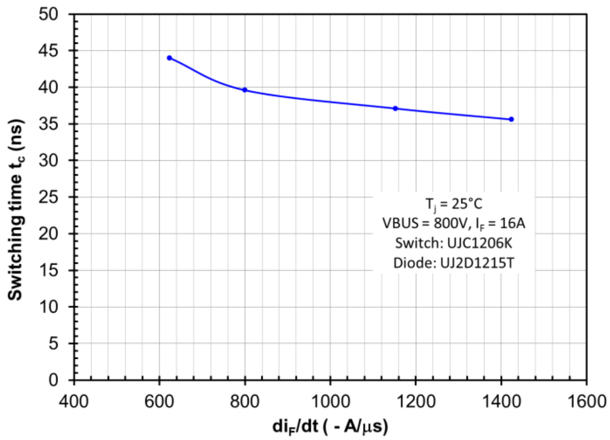

Fig.7: Measured switching time t_c of the SiC JBS diode UJ2D1215. T_J = 25°C, VBUS = 800V, I_F = 16A, Switch: UJC1206K.

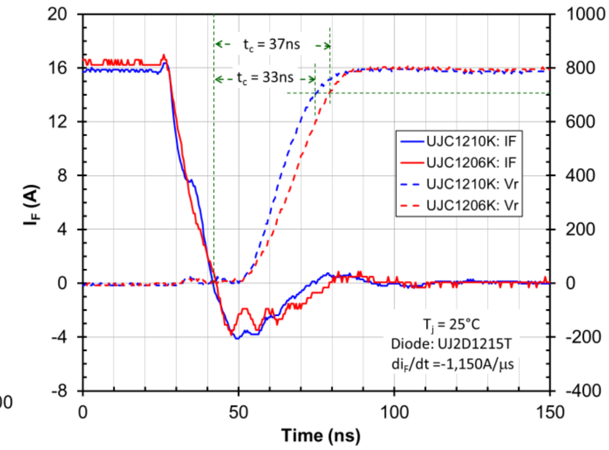

Fig.8: Comparison of the turn-off waveforms of the SiC JBS diode UJ2D1215T with different switches.

UJ2D1215T at different di_F/dt rates. When the di_F/dt rate is increased from 600A/□s to 1,400A/□s, the switching time t_c is decreased from 44ns to 36ns. Fig.8 compares the turn-off waveforms of the SiC JBS diode UJ2D1215T with different switches in the test setup. It is seen that, under about the same di_F/dt rate, the switching time t_c is decreased from 37ns to 33ns when the switch in the testing system is changed from UJC1206K to UJC1210K. This is because UJC1210K has smaller capacitances than UJC1206K and turns on faster.

4 Summary

SiC JBS diodes are majority carrier devices having no stored charge, and can be turned off much faster than Si PiN diodes. The key features of SiC JBS diodes are listed below:

- Turn-off process is the charging process of the junction capacitor;
- Capacitive charge Q_c is independent of the junction temperature T_j;
- Capacitive charge Q_c is independent of the forward current level I_F;
- Capacitive charge Q_c is independent of the di_F/dt rate;
- Capacitive charge Q_c is solely determined by the device design;
- Switching tine t_c is mainly determined by the test system.