

N-Channel MOSFET



Applications:

- Power switch circuit of adaptor and charger;
- LED backlight driver;
- Synchronous rectification

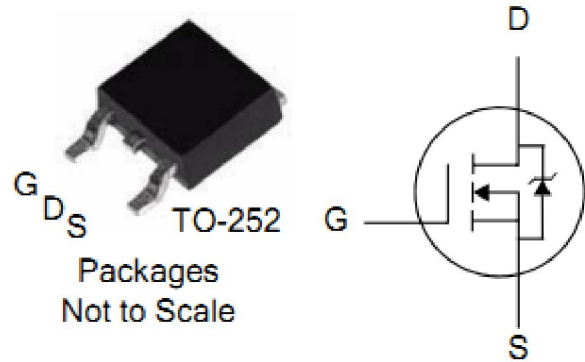
V_{DSS}	$R_{DS(ON)}(Typ.)$	I_D
60V	23m Ω	25A

Features:

- Fast Switching
- Low ON Resistance
- Low Gate Charge
- Low Reverse transfer capacitances
- 100% Single Pulse avalanche energy Test

Ordering Information

PART NUMBER	PACKAGE	BRAND
FTD36N06NA	TO-252	IPS



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

Symbol	Parameter	FTD36N06NA	Units
V_{DSS}	Drain-to-Source Voltage	60	V
I_D	Continuous Drain Current $T_C = 25^{\circ}\text{C}$	25	A
	Continuous Drain Current $T_C = 100^{\circ}\text{C}$	17.5	A
I_{DM}	Pulsed Drain Current $T_C = 25^{\circ}\text{C}$ (NOTE *1)	100	A
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy(NOTE *2)	56.2	mJ
P_D	Power Dissipation $T_C = 25^{\circ}\text{C}$	36.2	W
T_J and T_{STG}	Operating Junction and Storage Temperature Range	150, -55 to 150	$^{\circ}\text{C}$

Thermal Resistance

Symbol	Parameter	Max.	Units	Test Conditions
$R_{\theta JC}$	Junction-to-Case	3.45	$^{\circ}\text{C/W}$	Water cooled heatsink, P_D adjusted for a peak junction temperature of $+150^{\circ}\text{C}$.
$R_{\theta JA}$	Junction-to-Ambient	111.5		1 cubic foot chamber, free air.

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

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	60	--	--	V	$V_{GS}=0V, I_D=250\mu A$
I_{DSS}	Drain-to-Source Leakage Current	--	--	1	μA	$V_{DS}=60V, V_{GS}=0V$ $T_J=25^{\circ}\text{C}$
		--	--	100		$V_{DS}=48V, V_{GS}=0V$ $T_J=125^{\circ}\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage	--	--	+100	nA	$V_{GS}=+20V$
	Gate-to-Source Reverse Leakage	--	--	-100		$V_{GS}=-20V$

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	--	23	29	m Ω	$V_{GS}=10V, I_D=19A$
		--	30	38	m Ω	$V_{GS}=4.5V, I_D=19A$
$V_{GS(TH)}$	Gate Threshold Voltage	1	1.5	2	V	$V_{DS}=V_{GS}, I_D=250\mu A$
Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$						

Dynamic Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
R_g	Gate resistance	--	1.9	--	Ω	$f=1.0\text{MHz}$
C_{iss}	Input Capacitance	--	939	--	pF	$V_{GS}=0V, V_{DS}=30V$ $f=1.0\text{MHz}$
C_{oss}	Output Capacitance	--	73.5	--		
C_{rss}	Reverse Transfer Capacitance	--	52.7	--		
Q_g	Total Gate Charge	--	21.2	--	nC	$I_D=20A, V_{DD}=30V$ $V_{GS}=10V$
Q_{gs}	Gate-to-Source Charge	--	3.6	--		
Q_{gd}	Gate-to-Drain ("Miller") Charge	--	5.5	--		

Resistive Switching Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$t_{d(ON)}$	Turn-on Delay Time	--	8.4	--	ns	$V_{DD}=30V, I_D=20A,$ $V_{GS}=10V, R_G=3\Omega$
t_{rise}	Rise Time	--	8.5	--		
$t_{d(OFF)}$	Turn-Off Delay Time	--	35.4	--		
t_{fall}	Fall Time	--	4.8	--		

Source-Drain Diode Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I _S	Continuous Source Current (Body Diode)	--	--	25	A	T _C =25°C
I _{SM}	Maximum Pulsed Current (Body Diode)	--	--	100	A	
V _{SD}	Diode Forward Voltage	--	--	1.2	V	I _{SD} =20A, V _{GS} =0V
t _{rr}	Reverse Recovery Time	--	18.8	--	ns	di/dt=100A/us IF=20A
Q _{rr}	Reverse Recovery Charge	--	13.4	--	nC	
Pulse width ≤300μs; duty cycle ≤ 2%						

Notes:

- *1. Repetitive rating; pulse width limited by maximum junction temperature.
- *2. $L=0.5\text{mH}, V_{DD}=30\text{V}, I_{AS}=15\text{A}$ Start $T_J=25^{\circ}\text{C}$
- *3. Recommend soldering temperature defined by IPC/JEDEC J-STD 020

Characteristics Curve:

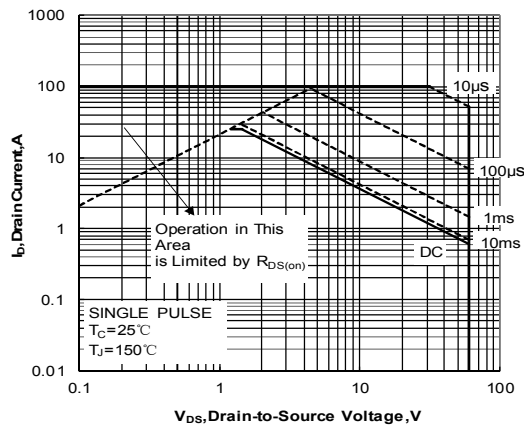


Figure 1 . Maximum Safe Operating Area

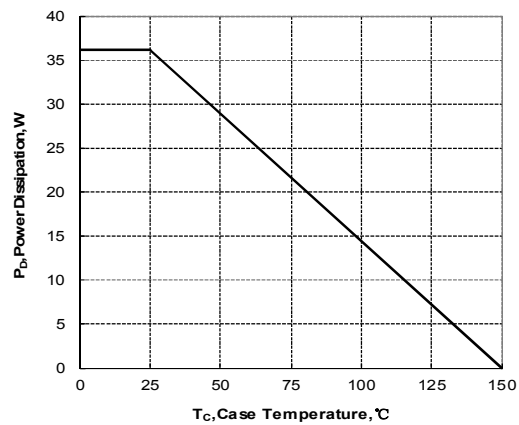


Figure 2. Maximum Power Dissipation vs Case Temperature

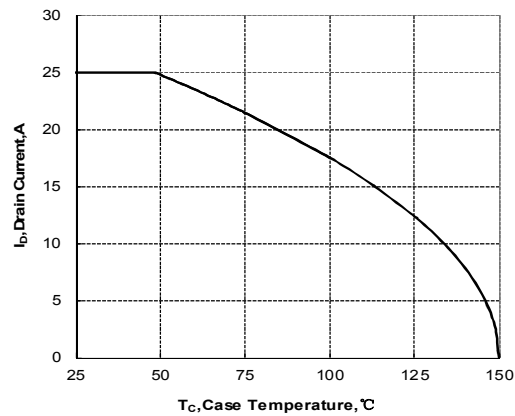


Figure 3. Maximum Continuous Drain Current vs Case Temperature

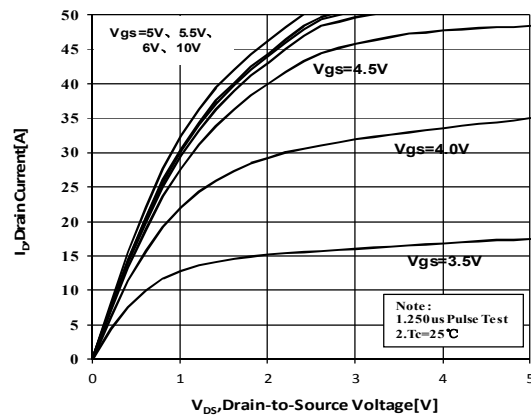


Figure 4. Typical output Characteristics

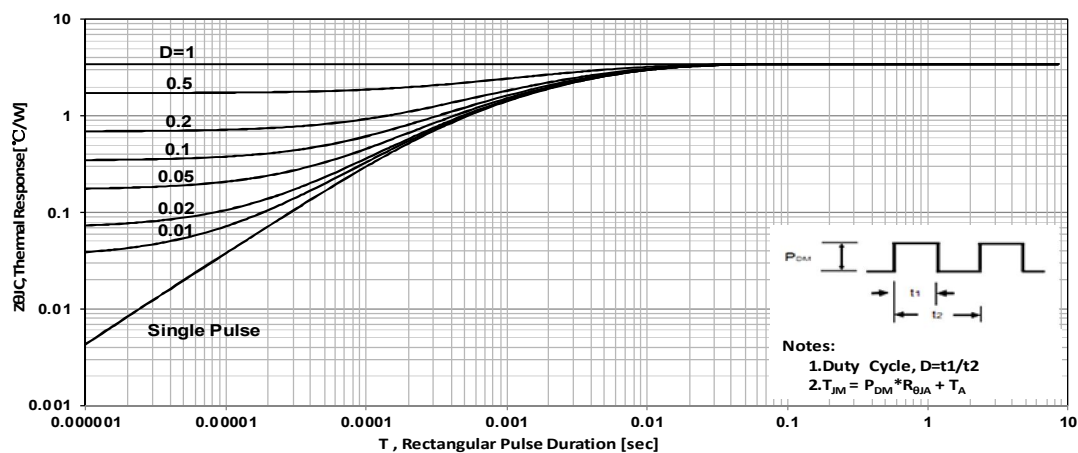


Figure 5 Maximum Effective Thermal Impedance , Junction to Case

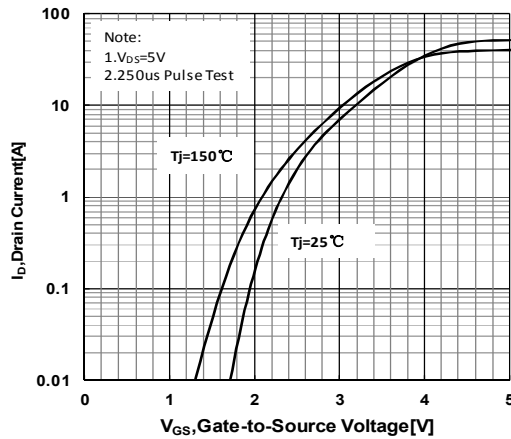


Figure 6 Typical Transfer Characteristics

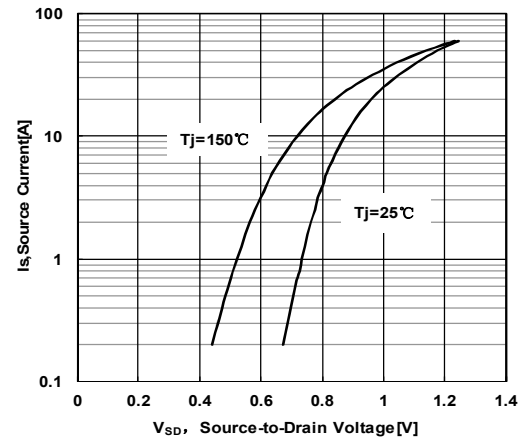


Figure 7 Typical Body Diode Transfer Characteristics

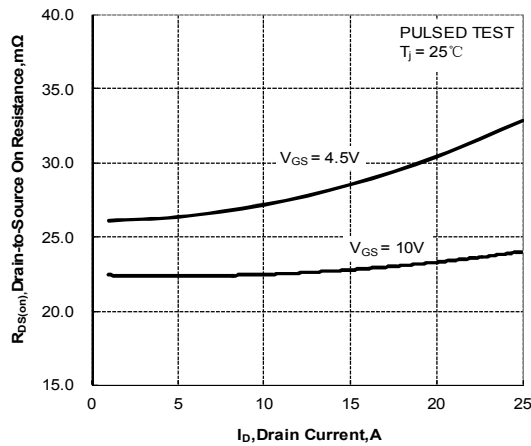


Figure 8. Drain-to-Source On Resistance vs Drain Current

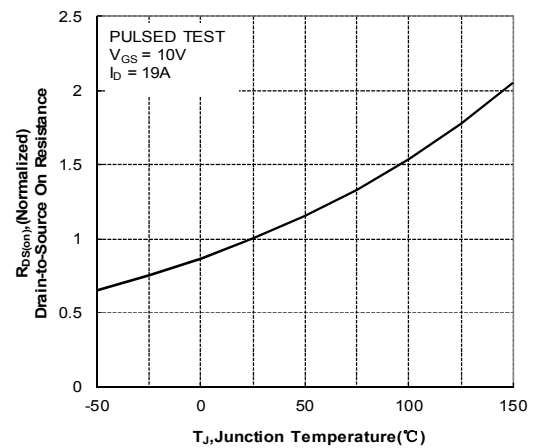


Figure 9. Normalized On Resistance vs Junction Temperature

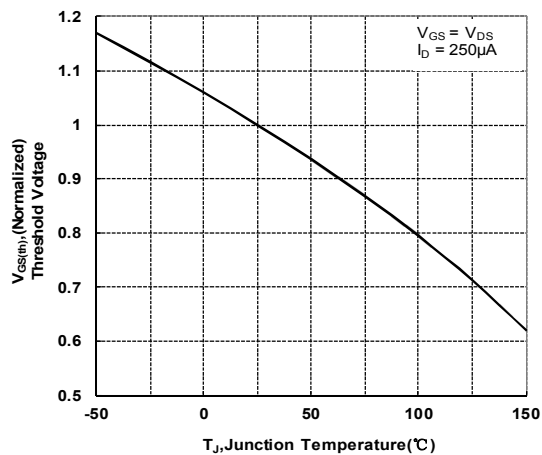


Figure 10. Normalized Threshold Voltage vs Junction Temperature

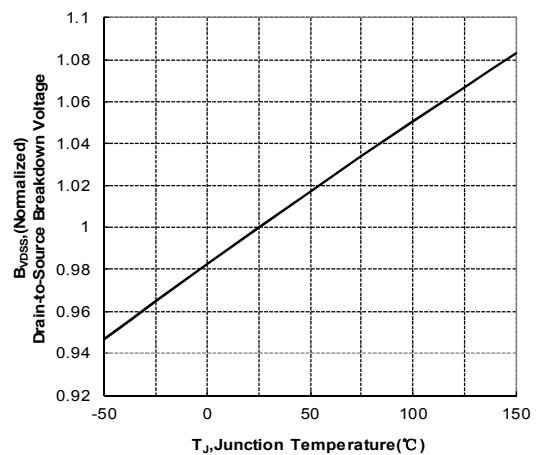


Figure 11. Normalized Breakdown Voltage vs Junction Temperature

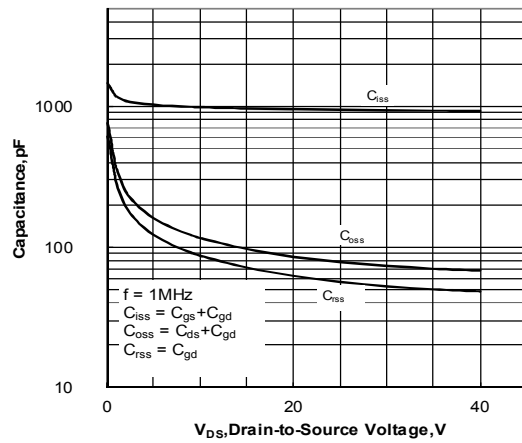


Figure 12. Capacitance Characteristics

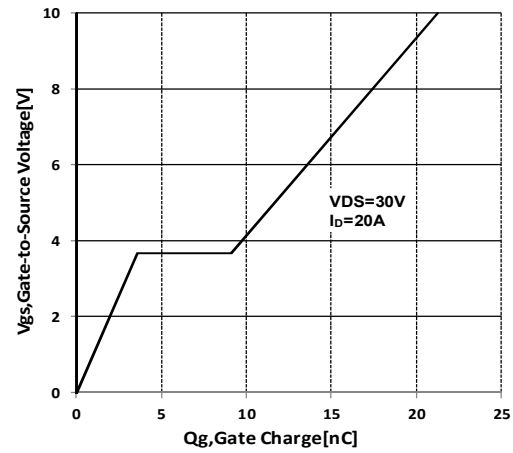


Figure 13 Typical Gate Charge vs Gate to Source Voltage

Test Circuits and Waveforms

Figure 14. Gate Charge Test Circuit

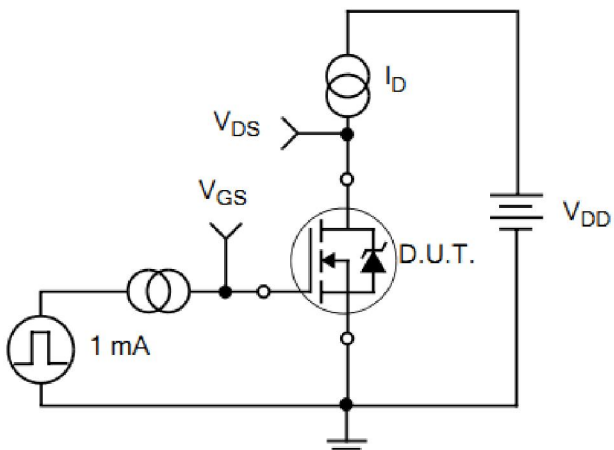


Figure 15. Gate Charge Waveforms

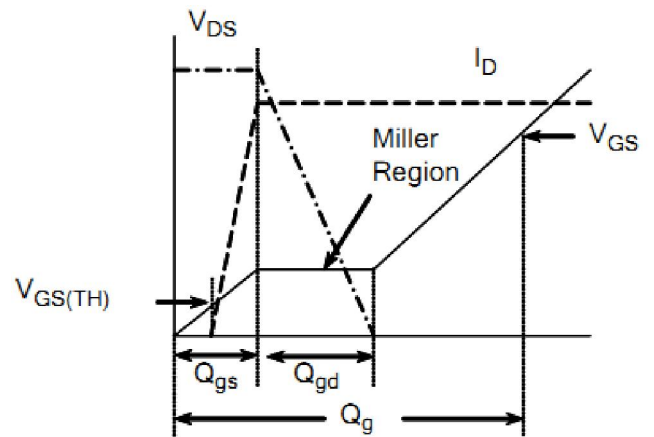


Figure 16. Resistive Switching Test Circuit

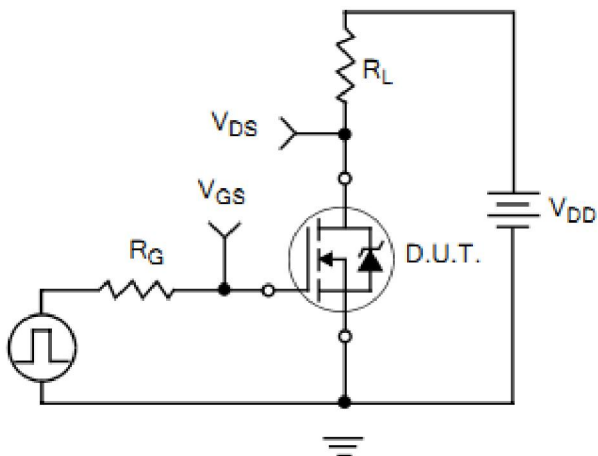


Figure 17. Resistive Switching Waveforms

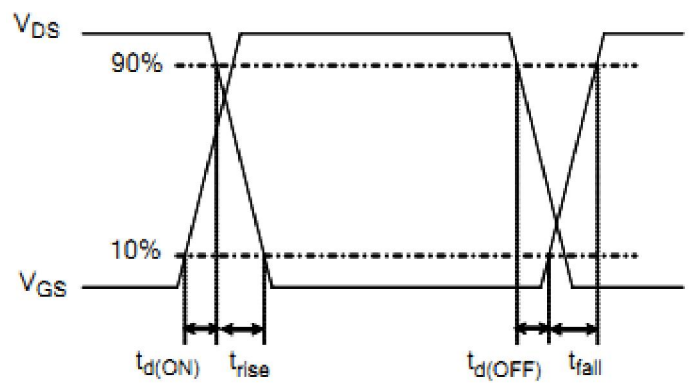


Figure 18. Diode Reverse Recovery Test Circuit

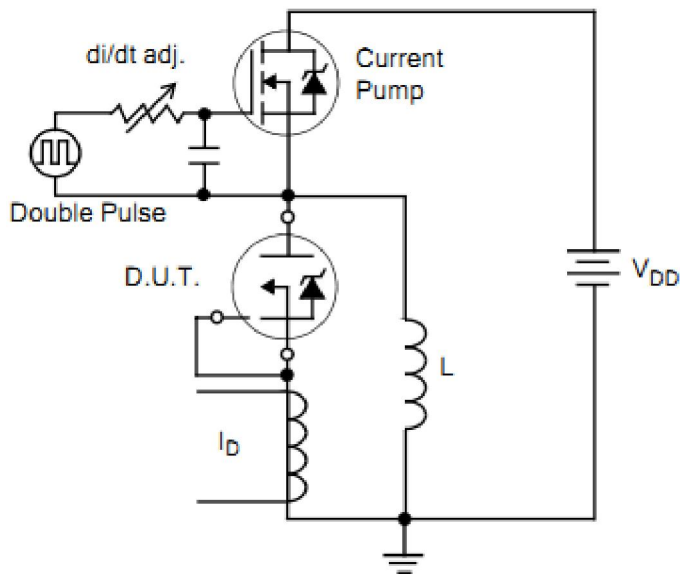


Figure 19. Diode Reverse Recovery Waveform

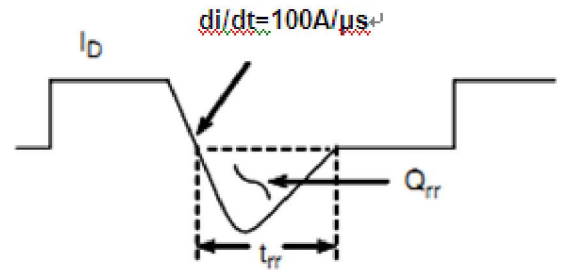


Figure20.Unclamped Inductive Switching Test Circuit

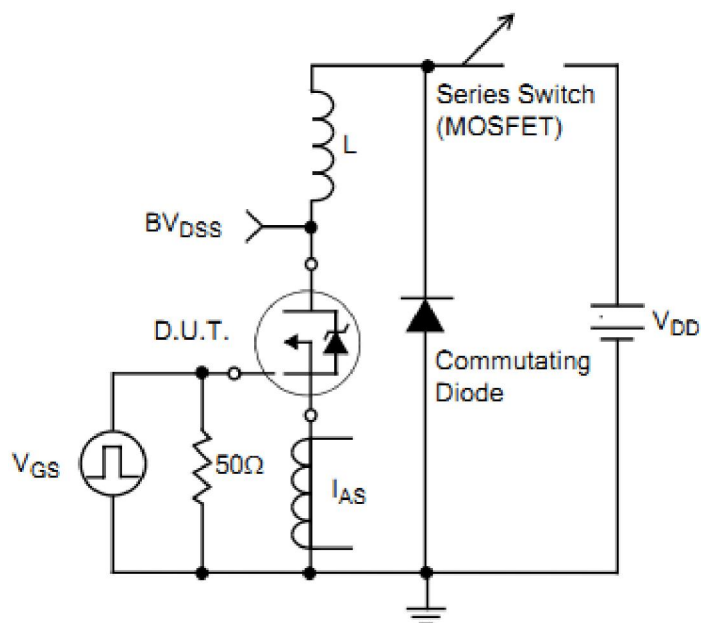
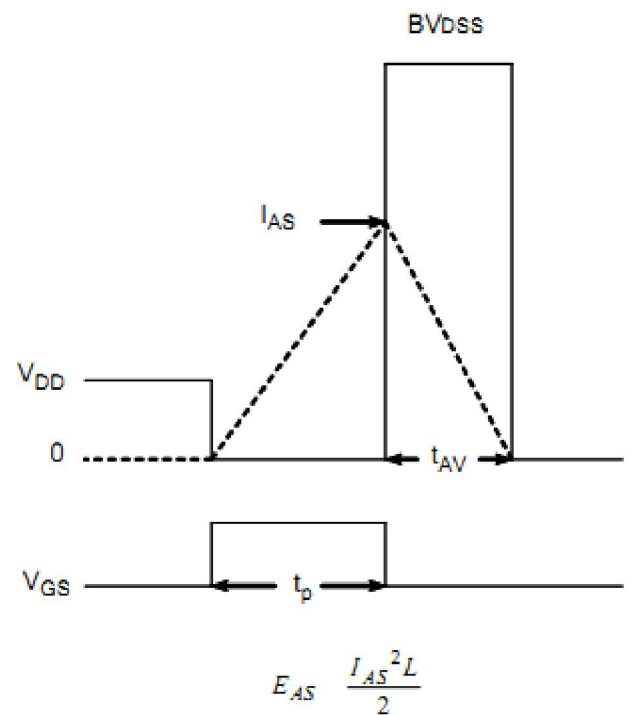


Figure21.Unclamped Inductive Switching Waveform



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