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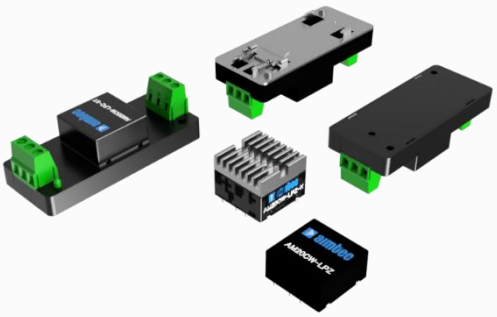
AM20CW-LPZ



1” x 1”

The AM20CW-LPZ is a 20W DC/DC converter that offers a regulated output which contributes to a more stable and reliable output performance. It features a wide 4:1 input voltage range of 9-75VDC, which will benefit your new system design.

This series offers great operating temperatures, from -40°C to 105°C. Furthermore, an isolation of 1600VDC, a high MTBF of 1,000,000h, continuous output short circuit protection (OSCP), over-current protection (OCP), over-voltage protection (OVP), and under voltage lock-out (UVLO) come standard with the series.

The AM20CW-LPZ is suitable for distributed power supply systems, industrial controls, power grid, instruments, and communications applications.

Features

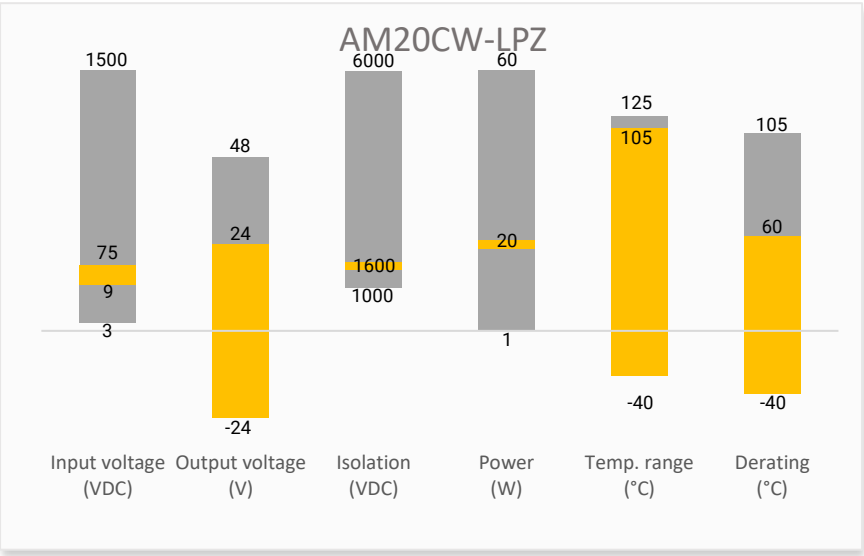
- Operating Temp: -40 °C to +105 °C
- High isolation voltage: 1600VDC
- Low ripple & noise, 120mV (p-p)
- Regulated Output
- 1” x 1” package
- Output short circuit, over-current, over-voltage, input under voltage protection

RoHS

3yr Warranty

CE

Summary



Training

Product Training Video (click to open)

Press Release

Coming Soon!

Application Notes

Applications

Power Grid

Industrial

Telecom

Instrumentation

Models & Specifications

Single Output							
Model	Input Voltage (VDC)	Output Voltage (VDC)	Input Current Max (mA)		Output Current Max (mA) Full Load	Maximum Capacitive Load (µF)	Efficiency Full Load Typ. (%)
			No Load	Full Load			
AM20CW-2403SLPZ	24 (9-36)	3.3	70	819	5000	10000	88
AM20CW-2405SLPZ	24 (9-36)	5	70	969	4000	10000	90
AM20CW-2406SLPZ	24 (9-36)	6	70	969	3333	8200	90
AM20CW-2409SLPZ	24 (9-36)	9	70	969	2222	6800	90
AM20CW-2412SLPZ	24 (9-36)	12	70	969	1667	1600	90
AM20CW-2415SLPZ	24 (9-36)	15	70	969	1333	1000	90
AM20CW-2418SLPZ	24 (9-36)	18	70	958	1111	820	90
AM20CW-2424SLPZ	24 (9-36)	24	70	958	833	500	91
AM20CW-4803SLPZ	48 (18-75)	3.3	30	410	5000	10000	88
AM20CW-4805SLPZ	48 (18-75)	5	30	485	4000	10000	90
AM20CW-4806SLPZ	48 (18-75)	6	30	485	3333	8200	90
AM20CW-4809SLPZ	48 (18-75)	9	30	485	2222	6800	90
AM20CW-4812SLPZ	48 (18-75)	12	30	485	1667	1600	90
AM20CW-4815SLPZ	48 (18-75)	15	30	485	1333	1000	90
AM20CW-4818SLPZ	48 (18-75)	18	30	485	1111	820	90
AM20CW-4824SLPZ	48 (18-75)	24	30	479	833	500	91

Note 1: Add suffix "-ST" for optional screw terminal bottom plate or "-STD" for optional DIN rail screw terminal bottom plate. 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. Ex: AM20CW-2412SLPZ-K-STD is DIN-Rail mounting version with the heatsink.
Note 2: Models with terminal bottom plates include input reverse polarity protection. Due to the input reverse polarity protection, models with "-ST", "-STD", "-K-ST" and "-K-STD" option have their minimum input and start-up voltage increased by 1VDC and efficiency decreased by 2%.
Note 3: Exceeding the maximum input voltage may cause permanent damage.

Dual Output							
Model	Input Voltage (VDC)	Output Voltage (VDC)	Input Current Max (mA)		Output Current Max (mA) Full Load	Maximum Capacitive Load (µF)	Efficiency (%) Full Load Typ.
			No Load	Full Load			
AM20CW-2403DLPZ	24 (9-36)	±3.3	70	838	±2500	±2000	84
AM20CW-2405DLPZ	24 (9-36)	±5	70	838	±2000	±2000	85
AM20CW-2406DLPZ	24 (9-36)	±6	70	838	±1667	±1500	85
AM20CW-2409DLPZ	24 (9-36)	±9	70	957	±1111	±1000	89
AM20CW-2412DLPZ	24 (9-36)	±12	70	957	±833	±800	89
AM20CW-2415DLPZ	24 (9-36)	±15	70	957	±667	±600	89
AM20CW-2418DLPZ	24 (9-36)	±18	70	957	±556	±470	89
AM20CW-2424DLPZ	24 (9-36)	±24	70	957	±417	±300	89
AM20CW-4803DLPZ	48 (18-75)	±3.3	30	414	±2500	±2000	85
AM20CW-4805DLPZ	48 (18-75)	±5	30	414	±2000	±2000	86
AM20CW-4806DLPZ	48 (18-75)	±6	30	414	±1667	±1500	86
AM20CW-4809DLPZ	48 (18-75)	±9	30	478	±1111	±1000	89
AM20CW-4812DLPZ	48 (18-75)	±12	30	478	±833	±800	90
AM20CW-4815DLPZ	48 (18-75)	±15	30	478	±667	±600	90
AM20CW-4818DLPZ	48 (18-75)	±18	30	478	±556	±470	88
AM20CW-4824DLPZ	48 (18-75)	±24	30	478	±417	±300	88

Note 1: Add suffix "-ST" for optional screw terminal bottom plate or "-STD" for optional DIN rail screw terminal bottom plate. 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. Ex: AM20CW-2412DLPZ -K-STD is DIN-Rail mounting version with the heatsink.
Note 2: Models with terminal bottom plates include input reverse polarity protection. Due to the input reverse polarity protection, models with "-ST", "-STD", "-K-ST" and "-K-STD" option have their minimum input and start-up voltage increased by 1VDC and efficiency decreased by 2%.
Note 3: Exceeding the maximum input voltage may cause permanent damage.

Input Specification

Parameters	Conditions	Typical	Maximum	Units
Voltage Types			4:1	
Filter	PI filter			
Absolute maximum rating	24Vin models, 1 sec.		-0.7~50	VDC
	48Vin models, 1 sec.		-0.7~100	VDC
Input reflected current		30		mA
Input Under Voltage turn off	24Vin models	5.5~6.5		VDC
	48Vin models	12~15.5		VDC
Startup Voltage	24Vin models		9	VDC
	48Vin models		18	VDC
Startup time		10		ms
Remote On/Off control	ON - open or pulled high (2.7 - 12 VDC) OFF - pulled low to GND (0 - 1.2 VDC), idle current 7mA max.			

Isolation Specification

Parameters	Conditions	Typical	Maximum	Units
Tested isolation voltage	Input to output 60 sec, ≤ 1mA	≥1600		VDC
	Input or output to Case 60 sec, ≤ 1mA	≥1000		VDC
Resistance	500VDC	≥1000		MΩ
Capacitance	Input to output, 100KHz/0.1V	2000		pF

Output Specification

Parameters	Conditions	Typical	Maximum	Units
Voltage Tolerance	Positive output, 5% to 100% load	±1	±3	%
	Negative output, 5% to 100% load	±3	±5	%
Line regulation	Positive output, Full load, LL to HL	±0.2	±0.5	%
	Negative output, Full load, LL to HL	±0.4	±1	%
Load regulation	Positive output, 5% to 100% load	±0.5	±1	%
	Negative output, 5% to 100% load	±0.5	±1.5	%
Cross Regulation	Positive output 50% load and Negative output 10% to 100% load		±5	%
Voltage adjustment			±10	% Vout
Transient recovery time	25%~50%~75% load	300	500	µs
Transient recovery deviation	25%~50%~75% load	±5	±8	% Vout
Ripple & Noise*	20MHz bandwidth, 5% to 100% load	80	120	mV pk-pk
	20MHz bandwidth, 0% to 5% load		5	% Vout

* Ripple and noise measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uF and 47uF parallel capacitor.

General Specifications

Parameters	Conditions	Minimum	Typical	Maximum	Units
Switching frequency	100% load		300		KHz
Over Current protection	Input voltage range	110	140		%Io
Over voltage protection	Input voltage range	110		160	%Vo
Short circuit protection	Continuous, Auto recovery				
Operating temperature	Single Vout=3.3 ~ 6V, with derating	-40		95	°C
	Other models, with derating	-40		105	°C
Storage temperature		-55		125	°C
Temperature coefficient	100% Load			± 0.03	%/ °C
Maximum soldering temperature	1.5mm from case for 10 sec.			300	°C
Cooling	Free air convection				
Humidity	Non-condensing	5		95	% RH
Case material	Aluminum alloy				
Weight	PCB mountable models		15		g
	With optional heatsink		21		g
	With optional -ST mounting plate		35		g
	With optional -STD mounting plate		55		g
	With optional heatsink and -ST mounting plate		41		g
	With optional heatsink and -STD mounting plate		60		g
Dimensions (L x W x H)	PCB mountable models	1.00 x 1.00 x 0.47 inches (25.40 × 25.40 × 12.00 mm)			
	With optional heatsink	1.00 x 1.00 x 0.73 inches (25.40 × 25.40 × 18.60 mm)			
	With optional -ST mounting plate	2.99 x 1.24 x 0.83 inches (76.00 × 31.50 × 21.20 mm)			
	With optional -STD mounting plate	2.99 x 1.24 x 1.02 inches (76.00 × 31.50 × 25.80 mm)			
	With optional heatsink and -ST mounting plate	2.99 x 1.24 x 1.08 inches (76.00 × 31.50 × 27.40 mm)			
	With optional heatsink and -STD mounting plate	2.99 x 1.24 x 1.26 inches (76.00 × 31.50 × 32.00 mm)			
MTBF	> 1 000 000 hrs (MIL-HDBK -217F, t=+25°C)				

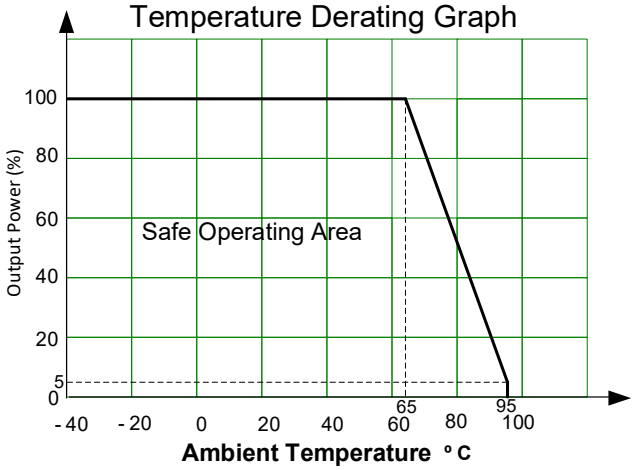
NOTE: All specifications in this datasheet are measured at an ambient temperature of 25°C, humidity<75%, nominal input voltage and at rated output load unless otherwise specified.

Safety Specifications

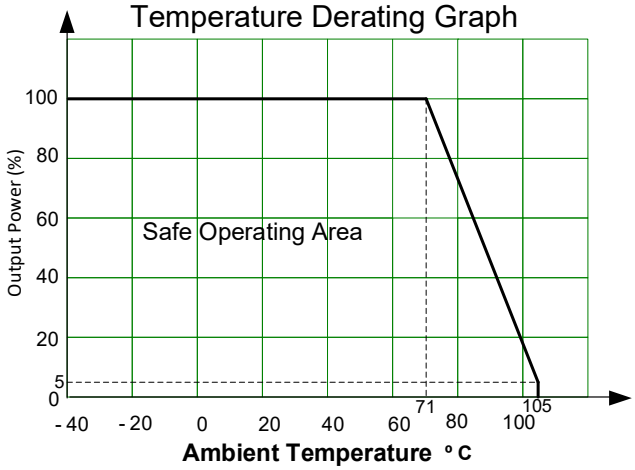
Parameters		
Standards	Designed to meet IEC/UL/EN62368-1	
	EMI - Conducted and radiated emission	CISPR32/EN55032, Class B with the recommended EMC circuit
	Electrostatic Discharge Immunity	IEC/EN 61000-4-2, Contact ±4kV, Air ±8kV, perf. Criteria B
	RF, Electromagnetic Field Immunity	IEC/EN 61000-4-3, 10V/m, perf. Criteria A
	Electrical Fast Transient/Burst Immunity	IEC/EN 61000-4-4, ±2kV, perf. Criteria B with the recommended EMC circuit
	Surge Immunity	IEC/EN 61000-4-5, Line to Line ±2kV, perf. Criteria B with the recommended EMC circuit
	RF, Conducted Disturbance Immunity	IEC/EN 61000-4-6, 3Vrms, perf. Criteria A
	Vibration	IEC/EN61373, category 1/grade B

Derating

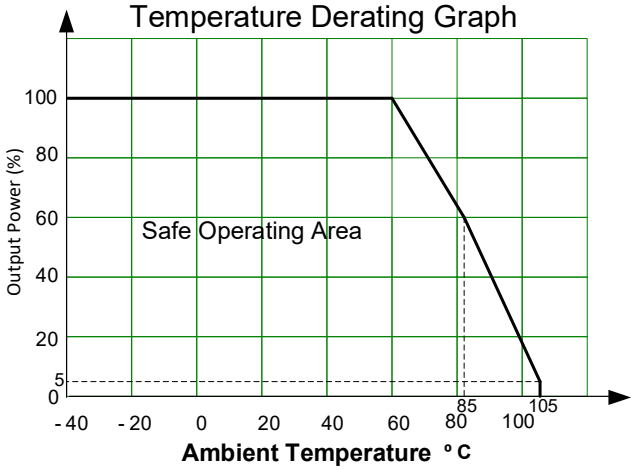
Single 3.3~6 Vout models



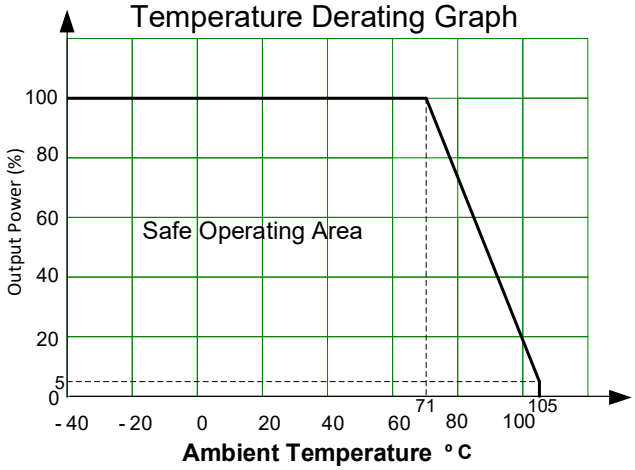
Single other Vout models



Dual ±3.3 Vout model

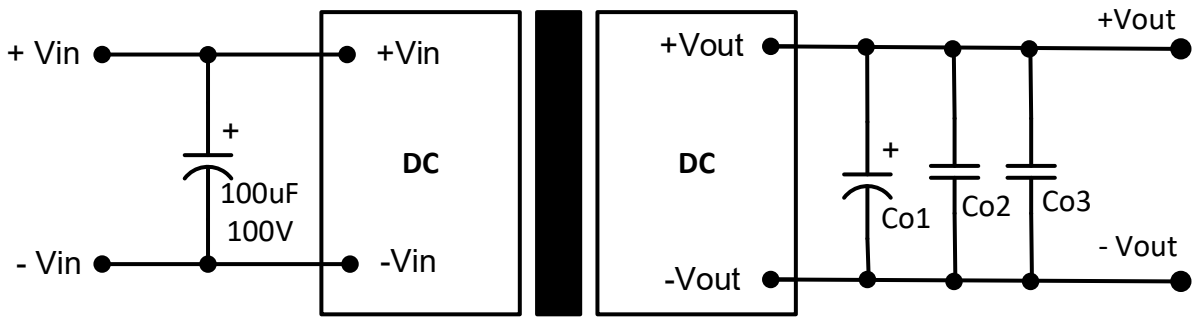


Dual other Vout models



Typical Application Circuit

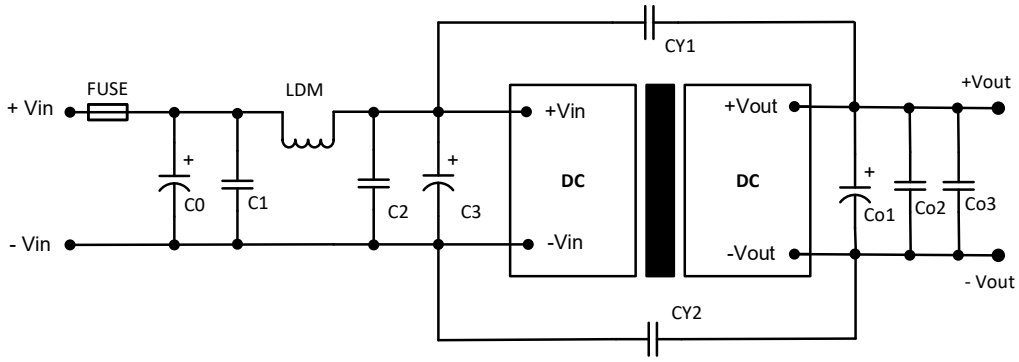
Typical application circuit is to further lower the input and output ripple. It is not required for general use.
For dual output models, output capacitors are connected to each output.



Vout	Co1	Co2	Co3
3.3, 5, 6V	100uF, 16V	10uF, 50V	0.1uF, 16V
9, 12, 15V	100uF, 25V	10uF, 50V	0.1uF, 25V
18, 24V	47uF, 50V	10uF, 50V	0.1uF, 50V

Recommended EMC Circuit

For dual output models, output capacitors are connected to each output.

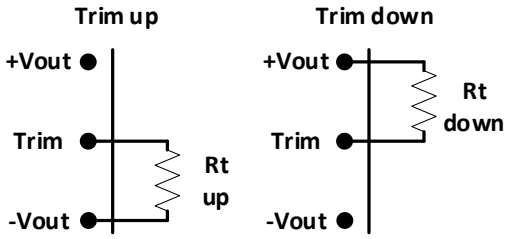


Vin	C0, C3	C1, C2	LDM	CY1, CY2
24V	330uF, 50V	4.7uF, 50V	4.7 ~ 10uH, 4A	1nF, 2KV
48V	330uF, 100V	4.7uF, 100V	4.7 ~ 10uH, 2A	1nF, 2KV

Fuse to be selected according to application needs. Co1 / Co2 / Co3 refer to Typical Application Circuit.

Trimming

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



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	2.970
Rt down (KΩ)	1121.642	378.474	220.234	151.369	112.834	88.207	71.111	58.549	48.928	41.324
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	3.630
Rt up (KΩ)	243.933	139.191	95.012	70.649	55.211	44.554	36.755	30.799	26.103	22.305

5V Output

Trim down %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	4.950	4.900	4.850	4.800	4.750	4.700	4.650	4.600	4.550	4.500
Rt down (KΩ)	39.966	22.440	13.270	7.631	3.813	1.056	-	-	-	-
Trim up %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	5.050	5.100	5.150	5.200	5.250	5.300	5.350	5.400	5.450	5.500
Rt up (KΩ)	-	135.361	52.843	29.152	17.912	11.350	7.048	4.011	1.752	0.006

6V Output

Trim down %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	5.940	5.880	5.820	5.760	5.700	5.640	5.580	5.520	5.460	5.400
Rt down (KΩ)	230.981	154.842	113.759	88.051	70.448	57.639	47.900	40.245	34.071	28.985
Trim up %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	6.060	6.120	6.180	6.240	6.300	6.360	6.420	6.480	6.540	6.600
Rt up (KΩ)	-	621.475	237.978	143.251	100.344	75.867	60.045	48.978	40.801	34.514

9V Output

Trim down %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	8.910	8.820	8.730	8.640	8.550	8.460	8.370	8.280	8.190	8.100
Rt down (KΩ)	688.959	363.942	241.424	177.109	137.483	110.619	91.206	76.523	65.028	55.785
Trim up %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	9.090	9.180	9.270	9.360	9.450	9.540	9.630	9.720	9.810	9.900
Rt up (KΩ)	404.624	168.879	102.131	70.606	52.244	40.225	31.746	25.444	20.576	16.703

12V Output

Trim down %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	11.880	11.760	11.640	11.520	11.400	11.280	11.160	11.040	10.920	10.800
Rt down (KΩ)	525.855	272.916	179.060	130.111	100.061	79.736	65.073	53.995	45.330	38.368
Trim up %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	12.120	12.240	12.360	12.480	12.600	12.720	12.840	12.960	13.080	13.200
Rt up (KΩ)	190.983	76.518	43.233	27.375	18.096	12.007	7.703	4.500	2.023	0.050

15V Output

Trim down %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	14.850	14.700	14.550	14.400	14.250	14.100	13.950	13.800	13.650	13.500
Rt down (KΩ)	675.367	382.496	260.958	194.429	152.455	123.560	102.455	86.363	73.689	63.447
Trim up %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	15.150	15.300	15.450	15.600	15.750	15.900	16.050	16.200	16.350	16.500
Rt up (KΩ)	323.076	105.467	56.466	34.831	22.640	14.818	9.373	5.365	2.291	-

18V Output

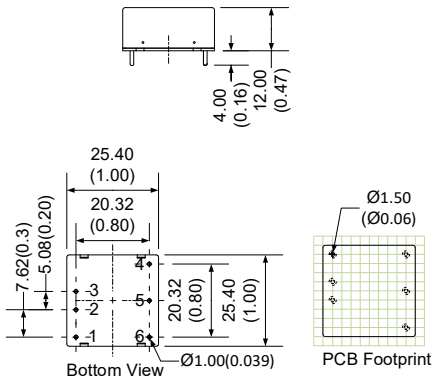
Trim down %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	17.820	17.640	17.460	17.280	17.100	16.920	16.740	16.560	16.380	16.200
Rt down (KΩ)	1882.798	943.782	617.287	451.386	350.981	283.679	235.427	199.139	170.856	148.193
Trim up %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	18.180	18.360	18.540	18.720	18.900	19.080	19.260	19.440	19.620	19.800
Rt up (KΩ)	323.639	139.086	80.338	51.458	34.284	22.899	14.798	8.739	4.036	0.280

24V Output

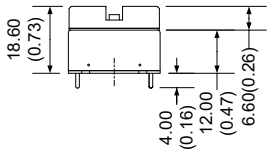
Trim down %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	23.760	23.520	23.280	23.040	22.800	22.560	22.320	22.080	21.840	21.600
Rt down (KΩ)	635.592	358.741	246.163	185.102	146.779	120.487	101.330	86.750	75.282	66.025
Trim up %	1	2	3	4	5	6	7	8	9	10
Vout (VDC)	24.240	24.480	24.720	24.960	25.200	25.440	25.680	25.920	26.160	26.400
Rt up (KΩ)	154.790	53.216	28.902	17.987	11.787	7.790	4.999	2.939	1.357	0.104

Dimensions

No Suffix

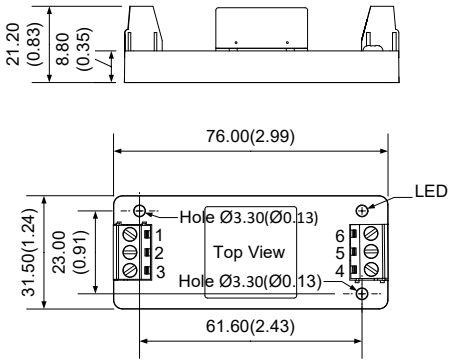


Suffix **"-K"** for optional heatsink

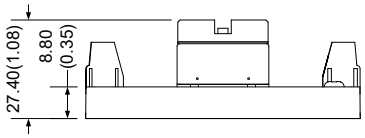


Unit: mm (inch)
General tolerance: ±0.50 (0.02)
Pin thickness: ±0.10 (0.004)
Footprint grid 2.54 x 2.54 mm

Suffix **"-ST"** for optional chassis



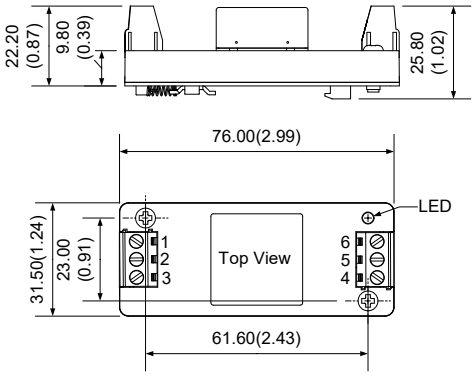
Suffix **"-K-ST"** for optional heatsink & chassis



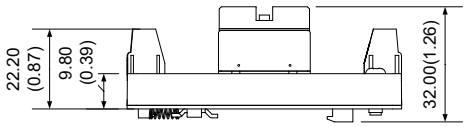
Unit: mm (inch)
General tolerance: ±1.00 (0.04)
Tightening torque: 0.4 Nm Max.
Wire gauge to chassis:12~24 AWG

Pin Out Specifications		
Pin	Single	Dual
1	Remote On/Off	Remote On/Off
2	-V Input	-V Input
3	+V Input	+V Input
4	+V Output	+V Output
5	Trim	Com
6	-V Output	-V Output

Suffix **"-STD"** for optional DIN Rail



Suffix **"-K-STD"** for optional heatsink & DIN Rail



Unit: mm (inch)
General tolerance: ±1.00 (0.04)
Tightening torque: 0.4 Nm Max.
Wire gauge to chassis:12~24 AWG

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