

VV-12W Series



12W 4:1 Regulated Single & Dual output

Features

- Wide 4:1 Input Range
- 1600VDC Isolation
- Efficiency up to 90%
- Operating Temperature Range -40 ~ 100°C max.
- No Minimum Load Required
- Continuous Short Circuit Protection
- Over Voltage Protection
- Over Load Protection
- DIP24 Package
- Soft Start
- Remote ON/OFF Control (CTRL)
- Low no load input Current



PART NUMBER STRUCTURE

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

(1) Series

(2) Input Voltage Range

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

(4) Output Type

S - Single Output
D - Dual Output

(3) Output Voltage

3R3 - 3.3 V
5R1 - 5.1 V
05 - 5.0 V - (Dual Output only)
12 - 12 V
15 - 15 V

(5) Watt

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)		
VV-243R3S12	9-36	15	553	3.3	0	3500	87	2000
VV-245R1S12	9-36	15	562	5.1	0	2400	89	2000
VV-2412S12	9-36	15	562	12	0	1000	89	430
VV-2415S12	9-36	15	581	15	0	800	86	300
VV-2405D12	9-36	15	574	±5	0	±1200	85	±1250
VV-2412D12	9-36	15	562	±12	0	±500	89	±200
VV-2415D12	9-36	15	562	±15	0	±400	89	±120
VV-483R3S12	18-75	15	277	3.3	0	3500	87	2000
VV-485R1S12	18-75	15	274	5.1	0	2400	89	2000
VV-4812S12	18-75	15	281	12	0	1000	89	430
VV-4815S12	18-75	15	281	15	0	800	89	300
VV-4805D12	18-75	15	294	±5	0	±1200	85	±1250
VV-4812D12	18-75	15	281	±12	0	±500	89	±200
VV-4815D12	18-75	15	281	±15	0	±400	89	±120

INPUT SPECIFICATIONS					
Parameter	Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	24V Input	9	24	36	VDC
	48V Input	18	48	75	
Input Filter		Pi Type			
Input Reflected Ripple Current (1)			20		mApk-pk
Start up Time	Nominal Vin and constant resistive load		20		ms
Remote ON/OFF Control (2)	Module ON (Open Circuit)	3.0		12	VDC
	Module OFF (Short circuit pin 2 and pin 3)	0		1.2	
		OFF idle current		5.0	
Recommended input fuse (slow blow)	24V Input	2.5			A
	48V Input	1.25			
Note :					
1. Measured with a simulated source inductance of 12μH and a source capacitor Cin (47μF, ESR<1.0Ω at 100kHz).					
2. The remote ON/OFF control pin is referenced to –Vin (pin2).					

OUTPUT SPECIFICATIONS						
Parameter	Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy			-1.2		+1.2	%
Line Regulation			-0.2		+0.2	%
Load Regulation	From 0% to 100% Load	Single Output	-0.5		+0.5	%
		Dual Output	-1.0		+1.0	
Cross Regulation	Asymmetrical Load 25% / 100% for Dual Output		-5		+5	%
Ripple & Noise (1)	20MHz bandwidth				85	mVpk-pk
Over Voltage Protection (Zener diode clamp)	3.3V Output			3.9		VDC
	5V Output			6.2		
	5.1V Output			6.2		
	12V Output			15		
	15V Output			18		
Over Current Protection				170		% 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)	For All models		250		μs
Transient Response Deviation		3.3V Single Output	-5		+5	%
		Other Output	-3		+3	
Note : 1. Measured with a 1.0μF MLCC.						

ABSOLUTE MAXIMUM RATINGS					
Parameter	Conditions	Min.	Typ.	Max.	Unit
Input Surge Voltage (100 ms)	24V Input			50	VDC
	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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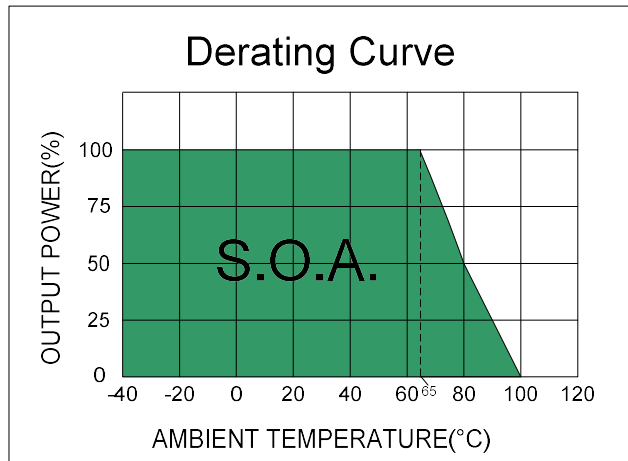
GENERAL SPECIFICATIONS					
Parameter	Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output, and rated for 60sec	1600			VDC
	Case-I/O, and rated for 60sec	1600			
Isolation Resistance	Input-output	1000			MΩ
Isolation Capacitance	Input-output		1500		pF
Switching Frequency			270		kHz
MTBF	MIL-HDBK-217 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				105	°C
Thermal Impedance		21.2			°C/W
Storage Humidity				95	% rel. H
Storage Temperature		-55		125	°C
Cooling	Natural Convection	30-65 LFM			

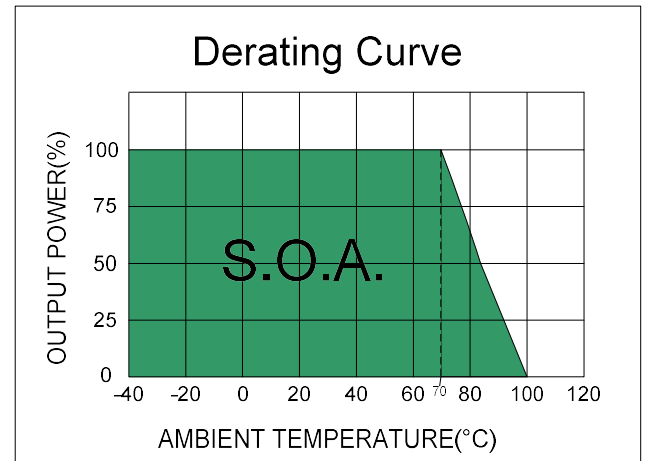
EMC SPECIFICATIONS			
Parameter	Standard	Condition	Criterion
Conducted Emissions	EN55032	with external components	A
Radiated Emissions	EN55032		A
ESD	IEC 61000-4-2	Air: ± 8kV / Contact: ± 6kV	B
RS	IEC 61000-4-3	10V/m	A
EFT	IEC 61000-4-4	±2kV with external components	A
Surge	IEC 61000-4-5	±1kV with external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

PHYSICAL SPECIFICATIONS	
Parameter	Value
Case Material	Aluminum
Base Material	Nonconductive Black Plastic (UL94V-0 rated)
Pin Material	Ø0.5mm Brass Solder-coated
Potting Material	Epoxy (UL94V-0 rated)
Weight	14.0 g, typ.
Dimensions	1.25" x 0.8" x 0.4"

ELECTRICAL CHARACTERISTIC CURVES



Efficiency 85% ~ 87% Models

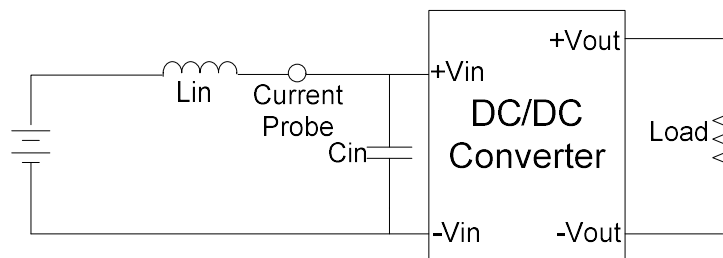


Efficiency 88% ~ 89% Models

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

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.

Over Voltage Protection

The module includes an internal output over voltage protection circuit, which monitors the voltage on the output terminals. If this voltage exceeds the over voltage set point, the module will activate the control loop of internal circuit to clamp the output voltage.

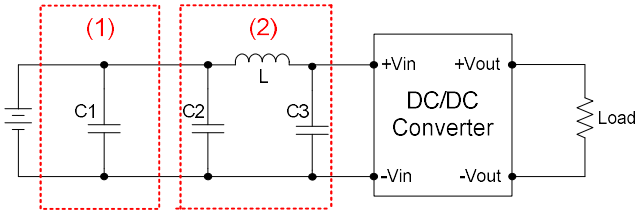
Note

1. Exceeding the absolute ratings of the unit could cause damage. It is not allowed for continuous operating.

DESIGN & FEATURE CONFIGURATIONS

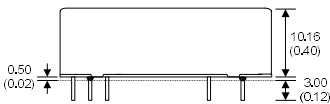
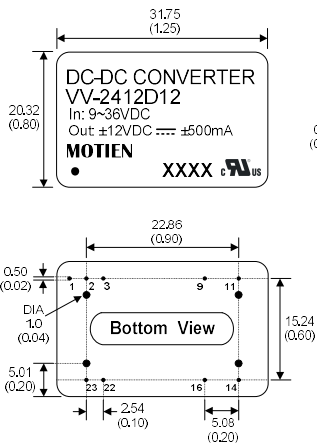
EMC Filter

The part (1) Circuit is used to meet Surge / EFT / CS test. (2) Circuit is used to meet EMI test.



	C1	C2, C3	L
VV-24XXX12	NIPPON Chemi-con	MLCC	12μH
VV-48XXX12	KY series 330μF, 100V	2.2μF, 100V	

MECHANICAL SPECIFICATIONS



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

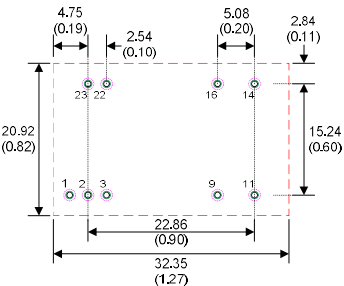
1. Pin diameter : 0.5±0.05 (0.02±0.002)
2. Pin pitch and length tolerance: ±0.35 (±0.014)
3. Case Tolerance: ±0.5 (±0.02)
4. Stand-off tolerance: ±0.1 (±0.004)

PIN CONNECTIONS		
PIN NUMBER	SINGLE	DUAL
1	CTRL	CTRL
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) 1~23: Ø0.80 (0.031)

Top view pad (green) 1~23: Ø1.00 (0.039)

Bottom view pad (pink) 1~23: Ø1.60 (0.063)