FUJI IGBT Module 6MBI800XV-075V-01

Gate resistance dependence of surge voltage

Measured module: 6MBI800XV-075-01
Measured conditions: $V_{CC}=400\,\text{V}$, $I_{C}=800\,\text{A}$, $V_{GE}=+15\,\text{V}$, $R_{G}=\text{var.}$, $C_{GE}=0, 56\,\text{nF}$
$T_{vj}=-40, 25, 125, 175^\circ\text{C}$
The surge voltage, especially at IGBT turn off, depends on the gate resistance. As shown in the figure above, the surge voltage is able to control with the gate resistance but the curves have peaks. Although detailed reasons for this relation are not described here, the background of such behaviors have already been analyzed and published. The primary reason of such behavior is the interaction of two silicon physics in IGBT chip: 1) the carriers stored in the drift region and 2) Current through MOS channel\(^1\).