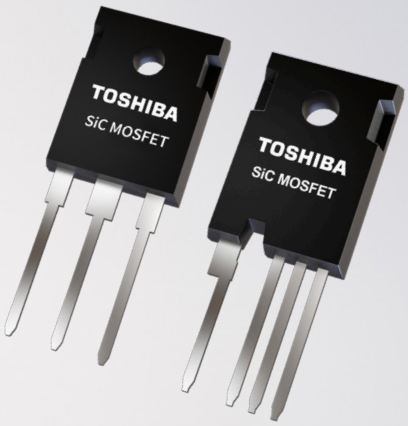
SiC Snacks
Bite Sized Benefits

Kelvin Source Pin for Precise Control



What does it mean?

As silicon carbide (SiC) MOSFETs deal with large currents being switched at elevated speeds, the effect of parasitic inductances situated between the gate and the source can become problematic. The resulting voltage drop means that such MOSFETs will experience a slowing of their switching speed. It will also cause power losses which will lower conversion efficiency. Inclusion of a Kelvin source pin within the MOSFET design makes a real difference. It provides a low current connection to the source which is separate from the power source pin. Complementing the 3-pin version, Toshiba also offers 4-pin SiC MOSFETs, which each feature a Kelvin source pin. This arrangement allows a significant boost in performance parameters.

What's the benefit?

Inclusion of a Kelvin source pin (as shown on the right of the diagram directly below) means there is a dedicated connection for the driving signal, rather than having to rely on the power source pin to deliver both power and the driving loop. It means that the parasitic inductances found between the gate and source no longer impact on the current driving the MOSFET or the speed at which switching is conducted. MOSFET turn-on is not slowed down by a voltage drop across such inductances and unwanted turn-on losses are avoided.