

### FEATURES AND APPLICATIONS

- 7 Pin SIL Package
- Semi-Regulated Single & Dual Output
- Low Ripple and Noise
- 1000 up to 3000 Vdc Isolation
- Cost Effective
- RoHS Compliant ✓
- Efficiency up to 89%
- -40 to +85°C Operation Temperature Range



### GENERAL DESCRIPTION

The VMC series is a family of cost effective semi-regulated 1 W single & dual output DC-DC converters with 1 kVdc or 3 kVdc isolation. These converters achieve low cost and miniature SIL7 size without compromising performance or field reliability.

Models operate from an input bus voltage of 5, 12, 15, 24 and 48 Vdcoffering output voltage levels of 5, 9, 12, 15,  $\pm 5$ ,  $\pm 9$ ,  $\pm 12$  or  $\pm 15$  Vdc.

±10% Input, single & dual outputs								
Model Number	Input Voltage Range [Vdc]	Output Voltage [Vdc]	Input Current		Full Load Output Current [mA]	max. Capacitor Load [ $\mu$ F]	Load Regulation [%]	Efficiency [%]
			5/12/15/24/48					
			No-Load [mA]	Full Load [mA]				5/12/15/24/48
VMC-xx05S1	5 12 15 24 48	5.0	20/15/10/7/5	250/98/79/51/27	200	220	6/4/4/4/4	83/84/84/81/78
VMC-xx09S1		9.0	20/15/10/7/5	230/96/77/50/26	111	220	5.5/3.5/3.5/3.5/3.5	86/86/86/84/80
VMC-xx12S1		12.0	20/15/10/7/5	230/95/76/49/26	83	100	5.5/3.5/3.5/3.5/3	87/88/87/85/81
VMC-xx15S1		15.0	20/15/10/7/5	230/95/76/49/26	67	100	5/3/3/2.5/3	87/88/89/86/81
VMC-xx05D1		$\pm 5.0$	20/15/10/7/5	230/98/78/51/27	$\pm 100$	$\pm 100$	6/4/3.5/3.5/3	84/85/85/82/77
VMC-xx09D1		$\pm 9.0$	30/15/10/7/5	230/95/76/49/26	$\pm 56$	$\pm 100$	5.5/3.5/2.5/2.5/3	86/86/87/85/81
VMC-xx12D1		$\pm 12.0$	20/15/10/7/5	228/94/76/48/26	$\pm 42$	$\pm 47$	5.5/3.5/2.5/2.5/3	87/87/87/87/82
VMC-xx15D1		$\pm 15.0$	20/15/10/7/5	228/94/75/48/26	$\pm 33$	$\pm 47$	5/3.5/2.5/2.5/2	87/87/88/87/81

\* Non-standard output voltages on request

xx ... input voltage (05, 12, 15, 24, 48)

05	5.0 Vdc $\pm 10\%$
12	12 Vdc $\pm 10\%$
15	15 Vdc $\pm 10\%$
24	24 Vdc $\pm 10\%$
48	48 Vdc $\pm 10\%$

Options:

Suffix H      3 kVdc isolation

### ELECTRICAL SPECIFICATIONS

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

#### Input Specifications

Voltage Range	±10%
Filter	Capacitors
Max. Input Current	See table
No-Load Input Current	See table
Input Reflected Ripple Current	5 Vin: 20 mApp 12 Vin: 20 mApp 15 Vin: 30 mApp 24 Vin: 40 mApp 48 Vin: 50 mApp
Input Surge Voltage (100ms)	5 Vin: 9 Vdc, max. 12 Vin: 18 Vdc, max. 15 Vin: 20 Vdc, max. 24 Vin: 30 Vdc, max. 48 Vin: 54 Vdc, max.

#### Output Specifications

Voltage Accuracy	±3%, max.
Ripple and Noise (20 MHz BW)	50 mVp-p, max.
Short Circuit Protection	Momentary Option "P" Continuous (on request)
Line Voltage Regulation	±1.2% / 1.0% of Vin Change
Load Voltage Regulation	See Table
Temperature Coefficient	±0.02%/°C
Max. Capacitor Load	See Table

#### Isolation Specification

I/O Isolation Voltage (3 sec)	1000 VDC, Standard 3000 VDC, Suffix H
I/O Resistance	10 <sup>9</sup> Ω
I/O Capacitance	60 pF, typ.

#### Environmental Specification

Operating Temperature	-40°C to +85°C
Max. Case Temperature	+100°C
Storage Temperature	-40°C to +125°C
Humidity	95% rel H
Cooling	Free-air convection
Soldering Temperature	260°C max.
(1.5mm from case 10 sec. max.)	

#### General Specifications

Efficiency	See Table
Switching Frequency	70 kHz, var.
Reliability Calculated MTBF	>2 Mhrs (MIL-HDBK-217 F)
Safety Standard	IEC 60950-1 (designed to meet)

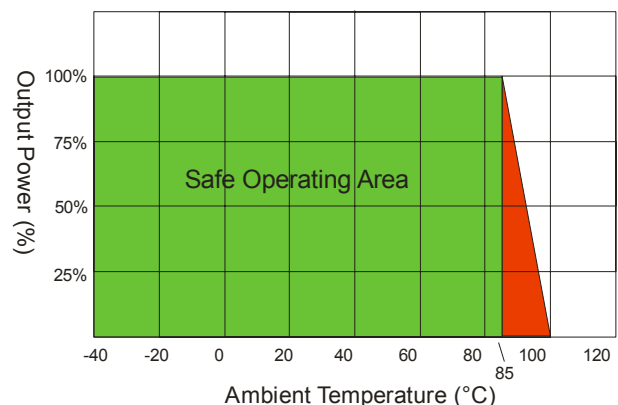
#### EMC Characteristics

Radiated Emissions	EN55022 Class B
Conducted Emissions	EN55022 Class B <sup>1)</sup>
EN61000-4-2 (ESD)	Perf. Criteria A
EN61000-4-3 (RS)	Perf. Criteria A
EN61000-4-4 (EFT)*	Perf. Criteria A
*An external Capacitor is required; Suggestion Nippon chemi-con KY series, 220µF/100V.	
EN61000-4-6 (CS)	Perf. Criteria A
EN61000-4-8 (PFMF)	Perf. Criteria A

#### Physical Characteristics

Dimension SIL7, Vin = 48V:	19.50 x 7.20 x 10.0 mm 0.76 x 0.28 x 0.39 inches
Dimension SIL7, others:	19.50 x 6.00 x 10.0 mm 0.76 x 0.24 x 0.39 inches
Weight	2.6 g
Case Material (UL94V-0 rated)	Non-conductive plastic
Pin Material	C5191R-H Solder-coated
Potting Material	Epoxy (UL94V-0 rated)

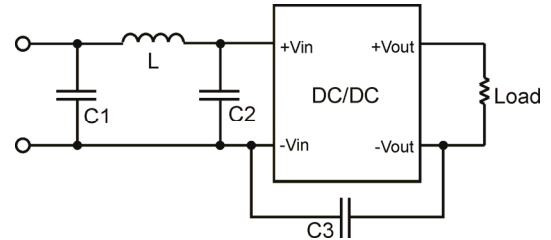
#### Derating VMC-Series (1W)



### 1) EMI Filter

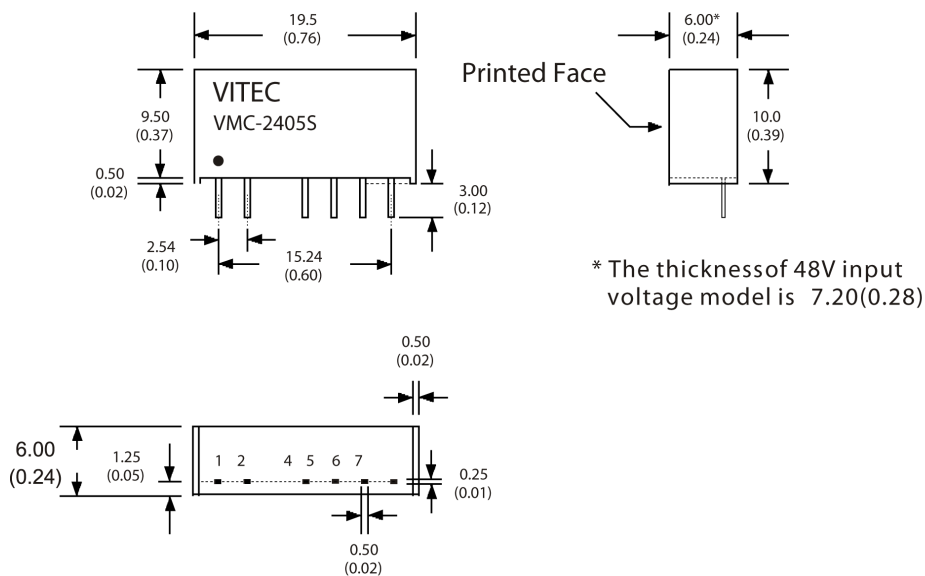
Input filter components are used to help meet conducted emissions requirement for the module. These components should be mounted as close as possible to the module, and all leads should be minimized to decrease radiated noise.

EMI Filter Components				
P/N	C1	L	C2	C3
VMC-05xxxx	1210, 2.2µF/100V	18µH	-	-
VMC-12xxxx	1210, 2.2µF/100V	18µH	-	-
VMC-15xxxx	1210, 2.2µF/100V	18µH	-	-
VMC-24xxxx	1210, 2.2µF/100V	18µH	1210, 2.2µF/100V	1210, 470pF/2kV
VMC-48xxxx	1210, 2.2µF/100V	18µH	1210, 2.2µF/100V	1210, 470pF/2kV



## PACKAGE AND PINNING

Pin Connections – SIL7 Package				
Pin	Single	Dual	Single -H	Dual -H
1	+V Input	+V Input	+V Input	+V Input
2	- V Input	- V Input	- V Input	- V Input
4	- V Output	- V Output	Omitted	Omitted
5	Omitted	Common	- V Output	- V Output
6	+V Output	+V Output	Omitted	Common
7	Omitted	Omitted	+V Output	+V Output



#### Notes:

All dimensions in millimeters (inches).

Tolerance  $\pm 0.25\text{mm}$  (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