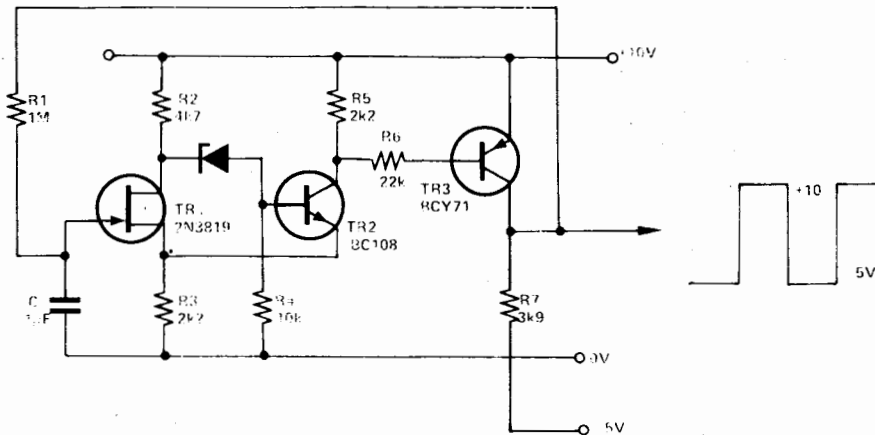


tech-tips

LOW FREQUENCY SQUARE WAVE OSCILLATOR

A drawback of low frequency oscillators using bipolar transistors or TTL logic is that the timing capacitor usually has to be a high value electrolytic. Using a field effect transistor at the input of a schmitt trigger, means a low value capacitor can be employed. The trigger by TR1 and TR2 has a hysteresis of approximately 3V. This is controlled by the 3V zener.

With C1 uncharged TR1 is off and TR2 is forward biased. The voltage at the source of TR1 is approximately +4V. TR2 conducts, thus turning on TR3. The output is therefore at +10V. C1 then charges via R1 and the gate voltage of TR1 goes positive. When the gate voltage is sufficiently positive TR1 conducts, turning off TR2. The positive feedback from the emitter of TR2 to the source of TR1 ensures a



rapid switch off. TR3 also switches off and the output goes to -5V. Capacitor C1 now discharges towards -5V, but when the voltage across C1 falls by approximately 3V, TR1 ceases to conduct, turning on TR2.

The collector load of TR3 is connected to a negative supply giving a

50% duty cycle. (The circuit still oscillates if R7 is connected to 0V but the duty cycle will change, the output remaining at 0V for a longer period than at +10V).

With the components as shown the frequency of the output is approximately 0.025Hz.