

- o Wide 2:1 Input Range
- o Regulated Output
- o 1000 VDC Isolation  
3000 VDC Isolation add Suffix „H3“ (only for Plastic Case)
- o Single & Dual Outputs
- o Continuous Short Circuit Protection
- o Plastic Case Standard, add Suffix „M“ for Metal Case
- o For Remote ON/OFF Control add Suffix „C“

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT		INPUT CURRENT		%EFF	CAPACITIVE LOAD	
			MIN. LOAD	FULL LOAD	NO LOAD	FULL LOAD			
2Z8RS5W3.3M	4.5-9 VDC	3.3 VDC	125 mA	500 mA	15 mA	492 mA	67	3300 µF	
2Z8RS5W5M		5 VDC	100 mA	400 mA		571 mA	70		
2Z8RS5W9M		9 VDC	56 mA	222 mA	30 mA	555 mA	72	470 µF	
2Z8RS5W12M		12 VDC	42 mA	167 mA		547 mA	73		
2Z8RS5W15M		15 VDC	33 mA	133 mA		60 mA	533 mA		75
2Z8RS5W24M		24 VDC	21 mA	83 mA	60 mA	533 mA	75	220 µF	
2Z8RD5W3.3M		±3.3 VDC	±63 mA	±250 mA	20 mA	471 mA	70	±1000 µF	
2Z8RD5W5M		±5 VDC	±50 mA	±200 mA		571 mA			
2Z8RD5W9M		±9 VDC	±28 mA	±111 mA		540 mA	74		
2Z8RD5W12M		±12 VDC	±21 mA	±83 mA	25 mA	533 mA	75	±220 µF	
2Z8RD5W15M		±15 VDC	±17 mA	±67 mA					
2Z8RD5W24M		±24 VDC	±10 mA	±42 mA					60 mA
2Z8RS12W3.3M	9-18 VDC	3.3 VDC	125 mA	500 mA	15 mA	205 mA	67	3300 µF	
2Z8RS12W5M		5 VDC	100 mA	400 mA		216 mA	77		
2Z8RS12W9M		9 VDC	56 mA	222 mA		213 mA	78	470 µF	
2Z8RS12W12M		12 VDC	42 mA	167 mA		208 mA	80		
2Z8RS12W15M		15 VDC	33 mA	133 mA		213 mA	78		
2Z8RS12W24M		24 VDC	21 mA	83 mA		208 mA	80	220 µF	
2Z8RD12W3.3M		±3.3 VDC	±63 mA	±250 mA		188 mA	188 mA	73	±1000 µF
2Z8RD12W5M		±5 VDC	±50 mA	±200 mA			222 mA	75	
2Z8RD12W9M		±9 VDC	±28 mA	±111 mA			210 mA	79	
2Z8RD12W12M		±12 VDC	±21 mA	±83 mA		208 mA	208 mA	80	±220 µF
2Z8RD12W15M		±15 VDC	±17 mA	±67 mA			210 mA	79	
2Z8RD12W24M		±24 VDC	±10 mA	±42 mA			30 mA	219 mA	

**SPECIFICATIONS**

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

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT		INPUT CURRENT		%EFF	CAPACITIVE LOAD	
			MIN. LOAD	FULL LOAD	NO LOAD	FULL LOAD			
2Z8RS24W3.3M	18-36 VDC	3.3 VDC	125 mA	500 mA	8 mA	98 mA	70	3300 µF	
2Z8RS24W5M		5 VDC	100 mA	400 mA		108 mA	77	3300 µF	
2Z8RS24W9M		9 VDC	56 mA	222 mA		104 mA	80	470 µF	
2Z8RS24W12M		12 VDC	42 mA	167 mA					
2Z8RS24W15M		15 VDC	33 mA	133 mA		220 µF			
2Z8RS24W24M		24 VDC	21 mA	83 mA					
2Z8RD24W3.3M		±3.3 VDC	±63 mA	±250 mA		94 mA	73	±1000 µF	
2Z8RD24W5M		±5 VDC	±50 mA	±200 mA		106 mA	78		
2Z8RD24W9M		±9 VDC	±28 mA	±111 mA		105 mA	79	±220 µF	
2Z8RD24W12M		±12 VDC	±21 mA	±83 mA		104 mA	80		
2Z8RD24W15M		±15 VDC	±17 mA	±67 mA					
2Z8RD24W24M		±24 VDC	±10 mA	±42 mA		20 mA	106 mA	78	±100 µF
2Z8RS48W3.3M		36-72 VDC	3.3 VDC	125 mA		500 mA	6 mA	48 mA	71
2Z8RS48W5M			5 VDC	100 mA	400 mA	56 mA		74	
2Z8RS48W9M	9 VDC		56 mA	222 mA	53 mA	78		470 µF	
2Z8RS48W12M	12 VDC		42 mA	167 mA					
2Z8RS48W15M	15 VDC		33 mA	133 mA	220 µF				
2Z8RS48W24M	24 VDC		21 mA	83 mA		52 mA		80	
2Z8RD48W3.3M	±3.3 VDC		±63 mA	±250 mA	47 mA	73		±1000 µF	
2Z8RD48W5M	±5 VDC		±50 mA	±200 mA	56 mA	74			
2Z8RD48W9M	±9 VDC		±28 mA	±111 mA	53 mA	79		±220 µF	
2Z8RD48W12M	±12 VDC		±21 mA	±83 mA					
2Z8RD48W15M	±15 VDC		±17 mA	±67 mA	52 mA	80			
2Z8RD48W24M	±24 VDC		±10 mA	±42 mA	12 mA	55 mA		75	±100 µF

**SPECIFICATIONS**

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

**INPUT SPECIFICATIONS**

Input Voltage Range			2:1
Input Filter			Capacitor Type
Input Reflected Ripple Current <sup>4)</sup>			35 mA p-p
Remote ON/OFF Control	ON	0 to 0.8 VDC max. (Short Circuit Pin1 and Pin3) or open circuit	
	OFF	4.5 to 15 VDC max. or 3.5 to 15 mA max. (via R1-D1)	
	OFF idle current	5 mA typ.	

**OUTPUT SPECIFICATIONS**

Voltage Accuracy	±2%
Temperature Coefficient	±0.02%/°C
Capacitive Load <sup>5)</sup>	see table
Ripple & Noise 20MHz BW <sup>6)</sup>	80 mV p-p max.
Short Circuit Protection	Indefinite (Automatic Recovery)
Line Regulation	±0.5% max.
Load Regulation (25% to 100% Load)	±1.0% max.
Cross Regulation (Dual Output) <sup>7)</sup>	±5%

**NOTE:**

1. Maximum value at nominal input voltage and full load.
2. Typical value at nominal input voltage and full load.
3. 25% minimum loading is needed.
4. Measured input reflected ripple current with a simulated source inductance of 12 µH.
5. Test by nominal input voltage and constant resistive load.
6. Ripple & Noise is measured with 20 MHz bandwidth.
7. One load is 25% to 100% load, the other load is 100% load, the output voltage variable rate is within ±5%.

**SPECIFICATIONS**

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

**GENERAL SPECIFICATION**

Efficiency		see table
Isolation Voltage	Input/Output (tested for 3 sec)	1000 VDC
Suffix "H3"		3000 VDC
Suffix "M"	Metal Case - Input/Output	1000 VDC
I/O Isolation Resistance		1000 Mohms min.
I/O Isolation Capacitance		60 pF max.
Switching Frequency		100 to 650 kHz
Operating Temperature Range		-40°C to +85°C (see Derating Curve)
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)		>1.61 Mhrs
Safety Standard (designed to meet)		IEC/EN 60950-1
Dimensions		21.85 x 9.2 x 11.1 mm (0.86 x 0.36 x 0.44 Inches)
Case Material		Non-conductive black plastic (UL94V-0 rated)
Suffix "M"		Nickel-coated Copper
Pin Material		Alloy42 Solder-coated
Potting Material		Epoxy (UL94V-0 rated)
Weight		4.5 g
Suffix "M"		6.5 g

**ABSOLUTE SPECIFICATIONS**

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

Input Surge Voltage (100 mS max.)	5 V	12 VDC max.
	12 V	24 VDC max.
	24 V	40 VDC max.
	48 V	80 VDC max.
Soldering Temperature (1.5 mm from case 10 sec. max.)		+260°C

## NOTE:

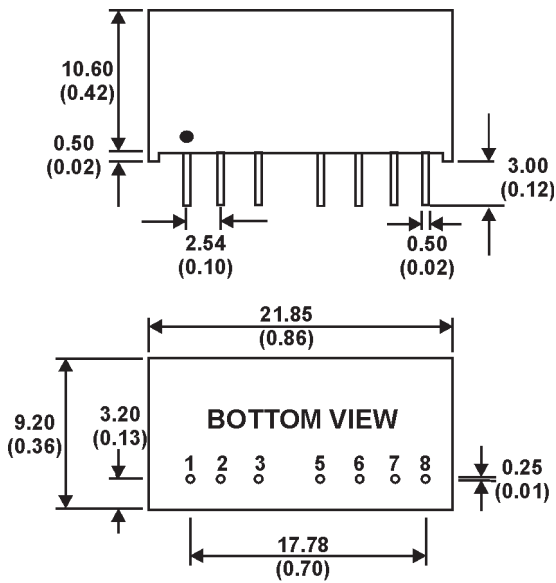
Exceeding the absolute ratings of the unit could cause damage. It is not allowed for continuous operating.  
 Operation under no-load conditions will not damage these devices, however they may not meet all listed specifications.

**SPECIFICATIONS**

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

**MECHANICAL SPECIFICATIONS**

CASE "Z8" (Plastic)

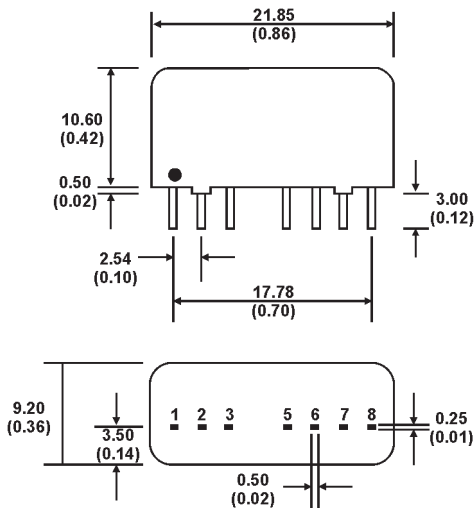


All Dimensions in mm (Inches)  
 Tolerances: Pin Diameter:  $0.5 \pm 0.05$  ( $0.02 \pm 0.002$ )  
 Pin Pitch:  $\pm 0.35$  ( $\pm 0.014$ )  
 Case:  $\pm 0.5$  ( $\pm 0.02$ )

PIN CONNECTIONS		
	Single	Dual
1	-INPUT	-INPUT
2	+INPUT	+INPUT
3	NO PIN	NOT CONNECTED
5	NO PIN	NOT CONNECTED
6	+OUTPUT	+OUTPUT
7	-OUTPUT	-OUTPUT
8	NOT CONNECTED	COMMON

PIN CONNECTIONS FOR REMOTE CONTROL		
	Single	Dual
1	-INPUT	-INPUT
2	+INPUT	+INPUT
3	REMOTE CONTROL	REMOTE CONTROL
5	NOT CONNECTED	NOT CONNECTED
6	+OUTPUT	+OUTPUT
7	-OUTPUT	-OUTPUT
8	NOT CONNECTED	COMMON

CASE "Z8" (Metal)



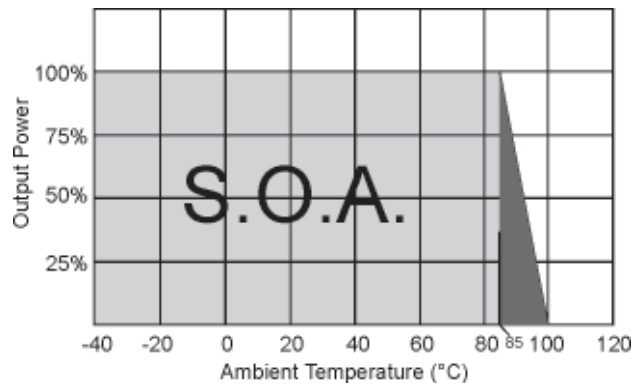
All Dimensions are typical in mm (inches)  
 Tolerances: Pin Diameter:  $0.5 \pm 0.05$  ( $0.02 \pm 0.002$ )  
 Pin Pitch:  $\pm 0.35$  ( $\pm 0.014$ )  
 Case:  $\pm 0.5$  ( $\pm 0.02$ )

**SPECIFICATIONS**

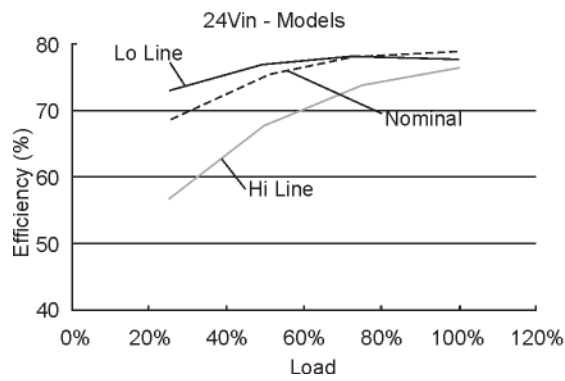
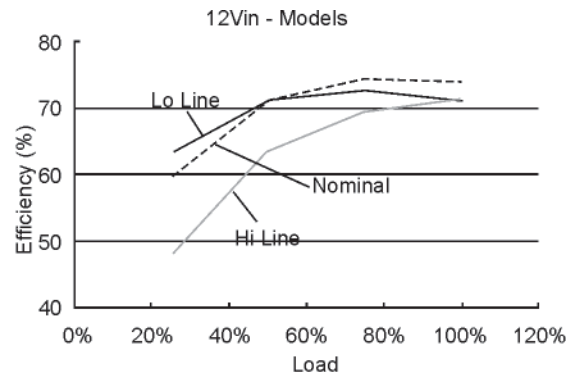
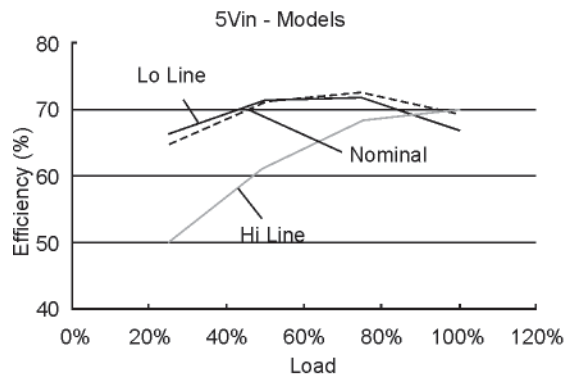
All Specifications Typical At Nominal Line, Full Load, and 25°C Unless Otherwise Noted

**DIAGRAMS & APPLICATION NOTES**

**Derating Curve**



**Efficiency vs Output Current**



**SPECIFICATIONS**

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

**MCU (Master Control Unit)**

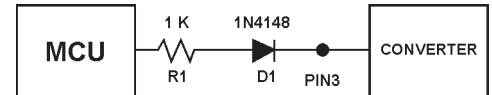
The MCU Pin Voltage is referenced to -Vin (Pin1)

ON: 0 - 0.8 VDC max.

(Short Circuit Pin1 and Pin3) or open Circuit

OFF: 4.5 to 15 VDC max. (or 3.5 mA to 15 mA max.) (via R1 ` D1)

OFF idle current: 5 mA typ.

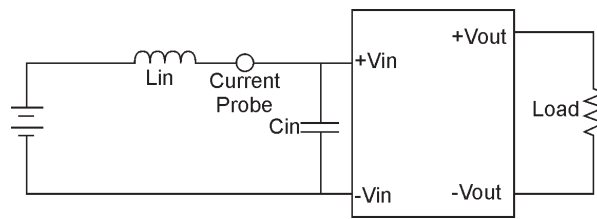
**Connection Example**

Input Filter components are required to help meet conducted emission class A, which application refer to the EMI Filter of design & test configuration.

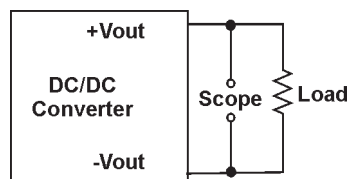
An external filter capacitor M+R suggest: Nippon - chemi - con KY series, 220  $\mu$ F/100 V.

**Input Reflected Ripple Current Test Step**

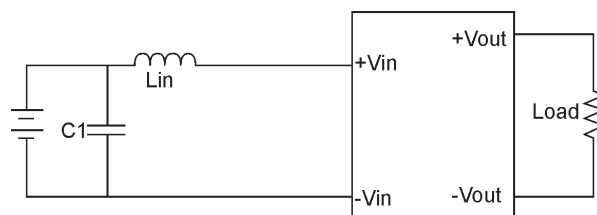
Input reflected ripple current is measured through a source inductor  $L_{in}$  (12  $\mu$ H) and a source capacitor  $C_{in}$  (47  $\mu$ F, ESR<1.0 Ohm at 100 kHz) at nominal input and full load.

**Output Ripple & Noise Measurement Test**

The Scope measurement bandwidth is 20 MHz.

**EMI Filter**

Input filter components ( $C_1$ ,  $L$ ) 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 radiated noise.

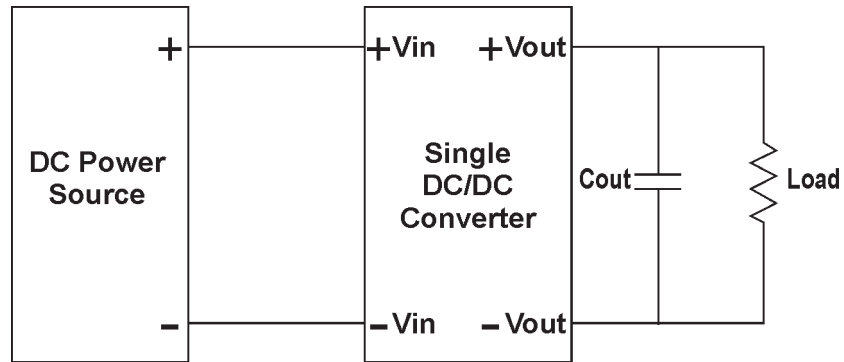
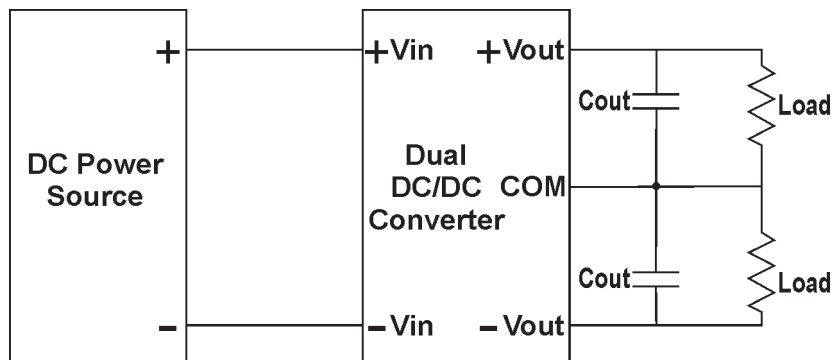


$C_1 = 100 \mu\text{F}/100 \text{ V}$

$L = 12 \mu\text{H}$

**SPECIFICATIONS**

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

**Recommendation for Filtering Ripple & Noise****Single****Dual****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.