

# Interfacing with the SK Series

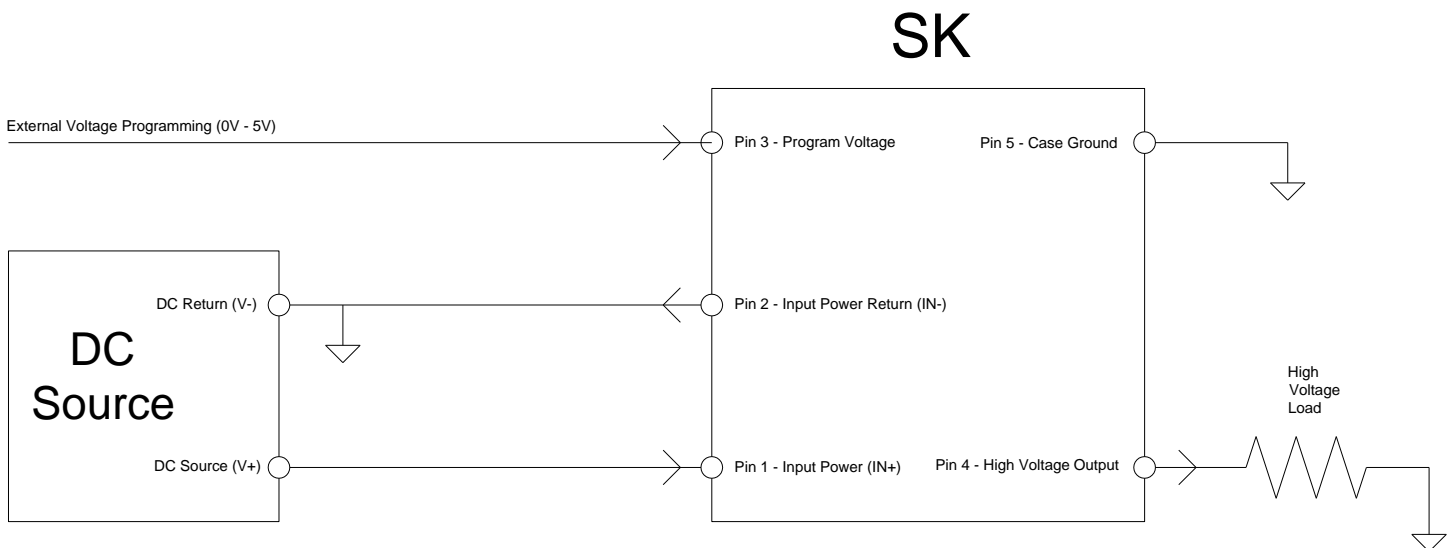
*Miniature High Voltage DC to DC Converter*

## Introduction

This application note is intended to provide the pin assignments, input requirements, and output characteristics for the **SK Series** miniature high voltage power supplies. This document should be used in conjunction with the product specification sheet to form a complete usage manual for the **SK Series** modules.

The **SK Series** is a family of miniature single-output DC to DC converters supplying up to 5kV in 0.963 cubic inches (1.75" x 1.10" x 0.50"). The nominal input voltage is 5Vdc. See product specification sheet for specific models.

## Functional Diagram



**Figure 1. SK Series Functional Diagram, Positive Polarity Model**

## Pin Overview

Pin assignments are referenced from Figure 1 above.

### **Pin 1 – Input Power (IN+):**

This pin is the power input for the SK module supplied by the DC source. This source must be capable of providing the input voltage and maximum input current necessary for operation of the SK module. These requirements vary by model and can be found in the Model Selection Guide table of the product specification sheet. Some examples of acceptable DC sources are batteries, AC/DC supplies, and DC/DC supplies.

### **Pin 2 – Input Power Return (IN-):**

This pin is the return ground path to the input DC source that powers the module. This pin is also used as the return ground path for the program voltage signal and the high voltage output.

### **Pin 3 – Program Voltage:**

This pin is used to control the high voltage output of the device by using a low voltage analog signal. An input of 0Vdc to +5Vdc will linearly control the high voltage output from 0 to 100% of the max rated output as described in the product specification sheet for the chosen module. This pin has an input impedance of >10kΩ. The programming voltage signal can be from a wide variety of sources as long as those sources have a common ground return to the SK module, including operational amplifiers, digital to analog converters, and potentiometers.

### **Pin 4 – High Voltage Output**

This pin is the high voltage output of the SK module. This pin supplies an output power of 1W at single polarity voltages up to ±5kV. Refer to product specification sheet for specific model max ratings. The output adjusts linearly in response to the signal from the Program Voltage.

### **Pin 5 – Case Ground:**

This pin is directly tied to the external copper adhesive shield. This pin is not internally tied to the power return pin and must be connected to a ground trace or ground plane for effective shield operation.



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**Pads – Calibration Adjustment:**

Two pads on the bottom view of the SK Series module can be used for unit calibration. These pads can be identified using the product specification sheet. Using a probe that is connected to the same ground as the power return for the unit to touch the pads, the output voltage can be adjusted by a minimum of  $\pm 5\%$  from the factory setting. This can help to maintain consistency in high voltage output from one unit to another.



## Design Considerations

### **PCB Layout:**

Always use best practices when designing the system PC board. The SK series can range up to  $\pm 5\text{kV}$  depending on model, so proper creepage and clearance spacing must be observed. If possible, PCB routing is recommended on higher voltage modules to isolate the high voltage output from the lower voltage pins. Avoid placing traces under the module, especially critical signal traces. Ground planes and/or power planes are recommended, but take caution to eliminate these layers near the High Voltage Output.

### **Soldering:**

The SK series of modules is rated for hand soldering only. Unit damage may occur in convection or wave soldering machines. Module should be soldered to PCB using a temperature not to exceed  $600^{\circ}\text{F}$  for no longer than 5 seconds. Inspect all solder connections for conformance to industry standards.

### **Cleaning:**

If contaminants are present on the unit or the connections, it is imperative to be cleaned prior to operation. The SK series are encased in a Thermoset plastic (Diallyl Phthalate) housing. Be sure any solvents used are compatible with the housing material and solder used.

### **Customization:**

The SK series can be manufactured with modifications, if necessary. Contact the factory for information on wire outputs, custom voltage outputs, or other requests.

## About HVM Technology

HVM Technology is the leading manufacturer of miniature high voltage products used in today's most advanced equipment. We design, manufacture and market high performance products for a variety of applications in the military, aerospace, scientific and analytical fields. Our expertise in high voltage miniaturization enables our customers to design the technology of the future.