

VD-10W Series



10W 2:1 Regulated Single & Dual output

Features

- Wide 2:1 Input Range
- Full SMD Technology
- 1500VDC Isolation
- Efficiency up to 89%
- Operating Temperature Range -40 ~ 100°C max.
- Continuous Short Circuit Protection
- Over Voltage Protection
- Low no load Input Current
- Soft Start
- DIP24 Package



PART NUMBER STRUCTURE

VD - **24** **12** **S** **10**
(1) (2) (3) (4) (5)

(1) Series

(2) Input Voltage Range

12 - 9-18 V
24 - 18-36 V
48 - 36-75 V

(4) Output Type

S - Single Output
D - Dual Output

(5) Watt

(3) Output Voltage

2R5 - 2.5 V
3R3 - 3.3 V
05 - 5.0 V
12 - 12 V
15 - 15 V

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-122R5S10	9-18	10	772	2.5	0	3000	81	2200
VD-123R3S10	9-18	15	994	3.3	0	3000	83	2200
VD-1205S10	9-18	10	980	5	0	2000	85	2200
VD-1212S10	9-18	15	958	12	0	833	87	820
VD-1215S10	9-18	15	958	15	0	667	87	470
VD-1212D10	9-18	15	958	±12	0	±416	87	±220
VD-1215D10	9-18	15	958	±15	0	±333	87	±150
VD-242R5S10	18-36	15	377	2.5	0	3000	83	2200
VD-243R3S10	18-36	15	485	3.3	0	3000	85	2200
VD-2405S10	18-36	15	473	5	0	2000	88	2200
VD-2412S10	18-36	15	479	12	0	833	87	820
VD-2415S10	18-36	15	468	15	0	667	89	470
VD-2412D10	18-36	10	479	±12	0	±416	87	±220
VD-2415D10	18-36	10	473	±15	0	±333	88	±150
VD-482R5S10	36-75	15	193	2.5	0	3000	81	2200
VD-483R3S10	36-75	15	246	3.3	0	3000	84	2200
VD-4805S10	36-75	10	239	5	0	2000	87	2200
VD-4812S10	36-75	15	242	12	0	833	86	820
VD-4815S10	36-75	15	239	15	0	667	87	470
VD-4812D10	36-75	15	245	±12	0	±416	85	±220
VD-4815D10	36-75	15	245	±15	0	±333	85	±150

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)			20		mApk-pk
Start up Time	Nominal Vin and constant resistive load		20		ms
Recommended input fuse (slow blow)	12V Input	2			A
	24V Input	1			
	48V Input	0.5			
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			-1.0		+1.0	%
Line Regulation			-0.5		+0.5	%
Load Regulation	From 0% to 100% Load	Single Output	-0.5		+0.5	%
		Dual Output	-1.0		+1.0	
		2.5 V & 3.3 V Output	-1.0		+1.0	
Cross Regulation	Asymmetrical Load 25% / 100% for Dual Output		-5		+5	%
Ripple & Noise (1)	20MHz bandwidth				75	mVpk-pk
Over Voltage Protection (Zener diode clamp)	2.5V&3.3V Output			3.9		VDC
	5V Output			6.2		
	12V Output			15		
	15V Output			18		
Over Current Protection				150		% of FL
Short Circuit Protection			Indefinite (hiccup) (Automatic Recovery)			
Temperature Coefficient			-0.02		+0.02	%/°C
Maximum Capacitive Load	Minimum Vin and constant resistive load		See Table			
Transient Recovery Time	Nominal Vin and 25% load step change (75%-50%-25% of Io)			200		μs
Transient Response Deviation		2.5V & 3.3V	-5		+5	%
		Other	-3		+3	%
Note :						
1. Measured with a 1.0uF MLCC						

ABSOLUTE MAXIMUM RATINGS					
Parameter	Conditions	Min.	Typ.	Max.	Unit
Input Surge Voltage (100 ms)	12V Input			25	VDC
	24V Input			50	
	48V Input			100	
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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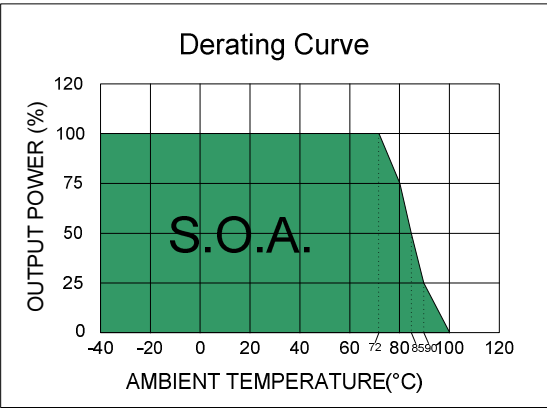
GENERAL SPECIFICATIONS					
Parameter	Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output, and rated for 60sec	1500			VDC
	Case-I/O, and rated for 60sec	1000			
Isolation Resistance	Input-output	1000			MΩ
Isolation Capacitance	Input-output		1000		pF
Switching Frequency			330		kHz
MTBF	MIL-HDBK-217 F @ 25°C	1			M 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		100	°C
Maximum Case Temperature				100	°C
Thermal Impedance	3.3V output	13.63			°C/W
	Others	14.24			
Storage Humidity				95	% rel. H
Storage Temperature		-55		125	°C
Cooling	Natural Convection	30-65 LFM			

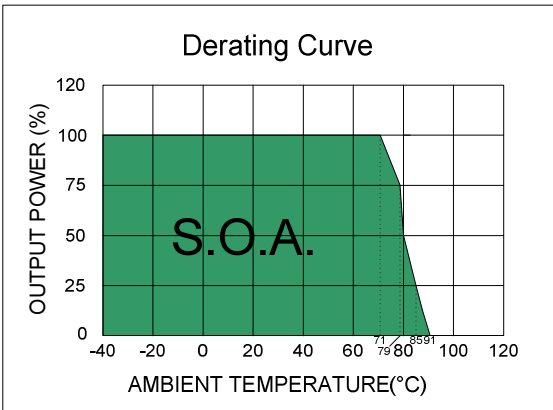
EMC SPECIFICATIONS			
Parameter	Standard	Condition	Criterion
Conducted Emissions	EN55032	with external components	A
Radiated Emissions	EN55032		A
ESD	IEC 61000-4-2	Air: ± 8kV / Contact: ± 6kV	A
RS	IEC 61000-4-3	10V/m	A
EFT	IEC 61000-4-4	±2kV	A
Surge	IEC 61000-4-5	±1kV with external components	A
CS	IEC 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 0.80" x 0.40"

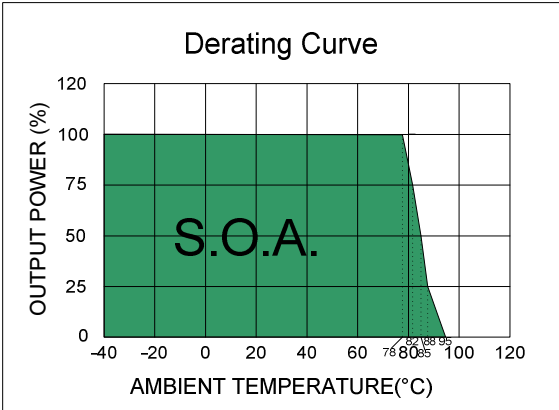
ELECTRICAL CHARACTERISTIC CURVES



Vo 2.5V



(Efficiency : 83 ~ 86%)

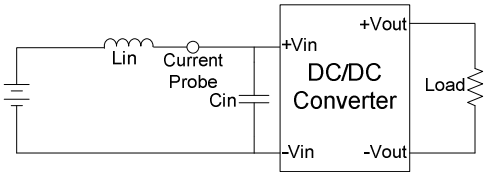


(Efficiency : 87 ~ 89%)

TEST CONFIGURATIONS

Input Reflected Ripple Current Test Step

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



DESIGN & FEATURE CONFIGURATIONS

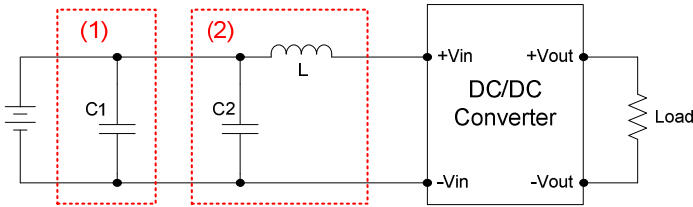
Over Current Protection

The module includes an internal over current protection circuit, which will endure current limiting for an unlimited duration during output over load condition. If the output current exceeds the OCP set point, the module will shut down automatically (hiccup). The module will try to restart after shut down. If the over load condition still exists, the module will shut down again.

DESIGN & FEATURE CONFIGURATIONS

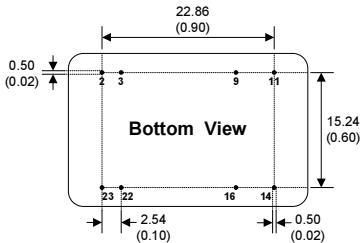
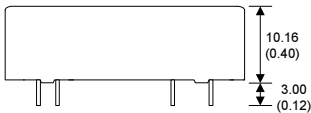
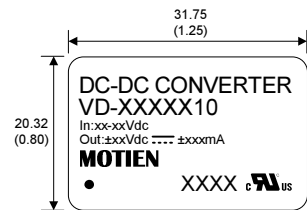
EMC Filter

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-12XXX10	NIPPON Chemi-con KY Series 220μF, 100V	NIPPON Chemi-con KY Series 100μF, 100V	12μH
VD-24XXX10			
VD-48XXX10			

MECHANICAL SPECIFICATIONS

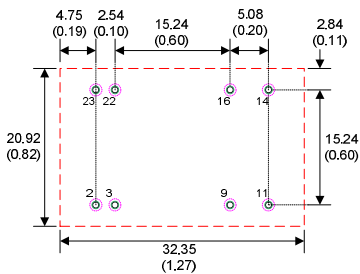


- Notes : All dimensions are typical in millimeters (inches).
1. Pin diameter: 0.5±0.05 (0.02±0.002)
 2. Pin pitch and length tolerance: ±0.35 (±0.014)
 3. Case tolerance: ±0.5 (±0.02)
 4. Stand-off tolerance: ±0.1 (±0.004)

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)