

VA-0.5W Series

0.5W Unregulated Single output



Features

- 4 Pin SIL / 8 Pin DIL Package
- 1000 VDC Isolation
- Up to 3000 VDC Isolation
- Low Ripple and Noise
- Efficiency up to 83%
- -40 ~ 85°C Operation Temperature Range
- Non-Conductive Black Plastic Case
- EMI Complies With EN55022 Class B



The VA series is a family of cost effective 0.5W single output DC-DC converters. These converters achieve low cost and ultra-miniature SIP 4 pin or DIP 8 pin size. Devices are encapsulated using flame retardant resin. The models operate from input voltage of 3.3, 5, 12, 15, 24, 48 Vdc with output voltage of 3.3, 5, 7.2, 9, 12, 15, 18, 24 Vdc. High performance features include 1000Vdc~3000Vdc input/output isolation, high efficiency operation and output voltage accuracy of $\pm 3\%$ maximum. Standard features include an input range of $\pm 10\%$ tolerance and low output noise and ripple.

All specifications typical at $T_a = 25^\circ\text{C}$, nominal input voltage and full load unless otherwise specified

OUTPUT SPECIFICATIONS	
Voltage accuracy	±3%
Line regulation	±1.2% / Per 1% Vin Change
Load regulation	(From 20% to 100% Load) ±10% (Output 3.3V Model) ±20%
Ripple & noise(20 MHz bandwidth)(1)	100mV pk-pk
Temperature coefficient	±0.02%/°C
Capacitor load(2)	See table
INPUT SPECIFICATIONS	
Voltage Range	±10%
Max. Input Current	See table
No-Load Input Current	See table
Input Filter	Capacitors
Input Reflected Ripple Current(3)	20mA pk-pk
GENERAL SPECIFICATIONS	
Efficiency	See table
I/O Isolation Voltage(3 sec)	1000~3000Vdc
Input/Output	
I/O Isolation Capacitance	60 pF Typ.
I/O Isolation Resistance	1000M Ohm
Switching Frequency	Variable 80kHz
Humidity	95% rel H
Reliability Calculated MTBF(MIL-HDBK-217 F)	>1.121Mhrs
Safety Standard : (designed to meet)	IEC 60950-1
ENVIRONMENT SPECIFICATIONS	
Operating Temperature	-40°C~85°C(See Derating Curve)
Maximum Case Temperature	100°C
Storage Temperature	-40°C~125°C
Cooling	Nature Convection

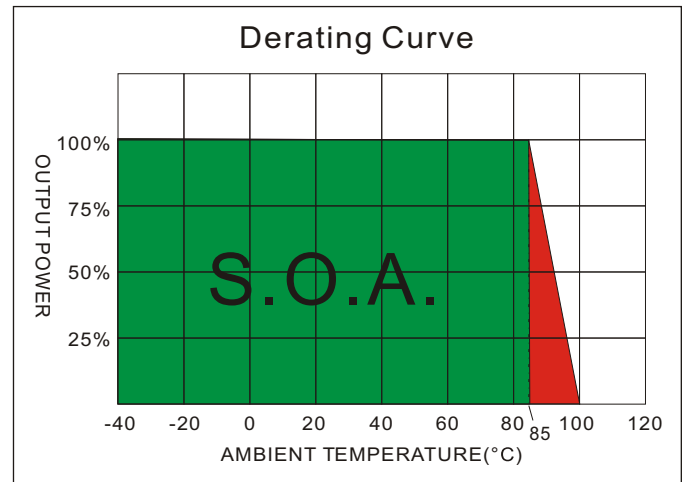
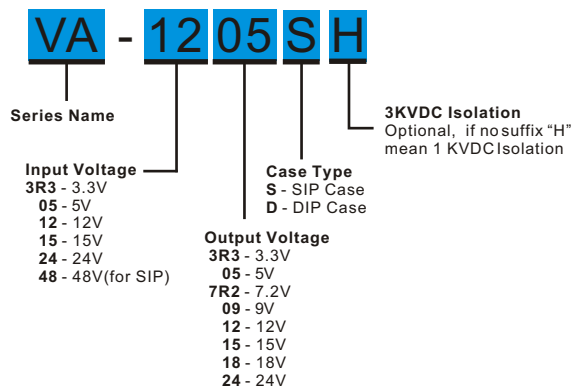
Case Material	Non-conductive Black Plastic(UL94V-0 rated)		
Pin Material			
SIP Case	0.5mm Alloy42 Solder-coated		
DIP Case	Ø0.5mm Brass Solder-coated		
Potting Material	Epoxy (UL94V-0 rated)		
Weight	(SIP/1.5g) (DIP/1.8g)		
Dimensions	SIP Case	0.46"x0.24"x0.40"	
	DIP Case	0.50"x0.40"x0.27"	

ABSOLUTE MAXIMUM RATINGS(4)	
These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.	
Input Voltage(100mS)	
3.3 Models	0~6 Vdc
5 Models	0~7 Vdc
12 Models	0~15 Vdc
15 Models	0~18 Vdc
24 Models	0~28 Vdc
48 Models(for SIP)	0~54 Vdc
Soldering Temperature (1.5mm from case 10sec. max.)	260°C ,max.

EMC SPECIFICATIONS	
Radiated Emissions	CLASS B
Conducted Emissions (6)	CLASS B
ESD	Perf. Criteria A
RS	Perf. Criteria A
EFT (7)	Perf. Criteria A
Surge (7)	Perf. Criteria A
CS	Perf. Criteria A
PFMF	Perf. Criteria A

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PART NUMBER STRUCTURE



MODEL SELECTION GUIDE

MODEL NUMBER	INPUT Voltage Range (Vdc)	INPUT Current		OUTPUT Voltage (Vdc)	OUTPUT Current		EFFICIENCY @FL(%)	Capacitor Load(uF)
		No-Load (mA)	Full Load (mA)		Full load (mA)			
VA-3R 33R3S	3.3	20	205	3.3	152	76	100	100
VA-3R 305S	3.3	25	216	5	100	70	100	100
VA-3R 37R2S	3.3	25	216	7.2	69	70	100	100
VA-3R 309S	3.3	25	216	9	56	70	100	100
VA-3R 312S	3.3	25	201	12	42	72	100	100
VA-3R 315S	3.3	25	208	15	33	73	100	100
VA-3R 318S	3.3	25	208	18	28	73	100	100
VA-3R 324S	3.3	25	208	24	21	73	100	100
VA-053R3 S	5	20	132	3.3	152	76	100	100
VA-0505 S	5	13	121	5	100	83	100	100
VA-057R2 S	5	15	134	7.2	69	75	100	100
VA-0509 S	5	15	128	9	56	78	100	100
VA-0512 S	5	18	127	12	42	79	100	100
VA-0515 S	5	22	130	15	33	77	100	100
VA-0518 S	5	20	127	18	28	79	100	100
VA-0524 S	5	25	134	24	21	75	100	100
VA-123R3 S	12	15	58	3.3	152	72	100	100
VA-1205 S	12	10	54	9	100	78	100	100
VA-127R2 S	12	15	57	7.2	69	73	100	100
VA-1209 S	12	15	57	9	56	73	100	100
VA-1212 S	12	20	58	12	42	72	100	100
VA-1215 S	12	20	61	15	33	69	100	100
VA-1218 S	12	15	61	18	28	68	100	100
VA-1224 S	12	15	59	24	21	71	100	100
VA-153R3 S	15	10	44	3.3	152	75	100	100
VA-1505 S	15	8	43	5	100	78	100	100
VA-157R2 S	15	12	44	7.2	69	75	100	100
VA-1509 S	15	12	44	9	56	75	100	100
VA-1512 S	15	10	44	12	42	77	100	100
VA-1515 S	15	15	48	15	33	70	100	100
VA-1518 S	15	12	51	18	28	66	100	100
VA-1524 S	15	10	51	24	21	66	100	100

Suffix "H" means 3 KVdcisolation

The models listed above is just for standard type. If you need the special specification product, please contact our service member by telephone presented in shortform cover or e-mail to : sales@motien.com.tw

VA - 0.5W Unregulated Single output

MODEL NUMBER	INPUT Voltage Range (Vdc)	INPUT Current		OUTPUT Voltage (Vdc)	OUTPUT Current Full load (mA)	EFFICIENCY @FL(%)	Capacitor Load(uF)
		No-Load (mA)	Full Load (mA)				
VA-243R3 S	24	8	31	3.3	152	69	100
VA-2405 S	24	8	29	5	100	73	100
VA-247R2 S	24	10	30	7.2	69	70	100
VA-2409 S	24	10	30	9	56	71	100
VA-2412 S	24	8	30	12	42	71	100
VA-2415 S	24	10	29	15	33	73	100
VA-2418 S	24	10	29	18	28	73	100
VA-2424 S	24	10	29	24	21	72	100
VA-483R3 S	48	6	17	3.3	152	60	100
VA-4805 S	48	6	16	5	100	66	100
VA-487R2 S	48	6	17	7.2	69	60	100
VA-4809 S	48	6	17	9	56	62	100
VA-4812 S	48	6	17	12	42	64	100
VA-4815 S	48	6	17	15	33	62	100
VA-4818 S	48	6	17	18	28	62	100
VA-4824 S	48	10	18	24	21	61	100
VA-3R33 R3D	3.3	20	205	3.3	152	76	100
VA-3R3 05D	3.3	25	216	5	100	70	100
VA-3R37 R2D	3.3	25	216	7.2	69	70	100
VA-3R3 09D	3.3	25	216	9	56	70	100
VA-3R3 12D	3.3	25	201	12	42	72	100
VA-3R3 15D	3.3	25	208	15	33	73	100
VA-3R3 18D	3.3	25	208	18	28	73	100
VA-3R3 24D	3.3	25	208	24	21	73	100
VA-053R3D	5	16	132	3.3	152	76	100
VA-0505D	5	15	124	5	100	81	100
VA-057R2D	5	15	134	7.2	69	75	100
VA-0509D	5	15	128	9	56	78	100
VA-0512D	5	18	127	12	42	79	100
VA-0515D	5	22	130	15	33	77	100
VA-0518D	5	20	127	18	28	79	100
VA-0524D	5	25	134	24	21	75	100
VA-123R3D	12	15	58	3.3	152	73	100
VA-1205D	12	12	54	5	100	78	100
VA-127R2D	12	15	57	7.2	69	73	100
VA-1209D	12	15	58	9	56	73	100
VA-1212D	12	20	58	12	42	72	100
VA-1215D	12	20	61	15	33	69	100
VA-1218D	12	15	61	18	28	68	100
VA-1224D	12	15	59	24	21	71	100
VA-153R3D	15	10	44	3.3	152	75	100
VA-1505D	15	8	43	5	100	78	100
VA-157R2D	15	12	44	7.2	69	75	100
VA-1509D	15	12	44	9	56	75	100
VA-1512D	15	10	44	12	42	77	100
VA-1515D	15	15	48	15	33	70	100
VA-1518D	15	12	51	18	28	66	100
VA-1524D	15	10	51	24	21	66	100

Suffix "H" means 3 KVdc isolation

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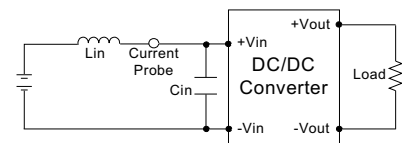
MODEL NUMBER	INPUT Voltage Range (Vdc)	INPUT Current		OUTPUT Voltage (Vdc)	OUTPUT Current Full load (mA)	EFFICIENCY @FL(%)	Capacitor Load(uF)
		No-Load (mA)	Full Load (mA)				
VA-243R3D	24	8	31	3.3	152	69	100
VA-2405D	24	10	29	5	100	74	100
VA-247R2D	24	10	31	7.2	69	69	100
VA-2409D	24	10	30	9	56	71	100
VA-2412D	24	10	31	12	42	69	100
VA-2415D	24	9	31	15	33	69	100
VA-2418D	24	10	29	18	28	73	100
VA-2424D	24	10	29	24	21	72	100

Suffix "H" means 3 KVdc isolation

TEST CONFIGURATIONS

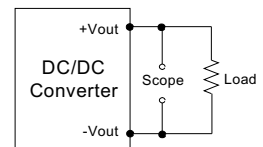
Input Reflected Ripple Current Test Step

Input reflected ripple current is measured through a source inductor L_{in} (12uH) and a source capacitor C_{in} (47uF, ESR<1.0Ω at 100KHz) at nominal input and full load.



Output Ripple & Noise Measurement Test

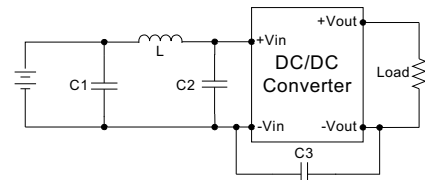
The Scope measurement bandwidth is 20MHz.



EMI Filter

Input filter components (C_1 , L , C_2 , C_3) are used to help meet conducted emissions requirement for the module.

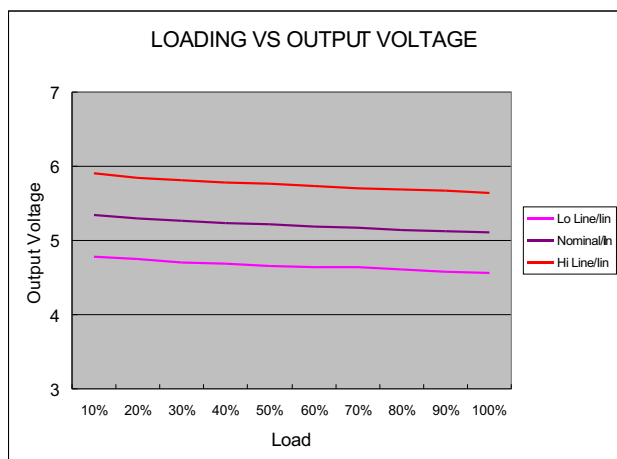
These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.



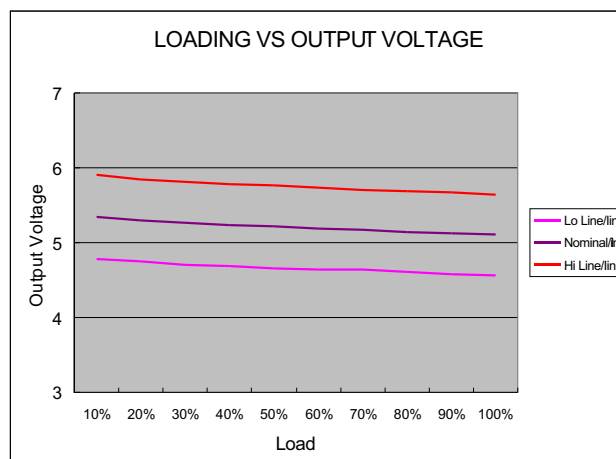
	C1	L	C2	C3
VA-3R3XXXXX	1210, 2.2uF/100V	18uH		
VA-05XXXXXX	1210, 2.2uF/100V	18uH		
VA-12XXXXXX	1210, 2.2uF/100V	18uH		
VA-15XXXXXX	1210, 2.2uF/100V	18uH		
VA-24XXXXXX	1210, 2.2uF/100V	18uH	1210, 2.2uF/100V	1206, 470pF/2KV
VA-48XXXXXX	Electrolytic capacitor, 10uF/100V	18uH	1210, 2.2uF/100V	1206, 470pF/2KV

NOTE

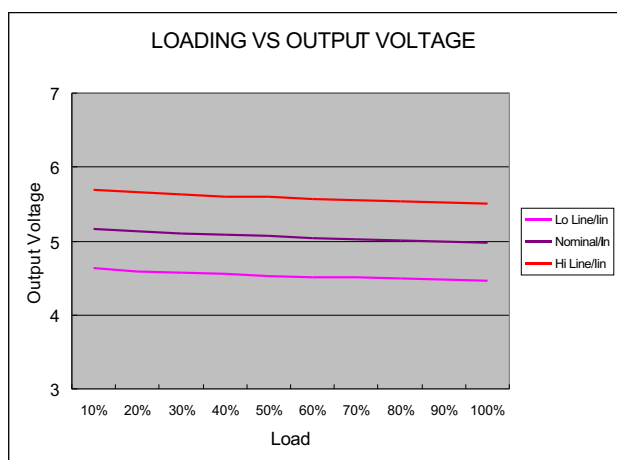
1. Ripple/Noise measured with 20MHz bandwidth.
2. Tested by minimal V_{in} and constant resistive load.
3. Measured Input reflected ripple current with a simulated source inductance of 12uH.
4. Exceeding the absolute ratings of the unit could cause damage. It is not allowed for continuous operating.
5. Operation under no-load conditions will not damage these devices, however they may not meet all listed specifications.
6. Input filter components are required to help meet conducted emission class B, which application refer to the EMI Filter of design & feature configuration.
7. An external filter capacitor is required if the module has to meet IEC61000-4-4 and IEC61000-4-5.
The filter capacitor Motien suggest: Nippon-chemi-con KY series, 470uF/100V.



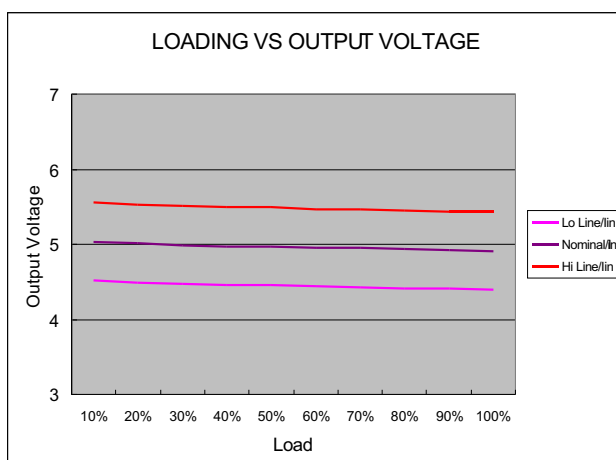
05 Models



12 Models

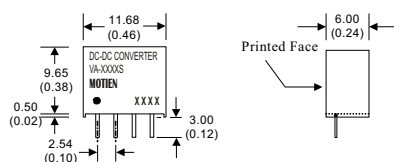


24 Models



48 Models

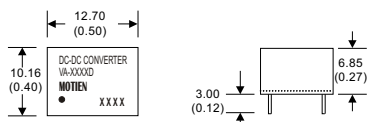
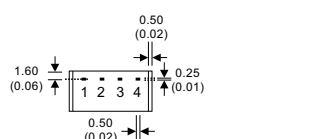
MECHANICAL SPECIFICATIONS



* The thickness of 48V input voltage model is 7.50(0.29)

4 Pin SIL Package

Notes : All dimensions are typical in millimeters (inches).
 1. Pin diameter: 0.5 ± 0.05 (0.02 ± 0.002)
 2. Pin pitch and length tolerance: ± 0.35 (± 0.014)
 3. Case Tolerance: ± 0.5 (± 0.02)



8 Pin DIL Package

Notes : All dimensions are typical in millimeters (inches).
 1. Pin diameter: 0.5 ± 0.05 (0.02 ± 0.002)
 2. Pin pitch and length tolerance: ± 0.35 (± 0.014)
 3. Case Tolerance: ± 0.5 (± 0.02)

PIN CONNECTIONS

PIN NUMBER	SINGLE
1	-V Input
2	+V Input
3	-V Output
4	+V Output

(The Pin Connection of high isolation one is the same with normal one.)

PIN CONNECTIONS

PIN NUMBER	SINGLE
1	-V Input
4	+V Input
5	+V Output
7	-V Output

(The Pin Connection of high isolation one is the same with normal one.)