heightlength	8.19 inches(208mm)
	length	16.02 inches(407mm)
	width	6.85 inches(174mm)
Weight	Approx.74.8 Pound(34.0kg)	

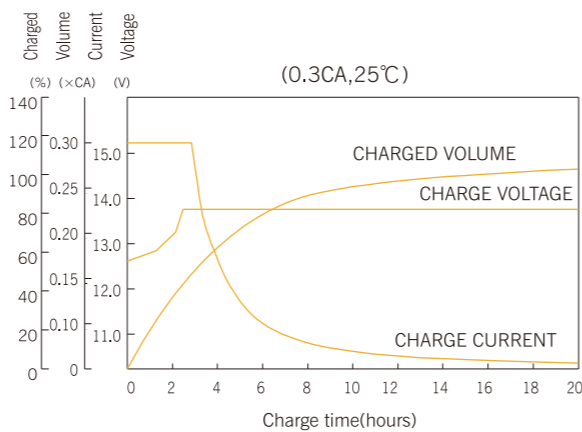
Characteristics

Capacity 77°F(25°C)	10 hour rate (10A)	100Ah
Internal Resistance	Full charged Battery 77°F(25°C)	5mΩ
	104°F(40°C)	102%
Capacity affected by Temperature (20hour rate)	77°F(25°C)	100%
	32°F(0°C)	85%
	5°F(-15°C)	65%
Self-Discharge 77°F(25°C)	Capacity after 3 month storage	91%
	Capacity after 6 month storage	81%
	Capacity after 12 month storage	60%
Max. Discharge Current 77°F(25°C)	1000A(5S)	
Terminal	M3	
Charge (Constant Voltage)	Cycle	Initial Charging Current less than 30A Voltage 14.4~14.7 V / 77°F(25°C)
	Float	Voltage 13.5~13.8 V / 77°F(25°C)

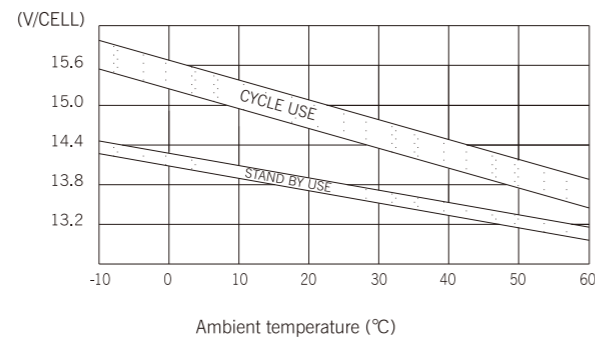
Constant Current Discharge (AMPERES @25°C)

F.V/Time	5Min	10Min	15Min	30Min	1Hour
1.60	354	264	223	133	75
1.67	348	260	216	131	73
1.75	302	234	185	125	70
1.80	278	211	168	114	68

Constant voltage charge characteristic



Relationship between charge voltage and temperature



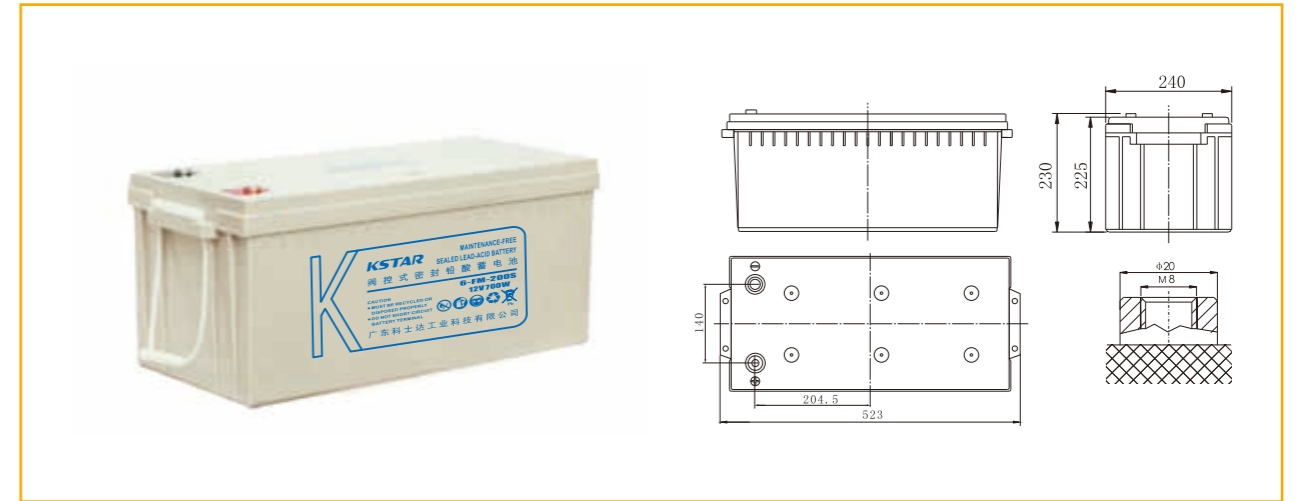
Constant Power Discharge (WATTS PER CELL@25°C)

F.V/Time	5Min	10Min	15Min	30Min	1Hour
1.60	611	457	387	233	132
1.67	605	453	377	230	130
1.75	538	419	332	226	129
1.80	506	386	309	211	127

FMS
For High discharge Use

6-FM-200S

12V700W



Specifications

Nominal Voltage	12V	
Rated Capacity (1.75V/15min)	700W	
Dimensions	Total Height (with terminals)	9.06 inches(230mm)
	Height	8.86 inches(225mm)
	length	20.59 inches(523mm)
	width	9.45 inches(240mm)
Weight	Approx.138.6Pound(63.0kg)	

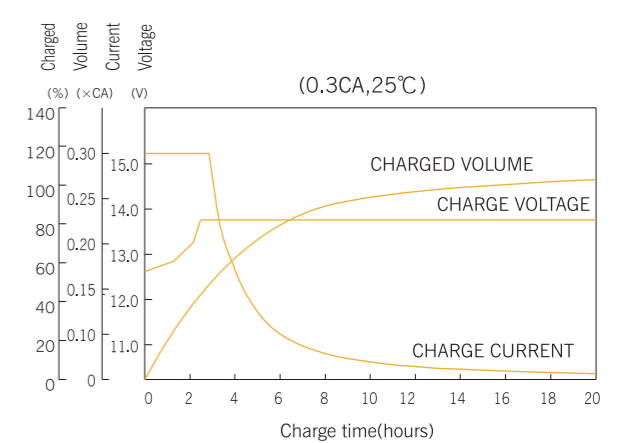
Characteristics

Capacity 77°F(25°C)	10 hour rate (20A)	200Ah
Internal Resistance	Full charged Battery 77°F(25°C)	2.4mΩ
	104°F(40°C)	102%
Capacity affected by Temperature (20hour rate)	77°F(25°C)	100%
	32°F(0°C)	85%
	5°F(-15°C)	65%
Self-Discharge 77°F(25°C)	Capacity after 3 month storage	91%
	Capacity after 6 month storage	81%
	Capacity after 12 month storage	60%
Max. Discharge Current 77°F(25°C)	2000A(5S)	
Terminal	M3	
Charge (Constant Voltage)	Cycle	Initial Charging Current less than 60A Voltage 14.4~14.7 V / 77°F(25°C)
	Float	Voltage 13.5~13.8 V / 77°F(25°C)

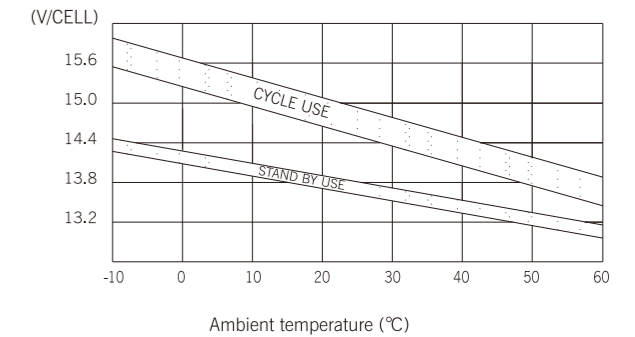
Constant Current Discharge (AMPERES @25°C)

F.V/Time	5Min	10Min	15Min	30Min	1Hour
1.60	652	496	427	256	144
1.67	641	489	415	252	141
1.75	557	441	354	239	135
1.80	513	397	323	220	131

Constant voltage charge characteristic



Relationship between charge voltage and temperature



Constant Power Discharge (WATTS PER CELL@25°C)

F.V/Time	5Min	10Min	15Min	30Min	1Hour
1.60	1125	859	743	448	253
1.67	1115	853	724	441	249
1.75	991	788	638	433	247
1.80	933	726	593	405	243

GFM500S

2V1200W

FMS
For High discharge Use



Specifications

Nominal Voltage	2V	
Rated Capacity (1.75V/15min)	1200W	
Dimensions	Total Height (with terminals)	14.41 inches(366mm)
	Height	13.03 inches(331mm)
	length	9.49 inches(241mm)
	width	6.77 inches(172mm)
Weight	Approx.63.8Pound(29.0kg)	

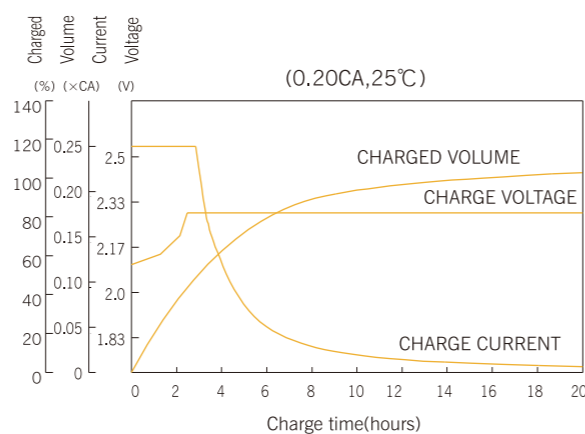
Characteristics

Capacity 77°F(25°C)	10 hour rate (50A)	500Ah
Internal Resistance	Full charged Battery 77°F(25°C)	0.5mΩ
	104°F(40°C)	102%
	77°F(25°C)	100%
	32°F(0°C)	85%
Capacity affected by Temperature (20hour rate)	5°F(-15°C)	65%
	Capacity after 3 month storage	91%
	Capacity after 6 month storage	81%
Self-Discharge 77°F(25°C)	Capacity after 12 month storage	60%
	Max. Discharge Current 77°F(25°C)	3500A(5S)
Terminal	M3	
Charge (Constant Voltage)	Cycle	Initial Charging Current less than 100A Voltage 2.4~2.45 V / 77°F(100°C)
	Float	Voltage 2.23~2.27 V / 77°F(25°C)

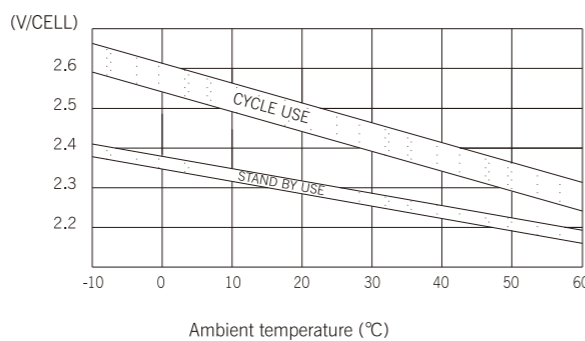
Constant Current Discharge (AMPERES @25°C)

F.V/Time	10Min	15Min	30Min	1Hour
1.60	980	845	506	285
1.67	967	821	498	279
1.75	871	700	473	267
1.80	785	638	434	258

Constant voltage charge characteristic



Relationship between charge voltage and temperature



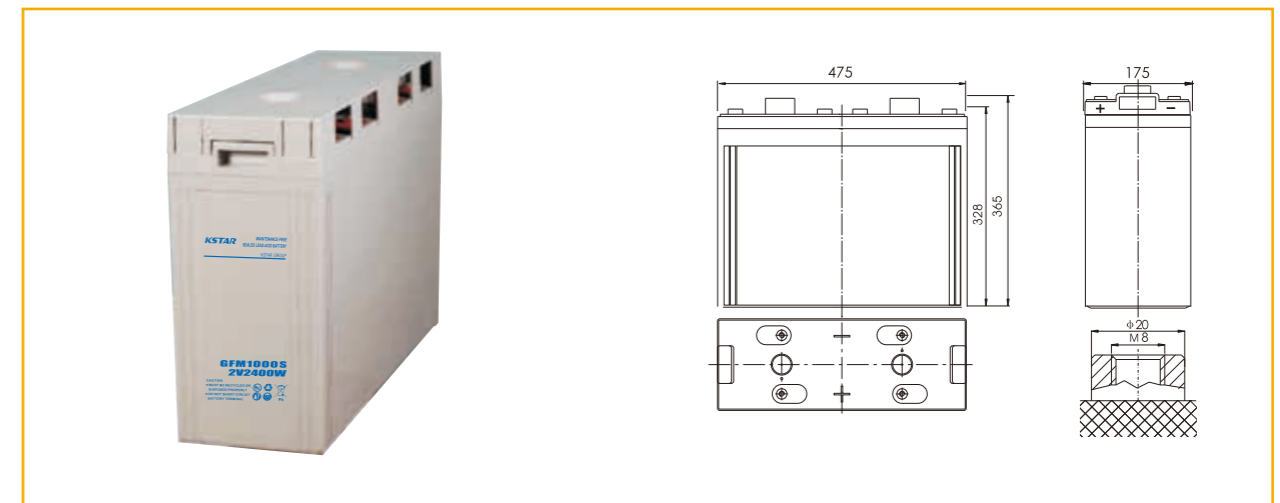
Constant Power Discharge (WATTS PER CELL@25°C)

F.V/Time	10Min	15Min	30Min	1Hour
1.60	1698	1470	885	501
1.67	1686	1432	873	493
1.75	1559	1261	856	488
1.80	1436	1173	802	480

FMS
For High discharge Use

GFM1000S

2V2400W



Specifications

Nominal Voltage	2V	
Rated Capacity (1.75V/15min)	2400W	
Dimensions	Total Height (with terminals)	14.38 inches(365mm)
	Height	12.92 inches(328mm)
	length	18.71 inches(475mm)
	width	6.89 inches(175mm)
Weight	Approx.132Pound(60.0kg)	

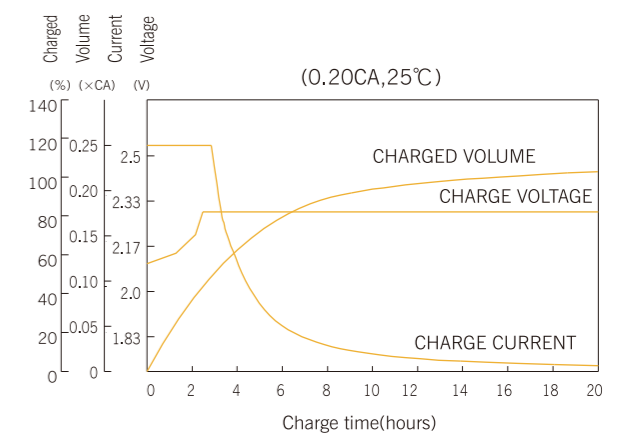
Characteristics

Capacity 77°F(25°C)	10 hour rate (100A)	1000Ah
Internal Resistance	Full charged Battery 77°F(25°C)	0.2mΩ
	104°F(40°C)	102%
	77°F(25°C)	100%
	32°F(0°C)	85%
Capacity affected by Temperature (20hour rate)	5°F(-15°C)	65%
	Capacity after 3 month storage	91%
	Capacity after 6 month storage	81%
Self-Discharge 77°F(25°C)	Capacity after 12 month storage	60%
	Max. Discharge Current 77°F(25°C)	7000A(5S)
Terminal	M3	
Charge (Constant Voltage)	Cycle	Initial Charging Current less than 200A Voltage 2.4~2.45 V / 77°F(25°C)
	Float	Voltage 2.23~2.27 V / 77°F(25°C)

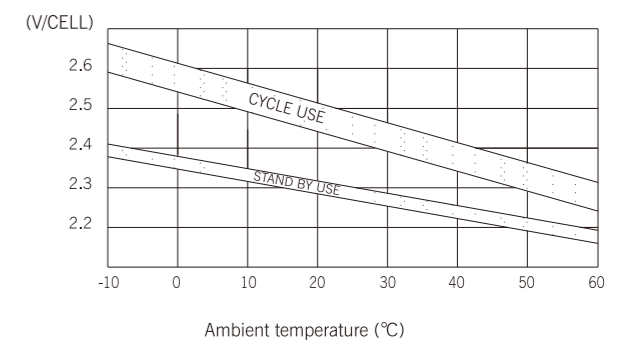
Constant Current Discharge (AMPERES @25°C)

F.V/Time	10Min	15Min	30Min	1Hour
1.60	1960	1690	1012	570
1.67	1934	1642	996	558
1.75	1742	1400	946	534
1.80	1570	1276	868	516

Constant voltage charge characteristic



Relationship between charge voltage and temperature



Constant Power Discharge (WATTS PER CELL@25°C)

F.V/Time	10Min	15Min	30Min	1Hour
1.60	3396	2940	1770	1002
1.67	3372	2864	1746	986
1.75	3118	2522	1712	976
1.80	2872	2346	1604	960