



SPECIFICATION FOR APPROVAL

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KEC-589A-02UC

Switching power supply specification

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KEC-589A-02UC

Manufacturer Part No.: KSXXXXXX



Customer Name KTEC

Customer Part NO. _____

Project Modify List

Item	Content	Rev.	Date	Prepared By	Checked By
1	First REV.	A			

Manufacturer

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CHECKED BY

TESTED BY

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1. INPUT REQUIREMENTS

1.1 Highlight & Features

- Simple design philosophy.
- This specification defines the performance and characteristics of an open frame power supply.
- >500,000 hours at 230Vac/50HZ typical load 25°C. The failure rate shall be calculated with Telcordia SR332, issue 4.
- E-Cap. life time: The E-Cap. Life time can meet 25,000 Hours at 100-240Vac/maximum load 50°C condition.
- Cooling: Air-cooled.

1.2 Chemical Substance Control Laws

PAHS 6P NP REACH ROHS PROP65

1.3 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	8.0A maximum
Power consumption	/ maximum
Primary current protection	An adequate internal fuse on the AC input line is provided.

1.4 Input Current

The maximum continuous input root mean square current is less than the values shown in the following table.

Input voltage	input current
115Vac	7.5Arms
230Vac	3.7Arms

1.5 AC inrush current

At 115Vac 25°C, typical load cold start, maximum inrush current under 30A. And 230Vac condition under 60A. At 90~264Vac 25°C, typical load hot start, no damage occurred.

1.6 Power factor

The power factor of the power subsystem should greater than 0.98 at 115Vac and 0.97 at 230Vac input voltage and measured at maximum load.

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1.7 Power Efficiency

The power efficiency of the power subsystem should be greater than 87% at 115Vac/60Hz and 230Vac/50Hz input voltage and measured at maximum load.

1.8 Power Ground Isolation

There is a bypass capacitor between chassis ground and the -54V.

2. OUTPUT REQUIREMENTS

2.1 Output Rating

voltage	+12V	-54V
Maximum load	14.0A	7.8A
Minimum load	0A	0A
Regulation limit	±3%	±3%
Ripple and noise	1%(2)	1%(3)

NOTE:

- (1) When output load is less than 0.1A, the output voltage range is relaxed to ±5%.
- (2) The output is decoupled with 47μF low ESR aluminum electrolytic and 0.1μF ceramic capacitor. Measurement is made with a high impedance probe connected across the decoupling capacitance. The ripple and noise are defined as periodic or random signals over a frequency band of 10Hz to 20MHz. Measurements shall be made with an oscilloscope with 20MHz bandwidth.
- (3) Noise is measured with a resistor load (not an electronic load). The output is decoupled with 470μF low ESR aluminum electrolytic and 0.1μF ceramic capacitor. See the table below for the output ripple and noise limits over frequency. Measurement is made with a high impedance probe connected across the decoupling capacitance. Measurement frequency range is 40Hz to 100MHz

Frequency range	Ripple and noise limit
<500Hz	500mVpk-pk
500Hz-150KHz	200mVpk-pk
150Hz-500KHz	150mVpk-pk
500Hz-100KHz	100mVpk-pk

- (4) The set point for the +12V output is $12.1 \pm 0.05V$ and -54V output is $-54 \pm 0.1V$ at 50% load, measured at the remote voltage sense points.

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Regulation Transient Response

2.2 Any frequency and input voltage change should be within the specification outline in section 2.1.
Includes static variation temperature change should be within the specification outline in section 2.1.

Regulation Transient Response

2.3	Output	Step load	Transient Voltage	Slew rate	Capacitive load
	+12V	20% to 80%	± 5%	1 A/μ s	Reference: 1000uF
	-54V	20% to 80%	± 5%	1 A/μ s	Reference: 470uF

Step load for 60% load change (above 20% load), at 50Hz-5KHz. The recovery time is less than 500us.

2.3	Overshoot	Overshoot at turn on shall be less than 10% of the nominal output voltage at maximum load.
2.4	Turn on delay time	Turn on time 2 sec. Max. at 115Vac input and Typical load.
2.5	Rise time	The output shall rise from 10% to 90% of nominal to within the regulation ranges specified in rating load within 1 ms to 20ms.
2.6	Hold up time	After disconnecting AC power, under the maximum load, +12V output is lower than 10.8V or -54V output is higher than -48.6V for at least 20ms.
2.7	LED indication function	/

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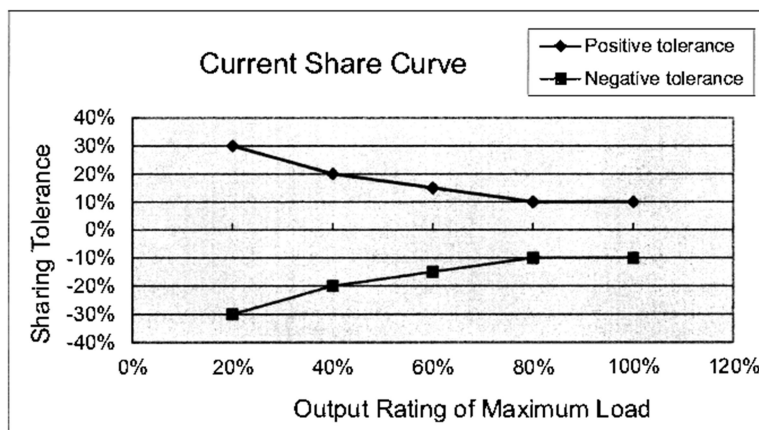
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**2.8 Current Share**

Current share is achieved by means of active current sharing. Provision is made for a current share line for +12V or -54V named +12VCS or -54VCS. +12VCS and -54VCS bus (LS-V1 & LS-V2) is independent. The current share line is referenced to output load negative terminal end. The voltage on each of these lines is characterized in the table and graph below.

PSU built in ORing diode and current sharing for 1 +1 redundant application. Two PSU must be same model of PSU and RPS connector (14 pins) use only for 1 +1 redundant application and no current sharing function. Or connect current sharing function connector (22 pins) for 1 +1 current sharing current sharing tolerance <15% at every load current > 30% maximum current.

**2.9 Protection function**

If the power supply is protected (when OCP, OVP, OTP or short protection), the power supply will auto-recovery when fault condition has been removed.

2.10 Over current protection

The overload currents should be ramped at a minimum rate of 10A/s starting from full load.

Output	Over current limit	PSU state
+12V	15A~20A	Auto recovery
-54V	10.5A~12A	Auto recovery

2.11 Over-voltage protection

The over voltage sense circuitry and reference shall reside in packages that are separate and distinct from the regulator control circuitry and reference. No single point fault shall be able to cause a sustained over voltage condition on any or all outputs. The supply shall provide latch mode over voltage protection as defined in below.

Output	Over voltage limit	PSU state
+12V	13V-16V	Auto recovery
-54V	-59V-65V	Auto recovery

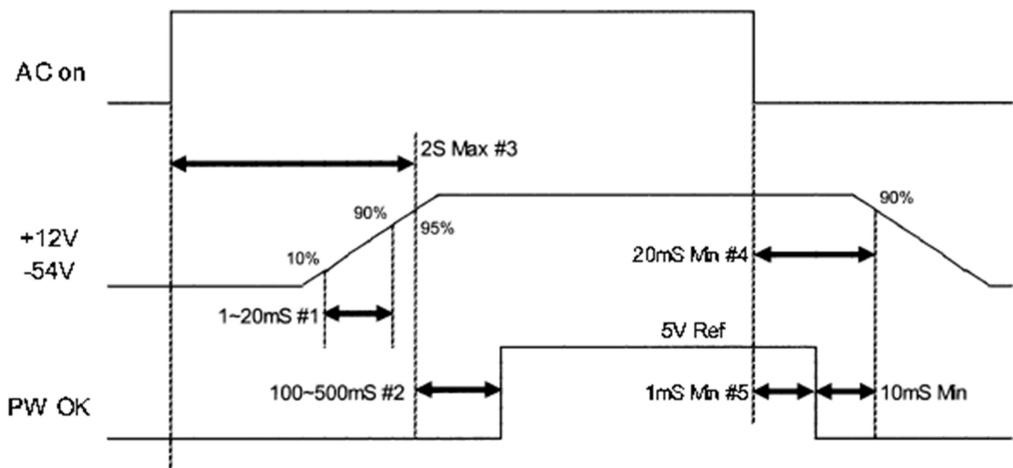
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2.12	Short-circuit protection	The power supply will not latch under short circuit condition on all outputs. It will return to its normal operating mode once the short circuit is removed.
2.13	Over Temperature Protection	The power supply shall have thermal protection against over temperature condition caused by loss of airflow or excessive ambient temperature. The shutdown should be latching type. When the temperature drops, this power supply will automatically start.
2.13	Power Recovery	The power supply shall recover automatically after an AC power failure. AC power failure is defined to be any loss of AC power that exceeds the dropout criteria defined in section 2.6

3. TIME SEQUENCE AND SIGNAL



- #1: The +12V I -54Voutput voltages rise time from 10% to 90% (Loads are C.R mode) during 1ms to 20ms.
- #2: PW OK signal turn on delay time of 100~500ms.
- #3: The +12V I -54V power on delay time ≤2s.
- #4: AC loss to +12V I -54V output hold up time ≥20ms.
- #5: AC loss to PG signal hold up time ≥1ms.

3.1 PW OK Signal

PW OK is a “power good” signal. It should be asserted high by the power supply to indicate that the -54V output is above the under-voltage thresholds (95% of output voltage rating level) listed in Section 2.0, Conversely, PW OK should be de-asserted to a low state when any of the -54V output voltage falls below its under-voltage threshold, or when mains power has been removed for a time sufficiently long such that power supply operation cannot be guaranteed beyond the power-down warning time. The electrical and timing characteristics of the PW OK signal are given in below.

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Signal type	+3.3V TTL compatible
Logic level low	$\leq 0.5V$ while sinking 3 mA
Logic level high	Between 2.4V and 3.6V output while sourcing 0.5 mA
PG delay time	$100mS \leq \# 3 \leq 500mS$
AC loss to PG hold up time	$\#5 \geq 1mS$

3.2 Power on Delay Time

The output shall have a power-on time of 2 second maximum after application of valid AC voltages.

3.3 PS Present

This signal connects to +12V _return inside the power supply via 1 KΩ resistor.

4. MECHANICAL

4.1 Enclosure and Layout

Weight	/ g (Typ.)
Dimensions	254mm(L) X 127mm (W)X 41.5 mm(H)

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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.

EN55032, Class B for radiated and conducted emissions.

5.2 Immunity

5.2.1 Electrostatic Discharge Immunity

EN 55035, EN 61000-4-2

Level 4

5.2.2 Radiated Field Immunity

EN 55035, EN 61000-4-3

Level 3

5.2.3 Fast Transient Immunity

EN 55035, EN 61000-4-4

Level 3

5.2.4 Surge Immunity

EN 55035, EN 61000-4-5

Level 4.

5.2.5 Conducted Field Immunity

Meet EN 61000-4-6 level 3

5.2.6 Power Frequency Magnetic Field Immunity Test

Meet EN 61000-4-8 level 3

5.2.7 Voltage Dips and voltage interruptions Immunity Test

Meet EN 61000-4-11

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5.2.8 Suppression of Harmonics Test

Meet EN 61000-3-2 class D

5.2.9 Voltage Fluctuations Test

Meet EN 61000-3-3

5.2.10 Shock

Operating : The power supply shall not be damaged during a shock of half sine 10G, 11mS pulse, 100 pulses in each direction.

Non-operating : The power supply shall not be damaged during a shock of 50G with an 11mS half sine wave.

5.2.11 Vibration

Wave Form Half sine wave

Acceleration 50m/s²

Duration Time 11Ms

NO . of Shock Each axis 1 times

Shock Direction X, Y, Z axis

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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 or Region	Certified Status	Standard
UL/CUL	USA	/	UL 62368-1
FCC	America	/	Class B part 15
BSMI	Taiwan	/	CNS15598-1

5.3.2 Additional Safety Requirements

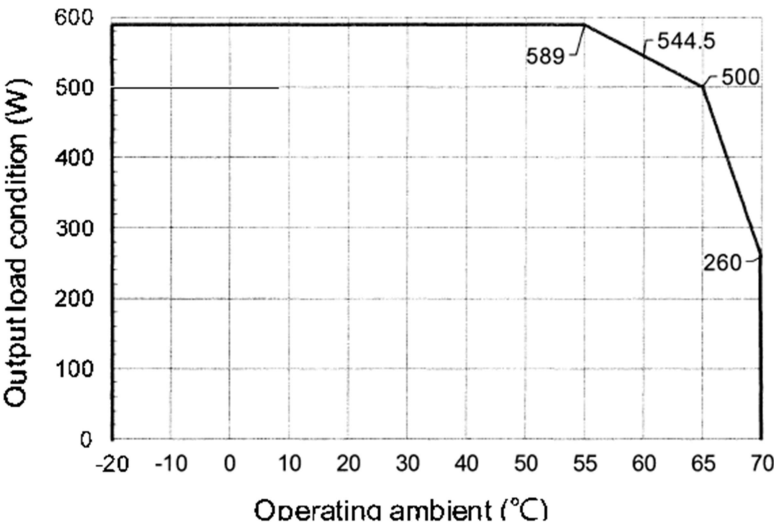
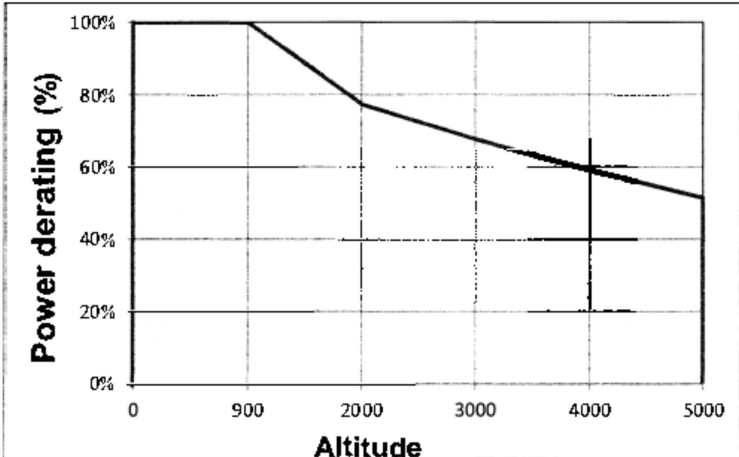
- © Input – FG: AC 1.5KV 1min. (cut current 10mA) nominal temp. nominal humidity.
AC 1.8KV 3sec. (cut current 10mA) at factory nominal temp. nominal humidity.
- © Input – Output AC 3KV 1min. (cut current 10mA) nominal temp. nominal humidity.
DC 4.242KV 3sec. (cut current 10mA) at factory nominal temp. nominal humidity.
- © 54V – FG DC 0.5KV 1min. (cut current 10mA) nominal temp. nominal humidity.
DC 0.5KV 3sec. (cut current 10mA) at factory nominal temp. nominal humidity.
- © 12V – FG DC 0.5KV 3sec. (cut current 10mA) nominal temp. nominal humidity.
DC 0.5KV 3sec. (cut current 10mA) at factory nominal temp. nominal humidity.
- © Insulation Resistance, Line to ground/chassis, input DC 500V, 3 seconds $>20M\Omega$ at 25°C and relative humidity 70% of reference.
- © Reinforced insulation system, Primary-to-Ground and Primary-to-Secondary.
- © The touch current shall not exceed 1.5mA at input 264Vac 63Hz.

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6. ENVIRONMENTAL REQUIREMENTS

Temperature	Operating	-20℃ +70℃									
	Non-Operating	-20℃,115Vac start up, (-20℃-0℃ is can normal operation, but the output ripple and noise and regulation transient response specifications may not be met). The de-rating curve as below: <table><caption>De-rating curve data</caption><tr><th>Operating ambient (°C)</th><th>Output load condition (W)</th></tr><tr><td>-20</td><td>589</td></tr><tr><td>55</td><td>589</td></tr><tr><td>65</td><td>544.5</td></tr><tr><td>70</td><td>260</td></tr></table> Storage temperature of the supply will be -40℃to +85℃ .	Operating ambient (°C)	Output load condition (W)	-20	589	55	589	65	544.5	70
Operating ambient (°C)	Output load condition (W)										
-20	589										
55	589										
65	544.5										
70	260										
Humidity	Operating	5%~95% (Non Condensing)									
	Non-Operating	5%~95% (Non Condensing)									
Altitude	Operation altitude of the supply will be between -75 and 5000 meter. <table><caption>Power derating curve data</caption><tr><th>Altitude</th><th>Power derating (%)</th></tr><tr><td>0</td><td>100</td></tr><tr><td>2000</td><td>80</td></tr><tr><td>5000</td><td>50</td></tr></table> Storage altitude of the supply will be between -75 and 15000 meter.		Altitude	Power derating (%)	0	100	2000	80	5000	50	
	Altitude	Power derating (%)									
0	100										
2000	80										
5000	50										

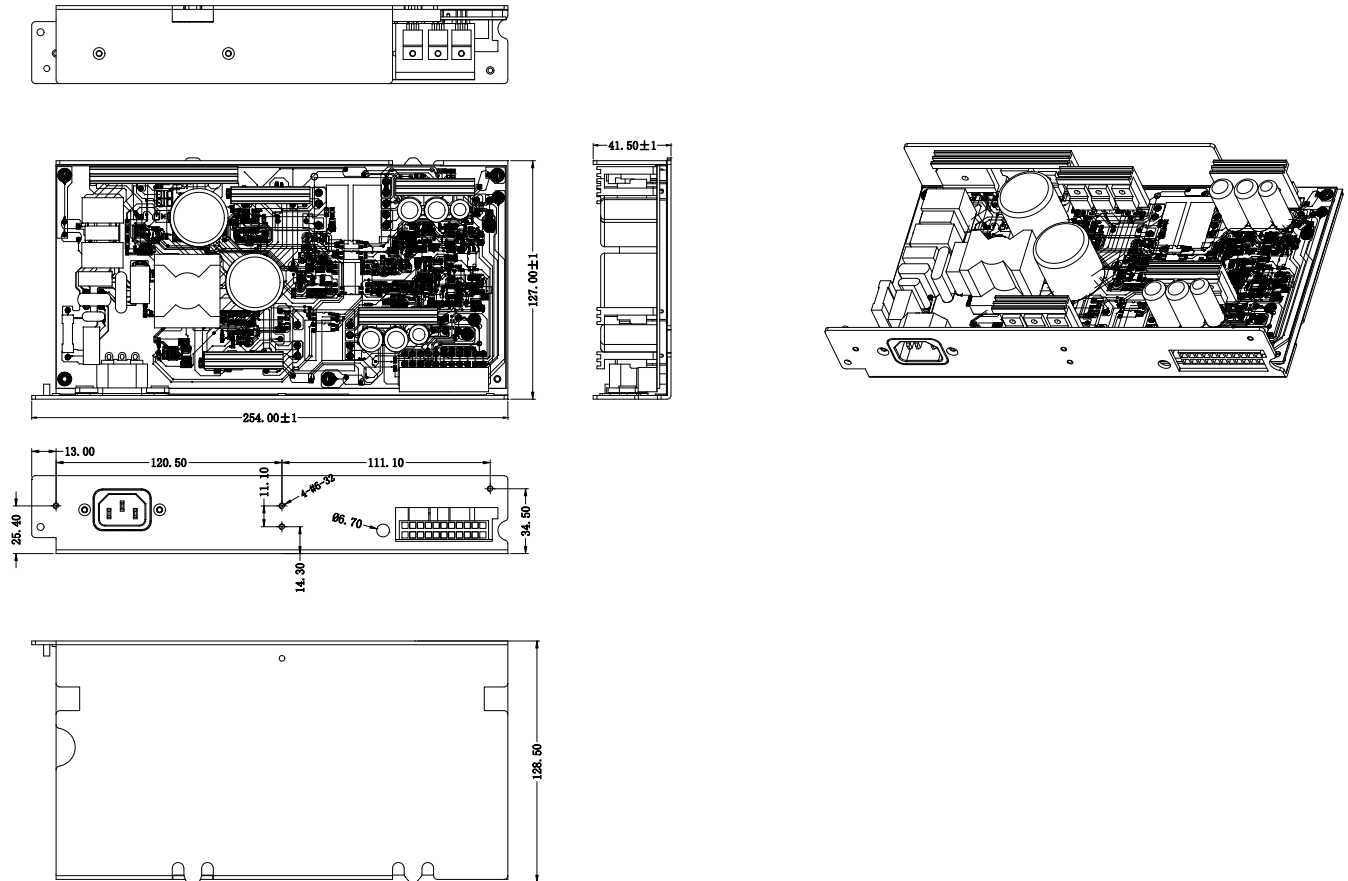
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7. APPEARANCE DRAWING: (UNIT: MM)



NOTE:

1. PAHS 6P NP REACH ROHS PROP65

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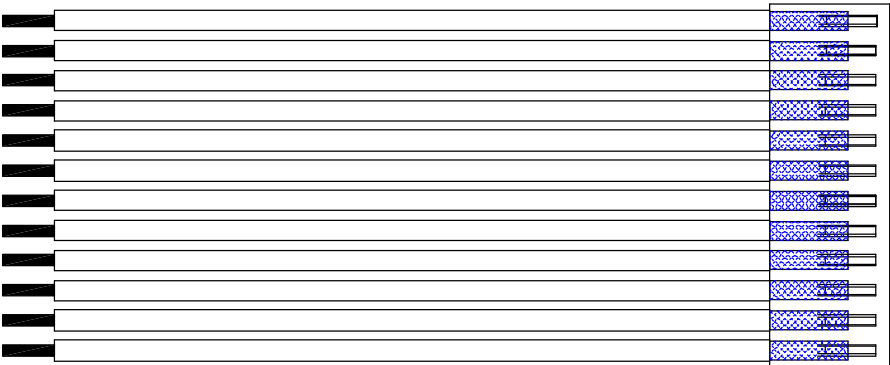


9. CONNECTOR & PIN DEFINE

P1 TYPE: 12PIN

JVT5001HN0-12+JVT5001TB-SNS
or EQU TYPE

ALL WIRE ARE UL1015 or UL1007 18AWG

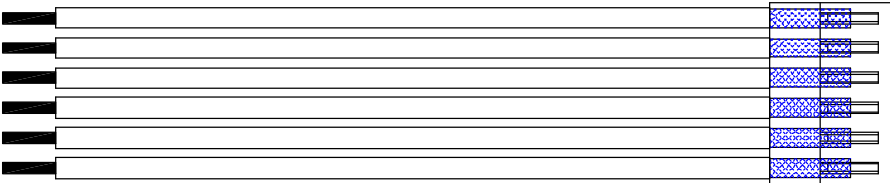


☐	PIN1	+12V	White/白色
☐	PIN2	+12V	White/白色
☐	PIN3	+12V	White/白色
☐	PIN4	+12V	White/白色
☐	PIN5	GND	Black/黑色
☐	PIN6	GND	Black/黑色
☐	PIN7	GND	Black/黑色
☐	PIN8	GND	Black/黑色
☐	PIN9	Status_1	Brown/棕色
☐	PIN10	Status_2	Blue/蓝色
☐	PIN11	Internal_PG	Yellow/黄色
☐	PIN12	Internal_Present	Orange/橙色

P2 TYPE: 6PIN

JVT5001HN0-06+JVT5001TB-SNS
or EQU TYPE

ALL WIRE ARE UL1015 or UL1007 18AWG



☐	PIN1	-54VRTN	Black/黑色
☐	PIN2	-54VRTN	Black/黑色
☐	PIN3	-54VRTN	Black/黑色
☐	PIN4	-54V	Blue/蓝色
☐	PIN5	-54V	Blue/蓝色
☐	PIN6	-54V	Blue/蓝色

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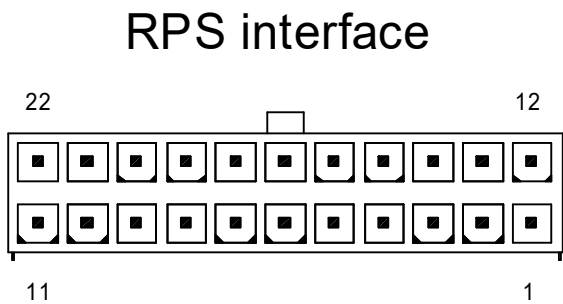
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RPS interface

V1: +12V output

V2: -54V output



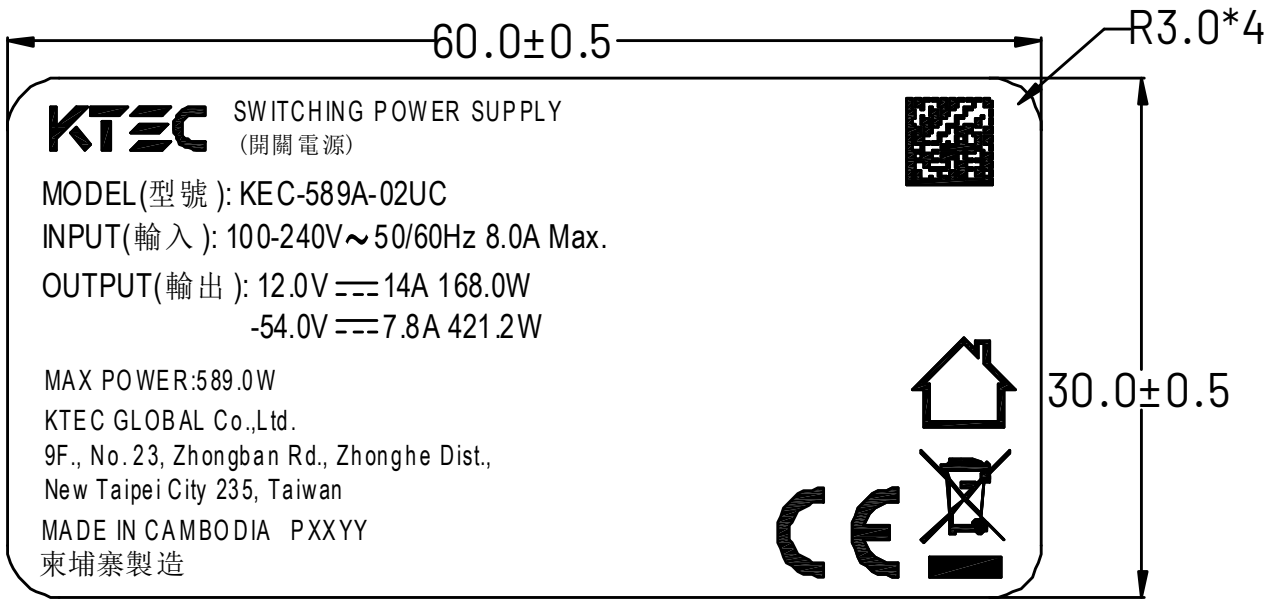
PIN NO	DESIGNATION
1	V2Vrtn
2	V2
3	V1
4	V1
5	V1
6	V1
7	GND
8	V1 sen
9	LS-V2
10	V2
11	V2Vrtn
12	N/C/GND
13	GND
14	RPS Present
15	Status 1
16	Status 2
17	RPS P.G
18	GND
19	V1 RTNsen
20	LS-V1
21	V2 sen
22	V2 RTNsen

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10. NAMEPLATE (UNIT: MM)



- Note: 1. MATERIAL: silver polyester (消银龙) ; Thickness: 0.08+-0.01mm
- Black characters silver background
- PAHS REACH ROHS
- PXXYY(P=PAHS,6P,NP, XX=WEEK YY=YEAR) 按实际生产日期制作

2. Attach to transformer
- SN (Data Matrix Code, size:5*5mm
- First code G(Ktec) + Production part number (Product code) + 10 yards of flow code SSSSSSSSSS
- (Decimal) Total 19 codes
- Example: GKS26016700000000001, GKS26016700000000002...GKS26016799999999999

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11. PACKING (UNIT: MM)

TBD