



**FEATURES:**

- Wide 4:1 Input Voltage Range
- High efficiency up to 90%
- 1500 VDC Isolation
- Over Current Protection
- No load consumption  $\leq 0.12W$
- Operating Temperature  $-40^{\circ}C$  to  $+85^{\circ}C$
- Output Over Voltage protection
- Continuous Short Circuit Protection
- Input Under Voltage Protection
- Remote On/Off control

**Models**  
**Single output**



Model	Input Voltage (V)	Output Voltage (V)	Output Current max (A)	Isolation (VDC)	Max Capacitive Load ( $\mu F$ )	Efficiency Typ. (%)
AM20CW-2403S-NZ	9-36	3.3	5	1500	10000	88
AM20CW-2405S-NZ	9-36	5	4	1500	10000	90
AM20CW-2412S-NZ	9-36	12	1.667	1500	1600	90
AM20CW-2415S-NZ	9-36	15	1.333	1500	1000	89
AM20CW-2424S-NZ	9-36	24	0.833	1500	500	91
AM20CW-4803S-NZ	18-75	3.3	5	1500	10000	88
AM20CW-4805S-NZ	18-75	5	4	1500	10000	90
AM20CW-4812S-NZ	18-75	12	1.667	1500	1600	91
AM20CW-4815S-NZ	18-75	15	1.333	1500	1000	91
AM20CW-4824S-NZ	18-75	24	0.833	1500	500	91

Add suffix “-ST” for optional screw terminal bottom plate or “-STD” for optional DIN Rail screw terminal bottom plate and reverse voltage protection. (Single output models only)

\*Add suffix “-K” for optional heatsink. (Single output models only)

**Models**  
**Dual output**

Model	Input Voltage (V)	Output Voltage (V)	Output Current max (A)	Isolation (VDC)	Max Capacitive Load ( $\mu F$ )	Efficiency Typ. (%)
AM20CW-2405D-NZ	9-36	$\pm 5$	$\pm 2$	1500	2000	87
AM20CW-2412D-NZ	9-36	$\pm 12$	$\pm 0.833$	1500	800	90
AM20CW-2415D-NZ	9-36	$\pm 15$	$\pm 0.667$	1500	600	90
AM20CW-2424D-NZ	9-36	$\pm 24$	$\pm 0.417$	1500	300	89
AM20CW-4805D-NZ	18-75	$\pm 5$	$\pm 2$	1500	2000	86
AM20CW-4812D-NZ	18-75	$\pm 12$	$\pm 0.833$	1500	800	90
AM20CW-4815D-NZ	18-75	$\pm 15$	$\pm 0.667$	1500	600	90
AM20CW-4824D-NZ	18-75	$\pm 24$	$\pm 0.417$	1500	300	90

NOTE: All specifications in this datasheet are measured at an ambient temperature of  $25^{\circ}C$ , humidity  $< 75\%$ , nominal input voltage and at rated output load unless otherwise specified.

**Input Specifications**

Parameters	Nominal	Typical	Maximum	Units
Voltage range	24 Vin 48 Vin	9-36 18-75		VDC
Filter	Pi network			
Absolute Maximum Rating (100ms)	24 Vin 48 Vin		-0.7 - 50 -0.7 - 100	VDC
No Load Input Current	24 Vin	3.3V single output	30	50
		5V single output	35	55
		12V single output	6	15
		15V single output	6	15
		24V single output	10	20
		All dual output	10	20

	48 Vin	3.3V single output	15	30	mA
		5V single output	20	30	
		12V single output	3	15	
		15V single output	3	15	
		24V single output	4	15	
		All dual output	5	11	
Input reflected current			30		mA
Input Under voltage turn off	24 Vin		5.5 ~ 6.5		VDC
	48 Vin		12 ~ 15.5		
Startup voltage	24 Vin			9	VDC
	48 Vin			18	
Startup time	Nominal input, resistive load		10		ms
Remote On/Off Control	On	3.5-12VDC or leave open			
	Off	0-1.2VDC or connect to GND, idle current 2-7mA			

### Isolation Specifications

Parameters	Conditions	Typical	Maximum	Units
Tested I/O voltage	60 sec, <1mA	>1500		VDC
Resistance	500VDC	>1000		MOhm
Capacitance	I/O, 100KHz/0.1V	2000		pF

### Output Specifications

Parameters	Conditions	Typical	Maximum	Units	
Voltage accuracy	Single output 0% to 100% load	±1	±3	%	
	Dual output 5%-100% load	±1	±3		
Over voltage protection		110-160		% of Vout	
Over current protection		150		% of Iout	
Short circuit protection	Continuous				
Short circuit restart	Auto-Recovery				
Line voltage regulation	Single output, Full load, LL to HL	±0.2	±0.5	% of Vin	
	Dual output, Full load, LL to HL	1 <sup>st</sup> output	±0.2		±0.5
		2 <sup>nd</sup> output	±0.4		±1
Load voltage regulation	5% to 100% load	±0.5	±1	%	
Cross regulation	50% at 1st output, 10-100% at 2nd output		±5	%	
Voltage adjustment	Single output		±10	%Vout	
Temperature coefficient	100% load		±0.03	%/°C	
Ripple & Noise	Single output, 20MHz, 5-100% load	50	100	mV p-p	
	Dual output, 20MHz, 5-100% load	100	200		
Transient recovery time	25% load step change	300	500	µs	
Transient recovery deviation	3.3/5VDC single output, 25% load step change	±5	±8	%	
	±5VDC dual output, 25% load step change	±3	±8		
	Others, 25% load step change	±3	±5		

### General Specifications

Parameters	Conditions	Typical	Maximum	Units
Switching frequency	3.3/5VDC single output, 100% load	300		KHz
	Others, 100% load	270		
Operating temperature	3.3/5VDC single output with derating curve	-40 to +95		°C
	Others with derating curve	-40 to +105		
Storage temperature	-55 to +125			°C
Maximum case temperature				105 °C
Cooling	Free air convection			
Humidity				95 % RH
Case material	Aluminum Alloy			
Weight	Pin mountable without heatsink		15	g
	Pin mountable with heatsink		20	
	-ST option without heatsink		38	
	-ST option with heatsink		40	
	-STD option without heatsink		58	
	-STD option with heatsink		60	

Dimensions (L x W x H)	Pin mountable without heatsink	1.00 x 1.00 x 0.46 inches	25.40 x 25.40 x 11.70 mm
	Pin mountable with heatsink	1.00 x 1.00 x 0.64 inches	25.40 x 25.40 x 16.20 mm
	-ST option without heatsink	2.99 x 1.24 x 0.83 inches	76.00 x 31.50 x 21.20 mm
	-ST option with heatsink	2.99 x 1.24 x 0.99 inches	76.00 x 31.50 x 25.20 mm
	-STD option without heatsink	2.99 x 1.24 x 1.02 inches	76.00 x 31.50 x 25.80 mm
	-STD option with heatsink	2.99 x 1.24 x 1.17 inches	76.00 x 31.50 x 29.80 mm
MTBF	>1,000,000 hours (MIL-HDBK -217F, Ground Benign, t=+25°C)		
Maximum soldering temperature	1.5mm from case for 10 sec		300 °C

## Environmental Specifications

Parameters		
Vibration	Test mode	10-150Hz
	Acceleration	5G, every axis tested

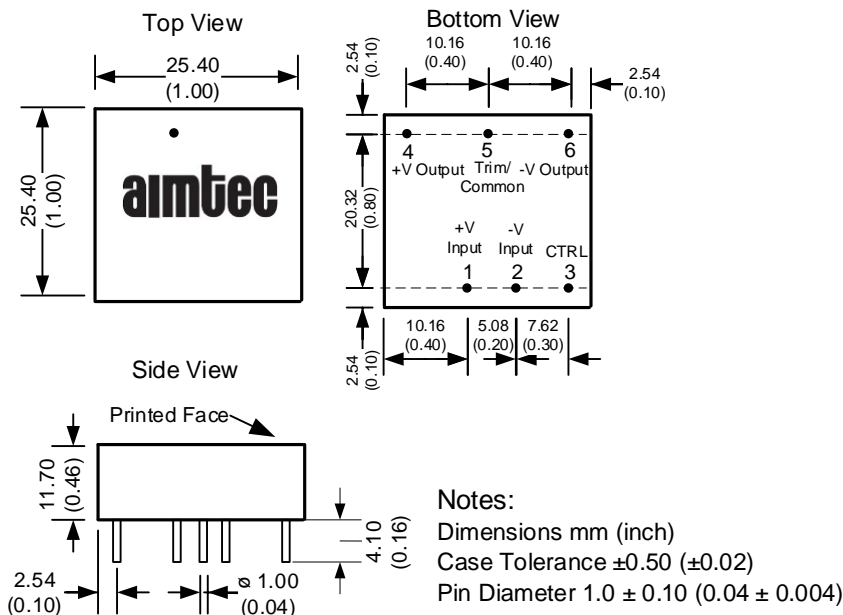
## Safety Specifications

Parameters		
Approval	cULus 62368-1 (with exception of the dual output models), CE	
Standards	Information technology Equipment	IEC/EN/UL 62368-1
	EMI - Conducted and radiated emission	EN 55032, class B (with the recommended EMC circuit)
	Electrostatic Discharge Immunity	IEC 61000-4-2, Contact ±4KV, Criteria B
	RF, Electromagnetic Field Immunity	IEC 61000-4-3, 10V/m, Criteria A
	Electrical Fast Transient / Burst Immunity	IEC 61000-4-4, ±2KV, Criteria B (with the recommended EMC circuit)
	Surge Immunity	IEC 61000-4-5, ±2KV, Criteria B (with the recommended EMC circuit)
	RF, Conducted Disturbance Immunity	IEC 61000-4-6, 3 Vrms, Criteria A

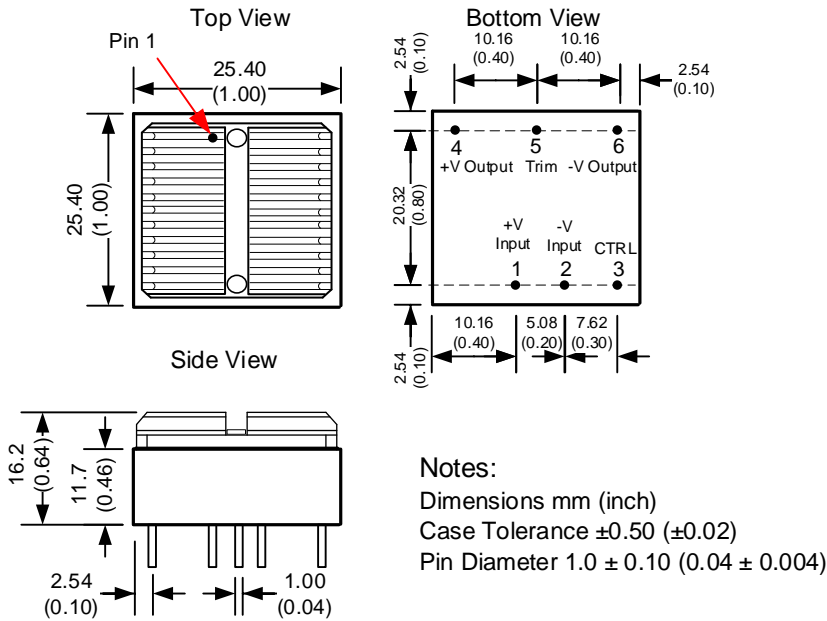
## Pin Out Specifications

Pin	Single	Pin	Dual
1	+V Input	1	+V Input
2	-V Input	2	-V Input
3	On/Off Control	3	On/Off Control
4	+V Output	4	+V Output
5	Trim	5	Common
6	-V Output	6	-V Output

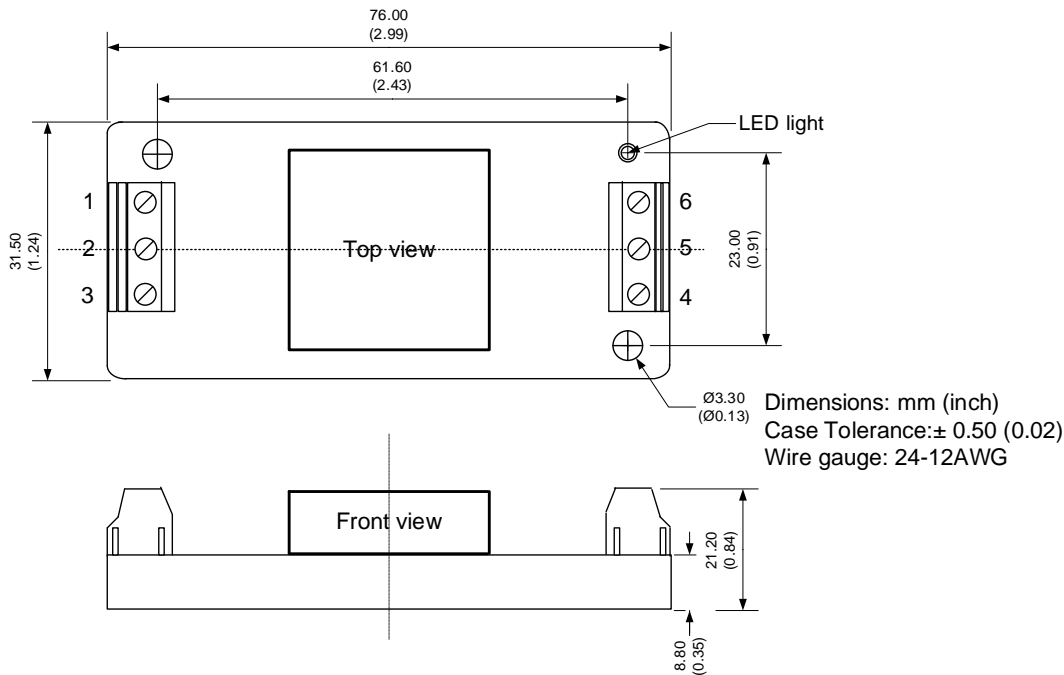
## Dimensions



**Heatsink Option: AM20CW-NZ-K**



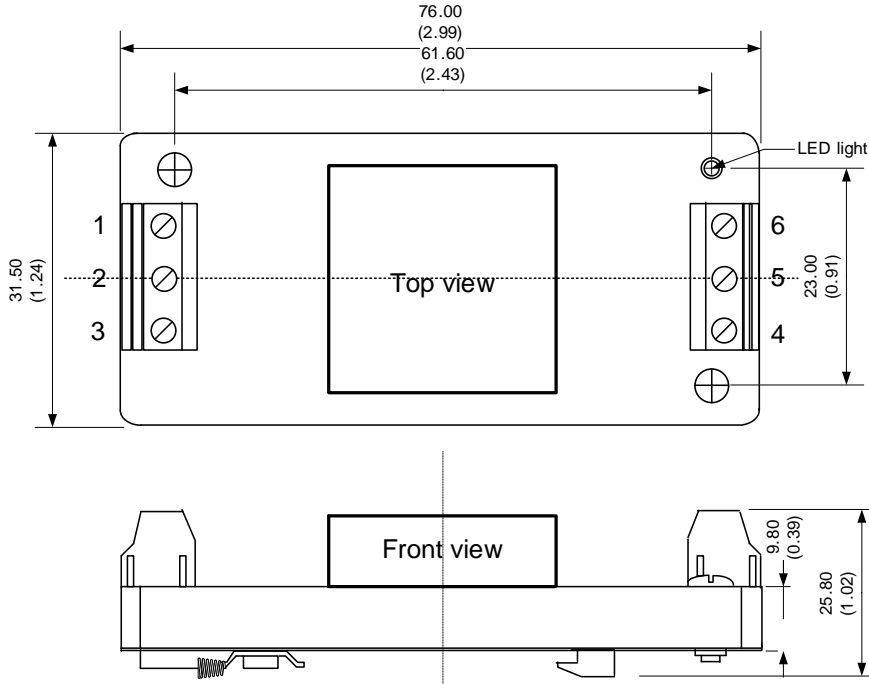
**Dimensions with -ST options**



**Pin Out Specifications**

Pin	Single
1	On/Off Control
2	-Vin
3	+Vin
4	+ Vout
5	Trim
6	- Vout

**Dimensions with -STD options**

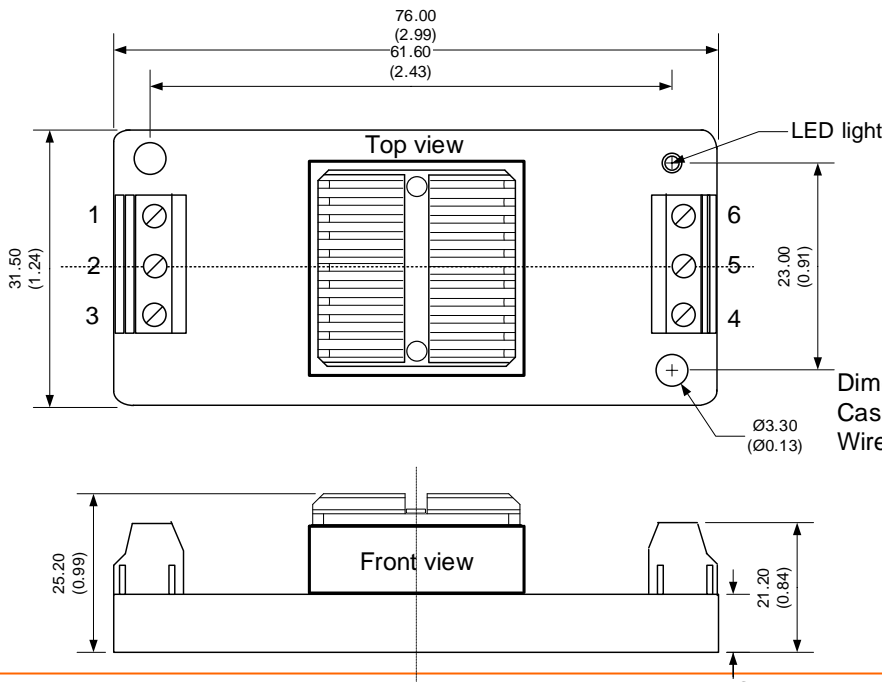


Dimensions: mm (inch)  
Case Tolerance: ± 1.00 (0.04)  
Wire gauge: 24-12AWG

**Pin Out Specifications**

Pin	Single
1	On/Off Control
2	-Vin
3	+Vin
4	+ Vout
5	Trim
6	- Vout

**Dimensions with heatsink and -ST options**

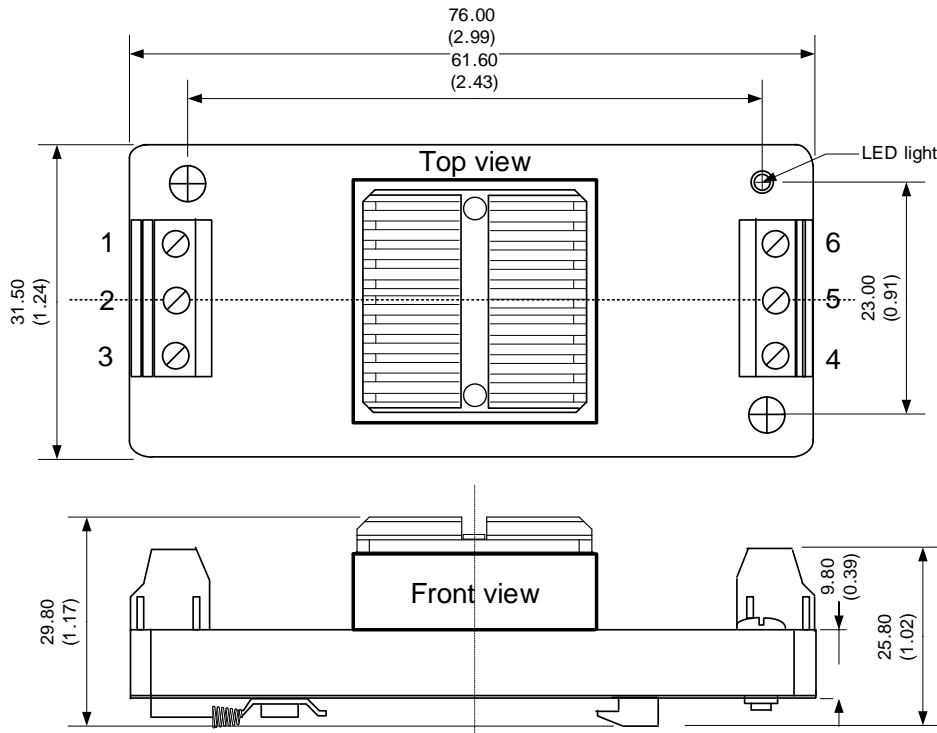


Dimensions: mm (inch)  
Case Tolerance: ± 0.50 (0.02)  
Wire gauge: 24-12AWG

**Pin Out Specifications**

Pin	Single
1	On/Off Control
2	-Vin
3	+Vin
4	+ Vout
5	Trim
6	- Vout

### Dimensions with heatsink and -STD options



Dimensions: mm (inch)  
Case Tolerance:  $\pm 0.50$  (0.02)  
Wire gauge: 24-12AWG

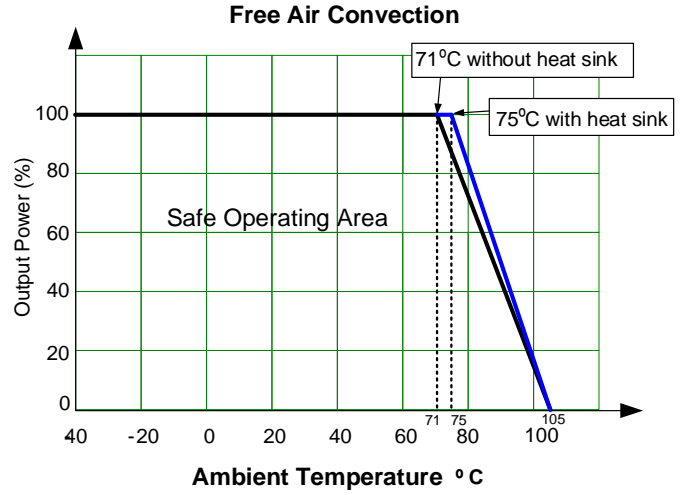
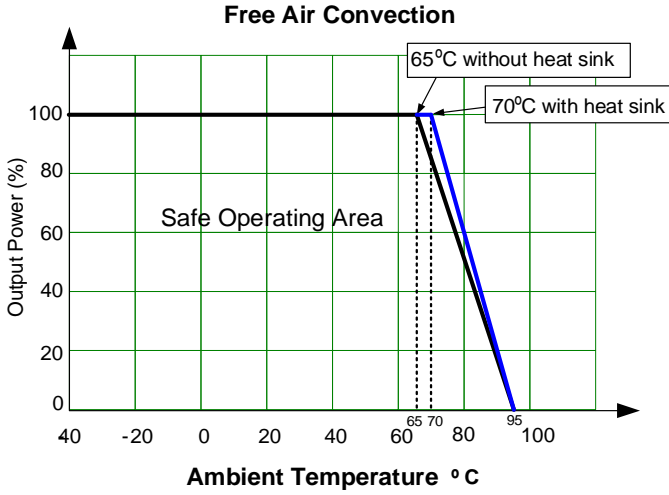
### Pin Out Specifications

Pin	Single
1	On/Off Control
2	-Vin
3	+Vin
4	+ Vout
5	Trim
6	- Vout

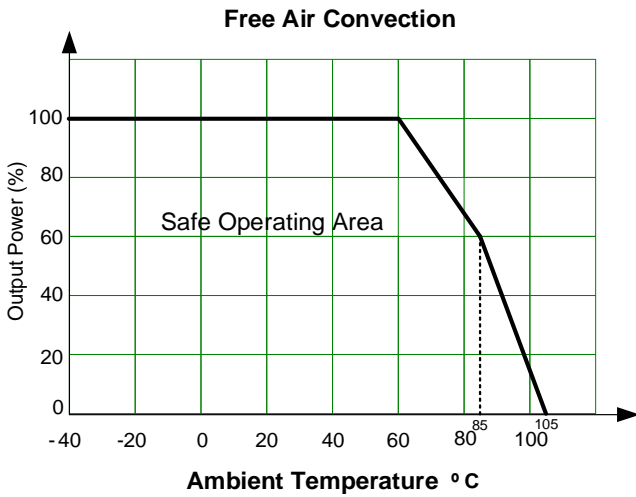
### Derating

**3.3V & 5V single output models**

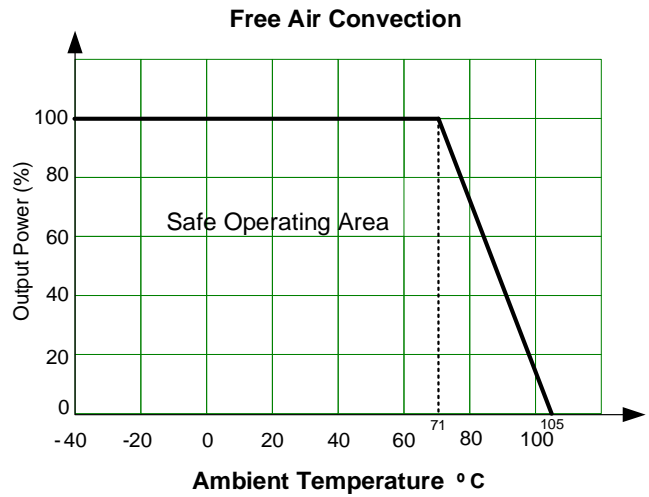
**Other single output models**



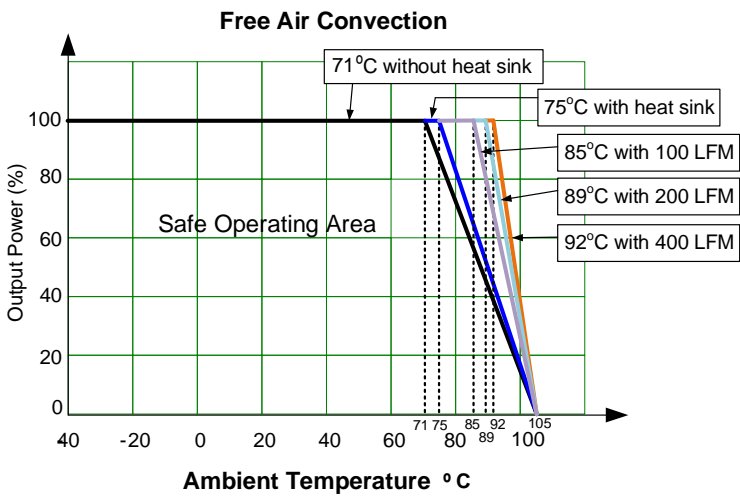
**±5V dual output model**



**Other Dual output models**

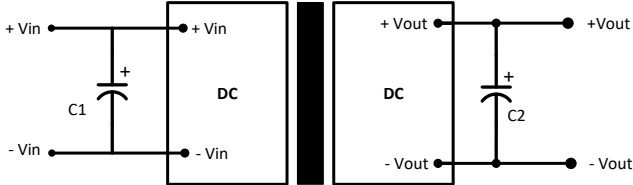


**24V output model**



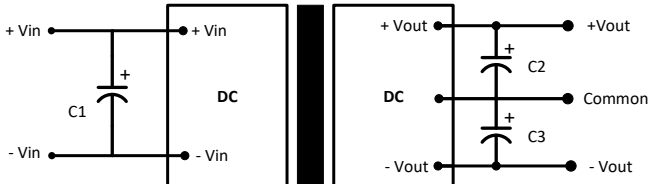
## Typical Application Circuit

### Single



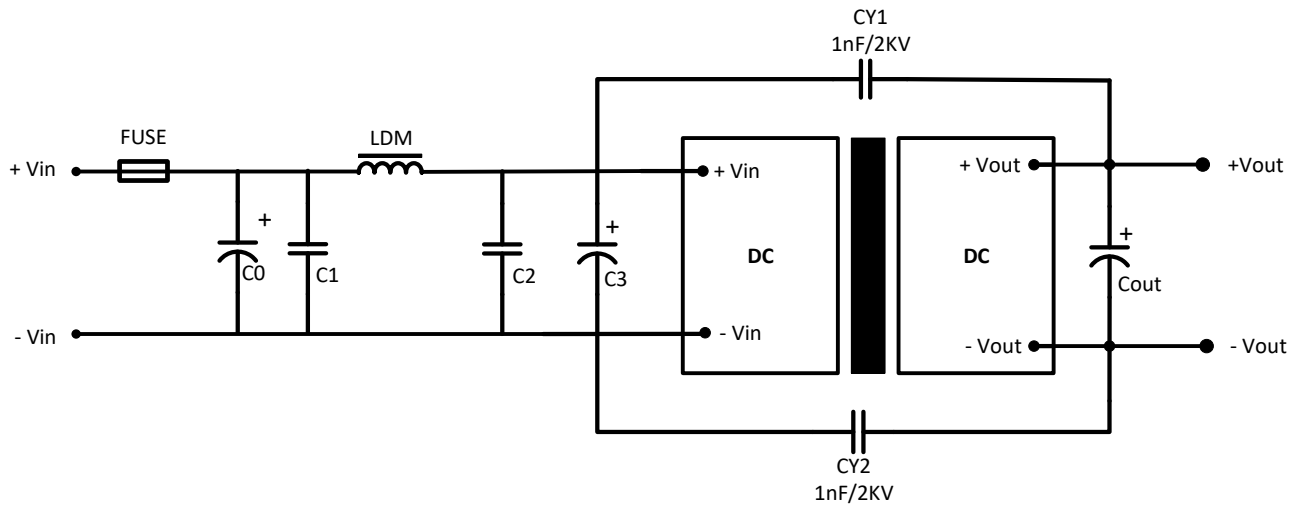
Model	Single 3.3/5/12/15V output	Single 24V output
C1	100 $\mu$ F	
C2	100 $\mu$ F	47 $\mu$ F

### Dual



Model	24V input dual output	48V input dual output
C1	100 $\mu$ F	10 - 47 $\mu$ F
C2	10 $\mu$ F	
C3	10 $\mu$ F	

## Recommended EMC Circuit



Model	24V input single output	48V input single output
C0, C3	330 $\mu$ F/50V	330 $\mu$ F/100V
C1, C2	4.7 $\mu$ F/50V	4.7 $\mu$ F/100V
LDM	2.2 $\mu$ H/4A	2.2 $\mu$ H/2A
Cout	Refer to typical circuit C2	

Model	24V input dual output	48V input dual output
C0, C3	330 $\mu$ F/50V	330 $\mu$ F/100V
C1, C2	4.7 $\mu$ F/50V	4.7 $\mu$ F/100V
LDM	4.7 $\mu$ H	
Cout	Refer to typical circuit C2	

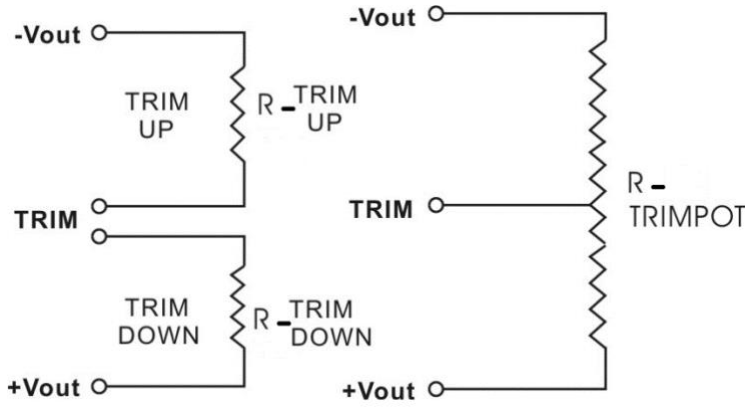
## Trimming

Output voltage can be externally trimmed by utilizing the methods as shown below



**Fixed Resistor**

**Variable Potentiometer**



Leave open if not used.

**3.3V Output**

Trim down %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	3.267	3.234	3.201	3.168	3.135	3.102	3.069	3.036	3.003	2.97
Rt down (KΩ)	149.795	89.213	60.517	43.778	32.811	25.070	19.314	14.866	11.325	8.441
Trim up %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	3.333	3.366	3.399	3.432	3.465	3.498	3.531	3.564	3.597	3.63
Rt up (KΩ)	891.884	136.200	67.476	41.703	28.202	19.894	14.266	10.202	7.128	4.723

**5V Output**

Trim down %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	4.95	4.9	4.85	4.8	4.75	4.7	4.65	4.6	4.55	4.5
Rt down (KΩ)	89.996	47.446	29.793	20.131	14.036	9.840	6.775	4.439	2.598	1.111
Trim up %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	5.05	5.1	5.15	5.2	5.25	5.3	5.35	5.4	5.45	5.5
Rt up (KΩ)	238.676	81.473	46.044	30.398	21.581	15.923	11.985	9.085	6.861	5.101

**12V Output**

Trim down %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	11.88	11.76	11.64	11.52	11.4	11.28	11.16	11.04	10.92	10.8
Rt down (KΩ)	493.692	299.052	210.127	159.185	126.173	103.042	85.932	72.764	62.316	53.823
Trim up %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	12.12	12.24	12.36	12.48	12.6	12.72	12.84	12.96	13.08	13.2
Rt up (KΩ)	704.035	156.520	81.479	51.675	35.677	25.695	18.874	13.917	10.152	7.195

**15V Output**

Trim down %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	14.85	14.7	14.55	14.4	14.25	14.1	13.95	13.8	13.65	13.5
Rt down (KΩ)	632.483	398.237	286.114	220.359	177.137	146.560	123.787	106.169	92.132	80.687
Trim up %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	15.15	15.3	15.45	15.6	15.75	15.9	16.05	16.2	16.35	16.5
Rt up (KΩ)	1457.699	190.174	94.242	58.954	40.616	29.381	21.791	16.321	12.190	8.961

**24V Output**

Trim down %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	23.76	23.52	23.28	23.04	22.8	22.56	22.32	22.08	21.84	21.6
Rt down (KΩ)	1284.000	789.923	563.667	433.904	349.754	290.763	247.115	213.514	186.847	165.170
Trim up %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	24.24	24.48	24.72	24.96	25.2	25.44	25.68	25.92	26.16	26.4
Rt up (KΩ)	814.689	177.714	92.138	58.264	40.107	28.788	21.057	15.440	11.176	7.827

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