CUI INC
a bel group



# SERIES: VSK-S5 | DESCRIPTION: AC-DC POWER SUPPLY

DISCONTINUED

## FEATURES

- up to 5.5 W continuous output
- compact board mount design
- universal input (85~264 Vac/110~370 Vdc)
- single regulated output from 3.3~24 Vdc
- over voltage, over temperature, and short circuit protections
- UL/cUL safety approvals
- efficiency up to 83%



## MODEL

| MODEL | output voltage (Vdc) | output current max (mA) | output power max (W) | ripple and noise[1] max (mVp-p) | efficiency max (%) |
|---|---|---|---|---|---|
| VSK-S5-3R3UA* | 3.3 | 1250 | 4.125 | 120 | 74 |
| VSK-S5-5UA* | 5 | 1000 | 5 | 120 | 78 |
| VSK-S5-9UA* | 9 | 550 | 5 | 100 | 78 |
| VSK-S5-12UA | 12 | 420 | 5 | 100 | 80 |
| VSK-S5-15UA* | 15 | 333 | 5 | 100 | 82 |
| VSK-S5-24UA* | 24 | 230 | 5.5 | 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.
2. * Discontinued model.

## PART NUMBER KEY

VSK-S5 - XXUA

Base Number — Output Voltage

## INPUT

| parameter | conditions/description | min | typ | max | units |
|---|---|---|---|---|---|
| voltage | | 85<br>110 | | 264<br>370 | Vac<br>Vdc |
| frequency | | 47 | | 63 | Hz |
| current | at 110 Vac<br>at 230 Vac | | 110<br>70 | | mA<br>mA |
| inrush current | at 110 Vac<br>at 230 Vac | | 10<br>20 | | A<br>A |
| input fuse | recommended external 1 A/250 V, slow-blow type | | | | |
| temperature coefficient | | | ±0.02 | | %/°C |

## OUTPUT

| parameter | conditions/description | min | typ | max | units |
|---|---|---|---|---|---|
| capcitive load[1] | 3.3 Vdc model<br>5 Vdc model<br>9 Vdc model<br>12 Vdc model<br>15 Vdc model<br>24 Vdc model | | | 4000<br>4000<br>1000<br>820<br>820<br>330 | µF<br>µF<br>µF<br>µF<br>µF<br>µF |
| line regulation | | | ±0.5 | | % |
| load regulation | at 10~100% load | | ±1 | | % |
| voltage set accuracy | 3.3 Vdc model<br>all other models | | ±3<br>±2 | | %<br>% |
| hold-up time | at 110 Vac<br>at 230 Vac | | 12<br>80 | | ms<br>ms |
| switching frequency | | | | 140 | kHz |

Notes: 1. Test without external circuit

## PROTECTIONS

| parameter | conditions/description | min | typ | max | units |
|---|---|---|---|---|---|
| over voltage protection | shutdown | | | | |
| over current protection | auto recovery | 110 | | | % |
| short circuit protection | hiccup, auto recovery | | | | |

## SAFETY & COMPLIANCE

| parameter | conditions/description | min | typ | max | units |
|---|---|---|---|---|---|
| isolation voltage | for 1 minute | 4,000 | | | Vac |
| safety approvals | UL60950-1 | | | | |
| safety class | Class II | | | | |
| conducted emissions | CISPR22/EN55022, Class B | | | | |
| radiated emissions | CISPR22/EN55022, Class B | | | | |
| ESD | IEC/EN61000-4-2 Class B, contact ±6 kV / air ±8 kV | | | | |
| 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 / ±2 kV | | | | |
| | 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 | | | | |
| PFM | IEC/EN61000-4-8 Class A, 10 A/m | | | | |

DISCONTINUED

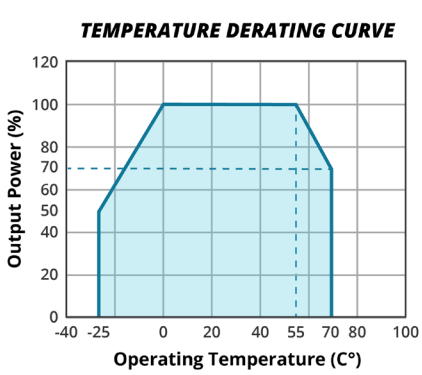
## SAFETY & COMPLIANCE (CONTINUED)

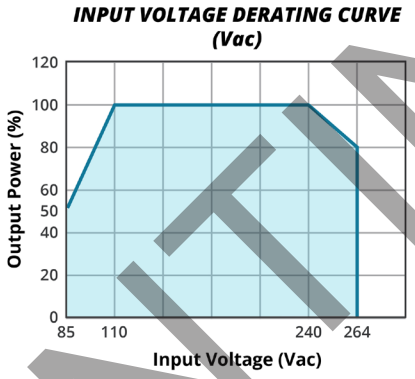
| parameter | conditions/description | min | typ | max | units |
|---|---|---|---|---|---|
| voltage dips & interruptions | IEC/EN61000-4-11 Class B, 0%-70% | | | | |
| MTBF | as per MIL-HDBK-217F, at 25 °C | 300,000 | | | hours |
| RoHS | 2011/65/EU | | | | |

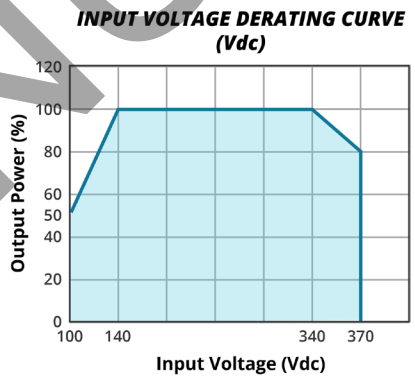
## ENVIRONMENTAL

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

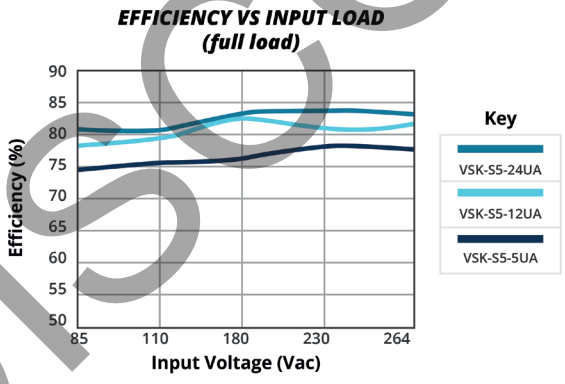
## DERATING CURVES

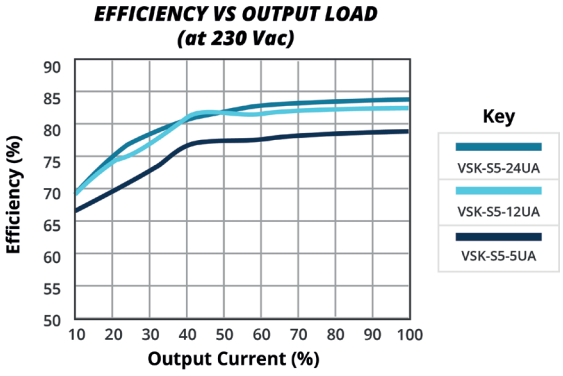



## EFFICIENCY CURVES




DISCONTINUED

## MECHANICAL

| parameter | conditions/description | min | typ | max | units |
|---|---|---|---|---|---|
| dimensions | 50.8 x 25.4 x 15.16 (2.00 x 1.00 x 0.597 inch) | | | | mm |
| material | UL94V-0 | | | | |
| weight | | | 31 | | g |

## MECHANICAL DRAWING

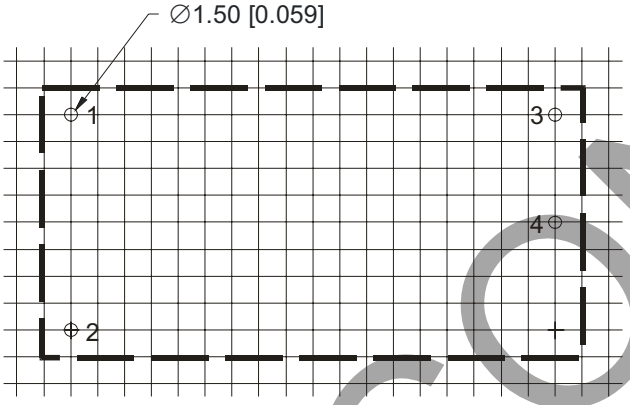
units: mm [inch]
tolerance: ±0.50 [±0.020]
pin section tolerance: ±0.10 [±0.004]

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



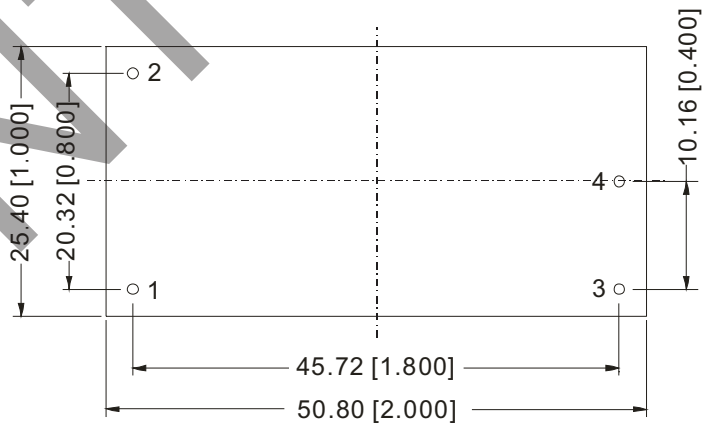

Front View

Grid Size: 2.54 x 2.54mm




Top View

PCB LAYOUT




Bottom View

DISCONTINUED

## TYPICAL APPLICATION CIRCUIT

**Figure 1**

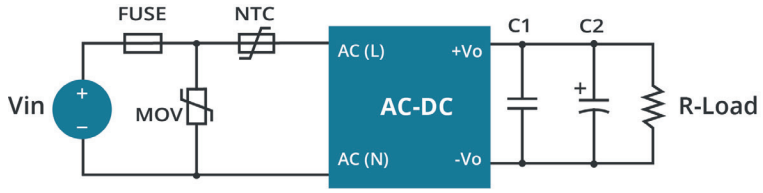



**Table 1**

| Recommended External Circuit Components | | | | | |
|---|---|---|---|---|---|
| MODEL | C1[1] (µF) | C2[1] (µF) | FUSE | NTC | MOV |
| VSK-S5-3R3UA | 1 | 220 | 1 A/250 V | 12D-5 | S14K350 |
| VSK-S5-5UA | 1 | 220 | 1 A/250 V | 12D-5 | S14K350 |
| VSK-S5-9UA | 1 | 100 | 1 A/250 V | 12D-5 | S14K350 |
| VSK-S5-12UA | 1 | 100 | 1 A/250 V | 12D-5 | S14K350 |
| VSK-S5-15UA | 1 | 100 | 1 A/250 V | 12D-5 | S14K350 |
| VSK-S5-24UA | 1 | 47 | 1 A/250 V | 12D-5 | S14K350 |

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**

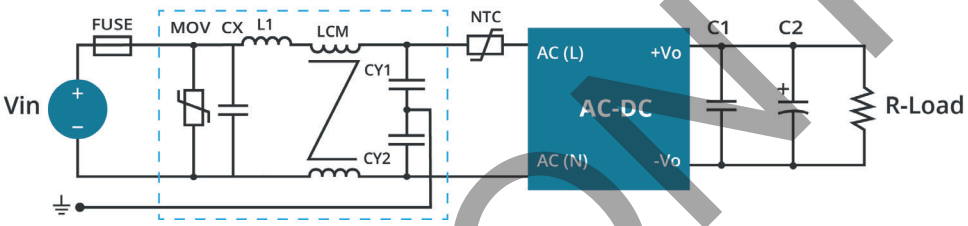



**Table 2**

| Recommended External Circuit Components | |
|---|---|
| FUSE | 1A/250V, slow fusing, necessary |
| MOV | S14K350 |
| CY1, CY2 | 1nF/400VAC |
| CX | 0.1µF/275VAC |
| LCM | 2.2mH |
| L1 | 4.7µH/2.0A |
| C1, C2 | see Table 1 |

DISCONTINUED

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 | new template applied | 03/06/2012 |
| 1.02 | V-Infinity branding removed | 08/21/2012 |
| 1.03 | added efficiency curves | 12/10/2012 |
| 1.04 | updated spec | 04/01/2013 |
| 1.05 | updated spec | 08/23/2013 |
| 1.06 | updated spec | 01/08/2014 |
| 1.07 | changed internal IC, updated datasheet | 06/05/2015 |
| 1.08 | company logo updated | 10/30/2020 |
| 1.09 | UKCA mark added, derating and efficiency curves and circuit figures updated | 06/01/2022 |
| 1.10 | discontinued models VSK-S5-15UA, VSK-S5-24UA, VSK-S5-9UA, VSK-S5-3R3UA | 11/11/2022 |
| 1.11 | discontinued model VSK-S5-5UA | 12/14/2022 |

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

DISCONTINUED

CUI INC
a bel group

**Headquarters**
20050 SW 112th Ave.
Tualatin, OR 97062
**800.275.4899**

Fax 503.612.2383
**cui**.com
techsupport@cui.com

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

CUI reserves the right to make changes to the product at any time without notice. Information provided by CUI is believed to be accurate and reliable. However, no responsibility is assumed by CUI for its use, nor for any infringements of patents or other rights of third parties which may result from its use.

CUI products are not authorized or warranted for use as critical components in equipment that requires an extremely high level of reliability. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.