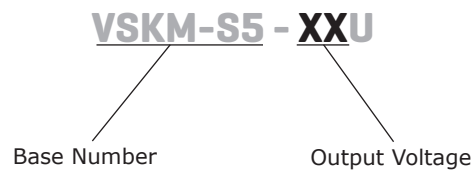


SERIES: VSKM-S5 | DESCRIPTION: MEDICAL AC-DC POWER SUPPLY
FEATURES

- 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 V
- over voltage, over temperature, and short circuit protections
- full medical approvals
- efficiency up to 78%



| MODEL | output voltage | output current max | output power max | ripple and noise typ | efficiency max |
|--------------|----------------|--------------------|------------------|----------------------|----------------|
| | (Vdc) | (mA) | (W) | (mVp-p) | (%) |
| VSKM-S5-3R3U | 3.3 | 1250 | 4.125 | 30 | 66 |
| VSKM-S5-5U | 5 | 1000 | 5 | 30 | 72 |
| VSKM-S5-9U | 9 | 550 | 5 | 30 | 74 |
| VSKM-S5-12U | 12 | 420 | 5 | 30 | 76 |
| VSKM-S5-15U | 15 | 333 | 5 | 30 | 76 |
| VSKM-S5-24U | 24 | 230 | 5.5 | 30 | 78 |

PART NUMBER KEY


INPUT

| parameter | conditions/description | min | typ | max | units |
|-------------------------|--|-----|------|-----|-------|
| voltage | | 85 | | 264 | Vac |
| | | 110 | | 370 | Vdc |
| frequency | | 47 | | 63 | Hz |
| current | at 110 Vac | | 110 | | mA |
| | at 230 Vac | | 70 | | mA |
| inrush current | at 110 Vac | | 10 | | A |
| | at 230 Vac | | 20 | | 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 |
|----------------------|------------------------|-----|------|-----|-------|
| line regulation | | | ±0.5 | | % |
| load regulation | at 10~100% load | | ±1 | | % |
| voltage set accuracy | 3.3 V model | | ±3 | | % |
| | all other models | | ±2 | | % |
| hold-up time | at 230 Vac | | 50 | | ms |
| switching frequency | | | 100 | | kHz |
| leakage current | | | | 0.3 | mA |

PROTECTIONS

| parameter | conditions/description | min | typ | max | units |
|-----------------------------|---------------------------|-----|-----|-----|-------|
| over voltage protection | diode clamp | | | | |
| short circuit protection | shutdown and auto restart | | | | |
| over temperature protection | | | | 150 | °C |

SAFETY & COMPLIANCE

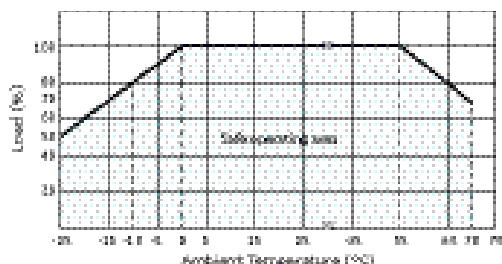
| parameter | conditions/description | min | typ | max | units |
|------------------------------|--|---------|-----|-----|-------|
| isolation voltage | for 1 minute | 4,000 | | | Vac |
| safety approvals | UL60601 | | | | |
| safety class | Class II | | | | |
| conducted emissions | CISPR11/EN55011 Class A, Class B (external circuit required, see figure 2) | | | | |
| radiated emissions | CISPR11/EN55011 Class A, Class B (external circuit required, see figure 2) | | | | |
| 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 | | | | |
| voltage dips & interruptions | IEC/EN61000-4-11 Class B, 0%-70% | | | | |
| MTBF | at 25°C, max. load | 300,000 | | | hours |
| RoHS | 2011/65/EU | | | | |

ENVIRONMENTAL

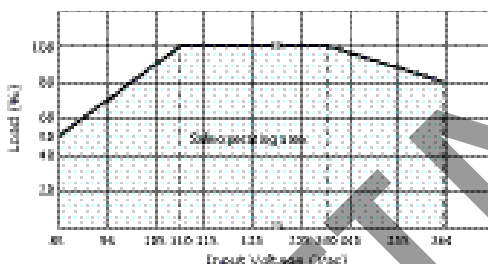
| parameter | conditions/description | min | typ | max | units |
|-----------------------|------------------------|-----|-----|-----|-------|
| operating temperature | see derating curves | -25 | | 70 | °C |
| storage temperature | | -40 | | 105 | °C |
| case temperature | | | | 95 | °C |
| humidity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

DERATING CURVES

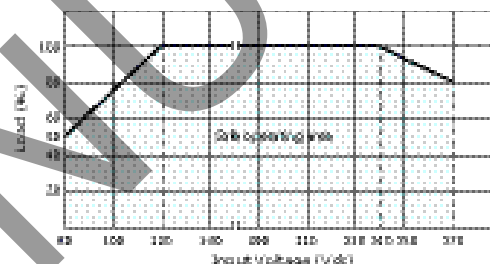
load vs. ambient temperature



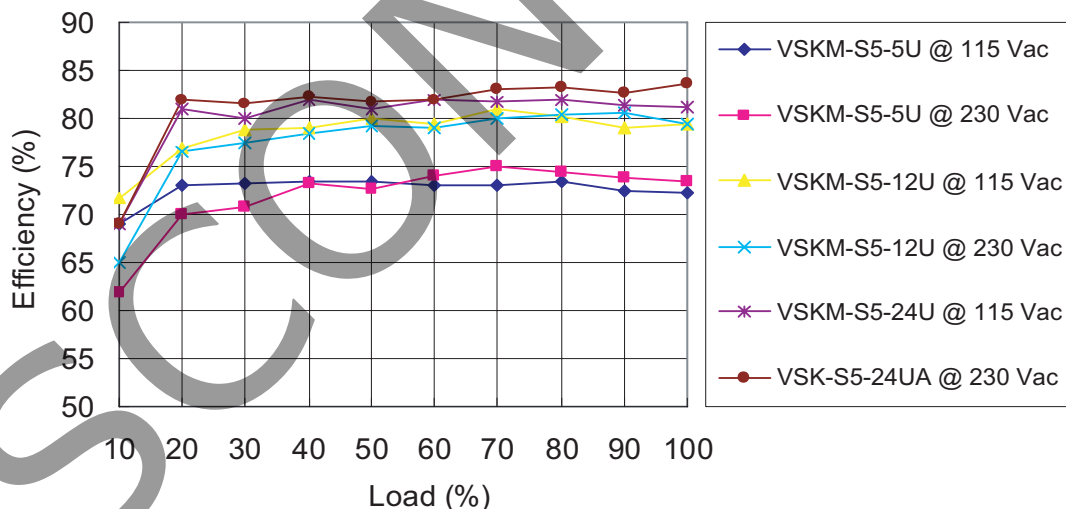
load vs. input voltage (Vac)



load vs. input voltage (Vdc)



EFFICIENCY CURVES



MECHANICAL

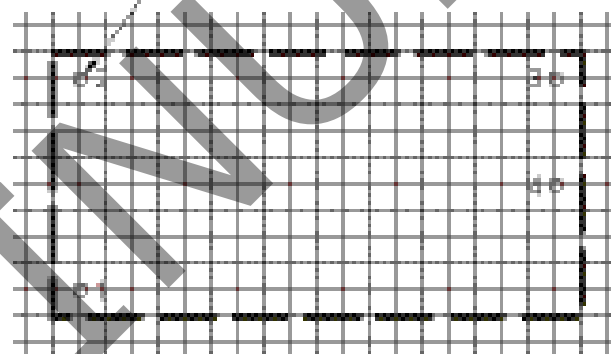
| parameter | conditions/description | min | typ | max | units |
|------------|--|-----|-----|-----|-------|
| dimensions | 50.8 x 25.4 x 15.16 (2.00 x 1.00 x 0.597 inch) | | | | mm |
| material | UL94V-0 | | | | |
| weight | | | 35 | | g |

MECHANICAL DRAWING

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

Grid Size: 2.54 x 2.54mm

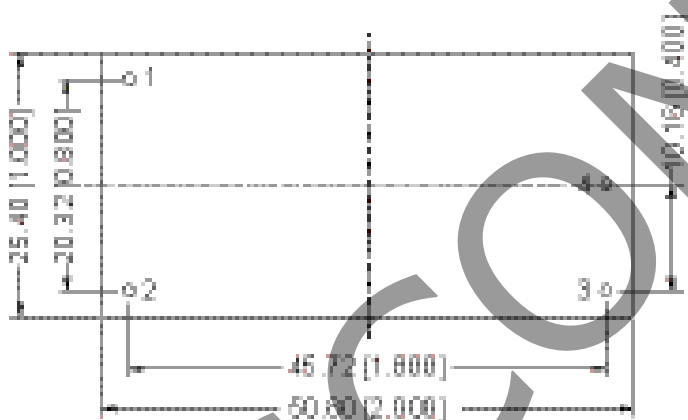
$\varnothing 1.50$ [0.059]



Top View
PCB LAYOUT



Front View



Bottom View

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

TYPICAL APPLICATION CIRCUIT

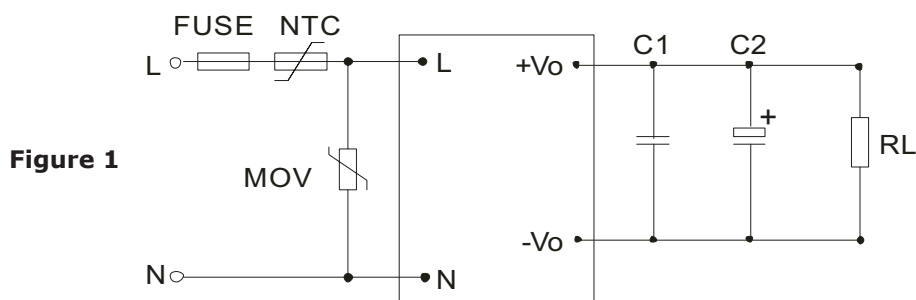


Figure 1

Table 1

| Recommended External Circuit Components | | | | |
|---|----------------------|----------------------|-----------|------|
| MODEL | C1 ¹ (μF) | C2 ¹ (μF) | FUSE | NTC |
| VSKM-S5-3R3U | 1 | 47 | 1 A/250 V | 5D-9 |
| VSKM-S5-5U | 1 | 47 | 1 A/250 V | 5D-9 |
| VSKM-S5-9U | 1 | 33 | 1 A/250 V | 5D-9 |
| VSKM-S5-12U | 1 | 33 | 1 A/250 V | 5D-9 |
| VSKM-S5-15U | 1 | 33 | 1 A/250 V | 5D-9 |
| VSK-S5-24UA | 1 | 10 | 1 A/250 V | 5D-9 |

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

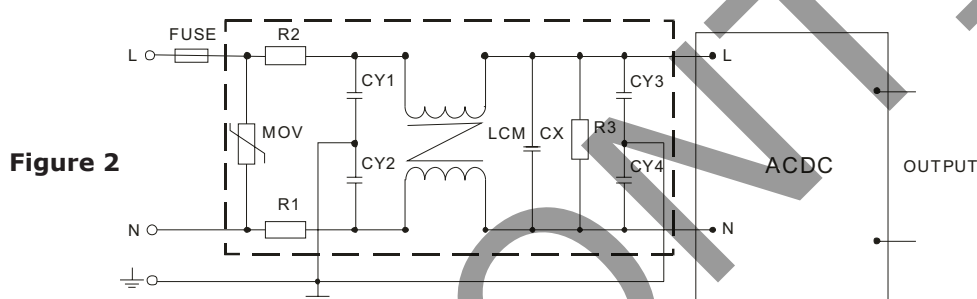


Figure 2

Table 2

| Recommended External Circuit Components | |
|---|------------------------|
| FUSE | 1 A/250 V |
| MOV | 561KD14 |
| R1, R2 | 2Ω/3W winding resistor |
| R3 | 1MΩ/2W |
| CY1, CY2, CY3, CY4 | 1000pF/400Vac |
| CX | 0.22μF/275Vac |
| LCM | 10mH-30mH |
| CY | Y capacitor, 102K/400V |

TEST CONFIGURATION

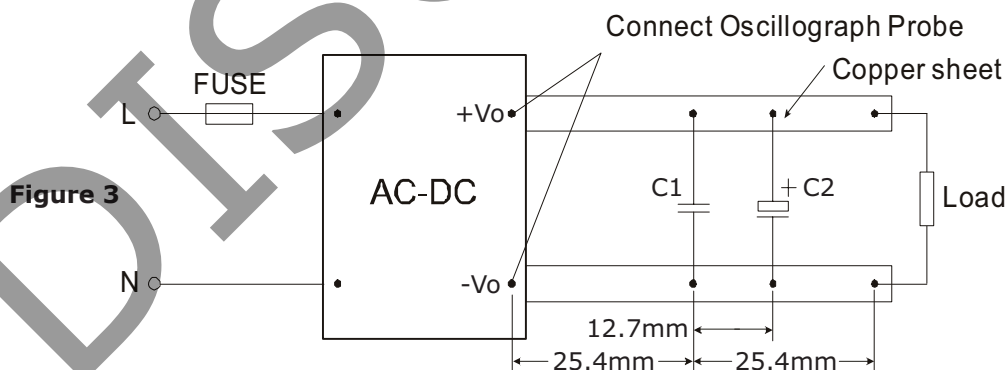


Figure 3

Table 3

| Capacitors | |
|------------|-----------------------------|
| C1 | 1μF ceramic capacitor |
| C2 | 10μF electrolytic capacitor |

Note: 1. All specifications measured at Ta=25°C, humidity <75%, 220 Vac input voltage, and rated output load, unless otherwise specified.

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 |
| 1.04 | updated spec | 01/08/2014 |

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



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