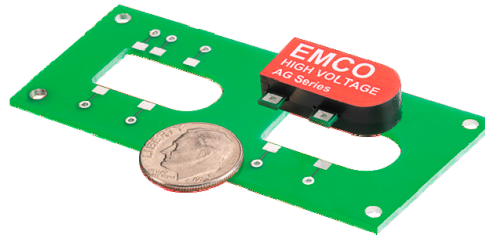


**0.1kV - 6kV; 1W, 1.5W**  
**ULTRA-MINIATURE, I/O PROPORTIONAL**  
**HIGH VOLTAGE POWER SUPPLIES**

**EMCO HIGH VOLTAGE CORPORATION**

## FEATURES

- Proportional Input/Output
- Extremely Low Profile and Small Volume
- Low Noise Quasi-sinewave Oscillator
- Control Pin
- Low Leakage Current
- Low Input/Output Capacitance
- Input to Output Galvanic Isolation
- Short Circuit Protection, 1 Minute Minimum
- No Minimum Load Required
- No External Components Required
- Three Standard Input Voltage Ranges
- Designed to meet RoHS and REACH Directives
- MTBF > 1,862,000 hours, per Belcore TR 332
- Surface Mount Package
- UL 94V-0 Listed Proprietary Encapsulant



## APPLICATIONS

- Avalanche Photodiodes
- Capacitor Charging
- Electrophoresis
- Photomultiplier Tubes
- Piezo Devices
- Mass Spectrometry

The AG / AGH Series is a new line of ultra-miniature, HV DC/DC converters that set an industry standard in high voltage miniaturization. This unique package occupies less than one tenth of a cubic inch of volume, and features an extremely low profile of only 0.128 inches (3.25mm) when mounted in from the top, or 0.152 inches (3.86mm) when mounted in from the bottom of the PCB! The AG / AGH Series converter can also mount off the PCB with .030" diameter pins. Controllable output voltages range from 100 V to 6000 V. These component-sized converters are ideal for applications requiring minimal size and weight.

Turn-on voltage is very low at less than 0.7 V, allowing for wide output voltage operating range. Use of a resonant, quasi-sinewave oscillator and fully shielded transformer result in clean, reliable high voltage conversion with inherently low ripple, EMI/RFI and input ripple current, making this product ideal for integration into noise sensitive equipment.

A separate high impedance control pin is standard and is designed for external error amplifier and/or DAC control in closed or open loop systems. Or simply connect the control pin to the + input for proportional input to output operation (see schematic and performance charts below).

No external components or minimum load are required. A proprietary encapsulation process and custom 94V-0 compliant, high performance formula are used to achieve excellent high voltage and thermal properties.

Isolation is  $\pm 500$  V bias on the output return. Input to output leakage current is very low at less than 100 nA and coupling capacitance is also low at <250 pF.

Output Voltage [VDC]	1 W Models - AG Series				1.5 W Models - AGH Series			
	Positive Output Model	Negative Output Model	Max. Output Current *1 [mA]	Ripple P-P	Positive Output Model	Negative Output Model	Max. Output Current *1 [mA]	Ripple P-P
0 - 100	AG01P-*2	AG01N-*2	10	< 5.00%	AGH01P-12 AGH01P-24	AGH01N-12 AGH01N-24	15	< 4.00%
0 - 200	AG02P-*2	AG02N-*2	5	< 1.00%	AGH02P-*2	AGH02N-*2	7.5	< 3.00%
0 - 250	AG025P-*2	AG025N-*2	4	< 0.90%	AGH025P-*2	AGH025N-*2	6	< 1.20%
0 - 300	AG03P-*2	AG03N-*2	3.33	< 0.70%	AGH03P-*2	AGH03N-*2	5	< 0.70%
0 - 400	AG04P-*2	AG04N-*2	2.5	< 0.50%	AGH04P-*2	AGH04N-*2	3.75	< 0.75%
0 - 500	AG05P-*2	AG05N-*2	2	< 0.50%	AGH05P-*2	AGH05N-*2	3	< 0.70%
0 - 600	AG06P-*2	AG06N-*2	1.67	< 1.00%	AGH06P-*2	AGH06N-*2	2.5	< 2.00%
0 - 700	AG07P-*2	AG07N-*2	1.43	< 0.50%	AGH07P-*2	AGH07N-*2	2.15	< 1.20%
0 - 800	AG08P-*2	AG08N-*2	1.25	< 1.00%	AGH08P-*2	AGH08N-*2	1.87	< 1.20%
0 - 900	AG09P-*2	AG09N-*2	1.1	< 1.00%	AGH09P-*2	AGH09N-*2	1.67	< 1.20%
0 - 1 000	AG10P-*2	AG10N-*2	1	< 0.79%	AGH10P-*2	AGH10N-*2	1.5	< 1.00%
0 - 1 200	AG12P-*2	AG12N-*2	0.83	< 0.50%	AGH12P-*2	AGH12N-*2	1.25	< 0.60%
0 - 1 500	AG15P-*2	AG15N-*2	0.67	< 0.40%	AGH15P-*2	AGH15N-*2	1	< 0.60%
0 - 2 000	AG20P-*2	AG20N-*2	0.5	< 0.30%	AGH20P-*2	AGH20N-*2	0.75	< 0.50%
0 - 3 000	AG30P-*2	AG30N-*2	0.33	< 0.20%	AGH30P-*2	AGH30N-*2	0.5	< 0.20%

Output Voltage [VDC]	1 W Models - AG Series				1.5 W Models - AGH Series			
	Positive Output Model	Negative Output Model	Max. Output Current *1 [mA]	Ripple p-p	Positive Output Model	Negative Output Model	Max. Output Current *1 [mA]	Ripple p-p
0 - 4 000	AG40P-5	AG40N-5	0.25	< 0.12%				
0 - 5 000	AG50P-5	AG50N-5	0.2	< 0.15%				
0 - 6 000	AG60P-5	AG60N-5	0.17	< 0.15%	AGH60P-5	AGH60N-5	0.25	< 0.25%

\*1 At maximum rated output voltage.

\*2 Input voltage range designator: "5", "12" or "24" for 0 - 5 V<sub>DC</sub>, 0 - 12 V<sub>DC</sub> or 0 - 24 V<sub>DC</sub> respectively;  
available for models up to 3kV - eg. **AG30N-12**

## SPECIFICATIONS

Turn-On Voltage:	< 0.7 V <sub>DC</sub>
Isolation:	< ±500 V bias on pin 4
Output Voltage Tolerance:	+10%/-10% at full load, max. input voltage
Input/Output Coupling Capacitance:	< 250 pF typ.
Input/Output Leakage Current:	< 50 nA typ.
Control Pin Voltage:	0 to max. input voltage
Internal Oscillator Frequency:	50 kHz - 350 kHz
Standard Temperature Ranges:	Operating: AG/AGH01 to AG/AGH60 -25°C - +75°C (case) Storage: AG/AGH01 to AG/AGH60 -55°C - +105°C
Extended Temperature Ranges (Option T):	Operating: AG01 to AG60 -55°C - +85°C (case) Storage: AG01 to AG60 -55°C - +105°C

Input Current:

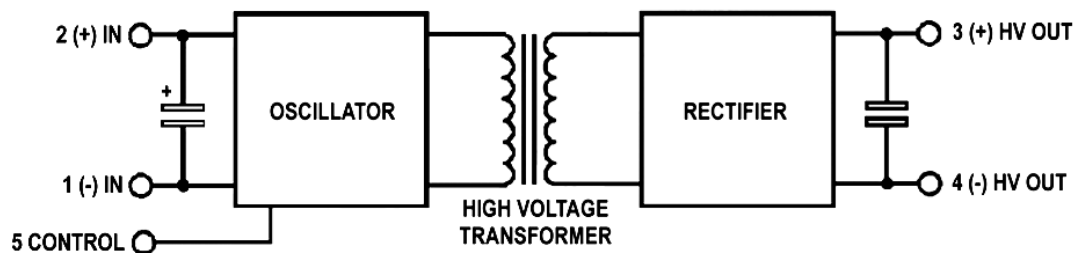
Input Voltage	AG Series		AGH Series	
	No-Load	Full-Load	No-Load	Full-Load
5 V <sub>DC</sub>	< 200 mA	< 470 mA	< 300 mA	< 550 mA
12 V <sub>DC</sub>	< 100 mA	< 185 mA	< 125 mA	< 250 mA
24 V <sub>DC</sub>	< 25 mA	< 60 mA	< 40 mA	< 120 mA

Dimensions (LxWxH) - AG/AGH01 to AG/AGH20: 0.92 (23.4) x 0.45 (11.4) x 0.25 (6.4) inch<sup>3</sup> (mm<sup>3</sup>)  
 - AG/AGH30 to AG/AGH50: 1.13 (28.7) x 0.45 (11.4) x 0.25 (6.4) inch<sup>3</sup> (mm<sup>3</sup>)  
 - AG/AGH60: 1.32 (33.5) x 0.45 (11.4) x 0.25 (6.4) inch<sup>3</sup> (mm<sup>3</sup>)  
 - Total width including connection wings - all models: 0.69 inch (17.5 mm)

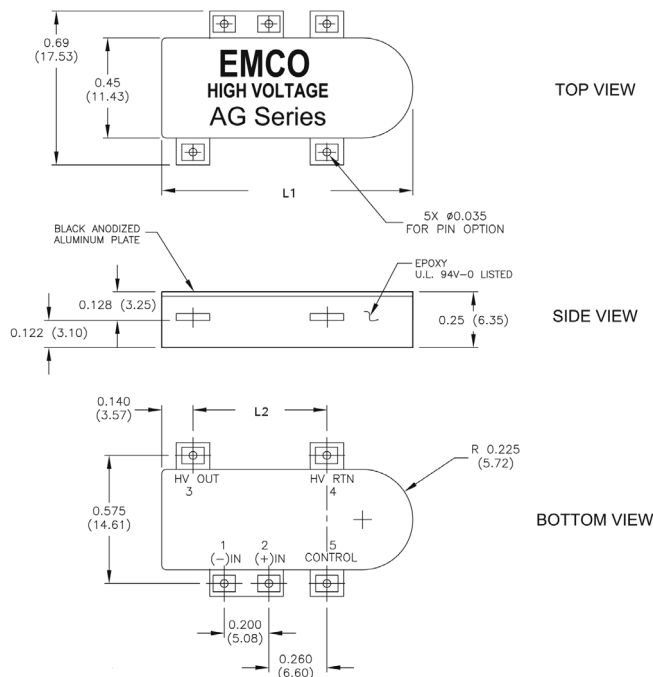
Weight - AG/AGH01 to AG/AGH20: < 0.20 oz (5.7 g)  
 - AG/AGH30 to AG/AGH50: < 0.25 oz (7.1 g)  
 - AG/AGH60: < 0.30 oz (8.5 g)

- Specifications after 30 minutes warm-up, full load, at 25°C unless otherwise indicated.
- Output Voltage is load dependent. Under light or no-load conditions, reduce the Input Voltage so maximum rated Output Voltage is not exceeded.
- Ripple may be reduced substantially by the addition of an external RC filter.

## BLOCK DIAGRAM (OUTPUT POSITIVE)



## DIMENSIONS

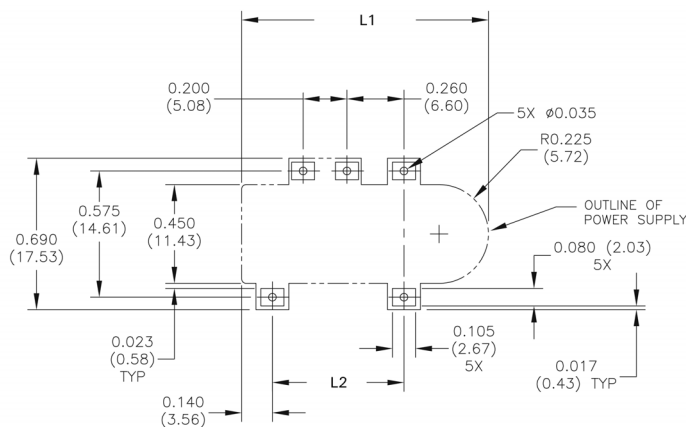


	AG01 - AG20 AGH01 - AGH20	AG30 - AG50 AGH30 - AGH50	AG60 AGH60
L1	0.92 [23.37]	1.13 [28.65]	1.32 [33.53]
L2	0.400 [10.16]	0.600 [15.24]	0.790 [20.07]

Dimensions are in inches (metric equivalents in parenthesis)

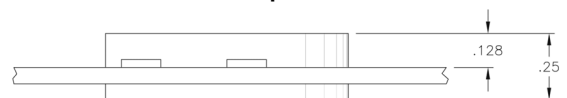
Dimensional Tolerances: .xx ±.02 (0.51mm)  
.xxx ±.005 (0.127mm)

## RECOMMENDED LAYOUT

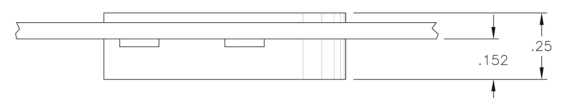


## INSTALLATION

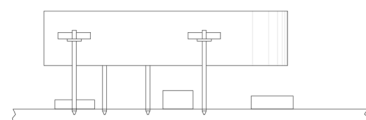
### AG / AGH mounted on top of PCB



### AG / AGH mounted from bottom of PCB



### AG / AGH mounted off PCB with .030" dia pins

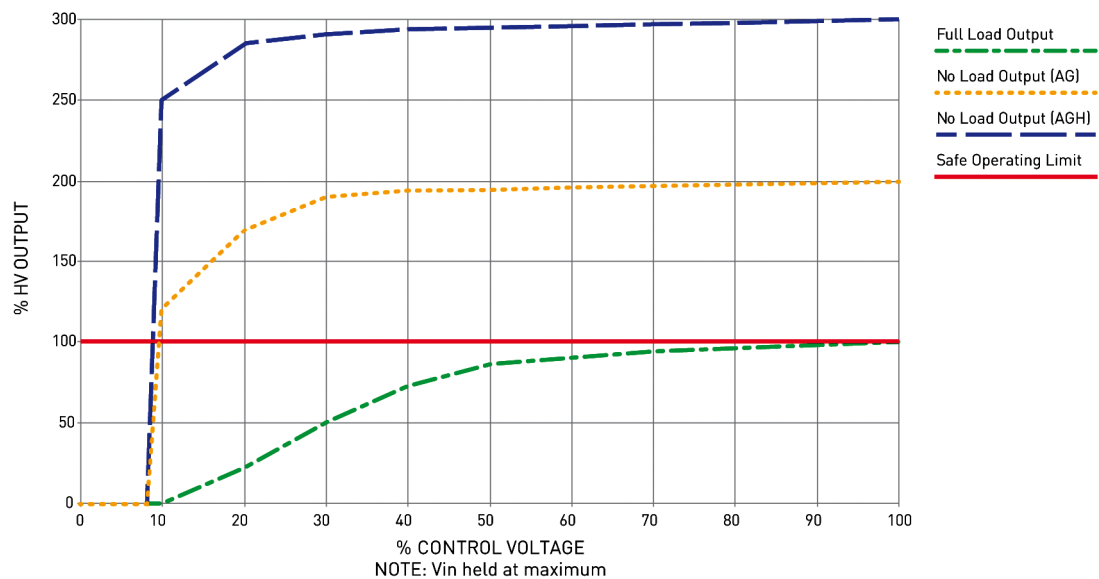


## PIN FUNCTION DESCRIPTIONS

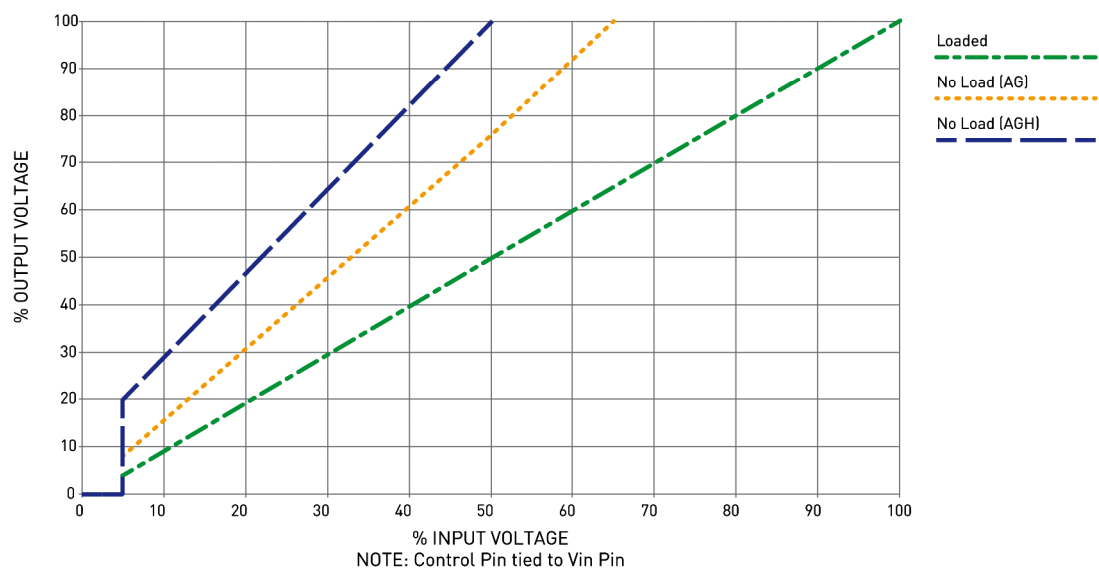
Pin No.	Function
1	(-) Input
2	(+) Input
3	HV Output
4	HV Return
5	Control

## CHARACTERISTICS

TYPICAL HV OUTPUT vs. CONTROL VOLTAGE



TYPICAL INPUT vs. OUTPUT VOLTAGE



## OPTIONS

- T** Extended Operating Temperature - AG Series only  
(add **T** to model number, e.g. AG09N-12T)

Alternate input / output voltages available.