

VV-15W Series



15W 4:1 Regulated Single & Dual output

Features

- Wide 4:1 Input Range
- 1600VDC Isolation
- Efficiency up to 90%
- Operating Temperature Range -40 ~ 95°C max.
- No Minimum Load Required
- Continuous Short Circuit Protection
- Over Voltage Protection
- Over Load Protection
- Soft Start
- DIP24 Package
- Remote ON/OFF
- Built-in EMC filter meets EN55032 classA without external components



PART NUMBER STRUCTURE

VV - **24** **12** **S** **15**
(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-243R3S15	9-36	10	632	3.3	0	4000	87	4700
VV-245R1S15	9-36	10	708	5.1	0	3000	90	3300
VV-2412S15	9-36	10	694	12	0	1250	90	600
VV-2415S15	9-36	10	694	15	0	1000	90	400
VV-2405D15	9-36	10	727	±5	0	±1500	86	±1500
VV-2412D15	9-36	10	694	±12	0	±625	90	±288
VV-2415D15	9-36	10	694	±15	0	±500	90	±200
VV-483R3S15	18-75	5	324	3.3	0	4000	85	4700
VV-485R1S15	18-75	5	362	5.1	0	3000	88	3300
VV-4812S15	18-75	5	351	12	0	1250	89	600
VV-4815S15	18-75	5	351	15	0	1000	89	400
VV-4805D15	18-75	5	368	±5	0	±1500	85	±1500
VV-4812D15	18-75	5	347	±12	0	±625	90	±288
VV-4815D15	18-75	5	347	±15	0	±500	90	±200

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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 1 and pin 2/3)	0		1.2	
	OFF idle current		5.0		mA
Recommended input fuse (slow blow)	24V Input	3.15			A
	48V Input	1.6			
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		-1.0		+1.0	%
Line Regulation	Single Output	-0.2		+0.2	%
	Dual Output	-0.5		+0.5	
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			60	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			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)		250		μs
Transient Response Deviation		-3		+3	%
Note :					
1. Measured with a 1.0μF MLCC.					

ABSOLUTE MAXIMUM RATINGS					
Parameter	Conditions	Min.	Typ.	Max.	Unit
Input Surge Voltage (1000 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		2000		pF
Switching Frequency			330		kHz
MTBF	MIL-HDBK-217 F @ 25°C	410			k hours
Safety Approval	IEC / EN / UL 62368-1	Designed to meet			
Environmental compliance		RoHS			

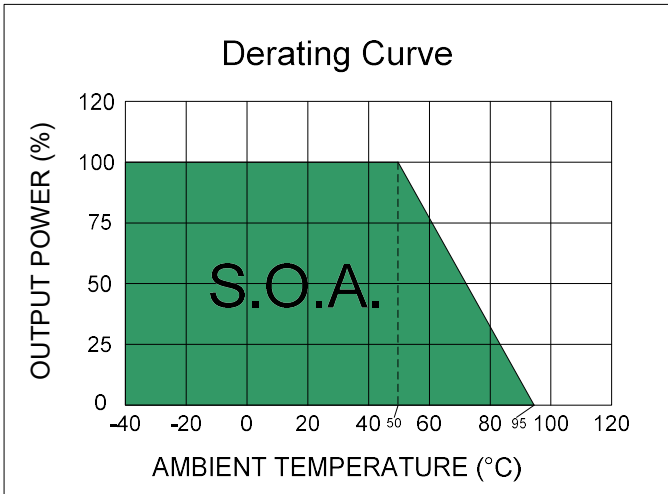
ENVIRONMENT SPECIFICATIONS					
Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating Ambient Temperature	See the Derating Curve	-40		95	°C
Maximum Case Temperature				105	°C
Thermal Impedance		21.0			°C/W
Storage Humidity				95	% rel. H
Storage Temperature		-55		125	°C
Cooling	Natural Convection	30-65 LFM			

EMC SPECIFICATIONS			
Parameter	Standard	Condition	Criterion
Conducted Emissions	EN55032		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	B
Surge	IEC 61000-4-5	±1kV with external components	B
CS	IEC 61000-4-6	10Vrms	A
PFMF	IEC 61000-4-8	1A/m	A

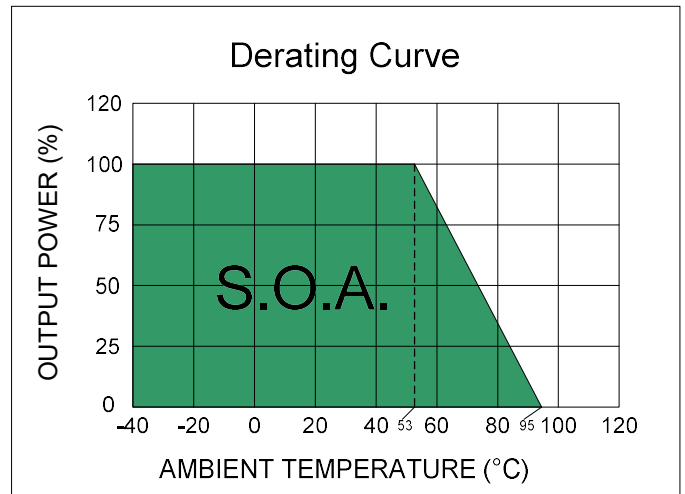
PHYSICAL SPECIFICATIONS	
Parameter	Value
Case Material	Aluminum
Base Material	Nonconductive Black Plastic (UL94V-0 rated)
Pin Material	Ø0.5mm Brass Solder-coated
Potting Material	Epoxy (UL94V-0 rated)
Weight	16.0 g, typ.
Dimensions	1.25" x 0.8" x 0.40"

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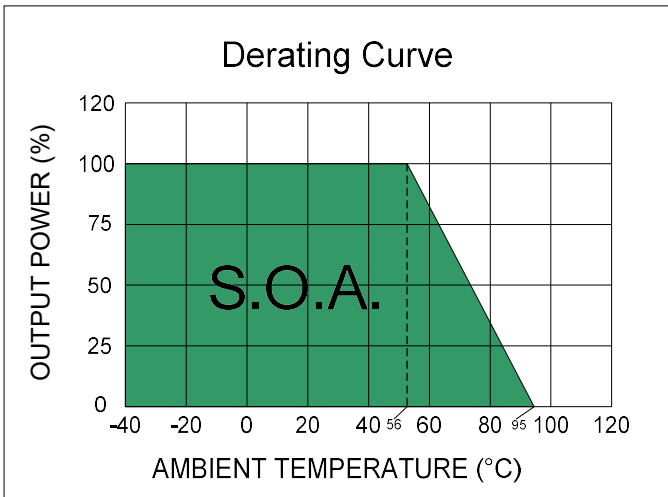
ELECTRICAL CHARACTERISTIC CURVES



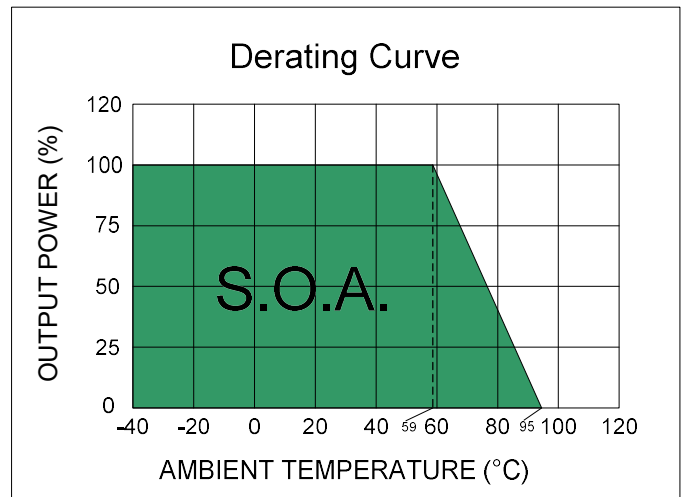
Efficiency 85% Models



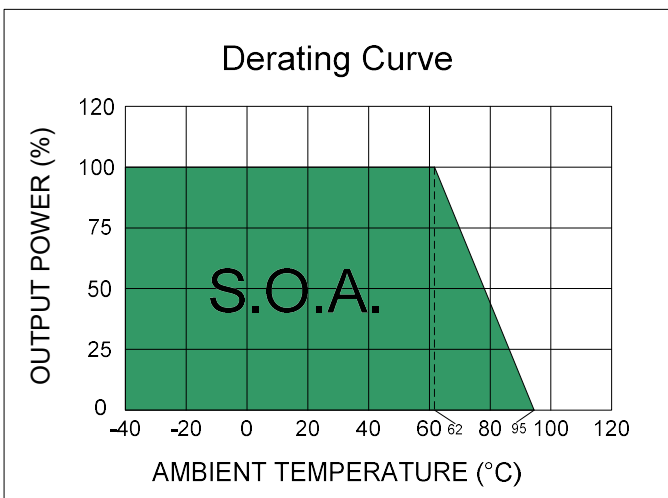
Efficiency 86% Models



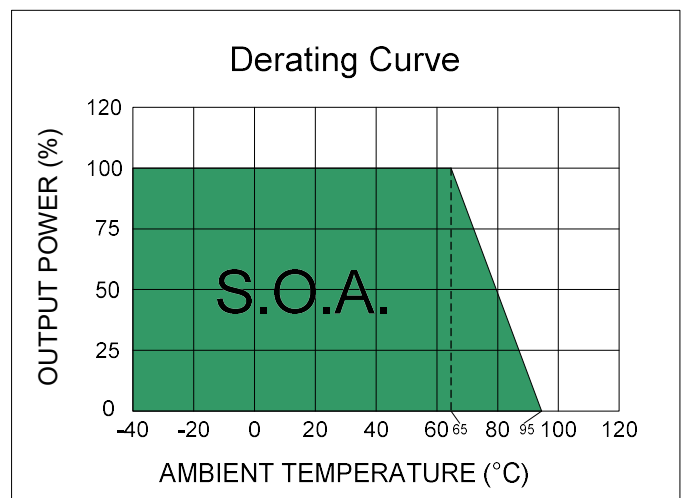
Vout : 3.3V & Efficiency 87% Models



Efficiency 88% Models



Efficiency 89% Models

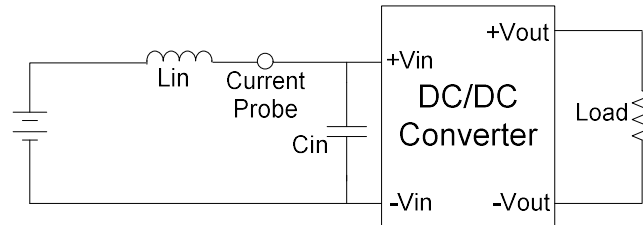


Efficiency 90% Models

TEST CONFIGURATIONS

Input Reflected Ripple Current Test Step

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

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.

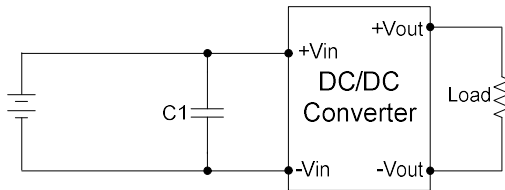
Remote Module ON / OFF

Positive logic turns on the module during high logic and off during low logic. Remote module ON/OFF can be controlled by an external switch between the CTRL terminal and -Vin terminal. For positive logic if the remote feature is not used, please leave the CTRL pin floating.

DESIGN & FEATURE CONFIGURATIONS

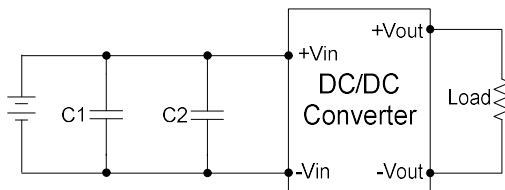
EMC Filter

The Circuit is used to meet Surge & EFT test.



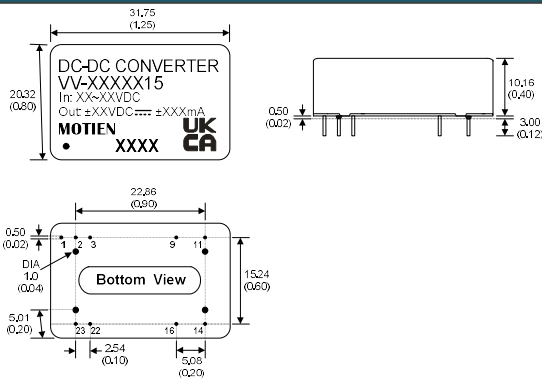
	C1
VV-24XXX15	NIPPON Chemi-con KY series 680μF, 100V
VV-48XXX15	

or



	C1, C2
VV-24XXX15	NIPPON Chemi-con KY series 330μF, 100V
VV-48XXX15	

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)

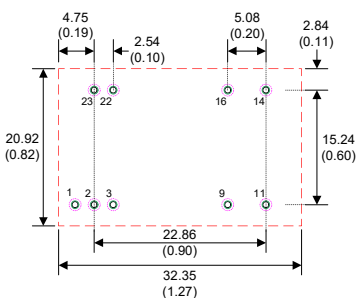
PIN CONNECTIONS

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)