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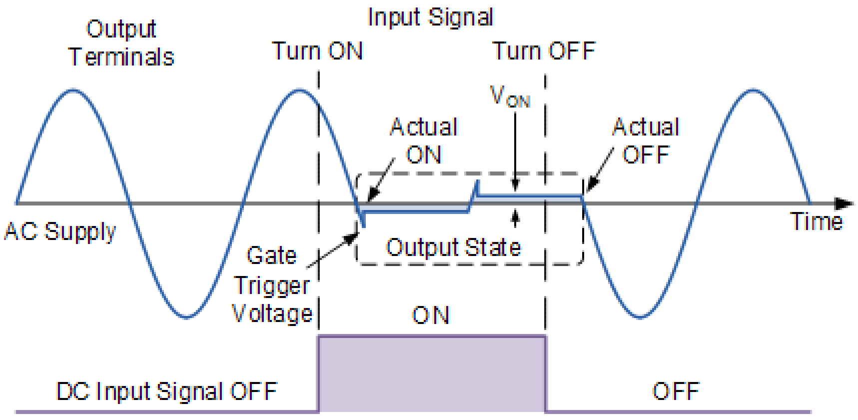
SENSEMASTER LTD

Sensing, Heating & Anti-static Solutions

Solid State Relay Output Waveform



With no input signal applied, no load current flows through the SSR as it is effectively OFF (open-circuited) and the output terminals see the full AC supply voltage. With the application of a DC input signal, no matter which part of the sinusoidal waveform, either positive or negative the cycle is going through, due to zero-voltage switching characteristics of the SSR, the output only turns-on when the waveform crosses over the zero point.

As the supply voltage increases in either a positive or negative direction, it reaches the minimum value required to turn the output thyristors or triac fully ON (usually less than about 15 volts). The voltage drop across the SSR's output terminals is that of the switching device's on-state voltage drop, VT (usually less than 2 volts). Thus, any high inrush currents associated with reactive or lamp loads are greatly reduced.

When the DC input voltage signal is removed, the output does not suddenly turn-off as once triggered into conduction, the thyristor or triac used as the switching device stays ON for the remainder of the half cycle until the load currents drops below the devices holding current, at which point it switches OFF. Thus, the high dv/dt back emf's associated with switching inductive loads in the middle of a sine wave is greatly reduced.

Then the main advantages of the AC solid state relay over the electro-mechanical relay are its zero-crossing function which turns ON the SSR when the AC load voltage is close to zero volts, thus suppressing any high inrush currents as the load current will always start from a point close to 0V, and the inherent zero current turn-off characteristic of the thyristor or triac. Therefore, there is a maximum possible turn-off delay (between the removal of the input signal and the removal of load current) of one-half cycle.