

N-Channel MOSFET

Lead Free Package and Finish

Applications:

- Adaptor
- Charger
- SMPS

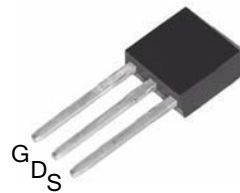
V_{DSS}	$R_{DS(ON)}(Typ.)$	I_D
900V	5Ω	3A

Features:

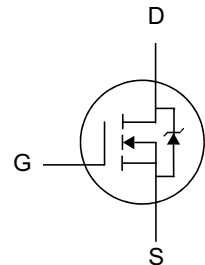
- RoHS Compliant
- Low ON Resistance
- Low Gate Charge
- Peak Current vs Pulse Width Curve
- Inductive Switching Curves

Ordering Information

PART NUMBER	PACKAGE	BRAND
ITU03N90A	TO-251	IPS



TO-251
Packages
Not to Scale



Absolute Maximum Ratings $T_C=25^{\circ}C$ unless otherwise specified

Symbol	Parameter	ITU03N90A	Units
V_{DSS}	Drain-to-Source Voltage	900	V
I_D	Continuous Drain Current	3	A
I_{DM}	Pulsed Drain Current, $V_{GS}@10V$ (NOTE *2)	12	A
P_D	Power Dissipation	75	W
	Derating Factor above 25°C	0.6	W/°C
V_{GS}	Gate-to-Source Voltage	±30	V
E_{AS}	Single Pulse Avalanche Energy	125	mJ
E_{AR}	Avalanche Energy ,Repetitive (NOTE *2)	12	mJ
I_{AR}	Avalanche Current (NOTE *2)	1.5	A
T_L	Maximum Temperature for Soldering	300	
T_J and T_{STG}	Operating Junction and Storage Temperature Range (NOTE *1)	-55 to 150	°C

Thermal Resistance

Symbol	Parameter	Typ.	Max.	Units	Test Conditions
$R_{\theta JC}$	Junction-to-Case		1.67	°C/W	Water cooled heatsink, P_D adjusted for a peak junction temperature of +150°C.
$R_{\theta JA}$	Junction-to-Ambient		62		1 cubic foot chamber, free air.



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OFF Characteristics $T_C=25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	900	--	--	$V^\circ\text{C}$	$V_{GS}=0V, I_D=250\mu\text{A}$
I_{DSS}	Drain-to-Source Leakage Current	--	--	25	μA	$V_{DS}=900V, V_{GS}=0V$ $T_J=25^\circ\text{C}$
		--	--	250		$V_{DS}=720V, V_{GS}=0V$ $T_J=125^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage	--	--	+100	nA	$V_{GS}=+30V$
	Gate-to-Source Reverse Leakage	--	--	-100		$V_{GS}=-30V$

ON Characteristics $T_J=25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance(NOTE *3)	--	5	5.5	Ω	$V_{GS}=10V, I_D=1.5A$
$V_{GS(TH)}$	Gate Threshold Voltage	2	--	4	V	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$
g_{fs}	Forward Transconductance(NOTE *3)	--	5	--	S	$V_{DS}=15V, I_D=3A$

Dynamic Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
C_{iss}	Input Capacitance	--	630	--	pF	$V_{GS}=0V, V_{DS}=25V$ $f=1.0\text{MHz}$
C_{oss}	Output Capacitance	--	44	--		
C_{rss}	Reverse Transfer Capacitance	--	6.5	--		
Q_g	Total Gate Charge	--	16	--	nC	$I_D=3A, V_{DD}=450V$ $V_{GS}=10V$
Q_{gs}	Gate-to-Source Charge	--	4	--		
Q_{gd}	Gate-to-Drain ("Miller") Charge	--	7	--		

Resistive Switching Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$t_{d(ON)}$	Turn-on Delay Time	--	25		ns	$V_{DD}=400V, I_D=3.5A,$ $V_G=10V R_G=20\Omega$
t_{rise}	Rise Time	--	55			
$t_{d(OFF)}$	Turn-Off Delay Time	--	70			
t_{fall}	Fall Time	--	40			



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Source-Drain Diode Characteristics $T_c=25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I_S	Continuous Source Current (Body Diode)	--	--	3	A	$T_C=25^\circ\text{C}$
I_{SM}	Maximum Pulsed Current (Body Diode)	--	--	12	A	
V_{SD}	Diode Forward Voltage	--	--	1.5	V	$I_{SD}=3\text{A}, V_{GS}=0\text{V}$
t_{rr}	Reverse Recovery Time	--	820	--	ns	$I_F=I_S$ $di/dt=100\text{A}/\mu\text{s}$
Q_{rr}	Reverse Recovery Charge	--	2.7	--	μC	

Notes:

*1. $T_J = +25^\circ\text{C}$ to $+150^\circ\text{C}$.

*2. Repetitive rating; pulse width limited by maximum junction temperature.

*3. Pulse width $< 380\mu\text{s}$; duty cycle $< 2\%$.

Characteristics Curve:

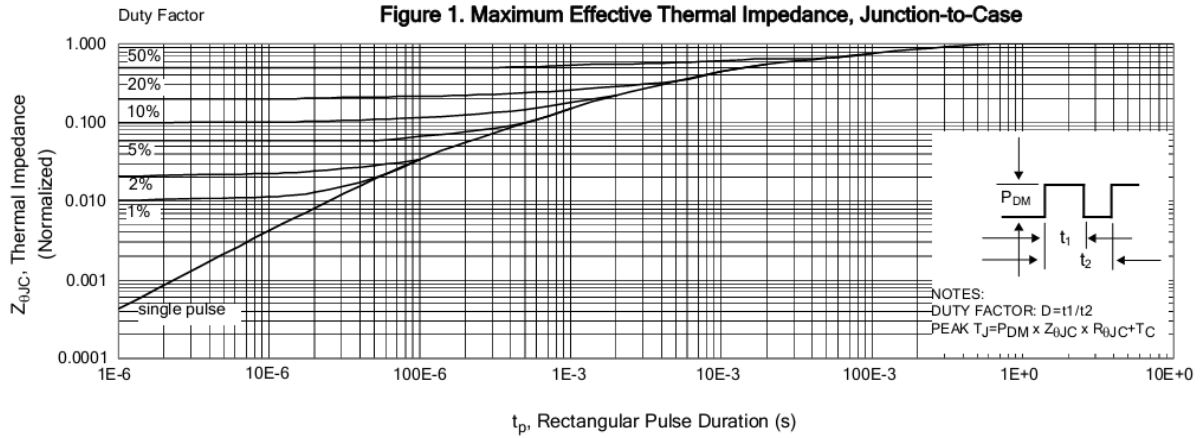


Figure 2. Maximum Power Dissipation vs Case Temperature

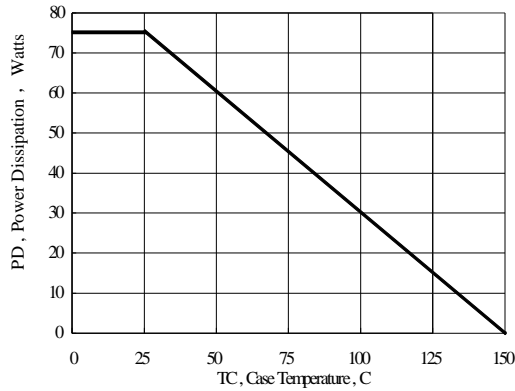


Figure 3. Maximum Continuous Drain Current vs Case Temperature

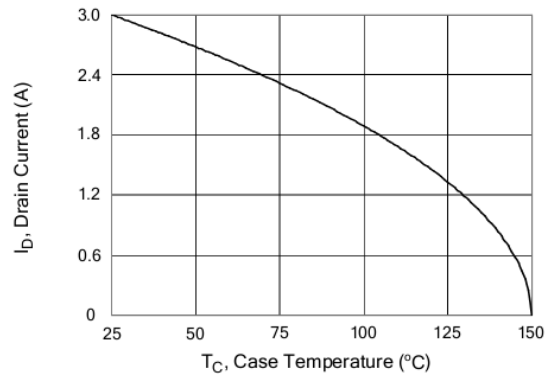


Figure 4. Typical Output Characteristics

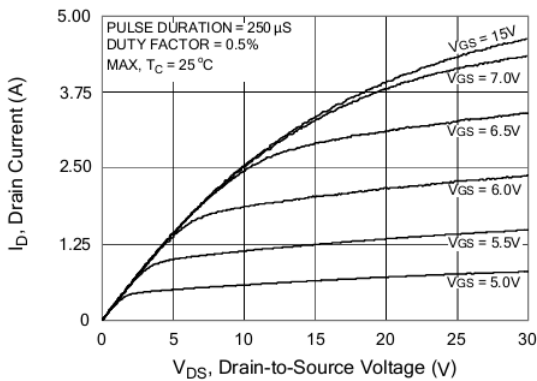


Figure 5. Typical Drain-to-Source ON Resistance vs Gate Voltage and Drain Current

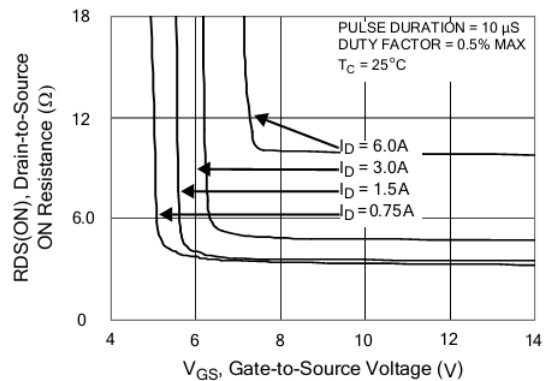


Figure 6. Maximum Peak Current Capability

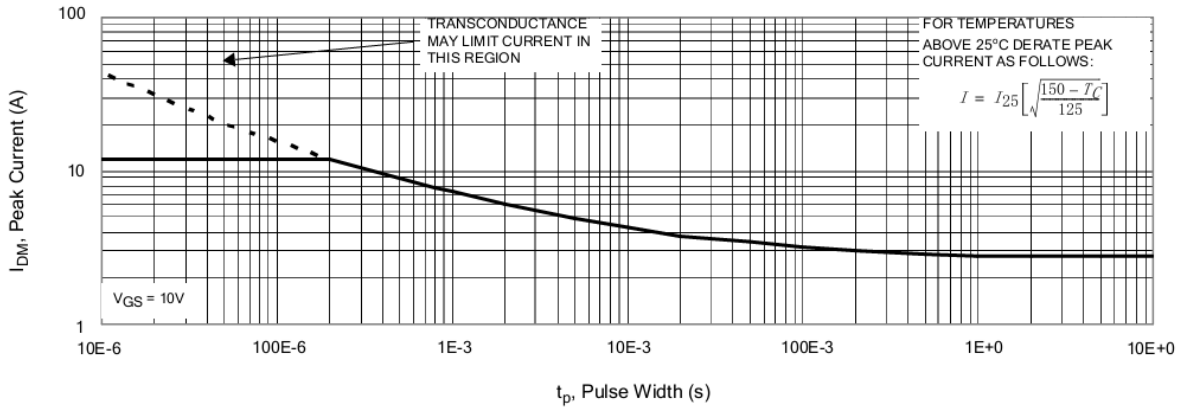


Figure 7. Typical Transfer Characteristics

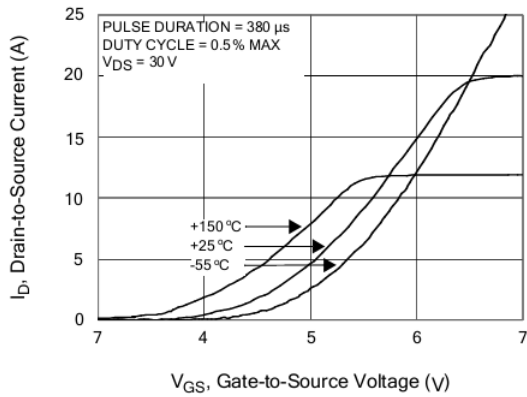


Figure 8. Unclamped Inductive Switching Capability

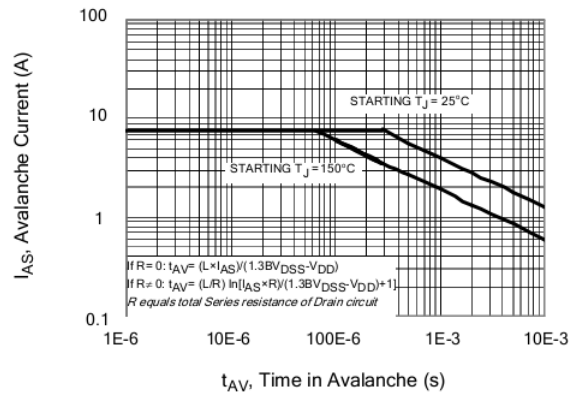


Figure 9. Typical Drain-to-Source ON Resistance vs Drain Current

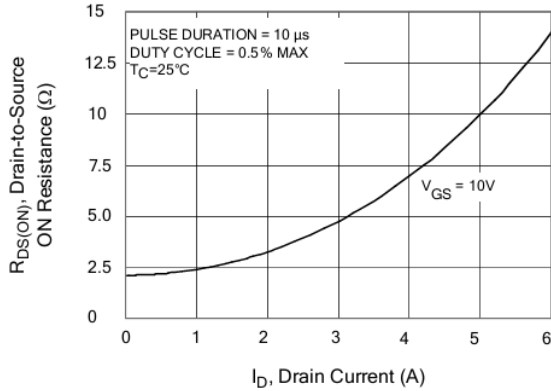


Figure 10. Typical Drain-to-Source ON Resistance vs Junction Temperature

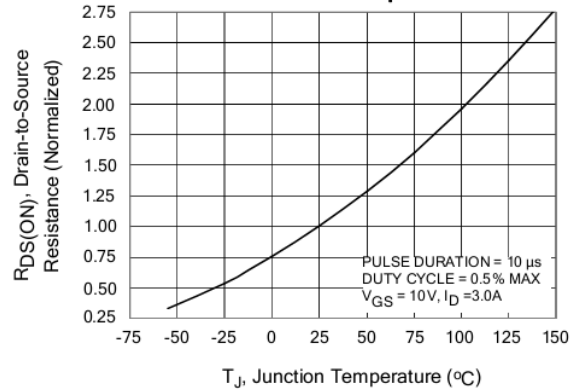


Figure 11. Typical Breakdown Voltage vs Junction Temperature

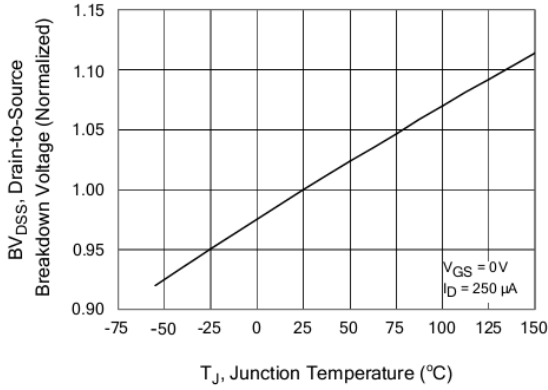


Figure 12. Typical Threshold Voltage vs Junction Temperature

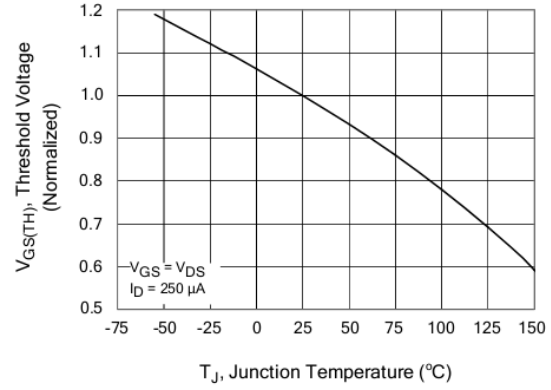


Figure 13. Maximum Forward Bias Safe Operating Area

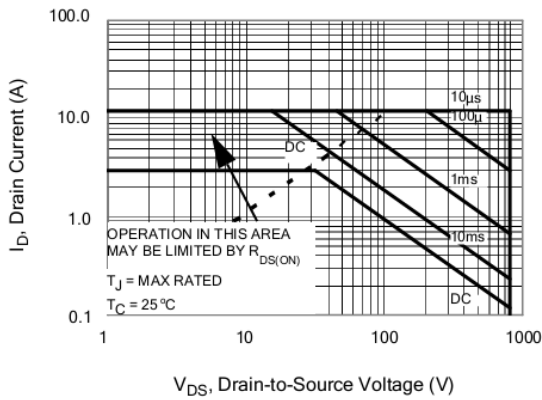


Figure 14. Typical Capacitance vs Drain-to-Source Voltage

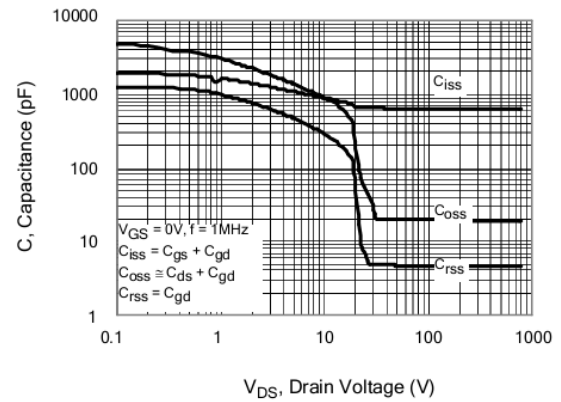


Figure 15. Typical Gate Charge vs Gate-to-Source Voltage

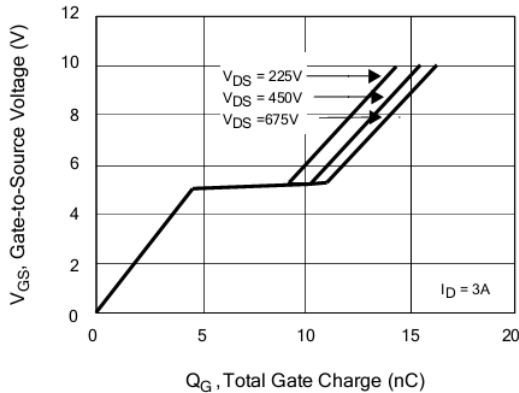
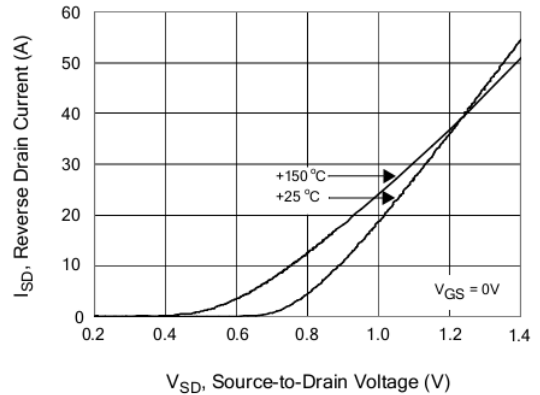


Figure 16. Typical Body Diode Transfer Characteristics



Test Circuits and Waveforms

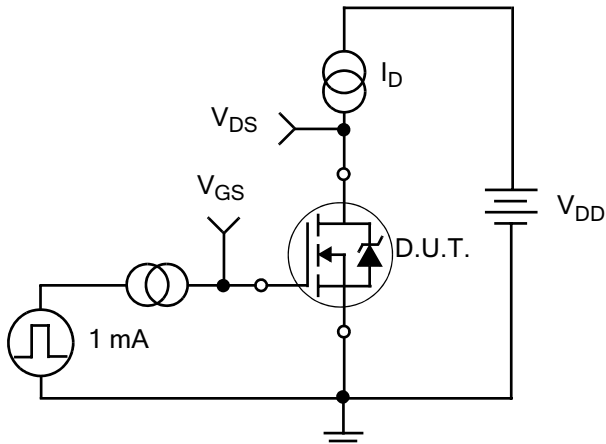


Figure 17. Gate Charge Test Circuit

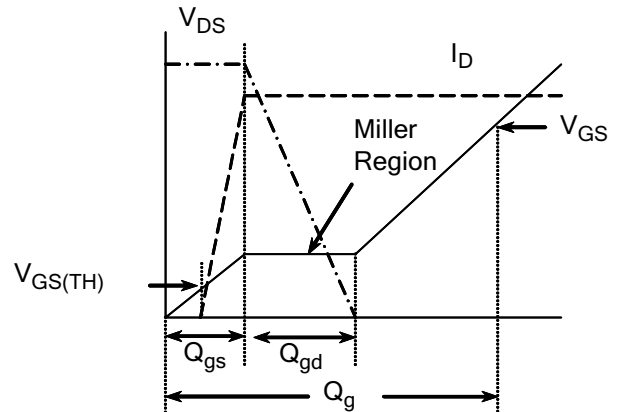


Figure 18. Gate Charge Waveforms

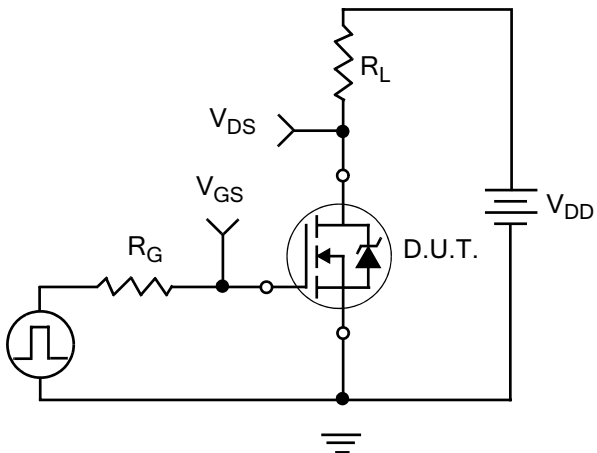


Figure 19. Resistive Switching Test Circuit

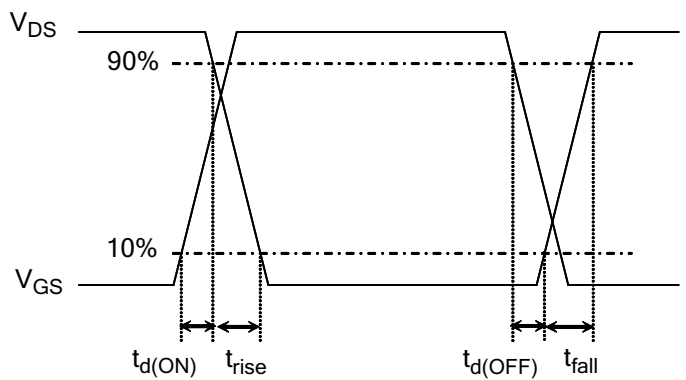


Figure 20. Resistive Switching Waveforms

Test Circuits and Waveforms

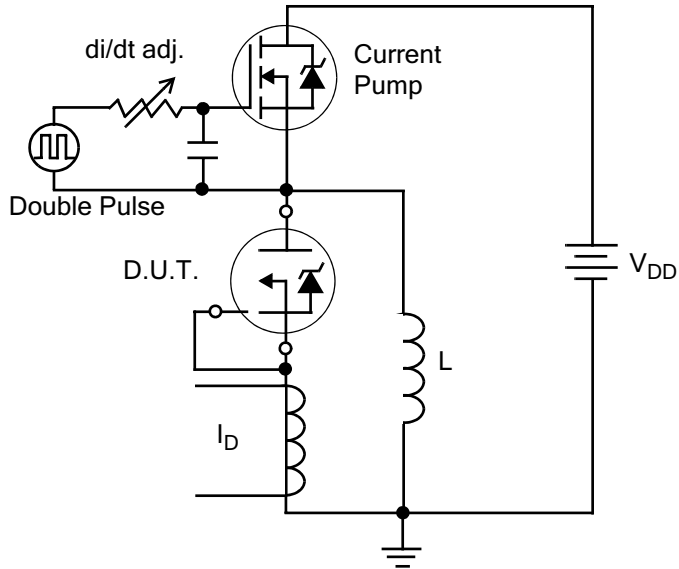


Figure 21 . Diode Reverse Recovery Test Circuit

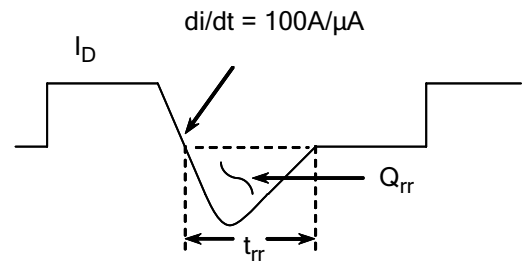


Figure 22. Diode Reverse Recovery Waveform

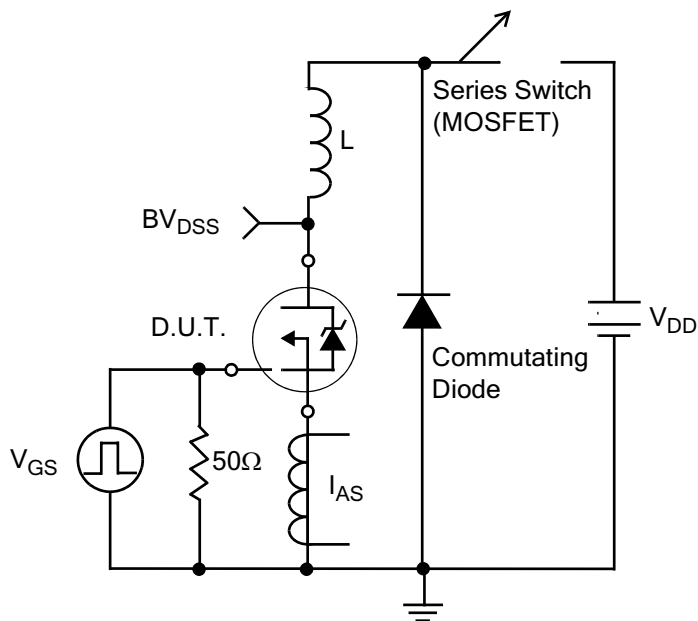


Figure23. Unclamped Inductive Switching Test Circuit

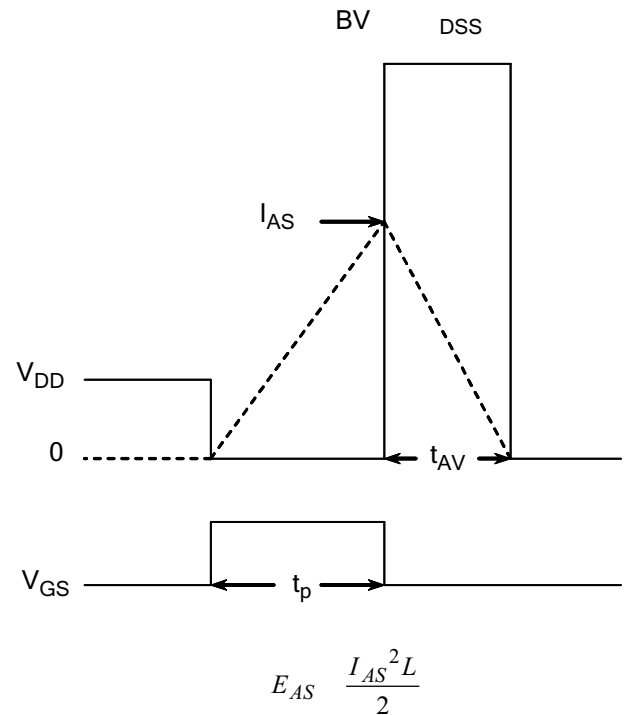


Figure 24 . Unclamped Inductive Switching Waveform



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