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"QUICK – START" your Dionics-USA Photovoltaic (PV) MOSFET-Driver

To begin conduction in a MOSFET, it is necessary first to fully charge its Gate capacitance. Using a PV MOSFET-Driver, the output short-circuit current, Isc, is fed into the MOSFET's Gate and Source terminals, thereby charging the Gate capacitance. The speed with which the MOSFET turns on, however, may be too slow if its Gate capacitance is high and/or the Isc charging current is low. The following "Quick-Start" approach may get around the problem.

We assume that your circuit has an external current-limiting resistor in series with the Input LED terminal of the PV MOSFET-Driver. Let us assume it is a 100-ohm current limiting resistor. The Quick-Start approach involves first replacing the 100-ohm resistor with two external resistors, in series, that add up to the same 100 ohms. As an example, let us use a 90-ohm resistor in series with a 10-ohm resistor. Next, the Quick-Start approach requires an external Capacitor, Qq-s, be put across (in parallel with) the 90-ohm external resistor. The designer must calculate the Qq-s capacitor value to satisfy the required turn-on speed.

How It Works

When the Input LED is turned on initially, the capacitor, Qq-s, which is across the 90-ohm resistor, acts temporarily as a short. The only current-limiting thus comes from the remaining 10-ohms, and so permits the initial current into the LED, and the charging Isc ,to both be 10-times higher than with 100-ohms of current limiting. The much greater current into the Gate of the MOSFET charges it 10-times faster, and results in the MOSFET turning on in 1/10th the time. However, as the capacitor Qq-s is itself charging up, it gradually converts from a short to an open, at which point the 90-ohm resistor is again active. The current-limiting is now back to the 100-ohm level, and the Isc current from the PV MOSFET-Driver is again at its original lower level, which should maintain the MOSFET in its turned-on condition. MOSFET Turn-On time, however, will have been greatly reduced.