



FEATURES:

- Efficiency up to 90%
- Wide 2:1 Input range
- No-load consumption $\leq 0.15W$
- Over Current protection
- Continuous Short Circuit protection
- On/Off Remote Control
- Over Voltage Protection
- I/O Isolation 1500VDC
- Operating Temperature: $-40^{\circ}C$ to $+85^{\circ}C$
- Output Voltage adjustment



Models
Single output

Model	Input Voltage (V)	Max Input Current Full/No load (mA)	Output Voltage (V)	Output Current max (A)	Isolation (VDC)	Max Capacitive Load (μF)	Efficiency Typ. (%)
AM20E-12110S-NZ	9-18	1938	110	0.18	1500	66	88
AM20E-2403S-NZ	18-36	818/45	3.3	5	1500	10000	86
AM20E-2405S-NZ	18-36	993/45	5	4	1500	10000	90
AM20E-2409S-NZ	18-36	969/10	9	2.22	1500	4700	87
AM20E-2412S-NZ	18-36	969/10	12	1.66	1500	1600	87
AM20E-2415S-NZ	18-36	969/10	15	1.33	1500	1000	88
AM20E-2424S-NZ	18-36	969/10	24	0.83	1500	500	88
AM20E-4803S-NZ	36-75	409/25	3.3	5	1500	10000	86
AM20E-4805S-NZ	36-75	497/25	5	4	1500	10000	90
AM20E-4809S-NZ	36-75	485/9	9	2.22	1500	4700	89
AM20E-4812S-NZ	36-75	485/9	12	1.66	1500	1600	89
AM20E-4815S-NZ	36-75	485/9	15	1.33	1500	1000	90
AM20E-4824S-NZ	36-75	485/9	24	0.83	1500	500	90

Models
Dual output

Model	Input Voltage (V)	Max Input Current Full/No load (mA)	Output Voltage (V)	Output Current max (A)	Isolation (VDC)	Max Capacitive Load (μF)	Efficiency Typ. (%)
AM20E-1215D-NZ	9-18	1960/20	± 15	± 0.66	1500	± 625	87
AM20E-1224D-NZ	9-18	1938/25	± 24	± 0.41	1500	± 220	88
AM20E-2405D-NZ	18-36	993/45	± 5	± 2	1500	± 4800	84
AM20E-2409D-NZ	18-36	969/10	± 9	± 1.11	1500	± 1000	86
AM20E-2412D-NZ	18-36	969/10	± 12	± 0.83	1500	± 800	86
AM20E-2415D-NZ	18-36	969/10	± 15	± 0.66	1500	± 625	86
AM20E-2424D-NZ	18-36	969/10	± 24	± 0.41	1500	± 500	86
AM20E-4805D-NZ	36-75	497/25	± 5	± 2	1500	± 4800	86
AM20E-4812D-NZ	36-75	485/9	± 12	± 0.83	1500	± 800	88
AM20E-4815D-NZ	36-75	485/9	± 15	± 0.66	1500	± 625	89

*Add suffix “-ST” for optional screw terminal bottom plate or “-STD” for optional DIN Rail screw terminal bottom plate (It is limited to models AM20E-4805S-NZ-ST, AM20E-4812S-NZ-STD and AM20E-4824S-NZ-STD).

**Add suffix “-K” for optional heatsink, “-K-ST” for optional heatsink and screw terminal bottom plate or “-K-STD” for optional heatsink and DIN Rail screw terminal bottom plate (It is limited to models AM20E-4812D-NZ-K, AM20E-4824S-NZ-K and AM20E-2405S-NZ-K).

*** All the suffix options will be discontinued (EOL) by December 30, 2020; For new designs, please refer to AM20EW-NZ series.

**** Due to the reverse polarity protection, models with -ST or -STD options will have their efficiency decreased by 2%.

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	12	9-18	20	VDC
	24	18-36	40	
	48	36-75	80	
Filter	π (Pi) Network			
Startup time		10		ms
Absolute Maximum Rating	12		-0.7-25	VDC
	24		-0.7-50	
	48		-0.7-100	
Peak Input Voltage time			1	s
On/Off control	ON – open or 3.5-12VDC; OFF – short to -Vin or 0-1.2VDC			
Input current when off	AM20E-12110S-NZ others	5 4	7	mA
Input reflected current	AM20E-12110S-NZ others	20 30		mA
Start-up voltage	12		9	VDC
	24		18	
	48		36	

Isolation Specifications

Parameters	Conditions	Typical	Maximum	Units
Tested I/O voltage	60 sec, 1mA	1500		VDC
Resistance	500VDC Isolation	>1000		MOhm
Capacitance	100KHz/0.1V, AM20E-12110S-NZ	2000		pF
	100KHz/0.1V, AM20E-2424S-NZ	2050		
	100KHz/0.1V, Others	1050		

Output Specifications

Parameters	Conditions	Typical	Maximum	Units
Voltage accuracy*	AM20E-1224D-NZ negative	± 2	± 4	%
	5% to 100% load	± 1	± 3	
Cross regulation	50% 1 st load, 10-100% 2 nd load		± 5	%
Line voltage regulation (single)	Full load, LL-HL	± 0.2	± 0.5	% of Vin
Line voltage regulation (dual)	Full load, LL-HL	± 0.5	± 1	% of Vin
Load voltage regulation (+Vout)**	5% to 100% load	± 0.5	± 1	%
Load voltage regulation (-Vout)**	5% to 100% load, 12Vin/15 and 24Vout	± 1	± 1.5	%
	5% to 100% load, others	± 0.5	± 1.5	
Over voltage protection****		≥ 110	160	% of Vo
Over current protection	AM20E-12110S-NZ	130		% of Io
	others	≥ 110	190	
Short Circuit protection	Continuous, hiccup, auto-recovery			
Temperature coefficient			± 0.03	%/°C
Ripple & Noise***	5% to 100% load, AM20E-12110S-NZ		250	mV p-p
	5% to 100% load, others	50	100	
Voltage adjustment range	24/48Vin		± 10	%
Transient recovery time	25% load step change	300	500	μ S
Transient recovery deviation	25% load step change: 3.3, 5, ± 5 Vout	± 5	± 8	%
	25% load step change: others	± 3	± 5	
Voltage adjustment	24/48Vin		± 10	% of Vo

* Voltage accuracy for ± 5 V and ± 9 V at 0% to 5% load is ± 5 % max.

** Load regulation at 0% to 5% load is ± 5 %.

*** Measured at 20MHz bandwidth. Ripple & Noise when load <5% is 5% of Vo.

**** AM20E-12110S-NZ does not have over voltage protection.

General Specifications

Parameters	Conditions	Typical	Maximum	Units
Switching frequency	AM20E-12110S-NZ 100% load	300 270		KHz
Operating temperature	See derating curve	-40 to +85		°C
Storage temperature		-55 to +125		°C
Maximum case temperature	AM20E-12110S-NZ		105	°C
Cooling	Free air convection			
Humidity			95	% RH
Case material	Aluminum alloy			
Dimensions (L x W x H)	Pin mountable	2.00 x 1.00 x 0.46inches (50.80 x 25.40 x 11.80mm)		
	With optional -ST mounting plate	2.99 x 1.24 x 0.84inches (76.00 x 31.50 x 21.20mm)		
	With optional -STD mounting plate	2.99 x 1.24 x 1.02inches (76.00 x 31.50 x 25.80mm)		
	With optional -K Pin mountable	2.02 x 1.03 x 0.65inches (51.40 x 26.20 x 16.50mm)		
	With optional -ST-K mounting plate	2.99 x 1.24 x 1.00inches (76.00 x 31.50 x 25.30mm)		
	With optional -STD-K mounting plate	2.99 x 1.24 x 1.18inches (76.00 x 31.50 x 29.90mm)		
Weight	Pin mountable	26		g
	With optional -ST mounting plate	48		
	With optional -STD mounting plate	68		
	With optional -K Pin mountable	34		
	With optional -ST-K mounting plate	56		
	With optional -STD-K mounting plate	76		
MTBF	>1,000,000 hours (MIL-HDBK -217F, Ground Benign, t ₊ =+25°C)			
Manual soldering temperature	1.5mm from case for 10 sec		300	°C

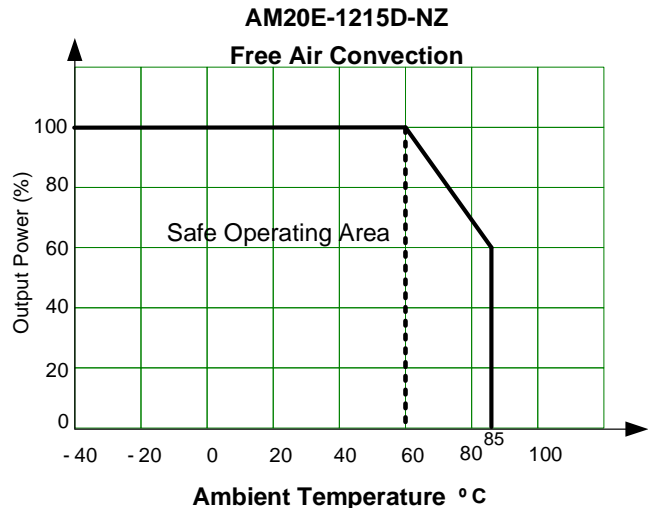
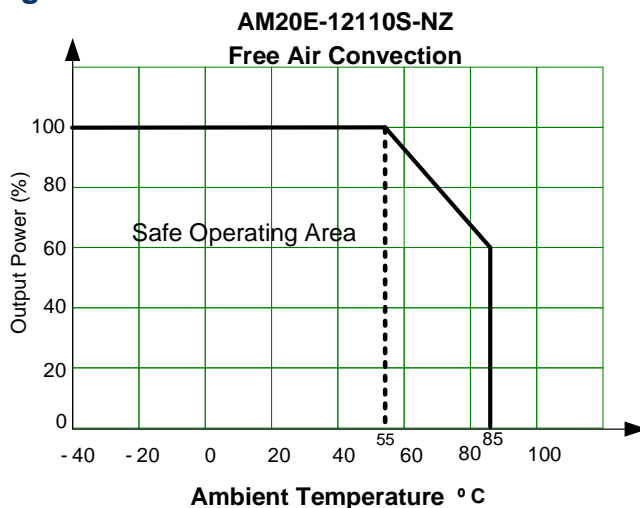
Environment Specification

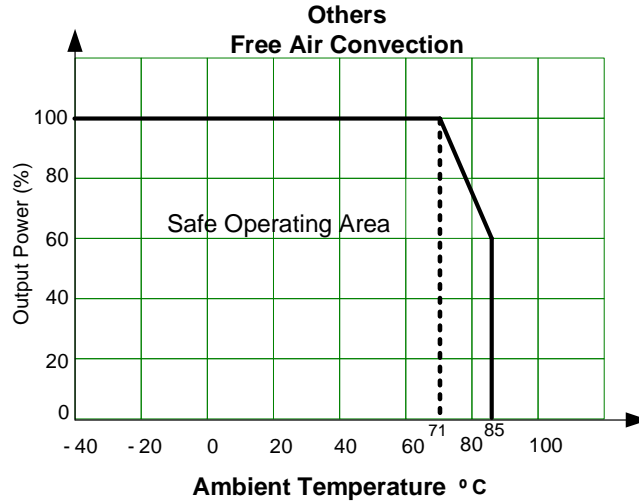
Test	Parameters	Conditions
Vibration	Test mode	10-150Hz
	Acceleration	5g, 90min, every axis tested

Safety Specifications

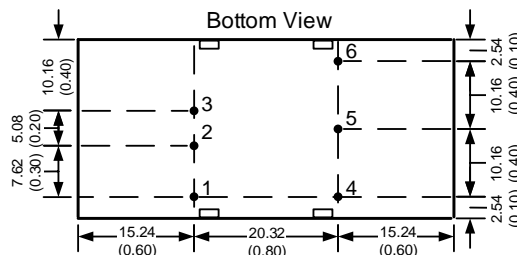
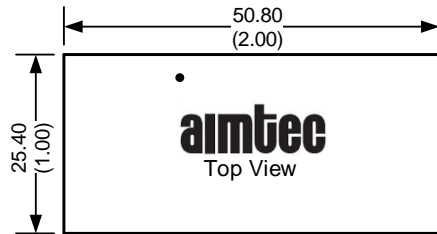
Parameters		
Standards	Design to meet EN60950 (except 12Vin models and AM20E-2424D-NZ) CISPR32/EN55032, Class A, with no external components; Class B with recommended EMC circuit part A (AM20E-12110S-NZ does not comply with CISPR32/EN55032 radiate emission standard)	
	Electrostatic Discharge Immunity	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 with recommended EMC circuit part B, Criteria B
	Surge Immunity	IEC 61000-4-5, L-L ±2KV with recommended EMC circuit part B, Criteria B
	RF, Conducted Disturbance Immunity	IEC 61000-4-6, 3 Vrms, Criteria A
	Voltage dips, Short Interruptions & Voltage variations Immunity	IEC 61000-4-29, 0-70%, Criteria B

Derating



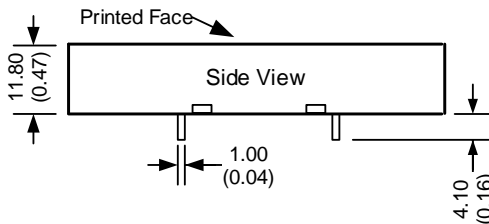


Dimensions metal case



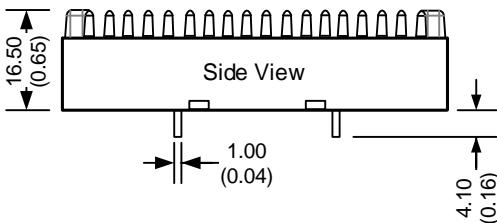
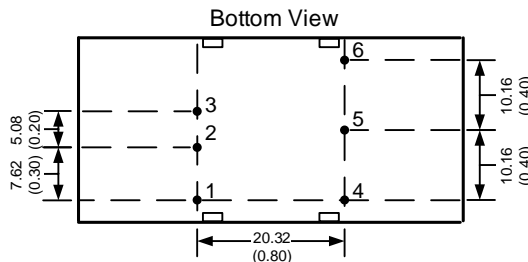
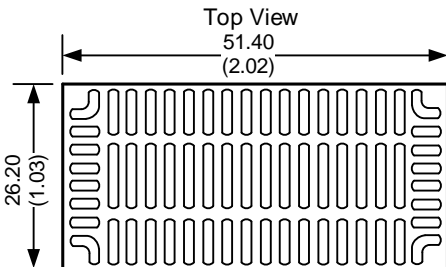
Pin Out Specifications

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



Note:
Unit: mm (inch)
General tolerances: ± 0.50 (± 0.02)
Pin diameter tolerance: ± 0.10 (± 0.004)

Heatsink Option: AM20E-NZ-K

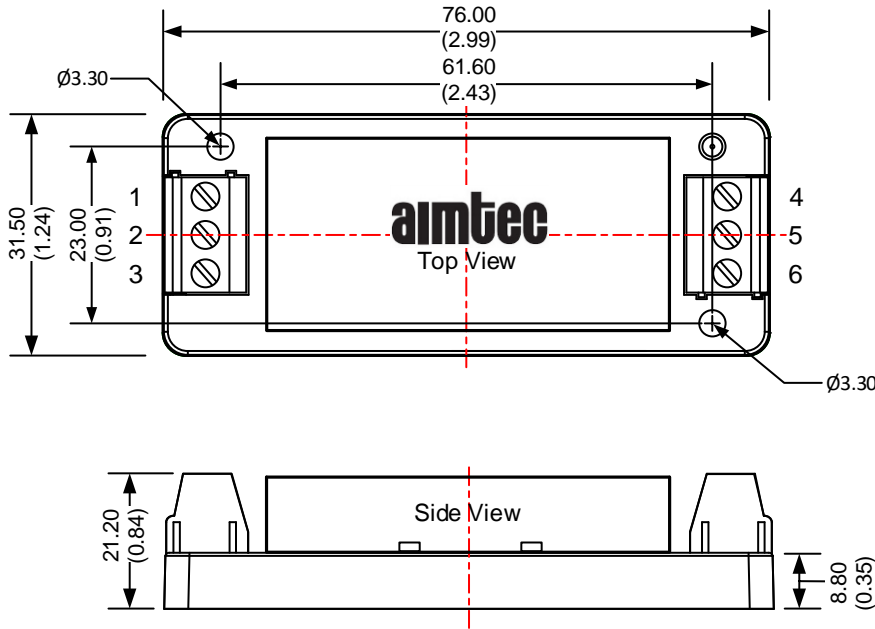


Note:
Unit: mm (inch)
General tolerances: ± 0.50 (± 0.02)

Screw Terminal Option: AM20E-NZ-ST

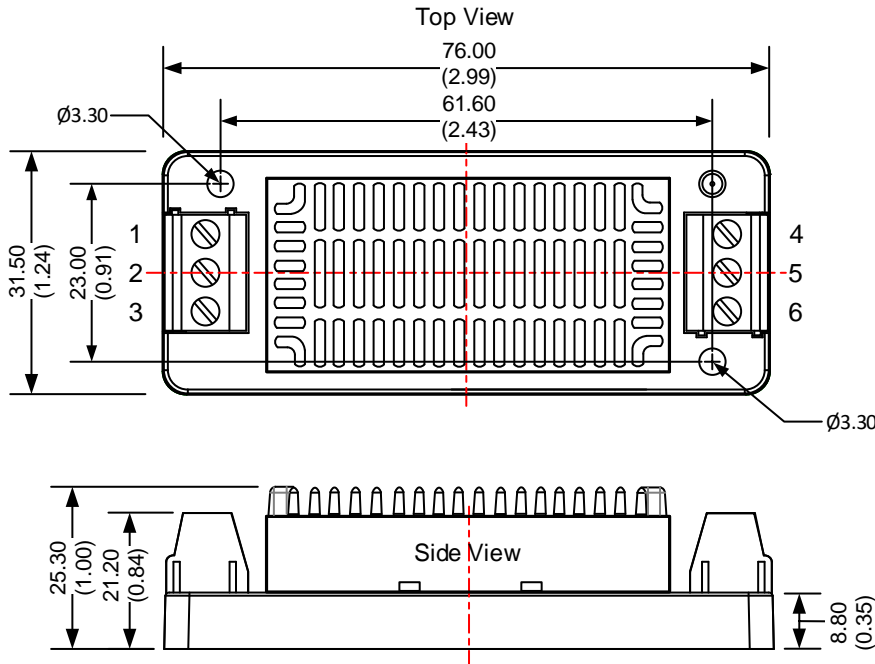
Pin Out Specifications

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



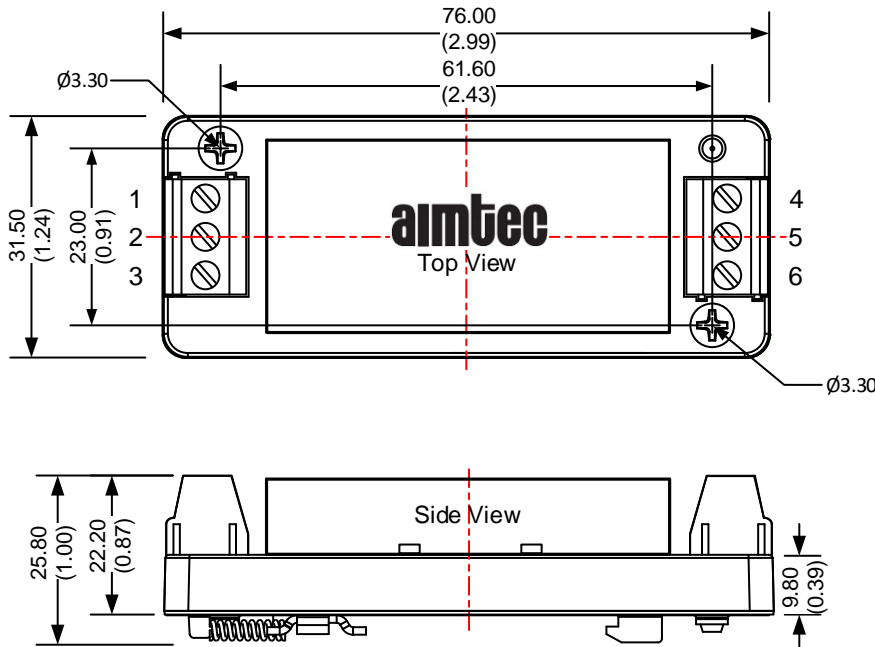
Note:
Unit: mm (inch)
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N*m
General tolerances: ±0.50 (±0.02)

Screw Terminal with Heatsink Option: AM20E-NZ-K-ST



Note:
Unit: mm (inch)
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N*m
General tolerances: ±0.50 (±0.02)

DIN-RAIL Option: AM20E-NZ-K-STD



Pin Out Specifications

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

Note:

Unit: mm (inch)

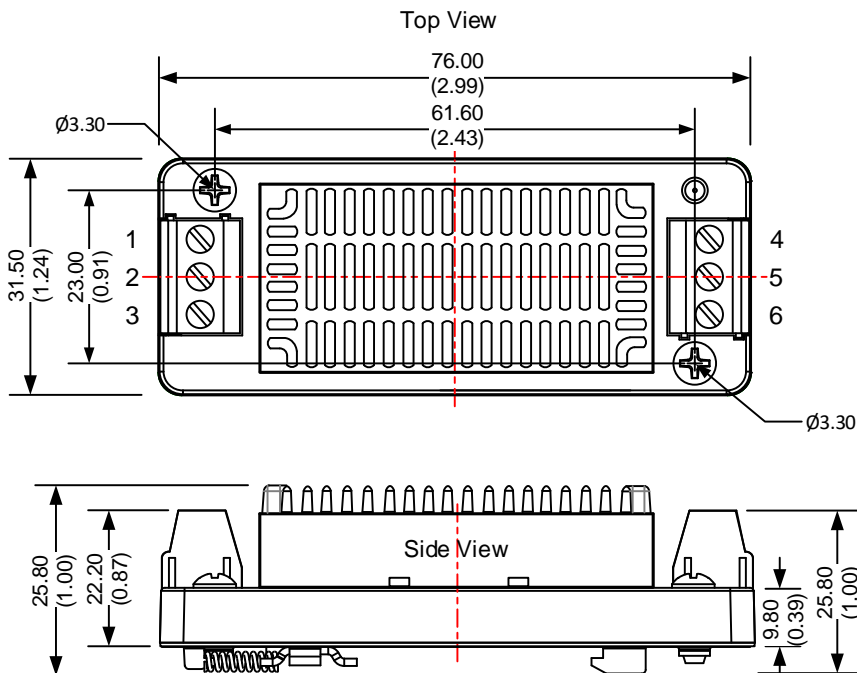
Mounting rail: TS35

Wire range: 24-12 AWG

Tightening torque: Max 0.4 N*m

General tolerances: ± 0.50 (± 0.02)

DIN-RAIL with heatsink Option: AM20E-NZ-K-STD



Note:

Unit: mm (inch)

Mounting rail: TS35

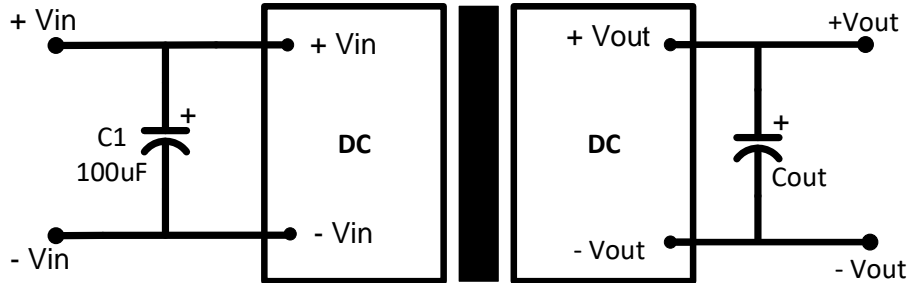
Wire range: 24-12 AWG

Tightening torque: Max 0.4 N*m

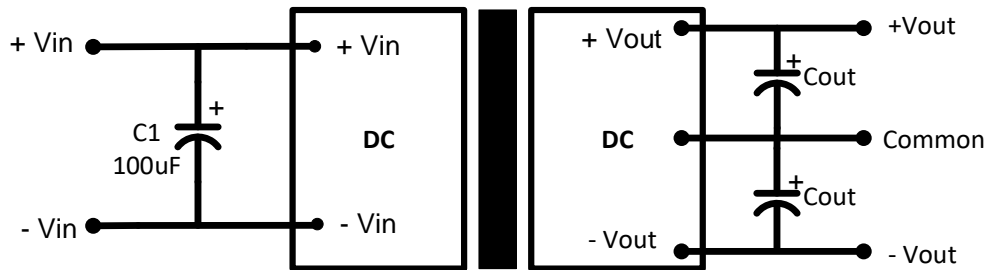
General tolerances: ± 0.50 (± 0.02)

Typical application circuit

Single output models

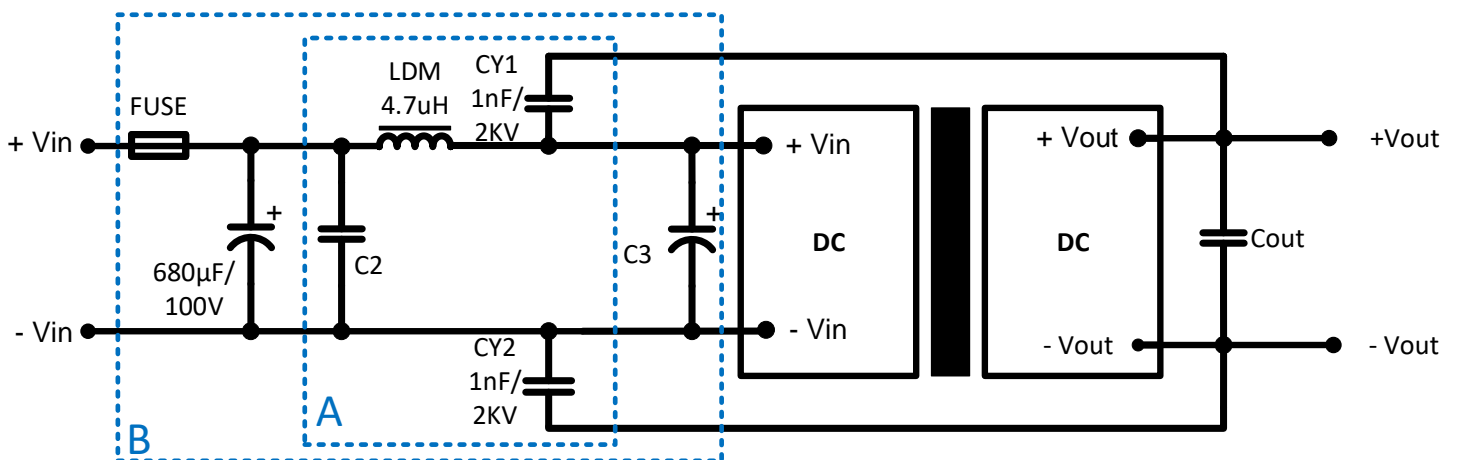


Dual output models



Model	Single output models			Dual output models	
	3.3V/5V Vout	9V/12V/15V Vout	24V Vout	±5V Vout	Others
Cout	470μF	220μF	100μF	220μF	100μF

EMC recommended external filter



Note: Part A for EMI filter, Part B for EMS filter

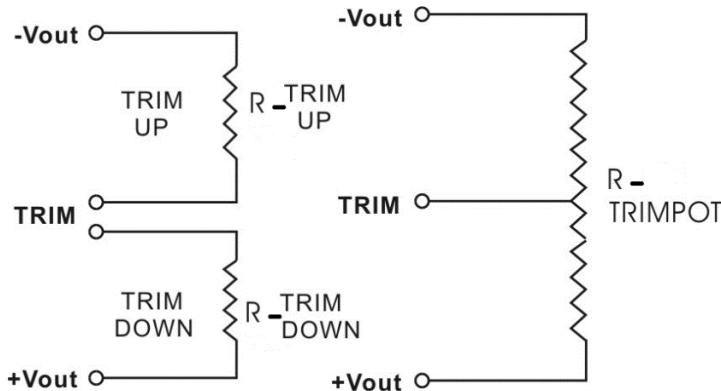
Model	12V/24V Vin	48V Vin
FUSE	Choose based on actual input current	
C2	1μF/50V	1μF/100V
C3	330μF/50V	330μF/100V

Trimming

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

Fixed Resistor

Variable Potentiometer



Leave open if not used.

AM20E-xx03S-NZ

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)	193.344	106.818	70.696	50.870	38.341	29.708	23.397	18.583	14.790	11.724
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)	305.949	102.749	57.886	38.180	27.104	20.007	15.072	11.442	8.658	6.457

AM20E-xx05S-NZ

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)	105.181	52.154	31.997	21.378	14.823	10.373	7.155	4.719	2.811	1.277
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)	176.356	71.279	41.974	28.200	20.198	14.967	11.281	8.544	6.430	4.749

AM20E-xx09S-NZ

Trim down %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	8.91	8.82	8.73	8.64	8.55	8.46	8.37	8.28	8.19	8.1
Rt down (KΩ)	375.533	207.430	139.157	102.145	78.924	62.997	51.393	42.562	35.617	30.011
Trim up %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	9.09	9.18	9.27	9.36	9.45	9.54	9.63	9.72	9.81	9.9
Rt up (KΩ)	314.532	112.639	64.148	42.357	29.975	21.990	16.412	12.297	9.134	6.629

AM20E-xx12S-NZ

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)	496.092	301.452	212.527	161.585	128.573	105.442	88.332	75.164	64.716	56.223
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)	706.435	158.920	83.879	54.075	38.077	28.095	21.274	16.317	12.552	9.595

AM20E-xx15S-NZ

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)	634.883	400.637	288.514	222.759	179.537	148.960	126.187	108.569	94.532	83.087
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)	1460.099	192.574	96.642	61.354	43.016	31.781	24.191	18.721	14.590	11.361

AM20E-xx24S-NZ

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)	1286.200	792.123	565.867	436.104	351.954	292.963	249.315	215.714	189.047	167.370
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)	816.889	179.914	94.338	60.464	42.307	30.988	23.257	17.640	13.376	10.027

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