

**date** 01/08/2014

page 1 of 6

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

#### **FEATURES**

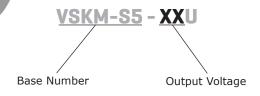
- up to 5.5 W continuous output
- compact board mount design
- universal input (85~264 Vac/110~370 Vdc)
- single regulated output from 3.3~24 V
- over voltage, over temperature, and short circuit protections
- full medical approvals
- efficiency up to 78%





MODEL	output voltage	output current	output power	ripple and noise	efficiency
	(Vdc)	max (mA)	max (W)	<b>typ</b> (mVp-p)	<b>max</b> (%)
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		85 110		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
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 all other models		±3 ±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

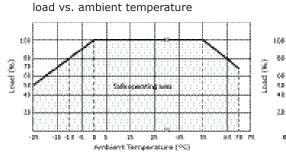
# **SAFETY & COMPLIANCE**

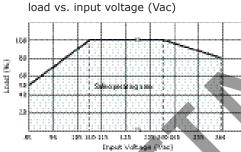
parameter	conditions/description	min	typ	max	units
isolation voltage	for 1 minute	4,000			Vac
safety approvals	UL60601				
safety class	Class II				
conducted emissions	CISPR11/EN55011 Class A, Class E	3 (external circuit required, see	figure 2)		
radiated emissions	CISPR11/EN55011 Class A, Class E	3 (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				
EET/buset	IEC/EN61000-4-4 Class B, ±2 kV				
EFT/burst	IEC/EN61000-4-4 Class B, ±4 kV (external circuit required, see figure 2)				
NI WOO	IEC/EN61000-4-5 Class B, ±1 kV /	′ ±2 kV			
surge	IEC/EN61000-4-5 Class B, ±2 kV /	±4 kV (external circuit require	ed, see figure	2)	
conducted immunity	IEC/EN61000-4-6 Class A, 10 Vr.m	n.s			
PFM	IEC/EN61000-4-8 Class A, 10 A/m				
voltage dips & interruptions	IEC/EN61000-4-11 Class B, 0%-70	)%			
МТВБ	at 25°C, max. load	300,000			hours
RoHS	2011/65/EU				

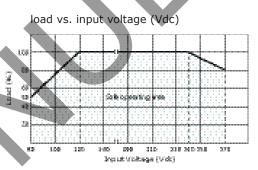
## **ENVIRONMENTAL**

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	%

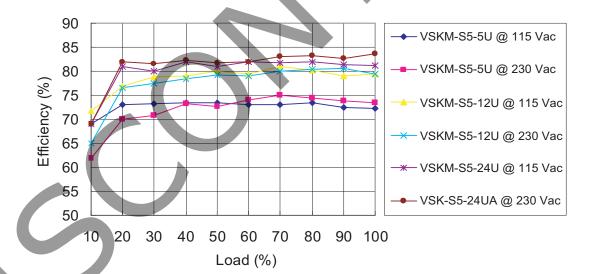
# **DERATING CURVES**







# **EFFICIENCY CURVES**



# **MECHANICAL**

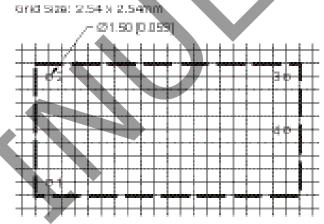
parameter	conditions/description	min	typ	max	units
dimensions	50.8 x 25.4 x 15.16 (2.00 x 1.00 x 0.597 inch)	50.8 x 25.4 x 15.16 (2.00 x 1.00 x 0.597 inch)			mm
material	UL94V-0				
weight			35		g

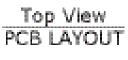
## **MECHANICAL DRAWING**

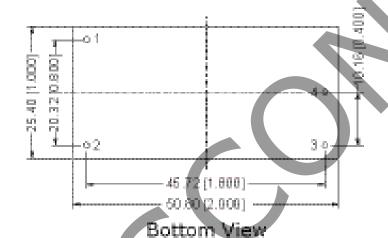
units: mm [inch] tolerance: ±0.50 [±0.020]

pin section tolerance:  $\pm 0.10$  [ $\pm 0.004$ ]









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

#### **TYPICAL APPLICATION CIRCUIT**

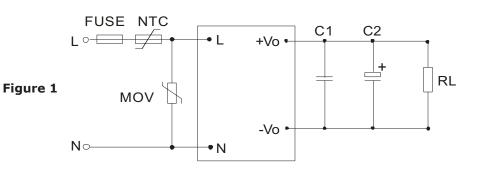


Table 1 Recommended External Circuit Components MODEL C1¹ (μF) C2<sup>1</sup> (μF) FUSE NTC VSKM-S5-3R3U 1 A/250 V 5D-9 VSKM-S5-5U 1 A/250 V 5D-9 VSKM-S5-9U 5D-9 1 A/250 V VSKM-S5-12U 1 A/250 V VSKM-S5-15U 33 1 A/250 V 5D-9

10

1 A/250 V

5D-9

VSK-S5-24UA

Note:

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**

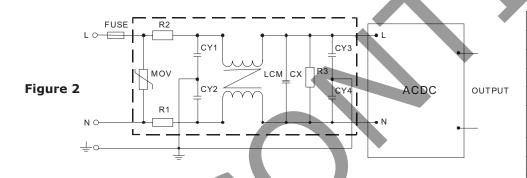


Table 2

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**

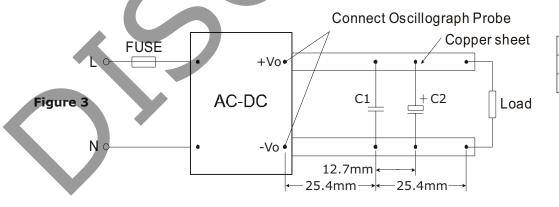


Table 3

Capacitors				
C1	1μF ceramic capacitor			
C2	10μF electrolytic capacitor			

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

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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