500V N-Channel MOSFET

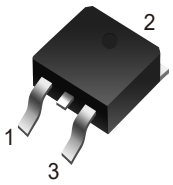
XXW5N50

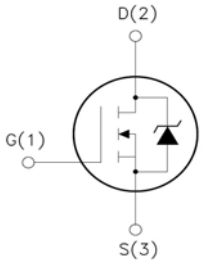
TO-252

RoHS COMPLIANT

Features:

- ☐ Low Intrinsic Capacitances.
- ☐ Excellent Switching Characteristics.
- ☐ Extended Safe Operating Area.
- ☐ Unrivalled Gate Charge :Qg= 15nC (Typ.).
- ☐ BVDSS= 500V,I_D=5 A
- ☐ R_{DS}(on) : 0.9 Ω (Typ.) @V_G=10V
- ☐ 100% Avalanche Tested





1.Gate (G)
2.Drain (D)
3.Source (S)

Absolute Maximum Ratings (Ta=25℃ unless otherwise noted)

Symbol	Parameter		Value	Unit
V_{DSS}	Drain-Source Voltage		500	V
I_D	Drain Current	T_j=25℃	5.0	A
		T_j=100℃	4.7	
$V_{GS(TH)}$	Gate Threshold Voltage		30	V
E_{AS}	Single Pulse Avalanche Energy (note1)		400	mJ
I_{AR}	Avalanche Current (note2)		8.0	A
P_D	Power Dissipation (Tj=25℃)		85	W
T_j	Junction emperatTre(Max)		150	℃
T_{stg}	Storage Temperature		-55~+150	℃
TL	Maximum lead temperature for soldering purpose,1/8’ from case for 5 seconds		300	℃

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JC}$	Thermal Resistance,Junction to Case	-	1.47	℃/W
$R_{\theta JA}$	Thermal Resistance,Junction to Ambient	-	62.5	℃/W

Electrical Characteristics (Ta=25℃ unless otherwise noted)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	I_D=250μA，V_{GS}=0	500	-	-	V
△BVDSS/△TJ	Breakdown Voltage Temperature Coefficient	I_D=250μA ,Reference to 25℃	-	0.6	-	V/℃
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=500V, V_{GS}=0V	-	-	10	μA
		V_{DS}=400V, Tj=125℃			100	
I_{GSSF}	Gate-body leakage Current, Forward	V_{GS}=+30V, V_{DS}=0V	-	-	100	nA
I_{GSSR}	Gate-body leakage Current, Reverse	V_{GS}=-30V, V_{DS}=0V	-	-	-100	
On Characteristics						
$V_{GS(TH)}$	Date Threshold Voltage	I_D=250μA,V_{DS}=V_{GS}	2	-	4	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	I_D=3A,V_{GS}=10V	-	0.9	1.3	Ω
Dynamic Characteristics						
Ciss	Input Capacitance	V_{DS}=25V，V_{GS}=0，f=1.0MHz	-	700	-	pF
Coss	Output Capacitance		-	63	-	
Crss	Reverse Transfer Capacitance		-	9	-	
Switching Characteristics						
Td(on)	Turn-On Delay Time	V_{DD}=250V，I_D=8A R_G=25Ω (Note 3,4)	-	22	70	nS
Tr	Turn-On Rise Time		-	80	170	
Td(off)	Turn-Off Delay Time		-	65	140	
Tf	Turn-Off Rise Time		-	60	130	
Qg	Total Gate Charge	V_{DS}=400V,V_{GS}=10V，I_D=8A (Note 3,4)	-	15	38	nC
Qgs	Gate-Source Charge		-	3.1	-	
Qgd	Gate-Drain Charge		-	4.6	-	
Drain-Source Diode Characteristics and Maximum Ratings						
Is	Max. Diode Forward Current	-	-	-	8	A
I_{SM}	Max. Pulsed Forward Current	-	-	-	24	
V_{SD}	Diode Forward Voltage	I_D=8A	-	-	1.4	V
Trr	Reverse Recovery Time	I_S=8A,V_{GS} =0V diF/dt=100A/μs (Note3)	-	320	-	nS
Qrr	Reverse Recovery Charge		-	1.6	-	μC

Notes : 1, L=0.5mH, IAS= 8A, VDD=50V, RG=25Ω, Starting TJ =25℃
2, Repetitive Rating : Pulse width limited by maximum junction temperature
3, Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%
4, Essentially Independent of Operating Temperature

Typical Electrical And Thermal Characteristics (Curves)

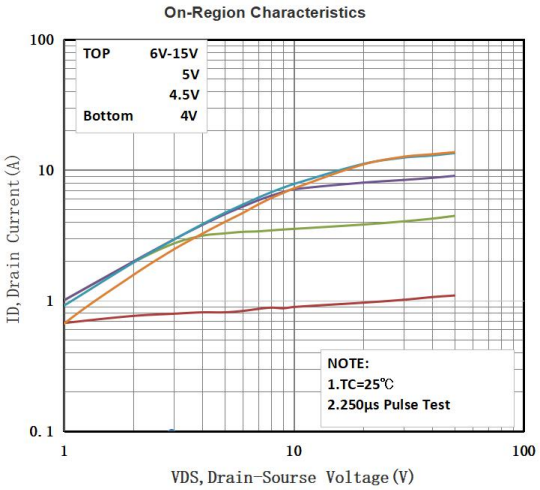


Fig1 Typical Output Characteristics, Tc=25℃

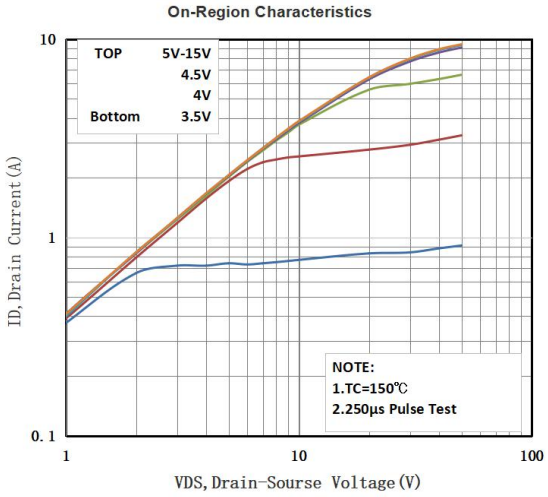


Fig2 Typical Output Characteristics, Tc=150℃

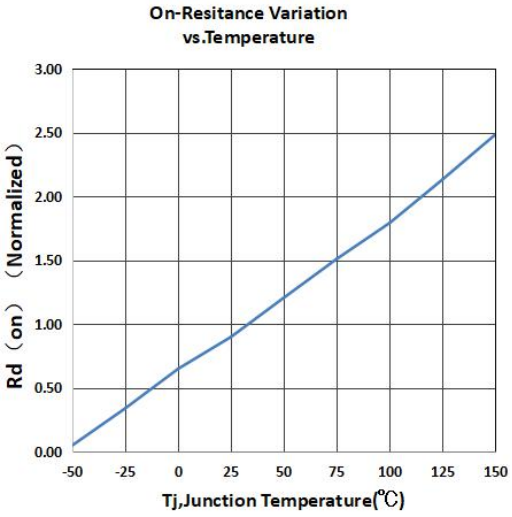


Fig3 Normalized Resistance Vs.Temperature

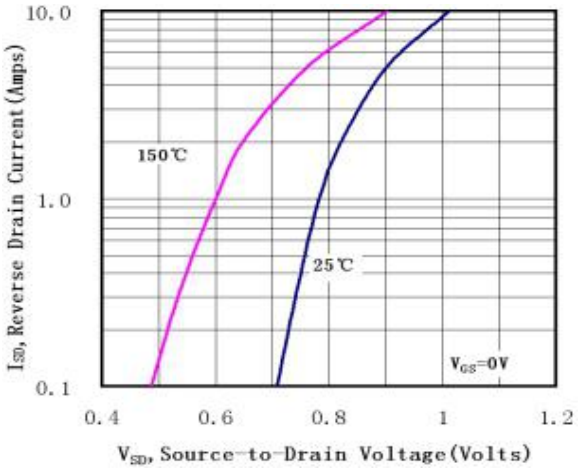


Fig4 Typical Source-Drain Diode Forward Voltage

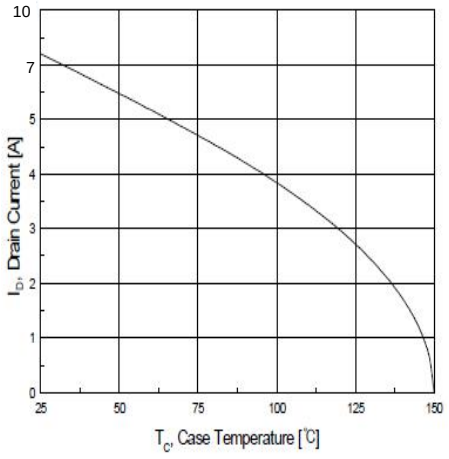


Fig5 Maximum Drain Current Vs.Case Temperature

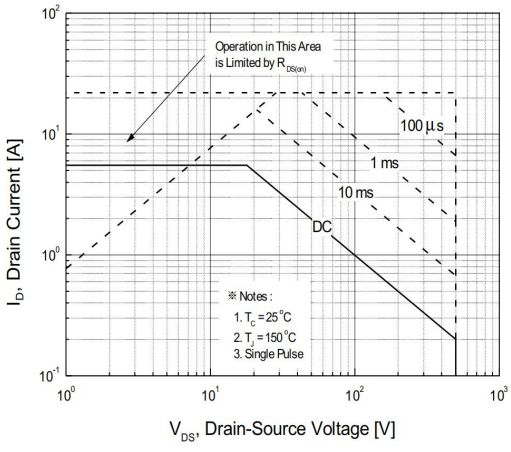


Fig6 Maximum Safe Operating Area

Test Circuit

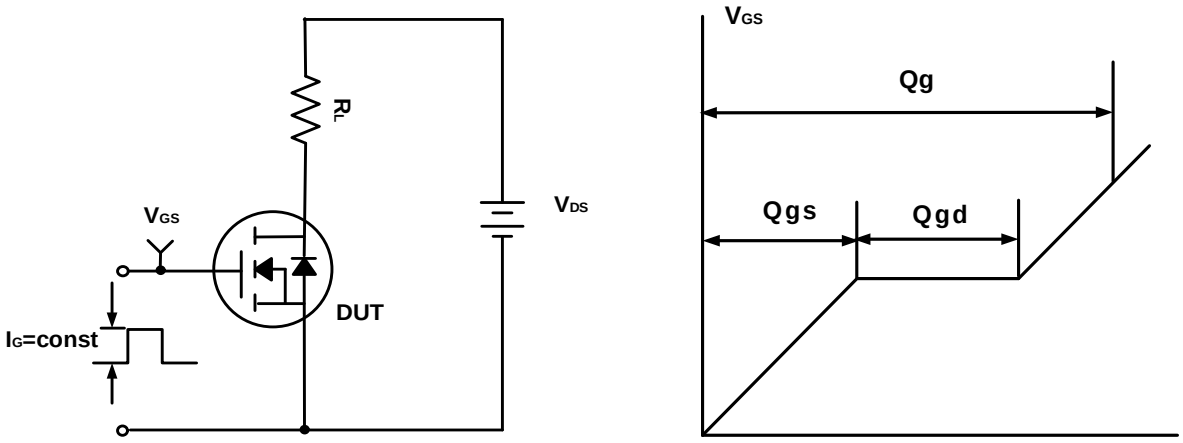


Figure A. Gate Charge Test Circuit & Waveforms

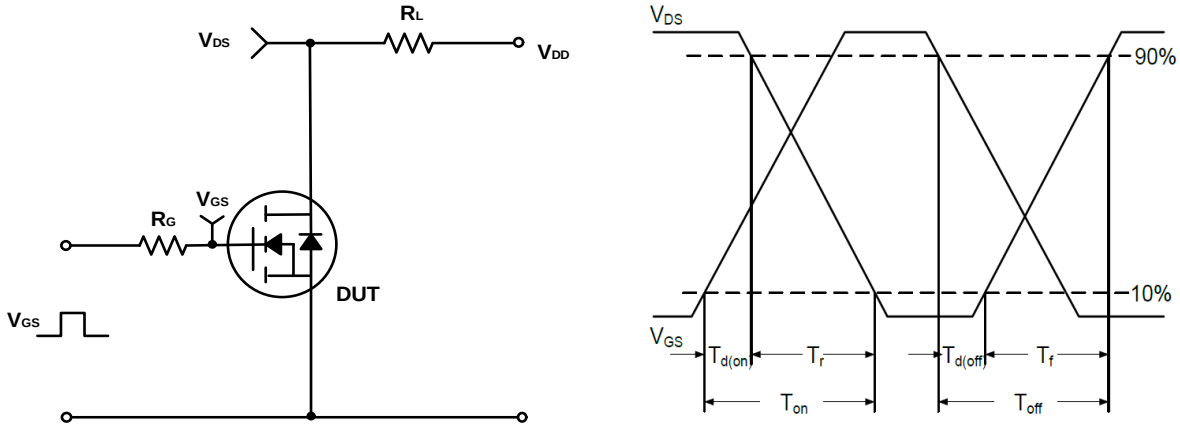


Figure B. Switching Test Circuit & Waveforms

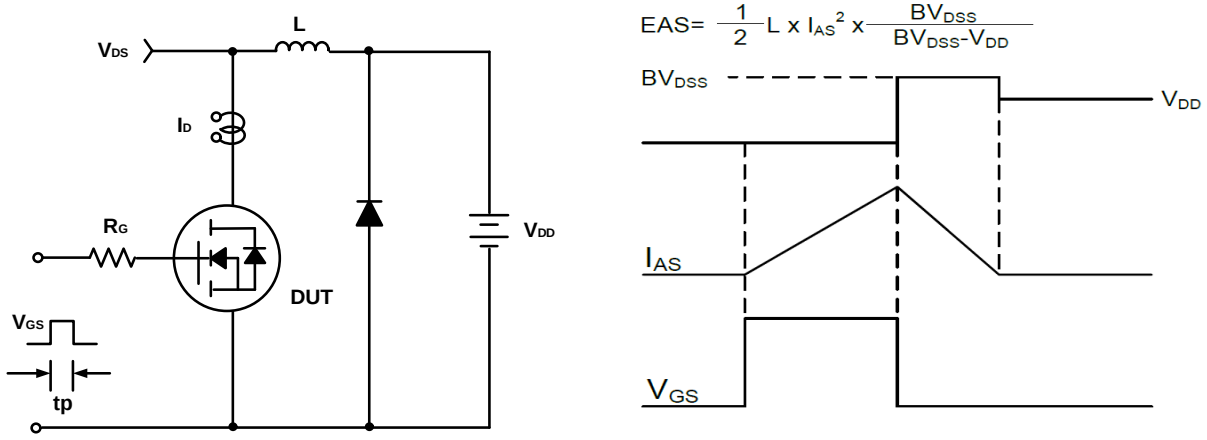
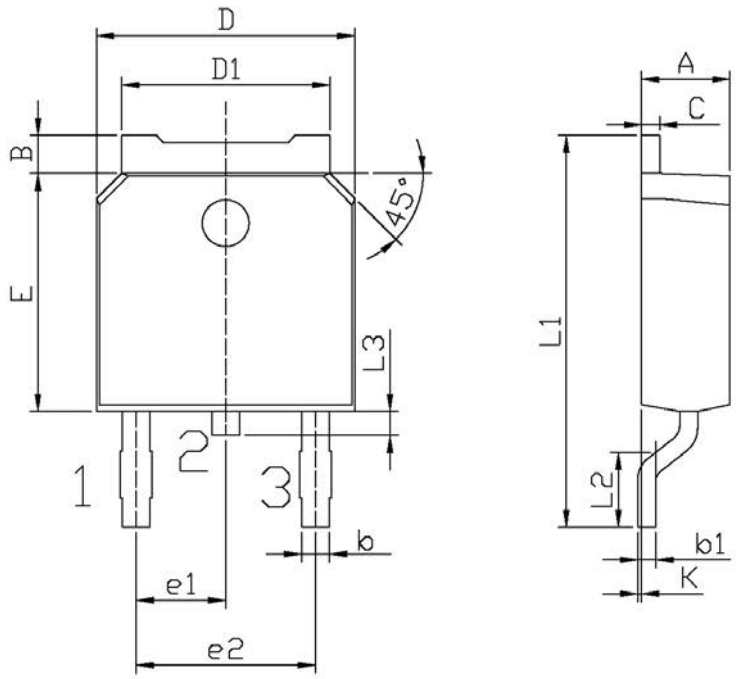


Figure C. Unclamped Inductive Switching Circuit & Waveforms

Package Dimension

TO-252

Unit: mm



单位：mm

Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
A	2.20	2.40	E	5.95	6.25
B	0.95	1.25	e1	2.24	2.34
b	0.70	0.90	e2	4.43	4.73
b1	0.45	0.55	L1	9.85	10.35
C	0.45	0.55	L2	1.25	1.75
D	6.45	6.75	L3	0.60	0.90
D1	5.20	5.40	K	0.00	0.10