Features

10V → 80V adjustable output voltage

4mA regulated output current at 80V
10mA output current at 35V

Adjustable over-current shutdown

±0.01% load regulation

0.01% trimmable accuracy (HV80A)
0.1% standard accuracy (HV80B)

0 → +2.5V control voltage

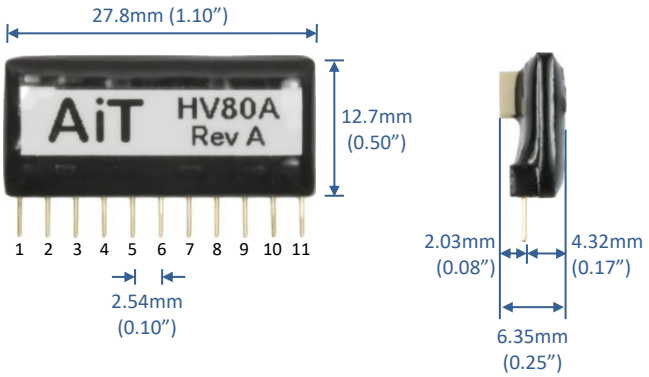
Output voltage monitor

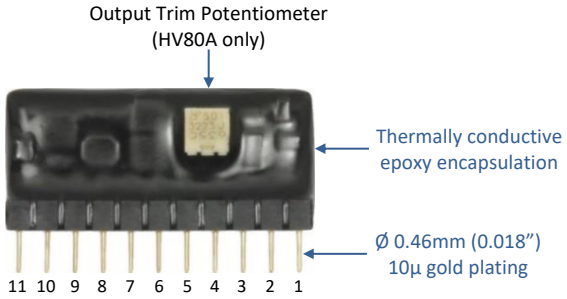
Output current monitor

Precision +2.5V voltage reference

+5.0V input voltage
+3.3V capable with reduced output power

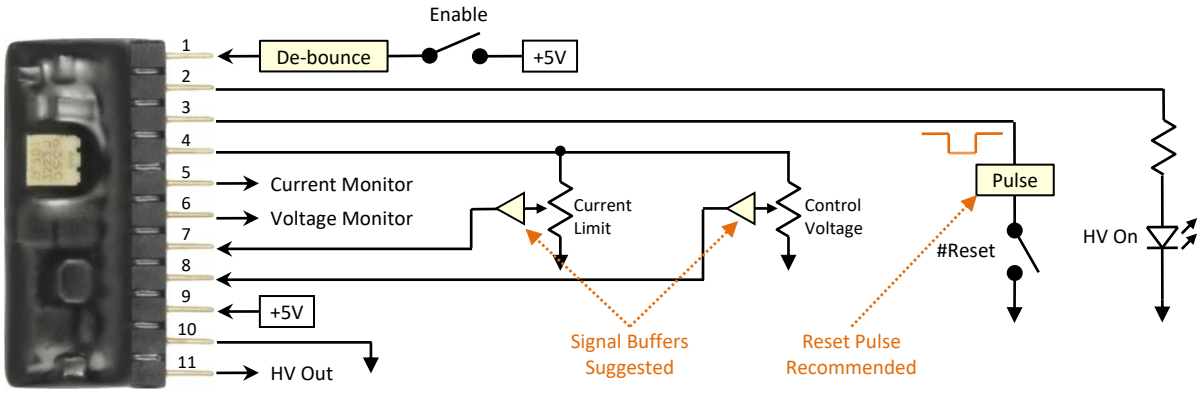
Compact SIP package with machined pins for breadboard or socketed use





Pin#	Function	Signal Type
1	Enable	TTL input
2	HV On	TTL output
3	#Reset	TTL input
4	+2.5V Reference	Analog output
5	HV Current Monitor	0 → +2.5V analog output
6	HV Voltage Monitor	0 → +2.5V analog output
7	HV Current Limit	0 → +2.5V analog input
8	HV Control Voltage	0 → +2.5V analog input
9	Power	+5V input voltage
10	Ground	Ground
11	HV Output	0 → +80V output voltage

Connections for Manual Control



Specifications

Pin#	Function	Parameter	Specification
1	**Enable**	Signal type	TTL/LVTTL compatible input, active high
		Range	high = HV80 main input voltage on low = HV80 main input voltage off
		Input impedance	10KΩ pull-down
		Default	0V (disabled) when disconnected
2	**HV On**	Signal type	TTL/LVTTL compatible output, active high
		Range	high = HV output enabled, no fault low = HV output disabled with possible fault
		Output current	20mA maximum
3	**#Reset**	Signal type	TTL/LVTTL compatible input, active low

		Range	high = #Reset de-asserted
			low = #Reset asserted, fault reset, over-current shutdown disabled

		Minimum width	10ns
		Input impedance	10KΩ pull-up to +5V
		Default	De-asserted when disconnected
		Caution	If #Reset is asserted during an output short-circuit condition, removing the short-circuit while #Reset is asserted results in the output voltage temporarily exceeding the setpoint.
4	**Voltage Reference**	Signal type	Analog output
		Range	+2.5V
		Output current	10mA maximum
		Initial accuracy	0.08%
		Temperature coefficient	2.0 ppm/°C typical
5	**HV Current Monitor**	Signal type	Analog output
		Range	0V → +2.5V = 0mA → +5mA HV output
		Output current	20mA maximum
6	**HV Voltage Monitor**	Signal type	Analog output
		Range	0V → +2.5V = 0V → +80V HV output
		Output current	20mA maximum
		Initial accuracy	HV80A: < 0.05%, trimmable to 0.01%
			HV80B: < 0.1% (0.05% typical), not trimmable
7	**HV Current Limit**	Signal type	Analog input
		Range	0V → +2.5V = 0mA → +5mA HV output
		Input impedance	50K pull-up to the internal +2.5V voltage reference 50K pull-down to ground

		Over-current fault	Disables the HV output until #Reset is asserted
		Response time	10ms → 100ms short-circuit response depending on load conditions
		Default	+1.25V (2.5mA output current limit) when disconnected
		Note	The over-current shutdown circuit is intended to protect the HV power supply from damaging load currents. It is not intended to protect external equipment or personnel.
8	**HV Control Voltage**	Signal type	Analog input
		Range	0V → +2.5V = 0V → +80V HV output
		Input impedance	1MΩ pull-down
		Default	0V when disconnected
9	**Power**	Signal type	Power
		Range	+4.5 → +5.5V DC +5V DC typical
		CAUTION	Exceeding +5.5V may damage the HV80
		+3.3V capability	+3.3V operation is possible with reduced output power. The HV80 is not fully characterized for +3.3V operation. All specifications use +5V input voltage. Maximum output voltage = 70V with a 4mA load Maximum output current = 3mA at 80V
		No-load current	20mA at 80V, no load
		Full-load current	140mA at 80V, 4mA load
		Maximum current	250mA at 45V, 9mA load (or 35V, 10mA load)
		Input fuse	0.4A, cycle Enable to reset
10	**Ground**	Signal type	Power
11	**HV Output**	Signal type	HV output voltage
		Range	+10V → +80V
		Output current	4mA regulated 10mA maximum at ≤ 35V Note: Performance above 4mA is not fully characterized or guaranteed
		Load regulation	±0.01% at 0mA → 4mA
		Initial accuracy	HV80B: < 0.1%, 0.05% typical
		Trimmable accuracy	HV80A: 0.01%
		Trim potentiometer	HV80A: 11-turn, top adjustment
		Trim range	HV80A: ±0.4%
		Settling time to 0.01%	< 30 seconds
		Ripple and noise	< 0.5mV RMS No load required for output voltages over 20V 20K load recommended for output voltages under 20V
		Output Capacitance	0.47µF

Operation

Enable (pin 1)

The Enable input controls a current-limiting power switch that provides all power to the HV80. If an internal fault causes excessive input current, the switch will disable all power on the HV80. The fault can be reset by de-asserting and re-asserting Enable, or by removing and reapplying the main input voltage. A persistent fault may indicate a damaged HV80.

The +2.5V internal voltage reference is powered only when Enable is asserted. If a voltage reference is needed while the HV80 is disabled, an external voltage reference should be used.

Voltage Reference (pin 4)

The internal +2.5V voltage reference is used internally and it provides a reference voltage for external components. Do not exceed 10mA load current. Do not apply an external voltage to this pin. A precision buffer is recommended for external use.

#Reset (pin 3)

The active low #Reset input has two functions. It resets an internal over-current fault (OCF) latch, and it disables the OCF shutdown function. If a control voltage setpoint is present when #Reset is de-asserted, the HV80 output voltage will increase from zero to the setpoint voltage.

#Reset can be temporarily asserted to disable the OCF shutdown function and allow load currents above the current limit, for example when charging a high load capacitance. Avoid permanently asserting #Reset. To allow load currents above the current limit setpoint, temporarily increase the current limit instead of disabling the OCF shutdown function. The current limit setpoint can exceed 4mA.

Recommended procedure for managing an over-current fault:

1. Verify that “HV On” transitioned from asserted to de-asserted, indicating an over-current fault
2. Disable the HV80 (de-assert “Enable”)
3. Remove the cause of the fault
4. Set the control voltage to zero
5. Enable the HV80 (assert “Enable”)
6. Set the required control voltage
   Optionally ramp to the required voltage while monitoring load current

Optional procedure for managing a spurious over-current fault:

1. Verify that “HV On” transitioned from asserted to de-asserted, indicating an over-current fault
2. Set the control voltage to zero
3. Assert then de-assert “#Reset” to clear the fault
4. Verify that “HV On” is asserted after “#Reset”

5. Set the required control voltage
   Optionally ramp to the required voltage to avoid spurious OCF due to high load capacitance

Caution Asserting #Reset During an Output Short-Circuit

If #Reset is asserted (OCF shutdown disabled) during an output short-circuit condition, removing the short-circuit will cause a temporary regulator over-drive until the regulator stabilizes. During over-drive, the output voltage will exceed the setpoint voltage, potentially up to 80V for a duration of 10ms to over 200ms depending on load conditions. Refer to the Output Voltage Limiting section.

#Reset is intended to be asserted temporarily to reset an over-current fault or permit brief high-current operation. In most cases, it should not be permanently asserted. If it is necessary to permanently assert #Reset, externally manage over-current and over-voltage conditions.

Output Current Limit (pin 7)

The HV80 limits output current primarily through an over-current fault (OCF) shutdown circuit. An OCF occurs when the output current exceeds a current limit set by the Current Limit pin. If the Current Limit pin is disconnected, the default voltage is 1.25V, equivalent to 2.5mA current limit. An OCF can be reset by momentarily asserting #Reset.

Load currents up to 10mA are possible at output voltages below 35V. However, performance above 4mA is not fully characterized and not guaranteed. The Current Monitor output range can exceed 4V, indicating load currents above 8mA. The OCF circuit can also function with Current Limit control voltages above 2.5V, allowing operation above the maximum specified output current of 4mA.

If load currents above 4mA are required, the recommended method is to increase the current limit, or to temporarily assert #Reset during high load conditions. Avoid permanently asserting #Reset because a temporary regulator over-drive may occur when recovering from an output short-circuit. Refer to the #Reset pin description for details.

Caution: A temporary short-circuit shorter than the fault reset response time may not be detected by the OCF circuit. This can trigger a brief regulator over-drive condition which causes the output to exceed the setpoint voltage. Refer to the Output Voltage Limiting section.

Output Voltage Limiting

The HV80 does not limit output voltage. If the application requires output voltage limiting, the following methods can be used.

1. Add a Zener clamp diode to the load and rely on the OCF function to disable the HV80 when the output voltage exceeds the Zener voltage. The Zener voltage should be low enough to allow adequate load protection and high enough to prevent Zener leakage current from causing excessive loading. This is a

simple method that should be implemented in the application circuit to prevent accidental over-voltage from being applied to the application circuit.

2. Use an external circuit to monitor the output voltage or the Voltage Monitor pin. If an over-voltage condition is detected then disable the HV80, reduce the control voltage, disconnect the load, or a combination of these.

SIP Connector

The 11-pin SIP connector is suitable for breadboard testing or installation in a standard SIP socket for embedded applications. The pins can be bent or broken if incorrectly installed in the socket. Make sure that all pins are straight and parallel before inserting the HV80 into a socket. Carefully insert the HV80 straight into the socket, not at an angle. Do not allow the pins to bend or catch on the socket edge during insertion. It is helpful to lightly insert the HV80 partially into the socket and check pin alignment before fully inserting it. When removing the HV80, carefully pull it straight away from the socket without bending it.

Pins with minor bending can usually be straightened without damage. A severe bend, such as a 90-degree bend, will likely result in a broken pin when straightened.

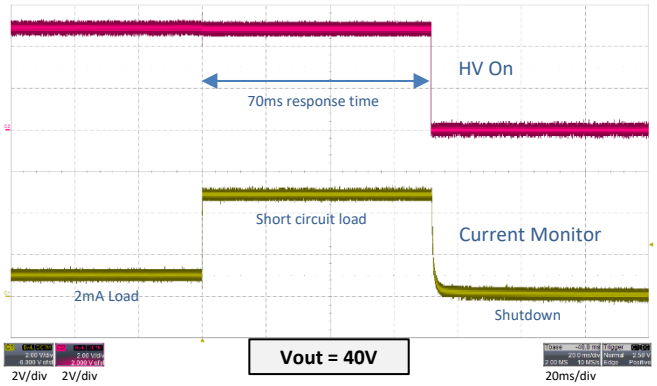
If the application requires different connectors, please contact us for other connector options.

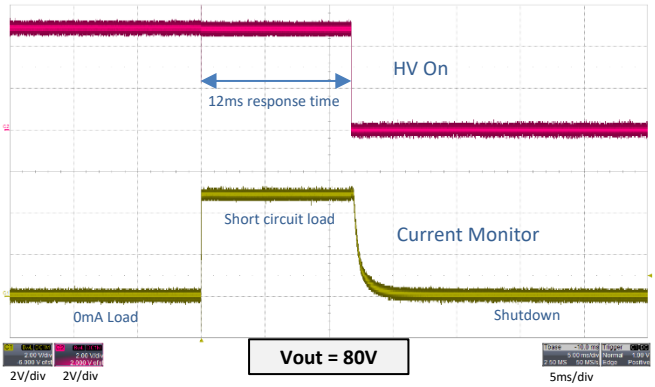
Epoxy Coating

The HV80 has a black thermally conductive epoxy coating intended to protect some sensitive components from accidental contact and contamination. It is not intended to protect against moisture exposure or harsh environments. The HV80 is not intended for use in these environments. It is normal for some components to be exposed through the epoxy coating. High voltage may be present on the exposed components. The sensitive components are not exposed.

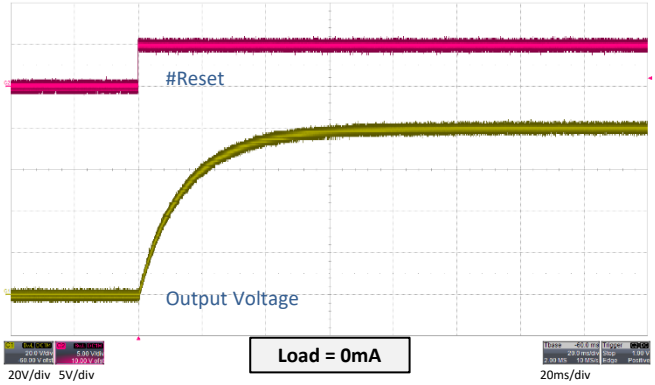
Measurements

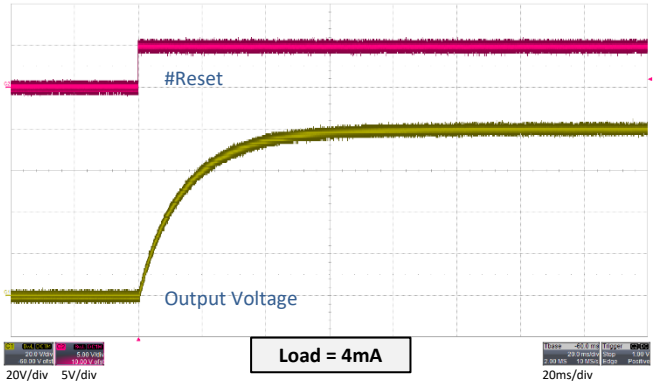
Over-current shutdown response to an output short-circuit (Initial load = 2mA)



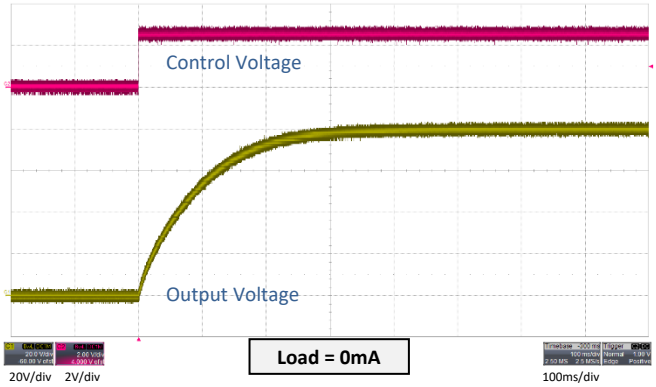


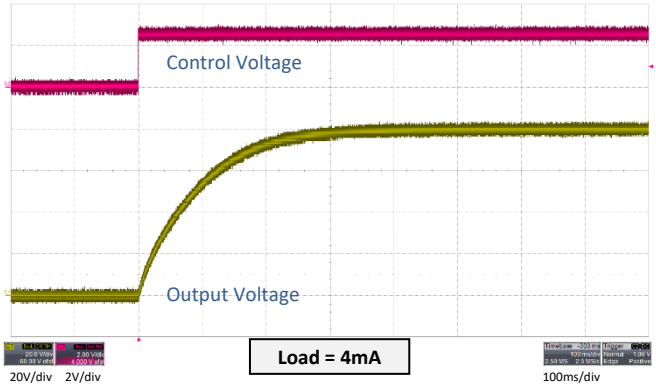
Recharge from over-current fault reset (Vout = 80V)





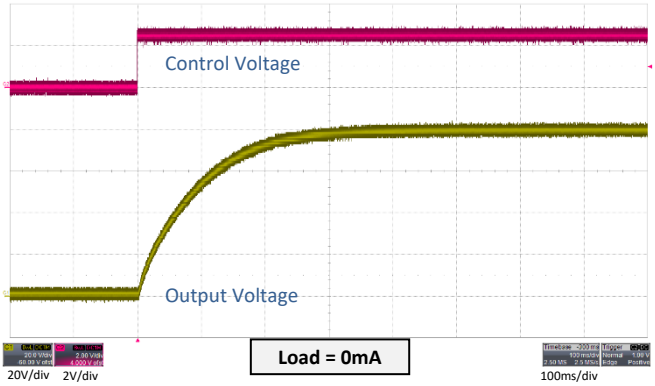
Charge to Vout = 80V

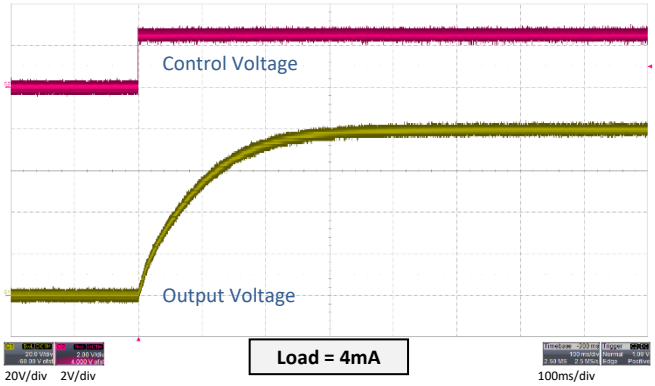




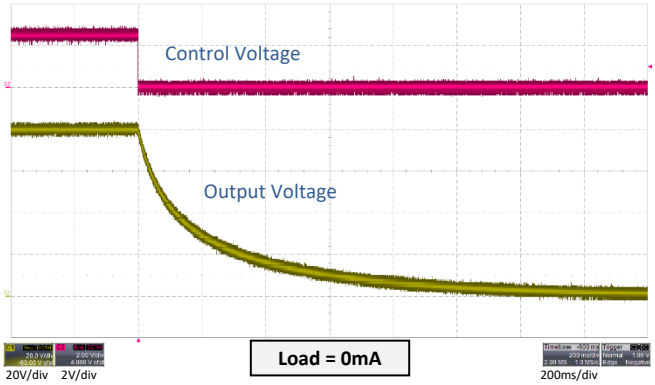
Measurements (cont.)

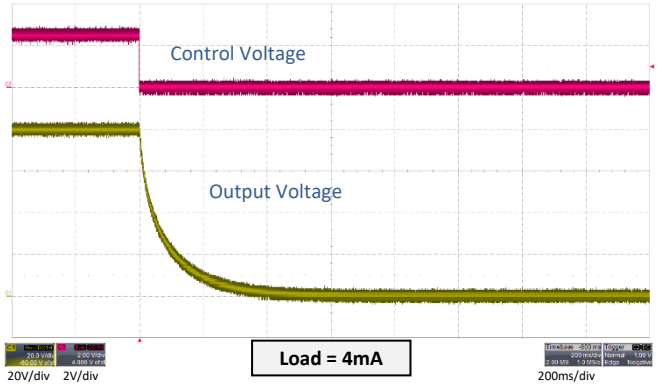
Charge to Vout = 80V, load capacitance = 9.4µF



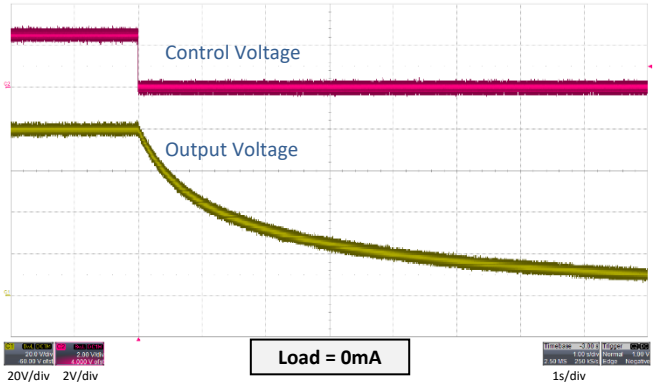


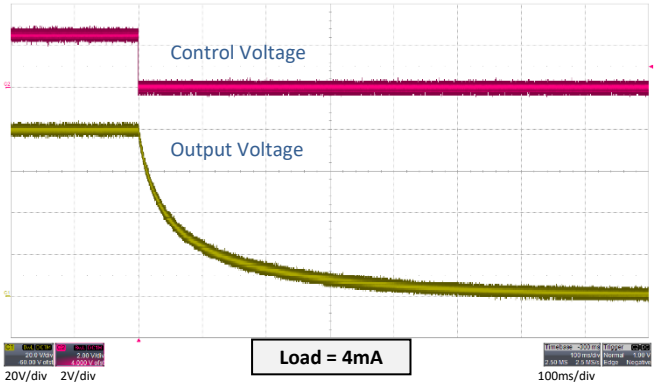
Discharge from Vout = 80V





Discharge from Vout = 80V, load capacitance = 9.4µF





Safety Information

WARNING – High Voltage

- High voltage may be present during operation
- High voltage stored on capacitors may be present after power is removed
- Improper handling may result in personnel injury or equipment damage

This high-voltage device must be used only by personnel trained and qualified in safe handling, installation, and operation of high-voltage equipment.

CAUTION – Electrostatic Discharge (ESD) Sensitivity

The circuit board can be damaged by electrostatic discharge. Observe precautions for handling electrostatic sensitive devices. Handle only at static-safe workstations.

Indoor Use Only

Do not operate this product in a wet or damp environment. Do not operate in an explosive atmosphere.