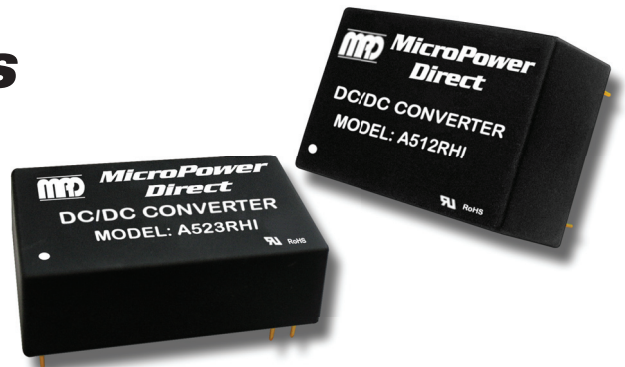


# A500RHI Series

## Very High Isolation, 5W Single & Dual Output DC/DC Converters



### Key Features:

- 5W Output Power
- 5,600 VDC Isolation
- 2  $\mu$ A Leakage Current Max
- Wide 2:1 Input Range
- Compact DIP Case
- Single & Dual Outputs
- Meets EN55022
- 700 kHz MTBF
- EN60950 Approved



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### Electrical Specifications

Specifications typical @ +25°C, nominal input voltage & rated output current, unless otherwise noted. Specifications subject to change without notice.

Input						
Parameter	Conditions	Min.	Typ.	Max.	Units	
Input Start Voltage	12 VDC Input	7.0	8.0	9.0	VDC	
	24 VDC Input	13.0	15.0	18.0		
	48 VDC Input	30.0	33.0	36.0		
Under Voltage Shutdown	12 VDC Input			8.5	VDC	
	24 VDC Input			16.0		
	48 VDC Input			34.0		
Input Filter	$\pi$ (Pi) Filter (Complies with EN55022 Class A)					
Reverse Polarity Input Current				0.3	A	
Short Circuit Input Power				3,000	mW	

Output						
Parameter	Conditions	Min.	Typ.	Max.	Units	
Output Voltage Accuracy			$\pm 0.5$	$\pm 1.0$	%	
Output Voltage Balance	Dual Output, Balanced Loads		$\pm 0.5$	$\pm 2.0$	%	
Line Regulation	$V_{in} = \text{Min to Max}$		$\pm 0.3$	$\pm 0.5$	%	
Load Regulation	$I_{out} = 10\% \text{ to } 100\%$		$\pm 0.5$	$\pm 1.0$	%	
Ripple & Noise (20 MHz) (Note 1)	5V Output		75	100	mV P - P	
	All Other Outputs		100	150		
Ripple & Noise (20 MHz)	Over Line, Load & Temp.			180	mV P - P	
Ripple & Noise (20 MHz)				25	mV rms	
Output Power Protection		120			%	
Transient Recovery Time (Note 2)	50% Load Step Change		300	500	$\mu$ Sec	
Transient Response Deviation			$\pm 3.0$	$\pm 6.0$	%	
Temperature Coefficient			$\pm 0.02$	$\pm 0.05$	%/°C	
Output Short Circuit	Continuous (Autorecovery)					

General						
Parameter	Conditions	Min.	Typ.	Max.	Units	
Isolation Voltage, Rated	60 Seconds	5,600			VDC	
Isolation Test Voltage	60 Seconds	6,000			VDC	
Leakage Current	240 VAC, 60 Hz			2	$\mu$ A	
Isolation Resistance	500 VDC	1,000			M $\Omega$	
Isolation Capacitance	100 kHz, 1V		7	13	pF	
Switching Frequency			150		kHz	

Environmental						
Parameter	Conditions	Min.	Typ.	Max.	Units	
Operating Temperature Range	Ambient	-40		+55	°C	
Operating Temperature Range	Case	-40		+95	°C	
Storage Temperature Range		-40		+125	°C	
Cooling	Free Air Convection					
Humidity	RH, Non-condensing			95	%	

Physical						
Case Size	1.25 x 0.80 x 0.40 Inches (31.8 x 20.3 x 10.2 mm)					
Case Material	Non-Conductive Black Plastic (UL94-V0)					
Weight	0.57 Oz (16.2g)					

Reliability Specifications						
Parameter	Conditions	Min.	Typ.	Max.	Units	
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	700			kHours	

Absolute Maximum Ratings						
Parameter	Conditions	Min.	Typ.	Max.	Units	
Input Voltage Surge (1 Sec)	12 VDC Input	-0.7		25.0	VDC	
	24 VDC Input	-0.7		50.0		
	48 VDC Input	-0.7		100.0		
Lead Temperature	1.5 mm From Case For 10 Sec			260	°C	
Internal Power Dissipation	All Models			2,500	mW	

**Caution:** Exceeding Absolute Maximum Ratings may damage the module. These are not continuous operating ratings.

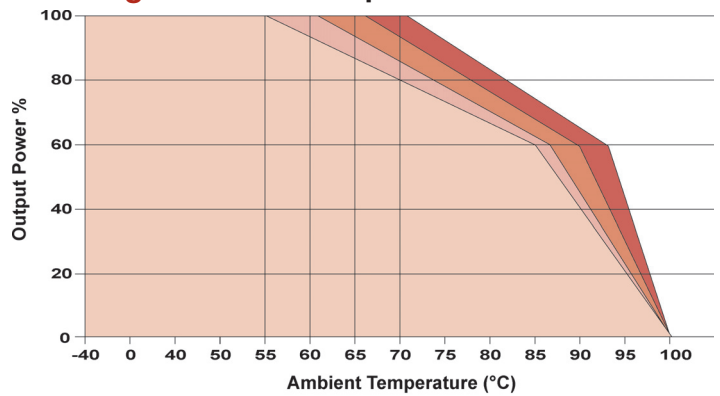
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Model Number	Input				Reflected Ripple Current (mA, Typ)	Output			Efficiency (% Typ)	Fuse Rating Slow-Blow (mA)
	Voltage (VDC)		Current (mA)			Voltage (VDC)	Current (mA, Max)	Current (mA, Min)		
	Nominal	Range	Full-Load	No-Load						
A501RHI	12	9.0 - 18.0	570	30	60	5.0	1,000	200.0	75	1,200
A502RHI	12	9.0 - 18.0	641	30	60	12.0	500	100.0	78	1,200
A503RHI	12	9.0 - 18.0	641	30	60	±12.0	±250	±50.0	78	1,200
A504RHI	12	9.0 - 18.0	641	30	60	±15.0	±200	±40.0	78	1,200
A511RHI	24	18.0 - 36.0	278	20	30	5.0	1,000	200.0	77	600
A512RHI	24	18.0 - 36.0	313	20	30	12.0	500	100.0	80	600
A513RHI	24	18.0 - 36.0	313	20	30	±12.0	±250	±50.0	80	600
A514RHI	24	18.0 - 36.0	313	20	30	±15.0	±200	±40.0	80	600
A521RHI	48	36.0 - 75.0	139	10	15	5.0	1,000	200.0	77	300
A522RHI	48	36.0 - 75.0	156	10	15	12.0	500	100.0	80	300
A523RHI	48	36.0 - 75.0	156	10	15	±12.0	±250	±50.0	80	300
A524RHI	48	36.0 - 75.0	156	10	15	±15.0	±200	±40.0	80	300

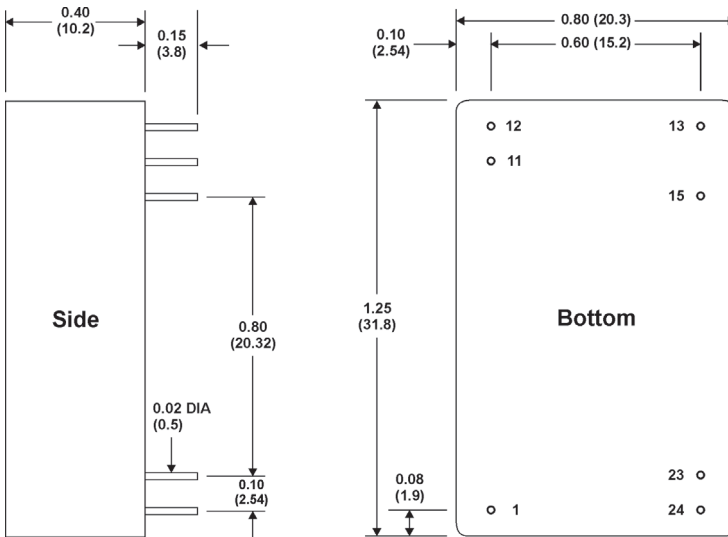
**Notes:**

- When measuring output ripple, it is recommended that an external 0.47  $\mu\text{F}$  ceramic capacitor be placed from the +Vout pin to the -Vout pin for single output units and from each output to common for dual output units. For noise sensitive applications, the use of 3.3  $\mu\text{F}$  capacitors will reduce the output ripple.
- Transient recovery is measured to within a 1% error band for a load step change of 75% to 100%.
- Dual output units may be connected to provide a 24 VDC or 30 VDC output. To do this, connect the load across the positive (+Vout) and negative (-Vout) outputs and float the output common.
- The converter should be connected to a low ac-impedance source. An input source with a highly inductive impedance may affect the stability of the converter. In applications where the converter output loading is high and input power is supplied over long lines, it may be necessary to use a capacitor on the input to insure start-up. In this case, it is recommended that a low ESR (ESR < 1.0 $\Omega$  at 100 kHz) capacitor be mounted close to the converter. For 12V input units a 10.0  $\mu\text{F}$  is recommended, for 24V a 4.7  $\mu\text{F}$  and for 48V units a 2.2  $\mu\text{F}$ .
- It is recommended that a fuse be used on the input of a power supply for protection. See the table above for the correct rating.

**Derating Curve - 5V Output**



**Mechanical Dimensions**



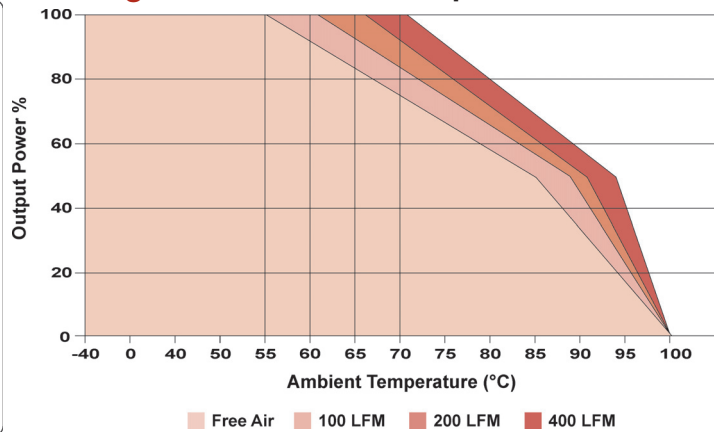
**Mechanical Notes:**

- All dimensions are typical in inches (mm)
- Tolerance x.xx =  $\pm 0.01$  ( $\pm 0.25$ )

**Capacitive Load -  $\mu\text{F}$  Max**

5V Out	12V Out	±12 Out	±15 Out
1,000	470	±220	±220

**Derating Curve - All Other Outputs**



**Pin Connections**

Pin	Single	Dual	Pin	Single	Dual
1	+Vin	+Vin	15	No Pin	+Vout
11	No Pin	Common	23	-Vin	-Vin
12	-Vout	No Pin	24	-Vin	-Vin
13	+Vout	-Vout			



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