



**Electrical Characteristics** ( $T_J=25$  unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
<b>Static Parameter</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	40	-	-	V
		$V_{GS}=0V, I_D=1mA$	40	-	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=40V, V_{GS}=0V$	-	-	1	$\mu A$
		$V_{DS}=40V, V_{GS}=0V, T_J=150$	-	-	100	
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.3	1.8	2.3	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=50A$	-	1.1	1.4	m
		$V_{GS}=4.5V, I_D=25A$	-	1.6	2.2	
Diode Forward Voltage	$V_{SD}$	$I_S=50A, V_{GS}=0V$	-	-	1.2	V
Gate resistance	$R_G$	$f=1MHz$	-	3.5	-	
Maximum Body-Diode Continuous Current	$I_S$		-	-	180	A
<b>Dynamic Parameters</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=20V, V_{GS}=0V, f=1MHz$	-	6330	-	$\mu F$
Output Capacitance	$C_{oss}$		-	1850	-	
Reverse Transfer Capacitance	$C_{rss}$		-	65	-	
<b>Switching Parameters</b>						
Total Gate Charge	$Q_g$	$V_{GS}=10V, V_{DS}=20V, I_D=50A$	-	89	-	nC
Gate-Source Charge	$Q_{gs}$		-	18	-	
Gate-Drain Charge	$Q_{gd}$		-	15	-	
Reverse Recovery Charge	$Q_{rr}$	$I_F=50A, di/dt=100A/us$	-	53	-	nC
Reverse Recovery Time	$t_{rr}$		-	55	-	ns
Turn-on Delay Time	$t_{D(on)}$	$V_{GS}=10V, V_{DD}=20V, I_D=50A$ $R_{GEN}=3$	-	14	-	ns
Turn-on Rise Time	$t_r$		-	15	-	
Turn-off Delay Time	$t_{D(off)}$		-	84	-	
Turn-off fall Time	$t_f$		-	44	-	

A. Repetitive rating; pulse width limited by max. junction temperature.

B.  $T_J=25$ ,  $V_{GS}=10V, R_G=25$ ,  $L=2mH, I_{AS}=30A$ .

C.  $P_g$  is based on max. junction temperature, using junction-case and junction-ambient thermal resistance.

D. The value of  $R_{JA}$  is measured with the device mounted on the 40mm\*40mm\*1.1mm FR-4 PCB board with 1 in<sup>2</sup> pad of 2oz. Copper, in the still air environment with  $T_A=25$ . The maximum allowed junction temperature of 150. The value in any given application depends on the user's specific board design.



### Typical Electrical and Thermal Characteristics Diagrams

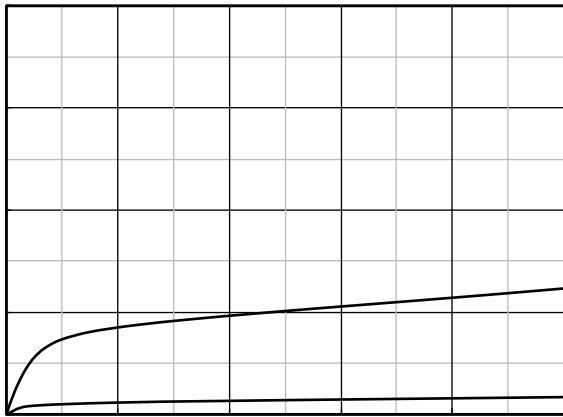


Figure 1. Output Characteristics

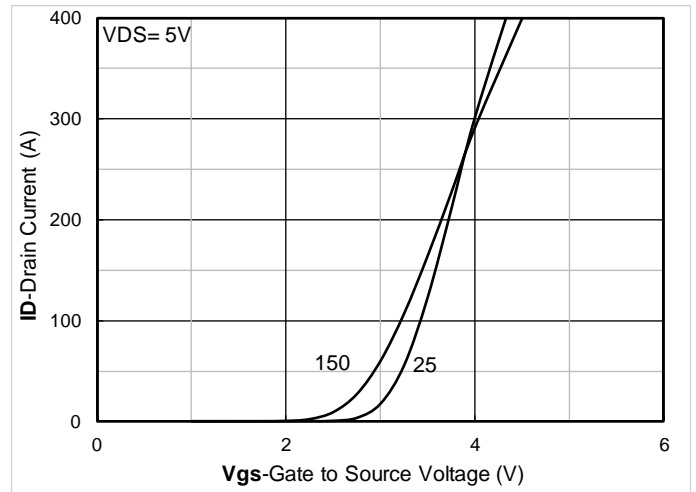


Figure 2. Transfer Characteristics

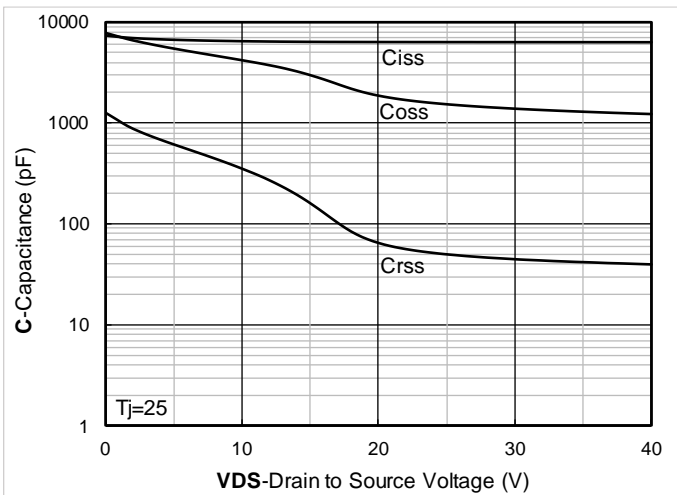


Figure 3. Capacitance Characteristics

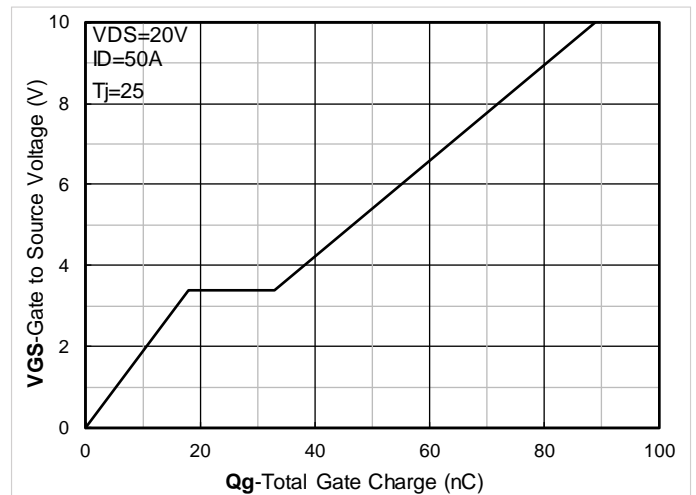


Figure 4. Gate Charge

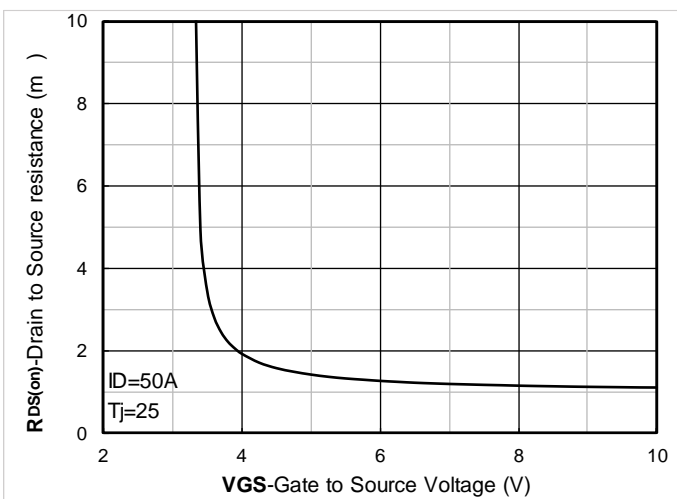


Figure 5. On-Resistance vs Gate to Source Voltage

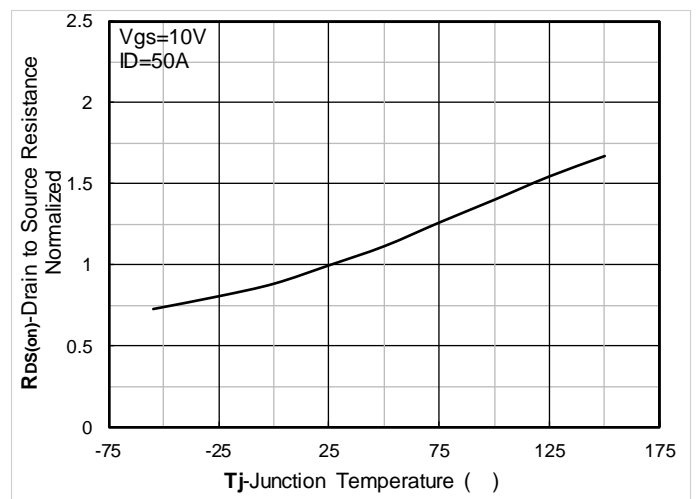


Figure 6. Normalized On-Resistance

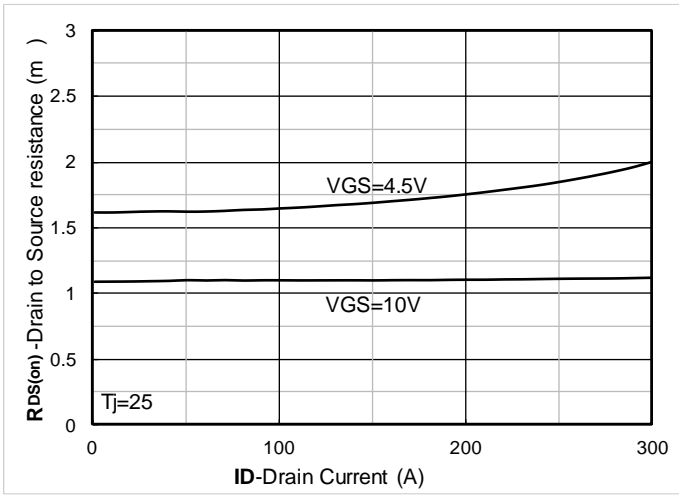


Figure 7. RDS(on) VS Drain Current

Figure 8. Forward characteristics of reverse diode

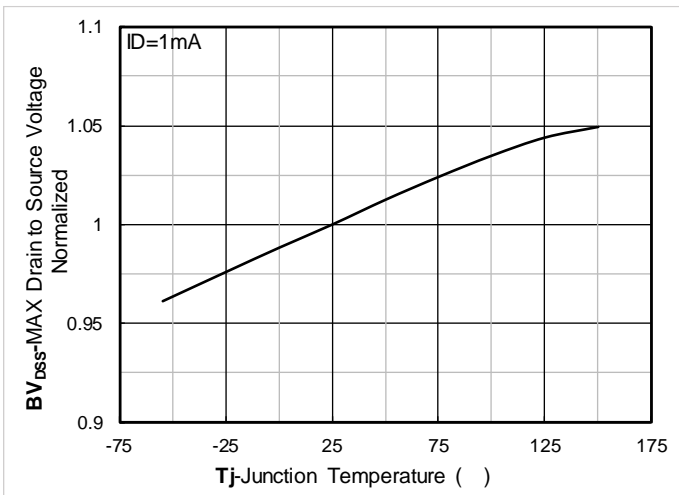


Figure 9. Normalized breakdown voltage

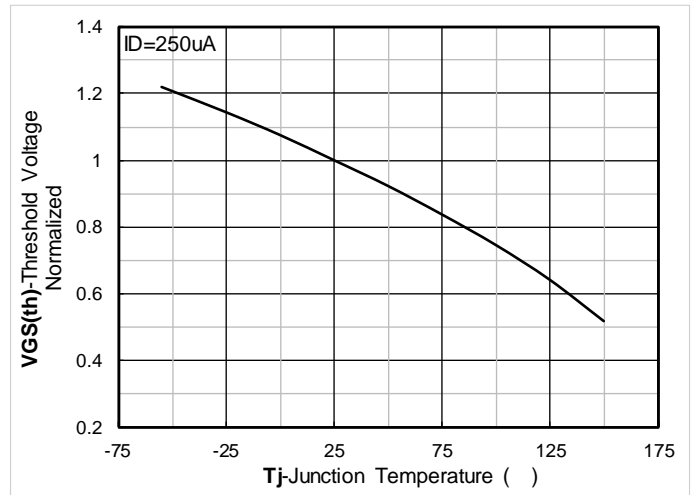


Figure 10. Normalized Threshold voltage

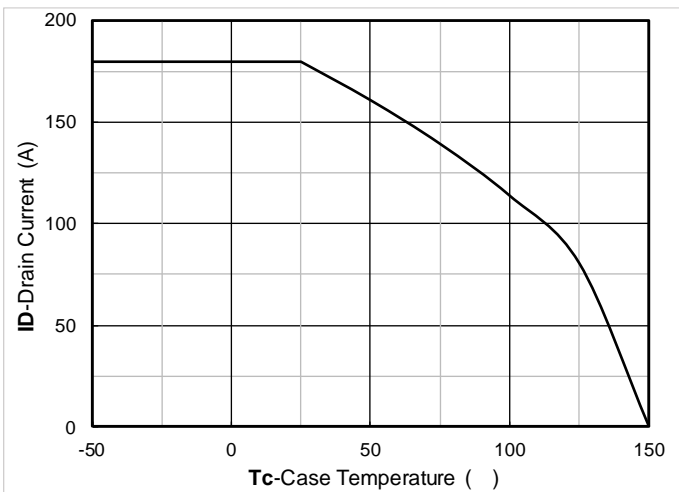


Figure 11. Current dissipation

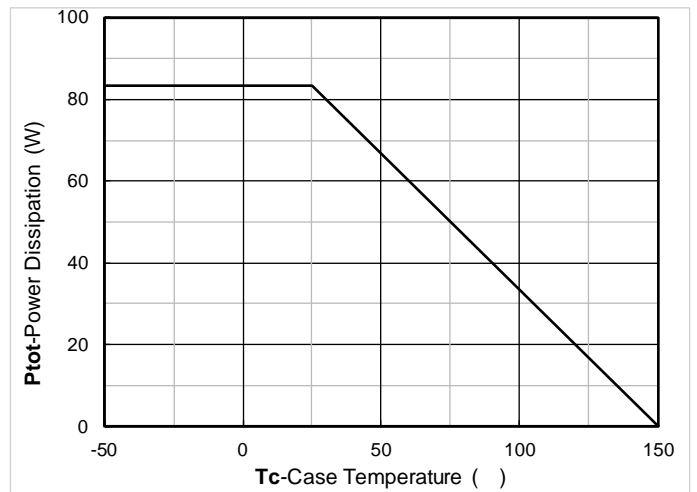


Figure 12. Power dissipation

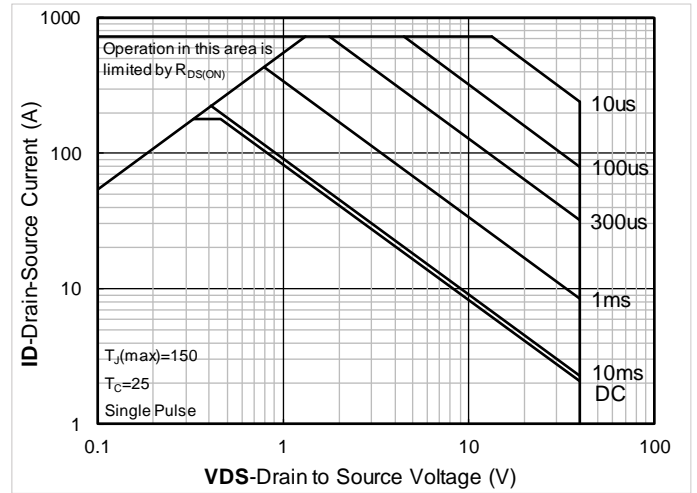


Figure 13. Maximum Transient Thermal Impedance

Figure 14. Safe Operation Area

### Test Circuits & Waveforms

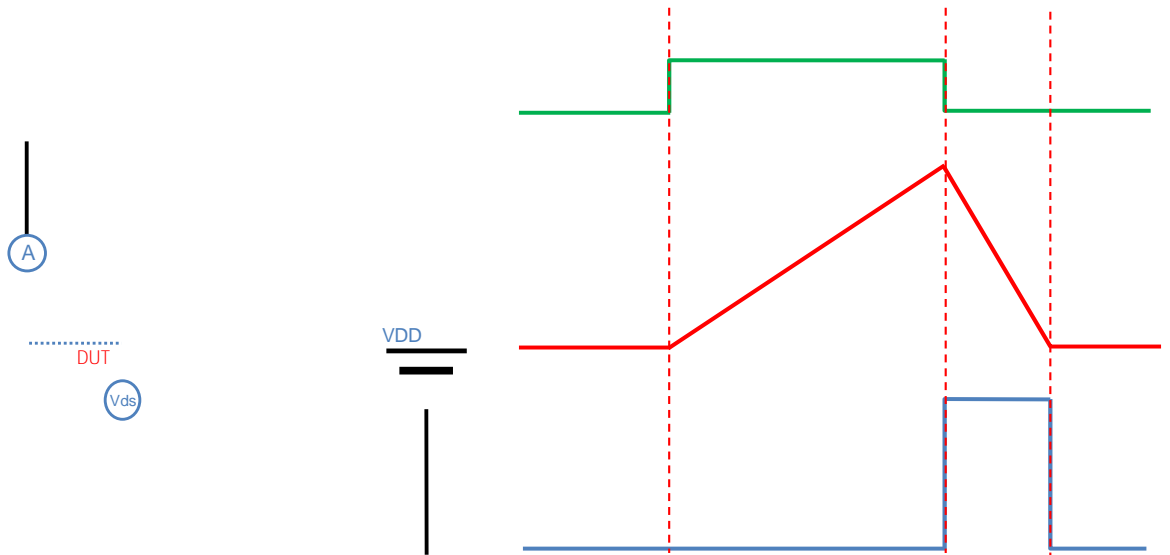


Figure A. Unclamped Inductive Switching (UIS) Test Circuit & Waveform

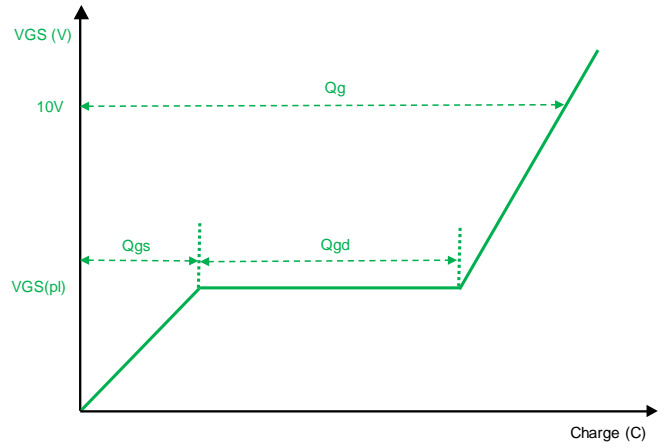
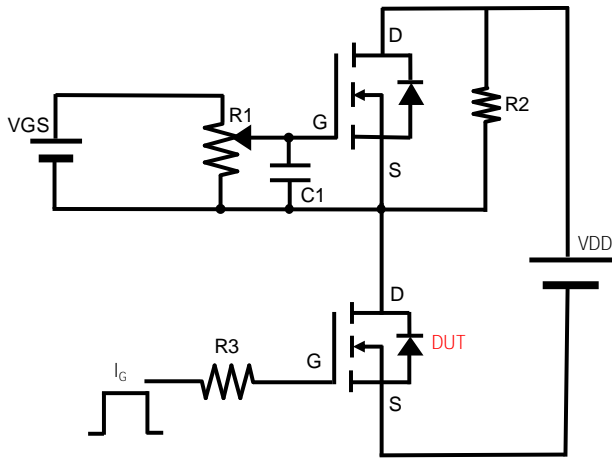


Figure B. Gate Charge Test Circuit & Waveform

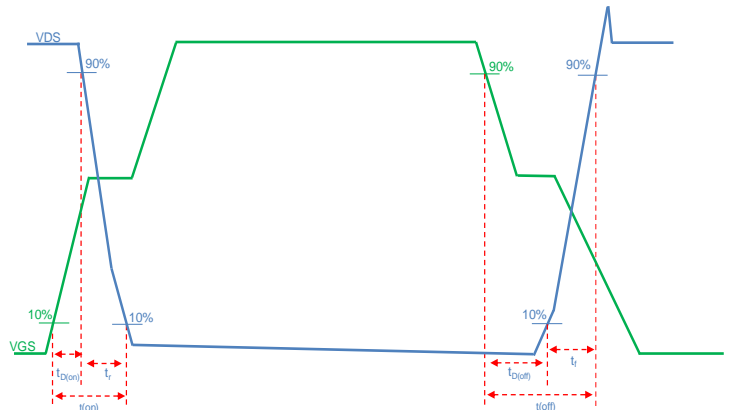
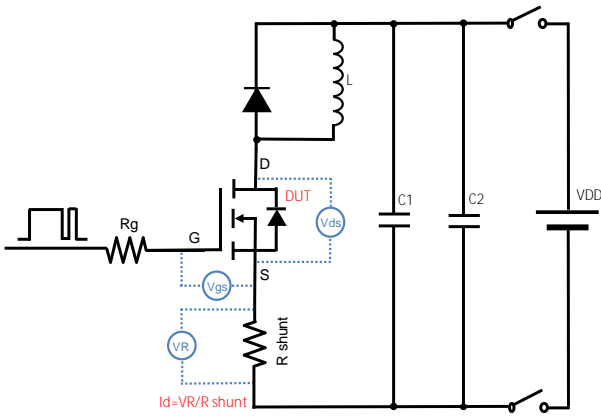


Figure C. Resistive Switching Test Circuit & Waveform

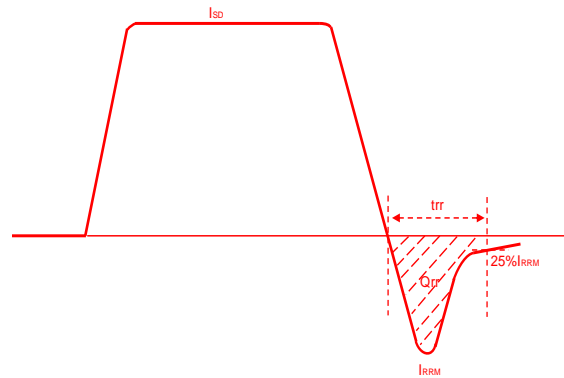
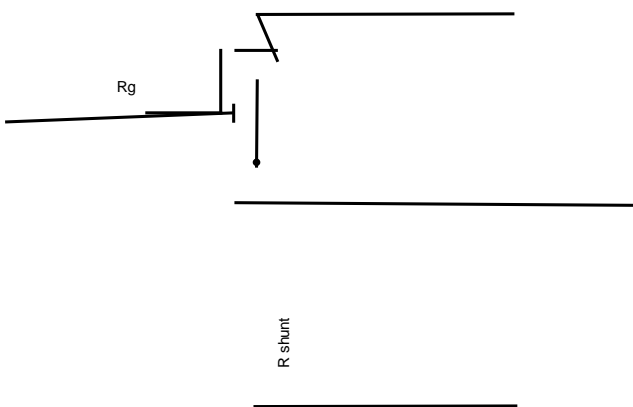


Figure D. Diode Recovery Test Circuit & Waveform



