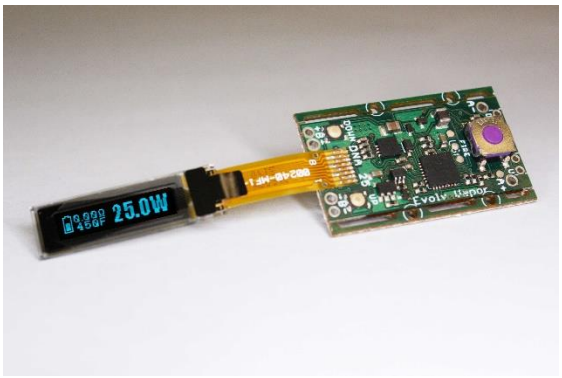


Evolv DNA 25

25 Watt Variable Power Module with Temperature Protection

The DNA 25 is a power regulated digital switch-mode DC-DC converter for personal vaporizers. It features Evolv's patented Wattage Control, Temperature Protection, Preheat, Step Up/Step Down Topology, Digital User Controls, OLED Screen, Onboard Buttons and Synchronous Rectification for maximum battery life and minimal heat generation. It is the most advanced personal vaporizer controller ever made.

Specifications

	Minimum	Typical	Max
Output Power	1 Watt		25 Watts
Output Voltage	1 Volt		7.0 Volts
Output Current, continuous			10.0 Amps
Output Current, instantaneous peak			16.0 Amps
Atomizer Resistance, standard wire	.25 Ohm	.7 Ohm	2.0 Ohms
Atomizer Resistance, temperature sensing wire, cold	.15 Ohm	.4 Ohm	1.0 Ohm
Temperature Limit	200°F	450°F	600°F
Input Voltage	3.1 Volts	3.7 Volts	4.3 Volts
Input Current	.5 Amps	6.0 Amps	10.0 Amps
Screen On Current		25mA	
Quiescent Current		1 mA	
Power Down Current			5uA
Efficiency		92%	
Weight		6g	
Footprint		.65" x 1.30"	.80" x 1.30"
Thickness		.32"	
Screen size		.69" OLED	

Contents

Temperature Protection

The DNA 25 is the second power supply for electronic cigarettes to directly measure and limit the temperature of the heating coil during operation. By preventing the coil from becoming too hot regardless of fluid, wicking or airflow, a variety of undesirable situations can be prevented. For example, appropriate temperature settings will prevent the wicking material from charring, which compromises taste and introduces unintended chemicals into the vapor. Appropriate temperature settings will also reduce the breakdown of flavoring and base liquid components, which could impact taste or safety.

Evolv's Temperature Protection Technology requires a heating coil made from Nickel 200 alloy, rather than Nickel Chromium or Kanthal alloys. Nickel 200 is commercially pure nickel. It is often sold in vapor shops and online as "non-resistance wire." If the temperature reaches the maximum value, the wattage applied to the atomizer coil is reduced to prevent overheating. Please note that the temperature reading is the average temperature of the atomizer coil, and care should be taken to construct the heating coil so that the temperature is uniform, without hot or cold spots. Ensure that the coil does not short to itself.

Because wattage, not temperature controls vapor volume, large vapor volumes can be produced without unnecessarily high temperatures. Temperature Protection is most helpful if the atomizer begins to dry out, the user pauses during a puff, the beginning or end of the puff, or if the wattage setting is inappropriate for the attached atomizer.

In normal operation, when the device is not firing the maximum temperature setting is displayed on the screen. When the device is firing, the actual average temperature of the coil is displayed on the screen.

By default, the Temperature Protection setting is 450° Fahrenheit. To change the limit

1) Lock the device by pressing the Fire button five times.
2) Hold down the UP and DOWN adjust buttons for two seconds.
3) After two seconds, the maximum temperature will be displayed, and the UP and DOWN buttons should be released.
4) Use the UP and DOWN buttons to adjust the maximum temperature
5) When the display shows the desired maximum temperature, press the Fire button to exit temperature adjust mode.

The maximum temperature is adjustable between 200° Fahrenheit and 600° Fahrenheit. To disable the temperature protection entirely, adjust the limit up to 600 degrees, then press the UP button one additional time. The temperature limit will read OFF. This will also disable the prompt when a new atomizer is attached.

Preheat

When the DNA 25 is used with a temperature sensing atomizer, an additional feature called Preheat is activated. No vapor is produced when the temperature is below the boiling point of the liquid. Preheat applies extra power until the heating coil is up to operating temperature to shorten the

delay between pressing the fire button and generating vapor. Because the preheat is temperature based, it will not overheat or burn the vapor.

Attaching a New Atomizer

The DNA 25 uses the resistance of the atomizer to calculate the temperature of the heating coil. It continually looks to see whether a new or changed atomizer has been connected. If you are using temperature protection, be careful to only attach new atomizers that have cooled to room temperature to the device. If a new atomizer is attached to the DNA 25 before it has cooled down, the temperature may read and protect incorrectly until the new atomizer cools.

When you connect a new atomizer or disconnect and reconnect your existing atomizer, the DNA 25 will prompt you to confirm this change. When you fire the first time, before activating the DNA 25 will prompt “New Coil? UP YES/DOWN NO”. When you see this prompt, if you have attached a new atomizer, press the UP button. If you have disconnected and reconnected the same atomizer, press the DOWN button.

For manufacturers outside the United States, the DNA 25 is available as a special order with Celsius units instead of Fahrenheit. Minimum quantities apply. Contact Evolv for details.

Operation

Basic operation of the DNA 25 is as follows. To wake the device from power off state, tap the Fire button. To generate vapor, press the Fire button. To change the wattage setting for more or less vapor, click or hold the Up and Down buttons.

Display

The DNA 25 has a small .69” diagonal blue OLED screen. The screen is attached to the main board by a flexible cable, allowing freedom in the design of your device. Please use caution when handling the screen and design the device so that the cable will be secured or strain relieved in operation. The normal and special operating modes shown on the display are discussed below. The DNA 25 will automatically detect whether a temperature sensing (Nickel 200) or standard (Kanthal etc) coil is attached.

Temperature Protected

Watt setting: The power level currently set on the DNA 25.

Battery indicator: The current state of charge of the battery.

Temperature display: When not firing, the maximum heating coil temperature setting. While firing, the actual temperature of the heating coil is displayed.

Ohms display: The resistance of the atomizer attached to the device. This is measured only when the unit is supplying power to the atomizer. At other times, it shows the most recent measurement.

Non-temperature Protected

Watt setting: The power level currently set on the DNA 25.

Battery indicator: The current state of charge of the battery.

Volts display: The output voltage being supplied to the atomizer.

Ohms display: The resistance of the atomizer attached to the device. This is measured only when the unit is supplying power to the atomizer. At other times, it shows the most recent measurement.

Modes

Locked mode: Pressing the fire button five times with less than .7 seconds between presses will cause the device to enter Locked mode. In Locked mode, the device will not fire and the output power will not adjust accidentally. While in Locked mode, the screen will be off, except that pressing a button will show “Locked, Click 5X”. To exit Locked mode, press the fire button 5 times.

Stealth mode: While locked, holding the fire and down buttons simultaneously for five seconds will switch to stealth mode. In this mode the display is off. It will still show error and lock messages. To switch back to normal display mode, hold down the fire and down buttons simultaneously for 5 seconds. This setting is stored to internal flash memory, and remains if power is removed.

Right Mode and Left Mode: While locked, holding the fire and up buttons simultaneously for 5 seconds flips the display. This allows for maximum flexibility in designing the mod, as well as accommodating left handed use. This setting is stored to internal flash memory, and remains if power is removed.

Power Locked mode: Holding down both the up and down buttons for two seconds will place the device in Power Locked mode. In this mode, the mod will operate normally, but you will not be able to change the power setting. This mode prevents accidental power level changes due to the buttons being pressed while in a pocket. To exit Power Locked mode, hold the up and down buttons for two seconds.

Max Temperature Adjust: From Locked Mode, holding down both the up and down buttons for two seconds will place the device in Max Temperature Adjust mode. Once this mode is entered, the max temperature will be displayed. The up and down buttons are used to adjust the max temperature. To save the new temperature setting and exit, press the Fire button.

Error Messages

The DNA 25 will indicate a variety of error states.

Check Atomizer: The DNA 25 does not detect an atomizer, the atomizer has shorted out, or the atomizer resistance is incorrect for the power setting.

Shorted: The atomizer or wiring are short circuited.

Weak Battery: The battery needs to be charged, or a higher rate battery needs to be used. If this happens, the DNA 25 will continue to fire the atomizer, but will not be able to provide the desired wattage. The Weak Battery message will continue to flash for a few seconds after the end of puff.

Temperature Protection: The heating coil reached the maximum allowed temperature during the puff. If this happens, the DNA 25 will continue to fire, but will not be able to provide the desired wattage.

Ohms Too High: The resistance of the atomizer coil is too high for the current wattage setting. If this happens, the DNA 25 will continue to fire, but will not be able to provide the desired wattage. The Ohms Too High message will continue to flash for a few seconds after the end of puff.

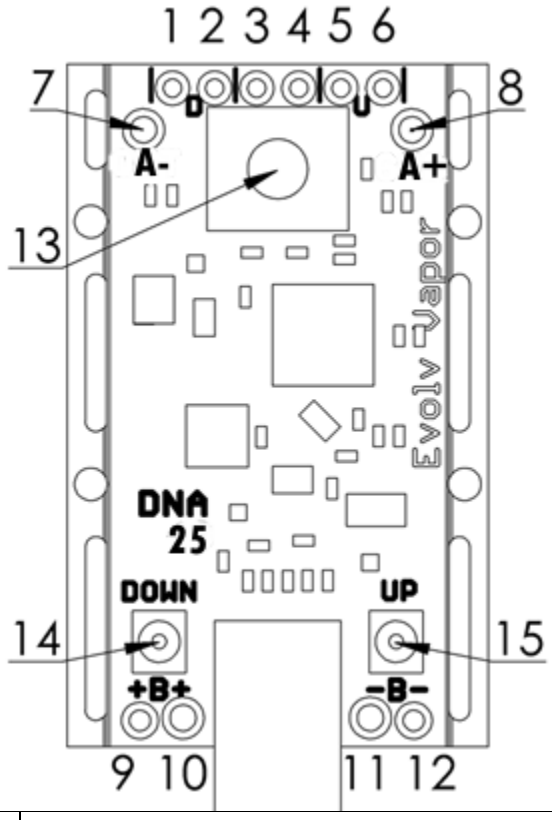
Ohms Too Low: The resistance of the atomizer coil is too low for the current wattage setting. If this happens, the DNA 25 will continue to fire, but will not be able to provide the desired wattage. The Ohms Too Low message will continue to flash for a few seconds after the end of puff.

Too Hot: The DNA 25 has onboard temperature sensing. It will shut down and display this message if the internal board temperature becomes excessive.

Auto power down

The screen will be at full brightness while firing. After 10 seconds with no button presses, the screen will dim. 30 seconds after the last button press, the screen will fade out and the device will go into sleep mode. To wake the device, press the fire button.

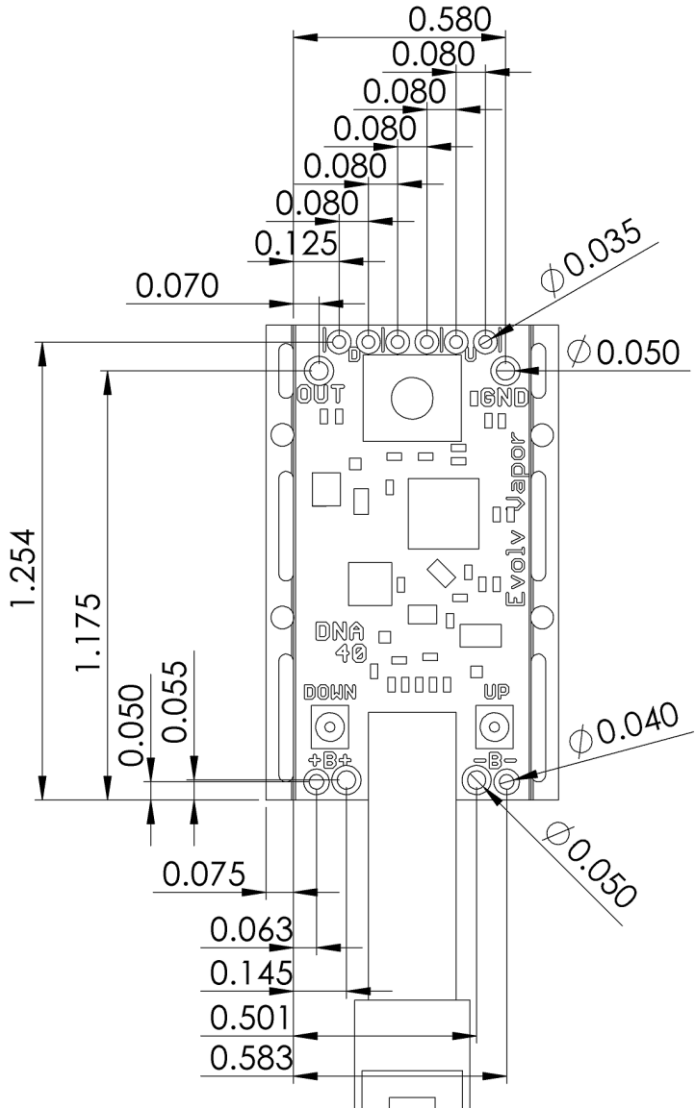
Pinout



Pin Number	Pin Name	Function
1	Down +	Positive side of the power down button.
2	Down -	Negative side of the power down switch. Does not connect to GND or B-
3	Fire +	Positive side of the fire button. Connects internally to B+
4	Fire-	Negative side of the fire button. Does not connect to GND or B-
5	Up-	Negative side of the power up button. Does not connect to GND or B-
6	Up+	Positive side of the power up button.
7	A-	Power output. Power output is a negative voltage. Connect to atomizer.
8	A+	Power output. A+ is the **ground** return for the atomizer. It is connected internally to B-.
9	B+	Positive battery terminal. Smaller terminal is for connecting a charger.
10	B+	Positive battery terminal. Larger terminal is the main power connection for the battery.
11	B-	Negative battery terminal. Larger terminal is the main power connection for the battery. It is connected internally to GND
12	B-	Negative battery terminal. Smaller terminal is for connecting a charger. It is connected internally to GND
13	FIRE	Onboard fire button
14	DOWN	Onboard power down button
15	UP	Onboard power up button

Wiring

The atomizer is connected to the OUT connection in the center, and the GND connection on the outside. The battery connects to the B+ and B- terminals. The optional remote charger also connects to the B+ and B- terminals. It is important to use appropriately sized wire when using the DNA. Too small wire will not perform well, and significantly undersized wire can burn out. High temperature insulation is preferred.



Recommended wire sizes

	Minimum size	Recommended size	Maximum size
Battery	22 gauge	20 gauge	18 gauge
Output	22 gauge	20 gauge	18 gauge
Charger, if used	26 gauge	24 gauge	20 gauge
Switches, if used	28 gauge	24 gauge	22 gauge

External component recommendations

The DNA 25 is a self-contained power regulator which does not require external components for its user interface. However, it does support the use of external interface components if desired.

Fire button:

Use a momentary on, normally open type switch or button. A standard pushbutton switch is appropriate. The switch is a logic function – all power switching is handled with transistors inside the DNA module, so the switch does not need to be rated for power. A waterproof or processed sealed switch is recommended.

Up/Down buttons:

The small onboard buttons labeled UP and DOWN allow the user to increase or decrease the power level in .1 Watt increments. The onboard tactile switches are waterproof and rated for 300,000 actuations. However, they are designed to always be used with external actuators, not pressed directly with the fingers. Please make sure the actuator presses down on the button only, and does not rotate or drag the top surface. Alternatively, remote normally open type switches or buttons can be attached to the UP and DOWN mounting holes for customization.

Battery:

A single cell rechargeable lithium chemistry battery is recommended. Either a lithium ion or a lithium polymer type can be used. Any battery used should be rated for a **MINIMUM** of 10 amps continuous discharge current. High C rated lithium polymer or IMR cylindrical cells are strongly preferred. Make sure that all contacts and connections are capable of handling at least 10 amps.

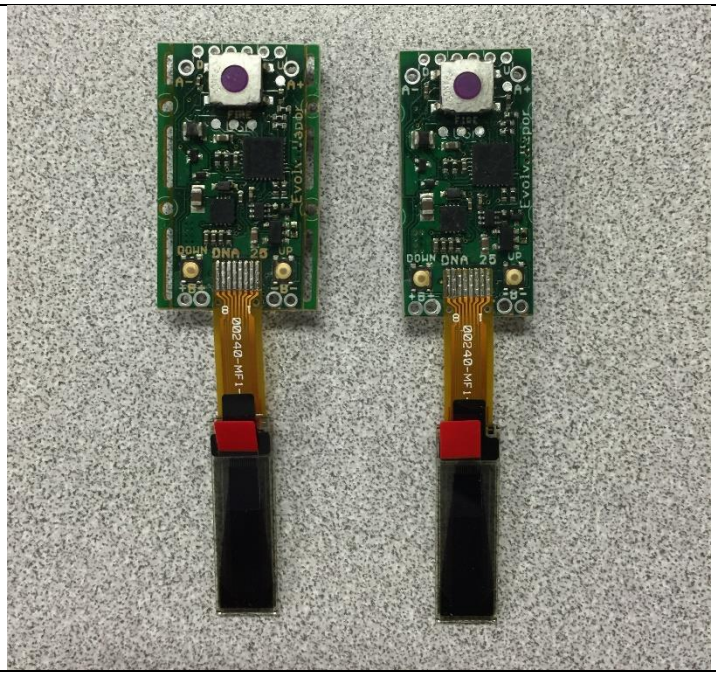
Charger:

Evolv offers an accessory DNA Charger which is USB powered and provides a 500 milliamp charge current. Other chargers can also be used. The use on an onboard charger is optional – a removable battery will also work.

Mounting

The DNA 25 has onboard switches for adjusting the power level and activating the output. Each of these functions also has optional through-hole pads for using remote buttons.

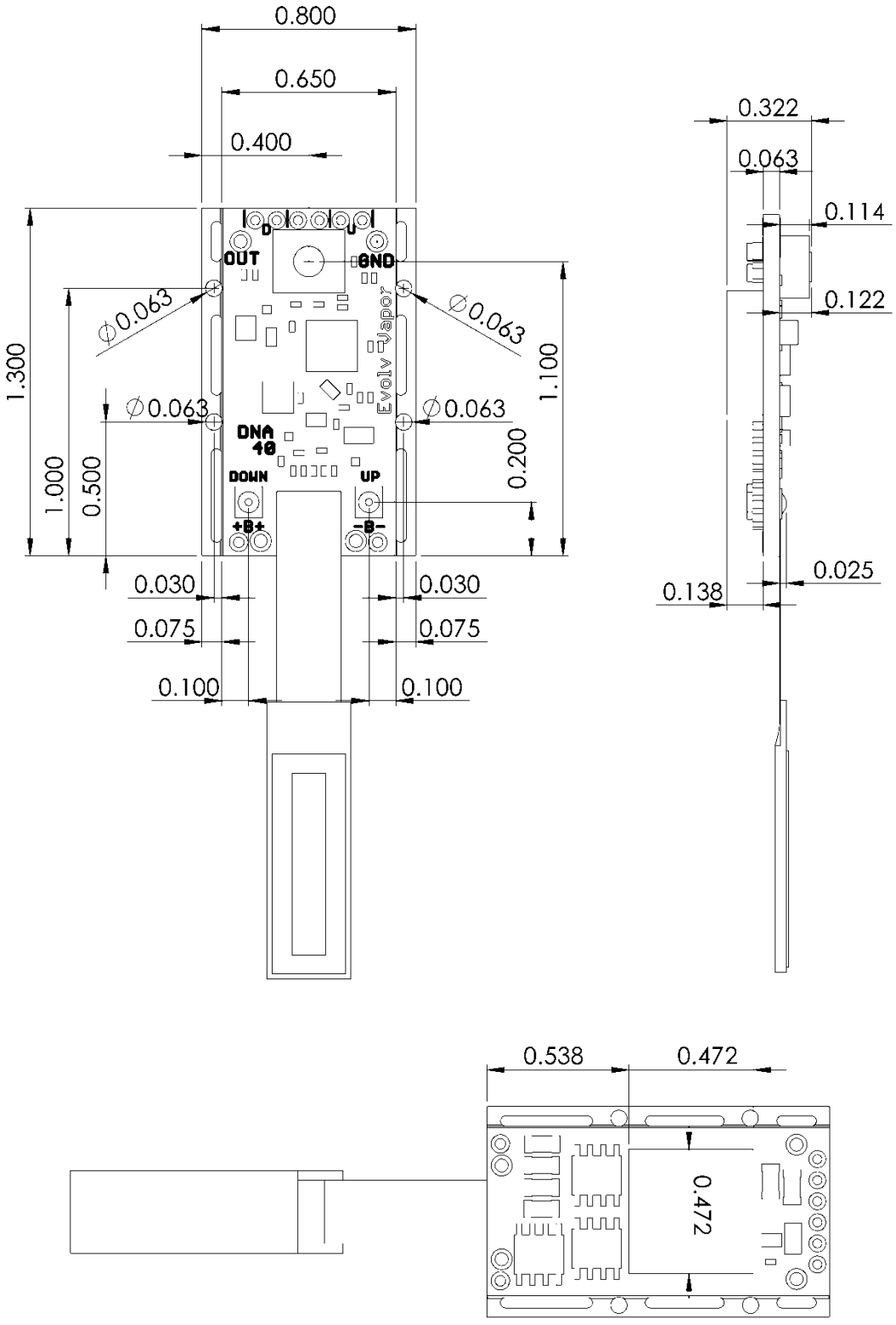
The DNA 25 features mounting rails. This allows the DNA 25 to be screwed, clamped or slotted into a device. The mounting rails are .075” wide and are removable. If the mounting rails are removed, the outline of the DNA 25 is identical to the DNA 30D and DNA 20. To remove the mounting rails, use sharp flush cutting clippers and trim the rail away one section at a time. A PCB de-paneling tool is ideal to remove the rails in volume production. Breaking the mounting rails off by bending could damage the board and should be avoided if possible.

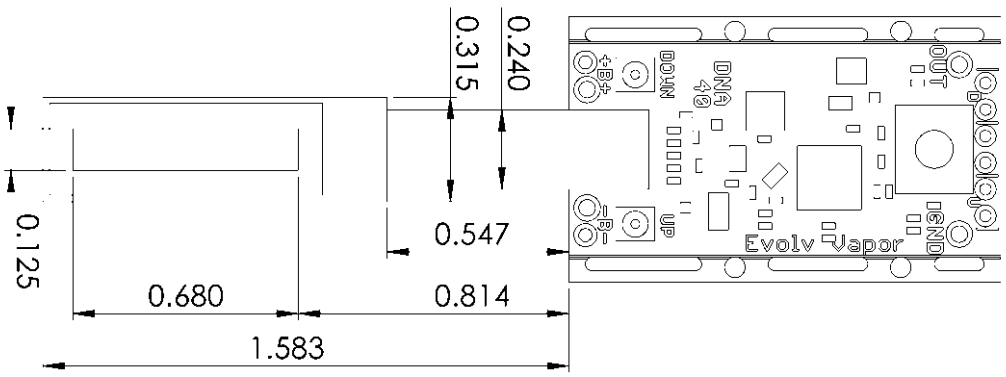


DNA 25 PCB with and without rails

The mounting rails have .063” diameter holes drilled for mounting screws. #0 or M1.6 screws are recommended.

Mechanical Dimensions





Evolv has 3D models of the DNA 25 available on their website in IGES, STL and Solidworks format.