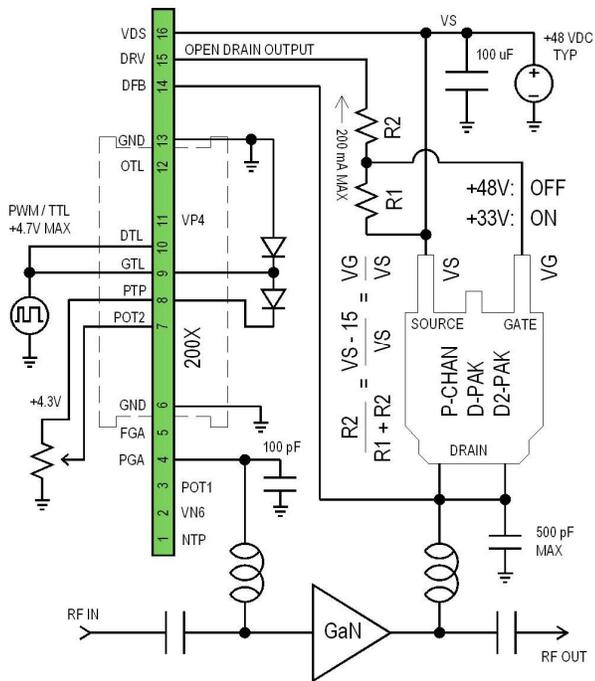


XAN-6: Converting Switch from Pulsed to CW

Background

GaN transistors operate in a host of drain voltages from 24V to 65V. While any Pulsed Switch type currently offered can accommodate them easily, it is not so easy with a CW switch to cover all voltage possibilities. The CW switch is very simple, and consists of a P-channel MOSFET with two resistors, which was detailed in previous application notes and diagrams. This app note allows the user to convert all types of single MOS Pulsed Switches into a CW version, in the event that pulse requirements become longer than 500usec width or 5msec period.

CW Switch Schematic

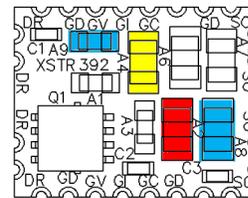
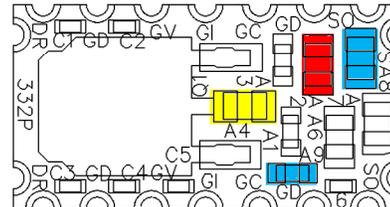
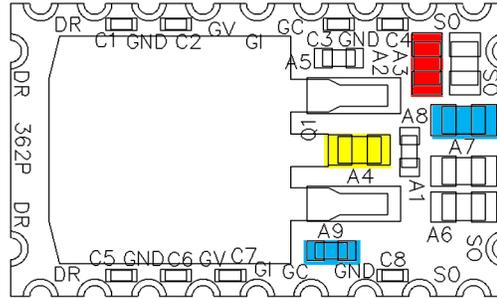


The diagram above shows a controller with an open-drain output driving a CW switch. It can be seen that the gate voltage to the MOS device is always 15V below the source level to turn-ON the switch. Therefore,

$$\frac{R2}{R1 + R2} = \frac{VS - 15}{VS} = \frac{VG}{VS}$$

Where, drive current $I_{drv} \approx 5\text{mA} \ll VS / (R1 + R2) \ll 100\text{mA}$ typically. Increasing current improves speed, but at the cost of added heat to the controller and resistors.

Modifications to the Switch



Rework Instructions:

1. Only Switches 332P, 362P, and 392P apply.
2. Place module on a hot plate set at 120°C. Use solder gun or hot-air gun to remove or insert parts. Lead-free solder melts at approximately 220°C.
3. Remove four components A2, A4, A8, and A9. They are indicated by red, yellow, and blue colors.
4. Insert placeholder A2 (shown in red) with R1 resistor as calculated from the schematic.
5. Insert placeholder A4 (shown in yellow) with R2 resistor as calculated. Make sure to use higher wattage resistors for appropriate current drawn.
6. Use lead-free solder as necessary.
7. Below are initial values to consider:
 - ◆ VS = 28V, $I_{drv} = 5.2\text{mA}$, R1 = 3.0K, R2 = 2.4K
 - ◆ VS = 36V, $I_{drv} = 5.2\text{mA}$, R1 = 3.0K, R2 = 3.9K
 - ◆ VS = 48V, $I_{drv} = 5.4\text{mA}$, R1 = 3.0K, R2 = 6.2K

Note: Scale down resistor values to increase current and switching speeds.