

SERIES: VSKM-S5 | **DESCRIPTION:** MEDICAL AC-DC POWER SUPPLY

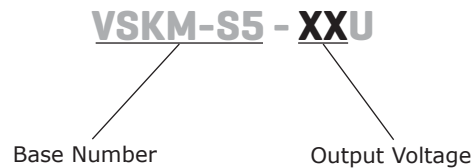
FEATURES

- up to 5.5 W continuous power
- compact board mount design
- universal input (85~264 Vac / 110~370 Vdc)
- single output from 3.3 ~ 24 V
- over voltage, over temperature, and short circuit protections
- full medical approvals
- efficiency up to 78%



| MODEL | output voltage | output current | output power | ripple and noise ¹ | efficiency |
|--------------|----------------|----------------|--------------|-------------------------------|------------|
| | (Vdc) | max (A) | max (W) | typ (mVp-p) | typ (%) |
| VSKM-S5-3R3U | 3.3 | 1.25 | 4.2 | 30 | 66 |
| VSKM-S5-5U | 5 | 1 | 5 | 30 | 72 |
| VSKM-S5-9U | 9 | 0.55 | 5 | 30 | 74 |
| VSKM-S5-12U | 12 | 0.42 | 5 | 30 | 76 |
| VSKM-S5-15U | 15 | 0.33 | 5 | 30 | 76 |
| VSKM-S5-24U | 24 | 0.23 | 5.5 | 30 | 78 |

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

PART NUMBER KEY


INPUT

| parameter | conditions/description | min | typ | max | units |
|-----------------------------------|--------------------------|-----------|-----------|------------|------------|
| voltage | | 85 110 | | 264 370 | Vac Vdc |
| frequency | | 47 | | 63 | Hz |
| current | at 110 Vac at 230 Vac | | 110 70 | | mA mA |
| inrush current | at 110 Vac at 230 Vac | | 10 20 | | A A |
| leakage current | none | | | | |
| external input fuse (recommended) | slow blow, 250 V | | 1 | | A |

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 all other models | | ±3 ±2 | | % % |
| switching frequency | | | 100 | | kHz |

PROTECTIONS

| parameter | conditions/description | min | typ | max | units |
|-----------------------------|---|-----|-----|-----|-------|
| over voltage protection | diode clamp and chip lock up | | | | |
| short circuit protection | auto recovery with no damage from a short on any output | | | | |
| over temperature protection | | | | 150 | °C |

SAFETY & COMPLIANCE

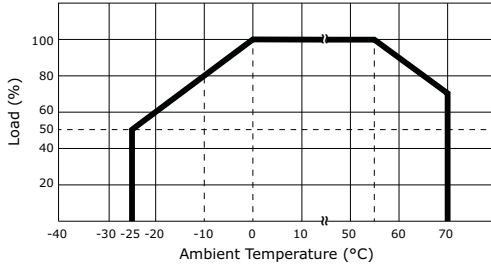
| parameter | conditions/description | min | typ | max | units |
|-------------------|--|---------|-----|-----|-------|
| isolation voltage | primary to secondary (for 1 minute) | 4,000 | | | Vac |
| safety approvals | IEC 60601-1, EN 60601-1, UL 60601-1 | | | | |
| safety class | class II | | | | |
| EMI/EMC | EN 55011 (level A), 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 |

ENVIRONMENTAL

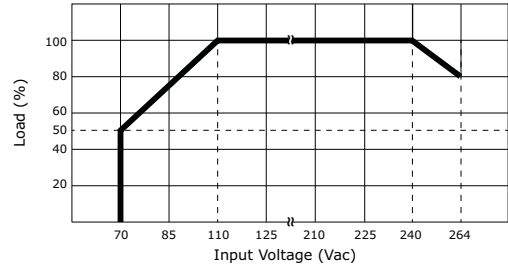
| parameter | conditions/description | min | typ | max | units |
|-----------------------|------------------------|-----|-----|-----|-------|
| operating temperature | | -25 | | 70 | °C |
| storage temperature | | -40 | | 105 | °C |
| case temperature | | | | 95 | °C |
| operating humidity | non-condensing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

DERATING CURVES

1. output power vs. ambient temperature



2. output power vs. input voltage

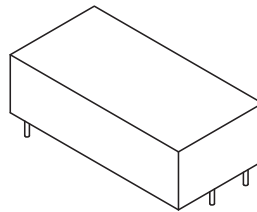


MECHANICAL

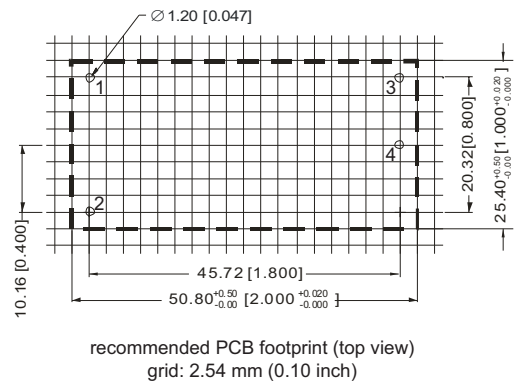
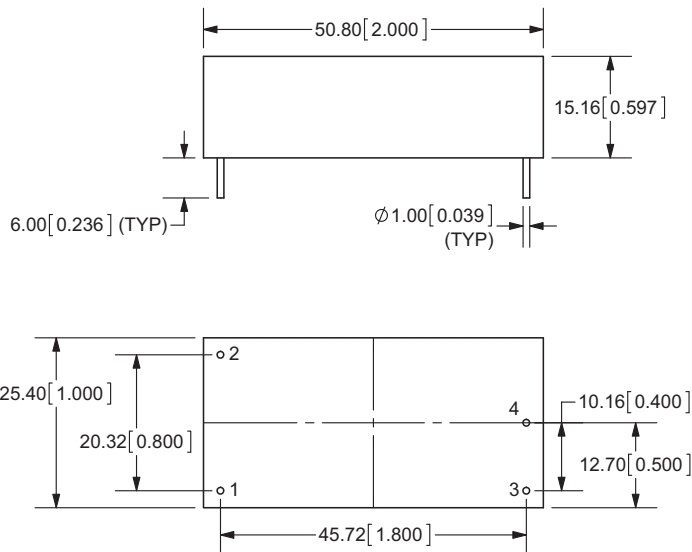
| parameter | conditions/description | min | typ | max | units |
|---------------|---|-----|-----|-----|-------|
| dimensions | 2.0 x 1.0 x 0.6 (50.8 x 25.4 x 15.2 mm) | | | | inch |
| case material | UL94V-0 | | | | |
| weight | | | 35 | | g |

MECHANICAL DRAWING

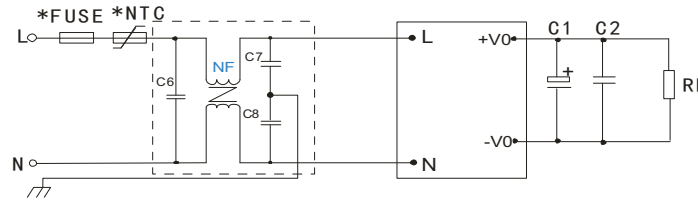
units: mm [inches]
 tolerance: ±0.5 [±0.02]
 pin section tolerance: ±0.10 [±0.004]



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



TYPICAL APPLICATION CIRCUIT



EMC Application Figure

| EXTERNAL CAPACITORS TYPICAL VALUE (Unit: μF) | | |
|--|----|-----|
| MODEL | C1 | C2 |
| VSKM-S5-3R3U | 47 | 0.1 |
| VSKM-S5-5U | 47 | 0.1 |
| VSKM-S5-9U | 33 | 0.1 |
| VSKM-S5-12U | 33 | 0.1 |
| VSKM-S5-15U | 33 | 0.1 |
| VSKM-S5-24U | 10 | 0.1 |

- 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.
 - It is recommended to use a 1A/250V slow blow FUSE. External input NTC is recommended to use 5D-14 or 10 Ω /2W wire-round resistor.
 - 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 μF /275V;
 C7,C8: Y capacitor, recommended parameter 2200pF/400V;
 CY:Y capacitor, recommended parameter 102K/400V
 NF: common model choke, recommended inductance is about 10mH-30mH.

REVISION HISTORY

| rev. | description | date |
|------|--|------------|
| 1.0 | initial release | 01/16/2012 |
| 1.01 | added leakage current to Safety & Compliance | 06/20/2012 |
| 1.02 | picture updated | 09/06/2012 |
| 1.03 | updated input data | 11/13/2012 |

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



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