

NOTE 1: Add suffix "TR" to a part number when ordering in tape and reel package

NOTE 2: 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

### Input Specifications

Parameters	Nominal	Typical	Maximum	Units
Voltage range	3	3.0-3.6		VDC
	5	4.5-5.5		
	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	VDC
Tested V1 output/ V2 output	60 sec	1000		VDC
Capacitance V input/V output	500Vdc	60		pF
Capacitance V1 output/V2 output	500Vdc	60		pF
Resistance	500Vdc	> 1000		MOhm

### Output Specifications

Parameters	Conditions	Typical	Maximum	Units
Voltage accuracy	See the tolerance graph	±5		%
Voltage balance	Dual Output	±2		%
Short Circuit protection	Momentary (1sec)			
Line voltage regulation	For 1.0% of Vin	±1.2		%
Load voltage regulation (Single)	Load 10 – 100%	10		%
Load voltage regulation (Dual)	Load 10 – 100%	10		%
Load voltage regulation (Dual Separated)	Load 10 – 100%	12.8		%
Temperature coefficient		±0.03		%/°C
Ripple & Noise	At 20MHz Bandwidth	75	100	mV p-p

NOTE: If the operating output current is less than 10% of maximum it is recommended to install a load resistor in parallel with the load to ensure the actual load current meets the minimum load current requirement.

### General Specifications

Parameters	Conditions	Typical	Maximum	Units
Switching frequency	100% load	100		KHz
Max Case temperature			+95	°C
Operating temperature	Without derating	-40 to +85		°C
Storage temperature		-55 to +125		°C
Cooling	Free air convection			
Humidity			95	%
Case material	Plastic UL94-VO			
Weight		1.5		g
	Dual Separated	2.1		
Dimensions (L x W x H)	Single 1000VDC	0.50 x 0.44 x 0.25 inch	12.70 x 11.20 x 6.25 mm	
	Dual 1000VDC	0.60 x 0.44 x 0.25 inch	15.24 x 11.20 x 6.25 mm	
	Dual Separated 1000VDC	0.70 x 0.70 x 0.24 inch	17.78 x 17.78 x 6.00 mm	
	Single and Dual 3000VDC	0.6 x 0.44 x 0.26 inch	15.24 x 11.20 x 6.50 mm	
MTBF	>980 000 hrs single, 1 000 000hrs dual (MIL-HDBK -217F, Ground Benign, t=+25°C)			

### Safety Specifications

Parameters	
Agency approvals	cULus (without 24V models and dual separate models)
	CE (for 5 and 12 Vin single models)
Standards	IEC/UL 60950-1

**Pin Out Specifications**  
**1000VDC**

Pin	Single
1	- V Input
2	+ V Input
3	N. C.
4	- V Output
5	+V Output
6	N.C.
7	N.C.
8	N.C.

Pin	Dual
1	- V Input
2	+ V Input
3	N. C.
4	Common
5	-V Output
6	N.C.
7	+V Output
8	N.C.
9	N.C.
10	N.C.

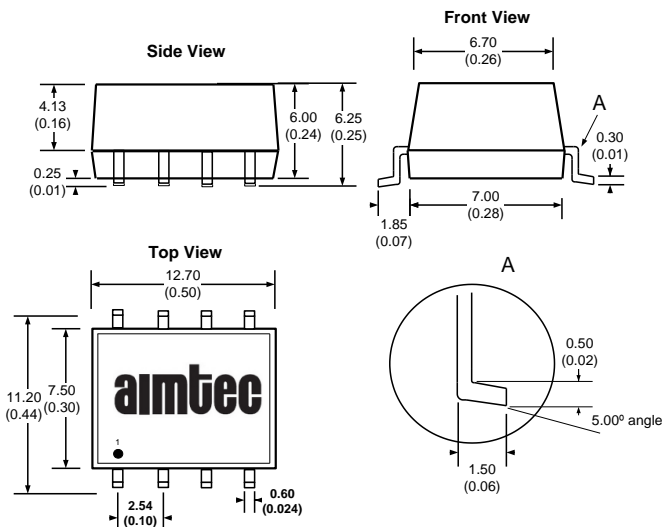
N.C: Not Connected

**3000VDC**

Pin	Single	Dual
1	- V Input	- V Input
2	+ V Input	+ V Input
3	N.C.	N.C.
4	Omitted	Omitted
5	-V Output	Common
6	N.C.	-V Output
7	N.C.	N.C.
8	+V Output	+V Output
9	Omitted	Omitted
10	N.C.	N.C.
11	N.C.	N.C.
12	N.C.	N.C.

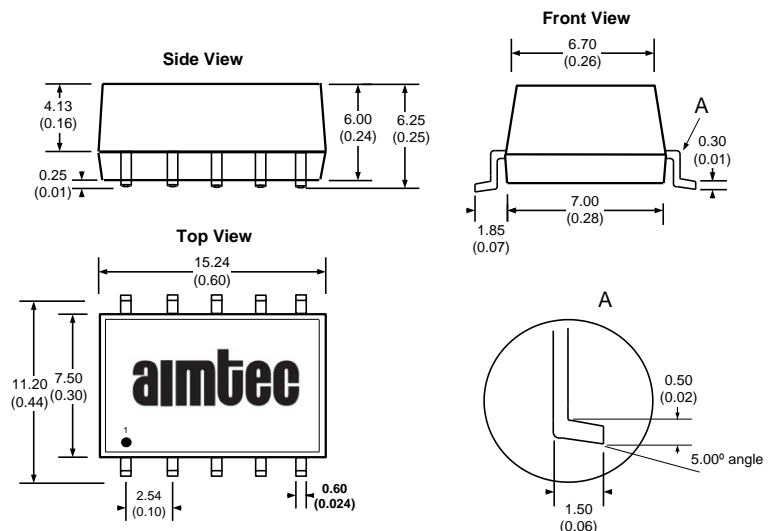
Pin	Dual Separated
1	- V Input
2	+ V Input
3	N.C.
5	- V1 Output
6	+V1 Output
7	N.C
8	N.C
9	+V2 Output
10	- V2 Output
12	N.C
13	N.C
14	N.C

**Dimensions Single 1000VDC**



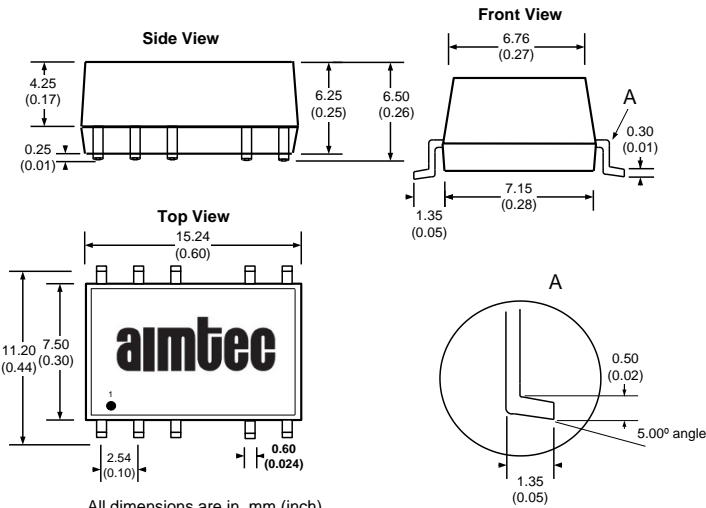
All dimensions are in mm (inch)  
All Pins are on a 2.54mm (0.10inch) pitch  
with tolerance of  $\pm 0.25$ mm (0.01inch)

**Dimensions Dual 1000VDC**



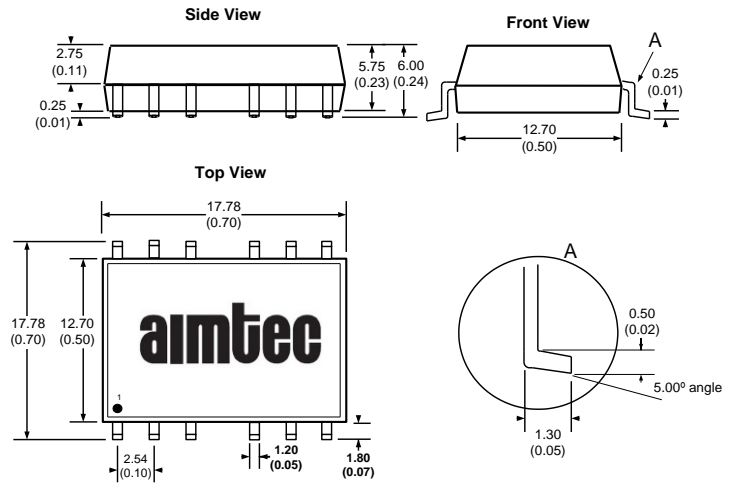
All dimensions are in mm (inch)  
All Pins are on a 2.54mm (0.10inch) pitch  
with tolerance of  $\pm 0.25$ mm (0.01inch)

## Dimensions Single and Dual 3000VDC



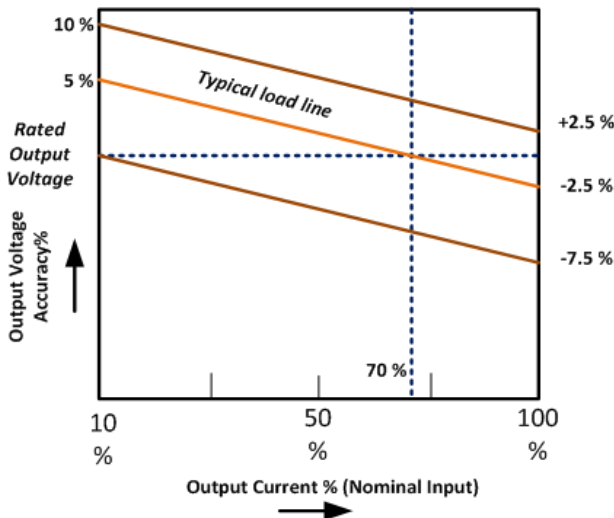
All dimensions are in mm (inch)  
All Pins are on a 2.54mm (0.10inch) pitch  
with tolerance of  $\pm 0.25$ mm (0.01inch)

## Dimensions Dual Separated 1000VDC

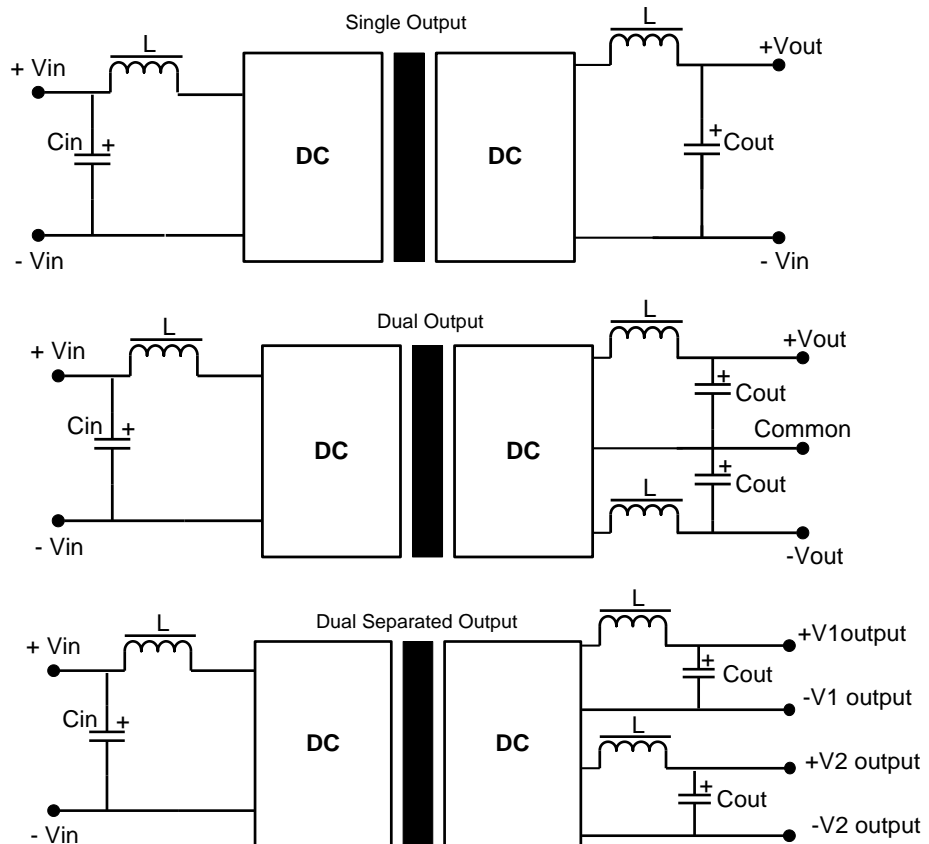


All dimensions are in mm (inch)  
All Pins are on a 2.54mm (0.10inch) pitch  
with tolerance of  $\pm 0.25$ mm (0.01inch)

## Tolerance Graph



## Recommended Filter Circuit



If it is required to decrease the input/output ripple, an "LC" filter network can be installed on the input and output of the converter (see above).

It should be noted that the inductance and the resonant frequency of the "LC" filtering network should differ from the DC/DC converter switching frequency to avoid mutual interference.

The capacitance of the output filter capacitor must not exceed the values in the Table below to avoid startup problems and ensure safe and reliable operation.

**It's not recommended to connect any external capacitor in the application field when output loading is less than 0.5 watt.**

### External Capacitor Tables

#### Input Capacitor (Cin)

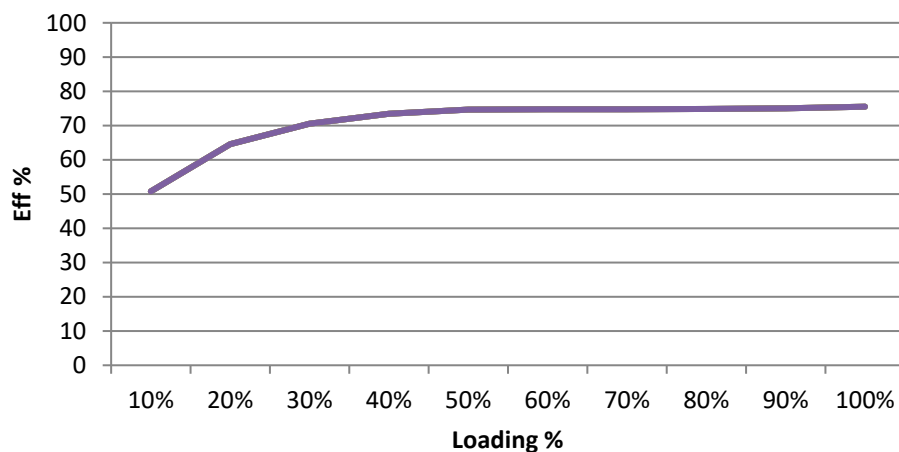
Vin (VDC)	Cin (uF)
5	4.7
12	2.2

#### Output Capacitor (Cout)

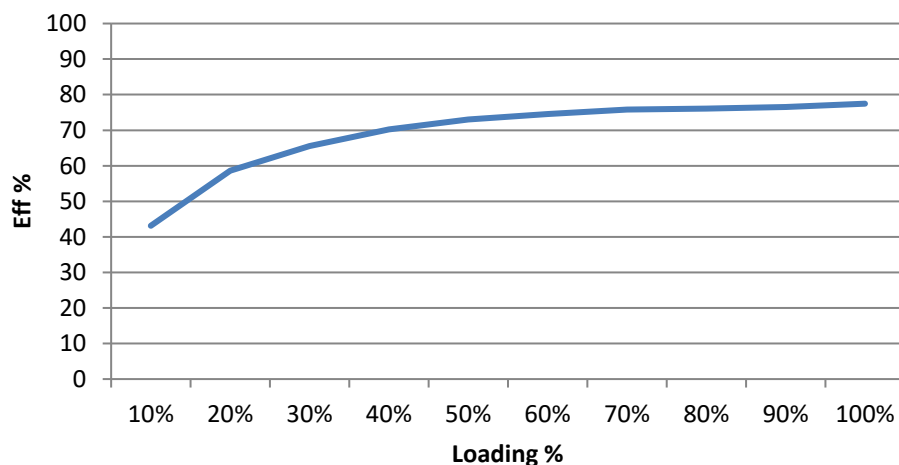
Single Vout (VDC)	Cout (uF)	Dual Vout (Vdc)	Cout (uF)	Dual Separated Vout (Vdc)	Cout (uF)
5	10	±5	4.7	5/5	4.7
9	4.7	±9	2.2	9/9	2.2
12	2.2	±12	1	12/12	1
15	1	±15	0.47	15/15	0.47

### Typical Efficiency vs. Loading

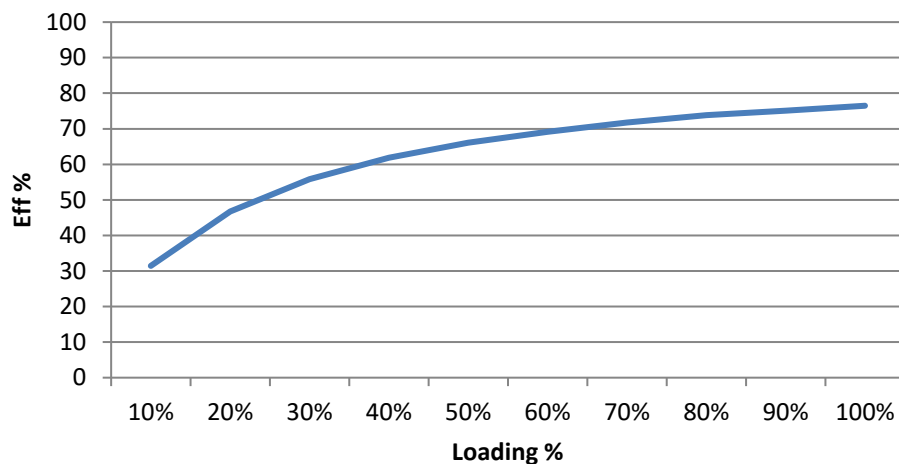
#### AM1L-0303S-NZ Efficiency vs. Loading



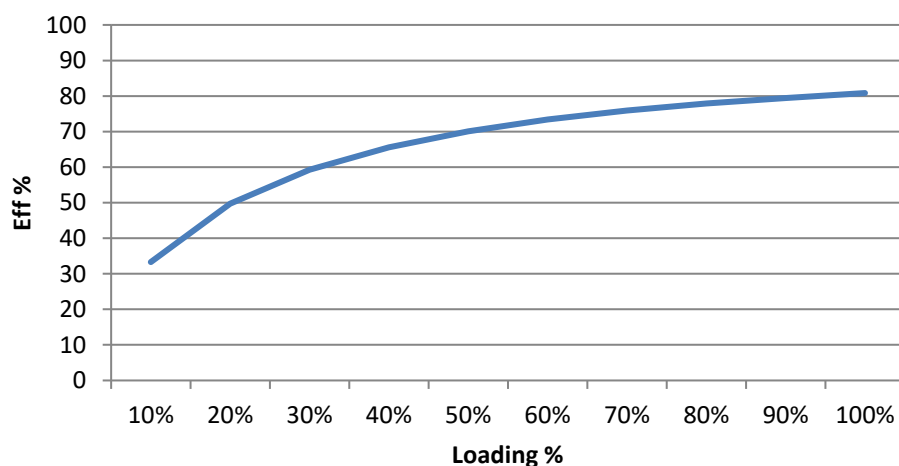
#### AM1L-0505S-NZ Efficiency vs. Loading



### AM1L-1212S-NZ Efficiency vs. Loading



### AM1L-2424S-NZ Efficiency vs. Loading



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