

## FEATURES AND APPLICATIONS

- 2:1 Input Range
- Efficiency up to 82%
- Industrial Standard DIL24 Housing
- VMU Series available with power levels between 2 and 15W
- RoHS ✓



## GENERAL DESCRIPTION

The VMU series is a family of 3 Watt single & dual output DC-DC converters with 1.5 kVdc or 3.5 kVdc isolation. These converters achieve miniature package in a 24-pin DIL compatible case with high performance features and a short circuit protection with automatic restart and tight line/load regulation. Wide range devices operate over 2:1 Input voltage range providing stable output voltage. Models operate from an input bus voltage of 12, 24 and 48 Vdc offering output voltage levels of 3.3, 5, 9, 12, 15, 24,  $\pm 3.3$ ,  $\pm 5$ ,  $\pm 9$ ,  $\pm 12$ ,  $\pm 15$  or  $\pm 24$  Vdc.

2:1 Input single and dual Output							
Model Number	Input Voltage Range [Vdc]	Output Voltage [Vdc]	Input Current		Full Load Output Current [mA]	max. Capacitor Load [ $\mu$ F]	Efficiency [%] 12/24/48
			No-Load [mA] 12/24/48	Full Load [mA] 12/24/48			
VMU-xx3R3S3	9-18 18-36 36-72	3.3	22/12/8	343/171/86	900	470	72/72/72
VMU-xx05S3		5.0	22/12/8	328/164/82	600	470	76/76/76
VMU-xx09S3		9.0	22/12/8	320/160/80	333	68	78/78/78
VMU-xx12S3		12.0	22/12/8	312/156/78	250	47	80/80/80
VMU-xx15S3		15.0	22/12/8	312/152/78	200	47	80/82/80
VMU-xx24S3		24.0	22/12/8	313/153/78	125	22	80/82/80
VMU-xx3R3D3	9-18 18-36 36-72	$\pm 3.3$	22/12/8	343/171/86	$\pm 450$	$\pm 220$	72/72/72
VMU-xx05D3		$\pm 5.0$	22/12/8	328/160/82	$\pm 300$	$\pm 220$	76/78/76
VMU-xx09D3		$\pm 9.0$	22/12/8	312/156/80	$\pm 167$	$\pm 33$	80/80/78
VMU-xx12D3		$\pm 12.0$	22/12/8	312/152/78	$\pm 125$	$\pm 22$	80/82/80
VMU-xx15D3		$\pm 15.0$	22/12/8	312/152/78	$\pm 100$	$\pm 22$	80/82/80
VMU-xx24D3		$\pm 24.0$	22/12/8	313/153/78	$\pm 63$	$\pm 10$	80/82/80

\* non standard output voltages on request

xx            nominal input voltage:  
               12        ( 9 – 18 Vdc)  
               24        (18 – 36 Vdc)  
               48        (36 – 72 Vdc)  
 Suffix H    3.5 kVdc isolation

### ELECTRICAL SPECIFICATIONS

Specifications typical at +25°C, nominal Input voltage, rated output current unless otherwise specified.

#### Input Specifications

2:1 Input Voltage Range	12V: 9 to 18 Vdc 24V: 18 to 36 Vdc 48V: 36 to 75 Vdc
Input Filter	Pi type
Input reflected ripple current	35 mA <sub>pp</sub>

#### Output Specifications

Output Power	3 Watts, max.
Output Voltage Accuracy	±1%
Min. Load for specified regulation	0%
Ripple and Noise (20 MHz BW)	60 mV <sub>pp</sub> , max.
Line Voltage Regulation	±0.5%
Load Voltage Regulation	±0.5%
Output 3.3V / ±3.3V Model:	±1.5%
Temperature Coefficient	±0.02%/°C, max.
Short Circuit Protection	Continuous (Hiccup)

#### General Specifications

Efficiency	see table
Switching Frequency	266 kHz
Isolation Voltage (Input / Output)	1500 Vdc, min. (3 sec)
H-Option:	3500 Vdc, min. (3 sec)
Isolation Voltage (Case / Input & Output)	1000 Vdc, min. (3 sec)
Isolation Resistance	10 <sup>9</sup> Ohms, min.
Isolation Capacitance	500 pF, typ.
Approvals	IEC/EN60950-1 (designed to meet)
Soldering Temperature	260°C (1.5mm form case; 10 sec.)

#### Environmental Specification

Operating Temperature	-40°C to +85°C
Max. Case Temperature	+100°C
Storage Temperature	-40°C to +125°C
Cooling	Free-air Convection
MTBF MIL-HDBK-217F:	>1.121 x 10 <sup>6</sup> Hrs
Relative Humidity	95% RH

#### EMC Characteristics

Radiated Emissions	EN55022	Class A
Conducted Emissions	EN55022	Class A *
* Input filter components are required to help meet conducted emission class A; find recommended EMI filter on page 3		
ESD	EN61000-4-2	Perf. Criteria B
Radiated Im.	EN61000-4-3	Perf. Criteria A
F. Transients.	EN61000-4-4	Perf. Criteria B **
Surge	EN61000-4-5	Perf. Criteria B **
**An external filter capacitor is required if the module has to meet EN61000-4-4 and EN61000-4-5. Recommended: 220 µF/100 V, ERS 48 mΩ		
Conducted I.	EN61000-4-6	Perf. Criteria A
PFMF	EN61000-4-8	Perf. Criteria A

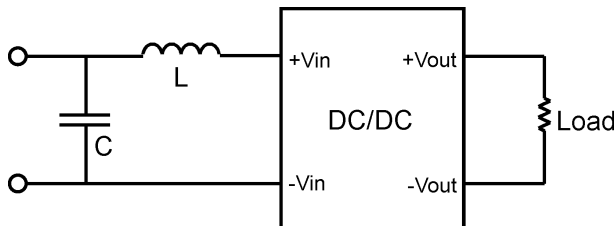
#### Physical Characteristics

Dimensions	31.8 x 20.3 x 10.2 mm 1.25 x 0.80 x 0.40 inches
Case Material	Nickel-coated copper
Base Material	Non-conductive black plastic
Potting Material	Epoxy (UL94-V0)
Weight	DIL24: 17 g

**CAUTION: This power module is not internally fused. An input line fuse must always be used!**

### Recommended Filter for EN55022 Class A Compliance

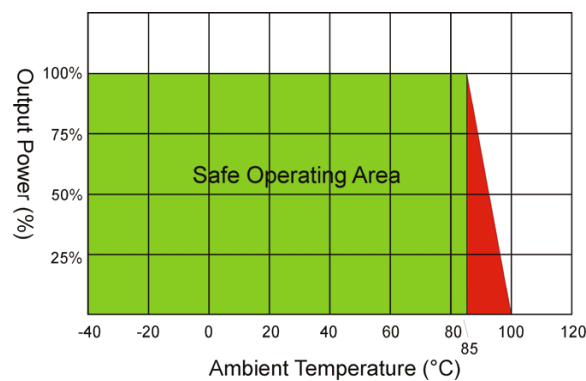
Input filter components (C, L) are used to help meet conducted emissions requirements for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.



Recommended Components as follows:

	C	L
VMU-3W-Series	100 $\mu$ F / 100V	12 $\mu$ H

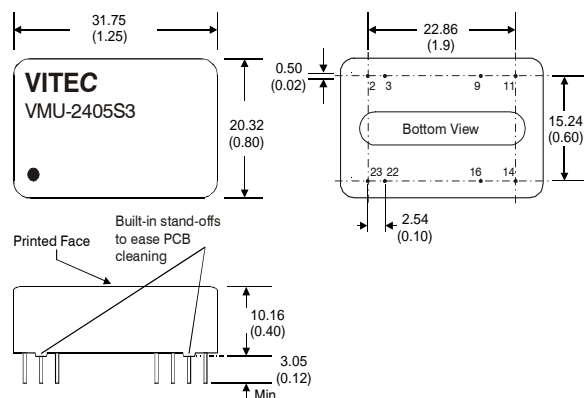
### Derating VMU-3W-Series



### PIN Connections DIL24 Package

PIN Connections 1 and 3.5 kVDC Isolation		
Pin	Single Output	Dual Output
2	-V Input	-V Input
3	-V Input	-V Input
9	N.P.	Common
11	N.C.	-V Output
14	+V Output	+V Output
16	-V Output	Common
22	+V Input	+V Input
23	+V Input	+V Input

N.C. ... No Connection  
 N.P. ... No Pin



Notes: All dimensions in millimeters (inches). Tolerance  $\pm 0.25$ mm (0.01).

Specifications can be changed without prior notice. Products are not intended for and must not be used in life support systems, human implantation, nuclear facilities or systems or any other application where product failure or malfunction of the component could lead to loss of life or catastrophic property damage.