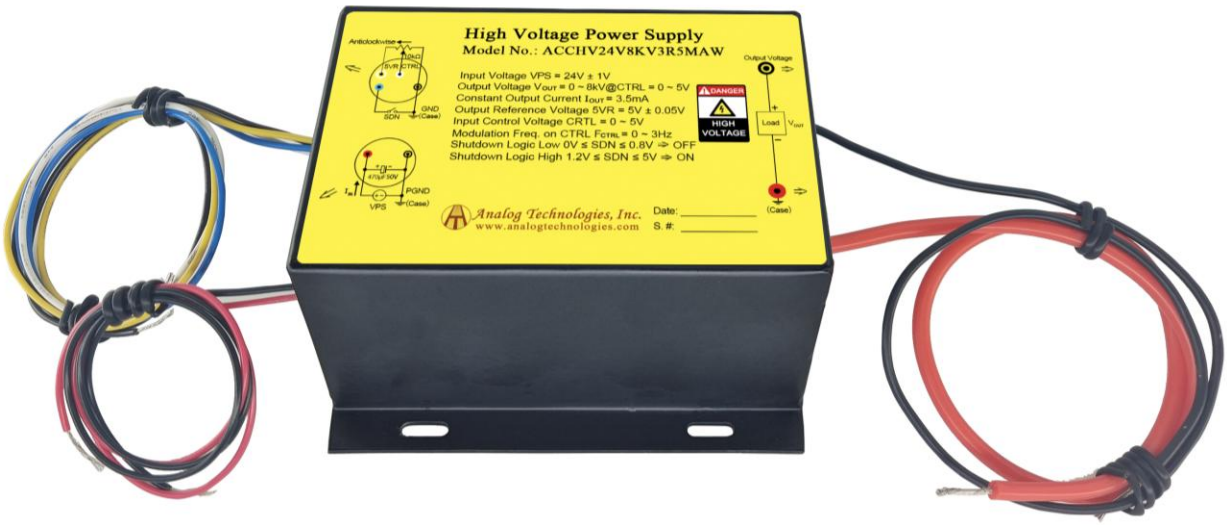


Figure 1.1. Top View of ACCHV24V8KV3R5MAW



Figure 1.2. Side View



Figure 1.3. Bottom View



Figure 1.4. Side View



Figure 1.5. Side View

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FEATURES

- Input Power Voltage: 24V ± 1V
- Input Current Range: 350mA to 1.6A
- Output Voltage: 0 to 8kV@CTRL = 0 to 5V
- Constant Output Current: 3.5mA
- Reference Voltage: 5V ± 0.05V
- Input Control Voltage: 0 to 5V
- Electronic Shutdown Control Available
- Zero EMIs and Good Heat Sinking by Metal Enclosure

APPLICATIONS

This power module, ACCHV24V8KV3R5MAW, is designed for achieving DC-DC conversion from low voltage to high voltage as a power supply source. It can be used for:

- Charge Capacitors
- X-ray Machine
- Spectral Analysis
- Nondestructive Inspection
- Semiconductor Manufacturing Equipment
- Particle Accelerator
- Capillary Electrophoresis
- Particles Injection
- Physical Vapor Phase Deposition
- Electrospinning Preparation of Nanofiber
- DC Reactive Magnetron Sputtering

DESCRIPTION

Figure 2 shows the connecting wires of ACCHV24V8KV3R5MAW, of which their detail information given in Table 1. The output voltage can be set to a constant value by connecting the CTRL port to the central tap of a POT (Potentiometer) corresponding to 0V to 8kV proportionally at the output VOUT port as shown in Figure 3.



Figure 2. The Connecting Lead Wires of ACCHV24V8KV3R5MAW

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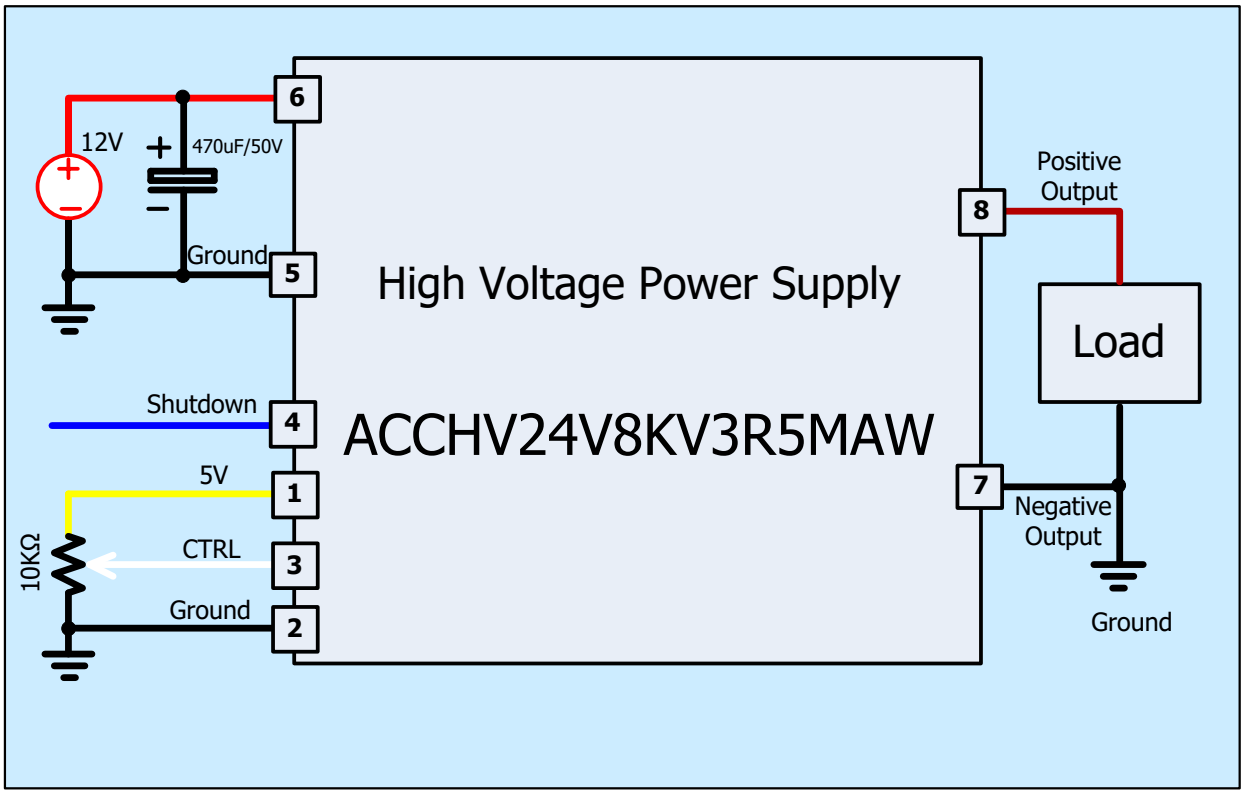


Figure 3. Setting Output to be a Constant Voltage

Table 1. Pin Names, Colors, Functions and Specifications.

No.	Name	Color		Type	Description	Min.	Typ.	Max.
1	5VR	Yellow		Analog output	Reference voltage		5V	
2	GND	Black		Ground for analog, digital and power signals.	Control GND		0V	
3	CTRL	White		Analog input	Regulation	0V		5V
4	SDN	Blue		Digital input	Shutdown logic low	0V		0.8V
					Shutdown logic high	1.2V		5V
5	GND	Black		Ground for analog, digital and power signals.	Input GND		0V	
6	VPS	Red		Power input	Input voltage		24V	
7	GND	Black		Power output	Output GND		0V	
8	VOUT	Brown		Power output	Output high voltage	0V		8kV

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The equivalent input circuit for the CTRL is shown in Figure 4.

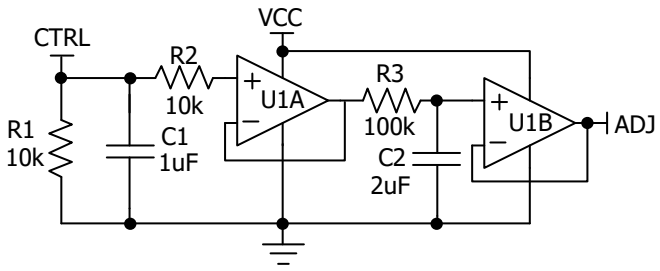


Figure 4. The Equivalent Circuit for CTRL Port

To shutdown ACCHV24V8KV3R5MAW, pull down SDN pin to <0.8V; to turn it on, leave SDN pin unconnected or pull it >1.2V. The maximum voltage allowed on the SDN pin is 5V. The equivalent circuit for SDN port is shown in Figure 5.

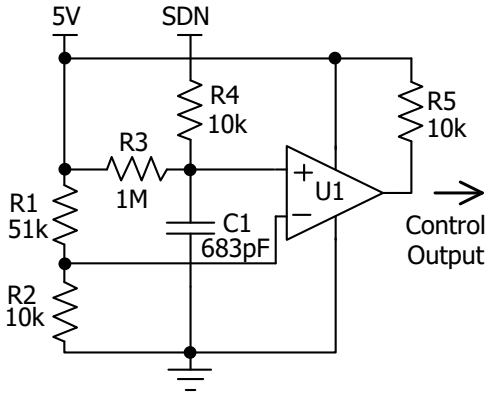


Figure 5. The Equivalent Circuit for SDN Port

USING ACCHV24V8KV3R5MAW

This high voltage power supply must be mounted tightly onto a metal plate, ideally, thus expanding its heating sinking capacity of the metal enclosure. Sufficient ventilation must be provided to keep the power supply surface temperature under 55°C.

SAFETY PRECAUTIONS

Although ACCHV24V8KV3R5MAW high voltage power supply comes with an over current protection circuit, a short circuit at the output should always be avoided. Make sure the high voltage wire for connecting VOUT node has sufficient insulation capability with its surrounding objects.

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SPECIFICATIONS

Table 2. Characteristics. T_A = 25°C, unless otherwise noted.

Parameter		Symbol	Test Conditions	Min.	Typ.	Max.	Unit/Note
Input Power Voltage		V_{VPS}		23	24	25	V
Input Power Quiescent Current		I_{VPS_QC}	I_{VOUT} = 0mA	350	400	450	mA
Input Power Current at Full Load		I_{VPS_FL}	I_{VOUT} = 3.5mA	1.5	1.6	1.7	A
Input Power Current at Shutdown		I_{VPS_SHDN}	T_A = −10°C ~ 55°C		16		mA
Modulation Voltage Range Frequency on CTRL		f_{CTRL}		0		3	Hz
Shutdown Port Current		I_{SDNL}	V_{SDNL} < 0.8V	4		4.8	μA
		I_{SDNH}	1.2V < V_{SDNL} < 5V	0		3.6	μA
Shutdown Voltage Logic Low		V_{SDNL}		0		0.8	V
Shutdown Voltage Logic High		V_{SDNH}		1.2		5	V
Output Voltage		V_{VOUT}	I_{VOUT} = 0 ~ 3.5mA	0		8000	V
Output Current Range		$I_{VOUTMAX}$	V_{VPS} = 23V ~ 25V	0		3.5	mA
Reference Voltage Output Range		V_{5VR}	T_A = −10°C ~ 55°C I_{5VR} ≤ 1mA	4.95	5	5.05	V
Output Load Range				$\frac{V_{VOUT}}{I_{VOUT}}$		∞	MΩ
Output Voltage Ripple		V_{VOUT_RP}	Bandwidth = 1MHz R_{LOAD} = 2.2MΩ	≤4			V_{P-P}
Output Voltage Temperature Coefficient		TCV_{VOUT}	V_{VPS} = 24V V_{CTRL} = V_{5VR} = 5V V_{VOUT} = 8kV I_{VOUT} = 3.5mA T_A = −10°C ~ 55°C		≤0.1		%/°C
Output Voltage Range v.s. Temperature		$V_{VOUT}(T)$	V_{VPS} = 24V V_{CTRL} = V_{5VR} = 5V V_{VOUT} = 8kV I_{VOUT} = 3.5mA T_A = −10°C ~ 55°C	0.99V_{VOUT}	V_{VOUT}	1.01V_{VOUT}	V
Output Voltage Drift	Short Term Drift	$\frac{\lvert\Delta V_{VOUT}/V_{VOUT}\rvert}{\Delta t\ (min)}$	V_{VPS} = 24V V_{CTRL} = V_{5VR} = 5V V_{VOUT} = 8kV I_{VOUT} = 3.5mA T_A = −10°C ~ 55°C		≤0.5		%/min
	Long Term Drift	$\frac{\lvert\Delta V_{VOUT}/V_{VOUT}\rvert}{\Delta t\ (h)}$			≤1		%/h
Output Voltage Rise Time		t_r	V_{VOUT} (t_1) = 800V V_{VOUT} (t_2) = 7200V No-Load		100		ms
Output Voltage Fall Time		t_f	V_{VOUT} (t_2) = 7200V V_{VOUT} (t_3) = 800V No-Load		100		ms

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Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit/Note
Mean Time Between Failure	MTBF			1M		h
Instantaneous Short Circuit Current at the Output	I_{VOUT_SC}			≤350		mA
Load Regulation	$\frac{\lvert\Delta V_{VOUT}/V_{VOUT}\rvert}{\Delta I_{VOUT}}$	V_{VOUT} = 8kV I_{VOUT} = 3.5mA		≤0.05		%/mA
Full Load Efficiency	η	V_{VPS} = 24V V_{VOUT} = 8kV I_{VOUT} = 3.5mA		≥70		%
Operating Temperature Range	T_{opr}		−10		55	°C
Storage Temperature Range	T_{stg}		−20		85	°C
External Dimensions			100×90×55			mm
			3.94×3.54×2.17			inch
Weight				1200		g
				2.65		lbs
				42.3		Oz

TESTING DATA

Test conditions: V_{VPS} = 24V, T_A = 25°C, R_{LOAD} = 2.2MΩ

DC Testing

The measured output voltage, V_{VOUT}, corresponding to the control port input voltage, V_{CTRL}, is shown in Figure 6.

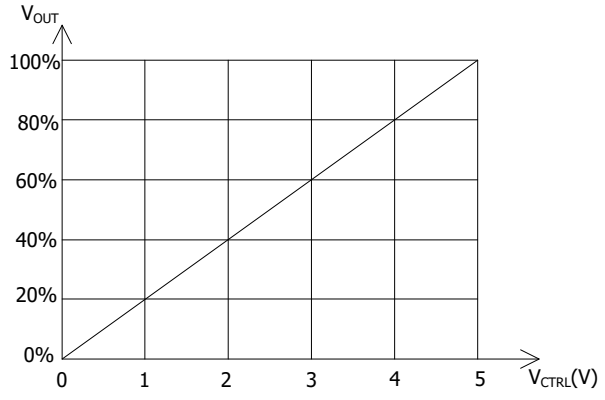


Figure 6. V_{CTRL} vs. V_{VOUT}

Charging Testing

It takes 6 seconds to charge a 22nF capacitor by using 8kV voltage and 3.5mA constant current. We can also customize high voltage power supply based on users' requirements.

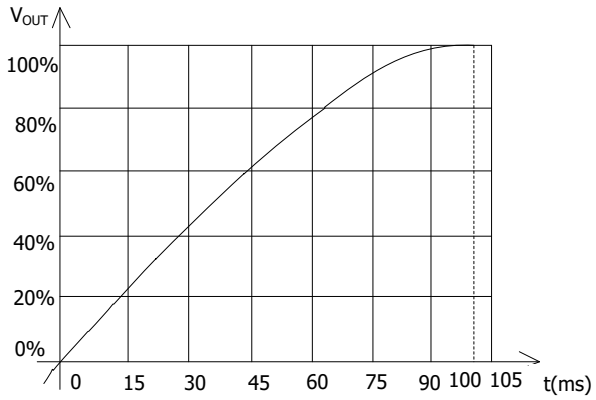


Figure 7. Charging Curve

AC Testing

To test the rise and fall times at the output, a step function signal is applied to the CTRL port. The testing results are shown in Figure 8, Figure 9, and Figure 10. As shown in Figure 9 and Figure 10, a square wave of 0.25V ~ 5V, f = 3Hz, is applied to CTRL port, the output waveform fall time is measured to be about 100ms and the rise time is about 100ms. These two values are not the same, that is because on the rising trail, the power supply injects a

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current to the load; while on the falling trail, the best the power supply can do is to stop its output current and let the load resistor drain the output filtering capacitor to a lower voltage, and the draining current is much smaller than the injection current.

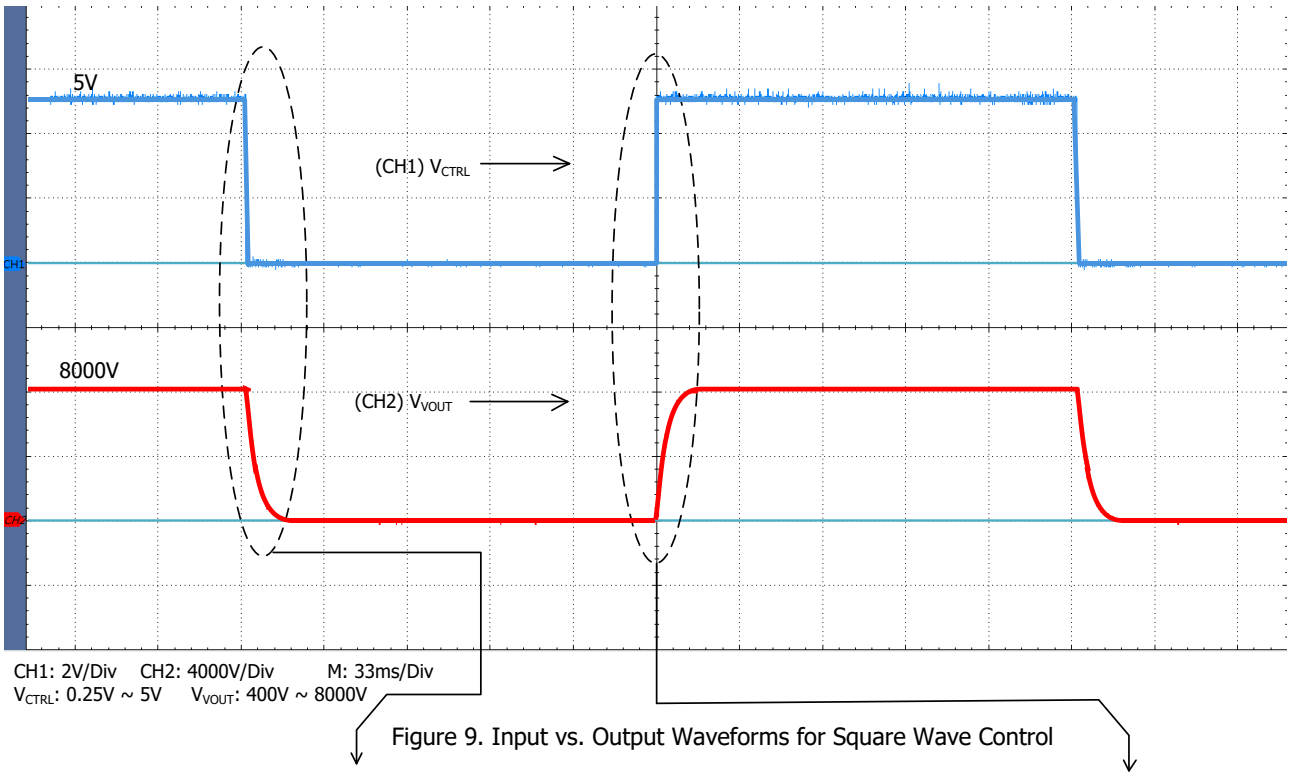


Figure 9. Input vs. Output Waveforms for Square Wave Control

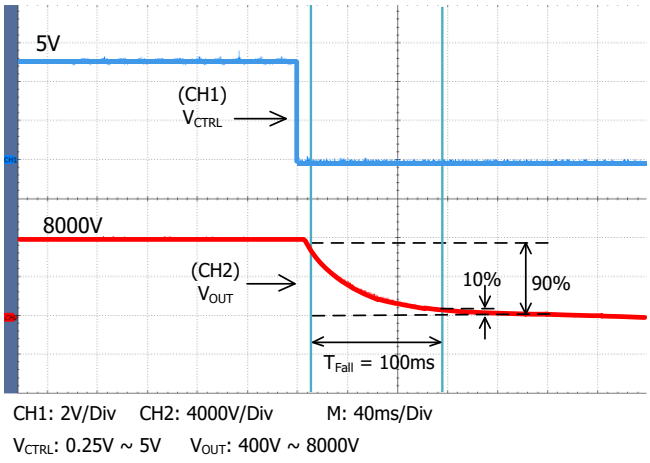


Figure 10. Falling Trail for Large Signal Response

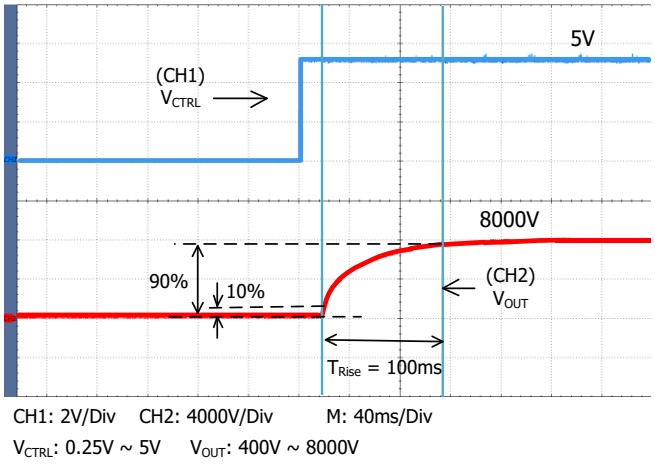


Figure 11. Rising Trail for Large Signal Response

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NAMING PRINCIPLE

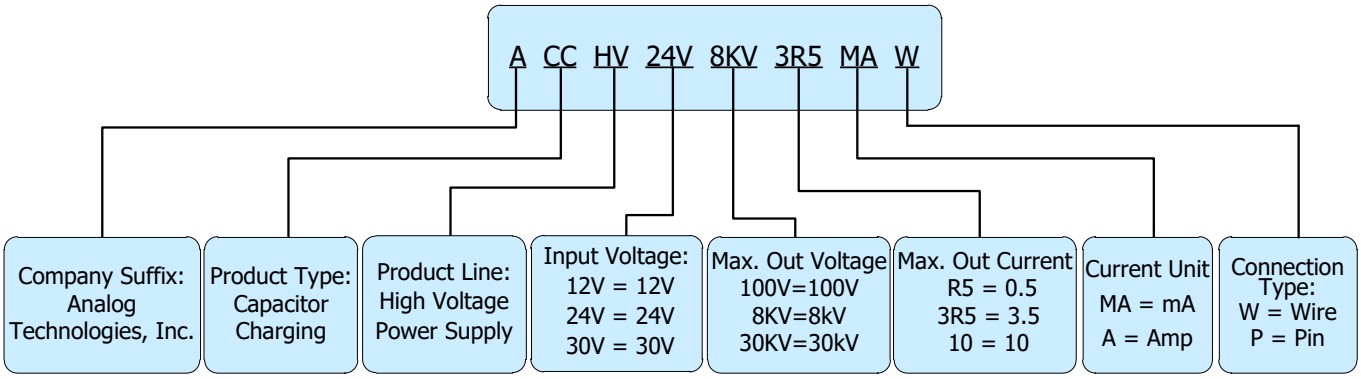


Figure 12. Naming Principle of ACCHV24V8KV3R5MAW

DIMENSIONS

Connecting Lead Wire Sizes and Lengths

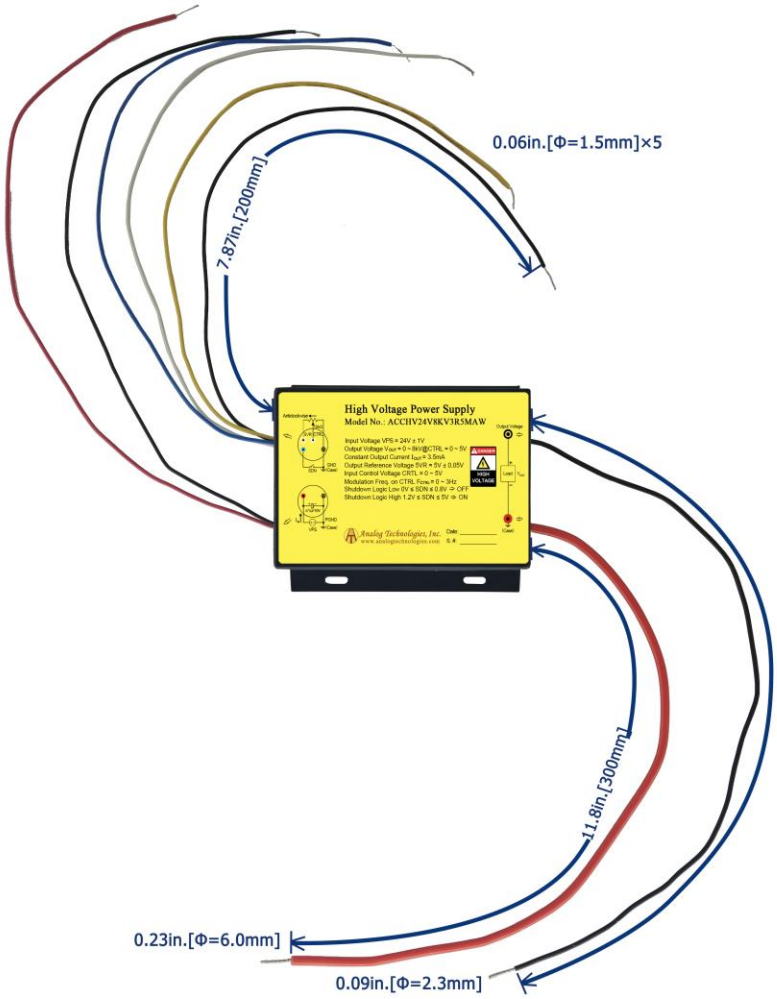


Figure 13. Connecting Lead Wires of ACCHV24V8KV3R5MAW

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Lead Wires	Diameter		Length	
	mm	inch	mm	inch
Thick brown lead wire	6.0	0.23	300 ± 1	11.80 ± 0.039
Black lead wire	2.3	0.09	300 ± 1	11.80 ± 0.039
Yellow, red, blue, black and white lead wires	1.5	0.06	200 ± 1	7.87 ± 0.039

Outline Dimensions

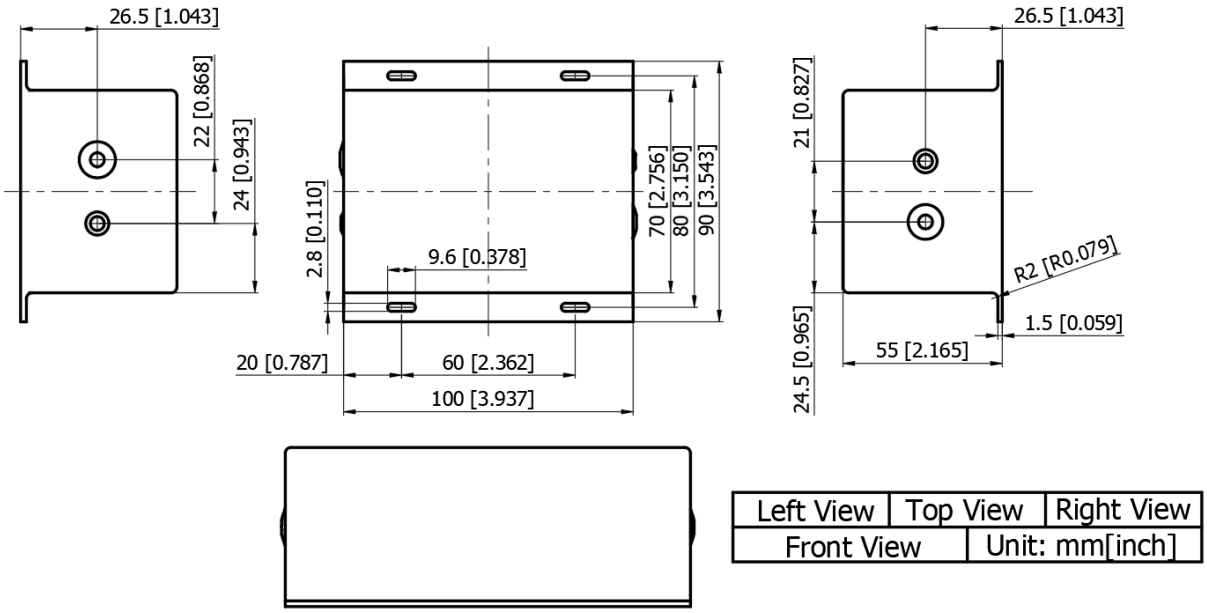


Figure 16. Outline Dimensions

ORDERING INFORMATION

Part Number	Buy Now
ACCHV24V8KV3R5MAW	

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Input Voltage: 24V, Input Control Voltage: 0 to 5V, Efficiency: 70%.

Part #	Datasheet	Output Voltage (V)	Output Current (mA)	Description	Buy Now*
ACCHV24V500V1MAW	Contact Us	500	1	Positive 500V 1mA module with lead wires	Contact Us
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ACCHV24V2KV1MAW	Contact Us	2000	1	Positive 2kV 1mA module with lead wires	Contact Us
ACCHV24V3KV1MAW	Contact Us	3000	1	Positive 3kV 1mA module with lead wires	Contact Us
ACCHV24V4KV1MAW	Contact Us	4000	1	Positive 4kV 1mA module with lead wires	Contact Us
ACCHV24V5KV1MAW	Contact Us	5000	1	Positive 5kV 1mA module with lead wires	Contact Us
ACCHV24V6KV1MAW		6000	1	Positive 6kV 1mA module with lead wires	* *
ACCHV24V7KV1MAW	Contact Us	7000	1	Positive 7kV 1mA module with lead wires	Contact Us
ACCHV24V8KV1MAW	Contact Us	8000	1	Positive 8kV 1mA module with lead wires	Contact Us
ACCHV24V9KV1MAW	Contact Us	9000	1	Positive 9kV 1mA module with lead wires	Contact Us
ACCHV24V10KV1MAW	Contact Us	10,000	1	Positive 10kV 1mA module with lead wires	Contact Us
ACCHV24VN500V1MAW	Contact Us	−500	1	Negative 500V 1mA module with lead wires	Contact Us
ACCHV24VN1KV1MAW	Contact Us	−1000	1	Negative 1kV 1mA module with lead wires	Contact Us
ACCHV24VN2KV1MAW	Contact Us	−2000	1	Negative 2kV 1mA module with lead wires	Contact Us
ACCHV24VN3KV1MAW	Contact Us	−3000	1	Negative 3kV 1mA module with lead wires	Contact Us
ACCHV24VN4KV1MAW	Contact Us	−4000	1	Negative 4kV 1mA module with lead wires	Contact Us
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ACCHV24VN6KV1MAW	Contact Us	−6000	1	Negative 6kV 1mA module with lead wires	Contact Us
ACCHV24VN7KV1MAW	Contact Us	−7000	1	Negative 7kV 1mA module with lead wires	Contact Us
ACCHV24VN8KV1MAW	Contact Us	−8000	1	Negative 8kV 1mA module with lead wires	Contact Us
ACCHV24VN9KV1MAW	Contact Us	−9000	1	Negative 9kV 1mA module with lead wires	Contact Us
ACCHV24VN10KV1MAW	Contact Us	−10000	1	Negative 10kV 1mA module with lead wires	Contact Us

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