VE-2W Series

2W Unregulated Single output

Features

- SIP4 Package
- 1000 VDC Isolation, Up to 3000 VDC Isolation
- Efficiency up to 88%
- Operation Temperature Range -40 ~ 90°C max.
- EMI Complies With EN55032 Class B



PART NUMBER STRUCTURE

VE - 12 05 S H

(1) (2) (3) (4) (5)

(1) Series

(2) Input Voltage Range

- **05 -** 4.5-5.5 V
- **12 -** 10.8-13.2 V
- **15 -** 13.5-16.5 V
- **24 -** 21.6-26.4 V

(3) Output Voltage

- **3R3 -** 3.3 V
- **05 -** 5.0 V
- **7R2 -** 7.2 V
- **09 -** 9.0 V
- **12 -** 12 V
- **15 -** 15 V
- **24 -** 24 V

(4) Case & Output Type

- **S -** SIP Case, Single Output

(5) Isolation Voltage (Optional)

- **Blank -** 1 KVDC
- **H -** 3 KVDC

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ALL SPECIFICATIONS ARE TYPICAL AT 25°C, NOMINAL INPUT AND FULL LOAD UNLESS OTHERWISE NOTED

Model Number	Input Voltage Range (VDC)	Input Current		Output Voltage (VDC)	Output Current Full Load (mA)	Efficiency @FL (%, typ.)	Capacitive Load @ FL (μF, max.)
		No-Load (mA, max.)	Full Load (mA, typ.)				
VE-053R3S	4.5-5.5	32	343	3.3	400	77	470
VE-0505S	4.5-5.5	30	494	5	400	81	470
VE-057R2S	4.5-5.5	40	488	7.2	278	82	470
VE-0509S	4.5-5.5	30	482	9	222	83	470
VE-0512S	4.5-5.5	38	477	12	167	84	470
VE-0515S	4.5-5.5	35	466	15	133	86	470
VE-0524S	4.5-5.5	35	466	24	83	86	470
VE-123R3S	10.8-13.2	20	147	3.3	400	75	470
VE-1205S	10.8-13.2	23	206	5	400	81	470
VE-127R2S	10.8-13.2	20	199	7.2	278	84	470
VE-1209S	10.8-13.2	23	199	9	222	84	470
VE-1212S	10.8-13.2	20	197	12	167	85	470
VE-1215S	10.8-13.2	30	199	15	133	84	470
VE-1224S	10.8-13.2	40	201	24	83	83	470
VE-153R3S	13.5-16.5	25	115	3.3	400	77	470
VE-1505S	13.5-16.5	20	167	5	400	80	470
VE-157R2S	13.5-16.5	20	161	7.2	278	83	470
VE-1509S	13.5-16.5	20	159	9	222	84	470
VE-1512S	13.5-16.5	20	157	12	167	85	470
VE-1515S	13.5-16.5	15	154	15	133	87	470
VE-1524S	13.5-16.5	20	157	24	83	85	470
VE-243R3S	21.6-26.4	7	71	3.3	400	78	470
VE-2405S	21.6-26.4	15	102	5	400	82	470
VE-247R2S	21.6-26.4	12	101	7.2	278	83	470
VE-2409S	21.6-26.4	10	97	9	222	86	470
VE-2412S	21.6-26.4	12	95	12	167	88	470
VE-2415S	21.6-26.4	8	97	15	133	86	470
VE-2424S	21.6-26.4	10	95	24	83	88	470

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INPUT SPECIFICATIONS					
Parameter	**Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Input Voltage Range	5 V Input	4.5	5	5.5	VDC
	12 V Input	10.8	12	13.2	
	15 V Input	13.5	15	16.5	
	24 V Input	21.6	24	26.4	
Input Filter		Capacitor			
Input Reflected Ripple Current (1)			20		mApk-pk
Start up Time	Nominal Vin and constant resistive load		20		ms
Recommended input fuse (slow blow)	5 V Input	0.63			A
	12 V & 15 V Input	0.25			
	24 V Input	0.16			
Note： 1. Measured with a simulated source inductance of 12μH and a source capacitor Cin (47μF, ESR<1.0Ω at 100kHz).					

OUTPUT SPECIFICATIONS						
Parameter	**Conditions**		**Min.**	**Typ.**	**Max.**	**Unit**
Output Voltage Accuracy			-3		+3	%
Line Regulation	For 1% Vin Change		-1.2		+1.2	%
Load Regulation	From 20% to 100% Load	VE-053R3S VE-0505S VE-057R2S VE-0509S			12	%
		Other Output			8	
Ripple & Noise	20MHz bandwidth				150	mVpk-pk
Short Circuit Protection			Short Term (1sec)			
Temperature Coefficient			-0.02		+0.02	%/°C
Maximum Capacitive Load	Minimum Vin and constant resistive load		See Table			

ABSOLUTE MAXIMUM RATINGS					
Parameter	**Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Input Surge Voltage (100 ms)	5 V Input			7	VDC
	12 V Input			15	
	15 V Input			18	
	24 V Input			28	
Soldering Temperature	1.5mm from case 10sec max.			260	°C
Note：These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.					

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GENERAL SPECIFICATIONS						
Parameter	**Conditions**		**Min.**	**Typ.**	**Max.**	**Unit**
Isolation Voltage	Input-output, and rated for 60sec	Standard Type	1000			VDC
		Suffix “H”	3000			
Isolation Resistance	Input-output		1000			MΩ
Isolation Capacitance	Input-output			60		pF
Switching Frequency				70		kHz
MTBF	MIL-HDBK-217 F @ 25°C		1121			k hours
Safety Standard	IEC / EN / UL 62368-1		Designed to meet			
Environmental compliance			RoHS			

ENVIRONMENT SPECIFICATIONS					
Parameter	**Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Operating Ambient Temperature	See the Derating Curve	-40		90	°C
Maximum Case Temperature				100	°C
Thermal Impedance		60			°C/W
Storage Humidity				95	% rel. H
Storage Temperature		-55		125	°C
Cooling	Natural Convection	30-65 LFM			

EMC SPECIFICATIONS			
Parameter	**Standard**	**Condition**	Criterion
Conducted Emissions	EN55032	with external components	B
Radiated Emissions	EN55032		B
ESD	IEC 61000-4-2	Air: ±8kV / Indirect: ±6kV	A
RS	IEC 61000-4-3	10V/m	A
EFT	IEC 61000-4-4	±2.0kV with external components	A
Surge	IEC 61000-4-5	±0.5kV with external components	A
CS	IEC 61000-4-6	10Vrms	A
PFMF	IEC 61000-4-8	1A/m	A

PHYSICAL SPECIFICATIONS	
Parameter	**Value**
Case Material	Nonconductive Black Plastic (UL94V-0 rated)
Pin Material	Alloy 42
Potting Material	Epoxy (UL94V-0 rated)
Weight	1.9 g, typ.
Dimensions	0.46" x 0.29" x 0.40"

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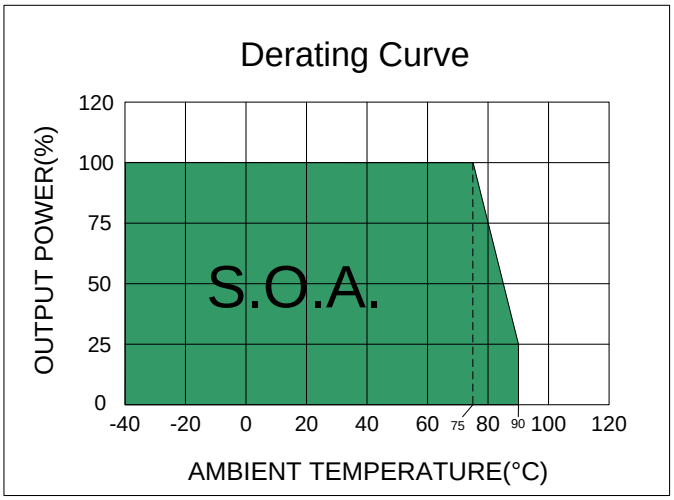
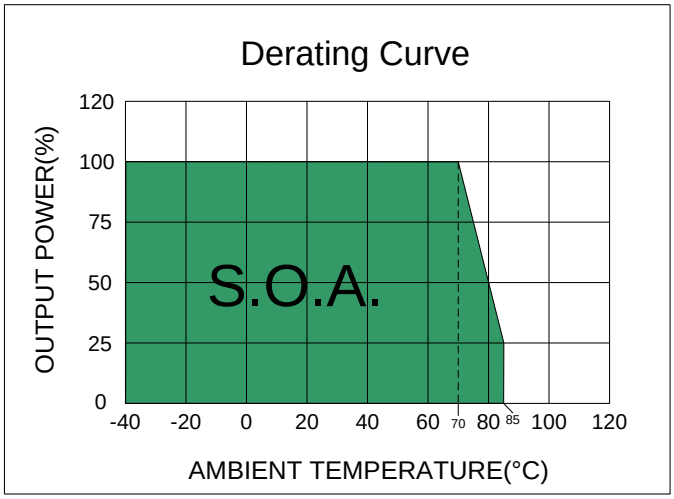
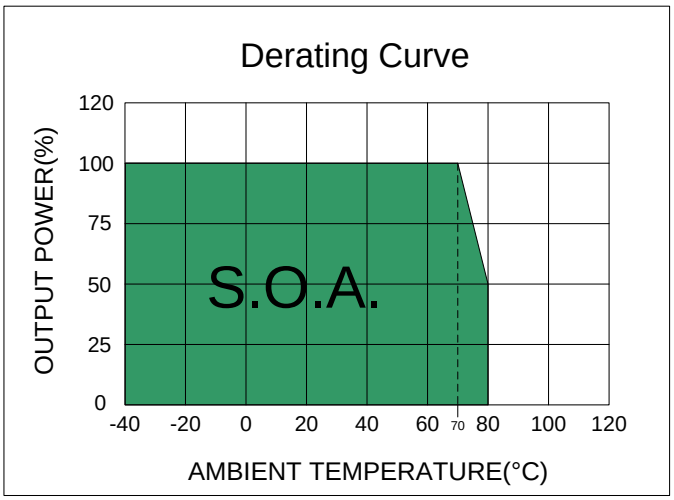
ELECTRICAL CHARACTERISTIC CURVES



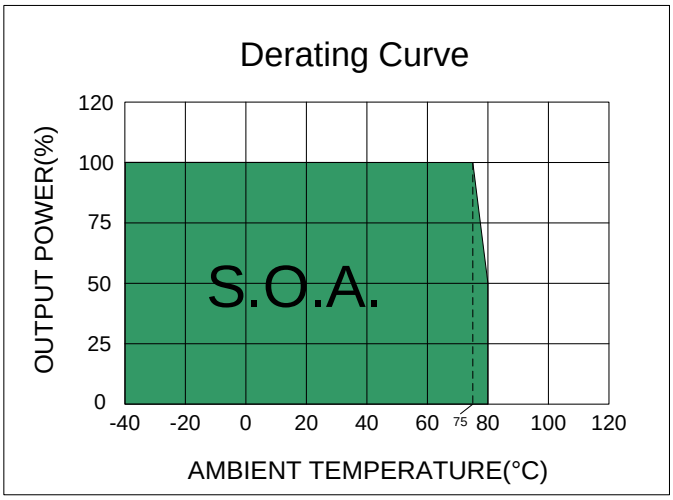
3.3V Output Models



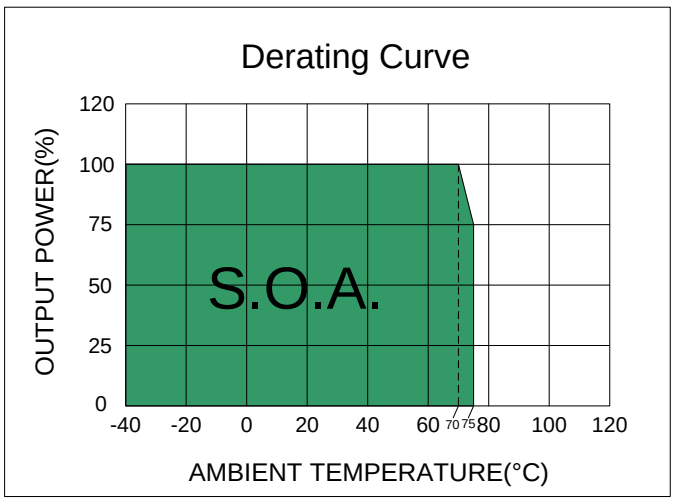
5V, 7.2V Output Models



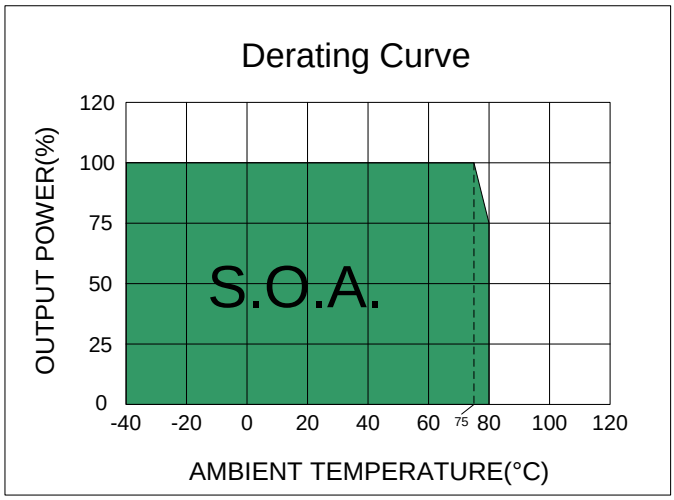
9V, 12V Output & 83~85% Models



9V, 12V Output & 86~88% Models



15V, 24V Output & 83~85% Models



15V, 24V Output & 86~88% Models

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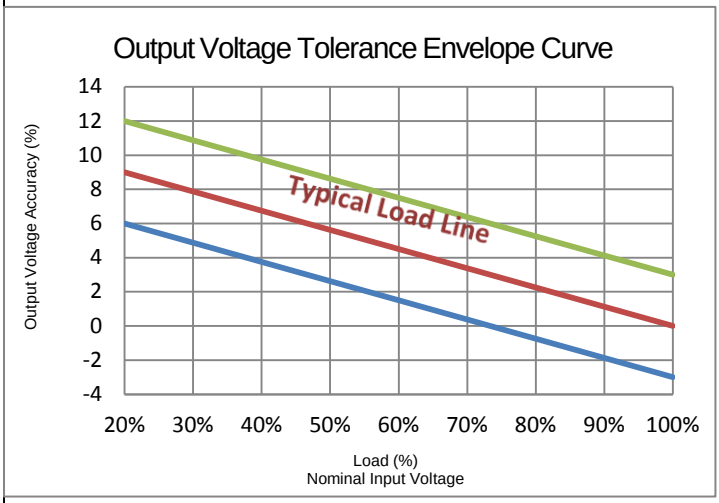
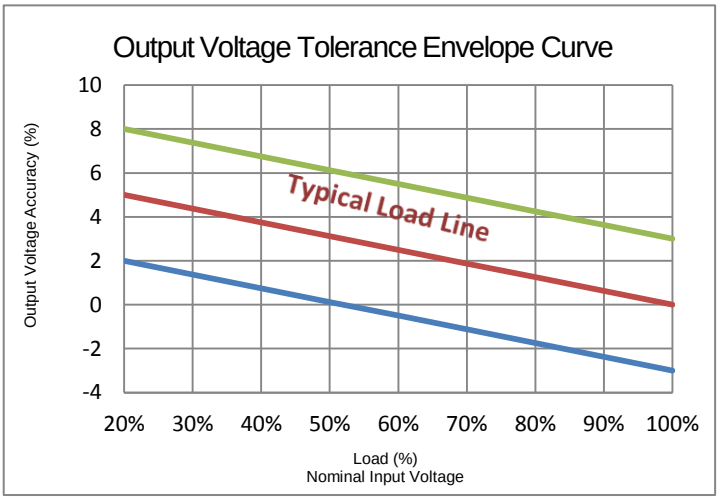
ELECTRICAL CHARACTERISTIC CURVES



VE-053R3S, 0505S, 057R2S, 0509S

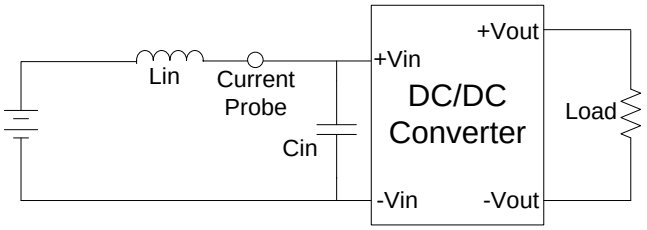


Others Models

TEST CONFIGURATIONS

Input Reflected Ripple Current Test Step

Input reflected ripple current is measured with a source inductor Lin (12μH) and a source capacitor Cin (47μF, ESR<1.0Ω at 100kHz) at nominal input and full load.



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DESIGN & FEATURE CONFIGURATIONS

Isolation Voltage

This series is designed to meet the functional insulation of UL, both input and output should be maintained within SELV limits (less than 42.4V peak, or 60VDC).

The isolation test voltage represents a measure of immunity to transient voltages and the part should never be used as an element of a safety isolation system. The part could be expected to function correctly with hundreds of volts offset applied continuously across the isolation barrier; but then the circuitry on both sides of the barrier must be regarded as operating at an unsafe voltage and further isolation/insulation systems must form a barrier between these circuits and any user-accessible circuitry according to safety standard requirements.

Repeated High-Voltage Isolation Testing

Repeated high-voltage isolation testing of a barrier component can actually degrade isolation capability, to a lesser or greater degree depending on materials, construction and environment.

This series has isolation transformers without additional insulation between primary and secondary windings of enameled wire.

While parts can be expected to withstand several times the stated test voltage, the isolation capability does depend on the wire insulation.

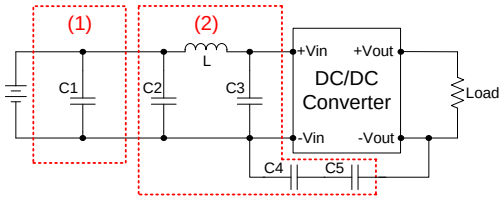
Any material including the enamel (typically polyurethane) is susceptible to eventual chemical degradation when subject to very high applied voltage, thus implying that the number of tests should be strictly limited.

We strongly advise against repeated high voltage isolation testing, but if it is absolutely required, the isolation test voltage should be reduced by 20% from specified test voltage.

DESIGN & FEATURE CONFIGURATIONS

EMC Filter

The part (1) Circuit is used to meet Surge & EFT test, and the part (2) Circuit is used to meet EMI test.



	C1	C2	L	C3	C4	C5
VE-05XXX	NIPPON Chemi-con KY series 470µF, 100V	MLCC 2.2µF, 100V	18µH			
VE-12XXX						
VE-15XXX						
VE-24XXX				MLCC 2.2µF, 100V	MLCC 470pF, 2kV	
VE-24XXXH					MLCC 820pF, 2kV	MLCC 820pF, 2kV

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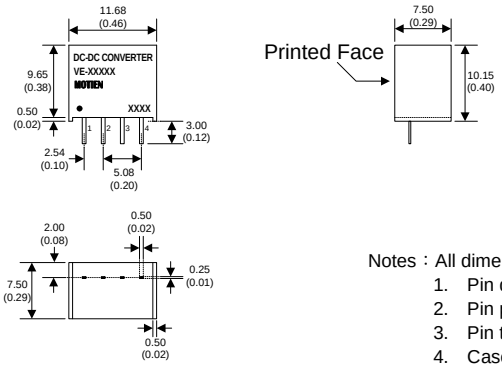
MECHANICAL SPECIFICATIONS

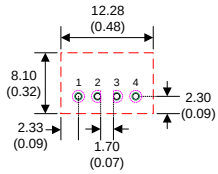


Notes：All dimensions are typical in millimeters (inches).

1. Pin dimension tolerance: ±0.05 (±0.002)
2. Pin pitch and length tolerance: ±0.35 (±0.014)
3. Pin to case tolerance: ±0.5 (±0.02)
4. Case Tolerance: ±0.5 (±0.02)

PIN CONNECTIONS	
PIN NUMBER	SINGLE
1	-Vin
2	+Vin
3	-Vout
4	+Vout

RECOMMENDED FOOTPRINT DETAILS



Notes：1. All dimensions are typical in millimeters (inches).
Through hole (black) 1~4:Ø0.80 (0.031)
Top view pad (green) 1~4:Ø1.00 (0.039)
Bottom view pad (pink) 1~4:Ø1.60 (0.063)

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