

General Description:

WTM05N50FVD the silicon N-channel Enhanced VDMOSFETs, is obtained by the self-aligned planar Technology which reduce the conduction loss, improve switching performance and enhance the avalanche energy. The transistor can be used in various power switching circuit for system miniaturization and higher efficiency. The package form is TO-252, which accords with the RoHS standard.

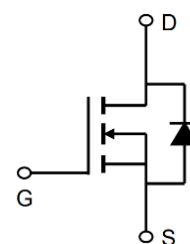
V_{DSS}	500	V
I_D	5	A
T_{rr}	60	ns
$R_{DS(ON)Typ}$	1.4	Ω

Features :

- Fast body diode eliminates the need for external diode in ZVS applications.
- Lower Gate charge results in simpler drive requirements
- Higher Gate voltage threshold offers improved Noise immunity

Applications:

- Motor Control applications
- Uninterruptible Power Supplies
- Zero Voltage Switching SMPS



MARKING



WPM=WPMtek's Logo
05N50FVD=Marking
XXX YYWW=Date Code

Absolute (Tc=25°C unless otherwise specified)

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	500	V
I_D	Continuous Drain Current	5	A
	Continuous Drain Current TC =100°C	2	A
I_{DM}^{a1}	Pulsed Drain Current	20	A
V_{GS}	Gate-to-Source Voltage	±30	V
E_{AS}^{a2}	Single Pulse Avalanche Energy	3	m
E_{AR}^{a1}	Avalanche Energy ,Repetitive	3	m
I_{AR}^{a1}	Avalanche Current	2	A
dv/dt^{a3}	Peak Diode Recovery dv/dt	5	V/ns
P_D	Power Dissipation	75	W
	Derating Factor above 25°C	0.5	W/°C
T_J, T_{STG}	Operating Junction and Storage Temperature Range	150,-55 To 150	°C
T_L	Maximum Temperature for Soldering	300	°C

Electrical Characteristics (T_c= 25°C unless otherwise specified)

OFF Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
V _{DSS}	Drain to Source Breakdown	V _{GS} =0V, I _D =250μA	505	--	--	V
Δ BV _{DSS} /Δ T _J	Bvdss Temperature Coefficient	I _D =250μA, Reference 25°C	--	0.55	--	V/°C
I	Drain to Source Leakage Current	V _{DS} =500V, V _{GS} = 0V, T _a = 25°C	--	--	1	μA
		V _{DS} =400V, V _{GS} = 0V, T _a = 125°C	--	--	10	μA
I _{GSS(F)}	Gate to Source Forward Leakage	V _{GS} = 30V	--	--	90	nA
I _{GSS(R)}	Gate to Source Reverse Leakage	V _{GS} =-30V	--	--	-90	nA

ON Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
R _{DS(ON)}	Drain-to-Source On-Resistance	V _{GS} =10V, I _D =2.5A	--	1.4	1.6	Ω
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	2.0	--	4.0	V
Pulse width tp ≤ 380μs, δ ≤ 2%						

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
g _{fs}	Forward Transconductance	V _{DS} =15V, I _D =2.5A	--	5.0	--	S
C _{iss}	Input Capacitance	V _{GS} = 0 V V _{DS} = 25V f = 1.0MHz	--	775	--	pF
C _{oss}	Output Capacitance		--	79	--	
C _{rss}	Reverse Transfer Capacitance		--	9.5	--	

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
t _{d(ON)}	Turn-on Delay Time	I _D =5A V _{DD} = 250V V _{RG} =25Ω	--	12	--	ns
t _r	Rise Time		--	46	--	
t _{d(OFF)}	Turn-Off Delay Time		--	50	--	
t _f	Fall Time		--	48	--	
Q _g	Total Gate Charge	I _D = 5A V _{DD} =250V V _{GS} = 10V	--	19		nC
Q _{gs}	Gate to Source Charge		--	4.0		
Q _{gd}	Gate to Drain ("Miller")Charge		--	8.0		

Source-Drain Diode Characteristics						
Symbol	Parameter	Test	Rating			Units
			Min.	Typ.	Max.	
I_S	Continuous Source Current (Body	Conditions	--	--	5	A
I_{SM}	Maximum Pulsed Current (Body Diode)		--	--	20	A
V_{SD}	Diode Forward Voltage	$I_S=5.0A, V_{GS}=0V$	--	--	1.5	V
t_{rr}	Reverse Recovery Time	$I_S=0.5A, T_J = 25^\circ C$ $dI_F/dt=100A/us$	--	43	60	ns
Q_{rr}	Reverse Recovery Charge	, $V_{GS}=0V$	--	265	--	nC
Pulse width $t_p \leq 380\mu s$, $\delta \leq 2\%$						

Symbol	Parameter	Typ.	Units
$R_{\theta JC}$	Junction-to-Case	1.67	$^\circ C/W$
$R_{\theta JA}$	Junction-to-Ambient	62.5	$^\circ C/W$

^{a1} Repetitive rating; pulse width limited by maximum junction temperature

^{a2} $L=10mH$, $I_D=8A$, Start $T_J=25^\circ C$

^{a3} $I_{SD}=5A, di/dt \leq 100A/us, V_{DD} \leq BV_{DS}$, Start $T_J=25^\circ C$

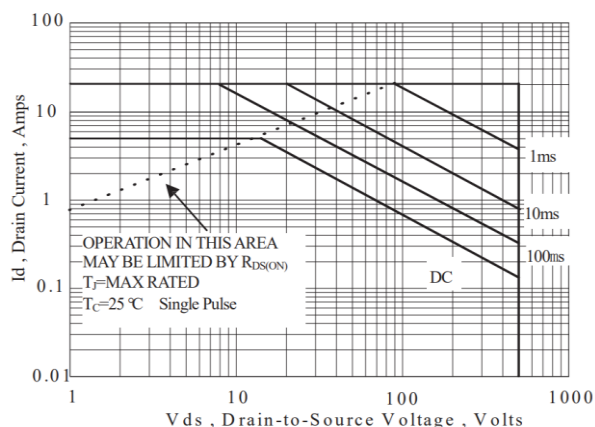


Figure 1 Maximum Forward Bias Safe Operating Area

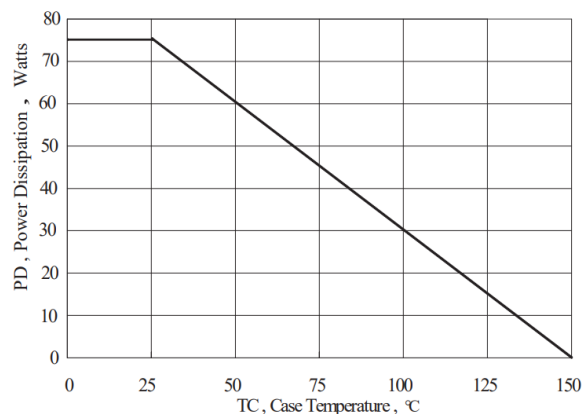


Figure 2 Maximum Power Dissipation vs Case Temperature

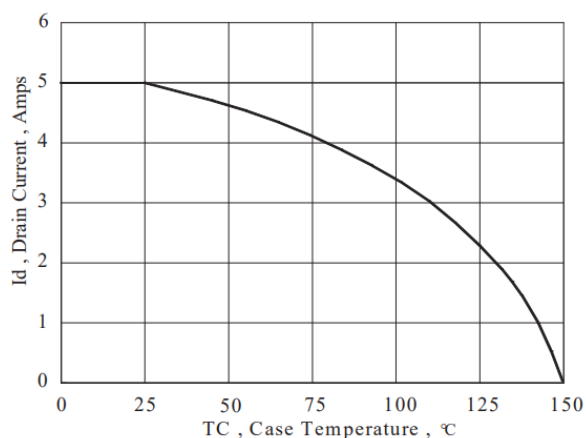


Figure 3 Maximum Continuous Drain Current
vs Case Temperature

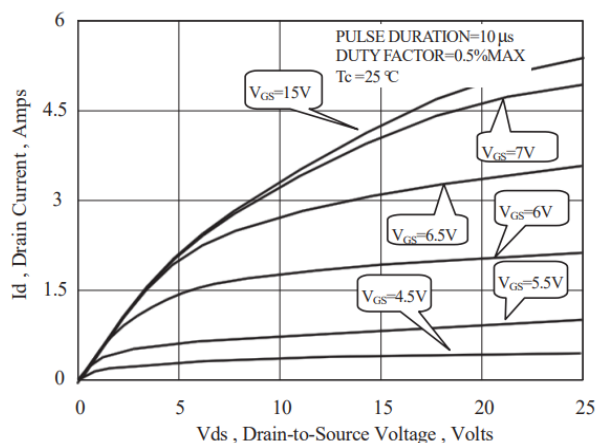


Figure 4 Typical Output Characteristics

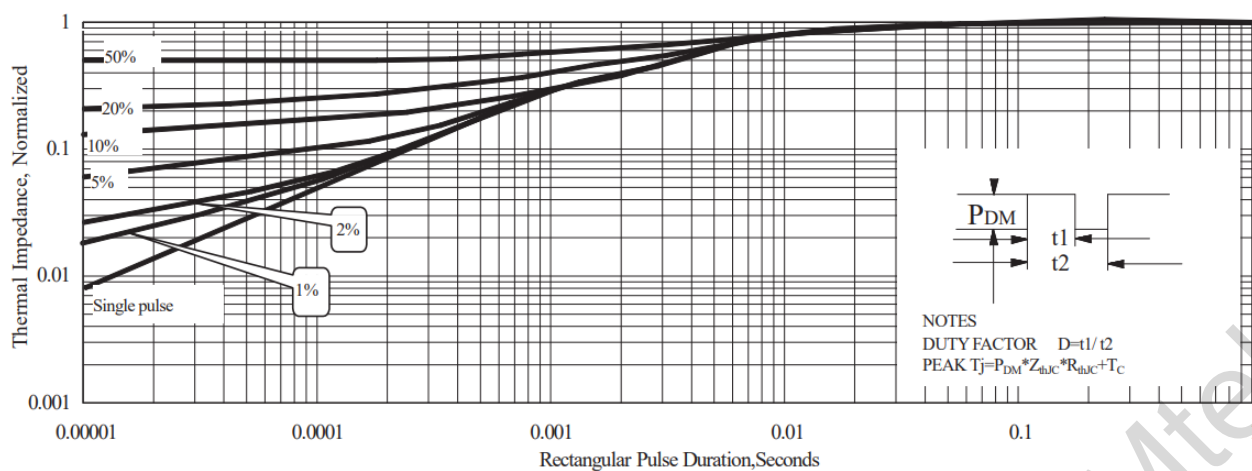


Figure 5 Maximum Effective Thermal Impedance , Junction to Case

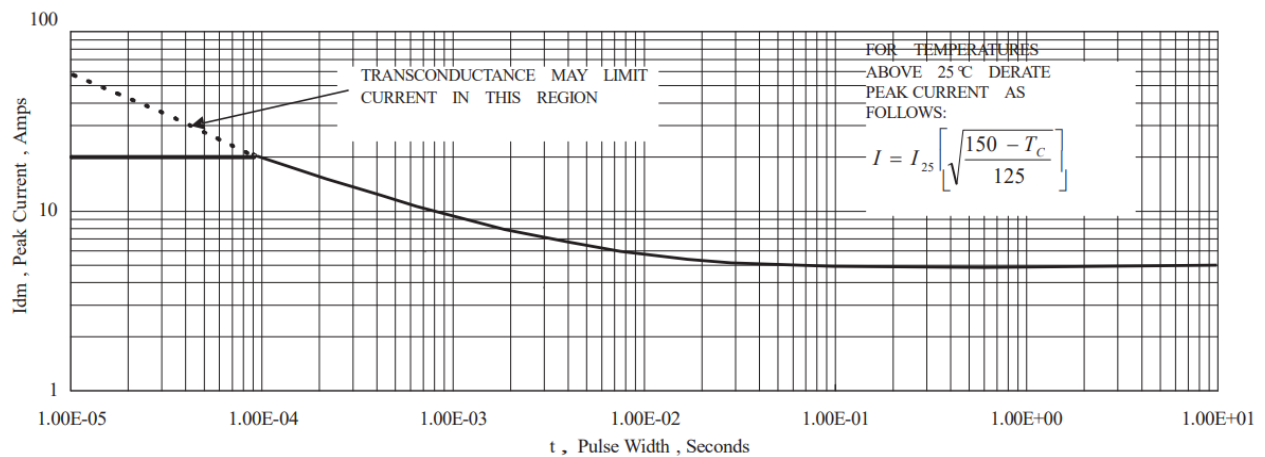


Figure 6 Maximum Peak Current Capability

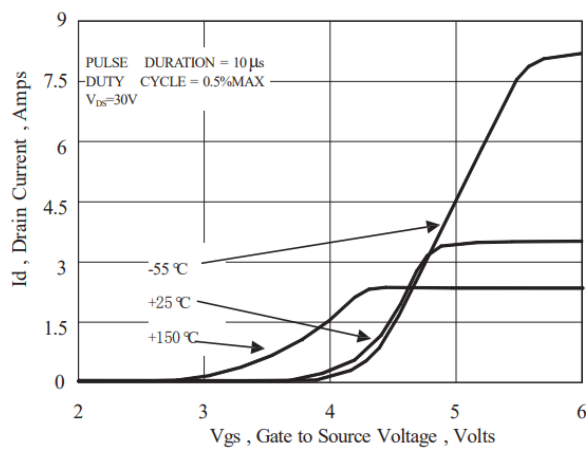


Figure 7 Typical Transfer Characteristics

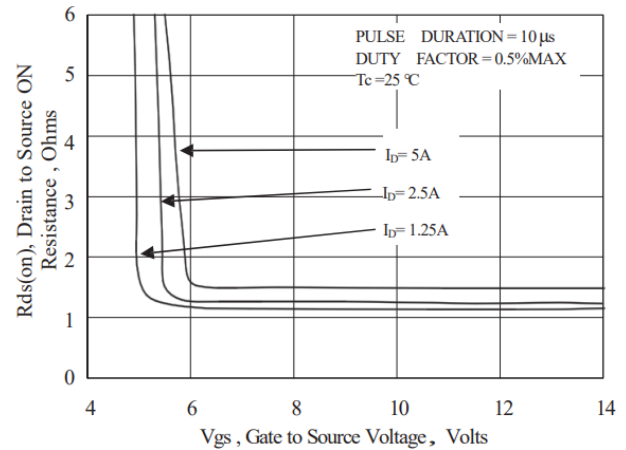


Figure 8 Typical Drain to Source ON Resistance vs Gate

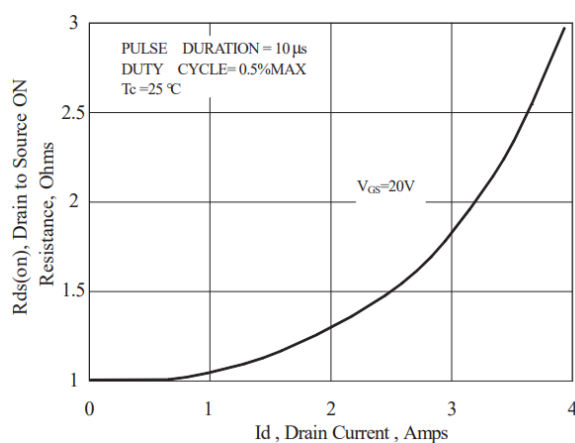


Figure 9 Typical Drain to Source ON Resistance
vs Drain Current

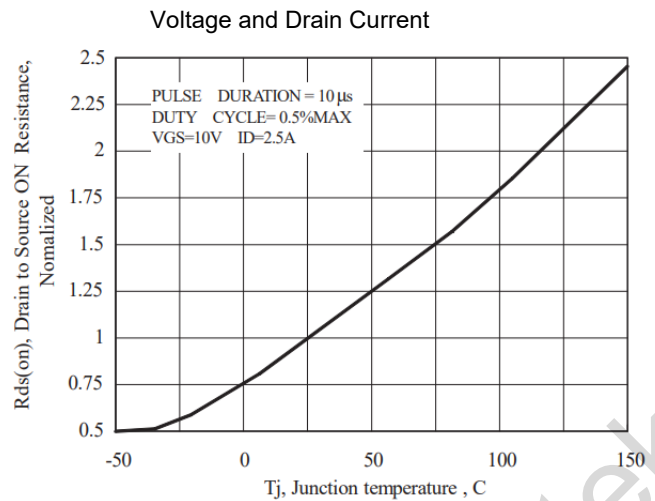


Figure 10 Typical Drain to Source on Resistance
vs Junction Temperature

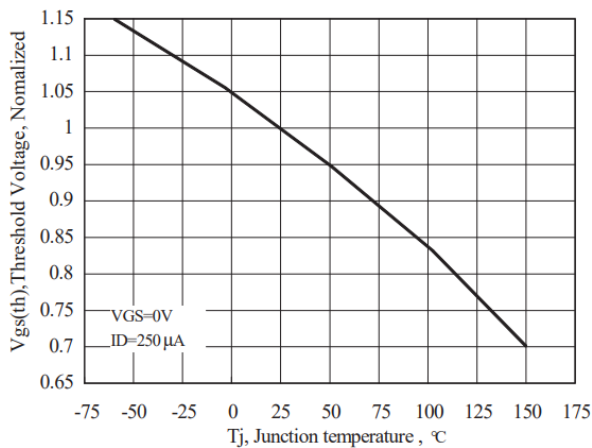


Figure 11 Typical Threshold Voltage vs Junction Temperature

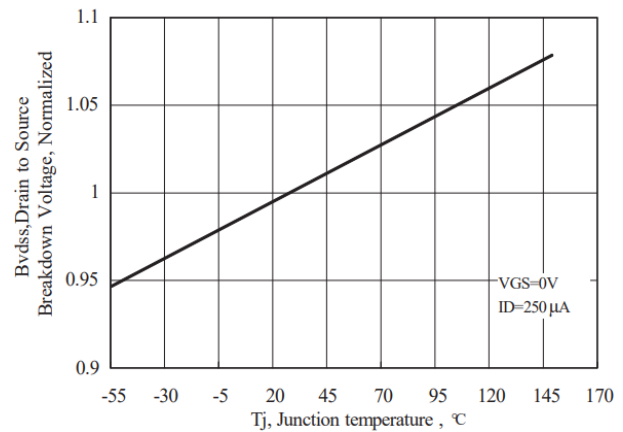


Figure 12 Typical Breakdown Voltage vs Junction Temperature

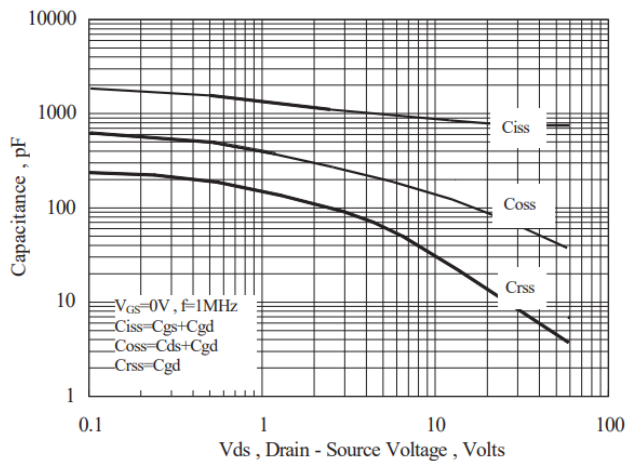


Figure 13 Typical Capacitance vs Drain to Source Voltage

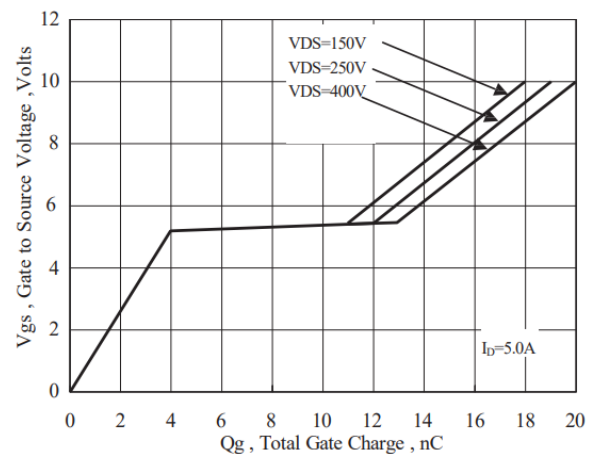


Figure 14 Typical Gate Charge vs Gate to Source Voltage

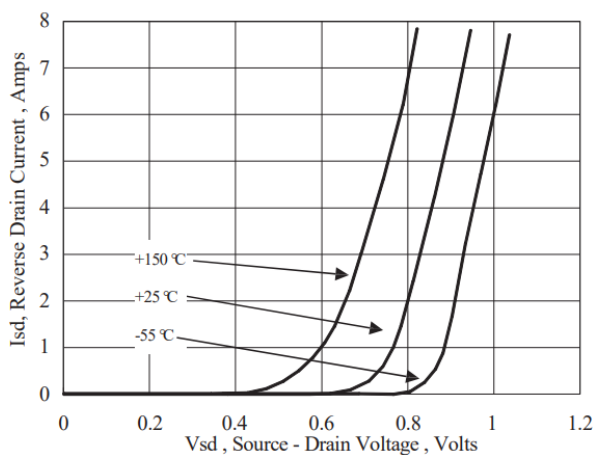


Figure 15 Typical Body Diode Transfer Characteristics

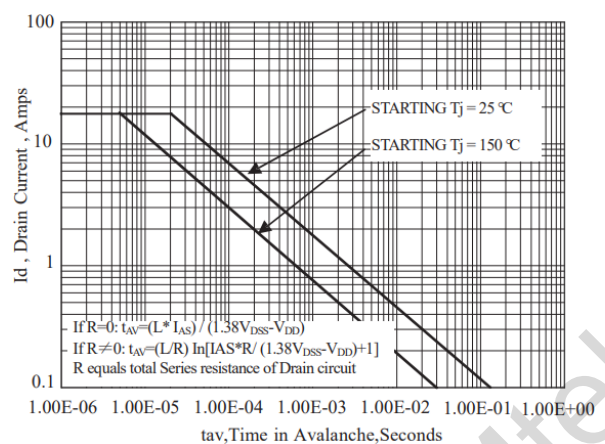


Figure 16 Unclamped Inductive Switching Capability

Test Circuit and Waveform

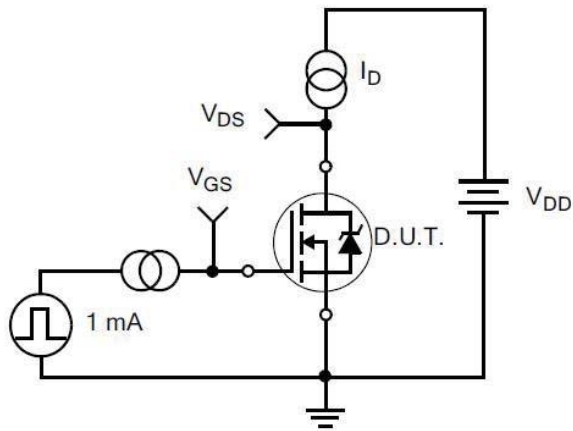


Figure 17. Gate Charge Test Circuit

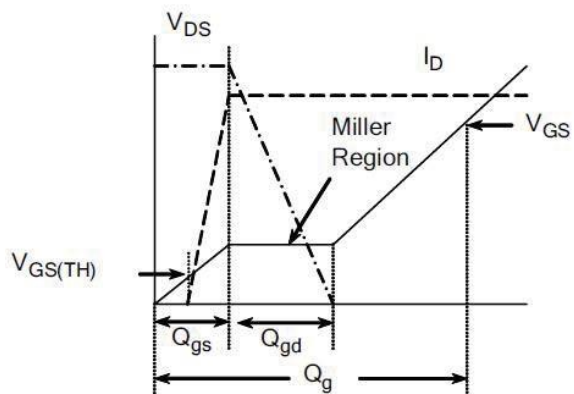


Figure 18. Gate Charge Waveform

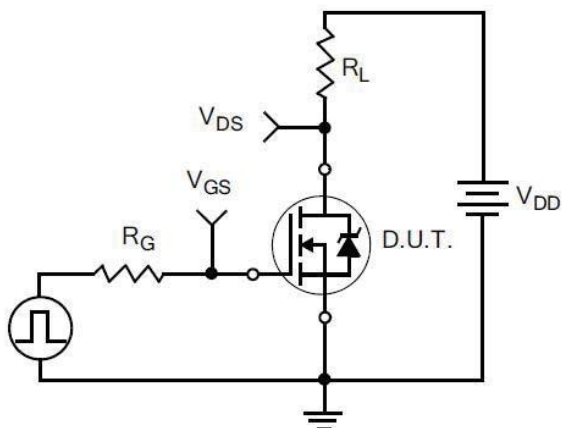


Figure 19. Resistive Switching Test Circuit

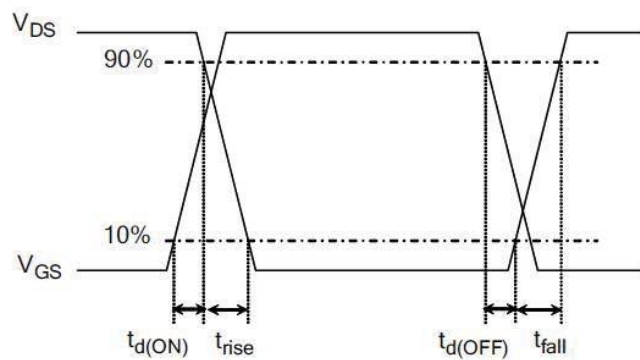


Figure 20. Resistive Switching Waveforms

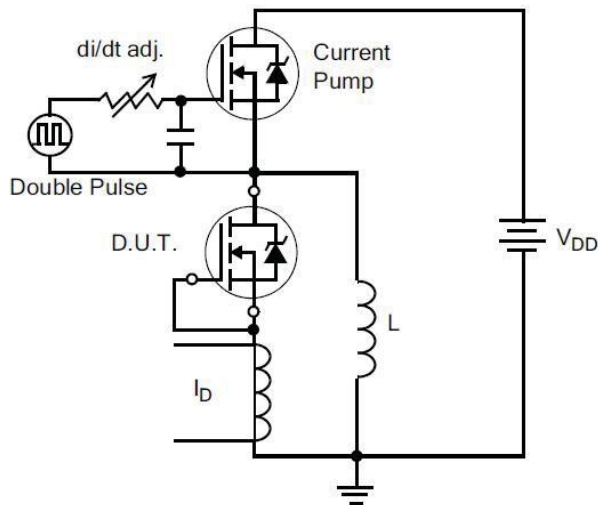


Figure 21. Diode Reverse Recovery Test Circuit

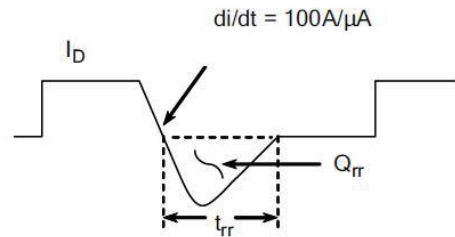


Figure 22. Diode Reverse Recovery Waveform

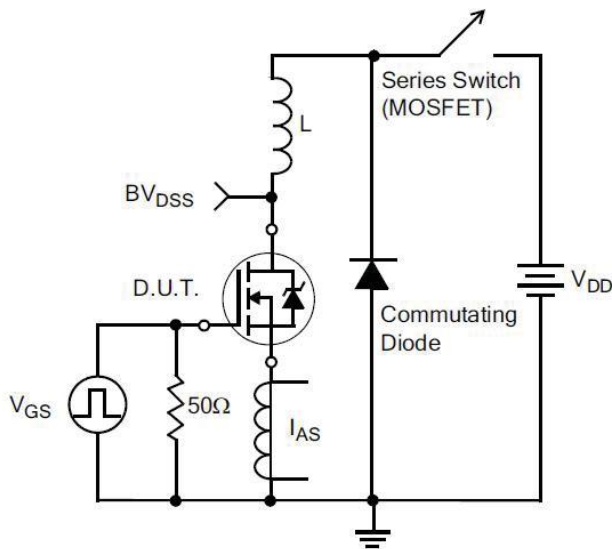


Figure 23. Unclamped Inductive Switching Test Circuit

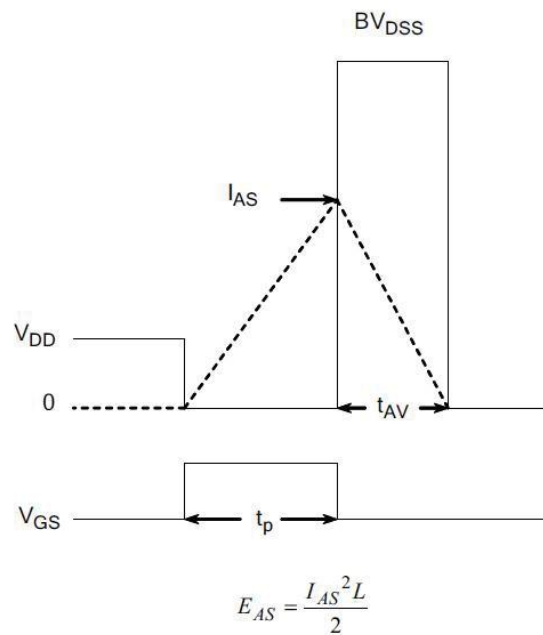
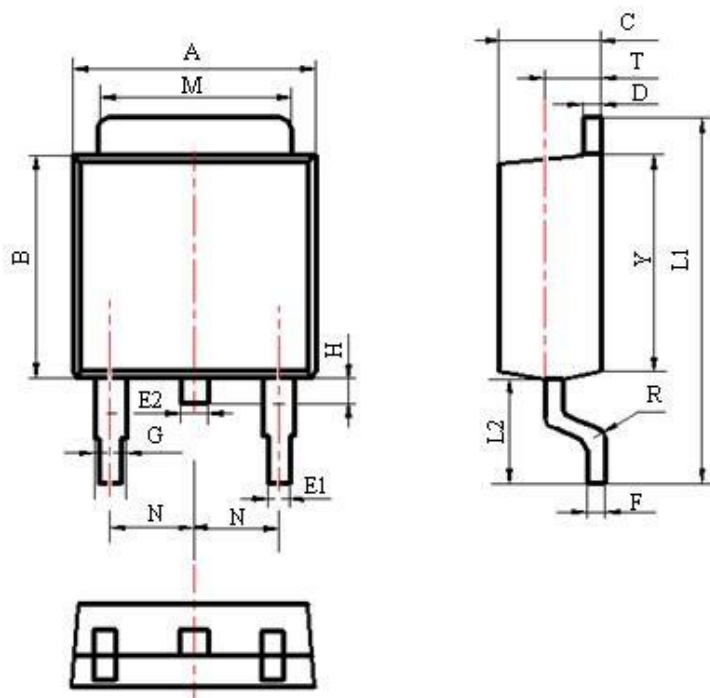


Figure 24. Unclamped Inductive Switching Waveforms

Package Information: TO-252 Package



Items	Values(mm)	
	MIN	MAX
A	6.30	6.80
B	5.20	6.20
C	2.10	2.50
D	0.40	0.60
E1	0.60	0.80
E2	0.70	0.90
F	0.40	0.60
G	0.80	1.00
L1	9.70	10.20
L2	2.70	3.10
H	0.60	0.90
M	5.10	5.50
N	2.09	2.49
R	0.3	
T	1.40	1.60
Y	5.10	6.30

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