



SPECIFICATION FOR APPROVAL

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KSC-160W-546293B3-H

BATTERY CHARGER

Customer Part NO.

[illegible]

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BATTERY CHARGER

KSC-160W-546293B3-H Manufacturer Part No.: KS240452



1.	INPUT REQUIREMENTS	5
1.1	Highlight & Features.....	5
1.2	General Description.....	5
1.3	Chemical Substance Control Laws	5
1.4	Input Conditions	5
1.5	Ac inrush current	5
2.	OUTPUT REQUIREMENTS	6
3.	CHARGING CURVE	7
3.1	Charging curve	7
3.2	Charging Mode	8
4.	MECHANICAL.....	9
4.1	Enclosure and Layout	9
4.2	Input and Output Configuration	9
5.	REGULATORY COMPLIANCE	10
5.1	EMC Specifications.....	10
5.1.1	Radiated and Conducted Emission.....	10
5.1.2	Harmonic Standard	10
5.1.3	Voltage fluctuations and Flicker	10
5.2	Immunity.....	10
5.2.1	Electrostatic Discharge Immunity.....	10
5.2.2	Radiated Field Immunity	10
5.2.3	Conducted Field Immunity.....	10
5.2.4	Fast Transient Immunity	11
5.2.5	Surge Immunity	11
5.2.6	Conducted Field Immunity.....	11
5.2.7	Power Frequency Magnetic Field Immunity	11
5.2.8	Voltage dips and interruption	11
5.3	Safety Requirements and Certification.....	12
5.3.1	Regulatory Standard	12
5.3.2	Additional Safety Requirements	12
6.	ENVIRONMENTAL REQUIREMENTS	12
6.1	Derating Curve.....	12
7.	APPEARANCE DRAWING: (UNIT: MM)	13
8.	NAME PLATE	14
9.	DIMENSION OF OUTPUT PLUG & DC CORD (UNIT: MM)	15

BATTERY CHARGER

KSC-160W-546293B3-H Manufacturer Part No.: KS240452



10. PACKING (UNIT: MM)..... 16

BATTERY CHARGER

KSC-160W-546293B3-H Manufacturer Part No.: KS240452



1. INPUT REQUIREMENTS

1.1 Highlight & Features

- Simple design philosophy.
- Reliability level of 50K hours MTBF @ 25°C (rated input voltage and using the Telcordia SR-332 issue 3 method).
- DC output voltage must be Safe Extra Low Voltage (SELV) & Limited Power as defined by UL1012.
- Cooling: natural convection

1.2 General Description

This specification defines the performance characteristics for a class I adapter, single-phase159.978watts. Single output level power supply.

1.3 Chemical Substance Control Laws

PAHS 6P NP REACH ROHS NOP

1.4 Input Conditions

The supply shall operate over the voltage ranges as follows :

Rated input voltage	100-240Vac
Operating range	90-264Vac
Rated input frequency	50/60Hz +/- 3Hz
Rated input current	2.0A maximum
Power consumption(no-loading)	1.5W maximum
Input Configuration	3 Conductor
Power Factor	PF> 0.9 @ 230VAC; PF>0.95@115Vac input with full load.

1.5 Ac inrush current

120A/230VAC@cold start.

BATTERY CHARGER

KSC-160W-546293B3-H Manufacturer Part No.: KS240452



2. OUTPUT REQUIREMENTS

2.1	Nominal DC output voltage	+54.6V
2.2	Output voltage(no-loading)	54.6V $\pm$ 1%
2.3	Rating load current	2.93A
2.4	Peak load current	/
2.5	Rating output power	159.978W
2.6	Output current(CV:39-53.5V)	2.93A $\pm$ 10%
2.7	Line regulation	The line regulation is less than $\pm$ 1% while measuring at rated load and $\pm$ 10% of input voltage changing.
2.8	Ripple and noise	300mVp-p Add 0.1uF/100V ceramic capacitor and 10uF/100V aluminum electrolytic capacitor across the output terminal. Measured with 20MHz Bandwidth Oscilloscope.
2.9	Efficiency	Full load efficiency $\geq$ 90% at 115Vac/230Vac.
2.10	Charging characteristics	Standby mode: Vo: 54.4V $\pm$ 0.2V Pulse Mode (On-time 1s, Off-time 1s, Period 2s) Trickle Charge : (limited to 120 minutes) Vo : 27.0~32.0V $\pm$ 1.0V, Io= 0.3 $\pm$ 0.1A Pre Charge : (limited to 120 minutes) Vo : 32.0 ~ 39.0V $\pm$ 1.0V, Io= 0.75 $\pm$ 0.2A C.C. Fast Charge : (limited time: 12 hours) Vo : 39.0 $\pm$ 1.0V~ 54.0 $\pm$ 0.5V, Io=2.93 $\pm$ 0.29A C.V. mode : (limited time: 4 hours) Vo : 54.0V $\pm$ 0.5V Io : 2.93A(Current decrease) $\rightarrow$ 0.3A(green) $\rightarrow$ 0A(full stop)
2.11	Turn on delay time	4000ms maximum at nominal input AC voltage and full load.
2.12	Rise time	The supply shall have a start-up rise time of less than 100ms to rise to within regulation limits for all DC outputs.CR Load Mode.
2.13	Hold up time	8ms minimum at nominal input 100Vac minimum voltage and full load.
2.14	Output over-shoot	Less than 10% of nominal voltage value.
2.15	LED indication function	Standby mode/Power on: Blue LED ON Full Charged mode: Green LED ON Charging Mode: Red LED ON

BATTERY CHARGER

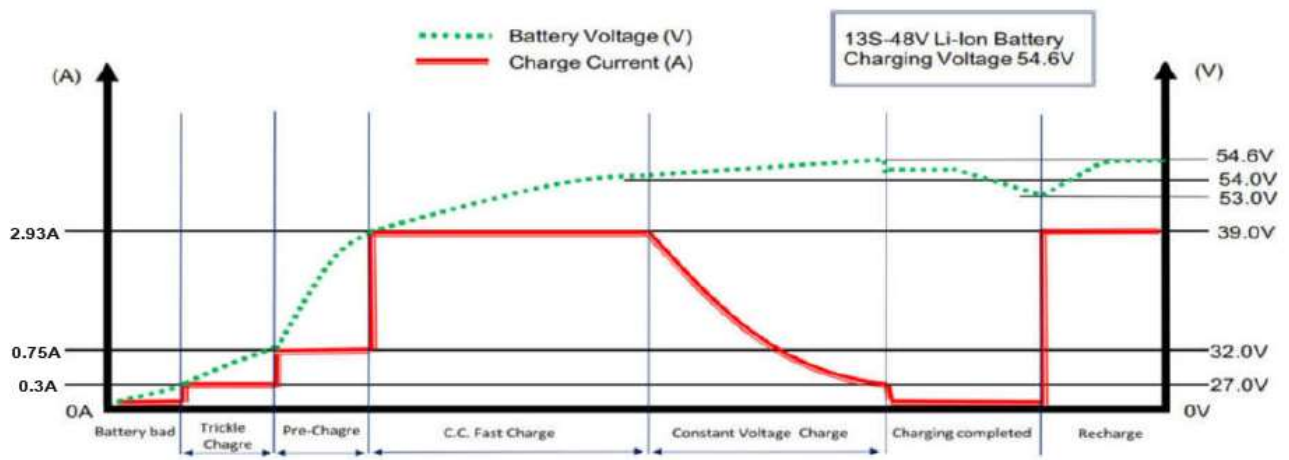
KSC-160W-546293B3-H Manufacturer Part No.: KS240452



2.16	Protection function	
	Over-voltage protection	The output voltage shall be clamped by internal protection at 105-135%.
	Short-circuit protection	The adapter shall not be damaged by short the DC output to Ground. The adapter shall resume normal operation when a short circuited fault condition is removed.
	Over current protection	The power supply will be protection when output power at 200% max. of all rated DC output.
	Over temperature protection	The power supply shall be protected for overheating without any damage; The unit shall recover and function automatically after the reason for overheating is removed.

3. CHARGING CURVE

3.1 Charging curve



BATTERY CHARGER

KSC-160W-546293B3-H Manufacturer Part No.: KS240452



3.2 Charging Mode

Mode	Output Voltage	Output Current	status
(1) Battery damaged	$< 27V \pm 1.0V$	0A	STOP charging
	When the battery voltage is less than 27V, it is determined that the battery is damaged. (Red LED flashes)		
(2) Trickle Charge	$27 \sim 32V \pm 1.0V$	$0.300mA \pm 0.1A$	Constant Current
	Charging the battery by 300mA constant current for 60 min $\pm$ 5 min.		
(3) Pre-Charge	$32 \sim 39V \pm 1.0V$	$0.750mA \pm 0.2A$	Constant Current
	Charging the battery by 750mA constant current for 120 min $\pm$ 5 min.		
(4) C.C. Fast Charge	$39 \pm 1.0V \sim 54.0V \pm 0.5V$	$2.93A \pm 0.293A$	Constant Current
	Charging the battery by 3660mA constant current for 12.0 hrs $\pm$ 10 min.		
(5) C.V. mode	$54.0V \pm 0.2V$	$2.93A \rightarrow 0.3A$	Constant Voltage
	Charging the battery by constant voltage for 4.0 hrs $\pm$ 5 min.		
(6) Full Charged	$54.6V \pm 0.2V$	$0.3A (\pm 0.1A)$	Green LED ON
	The charging current is less than 550mA, the battery is fully charged, and the green LED is on.		
(7) Charging completed	$54.6V \pm 0.2V$	$< 0.2A (\pm 0.1A)$	Cutoff Output
	After charging is complete, the output is turned off.		
(8) Standby mode	$54.4V \pm 0.2V$	0A	No Battery connected
	Pulse Mode (On-time 1 second, Off-time 1 second, Period 2 seconds) The battery is not connected to the charger and the blue LED is on.		
(9) Recharge mode	$< 53.0V \pm 1.0V$	$2.93A \rightarrow 0.3A$	CC/CV
	The charger will restart when the battery voltage is lower than 53.0V.		

BATTERY CHARGER

KSC-160W-546293B3-H Manufacturer Part No.: KS240452



4. MECHANICAL

4.1 Enclosure and Layout

Plastic case	UL94V-0
Weight	/ g (Max.)
Dimensions	175*78*36.8mm
Color	Black

4.2 Input and Output Configuration

Input pin	3PIN
Output connector	DC plug type: 4 Pin
Polarity	/
Cable	1.5M VW-1 80°C 300V 2464 4.5Q 2C 20AWG Black

BATTERY CHARGER

KSC-160W-546293B3-H Manufacturer Part No.: KS240452



5. REGULATORY COMPLIANCE

5.1 EMC Specifications

The external power supply must meet all specification in this section. it is required that the external power supply work closely with the customer's equipment in order to get the best EMC solution.

5.1.1 Radiated and Conducted Emission

FCC part 15: Class B for radiated and conducted emissions.

EN55014-1, Class B for radiated and conducted emissions.

5.1.2 Harmonic Standard

Meet EN61000-3-2

Performance Criteria A

5.1.3 Voltage fluctuations and Flicker

Meet EN61000-3-3

5.2 Immunity

5.2.1 Electrostatic Discharge Immunity

EN 55014-2, EN 61000-4-2

Air Discharge: $\pm 8\text{kv}$

Contact Discharge: $\pm 4\text{kv}$

Performance Criteria B

Electrostatic-discharge test by contact or air should be conducted with Static-discharge tester (energy storage capacitance of 150pF and discharge resistance of 330 Ω) 8kv air discharge, 4kv contact discharge.

5.2.2 Radiated Field Immunity

EN 55014-2, EN 61000-4-3

Frequency Range: 80-1000MHz

Field Strength: 3V/m with 80% amplitude modulation of 1kHz Performance Criteria A

Radio-frequency electromagnetic field susceptibility test, RS 80-1000MHz, 3V/m, 80%AM(1KHz).

5.2.3 Conducted Field Immunity

EN 55014-2, EN 61000-4-6

Frequency Range: 0.15-80MHz

Field Strength: 3A/m with 80% amplitude modulation of 1KHz

Performance Criteria A

BATTERY CHARGER

KSC-160W-546293B3-H Manufacturer Part No.: KS240452



5.2.4 Fast Transient Immunity

EN 55014-2, EN 61000-4-4

Power line: 1kv

Signal line: 0.5kV

Performance Criteria B

5.2.5 Surge Immunity

EN 55014-2, EN 61000-4-5

1.2/50 μ s Open Circuit voltage

8/20 μ s Short Circuit current

Power line: 1.0kV

Line to earth: 2.0kV

Lighting surge voltage of differential and common modes shall be applies across AC input lines and across input and frame ground.

5.2.6 Conducted Field Immunity

EN 55035, EN 61000-4-6

Frequency Range: 150kHz-230MHz

Field Strength: 3A/m with 80% amplitude modulation of 1kHz

Performance Criteria A

5.2.7 Power Frequency Magnetic Field Immunity

EN 61000-4-8

Field Strength: 30A/m

Orientations of Induction Coil: X, Y, Z

Performance Criteria A

5.2.8 Voltage dips and interruption

Meet EN61000-4-11

BATTERY CHARGER

KSC-160W-546293B3-H Manufacturer Part No.: KS240452



5.3 Safety Requirements and Certification

5.3.1 Regulatory Standard

The power supply shall comply with the following international regulatory standards:

for short	Country	Certified Status	Standard
UL	USA	/	UL 1012

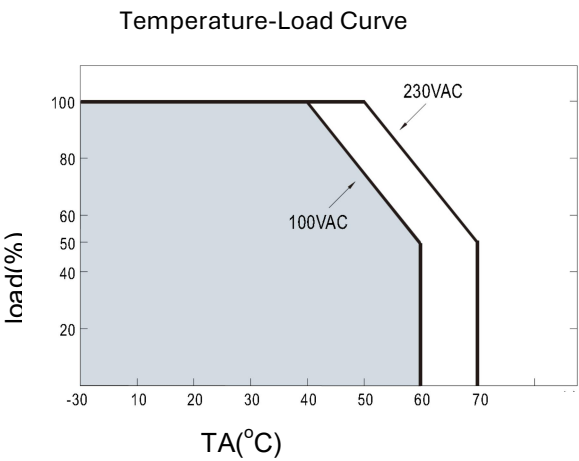
5.3.2 Additional Safety Requirements

- ◎ Dielectric Withstand Voltage, Primary (input AC short)-to-Secondary (output DC short): 1800Vac, 10mA, 1minute.
- ◎ Insulation Resistance, Input to output: 100M Ω (MIN.) at 500 VDC 25°C, 70%RH.
- ◎ Reinforced insulation system, Primary-to-Ground and Primary-to-Secondary.
- ◎ The leakage current shall not exceed 0.75mA / 240VAC.

6. ENVIRONMENTAL REQUIREMENTS

Temperature	Operating	-30°C +70°C (Refer to “7.4 Deratiing Curve”)
	Non-Operating	-40°C +85°C
Humidity	Operating	20%~90% (Non Condensing)
	Non-Operating	10%~95% (Non Condensing)
Altitude	Sea level to 2000m	
Vibration test	10Hz-500Hz, 2G 10minutes/week, long the 3 directions namely X-Y-Z. The each direction should be vibrated for 60 minutes.	

6.1 Deratiing Curve

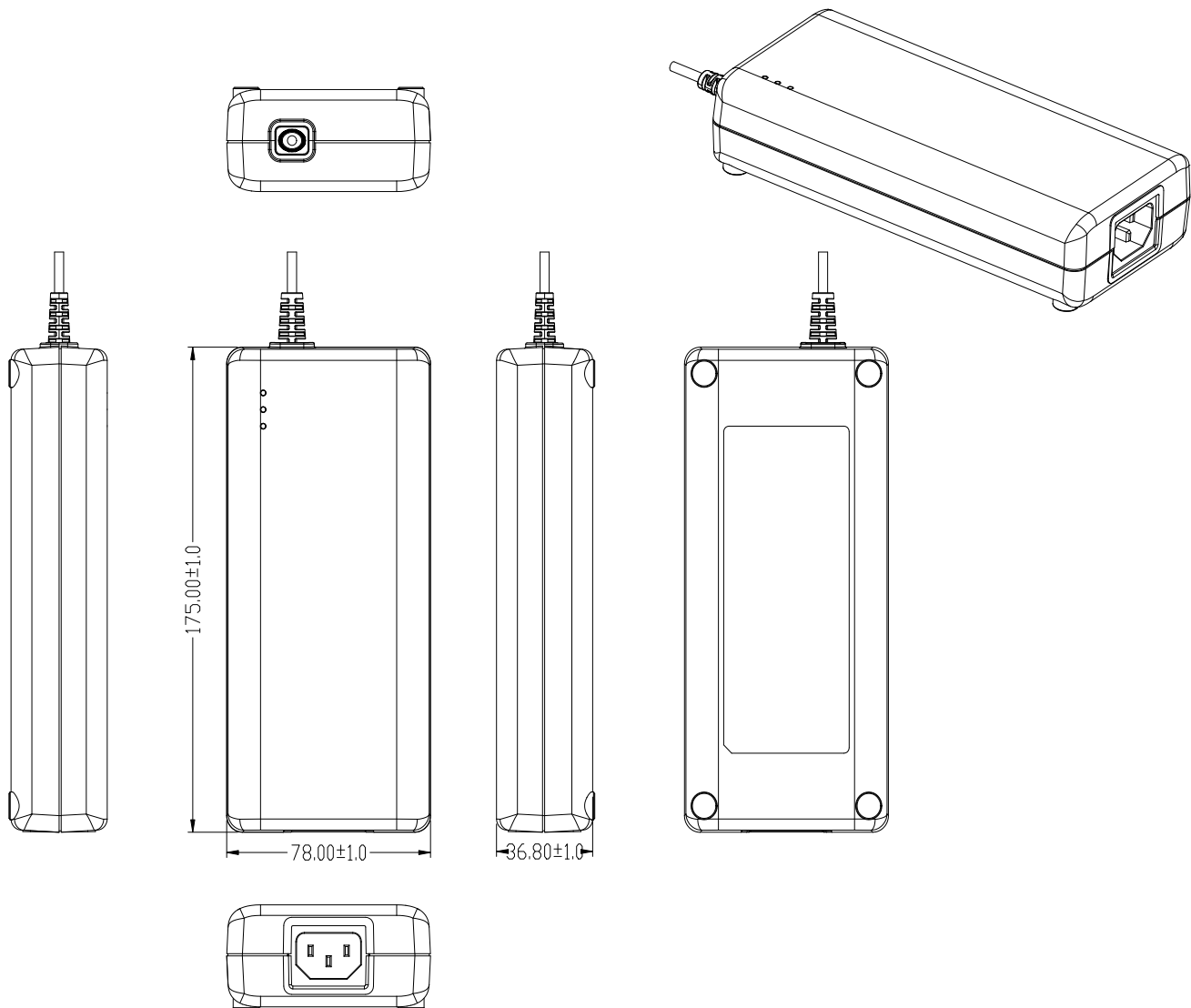


BATTERY CHARGER

KSC-160W-546293B3-H Manufacturer Part No.: KS240452



7. APPEARANCE DRAWING: (UNIT: MM)



NOTE:

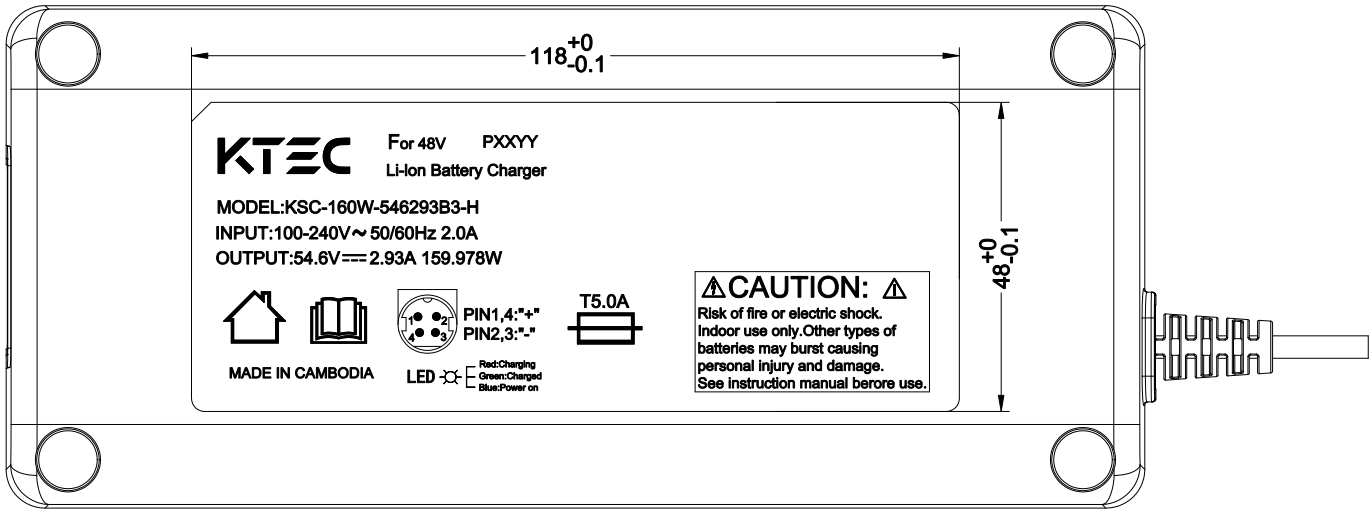
1. Case cover & chassis material: PC BLACK (NO KTEC)
2. AC PIN MATERIAL: BRASS (NI PLATED)
3. PAHS 6P NP REACH ROHS NOP
4. Satin Finish

BATTERY CHARGER

KSC-160W-546293B3-H Manufacturer Part No.: KS240452



8. NAME PLATE



Note: Laser

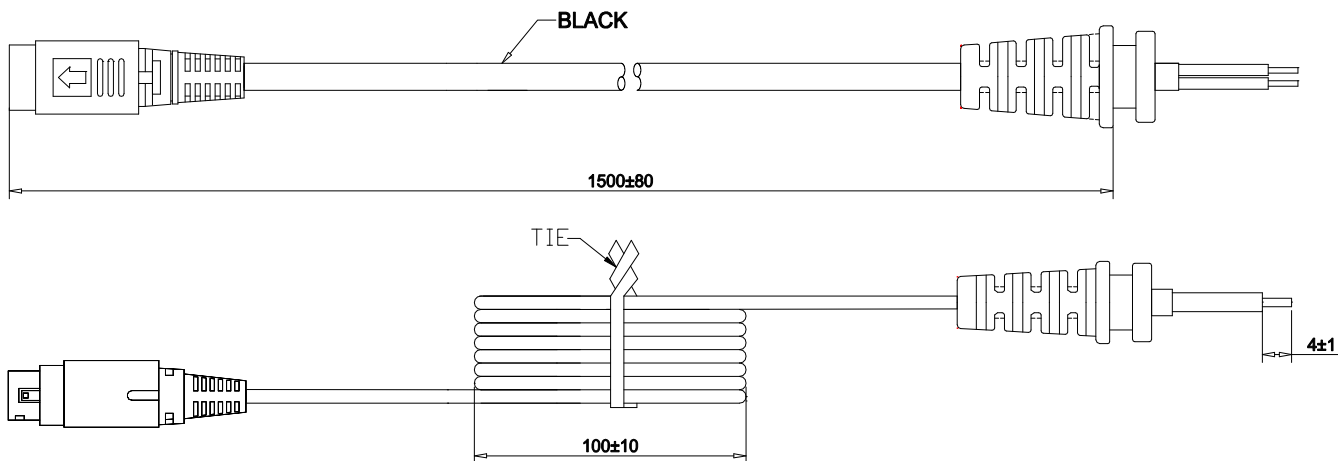
PXXYY (P=PAHS, 6P, NP XX=Week, YY=Year), use the actual production date.

BATTERY CHARGER

KSC-160W-546293B3-H Manufacturer Part No.: KS240452



9. DIMENSION OF OUTPUT PLUG & DC CORD (UNIT: MM)



- NOTE: (unit:mm)
- 1).WIRE TYPE:VW-1 2464 80°C 300V Ø4.5 20AWG 2C L=1500mm BLACK
 - 2).THE POLARITY:
 - 3).PAHS+6P+NP+REACH+ROHS+NOP



BATTERY CHARGER

KSC-160W-546293B3-H Manufacturer Part No.: KS240452



10. PACKING (UNIT: MM)

