

Features:

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

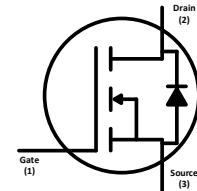
Benefits:

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

Symbol	Value	Unit
V_{DS}	1200	V
I_{DS} ($T_c = 25^\circ\text{C}$)	45	A
R_{DSon}	75	m Ω

Outline
Circuit
Applications:

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


TO-247-3
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/+18	V	Recommended operational values
I_{DS}	Continuous Drain Current	45	A	$V_{GS} = 18\text{V}$, $T_c = 25^\circ\text{C}$
		28	A	$V_{GS} = 18\text{V}$, $T_c = 100^\circ\text{C}$
$I_{DS(pulse)}$	Pulsed Drain Current	80	A	Pulse width t_p limited by T_{Jmax}
P_D	Power Dissipation	208	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		0.60		$^\circ\text{C}/\text{W}$

Electrical Characteristics (T_c = 25°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} = 100μA
V _{GS(th)}	Gate Threshold Voltage	1.2	2.0 1.5	3	V	V _{DS} = V _{GS} , I _{DS} = 5mA, T _J = 25°C V _{DS} = V _{GS} , I _{DS} = 5mA, T _J = 150°C
I _{DSS}	Zero Gate Voltage Drain Current		1	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		75 105	90	mΩ	V _{GS} = 18V, I _{DS} = 20A, T _J = 25°C V _{GS} = 18V, I _{DS} = 20A, T _J = 150°C
g _{fs}	Transconductance		8		S	V _{DS} = 20V, I _{DS} = 20A
R _{G,int}	Internal Gate Resistance		1.4		Ω	f = 1 MHz, V _{AC} = 25mV
C _{ISS}	Input Capacitance		2075		pF	V _{DS} = 1000V, V _{GS} = 0V f = 1 MHz, V _{AC} = 25mV
C _{OSS}	Output Capacitance		127			
C _{RSS}	Reverse Transfer Capacitance		17			
E _{OSS}	C _{OSS} Stored Energy		144			
E _{on}	Turn-On Switching Energy		340		μJ	V _{DD} = 800V, V _{GS} = -5/18V, I _{DS} = 20A, R _{G(EXT)} = 1Ω, L = 0.5mH
E _{off}	Turn-off Switching Energy		51			
t _{d(on)}	Turn-On Delay Time		14		ns	V _{DD} = 800V, V _{GS} = -5/18V, I _{DS} = 20A, R _{G(EXT)} = 1Ω, R _L = 40Ω, Timing relative to V _{DS}
t _r	Rise Time		16			
t _{d(off)}	Turn-off Delay Time		23			
t _f	Fall Time		15			
Q _{GS}	Gate to Source Charge		34		nC	V _{GS} = -5/18V, V _{DS} = 800V, I _{DS} = 20A
Q _{GD}	Gate to Drain Charge		57			
Q _G	Total Gate Charge		144			

Body Diode Characteristics

Symbol	Parameter	Value			Unit	Test Conditions
		Min.	Typ.	Max.		
V _{SD}	Diode Forward Voltage		4.6 4.1		V	V _{GS} = -5V, I _{SD} = 10A, T _J = 25°C V _{GS} = -5V, I _{SD} = 10A, T _J = 150°C
I _{SD}	Continuous Diode Current		36		A	
t _{rr}	Reverse Recovery Time		28		ns	V _{GS} = -5V, I _{SD} = 20A, V _R = 800V, di/dt = 1050A/μs
Q _{rr}	Reverse Recovery Charge		280		nC	
I _{rrm}	Peak Reverse Recovery Current		9.2		A	

Typical Performance

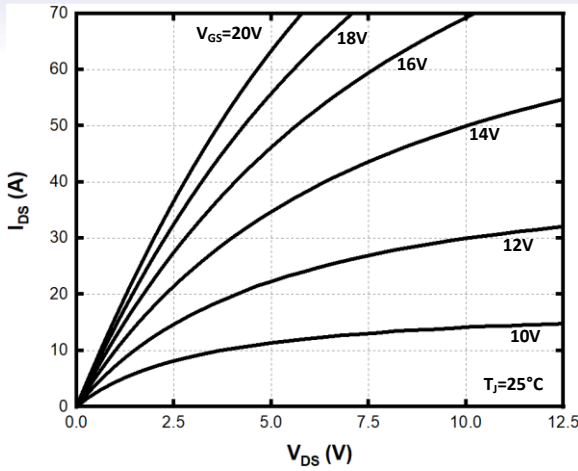


Fig. 1 Output Characteristics, $T_J = 25^\circ\text{C}$

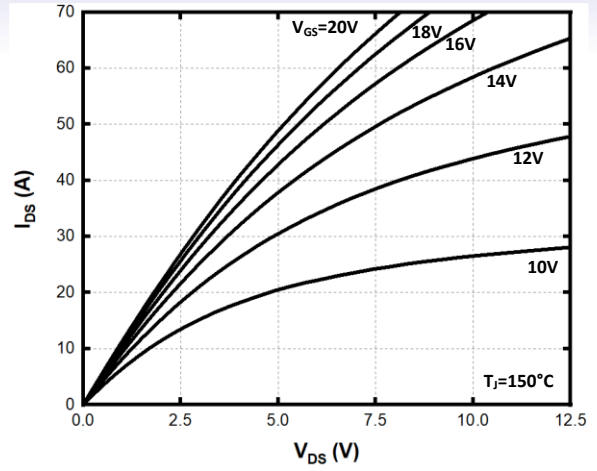


Fig. 2 Output Characteristics, $T_J = 150^\circ\text{C}$

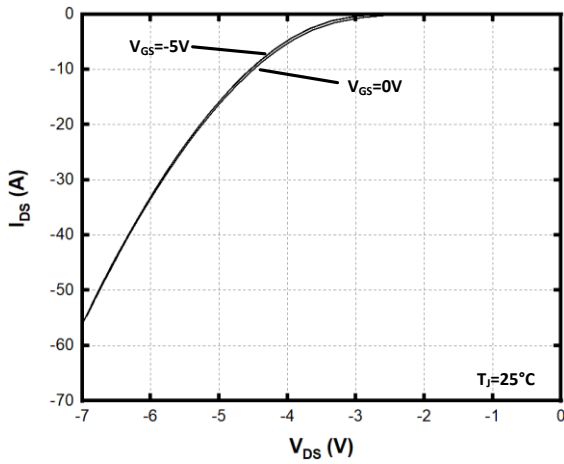


Fig. 3 Body Diode Characteristics, $T_J = 25^\circ\text{C}$

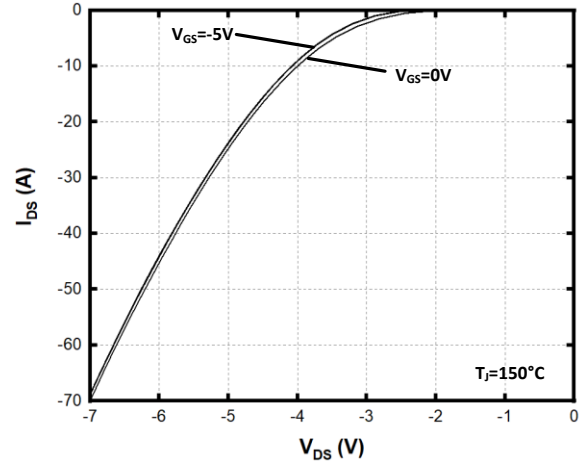


Fig. 4 Body Diode Characteristics, $T_J = 150^\circ\text{C}$

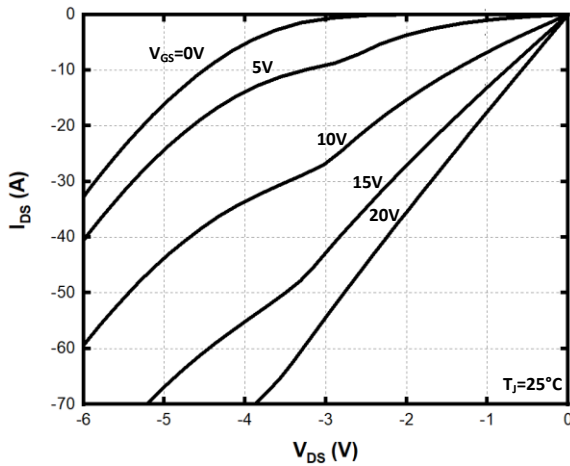


Fig. 5 3rd Quadrant Characteristics, $T_J = 25^\circ\text{C}$

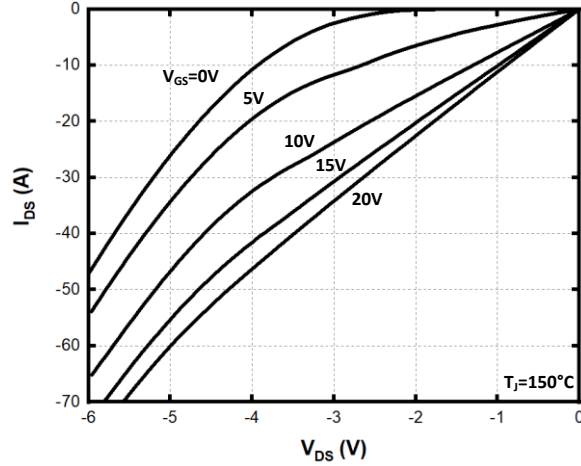


Fig. 6 3rd Quadrant Characteristics, $T_J = 150^\circ\text{C}$

Typical Performance

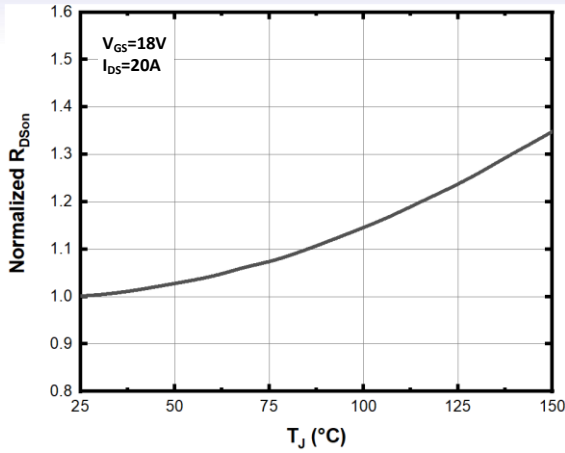


Fig. 7 Normalized On-Resistance vs Temperature

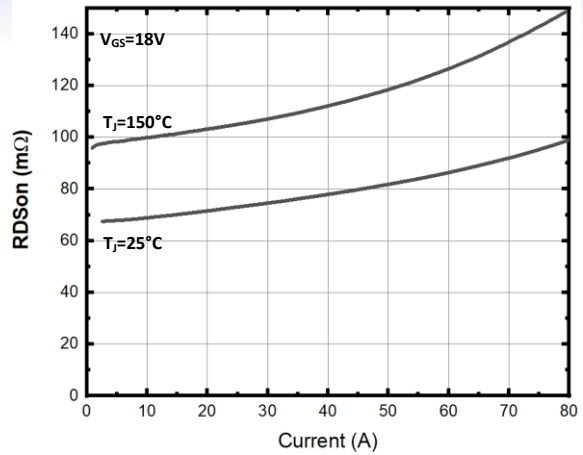


Fig. 8 On-Resistance vs Drain Current

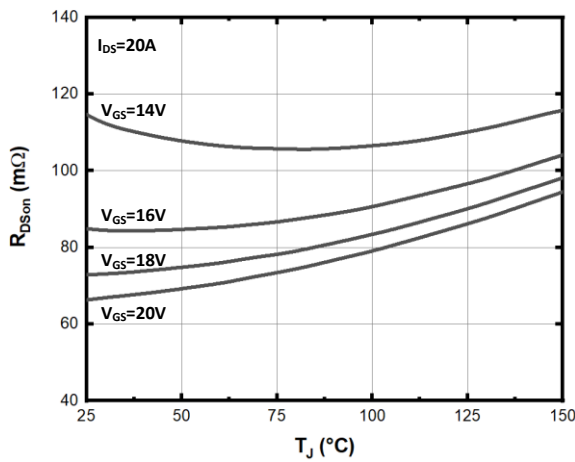


Fig. 9 On-Resistance vs Temperature

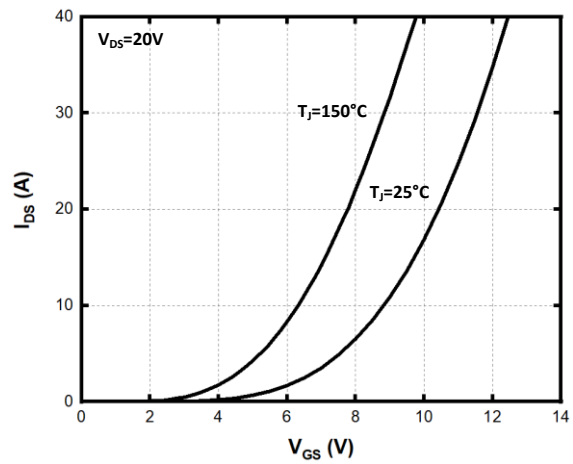


Fig. 10 Transfer Characteristics

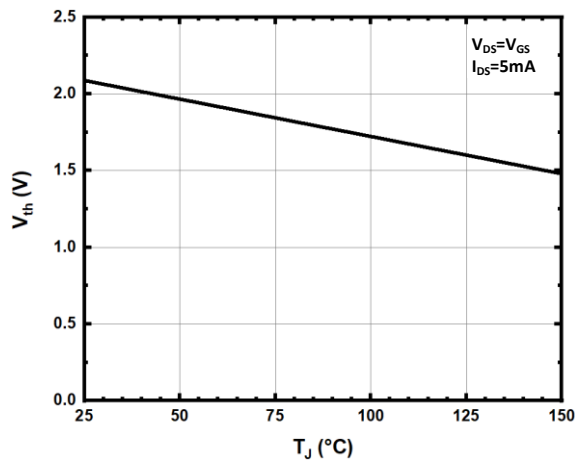


Fig. 11 Threshold Voltage vs. Temperature

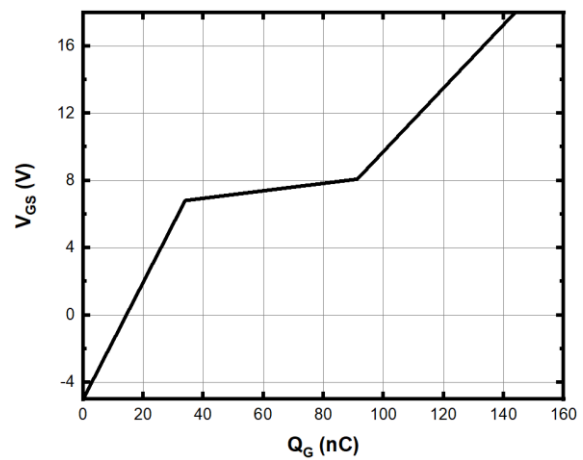


Fig. 12 Gate Charge Characteristics

Typical Performance

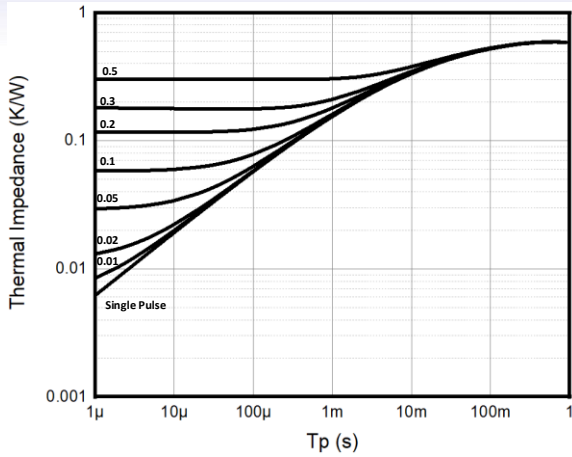


Fig. 13 Transient Thermal Impedance

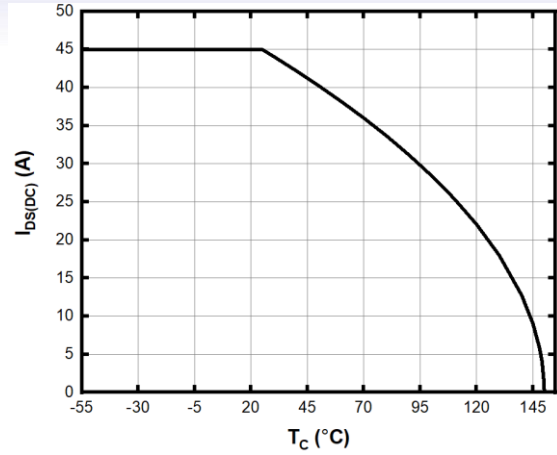


Fig. 14 Continuous Drain Current Derating

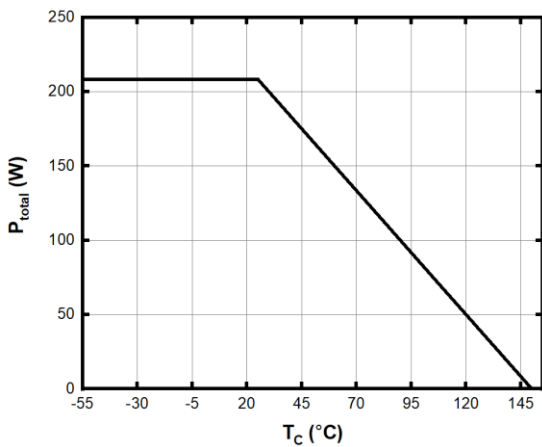


Fig. 15 Power Derating

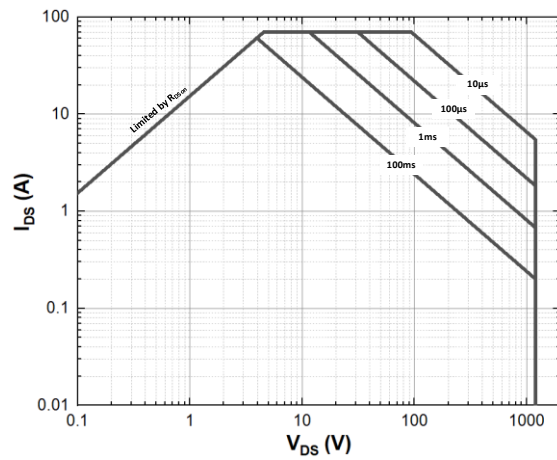


Fig. 16 Safe Operating Area

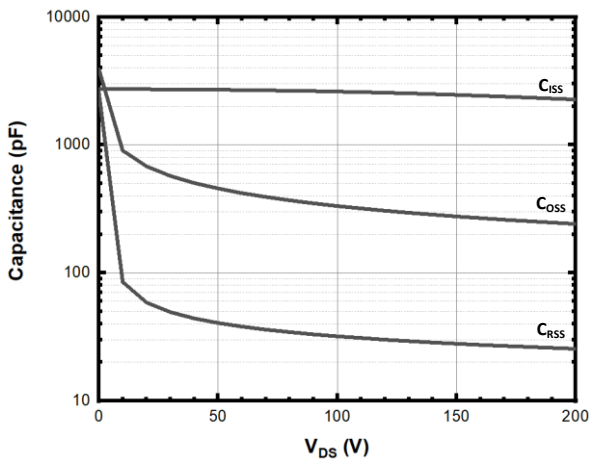


Fig. 17 Capacitances vs V_{DS} (200V)

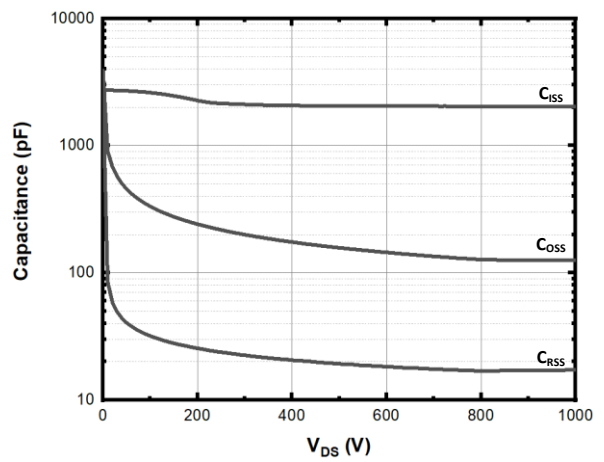


Fig. 18 Capacitances vs V_{DS} (800V)

Typical Performance

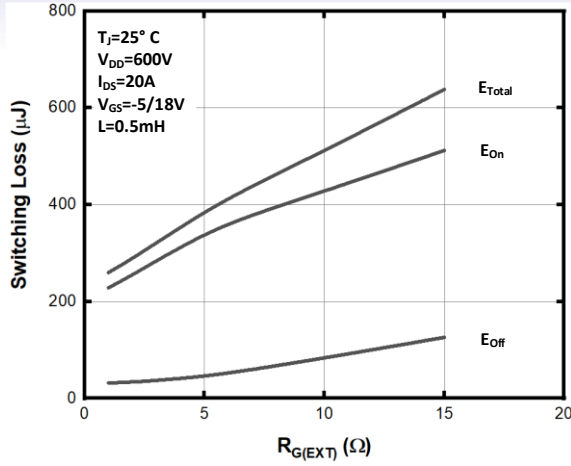


Fig. 19 Switching Loss vs $R_{G(EXT)}$ (600V)

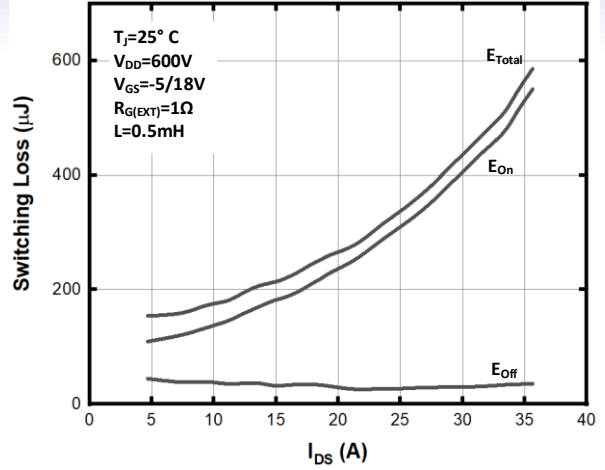


Fig. 20 Switching Loss vs Drain Current (600V)

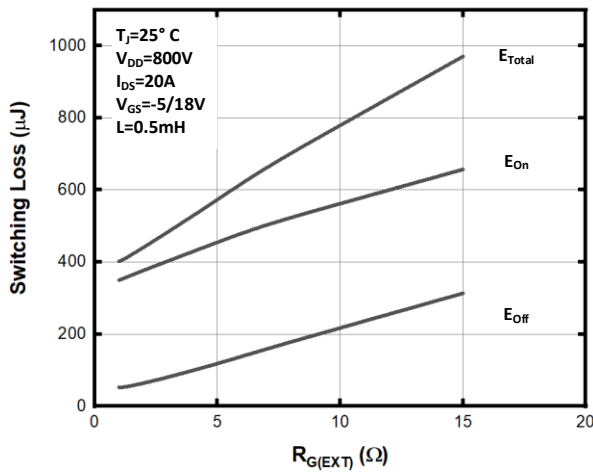


Fig. 21 Switching Loss vs $R_{G(EXT)}$ (800V)

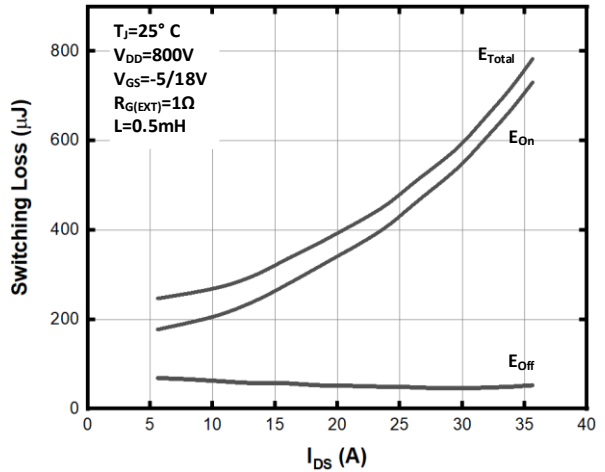


Fig. 22 Switching Loss vs Drain Current (800V)

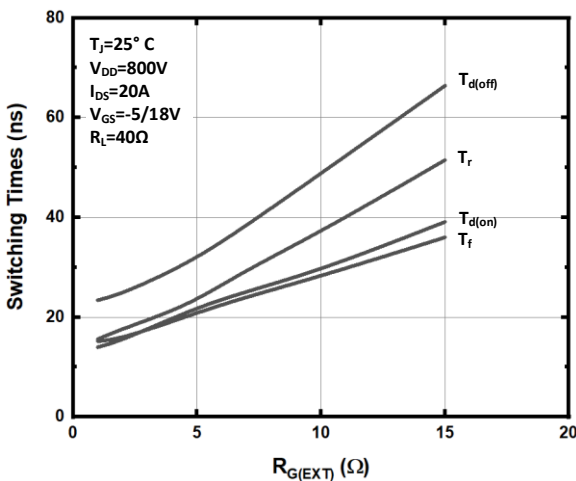


Fig. 23 Switching Time vs $R_{G(EXT)}$

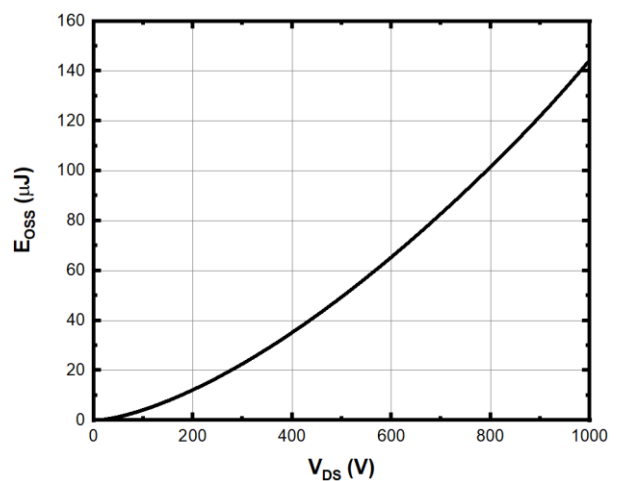


Fig. 24 Output Capacitor Stored Energy

Methodologies

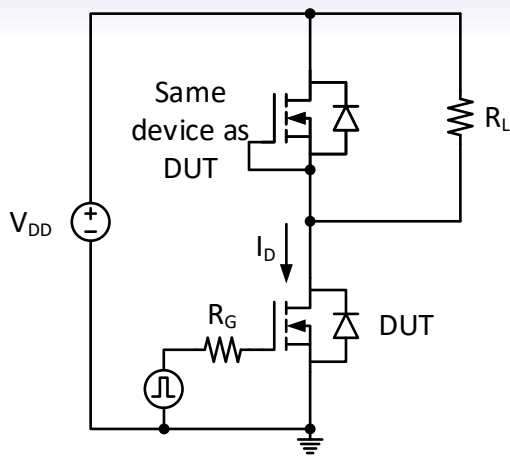


Fig. 25 Resistive Load Switching

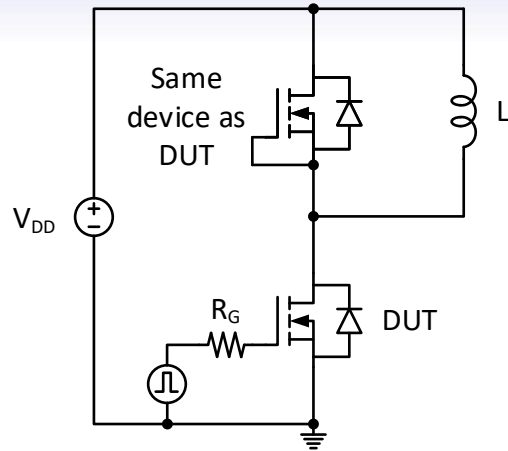


Fig. 26 Clamped Inductive Switching

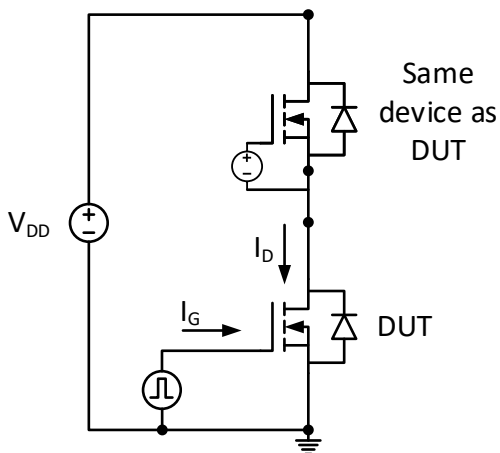


Fig. 27 Gate Charge

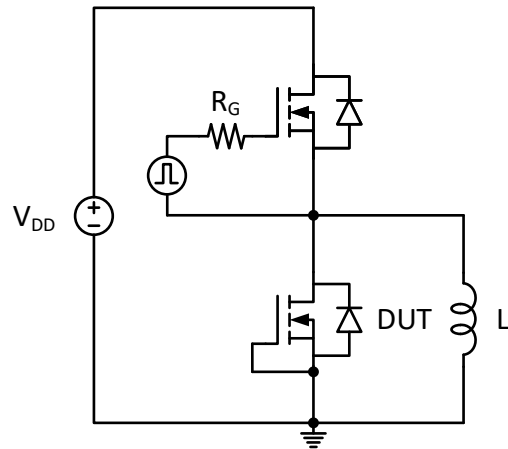


Fig. 28 Body Diode Reverse Recovery

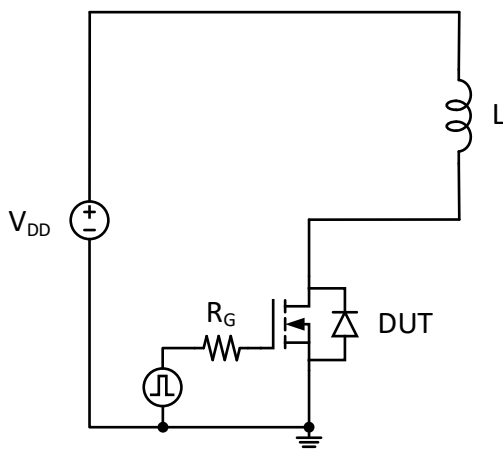


Fig. 29 Unclamped Inductive Switching

Definitions

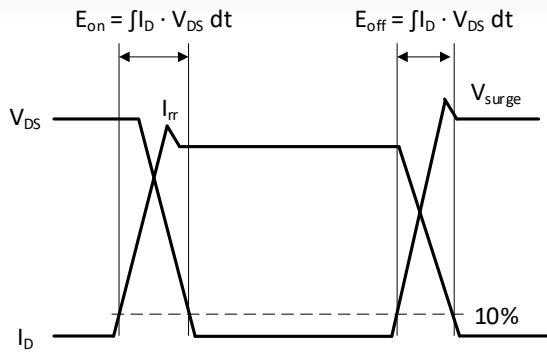


Fig. 30 Switching Losses

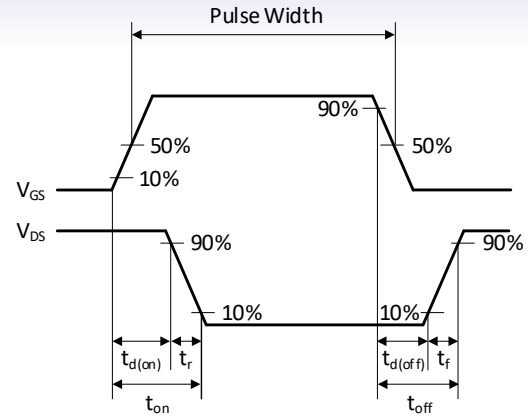


Fig. 31 Switching Times

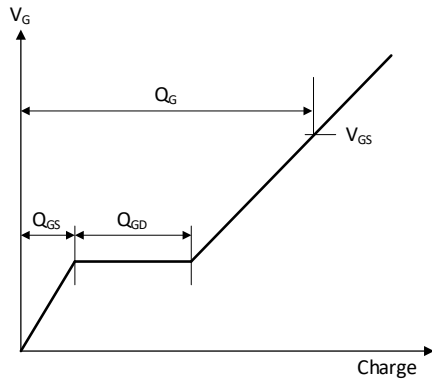


Fig. 32 Gate Charges

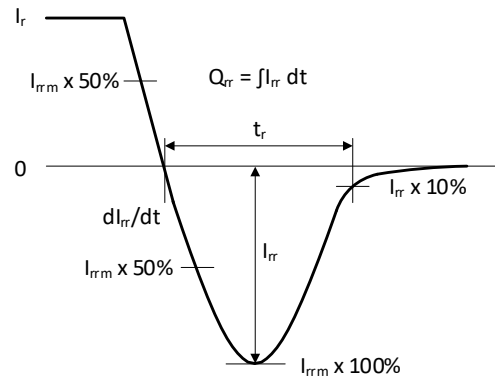
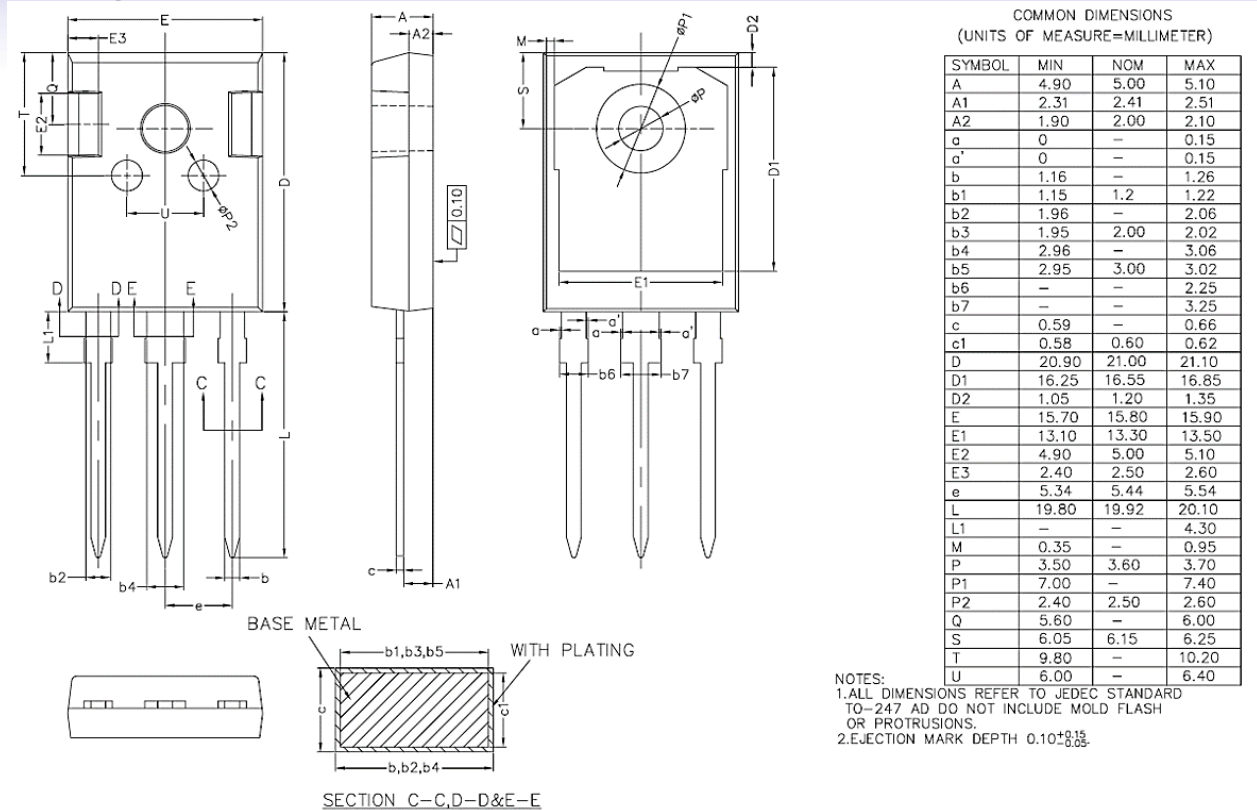


Fig. 33 Body Diode Reverse Recovery

Package TO-247-3 (Unit: mm)



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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