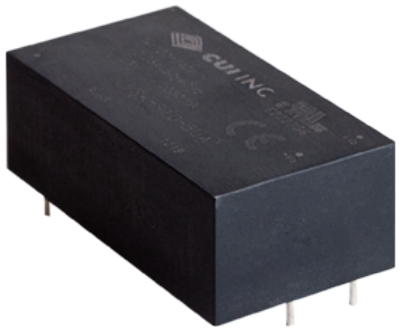
CUI INC®



# **SERIES:** VSK-S10 | **DESCRIPTION:** AC-DC POWER SUPPLY

## FEATURES

- up to 10 W continuous power
- compact board mount design
- universal input (85~264 Vac / 100~370 Vdc)
- single output from 3.3~24 Vdc
- over current and short circuit protections
- UL/cUL safety approvals
- efficiency up to 83%

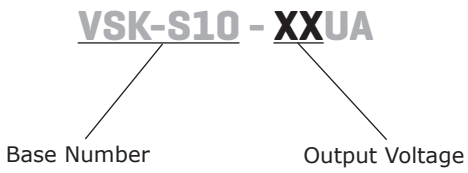


RoHS c UL us CE

| MODEL | output voltage (Vdc) | output current max (A) | output power max (W) | ripple and noise[1] max (mVp-p) | efficiency max (%) |
|---|---|---|---|---|---|
| VSK-S10-3R3UA | 3.3 | 2 | 6.6 | 100 | 72 |
| VSK-S10-5UA | 5 | 2 | 10 | 100 | 76 |
| VSK-S10-9UA | 9 | 1.1 | 10 | 100 | 80 |
| VSK-S10-12UA | 12 | 0.9 | 10 | 100 | 81 |
| VSK-S10-15UA | 15 | 0.7 | 10 | 100 | 82 |
| VSK-S10-24UA | 24 | 0.45 | 10 | 100 | 83 |

Notes: 1. Ripple and noise are measured at 20 MHz BW by "parallel cable" method with 1 µF ceramic and 10 µF electrolytic capacitors on the output.

## PART NUMBER KEY



## INPUT

| parameter | conditions/description | min | typ | max | units |
|---|---|---|---|---|---|
| voltage | | 85<br>100 | | 264<br>370 | Vac<br>Vdc |
| frequency | | 47 | | 440 | Hz |
| current | at 110 Vac<br>at 230 Vac | | 230<br>150 | | mA<br>mA |
| inrush current | at 110 Vac<br>at 230 Vac | | 10<br>20 | | A<br>A |
| input fuse | recommended external 2 A/250 V, slow-blow type | | | | |
| temperature coefficient | | | ±0.02 | | %/°C |
| no load power consumption | | | 0.5 | | W |

## OUTPUT

| parameter | conditions/description | min | typ | max | units |
|---|---|---|---|---|---|
| capcitive load | 3.3 Vdc model<br>5 Vdc model<br>9 Vdc model<br>12 Vdc model<br>15 Vdc model<br>24 Vdc model | | | 15,000<br>12,000<br>6000<br>2000<br>1500<br>500 | µF<br>µF<br>µF<br>µF<br>µF<br>µF |
| line regulation | full load | | ±0.5 | | % |
| load regulation | at 10 ~ 100% | | ±1 | | % |
| voltage set accuracy | 3.3 Vdc model<br>all other models | | ±3<br>±2 | | %<br>% |
| hold-up time | at 230 Vac | | 80 | | ms |
| switching frequency | | | 65 | | kHz |

## PROTECTIONS

| parameter | conditions/description | min | typ | max | units |
|---|---|---|---|---|---|
| over voltage protection | 3.3, 5 Vdc models<br>9 Vdc model<br>12, 15 Vdc models<br>24 Vdc model | | | 7.5<br>15<br>20<br>30 | Vdc<br>Vdc<br>Vdc<br>Vdc |
| over current protection | | 110 | | | % |
| short circuit protection | auto recovery | | | | |

## SAFETY & COMPLIANCE

| parameter | conditions/description | min | typ | max | units |
|---|---|---|---|---|---|
| isolation voltage | input to output | 4,000 | | | Vac |
| safety approvals | UL60950-1 | | | | |
| safety class | Class II | | | | |
| conducted emissions | CISPR11/EN55011, Class A, CISPR11/EN55011, Class B (external circuit required, see figure 2) | | | | |
| radiated emissions | CISPR11/EN55011, Class A, CISPR11/EN55011, Class B (external circuit required, see figure 2) | | | | |
| ESD | IEC/EN61000-4-2 Class B, ±6KV/8KV | | | | |
| radiated immunity | IEC/EN61000-4-3 Class A, 10V/m | | | | |
| EFT/burst | IEC/EN61000-4-4 Class B, ±2 kV | | | | |
| | IEC/EN61000-4-4 Class B, ±4 kV (external circuit required, see figure 2) | | | | |
| surge | IEC/EN61000-4-5 Class B, ±1 kV (external circuit required, see figure 1) | | | | |
| | IEC/EN61000-4-5 Class B, ±2 kV / ±4 kV (external circuit required, see figure 2) | | | | |
| conducted immunity | IEC/EN61000-4-6 Class A, 10 Vr.m.s | | | | |

## SAFETY & COMPLIANCE (CONTINUED)

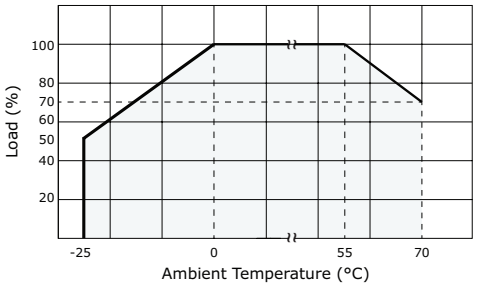
| parameter | conditions/description | min | typ | max | units |
|---|---|---|---|---|---|
| PFM | IEC/EN61000-4-8 Class A, 10 A/m | | | | |
| voltage dips & interruptions | IEC/EN61000-4-11 Class B, 0%-70% | | | | |
| MTBF | as per MIL-HDBK-217F at 25 °C | 300,000 | | | hours |
| RoHS | 2011/65/EU | | | | |

## ENVIRONMENTAL

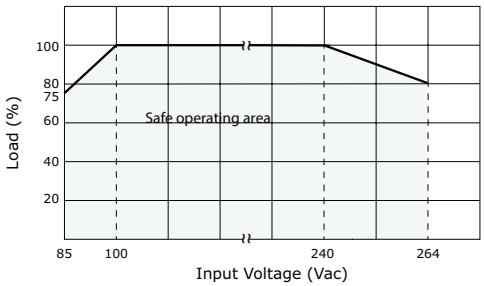
| parameter | conditions/description | min | typ | max | units |
|---|---|---|---|---|---|
| operating temperature | see derating curves | -25 | | 70 | °C |
| storage temperature | | -25 | | 105 | °C |
| storage humidity | | | | 95 | % |

## DERATING CURVES

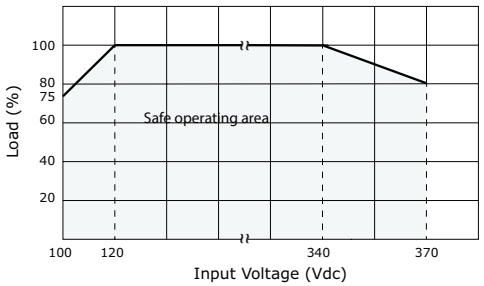
load vs. ambient temperature




load vs. input voltage (Vac)




load vs. input voltage (Vdc)



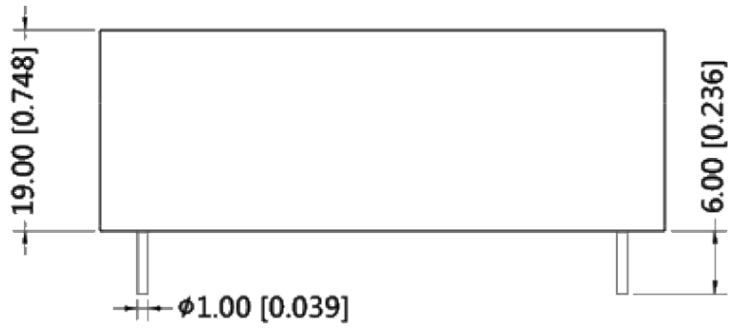
## MECHANICAL

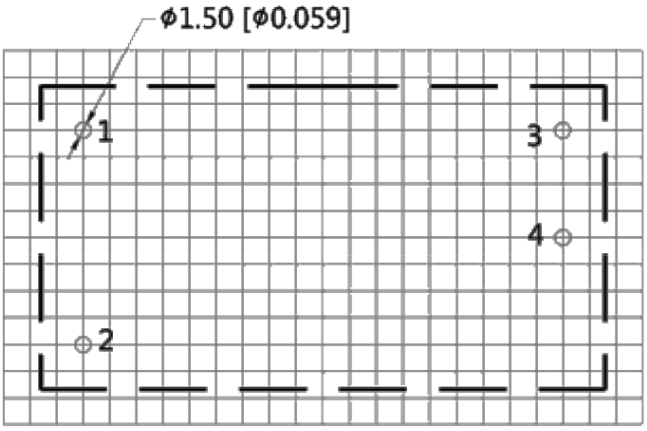
| parameter | conditions/description | min | typ | max | units |
|---|---|---|---|---|---|
| dimensions | 53.80 x 28.80 x 19 (2.118 x 1.134 x 0.748 inch) | | | | mm |
| material | UL94V-0 | | | | |
| weight | | | 50 | | g |

## MECHANICAL DRAWING

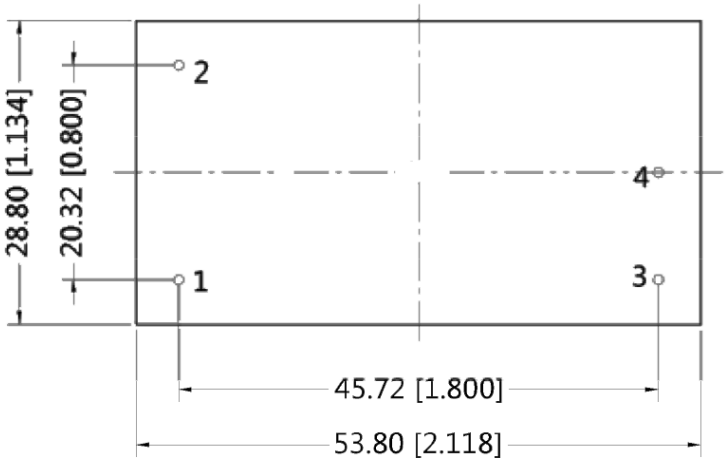
units: mm [inch]
tolerance: ±0.50 [±0.020]
pin section tolerance: ±0.10 [±0.004]

| PIN CONNECTIONS | |
|---|---|
| PIN | FUNCTION |
| 1 | AC(N) |
| 2 | AC(L) |
| 3 | +Vo |
| 4 | -Vo |




Note : Grid 2.54*2.54mm



## TYPICAL APPLICATION CIRCUIT

**Figure 1**

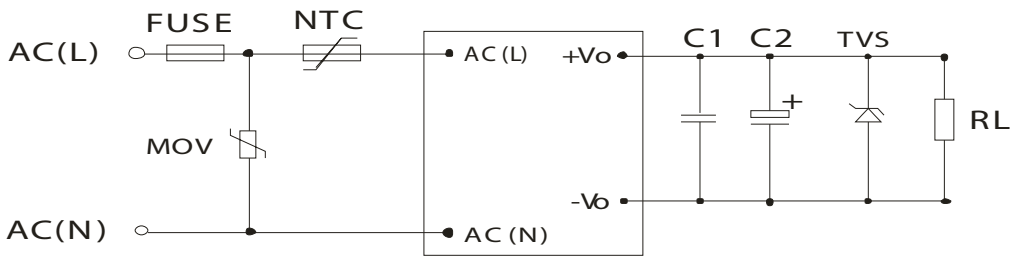



**Table 1**

| Recommended External Circuit Components | | | | | | |
|---|---|---|---|---|---|---|
| MODEL | C1[1] | C2[1] | TVS | FUSE | MOV | NTC |
| VSK-S10-3R3UA | 1 µF/50V | 220 µF/10V | SMBJ7.0A | 2A/250V | S14K300 | 10D-10 |
| VSK-S10-5UA | 1 µF/50V | 220 µF/10V | SMBJ7.0A | 2A/250V | S14K300 | 10D-10 |
| VSK-S10-9UA | 1 µF/50V | 120 µF/25V | SMBJ12A | 2A/250V | S14K300 | 10D-10 |
| VSK-S10-12UA | 1 µF/50V | 120 µF/25V | SMBJ20A | 2A/250V | S14K300 | 10D-10 |
| VSK-S10-15UA | 1 µF/50V | 120 µF/25V | SMBJ20A | 2A/250V | S14K300 | 10D-10 |
| VSK-S10-24UA | 1 µF/50V | 68 µF/35V | SMBJ30A | 2A/250V | S14k300 | 10D-10 |

Note: 1. Output filtering capacitor C1 is a ceramic capacitor that is used to filter high frequency noise. C2 is an electrolytic capacitor. It is recommended to use high frequency and low impedance electrolytic capacitors. For capacitance and current of capacitor please refer to the manufacturer's datasheet. Voltage derating of capacitor should be 80% or above.

## EMC RECOMMENDED CIRCUIT

**Figure 2**

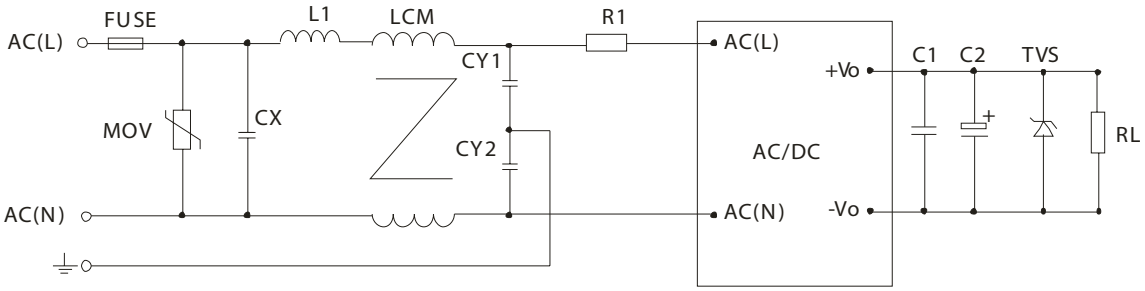



**Table 2**

| Recommended External Circuit Components | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| FUSE | MOV | CY1, CY2 | CX | LCM | L1 | R1 | C1, C2, | TVS |
| 2A/250 Vdc slow fusing | S14K300 | 1nF/400VAC | 0.1µF/275VAC | 2.2mH | 4.7µH/2.0A | 12Ω/3W | see Table 1 | see Table 1 |

Note: 1. All specifications measured at Ta=25°C, humidity <75%, nominal input voltage, and rated output load, unless otherwise specified.

## REVISION HISTORY

| rev. | description | date |
|---|---|---|
| 1.0 | initial release | 07/26/2011 |
| 1.01 | added output load vs. input voltage (Vdc) derating curve | 03/01/2012 |
| 1.02 | V-Infinity branding removed | 08/21/2012 |
| 1.03 | updated safety section | 01/29/2013 |
| 1.04 | updated spec | 01/08/2014 |
| 1.05 | changed internal IC, updated datasheet | 06/08/2015 |

The revision history provided is for informational purposes only and is believed to be accurate.

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CUI offers a two (2) year limited warranty. Complete warranty information is listed on our website.

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