

ULTRAVOLT AEQ SERIES

ULTRA-MINIATURE HIGH VOLTAGE POWER CONVERTERS



The UltraVolt® AEQ series of ultra-miniature UL approved isolated single or dual output DC to DC converters supply up to 600 VDC at 0.5 or 1.25 Watts of output power from an input voltage of +5 or +12 VDC. The small size of the units and ease of control make the AEQ series optimal for hand-held devices, portable equipment, and other small high-voltage projects.

PRODUCT HIGHLIGHTS

- Ultra-miniature size (0.5" cube)
- Adjustable 0 to ± 300 VDC (dual polarity units with CT), 0 to 600 VDC (floating/reversible units)
- +5 or +12 VDC input
- Output fully adjustable over 0 VDC to maximum rating
- ± 1500 VDC @ 0.5 W, ± 1750 VDC @ 1.25 W input to output isolation
- Output short-circuit protection
- 0.5 or 1.25 W maximum output power
- Low ripple (<1% peak to peak @ 0.5 W, <2% peak to peak @ 1.25 W)
- Temperature coefficient of 500ppm/°C
- Ease of installation with PCB mount
- Reliable modular design, > 3,000,000 hours MTBF per Bellcore TR332
- UL/cUL recognized, CE mark (LVD and RoHS), EN-62368

TYPICAL APPLICATIONS

- Mass spectrometry
- Gas chromatography
- Spectrometers
- PZT drivers
- Flat-panel displays
- Fiber-optic telecom detectors
- Particle physics detectors
- Laser range finder detectors
- Silicon (SiD) detectors
- Ionization chamber detectors
- Avalanche photo diodes (APD)
- Photo multiplier tubes (PMT)
- Photodiodes (PD)
- Multi-pixel photon counters (MPPC)
- Channel electron multipliers
- Silicon photomultipliers (SiPM)
- Microchannel plates (MCP)
- Biasing supplies

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ELECTRICAL SPECIFICATIONS

Parameters	Specifications	
Input Voltage	+5 VDC ($\pm 1\%$ recommended)	+12 VDC ($\pm 1\%$ recommended)
Input Current Disabled	<3 mA	<10 mA
Input Current at No Load	<150 mA (Module in safe operating region)	
Input Current at Full Load	<250 mA (0.5 W models), <450 mA (1.25 W models)	
HV Output Range (Vout)	0 to 600 VDC	
HV Turn On	0.08 to 0.55 VDC (Control Pin)	
Output Power	0 to 0.5 W, 0 to 1.25 W	
Polarity	Fixed positive or negative	
HV Setting	Via external source 0 to 5 VDC ($\pm 1\%$ recommended)	
Max Output Current (Iout)	See Model Table	
Load Voltage Regulation	30%	
Output Voltage Ripple	$\leq 1\%$ peak to peak (0.5 W models), $\leq 2\%$ peak to peak (1.25 W models)	
Output Voltage Tolerance	10% (At maximum Vout, full load)	
Temperature Coefficient	200 PPM/ $^{\circ}\text{C}$ @ 25 $^{\circ}\text{C}$, 500 PPM/ $^{\circ}\text{C}$ when swept from -25 to 70 $^{\circ}\text{C}$	
Regulation	Unregulated, output is proportional to Vcontrol pin	
Short Circuit Protection	2 minutes max.	
Mean Time Between Failure	>3 Mhrs (Per Bellcore TR332)	

Note 1 - All specifications are after a 30-minute warm-up at full load at 25 $^{\circ}\text{C}$ unless otherwise noted.

Note 2 - Maximum output load is available at the maximum rated output voltage, the load derates linearly as control pin voltage is decreased.

Note 3 - The AEQ output voltage is load dependent, under light load conditions it may be necessary to adjust the control pin, so the maximum rated output voltage is not exceeded.

Note 4 - Good thermal management techniques must be used to maintain the maximum case temperature when operating the AEQ at maximum load.

Note 5 - For further information please see AEQ Application Note: <https://www.advancedenergy.com/globalassets/non-resource-library-assets/en-hv-aeq-app-note.pdf>

ENVIRONMENTAL SPECIFICATIONS

Parameters	Specifications
Operation Case Temperature	-30 to +70 $^{\circ}\text{C}$, case temperature
Storage Temperature	-55 to +105 $^{\circ}\text{C}$
Humidity	5 to 95%, non-condensing
Cooling	Conduction/Convection (Case temperature must be maintained within specified limits)
Operating Altitude	≤ 2000 meters

GENERAL SPECIFICATIONS

Parameters	Specifications
Input to Output Isolation	± 1500 VDC @ 0.5 W, ± 1750 VDC @ 1.25 W, input pins to output pins
Construction	Solid vacuum encapsulation
RoHS	RoHS 2 and 3 Directive (2011/65/EU)
IP Protection class	IPX0 (Solid vacuum encapsulation with gold plated pins)
Weight	4.0 $\pm$ 0.5 g
Warranty	1 year

REGULATORY

Regulatory

Certifications	UL/cUL recognized, IEC/EN 62368-1 CE Mark, LVD 2014/35/EU and RoHS 2011/65/EC, amended by (EU) 2015/863
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MODEL TABLE

Item#	Model Number	Description	Input	Output	Output Power (W)
1	AEQ5-100FL0.5	Floating / Reversible	5.0 V (<250 mA)	100 V (5.00 mA)	0.5
2	AEQ5-200FL0.5	Floating / Reversible	5.0 V (<250 mA)	200 V (2.5 mA)	0.5
3	AEQ5-300FL0.5	Floating / Reversible	5.0 V (<250 mA)	300 V (1.67 mA)	0.5
4	AEQ5-400FL0.5	Floating / Reversible	5.0 V (<250 mA)	400 V (1.25 mA)	0.5
5	AEQ5-500FL0.5	Floating / Reversible	5.0 V (<250 mA)	500 V (1.00 mA)	0.5
6	AEQ5-600FL0.5	Floating / Reversible	5.0 V (<250 mA)	600 V (0.833 mA)	0.5
7	AEQ5-50BP0.5	Dual polarity with CT	5.0 V (<250 mA)	±50 V (5.00 mA)	0.5
8	AEQ5-100BP0.5	Dual polarity with CT	5.0 V (<250 mA)	±100 V (2.5 mA)	0.5
9	AEQ5-150BP0.5	Dual polarity with CT	5.0 V (<250 mA)	±150 V (1.67 mA)	0.5
10	AEQ5-200BP0.5	Dual polarity with CT	5.0 V (<250 mA)	±200 V (1.25 mA)	0.5
11	AEQ5-250BP0.5	Dual polarity with CT	5.0 V (<250 mA)	±250 V (1.00 mA)	0.5
12	AEQ5-300BP0.5	Dual polarity with CT	5.0 V (<250 mA)	±300 V (0.833 mA)	0.5

Item#	Model Number	Description	Input	Output	Output Power (W)
1	AEQ5-100FL1.25	Floating / Reversible	5.0 V (<500 mA)	100 V (12.50 mA)	1.25
2	AEQ5-200FL1.25	Floating / Reversible	5.0 V (<500 mA)	200 V (6.25 mA)	1.25
3	AEQ5-300FL1.25	Floating / Reversible	5.0 V (<500 mA)	300 V (4.16 mA)	1.25
4	AEQ5-400FL1.25	Floating / Reversible	5.0 V (<500 mA)	400 V (3.12 mA)	1.25
5	AEQ5-500FL1.25	Floating / Reversible	5.0 V (<500 mA)	500 V (2.50 mA)	1.25
6	AEQ5-600FL1.25	Floating / Reversible	5.0 V (<500 mA)	600 V (2.08 mA)	1.25
7	AEQ5-50BP1.25	Dual polarity with CT	5.0 V (<500 mA)	±50 V (12.25 mA)	1.25
8	AEQ5-100BP1.25	Dual polarity with CT	5.0 V (<500 mA)	±100 V (6.25 mA)	1.25
9	AEQ5-150BP1.25	Dual polarity with CT	5.0 V (<500 mA)	±150 V (4.16 mA)	1.25
10	AEQ5-200BP1.25	Dual polarity with CT	5.0 V (<500 mA)	±200 V (3.12 mA)	1.25
11	AEQ5-250BP1.25	Dual polarity with CT	5.0 V (<500 mA)	±250 V (2.50 mA)	1.25
12	AEQ5-300BP1.25	Dual polarity with CT	5.0 V (<500 mA)	±300 V (2.08 mA)	1.25

MODEL TABLE

Item#	Model Number	Description	Input	Output	Output Power (W)
1	AEQ12-100FL0.5	Floating / Reversible	12.0 V (<250 mA)	100 V (5.00 mA)	0.5
2	AEQ12-200FL0.5	Floating / Reversible	12.0 V (<250 mA)	200 V (2.5 mA)	0.5
3	AEQ12-300FL0.5	Floating / Reversible	12.0 V (<250 mA)	300 V (1.67 mA)	0.5
4	AEQ12-400FL0.5	Floating / Reversible	12.0 V (<250 mA)	400 V (1.25 mA)	0.5
5	AEQ12-500FL0.5	Floating / Reversible	12.0 V (<250 mA)	500 V (1.00 mA)	0.5
6	AEQ12-600FL0.5	Floating / Reversible	12.0 V (<250 mA)	600 V (0.833 mA)	0.5
7	AEQ12-50BP0.5	Dual polarity with CT	12.0 V (<250 mA)	±50 V (5.00 mA)	0.5
8	AEQ12-100BP0.5	Dual polarity with CT	12.0 V (<250 mA)	±100 V (2.5 mA)	0.5
9	AEQ12-150BP0.5	Dual polarity with CT	12.0 V (<250 mA)	±150 V (1.67 mA)	0.5
10	AEQ12-200BP0.5	Dual polarity with CT	12.0 V (<250 mA)	±200 V (1.25 mA)	0.5
11	AEQ12-250BP0.5	Dual polarity with CT	12.0 V (<250 mA)	±250 V (1.00 mA)	0.5
12	AEQ12-300BP0.5	Dual polarity with CT	12.0 V (<250 mA)	±300 V (0.833 mA)	0.5

Item#	Model Number	Description	Input	Output	Output Power (W)
1	AEQ12-100FL1.25	Floating / Reversible	12.0 V (<500 mA)	100 V (12.50 mA)	1.25
2	AEQ12-200FL1.25	Floating / Reversible	12.0 V (<500 mA)	200 V (6.25 mA)	1.25
3	AEQ12-300FL1.25	Floating / Reversible	12.0 V (<500 mA)	300 V (4.16 mA)	1.25
4	AEQ12-400FL1.25	Floating / Reversible	12.0 V (<500 mA)	400 V (3.12 mA)	1.25
5	AEQ12-500FL1.25	Floating / Reversible	12.0 V (<500 mA)	500 V (2.50 mA)	1.25
6	AEQ12-600FL1.25	Floating / Reversible	12.0 V (<500 mA)	600 V (2.08 mA)	1.25
7	AEQ12-50BP1.25	Dual polarity with CT	12.0 V (<500 mA)	±50 V (12.25 mA)	1.25
8	AEQ12-100BP1.25	Dual polarity with CT	12.0 V (<500 mA)	±100 V (6.25 mA)	1.25
9	AEQ12-150BP1.25	Dual polarity with CT	12.0 V (<500 mA)	±150 V (4.16 mA)	1.25
10	AEQ12-200BP1.25	Dual polarity with CT	12.0 V (<500 mA)	±200 V (3.12 mA)	1.25
11	AEQ12-250BP1.25	Dual polarity with CT	12.0 V (<500 mA)	±250 V (2.50 mA)	1.25
12	AEQ12-300BP1.25	Dual polarity with CT	12.0 V (<500 mA)	±300 V (2.08 mA)	1.25

MECHANICAL SPECIFICATIONS

PIN ASSIGNMENT

PIN 1	Input (-)
PIN 2	Input (+)
PIN 3	Output (+)
PIN 4	Output (-)
PIN 5	Center Tap
PIN 6	Control Pin

