

**SERIES:** VSKM-S10 | **DESCRIPTION:** MEDICAL AC-DC POWER SUPPLY

**FEATURES**

- up to 10 W continuous power
- compact board mount design
- universal input (85~264 Vac / 120~370 Vdc)
- single output from 3.3~24 V
- over current and short circuit protections
- full medical approvals
- efficiency up to 80%



| MODEL         | output voltage<br>(Vdc) | output current<br>max<br>(A) | output power<br>max<br>(W) | ripple and noise <sup>1</sup><br>typ<br>(mVp-p) | efficiency<br>typ<br>(%) |
|---------------|-------------------------|------------------------------|----------------------------|-------------------------------------------------|--------------------------|
| VSKM-S10-3R3U | 3.3                     | 2                            | 6.6                        | 50                                              | 70                       |
| VSKM-S10-5U   | 5                       | 2                            | 10                         | 50                                              | 74                       |
| VSKM-S10-9U   | 9                       | 1.1                          | 10                         | 50                                              | 76                       |
| VSKM-S10-12U  | 12                      | 0.9                          | 10                         | 50                                              | 76                       |
| VSKM-S10-15U  | 15                      | 0.7                          | 10                         | 50                                              | 78                       |
| VSKM-S10-24U  | 24                      | 0.45                         | 10                         | 50                                              | 80                       |

Notes: 1. Ripple and noise measured at 20 MHz bandwidth

**PART NUMBER KEY**

**VSKM-S10 - XXU**

Base Number

Output Voltage

## INPUT

| parameter       | conditions/description   | min       | typ        | max        | units      |
|-----------------|--------------------------|-----------|------------|------------|------------|
| voltage         |                          | 85<br>120 |            | 264<br>370 | Vac<br>Vdc |
| frequency       |                          | 47        |            | 63         | 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      | slow blow, 250 V         |           | 2          |            | A          |
| leakage current | 230 V ac, 50 Hz          |           | 0.1        |            | mA         |

## OUTPUT

| parameter                  | conditions/description           | min | typ      | max | units  |
|----------------------------|----------------------------------|-----|----------|-----|--------|
| line regulation            |                                  |     | ±0.5     |     | %      |
| load regulation            | 10 ~ 100%                        |     | ±1       |     | %      |
| temperature coefficient    |                                  |     | 0.02     |     | %/°C   |
| hold-up time               | at 230 Vac                       |     | 50       |     | ms     |
| voltage set point accuracy | 3.3 V output<br>all other models |     | ±3<br>±2 |     | %<br>% |
| switching frequency        |                                  |     | 60       |     | kHz    |

## PROTECTIONS

| parameter                | conditions/description                                  | min | typ | max | units |
|--------------------------|---------------------------------------------------------|-----|-----|-----|-------|
| over current protection  |                                                         |     |     | 110 | %     |
| short circuit protection | auto recovery with no damage from a short on any output |     |     |     |       |

## SAFETY & COMPLIANCE

| parameter            | conditions/description                                                                                                                        | min     | typ | max | units |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|---------|-----|-----|-------|
| isolation voltage    | primary to secondary (for 1 minute)                                                                                                           | 4,000   |     |     | Vac   |
| safety approvals     | IEC 60601-1, EN 60601-1, UL 60601-1                                                                                                           |         |     |     |       |
| safety class         | class II                                                                                                                                      |         |     |     |       |
| EMI/EMC <sup>1</sup> | EN 55011 (level B), IEC/EN 61000-4-2 level 4 (8kV/15kV), IEC/EN 61000-4-3, IEC/EN 61000-4-4 level 4 (4kV), IEC/EN 61000-4-5 level 4 (2kV/4kV) |         |     |     |       |
| RoHS compliant       | yes                                                                                                                                           |         |     |     |       |
| MTBF                 | 25°C                                                                                                                                          | 300,000 |     |     | hrs   |

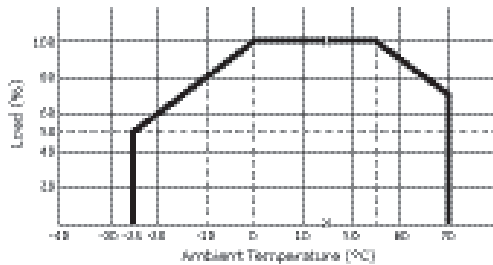
Notes: 1. external EMC application circuit is required

## ENVIRONMENTAL

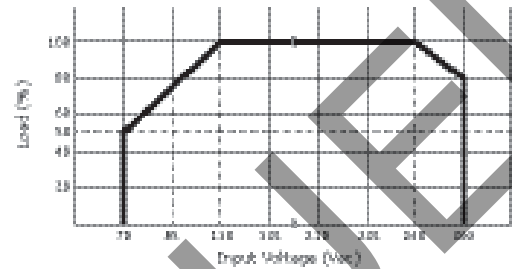
| parameter             | conditions/description | min | typ | max | units |
|-----------------------|------------------------|-----|-----|-----|-------|
| operating temperature |                        | -25 |     | 70  | °C    |
| storage temperature   |                        | -40 |     | 105 | °C    |
| case temperature      |                        |     |     | 95  | °C    |
| operating humidity    | non-condensing         |     |     | 95  | %     |

## DERATING CURVES

1. output power vs. ambient temperature



2. output power vs. input voltage

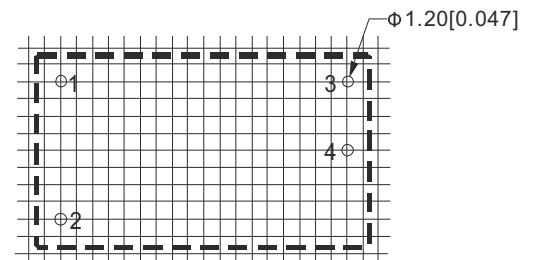
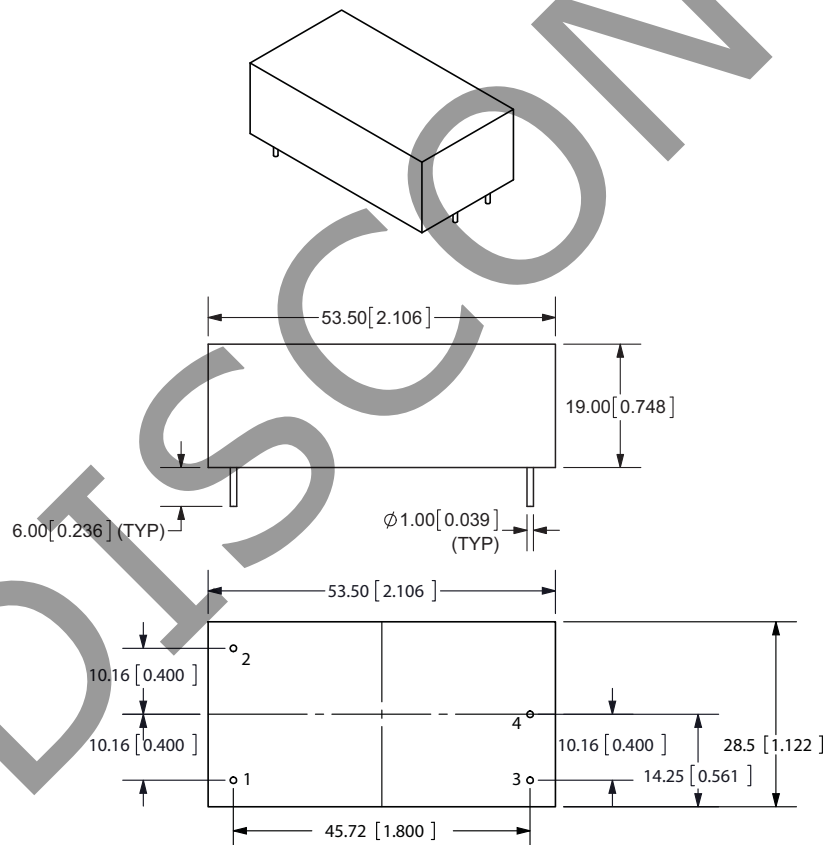


## MECHANICAL

| parameter     | conditions/description                    | min | typ | max | units |
|---------------|-------------------------------------------|-----|-----|-----|-------|
| dimensions    | 2.1 x 1.12 x 0.75 (53.5 x 28.5 x 19.0 mm) |     |     |     | inch  |
| case material | UL94V-0                                   |     |     |     |       |
| weight        |                                           | 47  | 50  | 53  | g     |

## MECHANICAL DRAWING

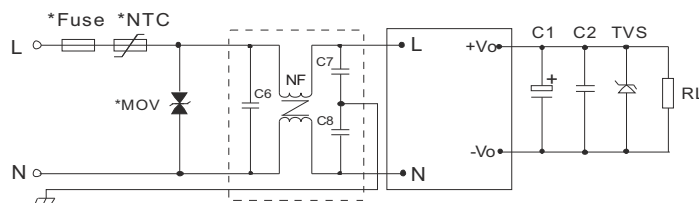
units: mm [inches]

tolerance:  $\pm 0.5$  [ $\pm 0.02$ ]pin section tolerance:  $\pm 0.10$  mm [ $\pm 0.004$ ]

### PIN CONNECTIONS

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

## TYPICAL APPLICATION CIRCUIT



| EXTERNAL CAPACITORS TYPICAL VALUE (Unit: $\mu\text{F}$ ) |                               |                               |          |
|----------------------------------------------------------|-------------------------------|-------------------------------|----------|
| MODEL                                                    | C1                            | C2                            | TVS      |
| VSKM-S10-3R3U                                            | 220 $\mu\text{F}/10\text{ V}$ | 0.1 $\mu\text{F}/50\text{ V}$ | P6KE6.8A |
| VSKM-S10-5U                                              | 220 $\mu\text{F}/10\text{ V}$ | 0.1 $\mu\text{F}/50\text{ V}$ | P6KE6.8A |
| VSKM-S10-9U                                              | 120 $\mu\text{F}/25\text{ V}$ | 0.1 $\mu\text{F}/50\text{ V}$ | P6KE12A  |
| VSKM-S10-12U                                             | 120 $\mu\text{F}/25\text{ V}$ | 0.1 $\mu\text{F}/50\text{ V}$ | P6KE20A  |
| VSKM-S10-15U                                             | 120 $\mu\text{F}/25\text{ V}$ | 0.1 $\mu\text{F}/50\text{ V}$ | P6KE20A  |
| VSKM-S10-24U                                             | 68 $\mu\text{F}/35\text{ V}$  | 0.1 $\mu\text{F}/50\text{ V}$ | P6KE30A  |

- Notes:
- Output filtering capacitor C1 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 manufacture's datasheet. Voltage derating of capacitor should be 80% or above. C2 is ceramic capacitor, it is used to filter high frequency noise. TVS is a recommended component to protect post-circuits (if converter fails).
  - MOV is required to protect the device under surge.
  - It is recommended to use a 2A/250V slow blow FUSE. External input NTC is recommended to use 5D-9.
  - If EMC performance is required, it is recommended to add "EMC filter" at the input end (see EMC Application Figure).
- C6: X capacitor, recommended parameter 0.1 $\mu\text{F}/275\text{V}$ ;  
 C7,C8: Y capacitor, recommended parameter 2200pF/400V;  
 NF: common model choke, recommended inductance is about 10mH-30mH.

## REVISION HISTORY

| rev. | description                 | date       |
|------|-----------------------------|------------|
| 1.0  | initial release             | 01/19/2012 |
| 1.01 | V-Infinity branding removed | 09/11/2012 |

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



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