

XAN-2:

Connecting the Controller and Switch

APPLICATION NOTE
July 2017

9. Adjusting Gate Threshold Shutdown

The 100/200 Series Controllers come in presets of $-2.6V$, $-2.0V$, $-1.4V$, or $-0.8V$ thresholds at the device gate, where drain voltage is shutdown when these levels are reached. The device gate operating voltage or quiescent voltage is typically $0.5V$ lower than these presets. The user has the option to adjust them when necessary to precisely trigger a shutdown event and protect the GaN transistor from excessive current or runaway. Figure 13 illustrates the tap points of resistors R1, R2, or R3 when increasing or decreasing the preset voltages with a single resistor. Refer to Page 1 for the pin descriptions. Always shutdown power to the Controller when soldering new components.

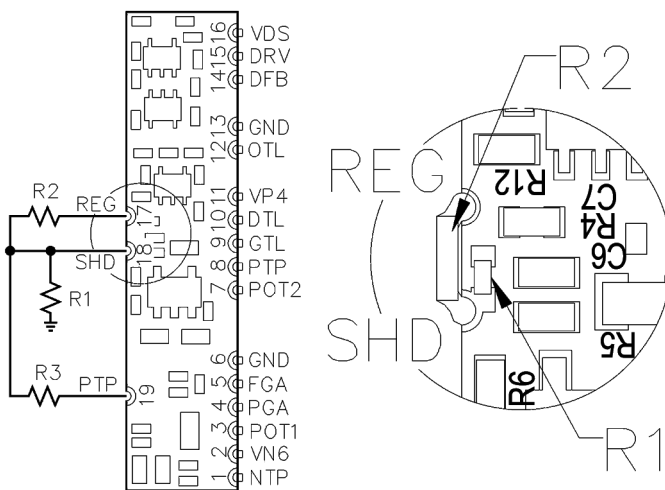


FIGURE 13

If chip resistors are preferred, the placeholder for R1 will fit an 0201 size. R2 will fit 0603 or 0805 size, and soldered on top of the unit between pins REG and SHD. On the other hand, a simpler approach to tapping these points is by using small axial resistors between $100K\Omega$ and $1M\Omega$. The table below shows resistance values needed to increase or decrease the threshold presets.

	R1 (Ω)			R2 or R3 (Ω)		
ADJUST \rightarrow	-0.4 V	-0.2 V	-0.1 V	+0.1 V	+0.2 V	+0.4 V
PRESETS \downarrow						
-2.6 V	120K	240K	480K	620K	310K	150K
-2.0 V	140K	280K	580K	600K	300K	150K
-1.4 V	140K	280K	580K	500K	250K	125K
-0.8 V	140K	280K	580K	400K	200K	100K

10. Controller Selection Guide

MODEL	DESCRIPTION
100X, 100T, 100L	100X, 100T, & 100L ARE IDENTICAL FUNCTIONALLY BUT DIFFER STRUCTURALLY. SUFFIX 'T' STANDS FOR TERMINAL PINS AT 50 MIL PITCH, WHILE 'L' FOR LOW PROFILE AT 60 MIL PITCHED CONNECTIONS. 'X' IS STANDARD CONFIGURATION. THE 100X & 100L MOUNT ON PCB FROM CASTELLATED I/O PORTS. THESE UNITS CONTROL THE GaN TRANSISTOR BY SWITCHING THEIR DRAIN AND GATE SUPPLIES SEQUENTIALLY OR INDEPENDENTLY. A SINGLE SUPPLY OF UP TO $+65V$ IS SUFFICIENT TO OPERATE. THE 100 SERIES HAVE NON-INVERTING INPUTS, WHICH MEANS IT TAKES NEGATIVE VOLTAGE TO PRODUCE NEGATIVE GATE BIAS TO THE
120X, 120T, 120L	SAME AS THE 100 SERIES BUT WITHOUT GATE SWITCHING CAPABILITY. A FIXED GATE BIAS VOLTAGE IS UTILIZED INSTEAD.
122X, 122T, 122L	SAME AS THE 100 BUT WITHOUT GATE SWITCHING AND VOLTAGE INVERSION. A NEGATIVE SOURCE IS SUPPLIED BY THE USER.
124X, 124T, 124L	THIS MODEL IS A BASIC GaN SEQUENCER/MODULATOR. THERE ARE NO GATE SWITCHING, VOLTAGE INVERTER, AND LOGIC SUPPLY. THE USER BASICALLY PROVIDES THE NECESSARY DC SOURCES THAT'S ALREADY IN THEIR SYSTEM.
200X, 200T, 200L	200X, 200T, & 200L ARE THE SAME AS THEIR COUNTERPARTS ABOVE EXCEPT THAT THEY HAVE INVERTING INPUTS. IT TAKES POSITIVE VOLTAGE TO PRODUCE NEGATIVE GATE BIAS TO THE
220X, 220T, 220L	SAME AS THE 200 ABOVE BUT WITHOUT GATE SWITCHING CAPABILITY. A FIXED GATE BIAS VOLTAGE IS UTILIZED INSTEAD.
222X, 222T, 222L	SAME AS THE 200 BUT WITHOUT GATE SWITCHING AND VOLTAGE INVERSION. A NEGATIVE SOURCE IS SUPPLIED BY THE USER.
224X, 224T, 224L	THIS BASIC SEQUENCER/MODULATOR HAVE NO GATE SWITCHING, VOLTAGE INVERTER, AND LOGIC SUPPLY. THE USER PROVIDES ALL DC SOURCES ALREADY PRESENT IN THEIR SYSTEM.

11. MOS Switch Selection Guide

MODEL	DESCRIPTION
332P	SINGLE 12A SWITCH MODULE FOR PULSED APPLICATIONS.
332N	ADD-ON TO 332P FOR A COMPLEMENTARY CONFIGURATION.
335CT	12A POWER CMOS MODULE WITH TTL DRIVE. SPECIFIC TO PULSED OPERATION WITH VERY FAST RISE/FALL TIME REQUIREMENT.
362P	SINGLE 36A SWITCH MODULE FOR PULSED APPLICATIONS.
362N	ADD-ON TO 362P FOR A COMPLEMENTARY CONFIGURATION.
365CT	36A POWER CMOS MODULE WITH TTL DRIVE. SPECIFIC TO PULSED OPERATION WITH VERY FAST RISE/FALL TIME REQUIREMENT.
392P	SINGLE 8A SWITCH, MINI-MODULE FOR PULSED APPLICATIONS.
395CT	8A MINI CMOS MODULE WITH TTL DRIVE. SPECIFIC TO PULSED OPERATION WITH VERY FAST RISE/FALL TIME REQUIREMENT.
410X, 410T, 410L	HAS DUAL 8A MOSFET SWITCHES FOR CW OR GENERAL PURPOSE OPERATION. 410X, 410T, 410L ARE IDENTICAL FUNCTIONALLY BUT DIFFER STRUCTURALLY. SUFFIX 'T' STANDS FOR TERMINAL PINS AT 50 MIL PITCH, WHILE 'L' FOR LOW PROFILE AT 60 MIL PITCHED CONNECTIONS. 'X' IS STANDARD CONFIGURATION. THE 410X & 410L MOUNT ON PCB FROM CASTELLATED I/O PORTS.
420X, 420T, 420L	HAS DUAL 8A MOSFET SWITCHES FOR PULSED APPLICATIONS. LIKE THE 410 AND 430, THEY ARE SMALLER THAN THE 100/200 CONTROLLER MODULES AND WORK WELL IN TIGHT SPACES.
430X, 430T, 430L	THE 8A P-CHAN & N-CHAN MOS SWITCHES ARE COMPLEMENTARY AND WORKS LIKE A PUSH-PULL. SPECIFIC TO PULSED OPERATION WITH VERY FAST RISE AND FALL TIME REQUIREMENT.