

VD-4W Series



4W 2:1 Regulated Single & Dual output

Features

- Wide 2:1 Input Range
- 1500VDC Isolation, Up to 3500VDC
- Continuous Short Circuit Protection
- Efficiency up to 87%
- Operating Temperature Range -40 ~ 95°C max.



PART NUMBER STRUCTURE

VD - **24** **05** **S** **4** **H**
(1) (2) (3) (4) (5) (6)

(1) Series

(2) Input Voltage Range

12 - 9-18 V
24 - 18-36 V
48 - 36-72 V

(4) Output Type

S - Single Output
D - Dual Output

(5) Watt

(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
18 - 18 V
24 - 24 V

(6) Isolation Voltage

Blank - 1500 VDC
H - 3500 VDC

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		Efficiency @FL (% , typ.)	Capacitive Load @FL (μF, max.)
		No-Load (mA, max.)	Full Load (mA, typ.)		Min. load (mA)	Full load (mA)		
VD-123R3S4	9-18	15	440	3.3	0	1200	75	680
VD-1205S4	9-18	18	417	5	0	800	80	1000
VD-127R2S4	9-18	15	402	7.2	0	555	83	680
VD-1209S4	9-18	20	407	9	0	444	82	470
VD-1212S4	9-18	20	397	12	0	333	84	100
VD-1215S4	9-18	20	393	15	0	266	85	100
VD-1218S4	9-18	20	417	18	0	222	80	47
VD-1224S4	9-18	20	402	24	0	166	83	22
VD-123R3D4	9-18	20	428	±3.3	0	±600	78	±680
VD-1205D4	9-18	18	417	±5	0	±400	80	±470
VD-127R2D4	9-18	20	407	±7.2	0	±277	82	±330
VD-1209D4	9-18	18	402	±9	0	±220	83	±220
VD-1212D4	9-18	25	412	±12	0	±166	81	±47
VD-1215D4	9-18	22	412	±15	0	±133	81	±150
VD-1218D4	9-18	30	407	±18	0	±111	82	±47
VD-1224D4	9-18	30	407	±24	0	±83	82	±10
VD-243R3S4	18-36	12	214	3.3	0	1200	78	1000
VD-2405S4	18-36	20	204	5	0	800	82	1000
VD-247R2S4	18-36	12	204	7.2	0	555	82	330
VD-2409S4	18-36	10	199	9	0	444	84	470
VD-2412S4	18-36	20	197	12	0	333	85	330
VD-2415S4	18-36	12	197	15	0	266	85	330
VD-2418S4	18-36	20	194	18	0	222	86	47
VD-2424S4	18-36	18	194	24	0	166	86	1000

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Model Number	Input Voltage Range (VDC)	Input Current		Output Voltage (VDC)	Output Current		Efficiency @FL (% , typ.)	Capacitive Load @FL (μF , max.)
		No-Load (mA, max.)	Full Load (mA, typ.)		Min. load (mA)	Full load (mA)		
VD-243R3D4	18-36	15	211	±3.3	0	±600	79	±1000
VD-2405D4	18-36	15	206	±5	0	±400	81	±330
VD-247R2D4	18-36	15	199	±7.2	0	±277	84	±100
VD-2409D4	18-36	15	197	±9	0	±220	85	±220
VD-2412D4	18-36	20	197	±12	0	±166	85	±68
VD-2415D4	18-36	12	201	±15	0	±133	83	±220
VD-2418D4	18-36	22	201	±18	0	±111	83	±10
VD-2424D4	18-36	25	204	±24	0	±83	82	±47
VD-483R3S4	36-72	8	106	3.3	0	1200	78	1000
VD-4805S4	36-72	8	103	5	0	800	81	1000
VD-487R2S4	36-72	15	102	7.2	0	555	82	470
VD-4809S4	36-72	15	99	9	0	444	85	470
VD-4812S4	36-72	12	99	12	0	333	85	330
VD-4815S4	36-72	15	101	15	0	266	83	68
VD-4818S4	36-72	10	99	18	0	222	85	100
VD-4824S4	36-72	15	96	24	0	166	87	68
VD-483R3D4	36-72	12	106	±3.3	0	±600	79	±1000
VD-4805D4	36-72	12	103	±5	0	±400	81	±470
VD-487R2D4	36-72	15	107	±7.2	0	±277	78	±220
VD-4809D4	36-72	15	99	±9	0	±220	85	±220
VD-4812D4	36-72	12	97	±12	0	±166	86	±220
VD-4815D4	36-72	10	101	±15	0	±133	83	±47
VD-4818D4	36-72	15	105	±24	0	±111	80	±22
VD-4824D4	36-72	15	101	±24	0	±83	83	±100

INPUT SPECIFICATIONS					
Parameter	Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	12V Input	9	12	18	VDC
	24V Input	18	24	36	
	48V Input	36	48	72	
Input Filter		Pi Type			
Input Reflected Ripple Current (1)			35		mApk-pk
Start up Time	Nominal Vin and constant resistive load		500		ms
Recommended input fuse (slow blow)	12V Input	0.8			A
	24V Input	0.4			
	48V Input	0.2			
Note :					
1. Measured with a simulated source inductance of 12uH and a source capacitor Cin (47uF, ESR<1.0Ω at 100kHz).					

OUTPUT SPECIFICATIONS						
Parameter	Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	3.3V Output		-2.0		+2.0	%
	Other Output		-1.0		+1.0	
Line Regulation			-0.5		+0.5	%
Load Regulation	From 0% to 100% Load	3.3V Output	-1.5		+1.5	%
		Other Output	-0.5		+0.5	
Cross Regulation	Asymmetrical Load 25% / 100% for Dual Output		-5		+5	%
Ripple & Noise (1)	20MHz bandwidth	24V Output			150	mVpk-pk
		Other Output			60	
Short Circuit Protection			Indefinite (Automatic Recovery)			
Temperature Coefficient			-0.02		+0.02	%/°C
Maximum Capacitive Load	Nominal Vin and constant resistive load		See Table			
Note :						
1. Measured with a 1.0μF MLCC.						

ABSOLUTE MAXIMUM RATINGS					
Parameter	Conditions	Min.	Typ.	Max.	Unit
Input Surge Voltage (100 ms)	12V Input			24	VDC
	24V Input			40	
	48V Input			80	
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.					

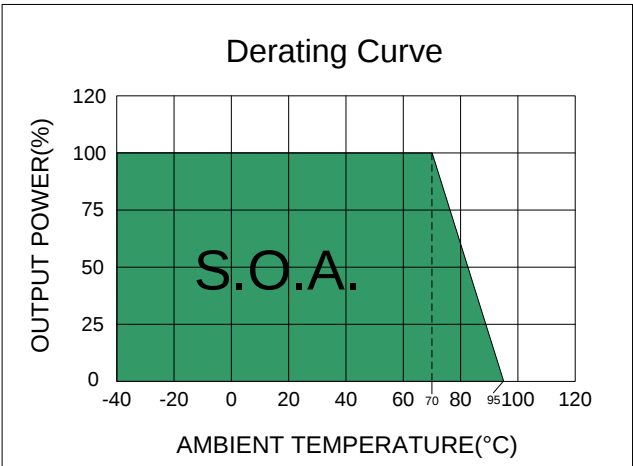
GENERAL SPECIFICATIONS						
Parameter	Conditions		Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output, and rated for 60sec	Standard Type	1500			VDC
		Suffix “H”	3500			
	Case-I/O, and rated for 60sec		1000			
Isolation Resistance	Input-output		1000			MΩ
Isolation Capacitance	Input-output			500		pF
Switching Frequency				266		kHz
MTBF	MIL-HDBK-217 F @ 25°C		1121			k hours
Safety Approval	IEC / EN / UL 62368-1		DK-64825-UL, E252573			
Environmental compliance			RoHS			

ENVIRONMENT SPECIFICATIONS					
Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating Ambient Temperature	See the Derating Curve	-40		95	°C
Maximum Case Temperature				100	°C
Thermal Impedance		25			°C/W
Storage Humidity				95	% rel. H
Storage Temperature		-55		125	°C
Cooling	Natural Convection	30-65 LFM			

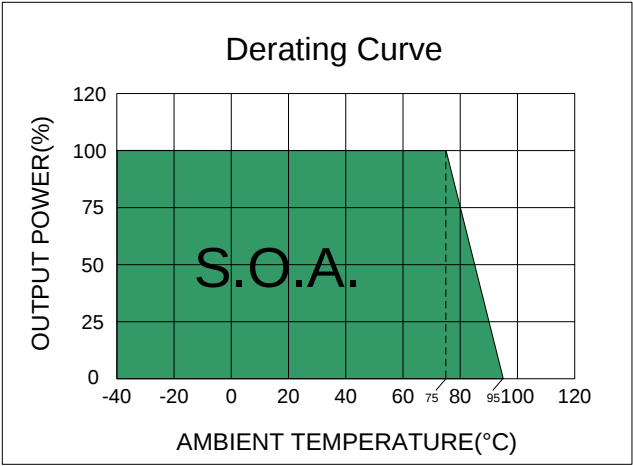
EMC SPECIFICATIONS			
Parameter	Standard	Condition	Criterion
Conducted Emissions	EN55032	with external components	A
Radiated Emissions	EN55032		A
ESD	IEC 61000-4-2	Air: ±8kV / Contact: ±6kV	A
RS	IEC 61000-4-3	10V/m	A
EFT	IEC 61000-4-4	±2kV with external components	A
Surge	IEC 61000-4-5	±1kV with external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

PHYSICAL SPECIFICATIONS	
Parameter	Value
Case Material	Aluminum
Pin Material	Ø0.5mm Brass Solder-coated
Potting Material	Epoxy (UL94V-0 rated)
Weight	13.0 g, typ.
Dimensions	1.25" x 0.8" x 0.4"

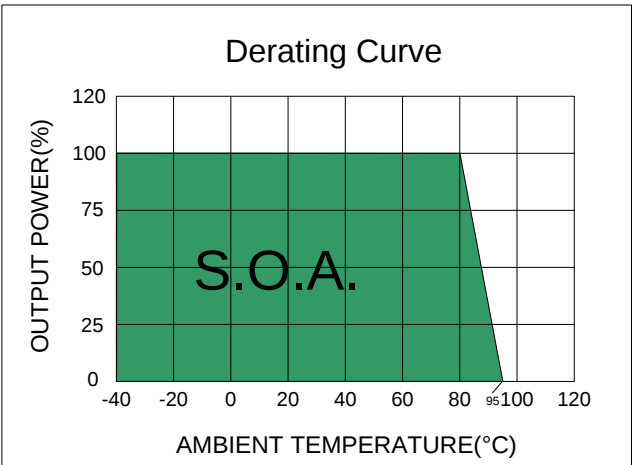
ELECTRICAL CHARACTERISTIC CURVES



Efficiency 75% ~ 80% Models



Efficiency 81% ~ 83% Models

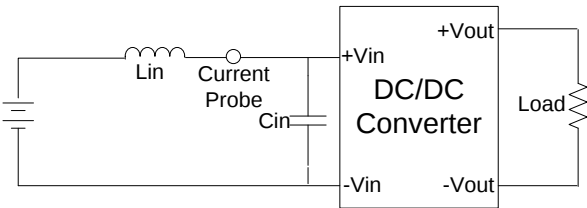


Efficiency 84% ~ 87% Models

TEST CONFIGURATIONS

Input Reflected Ripple Current Test Step

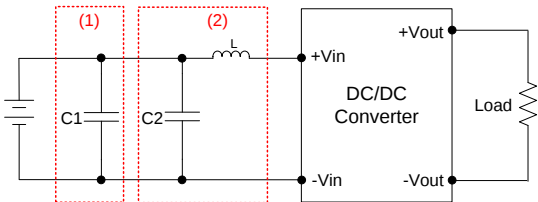
Input reflected ripple current is measured with a source inductor L_{in} (12 μ H) and a source capacitor C_{in} (47 μ F, ESR<1.0 Ω at 100kHz) at nominal input and full load.



DESIGN & FEATURE CONFIGURATIONS

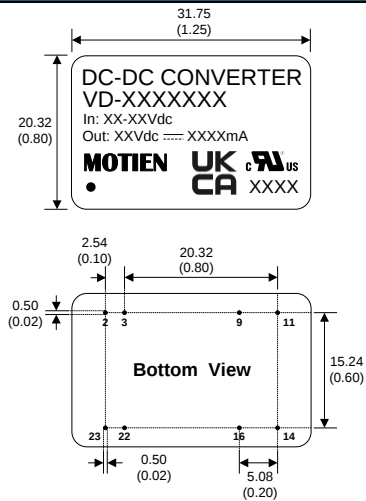
EMC Filter

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
VD-12XXX4	NIPPON Chemi-con KY series 220μF, 100V	NIPPON Chemi-con KY series 100μF, 100V	12μH
VD-24XXX4			
VD-48XXX4			

MECHANICAL SPECIFICATIONS

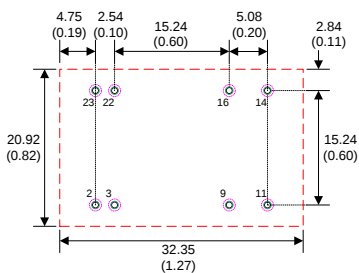


- Notes : All dimensions are typical in millimeters (inches).
1. Pin diameter: 0.5±0.05 (0.02±0.002)
 2. Pin pitch and length tolerance: ±0.35 (±0.014)
 3. Case Tolerance: ±0.5 (±0.02)
 4. Stand-off tolerance: ±0.1 (±0.004)

PIN CONNECTIONS		
PIN NUMBER	SINGLE	DUAL
2	-Vin	-Vin
3	-Vin	-Vin
9	N.P.	COM
11	N.C.	-Vout
14	+Vout	+Vout
16	-Vout	COM
22	+Vin	+Vin
23	+Vin	+Vin

*N.P. : No PIN
*N.C. : No Connection

RECOMMENDED FOOTPRINT DETAILS



- Notes : 1. All dimensions are typical in millimeters (inches).
- Through hole (black) 2 ~ 23: Ø0.80 (0.031)
- Top view pad (green) 2 ~ 23: Ø1.00 (0.039)
- Bottom view pad (pink) 2 ~ 23: Ø1.60 (0.063)