

12 Watt

24 Pin DIL Package V 4:1 Input Range



- o Wide 4:1 Input Range
- o Pi Input Filter
- o Regulated Single & Dual Outputs
- o Continuous Short Circuit Protection
- o 1600 VDC I/O-Isolation
- o High Efficiency up to 90%
- o Remote ON/OFF

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	INPUT CURRENT		% EFF MIN.	CAPACITOR LOAD ¹⁾
				NO LOAD	FULL LOAD		
12VRS24X3.3M	9-36 VDC	3.3 VDC	3500 mA	15 mA	573 mA	87	2000 µF
12VRS24X5.1M		5.1 VDC	2400 mA		581 mA	89	2000 µF
12VRS24X12M		12 VDC	1000 mA		574 mA	90	430 µF
12VRS24X15M		15 VDC	800 mA		574 mA	90	300 µF
12VRD24X5M		±5 VDC	±1200 mA		595 mA	87	±1250 µF
12VRD24X12M		±12 VDC	±500 mA		574 mA	90	±200 µF
12VRD24X15M		±15 VDC	±400 mA		574 mA	90	±120 µF
12VRS48X3.3M	18-75 VDC	3.3 VDC	3500 mA		286 mA	87	2000 µF
12VRS48X5.1M		5.1 VDC	2400 mA		290 mA	89	2000 µF
12VRS48X12M		12 VDC	1000 mA		287 mA	90	430 µF
12VRS48X15M		15 VDC	800 mA		287 mA	90	300 µF
12VRD48X5M		±5 VDC	±1200 mA		297 mA	87	±1250 µF
12VRD48X12M		±12 VDC	±500 mA		287 mA	90	±200 µF
12VRD48X15M		±15 VDC	±400 mA		287 mA	90	±120 µF

1. Tested by minimal Vin and constant resistive Load.

SPECIFICATIONS

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

INPUT SPECIFICATIONS		
Input Voltage Range		4:1
Start up Time (Nominal Vin and constant resistive load)		20 ms
Input Filter		Pi Type
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
Ripple & Noise 20MHz BW ²⁾		85 mV p-p max.
Transient Recovery Time ³⁾		250 µs
Transient Response Deviation ³⁾		±3% max.
Short Circuit Protection		Indefinite (hiccup) (Automatic Recovery)
Over Voltage Protection (Zener Diode Clamp)	3.3 V	3.9 V
	5.1 V	6.2 V
	12 V	15 V
	15 V	18 V
	±5 V	±6.2 V
	±12 V	±15 V
	±15 V	±18 V
Over Load Protection		170% of FL
Line Regulation		±0.2% max.
Load Regulation (0% Load to Full Load)	Single	±0.5% max.
	Dual	±1.0% max.
Cross Regulation (Dual Output) ⁴⁾		±5%

NOTE:

2. Measured with 20 MHz bandwidth and 1.0 µF ceramic capacitor.

3. Tested by nominal Vin and 25% step load change (75% - 50% - 25% of Io).

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		1500 pF max.
Switching Frequency		270 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		+105°C max.
Cooling		Nature 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) ⁶⁾		EN61000-4-4 Perf. Criteria B
Surge ⁶⁾		EN61000-4-5 Perf. Criteria B
CS (Conducted Radio Frequency Disturbances) ⁶⁾		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

5. Input filter components (C1, L, C2) 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 EN61000-4-4 and EN61000-4-5 and EN61000-4-6.

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

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ABSOLUTE SPECIFICATIONS

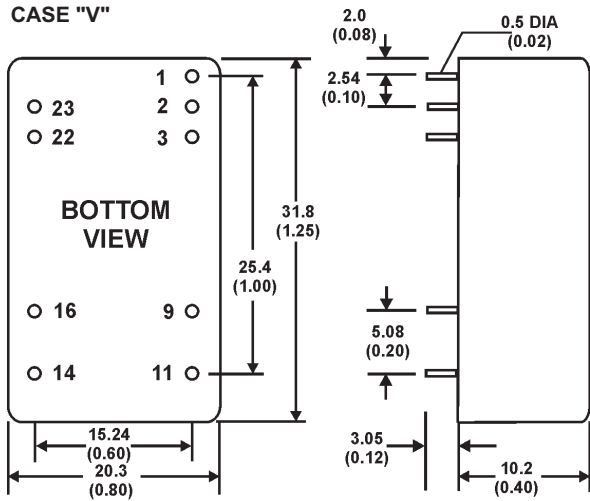
These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.

Input Surge Voltage (1000 mS)	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:

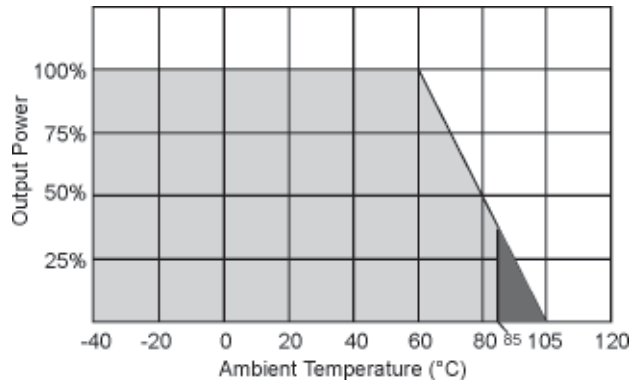
Pin diameter ± 0.05 (±0.002)

Pin pitch ±0.35 (±0.014)

Case ±0.5 (±0.02)

APPLICATION NOTES & DIAGRAMS

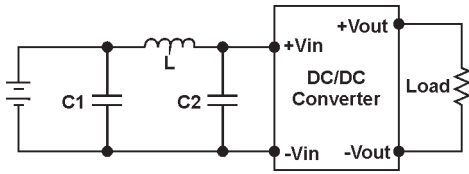
Derating Curve



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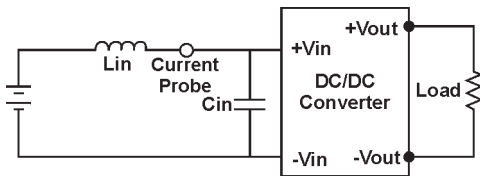
Input Filter Recommendation



INPUT FILTER			
	C1	L	C2
12VRS/D24W...	2.2 μF, 100V	12 μH	2.2 μF, 100V
12VRS/D48W...	2.2 μF, 100V	12 μH	2.2 μF, 100V

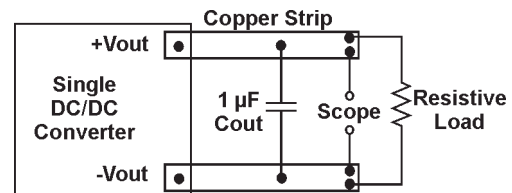
Input Reflected Ripple Current Test Step

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

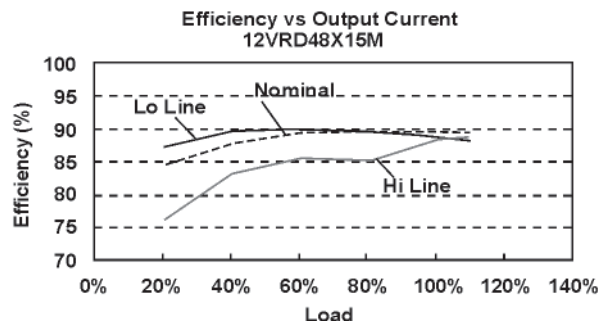
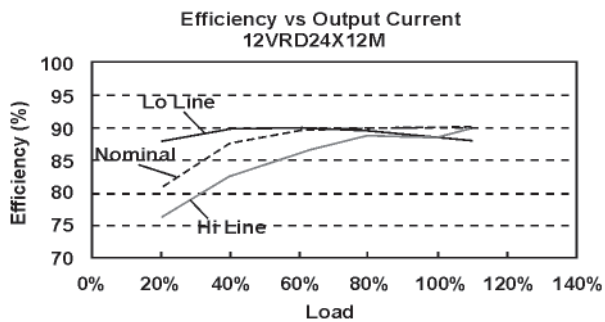
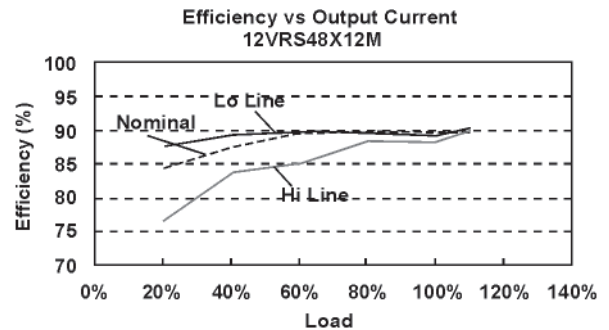
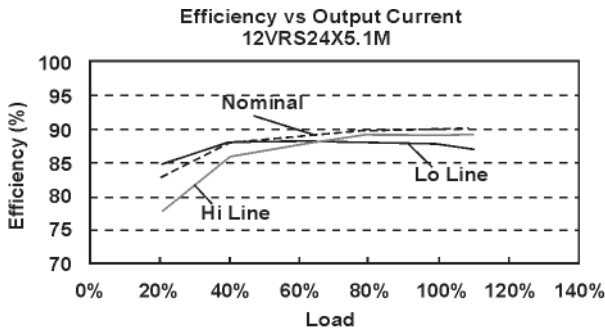


Output Ripple & Noise Measurement Test

Use a capacitor C_{out} (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.