

### Features

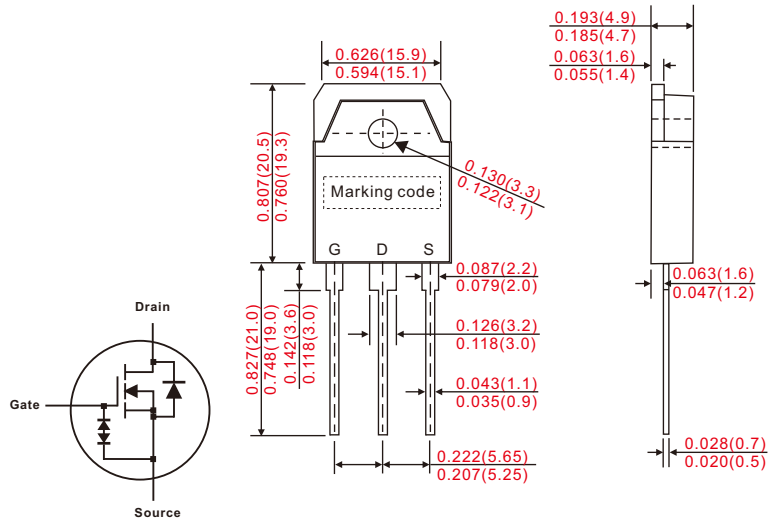
- Fast switching.
- ESD improved capability.
- Low gate charge.
- Low reverse transfer capacitances.
- 100% single pulse avalanche energy test.

### Mechanical data

- Epoxy : UL94-V0 rated flame retardant.
- Case : JEDEC TO-3P molded plastic body.
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026.
- Polarity: As marked.
- Mounting Position : Any.
- Weight : Approximated 5.60 gram.

### Outline

TO-3P



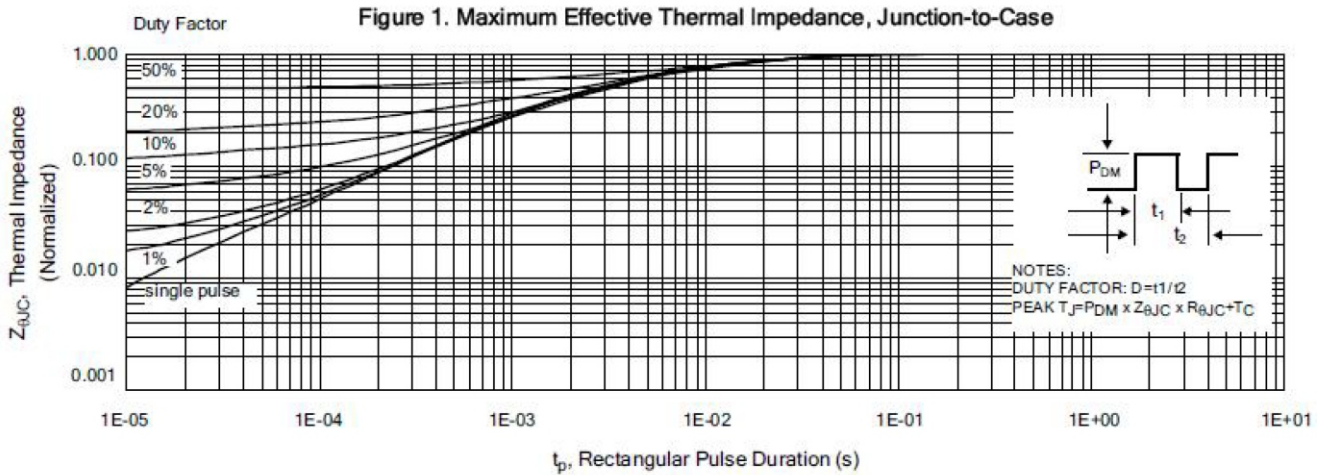
### Absolute (T<sub>c</sub> = 25°C unless otherwise specified)

PARAMETER	CONDITIONS	Symbol	CS2837AND	UNIT
Drain-Source Voltage		V <sub>DSS</sub>	500	V
Continuous Drain Current		I <sub>D</sub>	20	A
Continuous Drain Current	T <sub>c</sub> = 100°C		13	
Pulsed Drain Current(1)		I <sub>DM</sub>	80	
Gate-Source Voltage		V <sub>GS</sub>	±30	V
Single Pulse Avalanche Energy(2)		E <sub>AS</sub>	1500	mJ
Avalanche Current(1)		I <sub>AR</sub>	7.1	A
Repetitive Avalanche Energy(1)		E <sub>AR</sub>	250	mJ
Power Dissipation		P <sub>D</sub>	230	W
	Derating factor above 25°C		1.84	W/°C
Peak Diode Recovery dv/dt(3)		dV/dt	5.0	V/ns
Gate source ESD	HBM-C = 100pf, R = 1.5kΩ	V <sub>ESD(G-S)</sub>	6000	V
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 ~ +150	°C
Maximum temperature for soldering		T <sub>L</sub>	300	°C

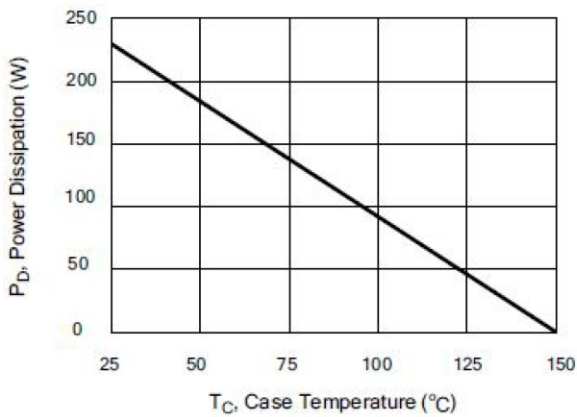
NOTE : 1.Repetitive rating; pulse width limited by maximum junction temperature.  
 2.L=10.0mH, I<sub>0</sub> = 17.3A, Start T<sub>J</sub> = 25°C.  
 3.I<sub>sp</sub> = 20A, di/dt ≤ 100A/us, V<sub>DS</sub> ≤ BV<sub>DS</sub>, Start T<sub>J</sub> = 25°C.

■ Electrical characteristics( $T_c = 25^\circ\text{C}$ unless otherwise specified)						
PARAMETER	CONDITIONS	Symbol	MIN.	TYP.	MAX.	UNIT
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu\text{A}$	$V_{DSS}$	500			V
Bvdss Temperature Coefficient	$I_D = 250\mu\text{A}$ , Reference $25^\circ\text{C}$	$BV_{DSS} / T_J$		0.6		V/ $^\circ\text{C}$
Drain-Source Leakage Current	$V_{DS} = 500V, V_{GS} = 0V, T_a = 25^\circ\text{C}$	$I_{DSS}$			1	uA
	$V_{DS} = 400V, V_{GS} = 0V, T_a = 125^\circ\text{C}$				10	
Gate-Source Leakage Current, Forward	$V_{GS} = 30V$	$I_{GSS(F)}$			10	uA
Gate-Source Leakage Current, Reverse	$V_{GS} = -30V$	$I_{GSS(R)}$			-10	
■ ON Characteristics						
PARAMETER	CONDITIONS	Symbol	MIN.	TYP.	MAX.	UNIT
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	$V_{GS(th)}$	2.0		4.0	V
Static Drain-Source On-Resistance	$V_{GS} = 10V, I_D = 10A$	$R_{DS(on)}$		0.18	0.26	$\Omega$
■ Dynamic Characteristics						
PARAMETER	CONDITIONS	Symbol	MIN.	TYP.	MAX.	UNIT
Forward Transconductance	$V_{DS} = 15V, I_D = 10A$	$g_{fs}$		18		S
Input Capacitance	$V_{DS} = 25V, V_{GS} = 0V, f = 1.0\text{MHz}$	$C_{iss}$		4900		pF
Output Capacitance		$C_{oss}$		410		
Reverse Transfer Capacitance		$C_{rss}$		44		
■ Resistive Switching Characteristics						
PARAMETER	CONDITIONS	Symbol	MIN.	TYP.	MAX.	UNIT
Turn-on Delay Time	$I_D = 20A, V_{DD} = 250V, V_{GS} = 10V, R_G = 25\Omega$	$td_{(ON)}$		53		ns
Rise Time		$tr$		117		
Turn-off Delay Time		$td_{(OFF)}$		307		
Fail Time		$tf$		138		
Total Gate Charge	$I_D = 20A, V_{DD} = 250V, V_{GS} = 10V$	$Q_g$		96		nC
Gate-Source Charge		$Q_{gs}$		18		
Gate-Drain Charge		$Q_{gd}$		41		
■ Source-Drain Diode Characteristics						
PARAMETER	CONDITIONS	Symbol	MIN.	TYP.	MAX.	UNIT
Continuous Source-Drain Diode Current	Body Diode	$I_S$			20	A
Pulse Diode Forward Current	Body Diode	$I_{SM}$			80	
Body Diode Voltage	$I_S = 20A, V_{GS} = 0V$	$V_{SD}$			1.5	V
Reverse recovery time	$I_S = 20A, T_J = 25^\circ\text{C}, di_f/dt = 100A/\mu\text{s}, V_{GS} = 0V$	$t_{rr}$		558		ns
Reverse recovery charge		$Q_{rr}$		6.1		uC
■ Thermal characteristics						
PARAMETER	CONDITIONS	Symbol	MIN.	TYP.	MAX.	UNIT
Thermal Resistance	Junction to Case	$R_{\theta JC}$		0.54		$^\circ\text{C/W}$
	Junction to Ambient	$R_{\theta JA}$		40		
■ Thermal characteristics						
PARAMETER	CONDITIONS	Symbol	MIN.	TYP.	MAX.	UNIT
Gate-Source Breakdown Voltage	$I_{GS} = \pm 1\text{mA}$ (open Drain)	$V_{GSO}$	30			V

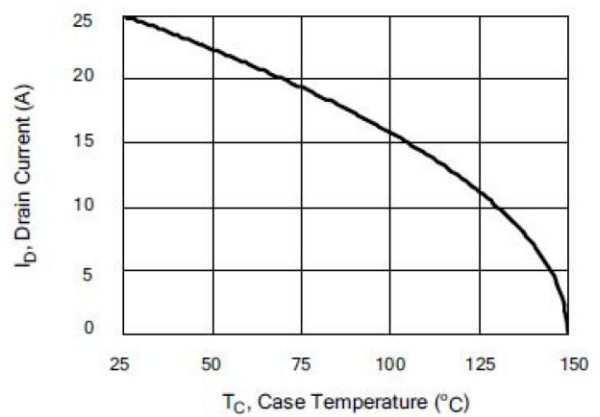
■ Rating and characteristic curves



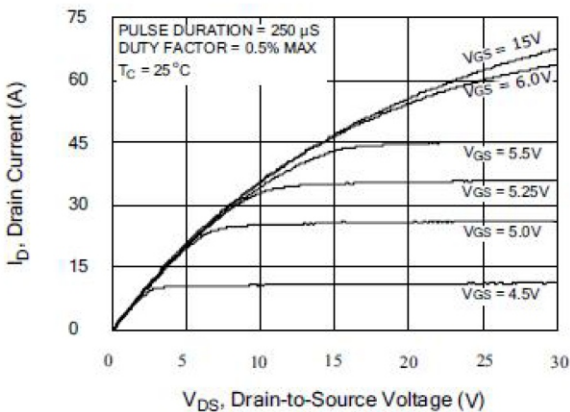
**Figure 2. Maximum Power Dissipation vs Case Temperature**



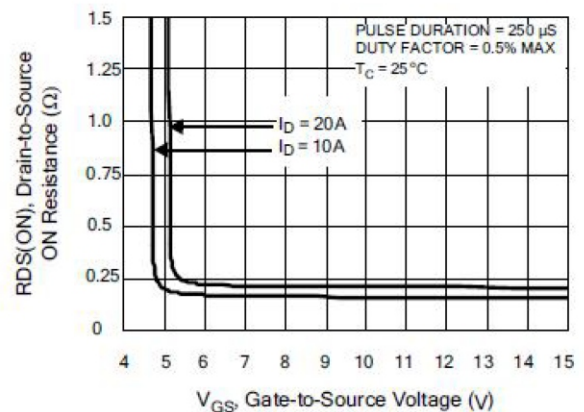
**Figure 3. Maximum Continuous Drain Current vs Case Temperature**



**Figure 4. Typical Output Characteristics**



**Figure 5. Typical Drain-to-Source ON Resistance vs Gate Voltage and Drain Current**



■ Rating and characteristic curves

Figure 6. Maximum Peak Current Capability

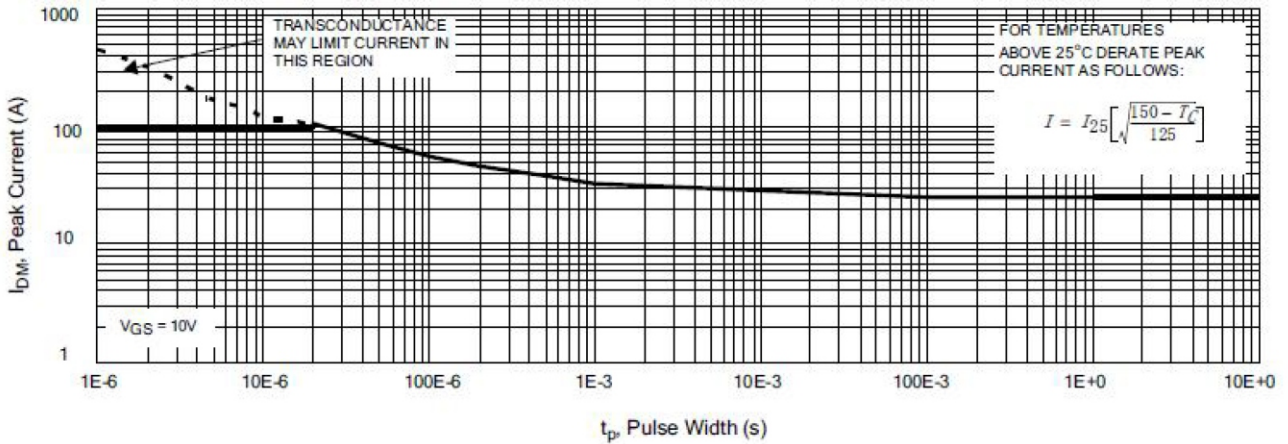


Figure 7. Typical Transfer Characteristics

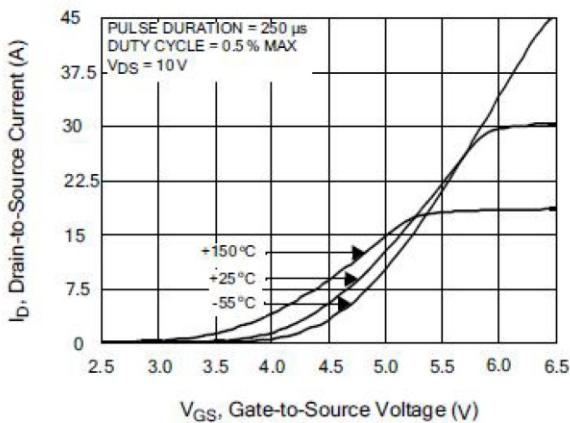


Figure 8. Unclamped Inductive Switching Capability

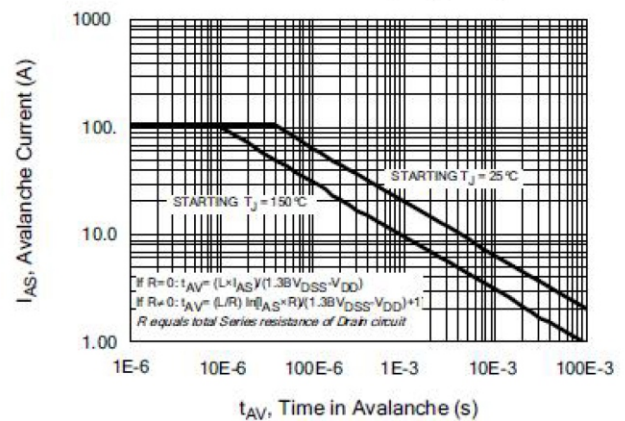


Figure 9. Typical Drain-to-Source ON Resistance vs Drain Current

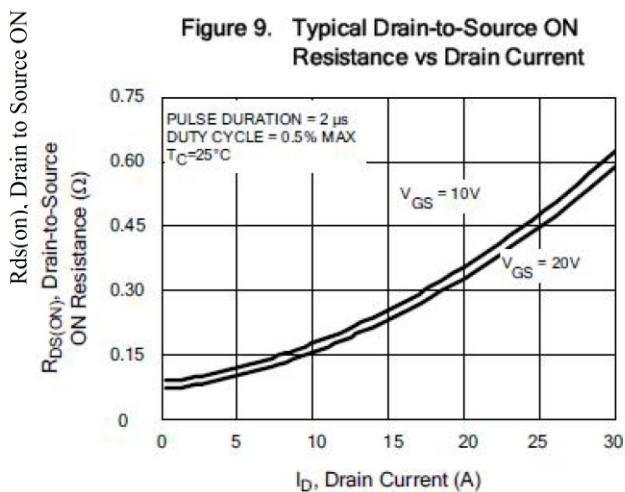
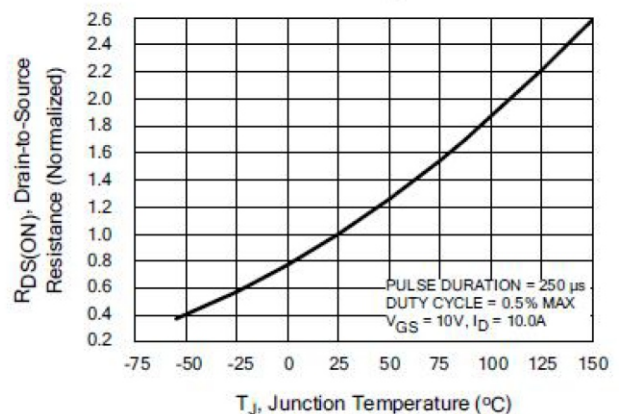


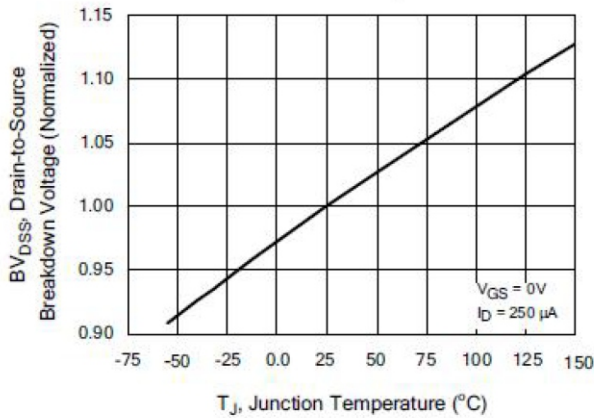
Figure 10. Typical Drain-to-Source ON Resistance vs Junction Temperature



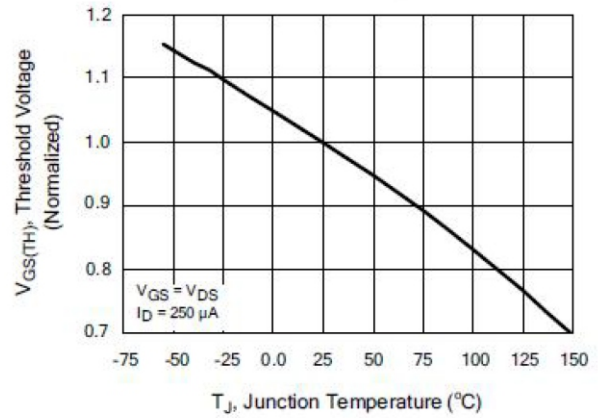


Rating and characteristic curves

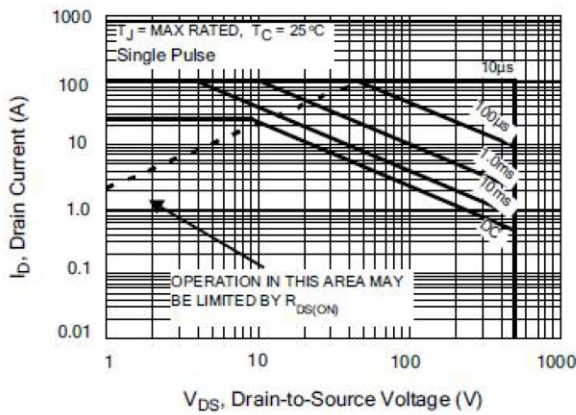
**Figure 11. Typical Breakdown Voltage vs Junction Temperature**



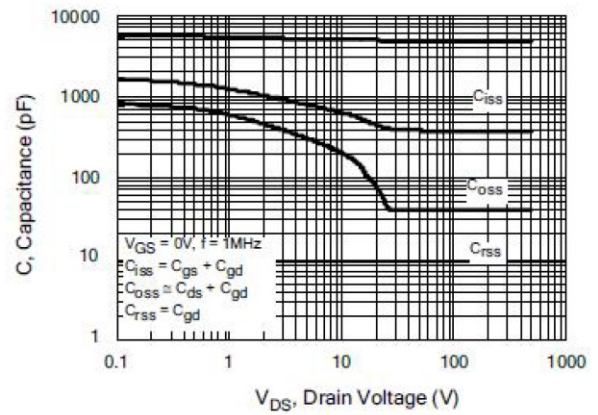
**Figure 12. Typical Threshold Voltage vs Junction Temperature**



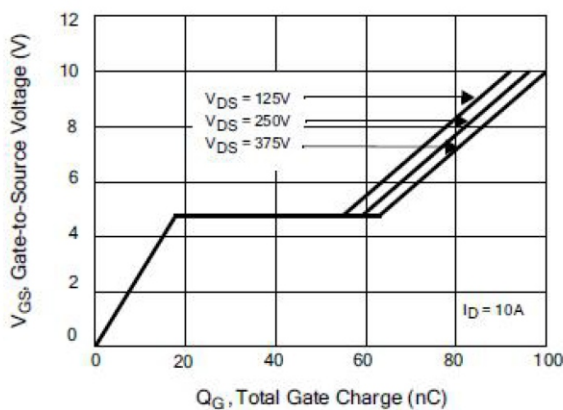
**Figure 13. Maximum Forward Bias Safe Operating Area**



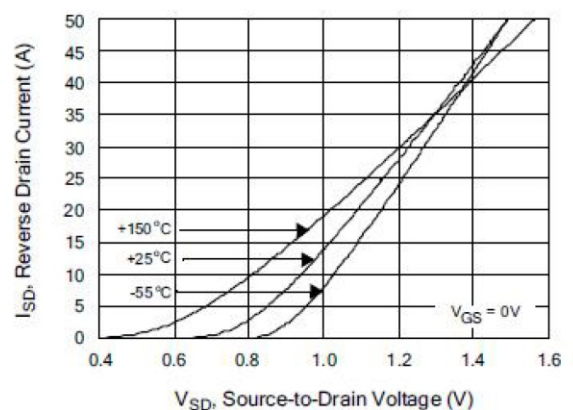
**Figure 14. Typical Capacitance vs**



**Figure 15. Typical Gate Charge vs Gate-to-Source Voltage**



**Figure 16. Typical Body Diode Transfer Characteristics**



■ Test circuit and waveform

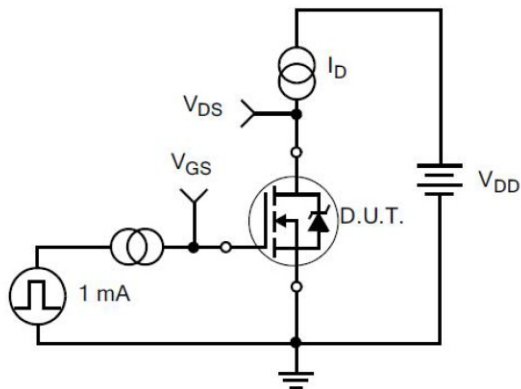


Figure 17. Gate Charge Test Circuit

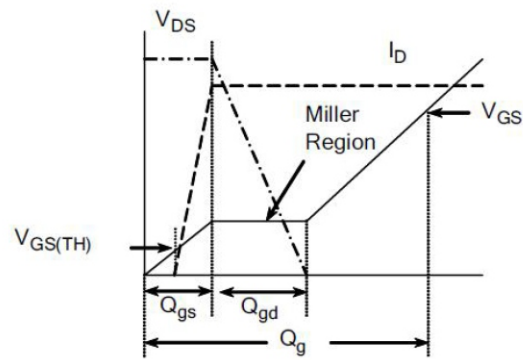


Figure 18. Gate Charge Waveform

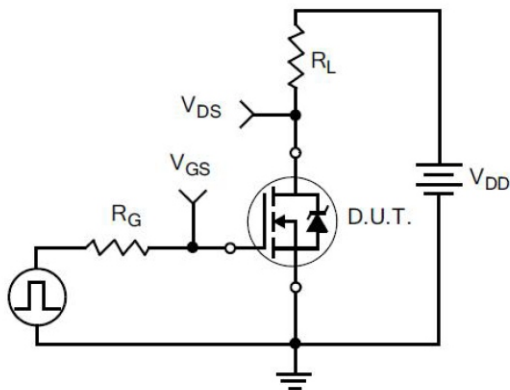


Figure 19. Resistive Switching Test Circuit

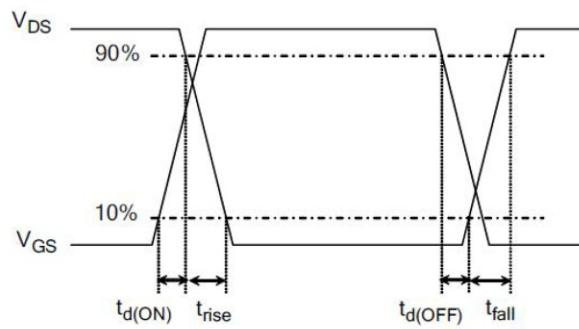


Figure 20. Resistive Switching Waveforms

■ Test circuit and waveform

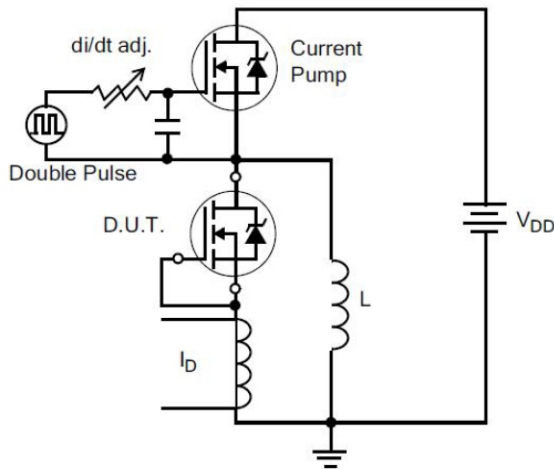


Figure 21. Diode Reverse Recovery Test Circuit

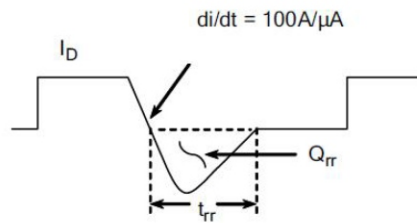


Figure 22. Diode Reverse Recovery Waveform

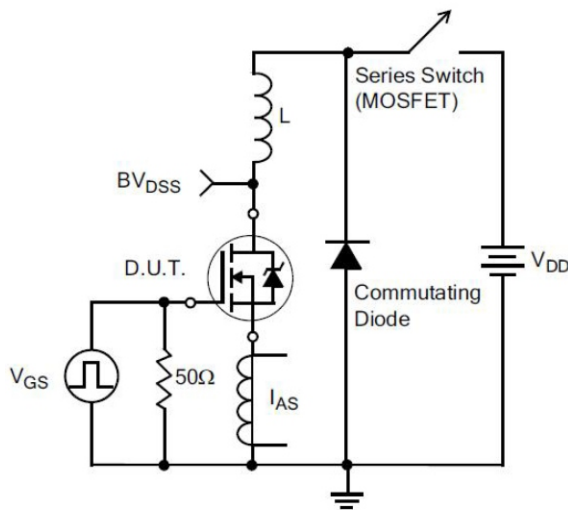


Figure 23. Unclamped Inductive Switching Test Circuit

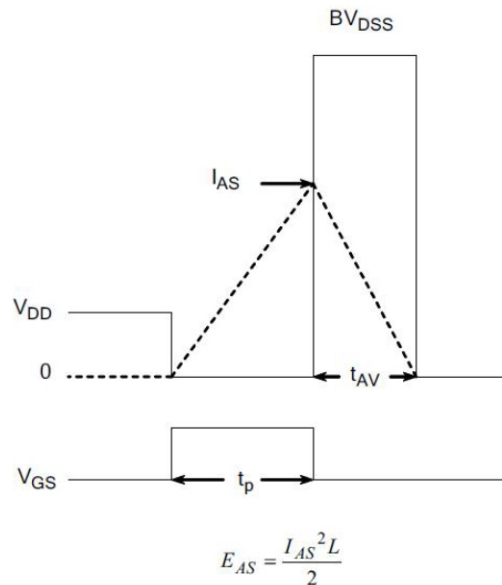


Figure 24. Unclamped Inductive Switching Waveforms

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