

12 Watt

24 Pin DIL Package V



2:1 Input Range

- o Wide Input Range
- o Pi Input Filter
- o Regulated Single & Dual Outputs
- o Continuous Short Circuit Protection
- o Standard 1600 VDC I/O-Isolation
- o High Efficiency up to 91%
- o Low no Load Current Consumption

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	INPUT CURRENT		%EFF	Capacitor Load
				NO LOAD	FULL LOAD		
12VRS12W2.5M	9-18 VDC	2.5 VDC	3500 mA	15 mA	889 mA	85	2000 µF
12VRS12W3.3M		3.3 VDC	3500 mA		1146 mA	87	
12VRS12W5M		5 VDC	2400 mA		1163 mA	89	
12VRS12W12M		12 VDC	1000 mA		1149 mA	90	430 µF
12VRS12W15M		15 VDC	800 mA				300 µF
12VRD12W12M		±12 VDC	±500 mA				±200 µF
12VRD12W15M		±15 VDC	±400 mA		1136 mA	91	±120 µF
12VRS24W2.5M		18-36 VDC	2.5 VDC		3500 mA	15 mA	445 mA
12VRS24W3.3M	3.3 VDC		3500 mA	573 mA	87		
12VRS24W5M	5 VDC		2400 mA	581 mA	89		
12VRS24W12M	12 VDC		1000 mA	575 mA	90		430 µF
12VRS24W15M	15 VDC		800 mA				300 µF
12VRD24W12M	±12 VDC		±500 mA				±200 µF
12VRD24W15M	±15 VDC		±400 mA	562 mA	91		±120 µF
12VRS48W2.5M	36-75 VDC		2.5 VDC	3500 mA	15 mA		225 mA
12VRS48W3.3M		3.3 VDC	3500 mA	283 mA		88	
12VRS48W5M		5 VDC	2400 mA	291 mA		89	
12VRS48W12M		12 VDC	1000 mA	294 mA		88	430 µF
12VRS48W15M		15 VDC	800 mA				300 µF
12VRD48W12M		±12 VDC	±500 mA				±200 µF
12VRD48W15M		±15 VDC	±400 mA	291 mA		89	±120 µF

SPECIFICATIONS

All Specifications Typical At Nominal Line, Full Load, and 25°C Unless Otherwise Noted

INPUT SPECIFICATIONS	
Input Voltage Range	2:1
Start up Time (Nominal Vin and constant resistive load)	20 ms
Input Filter	Pi Type
Input Current (No-Load)	15 mA
Input Reflected Ripple Current	20 mA p-p
Remote ON/OFF Control	ON OFF OFF idle current
	3 to 12 VDC or open circuit 0 to 1.2 VDC or Short Circuit Pin1 and Pin2/3 5 mA

OUTPUT SPECIFICATIONS	
Voltage Accuracy	±1.2%
Temperature Coefficient	±0.02%/°C
Capacitive Load ¹⁾	see table
Transient Recovery Time ²⁾	250 µs
Transient Response Deviation ²⁾	±3% max.
Ripple & Noise 20MHz BW ³⁾	85 mV p-p max.
Short Circuit Protection	Indefinite (hiccup) (Automatic Recovery)
Over Voltage Protection (Zener Diode Clamp)	2.5 V, 3.3 V 5 V 12 V 15 V ±12 V ±15 V
	3.9 V 6.2 V 15 V 18 V ±15 V ±18 V
Over Current Protection	150% of FL
Line Regulation	±0.5% max.
Load Regulation (0% Load to Full Load)	Single Dual
	±0.5% max. ±1.0% max.
Cross Regulation (Dual Output) ⁴⁾	±5%

NOTE:

1. Tested by minimal Vin and constant resistive load.
2. Tested by nominal Vin and 25% step load change (75% - 50% - 25% of Io).
3. Maximum value at nominal input voltage, measured with 20 MHz bandwidth and 1.0 µF ceramic capacitor.
4. One load is 25% to 100% load, the other load is 100% load, the output voltage variable rate is within ±5%.

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GENERAL SPECIFICATION	
Efficiency	see table
Isolation Voltage (3 sec)	Input/Output Case/Input & Output 1600 VDC 1600 VDC
Isolation Resistance	1000 Mohms min.
Isolation Capacitance	1200 pF max.
Switching Frequency	330 kHz
Operating Temperature Range	-40°C to +85°C (see derating curve) -40°C to +60°C (for 100% Load)
Storage Temperature Range	-40°C to +125°C
Case Temperature	+100°C max.
Cooling	Natural Convection
Humidity	95% rel H
Reliability Calculated MTBF (MIL-HDBK-217F)	>1 Mhrs
Safety Standard (designed to meet)	IEC 60950-1:2001
Radiated Emissions	EN55022 Class A
Conducted Emissions ⁵⁾	EN55022 Class A
ESD (Electrostatic Discharge)	EN61000-4-2 Perf. Criteria B
RS (Radiated, Radio-Frequency, Electromagnetic Field)	EN61000-4-3 Perf. Criteria A
EFT (Electrical Fast Transient)	EN61000-4-4 Perf. Criteria B
Surge ⁶⁾	EN61000-4-5 Perf. Criteria B
CS (Conducted Radio Frequency Disturbances)	EN61000-4-6 Perf. Criteria A
PFMF (Power Frequency Magnetic Field)	EN61000-4-8 Perf. Criteria A
Dimensions	1.25x0.8x0.4 Inches (31.8x20.3x10.2 mm)
Case Material	Nickel-coated Copper
Base Material	Non-conductive black plastic (UL94V-0 rated)
Pin Material	ø0.5 mm Brass Solder-coated
Potting Material	Epoxy (UL94V-0 rated)
Weight	18.0 g

NOTE:

5. Input filter components (C1, L) are used to help meet conducted emissions requirement for the module.

These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiate d noise.

6. An external filter capacitor is required if the module has to meet EN61000-4-5.

The filter capacitor M+R suggest: Nippon - chemi - con KY series, 330 µF/100 V.

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ABSOLUTE SPECIFICATIONS

These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.

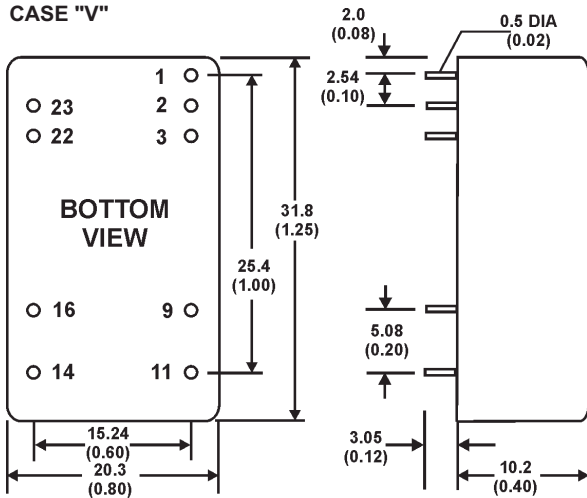
Input Surge Voltage (1000 mS)	12 V	-0.7 VDC to 36 VDC
	24 V	-0.7 VDC to 50 VDC
	48 V	-0.7 VDC to 100 VDC

Lead/Lead Free Soldering Temperature (1.5 mm from case 10 sec.) +260°C max.

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

MECHANICAL SPECIFICATIONS

CASE "V"



PIN CONNECTIONS		
PIN	SINGLE	Dual
1	REMOTE ON/OFF	REMOTE ON/OFF
2	-INPUT	-INPUT
3	-INPUT	-INPUT
9	NO PIN	COMMON
11	NOT CONNECTED	-OUTPUT
14	+OUTPUT	+OUTPUT
16	-OUTPUT	COMMON
22	+INPUT	+INPUT
23	+INPUT	+INPUT

All Dimensions in mm (Inches)

Tolerances:

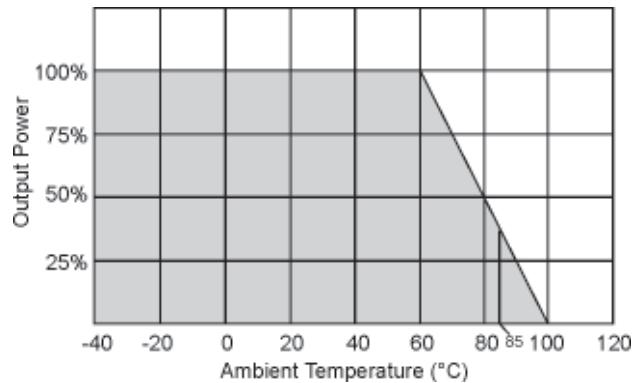
Pin diameter ± 0.05 (±0.002)

Pin pitch ±0.35 (±0.014)

Case ±0.5 (±0.02)

APPLICATION NOTES & DIAGRAMS

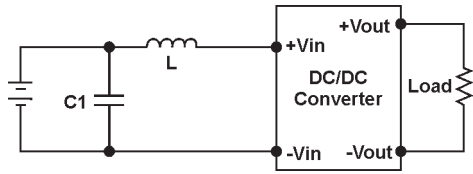
Derating Curve



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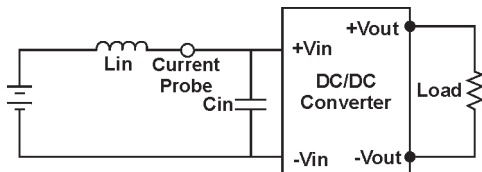
Input Filter Recommendation



INPUT FILTER		
	C1	L
12VRS/D12W...	100 µF, 100V	12 µH
12VRS/D24W...	100 µF, 100V	12 µH
12VRS/D48W...	100 µF, 100V	12 µH

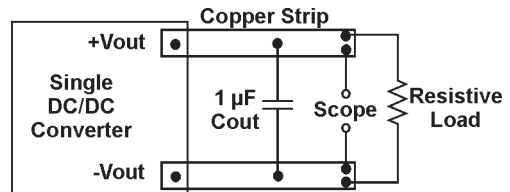
Input Reflected Ripple Current Test Step

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

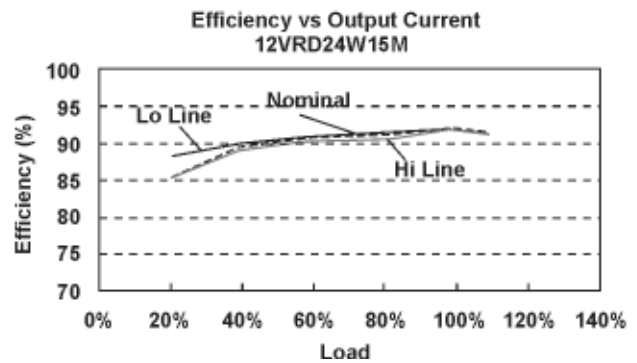
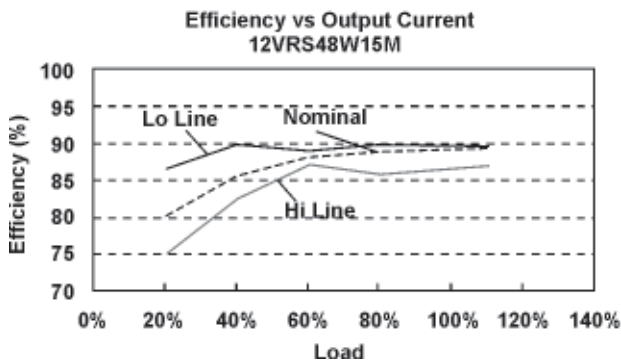
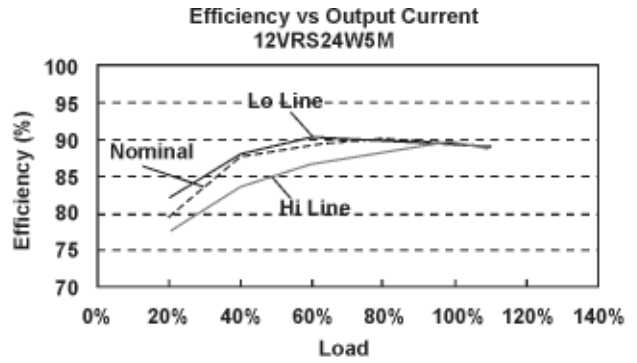
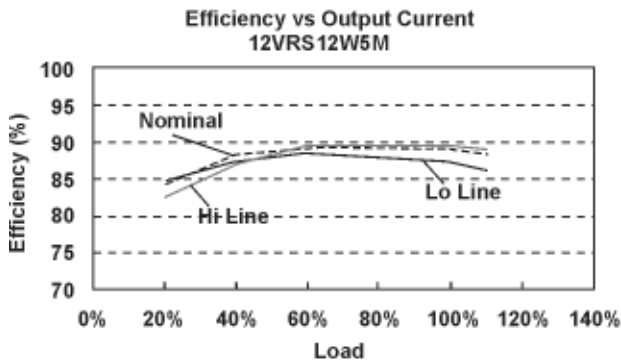


Output Ripple & Noise Measurement Test

Use a capacitor Cout (1 µF) measurement. The Scope measurement bandwidth is 0-20 MHz.



Efficiency-Load Deviation



NOTICE:
The information in this document has been carefully checked. However, no responsibility is assumed for inaccuracies! Specifications can be changed without notice. The latest and most complete information can be found on our website.