

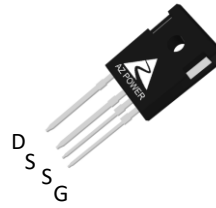
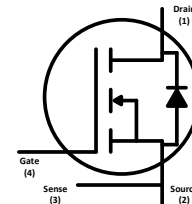
Features:

- 1200V High Blocking Voltage
- Low On-Resistance
- High Speed Switching
- Easy to Parallel

Benefits:

- Increased frequency
- Minimal switching loss
- Higher Efficiency
- Low cooling requirement

Symbol	Value	Unit
V_{DS}	1200	V
I_{DS} ($T_C=25^\circ\text{C}$)	80	A
R_{DSon}	40	$\text{m}\Omega$

Outline

TO-247-4
Circuit

Applications:

- Switch Mode Power Supply
- High Voltage DC/DC Converters
- Solar Inverters
- Motor Drivers

Maximum Ratings ($T_C=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions
V_{DSmax}	Drain-Source Voltage	1200	V	$V_{GS}=0\text{V}$, $I_{DS}=100\mu\text{A}$
V_{GSmax}	Gate-Source Voltage	-10/+25	V	Absolute Maximum values
V_{GSop}	Gate-Source Voltage	-5/+20	V	Recommended operational values
I_{DS}	Continuous Drain Current	80	A	$V_{GS}=20\text{V}$, $T_C=25^\circ\text{C}$
		50		$V_{GS}=20\text{V}$, $T_C=100^\circ\text{C}$
$I_{DS(pulse)}$	Pulsed Drain Current	160	A	Pulse width t_p limited by T_{Jmax}
P_D	Power Dissipation	312	W	$T_C=25^\circ\text{C}$, $T_J=150^\circ\text{C}$
$T_{J,max}$	Operating Junction Temperature	150	$^\circ\text{C}$	
T_{stg}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$	

Thermal characteristics

Symbol	Parameter	Min.	Typ.	Max.	Unit
R_{thJC}	Thermal resistance		0.40		$^\circ\text{C}/\text{W}$

Electrical Characteristics ($T_c=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Value			Unit	Test Conditions
		Min.	Typ.	Max.		
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	1200			V	$V_{GS}=0V, I_{DS}=100\mu A$
$V_{GS(th)}$	Gate Threshold Voltage	1.2	2.2 1.5	3	V	$V_{DS}=V_{GS}, I_{DS}=10mA, T_J=25^\circ\text{C}$ $V_{DS}=V_{GS}, I_{DS}=10mA, T_J=150^\circ\text{C}$
I_{DSS}	Zero Gate Voltage Drain Current		5	100	μA	$V_{DS}=1200V, V_{GS}=0V$
I_{GSS}	Gate-Source Leakage Current			250	nA	$V_{GS}=20V, V_{DS}=0V$
$R_{DS(on)}$	Drain-Source On-State Resistance		38 60	50	$m\Omega$	$V_{GS}=20V, I_{DS}=40A, T_J=25^\circ\text{C}$ $V_{GS}=20V, I_{DS}=40A, T_J=150^\circ\text{C}$
g_{fs}	Transconductance		13.3		S	$V_{DS}=20V, I_{DS}=40A$
$R_{G,int}$	Internal Gate Resistance		1.25		Ω	$f=1\text{ MHz}, V_{AC}=25mV$
C_{ISS}	Input Capacitance		3012		pF	$V_{DS}=1000V, V_{GS}=0V$ $f=1\text{ MHz}, V_{AC}=25mV$
C_{OSS}	Output Capacitance		196			
C_{RSS}	Reverse Transfer Capacitance		19			
E_{OSS}	C_{OSS} Stored Energy		120		μJ	
E_{on}	Turn-On Switching Energy		641		μJ	$V_{DD}=800V, V_{GS}=-5/20V, I_{DS}=40A, R_{G(EXT)}=1\Omega,$ $L=0.5mH$
E_{off}	Turn-off Switching Energy		90			
$t_{d(on)}$	Turn-On Delay Time		13		ns	$V_{DD}=800V, V_{GS}=-5/20V, I_{DS}=40A, R_{G(EXT)}=1\Omega,$ $R_L=20\Omega,$ Timing relative to V_{DS}
t_r	Rise Time		17			
$t_{d(off)}$	Turn-off Delay Time		32			
t_f	Fall Time		13			
Q_{GS}	Gate to Source Charge		52		nC	$V_{GS}=-5/20V, V_{DS}=800V, I_{DS}=40A$
Q_{GD}	Gate to Drain Charge		86			
Q_G	Total Gate Charge		216			

Body Diode Characteristics

Symbol	Parameter	Value			Unit	Test Conditions
		Min.	Typ.	Max.		
V_{SD}	Diode Forward Voltage		4.3 3.8		V	$V_{GS}=-5V, I_{SD}=10A, T_J=25^\circ\text{C}$ $V_{GS}=-5V, I_{SD}=10A, T_J=150^\circ\text{C}$
I_{SD}	Continuous Diode Current		57		A	
t_{rr}	Reverse Recovery Time		68		ns	$V_{GS}=-5V, I_{SD}=40A, V_R=800V,$
Q_{rr}	Reverse Recovery Charge		408		nC	$di/dt=1250A/\mu s$

I_{rrm}	Peak Reverse Recovery Current	14	A
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Typical Performance

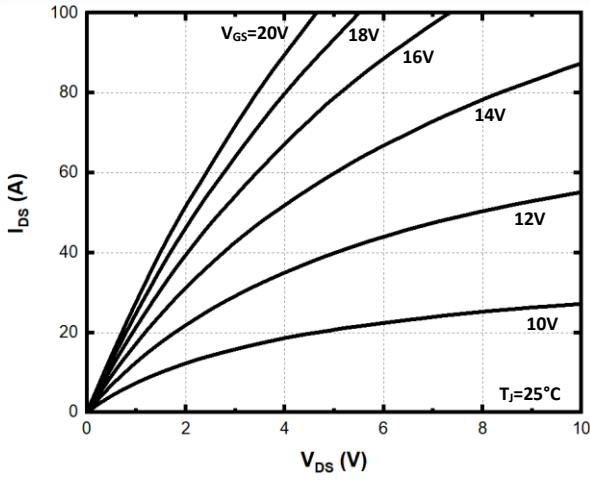


Fig. 1 Output Characteristics, $T_j = 25^\circ\text{C}$

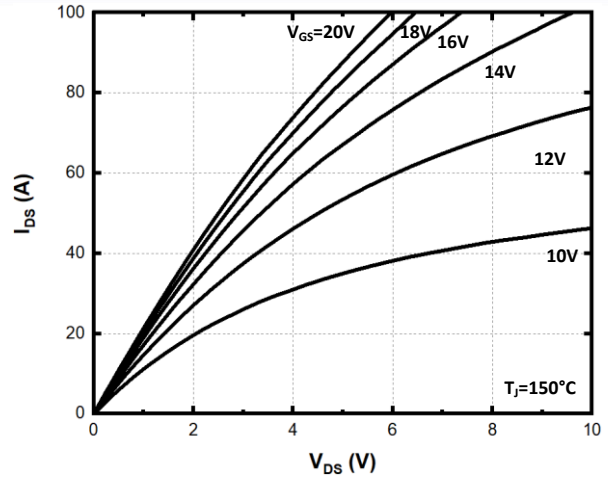


Fig. 2 Output Characteristics, $T_j = 150^\circ\text{C}$

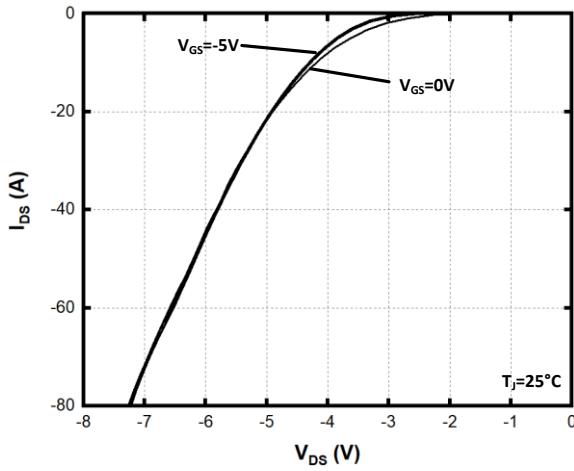


Fig. 3 Body Diode Characteristics, $T_j = 25^\circ\text{C}$

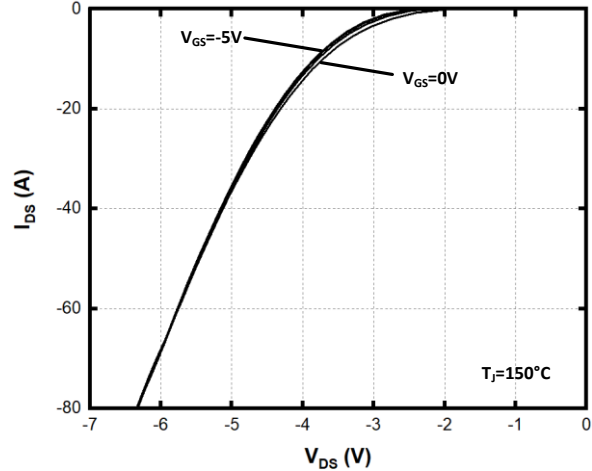


Fig. 4 Body Diode Characteristics, $T_j = 150^\circ\text{C}$

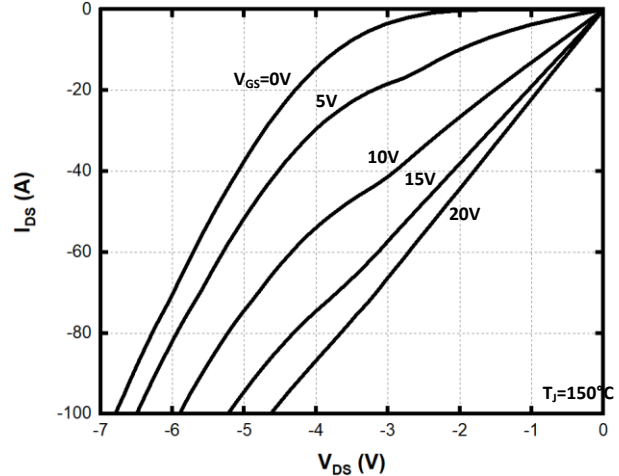
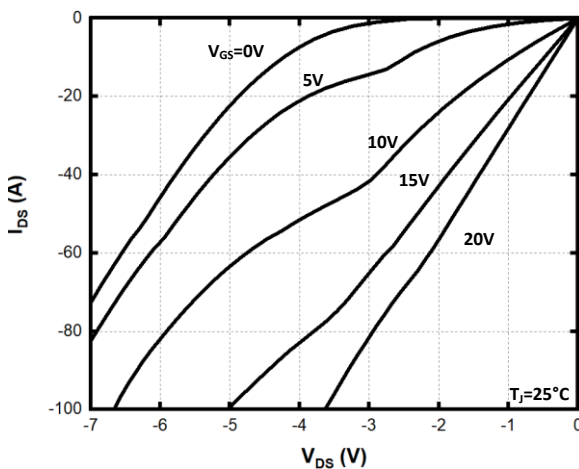


Fig. 5 3rd Quadrant Characteristics, $T_J=25^\circ\text{C}$

Fig. 6 3rd Quadrant Characteristics, $T_J=150^\circ\text{C}$

Typical Performance

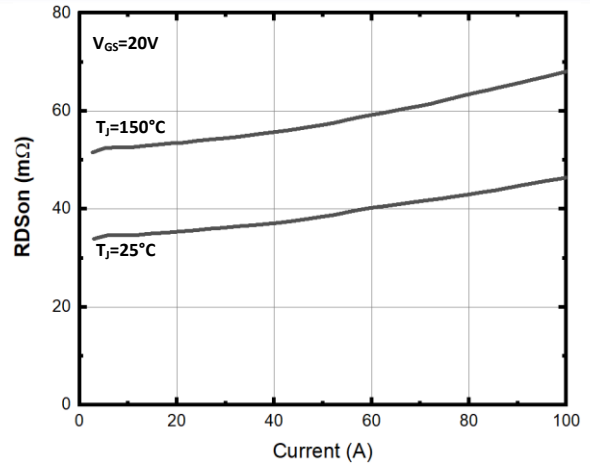
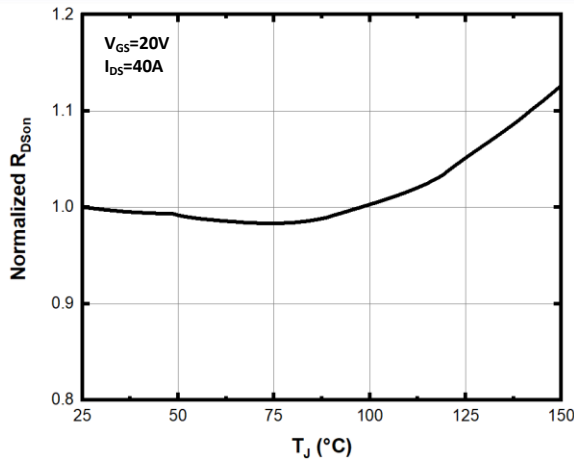


Fig. 7 Normalized On-Resistance vs Temperature

Fig. 8 On-Resistance vs Drain Current

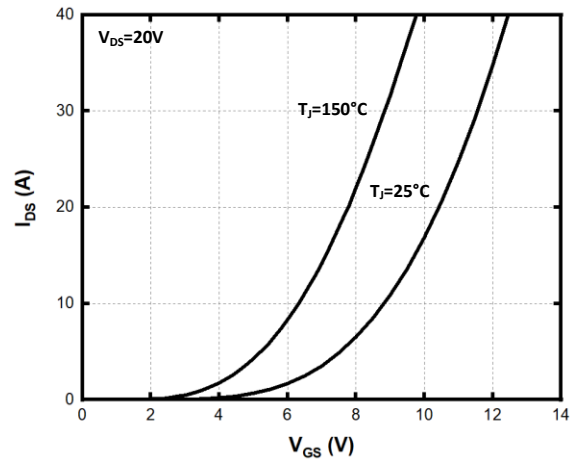
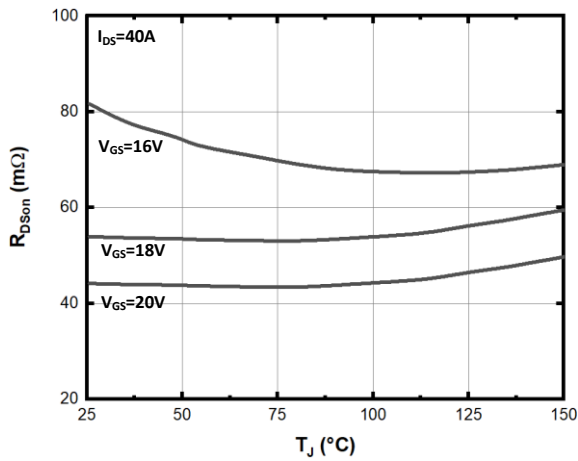


Fig. 9 On-Resistance vs Temperature

Fig. 10 Transfer Characteristics

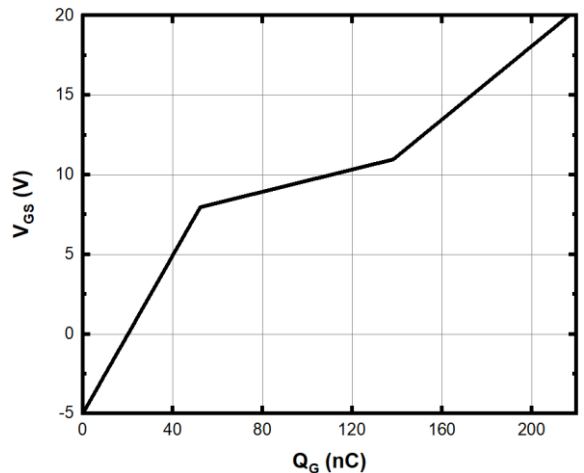
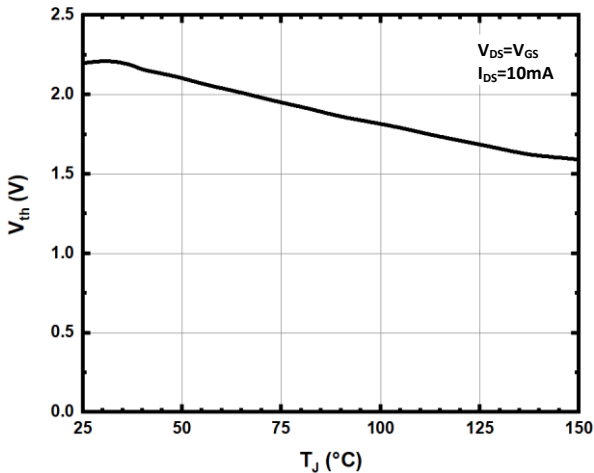


Fig. 11 Threshold Voltage vs. Temperature

Fig. 12 Gate Charge Characteristics

Typical Performance

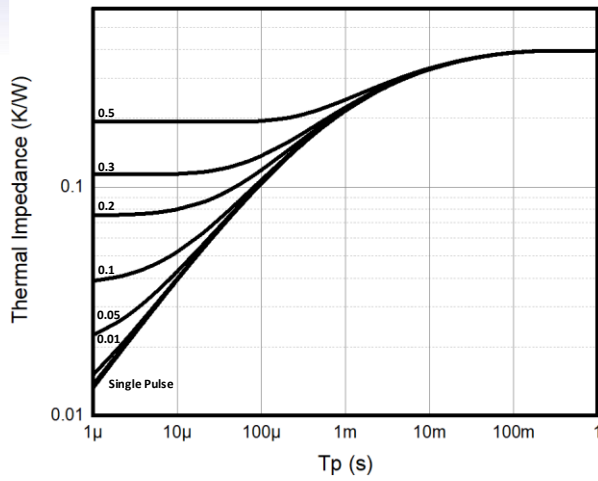


Fig. 13 Transient Thermal Impedance

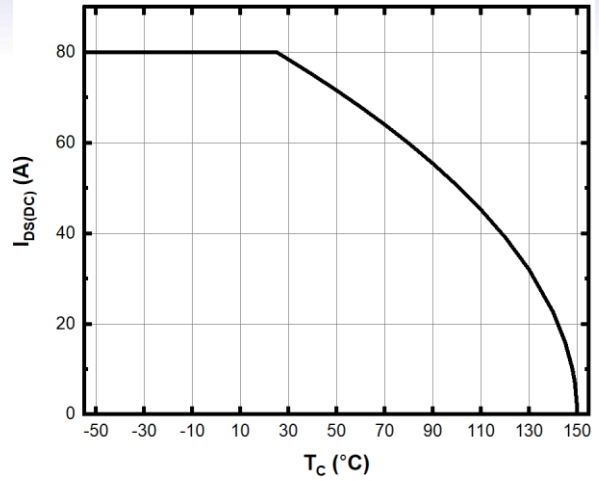


Fig. 14 Continuous Drain Current Derating

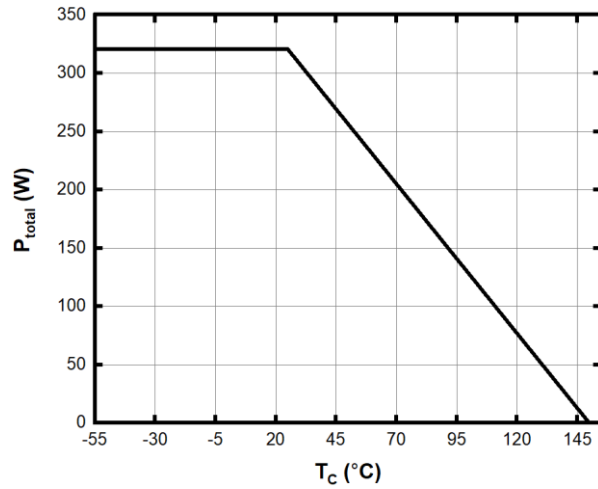


Fig. 15 Power Derating

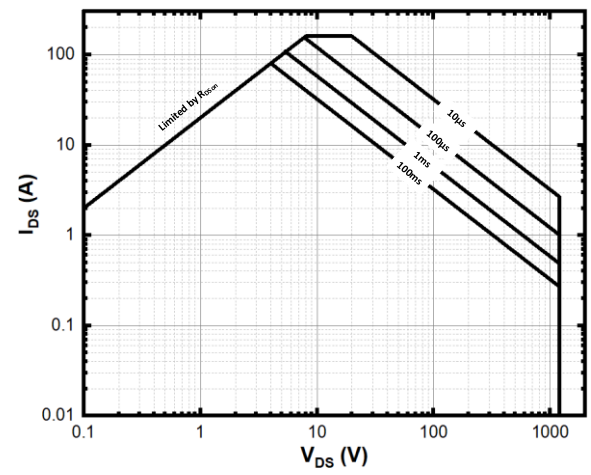


Fig. 16 Safe Operating Area

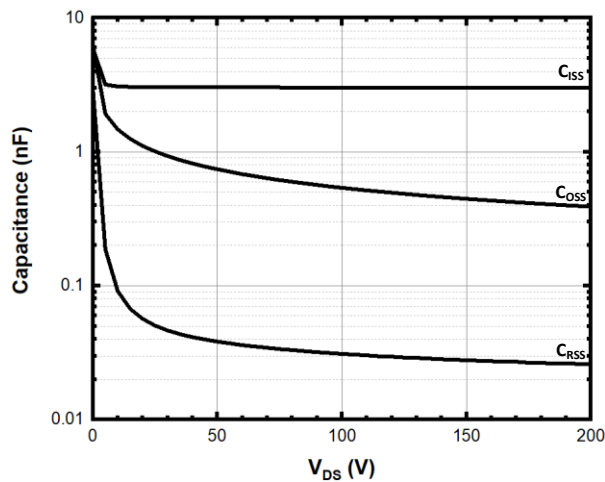


Fig. 17 Capacitances vs V_{DS} (200V)

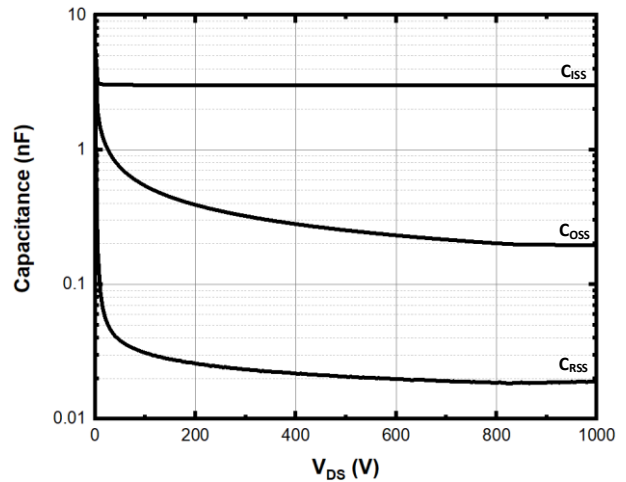


Fig. 18 Capacitances vs V_{DS} (800V)

Methodologies

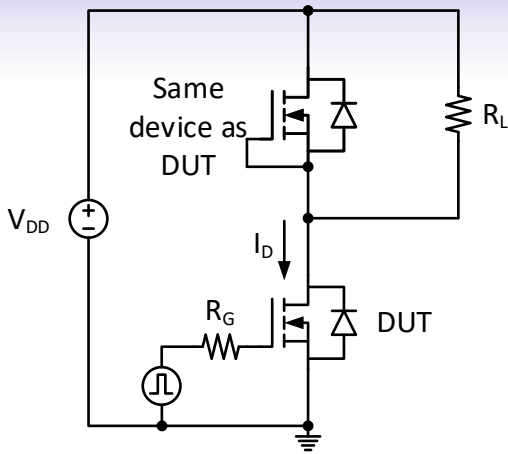


Fig. 25 Resistive Load Switching

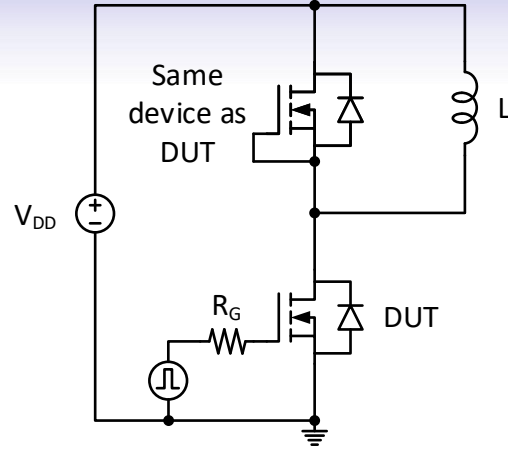


Fig. 26 Clamped Inductive Switching

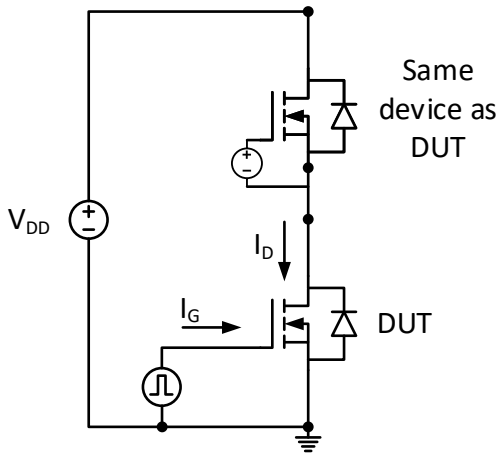


Fig. 27 Gate Charge

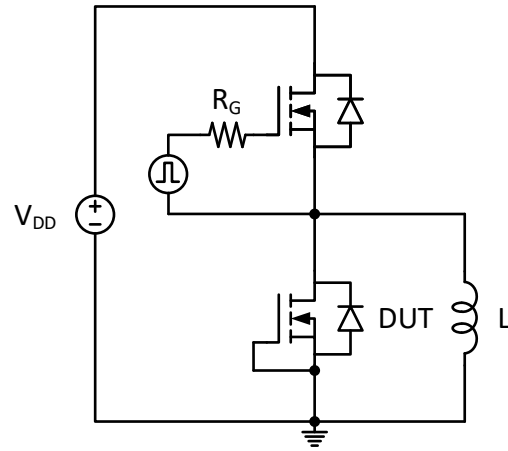


Fig. 28 Body Diode Reverse Recovery

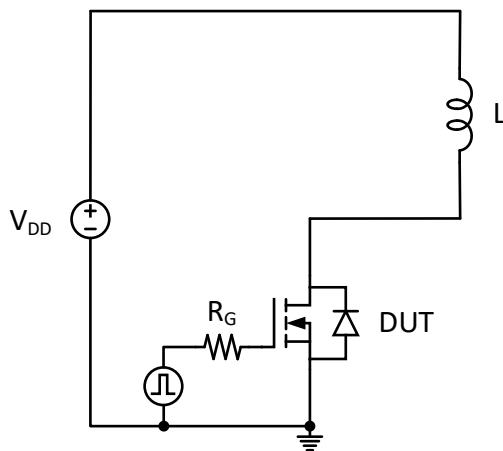


Fig. 29 Unclamped Inductive Switching

Definitions

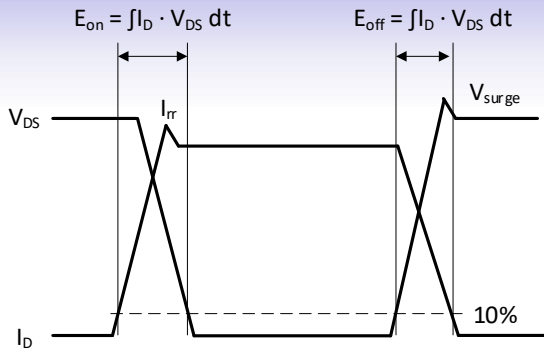


Fig. 30 Switching Losses

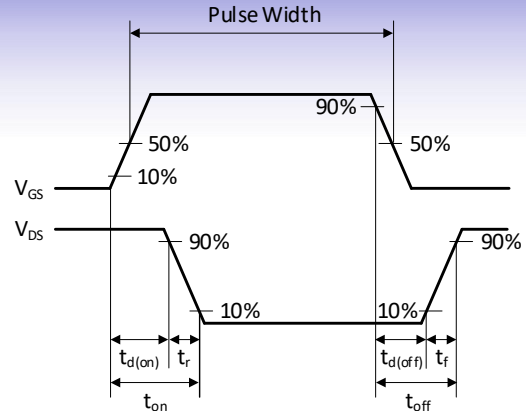


Fig. 31 Switching Times

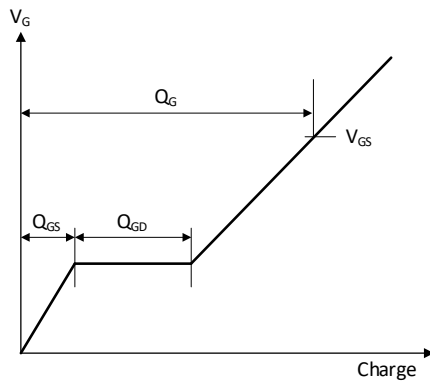


Fig. 32 Gate Charges

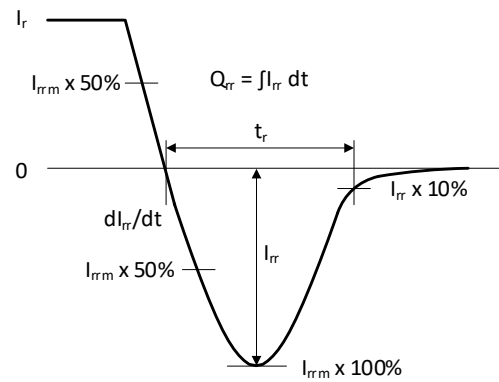


Fig. 33 Body Diode Reverse Recovery

This Product has not been designed or tested for use in, and is not intended for use in, applications implanted into the human body nor in applications in which failure of the product could lead to death, personal injury or property damage, including but not limited to equipment used in the operation of nuclear facilities, life-support machines, systems, or air-traffic control systems.

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