

## Series AM1D-NZ

### 1 Watt | DC-DC Converter



#### FEATURES:

- RoHS compliant
- 7 pin SIP package
- High efficiency up to 82%
- Low profile plastic package
- Operating temperature -40°C to + 85°C or -40°C to + 105°C on 6000V models
- 1 sec short circuit protection or continuous on 6000V models
- Pin compatible with multiple manufacturers

#### Models Single output



Model	Input Voltage (V)	Output Voltage (V)	Output Current max (Ma)	Input Current Max   No Load (mA)	Isolation (VDC)	Efficiency (%)
AM1D-0505S-NZ	4.5-5.5	5	200	250   20	1000	72
AM1D-0512S-NZ	4.5-5.5	12	83	250   20	1000	77
*AM1D-0515S-NZ	4.5-5.5	15	70	248   20	1000	79
*AM1D-1205S-NZ	10.8-13.2	5	200	92   15	1000	73
AM1D-0505SH30-NZ	4.5-5.5	5	200	250   20	3000	70
AM1D-0509SH30-NZ	4.5-5.5	9	110	250   20	3000	75
*AM1D-0515SH30-NZ	4.5-5.5	15	70	248   20	3000	80
AM1D-1205SH30-NZ	10.8-13.2	5	200	92   15	3000	72
AM1D-2415SH30-NZ	21.6-26.4	15	70	52   7	3000	82
AM1D-0505SH60-NZ	4.5-5.5	5	200	256   30	6000	75
AM1D-0509SH60-NZ	4.5-5.5	9	110	253   30	6000	75
AM1D-0515SH60-NZ	4.5-5.5	15	70	253   30	6000	78
AM1D-1205SH60-NZ	10.8-13.2	5	200	104   20	6000	78
AM1D-1209SH60-NZ	10.8-13.2	9	110	104   20	6000	76
AM1D-1212SH60-NZ	10.8-13.2	12	83	104   20	6000	79
AM1D-1215SH60-NZ	10.8-13.2	15	70	104   20	6000	81

#### Models Dual output

Model	Input Voltage (V)	Output Voltage (V)	Output Current (mA)	Input Current Max   No Load (mA)	Isolation (VDC)	Efficiency (%)
AM1D-0505D-NZ	4.5-5.5	±5	±100	250   20	1000	72
AM1D-0509D-NZ	4.5-5.5	±9	±55	250   20	1000	75
AM1D-0512D-NZ	4.5-5.5	±12	±42	250   20	1000	78
AM1D-0515D-NZ	4.5-5.5	±15	±35	248   20	1000	79
AM1D-1212D-NZ	10.8-13.2	±12	±42	92   15	1000	79
AM1D-2412D-NZ	21.6-26.4	±12	±42	51   7	1000	80
AM1D-0505DH30-NZ	4.5-5.5	±5	±100	250   20	3000	72
AM1D-0512DH30-NZ	4.5-5.5	±12	±42	250   20	3000	78
AM1D-1212DH30-NZ	10.8-13.2	±12	±42	92   15	3000	79
*AM1D-1215DH30-NZ	10.8-13.2	±15	±35	90   15	3000	80
AM1D-2405DH30-NZ	21.6-26.4	±5	±100	56   7	3000	74
AM1D-2415DH30-NZ	21.6-26.4	±15	±35	52   7	3000	81
AM1D-0505DH60-NZ	4.5-5.5	±5	±100	256   30	6000	75
AM1D-0509DH60-NZ	4.5-5.5	±9	±55	253   30	6000	75
AM1D-0512DH60-NZ	4.5-5.5	±12	±42	253   30	6000	78
AM1D-0515DH60-NZ	4.5-5.5	±15	±35	253   30	6000	78

## Models

### Dual output (continued)

Model	Input Voltage (V)	Output Voltage (V)	Output Current (mA)	Input Current Max   No Load (mA)	Isolation (VDC)	Efficiency (%)
AM1D-1205DH60-NZ	10.8-13.2	±5	±100	104   20	6000	78
AM1D-1209DH60-NZ	10.8-13.2	±9	±55	102   20	6000	79
AM1D-1212DH60-NZ	10.8-13.2	±12	±42	103   20	6000	81
AM1D-1215DH60-NZ	10.8-13.2	±15	±35	102   20	6000	81

\*Not recommended for new design

## Input Specifications

Parameters	Nominal	Typical	Maximum	Units
Voltage range	5	4.5-5.5		VDC
	12	10.8-13.2		
	24	21.6-26.4		
Filter	Capacitor			

## Isolation Specifications

Parameters	Conditions	Typical	Rated	Units
Tested I/O voltage	60 sec		1000, 3000 & 6000	VDC
Resistance		> 1000		MOhm
Capacitance		60		pF

## Output Specifications

Parameters	Conditions	Typical	Maximum	Units
Voltage accuracy		±5		%
Voltage balance	Dual Output	±1		%
Short Circuit protection		Momentary (1 sec.) Continuous on 6000V models		
Line voltage regulation (Single)	For 1.0% of Vin	±1.2		%
Line voltage regulation (Dual)	For 1.0% of Vin	±1.2		%
Load voltage regulation (Single)	load 10~100%	10		%
Load voltage regulation (Dual)	load 10~100%	10		%
Temperature coefficient		±0.03		%/°C
Ripple & Noise	At 20MHz Bandwidth	75		mV p-p

## General Specifications

Parameters	Conditions	Typical	Maximum	Units
Switching frequency	100% load (6000V models only)	150 40		KHz
Max Case temperature			+125	°C
Operating temperature		-40 to +85 Up to +105 on 6000V models only, see derating table		°C
Storage temperature		-55 to +125		°C
Derating		Not-Required		
Cooling		Free air convection		
Humidity			90	%
Case material		Non-conductive black plasticUL94V-0		
Weight		2		g
Dimensions (L x W x H)	1000 & 3000VDC	0.76 x 0.24 x 0.37 inch		19.5 x 6.00 x 9.35 mm
	6000VDC	0.76 x 0.39 x 0.49 inch		19.50 x 9.80 x 12.5 mm
MTBF		>1 100 000 hrs (MIL-HDBK -217F, Ground Benign, t=+25°C)		

NOTE: All specifications in this datasheet are measured at an ambient temperature of 25°C, humidity<75%, nominal input voltage and at rated output load unless otherwise specified

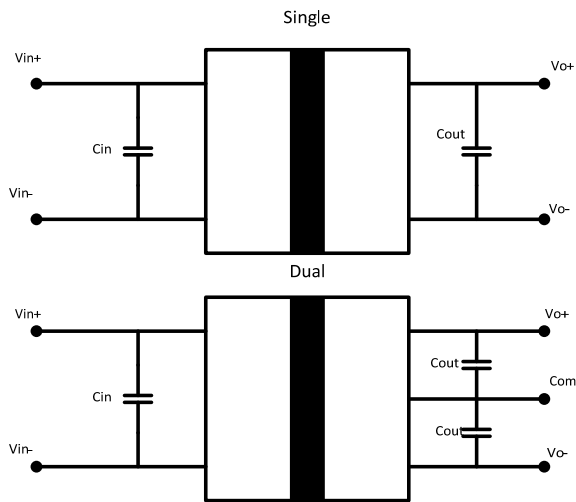
## Safety Specifications

Parameters	
Standards	UL60950-1: 2001
Agency approvals	cULus (without 6000VDC Isolated dual output models);
	CE (for 3000VDC Isolation models and single 1000VDC Isolation models)
	NOTE: all other models not referenced above are designed to meet standard IEC 60950-1:2001

## Pin Out Specifications

Pin	1000 VDC		3000, 6000 VDC	
	Single	Dual	Single	Dual
1	+ V Input	+ V Input	+ V Input	+ V Input
2	- V Input	- V Input	- V Input	- V Input
4	- V Output	- V Output	No pin	No pin
5	No pin	Common	- V Output	- V Output
6	+ V Output	+ V Output	No pin	Common
7	No pin	No pin	+ V Output	+ V Output

## Recommended Circuit



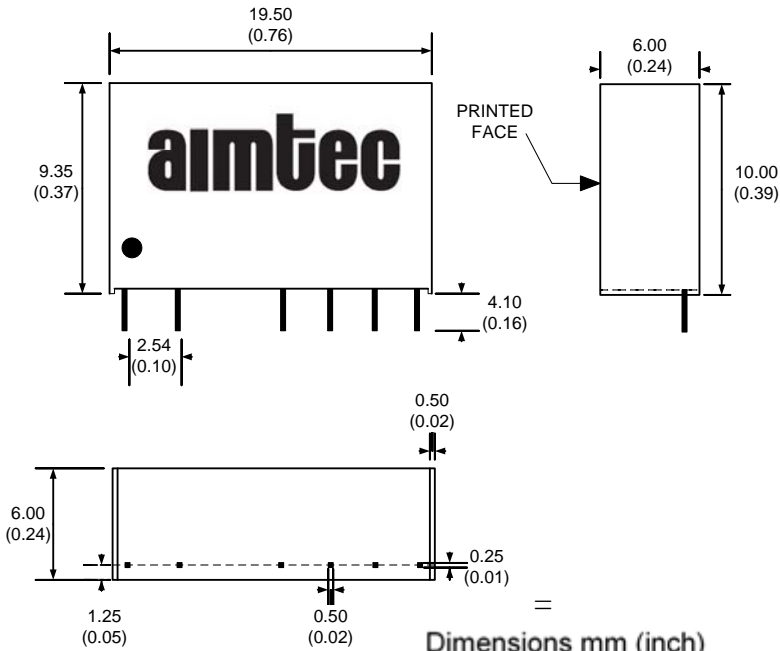
### External capacitor – Single output

Vin (VDC)	External capacitor (μF)	Vout (VDC)	External capacitor (μF)
5	4.7	5	10
12	2.2	9	4.7
24	1	12	2.2
-	-	15	1

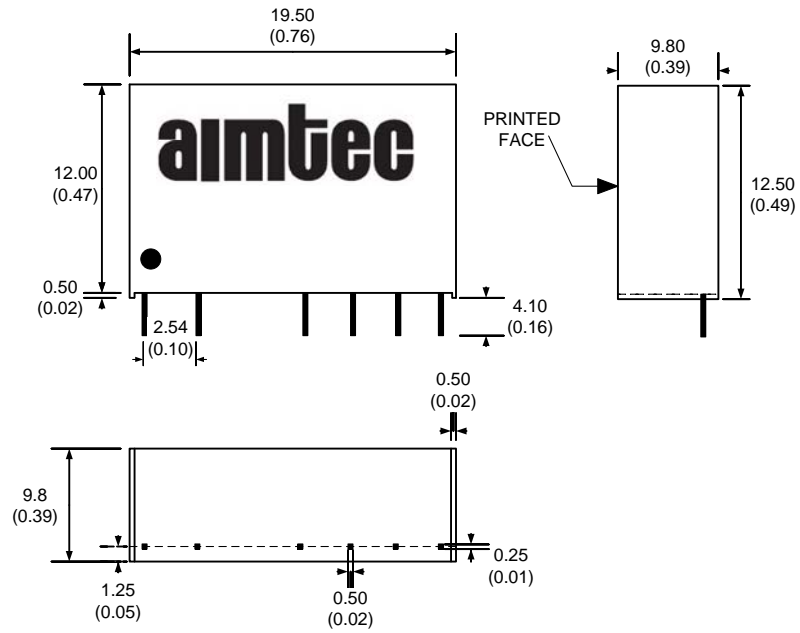
### External capacitor – Dual output

Vin (VDC)	External capacitor (μF)	Vout (VDC)	External capacitor (μF)
5	4.7	5	10
12	2.2	9	4.7
24	1	12	2.2
-	-	15	1

**Dimensions**  
1000 and 3000VDC

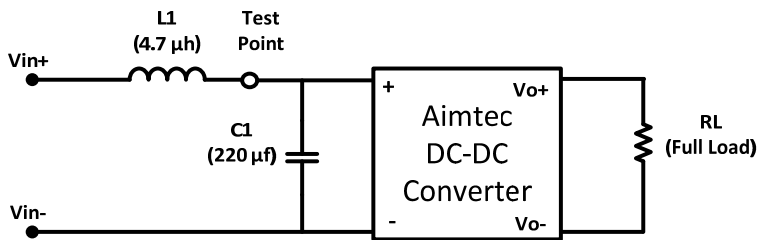


**Dimensions**  
6000VDC



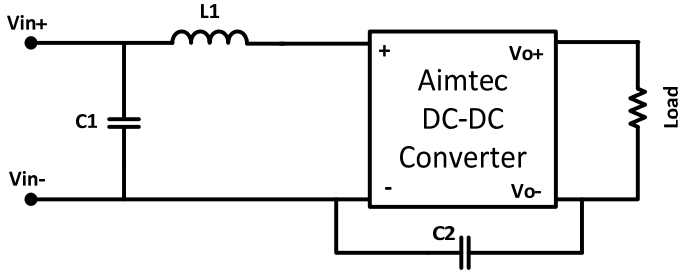
Dimensions mm (inch)  
Case Tolerance  $\pm 0.5$  ( $\pm 0.02$ )  
Pin Diameter  $0.60 \Phi \pm 0.05$  ( $\pm 0.002$ )  
Pin Pitch Tolerance  $\pm 0.50$  ( $\pm 0.02$ )

**Input Reflected Ripple**



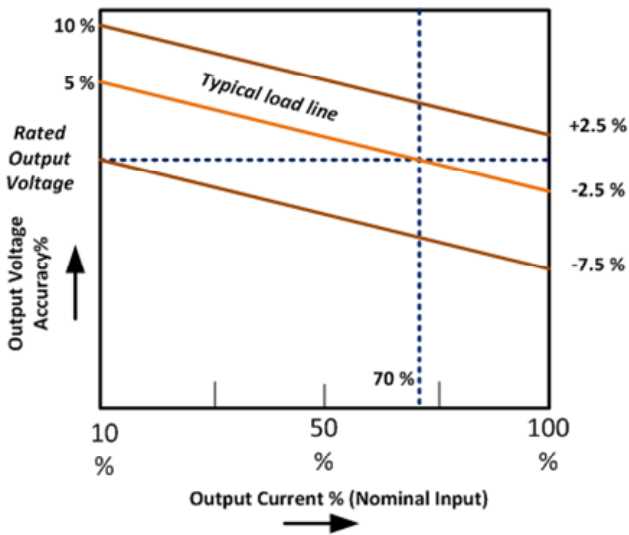
\* Tested at full load, and nominal input

**EMI Filter**

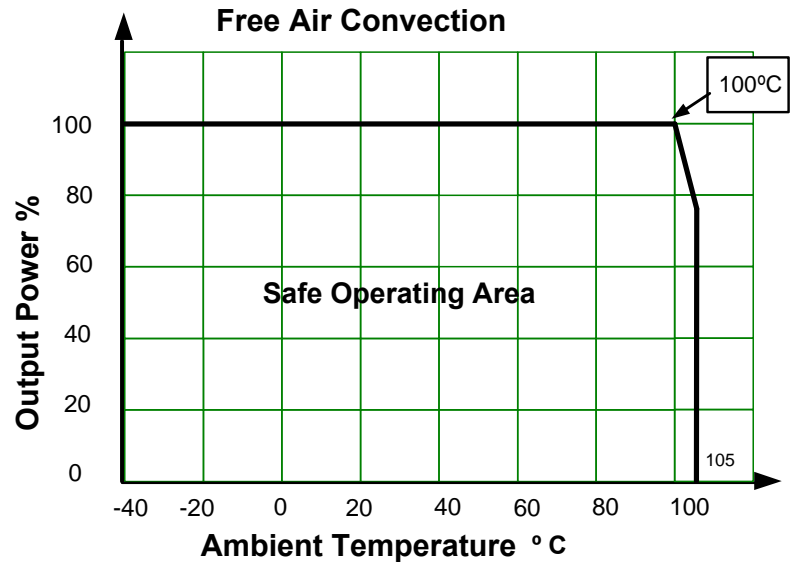


Vin	C1	L1	C2
5, 9, 12 Vdc	4.7 $\mu$ F / 50V	6.8 $\mu$ H	
15 Vdc	4.7 $\mu$ F / 50V	6.8 $\mu$ H	470 pF / 2kV

### Regulation Graph



### Derating Chart (6000V Isolation Models Only)



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