

### FEATURES AND APPLICATIONS

- 7 Pin SIL or 14 Pin DIL Package
- Low Ripple and Noise
- 1000 up to 6000 VDC Isolation
- Cost Effective; RoHS ✓
- Mobile Applications
- Portable Equipments
- Telecommunication Instruments
- Mixed Analog / Digital Subsystems



### GENERAL DESCRIPTION

The VMA series is a family of cost effective 1 W single & dual output DC-DC converters with 1kVDC - 6kVDC isolation. These converters achieve low cost and miniature SIL or DIL size without compromising performance or field reliability.

Models operate from an input bus voltage of 3.3, 5, 12, 24 and 48 VDC offering output voltage levels of 3.3, 5, 7.2, 9, 12, 15, 18, 24, ±3.3, ±5, ±7.2, ±9, ±12, ±15, ±18 or ±24 VDC.

#### SIL 7 Package - Standard Types

Type Number	Input Voltage [VDC]	Output Voltage [VDC]	Output Current [mA]
VMA-xx3R3SS	3.3 5 12 24 48	3.3	300
VMA-xx05SS		5.0	200
VMA-xx7R2SS		7.2	138
VMA-xx09SS		9.0	111
VMA-xx12SS		12.0	84
VMA-xx15SS		15.0	64
VMA-xx18SS		18.0	54
VMA-xx24SS		24.0	41
VMA-xx3R3S	3.3 5 12 24 48	± 3.3	± 150
VMA-xx05S		± 5.0	± 100
VMA-xx7R2S		± 7.2	± 69
VMA-xx09S		± 9.0	± 55
VMA-xx12S		± 12.0	± 42
VMA-xx15S		± 15.0	± 32
VMA-xx18S		± 18.0	± 27
VMA-xx24S		± 24.0	± 20

#### DIL 14 Package - Standard Types

Type Number	Input Voltage [VDC]	Output Voltage [VDC]	Output Current [Am]
VMA-xx3R3DS	5 12 24 48	3.3	300
VMA-xx05DS		5.0	200
VMA-xx7R2DS		7.2	138
VMA-xx09DS		9.0	111
VMA-xx12DS		12.0	84
VMA-xx15DS		15.0	64
VMA-xx18DS		18.0	54
VMA-xx24DS		24.0	41
VMA-xx3R3D	5 12 24 48	± 3.3	± 150
VMA-xx05D		± 5.0	± 100
VMA-xx7R2D		± 7.2	± 69
VMA-xx09D		± 9.0	± 55
VMA-xx12D		± 12.0	± 42
VMA-xx15D		± 15.0	± 32
VMA-xx18D		± 18.0	± 27
VMA-xx24D		± 24.0	± 20

xx = input voltage (33, 05, 12, 24, 48)

33	3.3 Vdc ± 10%
05	5.0 Vdc ± 10%
12	12 Vdc ± 10%
24	24 Vdc ± 10%
48	48 Vdc ± 10%

Options :

Suffix HS	2kVDC isolation
Suffix H	3kVDC isolation
Suffix H4	4kVDC isolation
Suffix H6	6kVDC isolation
Suffix P	continuous short circuit protection

\* 3.3V input: DIL14 package or H-option on request

\*\* Non-standard output voltages on request

### ELECTRICAL SPECIFICATIONS

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

#### Input Specifications

Voltage Range	±10%
Filter	Capacitors

#### Output Specifications

Voltage Accuracy	±3%, max.
Voltage Balance (Dual Outp.)	±1%
Ripple and Noise (20 MHz BW)	75 mVp-p, max.
Short Circuit Protection	Momentary
	Option "P" Continuous (on request)
Line Voltage Regulation	±1.2% / 1.0% of Vin
Load Voltage Regulation	±10%, Load=20~100%
	±20% (3.3V output)
Temperature Coefficient	±0.02%/°C
Max. Capacitor Load	Single Output: 220 µF
	Dual Output: ±100 µF

#### Isolation Specification

I/O Isolation Voltage 1 Minute, Flash Tested for 1 Second	1000 VDC, Standard
	2000 VDC, Suffix HS
	3000 VDC, Suffix H
	4000 VDC, Suffix H4
	6000 VDC, Suffix H6
Leakage Current	1 x 10 <sup>-6</sup> A
Resistance	10 <sup>9</sup> Ω
Capacitance	60 pF, typ.

#### General Specifications

Efficiency	66% to 80%
Switching Frequency	80 kHz, var.
Reliability Calculated MTBF	>1.121 Mhrs (MIL-HDBK-217 F)
Safety Standard	IEC 60950-1 (designed to meet)

#### Environmental Specification

Operating Temperature	-40°C to +85°C
Max. Case Temperature	+100°C
Storage Temperature	-40°C to +125°C
Humidity	max. 95%, non-condensing
Cooling	Free-air convection

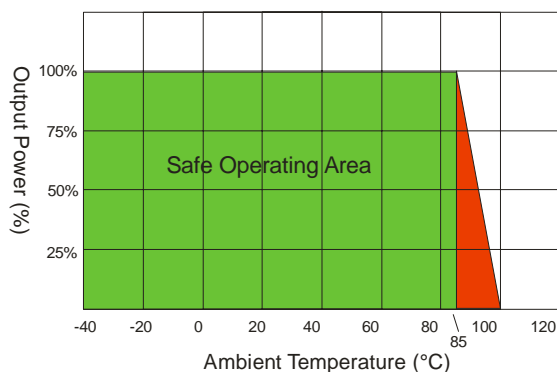
#### EMC Characteristics (For SIL7 Series)

Radiated Emissions	EN55022 Class B
	FCC 47 CFP Part 15 Subpart A Class B
EN61000-4-2 (ESD)	Perf. Criteria B
EN61000-4-3 (RS)	Perf. Criteria A

#### Physical Characteristics

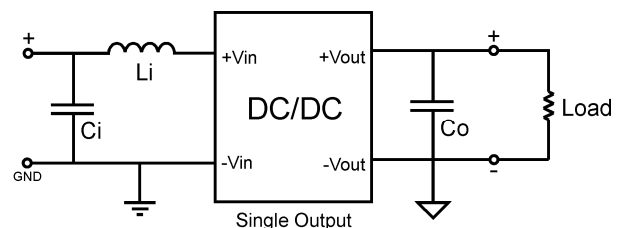
Dimension SIP	19.50 x 6.00 x 9.50 mm
	0.76 x 0.24 x 0.37 inches
Dimension DIP	20.32 x 10.16 x 6.85 mm
	0.80 x 0.40 x 0.27 inches
Weight	2,7 g
Case Material	Non-conductive plastic

#### Derating Curve



#### Additional Ripple & Noise Filter

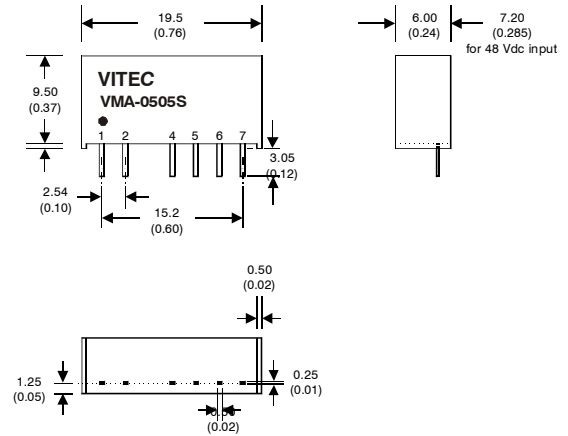
Single Output: To reduce converter's ripple & noise, it is recommended to add a 4.7 µF ~ 100 µF (±4.7µF ~ ±68µF for dual output) capacitor in output end. For EMI performance improvement, it is recommended to add a 12 µH inductor and a 10 µF ~ 100 µF capacitor at input side.



### PACKAGE AND PINNING

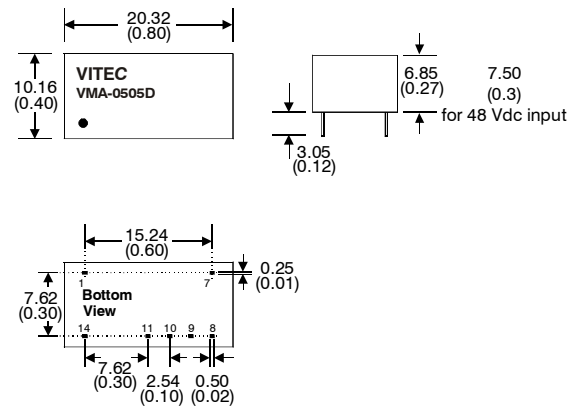
#### SIL 7 Package

Pin	1-2kVDC Isolation		3-6kVDC Isolation	
	Single Output	Dual Output	Single Output	Dual Output
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



#### DIL 14 Package

Pin	1-2kVDC Isolation		3-6kVDC Isolation	
	Single Output	Dual Output	Single Output	Dual Output
1	- V Input	- V Input	- V Input	- V Input
7	NC	NC	NC	NC
8	Omitted	Common	+V Output	+V Output
9	+V Output	+V Output	Omitted	Common
10	Omitted	Omitted	- V Output	- V Output
11	- V Output	- V Output	Omitted	Omitted
14	+V Input	+V Input	+V Input	+V Input



NC...not connected

**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