

30W, specific power supply for power grid



### FEATURES

- Specific power supply designing for smart grid
- Ultra-wide 85 - 305VAC and 88- 430VDC input voltage range
- Ultra-wide operating ambient temperature range: -40°C to +85°C
- High reliability, low output ripple & noise
- EMI performance meets CISPR32/EN55032 CLASS B
- Immunity meets electricity standard Level 4
- Meets impulse voltage requirements of 1.2/50us 5KV
- Designed to meet UL/EN/IEC62368 standards
- EN62368 safety approval

*SLO30-23BxxE series is a special power supply design for the smart grid industry that meets the power industry standards. It features AC input and at the same time accepts DC input voltage, with ultra-wide input voltage range, wide operating temperature range, high EMS level, high reliability, and high isolation. EMC and safety specifications meet IEC/EN61000-4, CISPR32/EN55032, UL/EN/IEC62368 standards. It is suitable for smart grid occasions with poor power quality and high reliability requirements, such as smart power transmission and substations. It also can be used in microcomputer protection equipment, bus voltage protection equipment or equipment with high reliability requirements that require 110VDC input voltage.*

### Selection Guide

| Certification | Part No.     | Output Power | Nominal Output Voltage and Current | Output Voltage Adjustable Range(V) | Efficiency at 230VAC (%) Typ. | Capacitive Load (μF) Max. |
|---------------|--------------|--------------|------------------------------------|------------------------------------|-------------------------------|---------------------------|
| CE            | SLO30-23B03E | 19.8W        | 3.3V/6000mA                        | 2.97-3.63                          | 77                            | 30000                     |
|               | SLO30-23B05E | 30W          | 5V/6000mA                          | 4.5-5.5                            | 82                            | 30000                     |
|               | SLO30-23B12E |              | 12V/2500mA                         | 10.8-13.2                          | 86                            | 15000                     |
|               | SLO30-23B15E |              | 15V/2000mA                         | 13.5-16.5                          | 87                            | 12000                     |
|               | SLO30-23B24E | 31.2W        | 24V/1300mA                         | 21.6-26.4                          | 88                            | 2000                      |

### Input Specifications

| Item                | Operating Conditions | Min.           | Typ. | Max. | Unit |
|---------------------|----------------------|----------------|------|------|------|
| Input Voltage Range | AC input             | 85             | --   | 305  | VAC  |
|                     | DC input             | 88             | --   | 430  | VDC  |
| Input Frequency     |                      | 47             | --   | 440  | Hz   |
| Input Current       | 115VAC               | --             | --   | 750  | mA   |
|                     | 230VAC               | --             | --   | 450  |      |
| Inrush Current      | 115VAC               | --             | 15   | --   | A    |
|                     | 230VAC               | --             | 30   | --   |      |
| Leakage Current     | 277VAC               | 0.3mA RMS max. |      |      |      |
| Hot Plug            |                      | Unavailable    |      |      |      |

### Output Specifications

| Item                       | Operating Conditions                  |                 | Min.                              | Typ.  | Max. | Unit |
|----------------------------|---------------------------------------|-----------------|-----------------------------------|-------|------|------|
| Output Voltage Accuracy    | 0% - 100% load                        | 3.3V, 5V output | --                                | ±2    | --   | %    |
|                            |                                       | Other output    | --                                | ±1    | --   |      |
| Line Regulation            | Rated load                            | 3.3V, 5V output | --                                | ±0.8  | --   |      |
|                            |                                       | Other output    | --                                | ±0.4  | --   |      |
| Load Regulation            | 0% - 100% load                        |                 | --                                | ±1    | --   |      |
| Ripple & Noise*            | 100MHz bandwidth (peak-to-peak value) |                 | --                                | 50    | 120  | mV   |
| Stand-by Power Consumption |                                       |                 | --                                | --    | 0.5  | W    |
| Temperature Coefficient    |                                       |                 | --                                | ±0.02 | --   | %/°C |
| Short Circuit Protection   |                                       |                 | Hiccup, continuous, self-recovery |       |      |      |

# AC/DC Converter

## SLO30-23BxxE Series

|                         |                           |   |     |      |    |
|-------------------------|---------------------------|---|-----|------|----|
| Over-current Protection |                           | $\geq 120\%I_o$ , self-recovery               |     |      |    |
| Over-voltage Protection | 3.3VDC output             | $\leq 5.25V$ (Output voltage clamp or hiccup) |     |      |    |
|                         | 5VDC output               | $\leq 7V$ (Output voltage clamp or hiccup)    |     |      |    |
|                         | 12VDC output              | $\leq 16V$ (Output voltage clamp or hiccup)   |     |      |    |
|                         | 15VDC output              | $\leq 20.3V$ (Output voltage clamp or hiccup) |     |      |    |
|                         | 24VDC output              | $\leq 32.4V$ (Output voltage clamp or hiccup) |     |      |    |
| Minimum Load            |                           | 0   | --  | --   | %  |
| Start-up Delay Time     |                           | --  | 500 | 1000 | ms |
| Hold-up Time            | 115VAC input, $I_o=100\%$ | --  | 40  | --   | ms |
|                         | 230VAC input, $I_o=100\%$ | --  | 160 | --   |    |

Note: \*The "Tip and barrel method" is used for ripple and noise test, with a 0.1uf ceramic capacitor & 100uf parallel capacitor, please refer to AC-DC Converter Application Notes for specific information.

## General Specifications

| Item                      |                      |                                    | Operating Conditions                                    | Min.                     | Typ. | Max. | Unit |
|---------------------------|----------------------|------------------------------------|---|--------------------------|------|------|------|
| Isolation                 | Input-output         |                                    | Electric Strength Test for 1min., leakage current <10mA | 4000                     | --   | --   | VAC  |
|                           | Input-PE             |                                    | Electric Strength Test for 1min., leakage current <5mA  | 2000                     | --   | --   | VAC  |
|                           | Output-PE            |                                    | Electric Strength Test for 1min., leakage current <20mA | 500                      | --   | --   | VAC  |
| Insulation Resistance     | Input-output         |                                    | 500VDC  | ≥100x10 <sup>6</sup>     |      |      | Ω    |
|                           | Input-PE             |                                    |   |                          |      |      |      |
|                           | Output-PE            |                                    |   |                          |      |      |      |
| Impulse withstand voltage | Input-output         |                                    | 5KV, 1.2/50 us Impulse voltage                          |                          |      |      |      |
|                           | Input-PE             |                                    |   |                          |      |      |      |
| Operating Temperature     |                      |                                    |   | -40                      | --   | +85  | ℃    |
| Storage Temperature       |                      |                                    |   | -40                      | --   | +85  |      |
| Storage Humidity          |                      |                                    |   | --                       | --   | 90   | %RH  |
| Altitude                  |                      |                                    |   | --                       | --   | 5000 | m    |
| Switching Frequency       |                      |                                    |   | --                       | 65   | --   | kHz  |
| Power Derating            |                      |                                    | -40℃ to -25℃  | 2                        | --   | --   | %/℃  |
|                           | 5 years design life  | Natural air cooling                | +50℃ to +70℃  | 2.5                      | --   | --   |      |
|                           |                      |                                    | +70℃ to +85℃  | 2.66                     | --   | --   |      |
|                           |                      | Forced cooling wind speed ≥ 0.7m/s | +65℃ to +70℃  | 8                        | --   | --   |      |
|                           |                      |                                    | +70℃ to +85℃  | 2                        | --   | --   |      |
|                           | 3 years design life  | Natural air cooling                | +55℃ to +70℃  | 2                        | --   | --   |      |
|                           |                      |                                    | +70℃ to +85℃  | 2.66                     | --   | --   |      |
|                           |                      | Forced cooling wind speed ≥ 0.7m/s | +65℃ to +70℃  | 2                        | --   | --   |      |
|                           |                      |                                    | +70℃ to +85℃  | 3.33                     | --   | --   |      |
|                           |                      |                                    | 85VAC - 100VAC  | 1.33                     | --   | --   |      |
|                           |                      |                                    | 277VAC - 305VAC   | 0.72                     | --   | --   |      |
|                           |                      |                                    | 2000m-5000m   | 5                        | --   | --   | %/Km |
|                           | Safety Certification |                                    |   | UL62368/EN62368/IEC62368 |      |      |      |
| Safety Certification      |                      |                                    | EN62368   |                          |      |      |      |
| Safety Class              |                      |                                    | CLASS I   |                          |      |      |      |
| MTBF                      |                      |                                    | MIL-HDBK-217F@25℃ >300,000 h                            |                          |      |      |      |

# AC/DC Converter

## SLO30-23BxxE Series

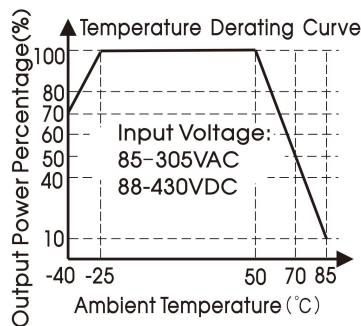
### Mechanical Specifications

|                |                           |
|----------------|---------------------------|
| Dimension      | 105.00 x 50.00 x 30.00 mm |
| Weight         | 110g (Typ.)               |
| Cooling method | Free air convection       |

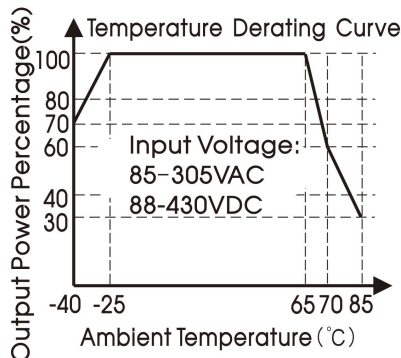
### Electromagnetic Compatibility (EMC)

|           |   |                  |  |                  |
|-----------|---|------------------|--|------------------|
| Emissions | CE  | CISPR32/EN55032  | CLASS B  |                  |
|           | RE  | CISPR32/EN55032  | CLASS B  |                  |
| Immunity  | ESD   | IEC/EN61000-4-2  | Contact $\pm 8\text{KV}$ / Air $\pm 15\text{KV}$                   | Perf. Criteria B |
|           | RS  | IEC/EN61000-4-3  | 10V/m  | perf. Criteria A |
|           | EFT   | IEC/EN61000-4-4  | $\pm 4\text{KV}$   | perf. Criteria B |
|           | Surge   | IEC/EN61000-4-5  | Line to line $\pm 2\text{KV}$ /<br>line to ground $\pm 4\text{KV}$ | perf. Criteria B |
|           | CS  | IEC/EN61000-4-6  | 10 Vr.m.s  | perf. Criteria A |
|           | Voltage dips, short interruption and voltage variations | IEC/EN61000-4-11 | 0%, 70%  | perf. Criteria B |

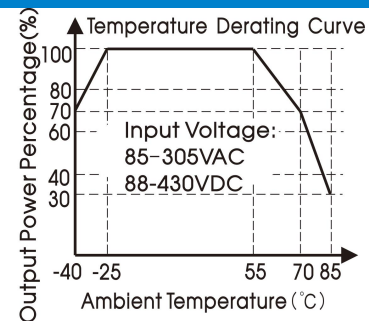
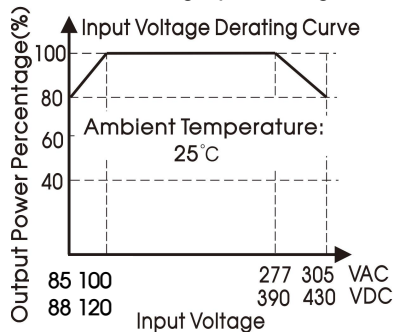
### Product Characteristic Curve



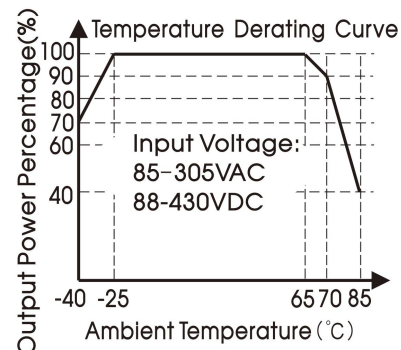
Natural air cooling 5 years design life



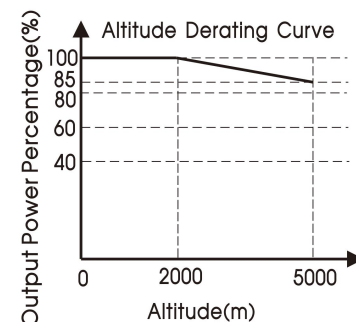
Forced cooling 5 years design life



Natural air cooling 3 years design life



Forced cooling 3 years design life

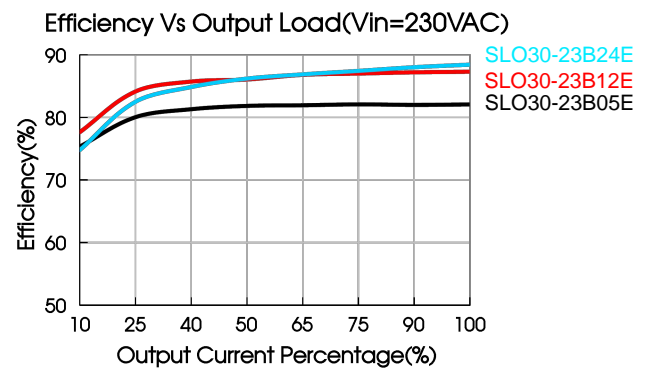
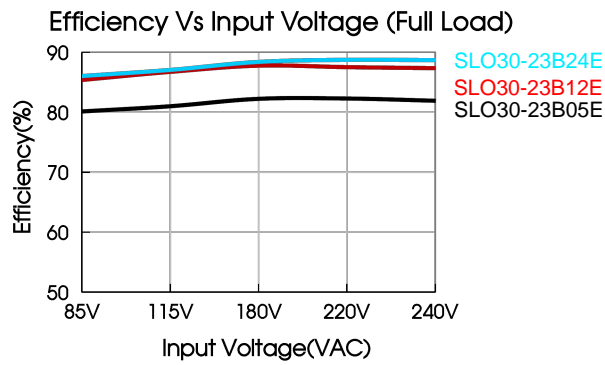


Note: ① With an AC input between 85-100VAC/277-305VAC and a DC input between 88-120VDC/390-430VDC, the output power must be derated as per temperature derating curves;

② This product is suitable for applications using natural air cooling; for applications in closed environment please consult factory or one of our FAE.

# AC/DC Converter

## SLO30-23BxxE Series



## Design Reference

### 1. Typical application

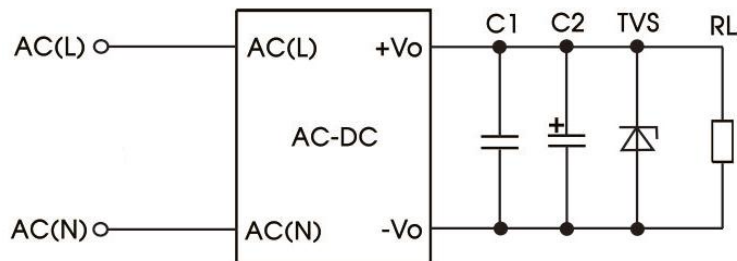


Fig. 1: Typical circuit diagram

| Part no.     | C1        | C2        | TVS      |
|--------------|-----------|-----------|----------|
| SLO30-23B03E | 0.1μF/50V | 100μF/50V | SMBJ7.0A |
| SLO30-23B05E |           |           | SMBJ7.0A |
| SLO30-23B12E |           |           | SMBJ20A  |
| SLO30-23B15E |           |           | SMBJ20A  |
| SLO30-23B24E |           |           | SMBJ30A  |

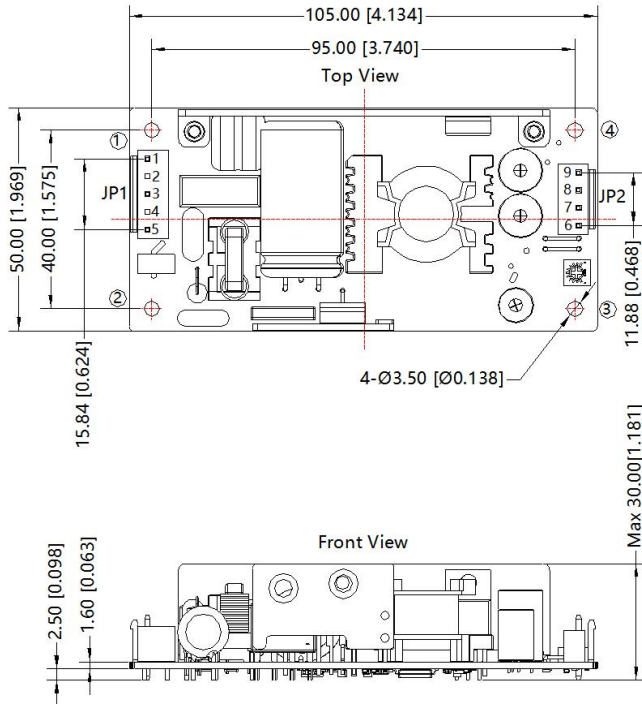
#### Output Filter Components:

We recommend using an electrolytic capacitor with high frequency, and low ESR rating for C2 (refer to manufacture's datasheet). Choose a capacitor voltage rating with at least 20% margin, in other words not exceeding 80%. C1 is a ceramic capacitor used for filtering high-frequency noise and TVS is a recommended suppressor diode to protect the application in case of a converter failure.

## SLO30-23BxxE Series

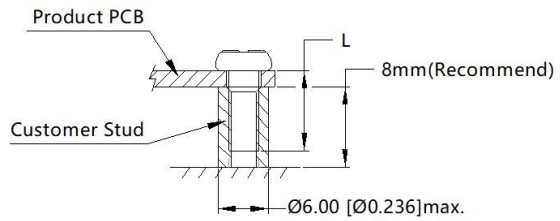
## Dimensions and Recommended Layout

THIRD ANGLE PROJECTION 



| Pin-Out    |     |        |   |
|------------|-----|--------|---|
| Connectors | Pin | Mark   | Client Connectors   |
| JP1        | 1   | PE     | Housing: JST VHR<br>Contact: JSTSVH-21T-P1.1<br>or equivalent |
|            | 2   | No Pin |   |
|            | 3   | AC(N)  |   |
|            | 4   | No Pin |   |
|            | 5   | AC(L)  |   |
| JP2        | 6   | +Vo    | Housing: JST VHR<br>Contact: JSTSVH-21T-P1.1<br>or equivalent |
|            | 7   | +Vo    |   |
|            | 8   | -Vo    |   |
|            | 9   | -Vo    |   |

| Position | Screw Spec. | L(Recommend) | Torque(max) |
|----------|-------------|--------------|-------------|
| ① - ④    | M3          | 6mm          | 0.4N·m      |



Note:  
Unit: mm[inch]  
General tolerances:  $\pm 0.50[\pm 0.020]$   
The layout of the device is for reference only, please refer to the actual product

Note:

1. Unless otherwise specified, parameters in this datasheet were measured under the conditions of  $T_a=25^{\circ}\text{C}$ , humidity<75% with nominal input voltage and rated output load;
2. All index testing methods in this datasheet are based on our company corporate standards;
3. We can provide product customization service, please contact our technicians directly for specific information;
4. Products are related to laws and regulations: see "Features" and "EMC";
5. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.