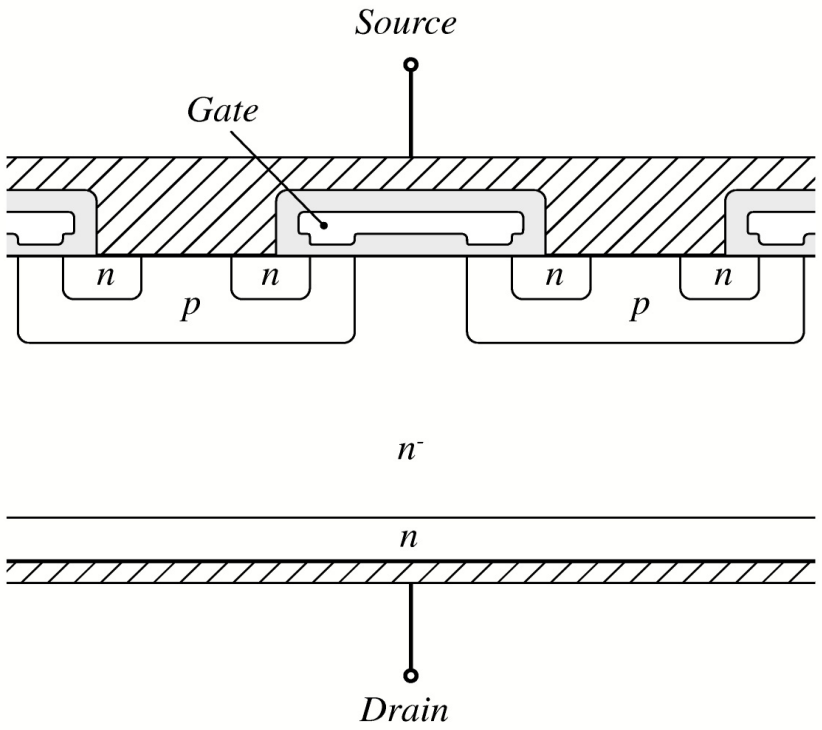
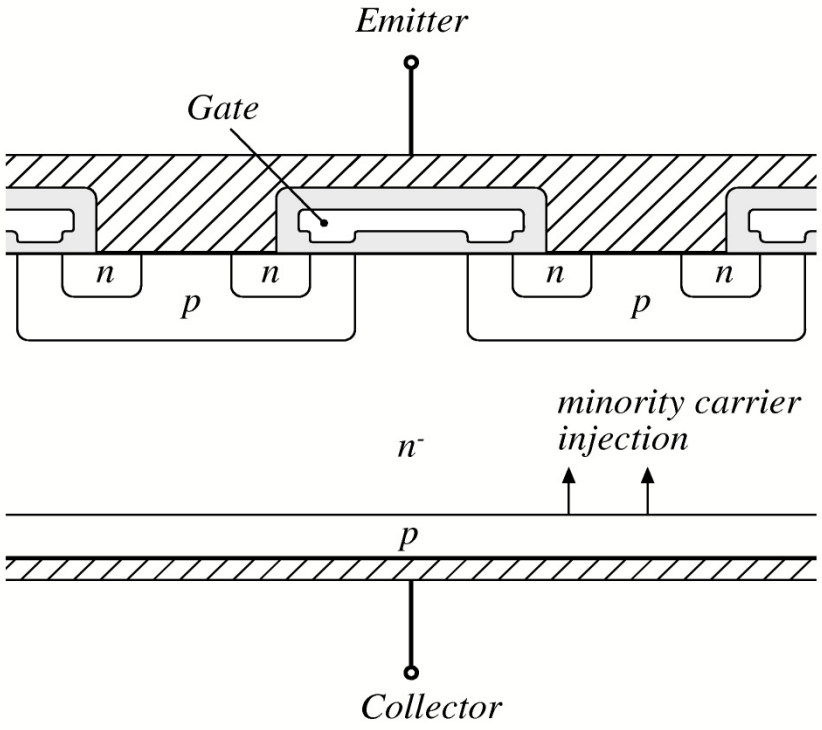
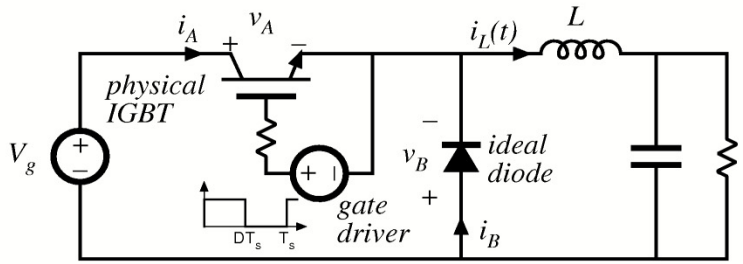
Charge Storage

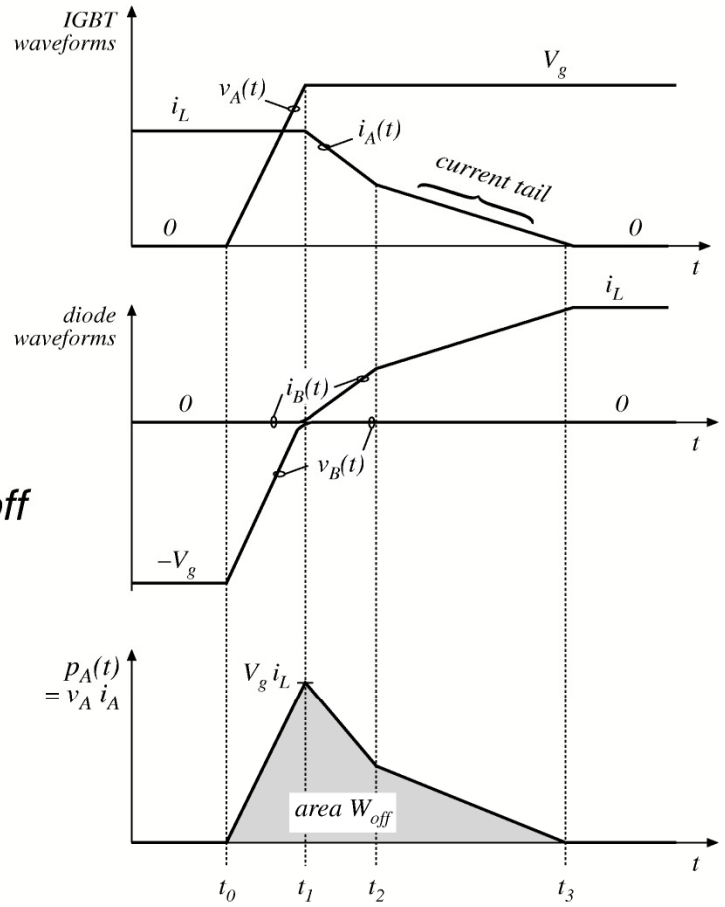




IGBT Current Tailing



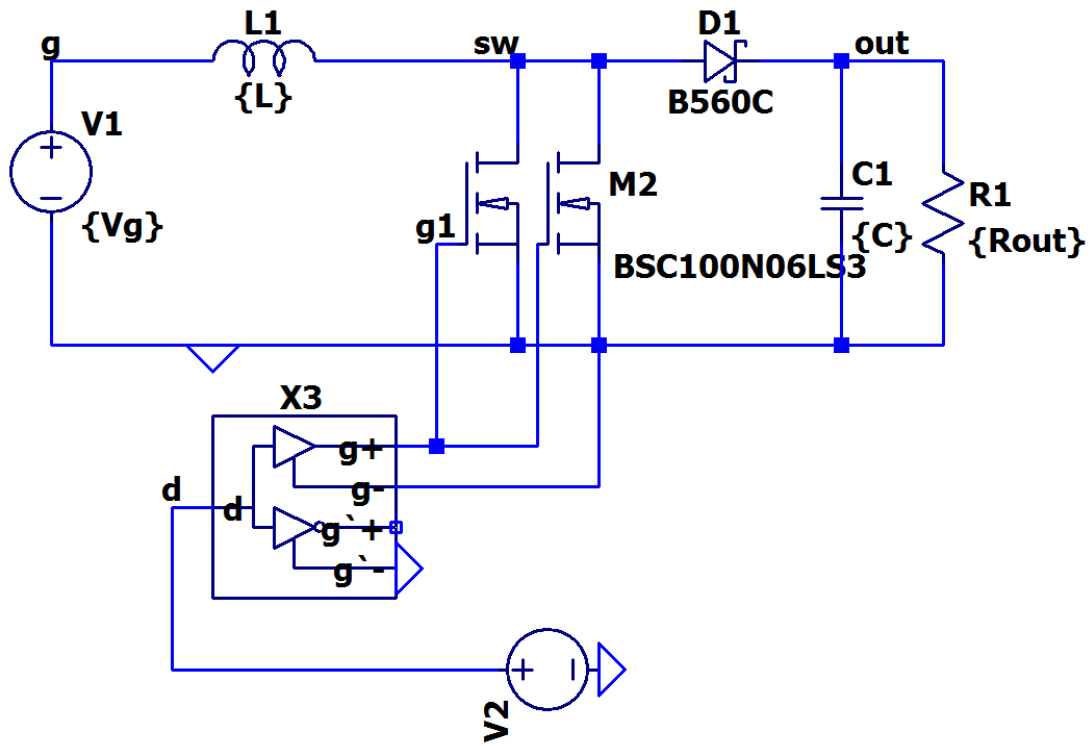
Example: buck converter with IGBT



transistor turn-off transition

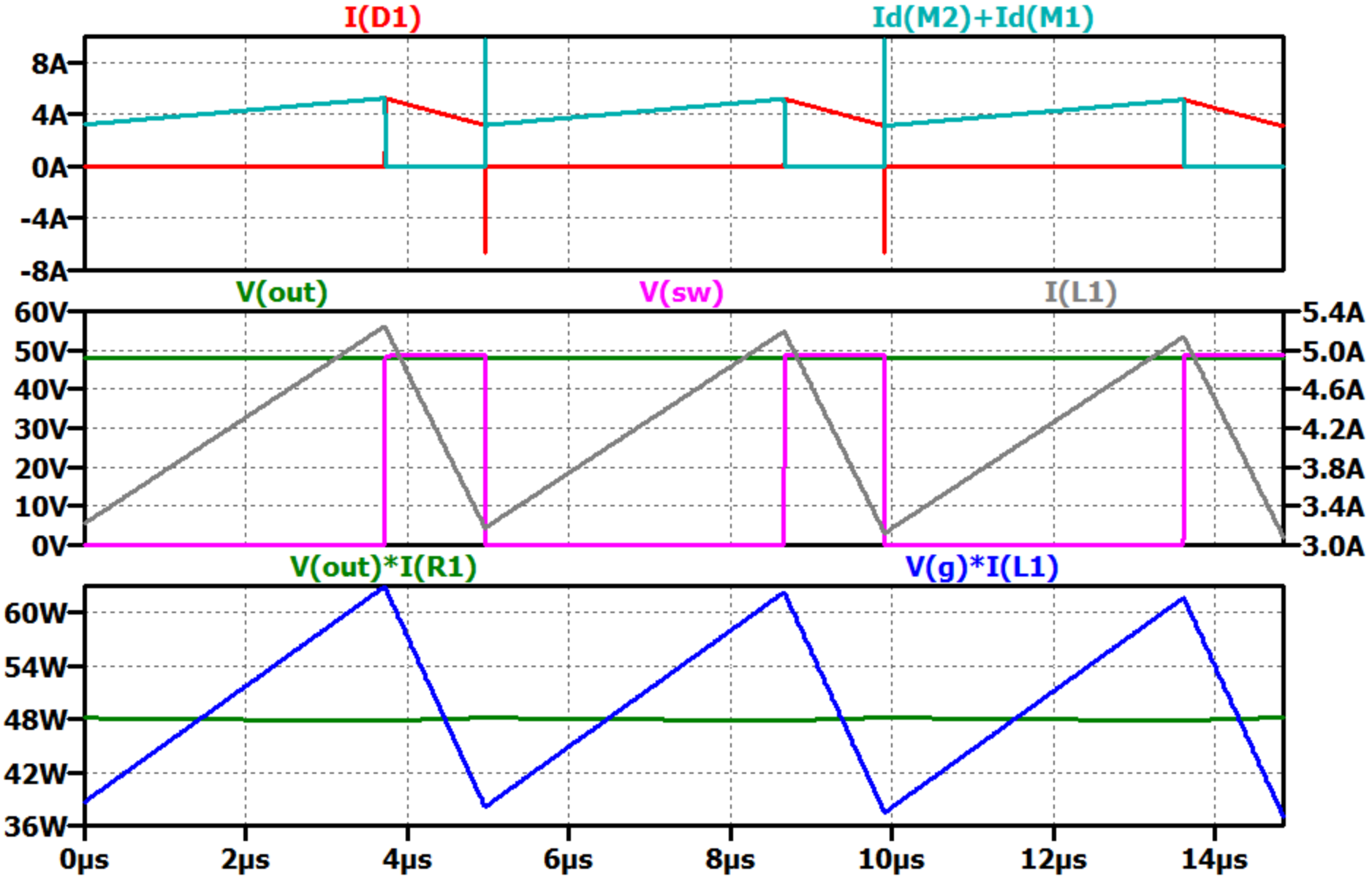
$$P_{sw} = \frac{1}{T_s} \int_{\substack{\text{switching} \\ \text{transitions}}} p_A(t)\, dt = (W_{on} + W_{off})\, f_s$$

Schottky Diode

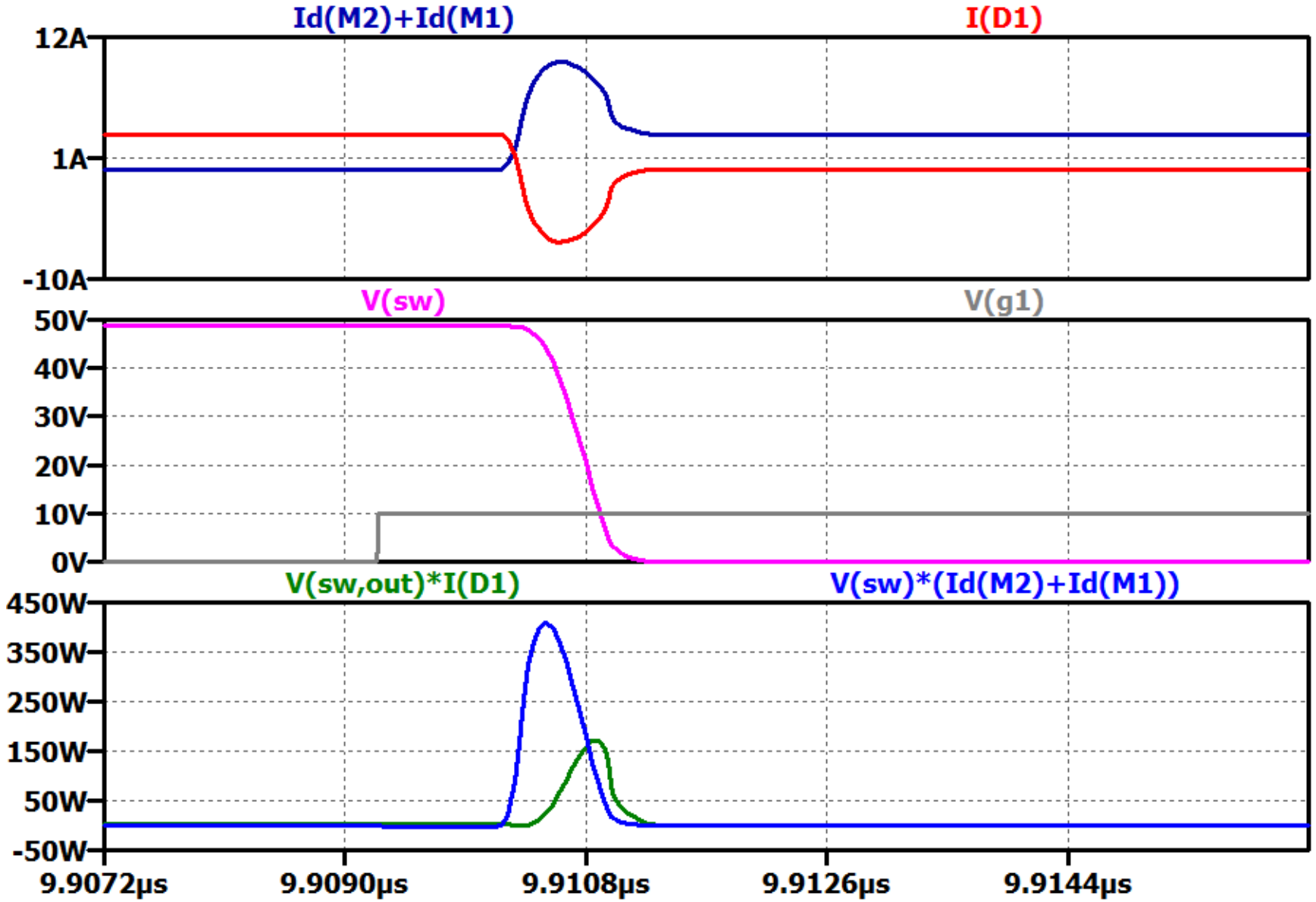


L	C_{out}	f_s	Diode	η (Sim)
22uH	22uF	202k	Si (FR)	93.9%
22uH	22uF	202k	Si Schottky	95.8%

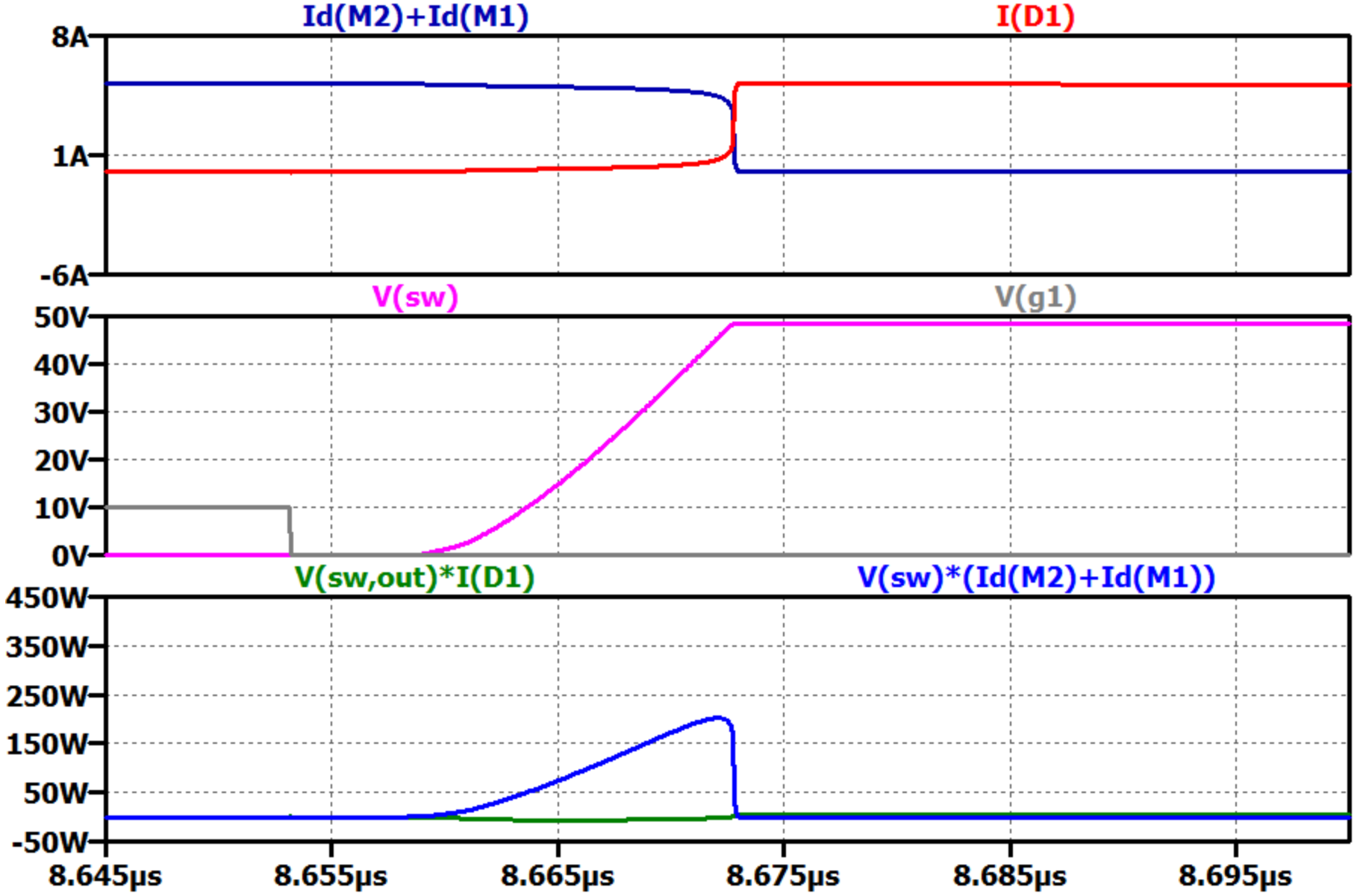
Simulation Waveforms



Switching Transition – FET turn ON



Switching Transition – FET turn OFF

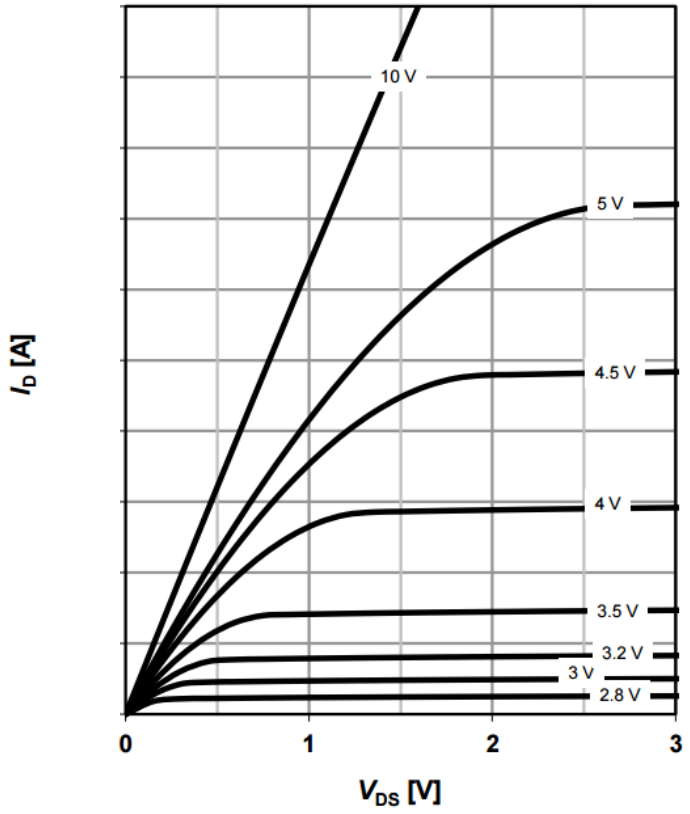


MOSFET Switching Behaviors

5 Typ. output characteristics

$I_D=f(V_{DS})$; $T_j=25$ °C

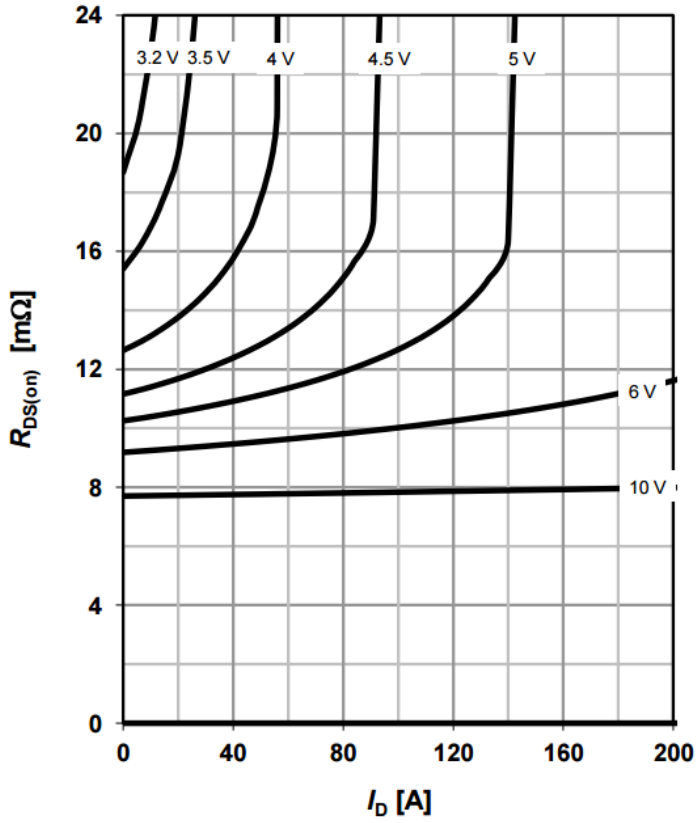
parameter: V_{GS}



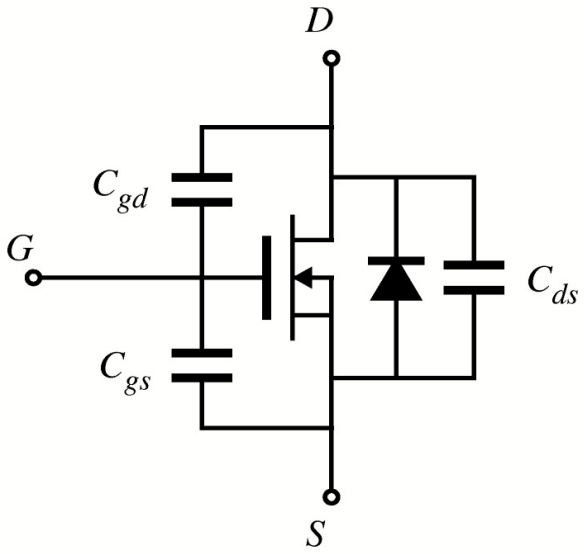
6 Typ. drain-source on resistance

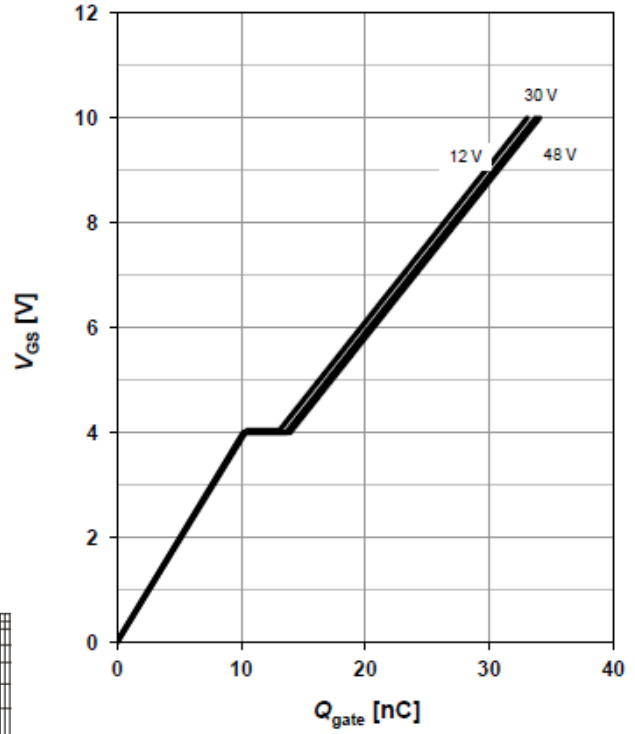
$R_{DS(on)}=f(I_D)$; $T_j=25$ °C

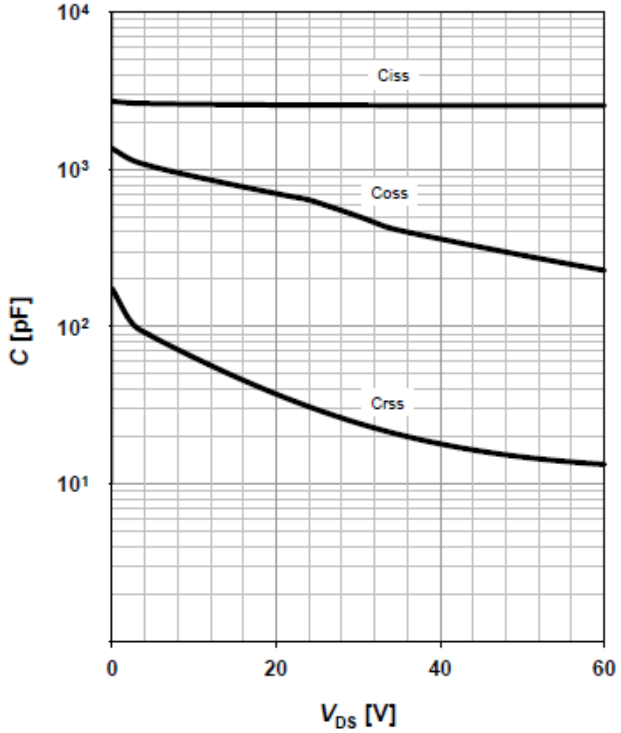
parameter: V_{GS}

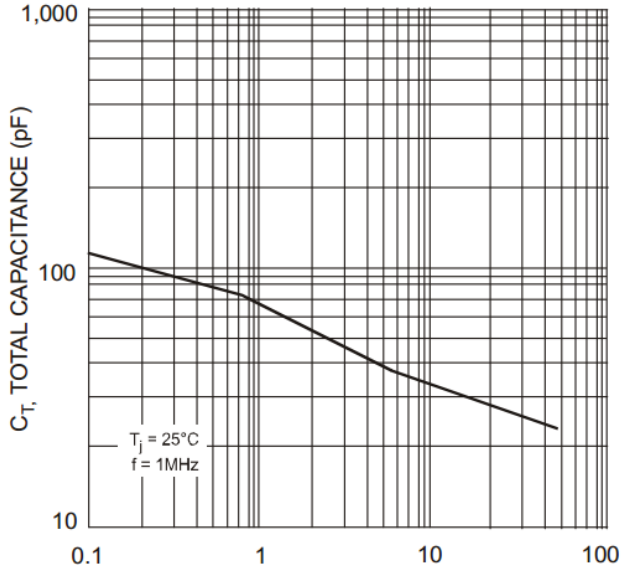


MOSFET Stored Charge









Device Capacitances