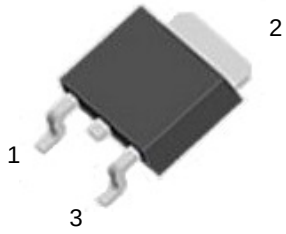
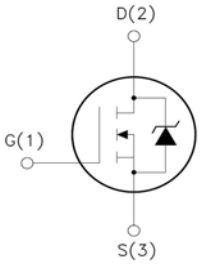
XXW9N20

TO-252



Features

- ☐ Low Intrinsic Capacitances
- ☐ Excellent Switching Characteristics
- ☐ Extended Safe Operating Area
- ☐ Unrivalled Gate Charge : 22 nC (Typ.)
- ☐ BVDSS=200V,ID=9A
- ☐ Lower $R_{DS(on)}$: 0.4 Ω (Max) @VG=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		200	V
I_D	Drain Current	T_j=25℃	9.0	A
		T_j=100℃	5.7	
$V_{GS(TH)}$	Gate Threshold Voltage		±30	V
E_{AS}	Single Pulse Avalanche Energy (note1)		160	mJ
I_{AR}	Avalanche Current (note2)		9.0	A
P_D	Power Dissipation (Tj=25℃)		72	W
T_j	Junction Temperature(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	-	1.74	℃/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	Units
Off Characteristics						
BV_{DSS}	Drain-Sourse Breakdown Voltage	ID=250μA，VGS=0	200	--	--	V
$\triangle BV_{DSS}/\triangle T_J$	Breakdown Voltage Temperature Conficient	I_D=250μA ,Reference to 25℃	--	0.55	--	V/℃
IDSS	Zero Gate Voltage Drain Current	Vds=200V, Vgs=0V	--	--	1	μA
		Vds=160V, Tc=125℃			10	μA
IGSSF	Gate-body leakage Current, Forward	Vgs=+30V, Vds=0V	--	--	100	nA
IGSSR	Gate-body leakage Current, Reverse	Vgs=-30V, Vds=0V	--	--	-100	nA
On Characteristics						
$V_{GS(th)}$	Date Threshold Voltage	Id=250uA,Vds=Vgs	2	--	4	V
$R_{DS(on)}$	Static Drain-Sourse On-Resistance	Id=4.5A,Vgs=10V	--	--	0.4	Ω
Dynamic Characteristics						
Ciss	Input Capacitance	VDS=25V，VGS=0，f=1.0MHz	--	550	720	pF
Coss	Output Capacitance		--	85	110	pF
Crss	Reverse Transfer Capacitance		--	22	29	pF
Switching Characteristics						
Td(on)	Turn-On Delay Time	VDD=100V，ID=9A，RG=25Ω (Note 3,4)	--	11	25	nS
Tr	Turn-On Rise Time		--	70	140	nS
Td(off)	Turn-Off Delay Time		--	60	120	nS
Tf	Turn-Off Fall Time		--	65	130	nS
Qg	Total Gate Charge	VDS=160,VGS=10V，ID=9A (Note 3,4)	--	22	30	nC
Qgs	Gate-Sourse Charge		--	4	--	nC
Qgd	Gate-Drain Charge			11	--	nC
Drain-Sourse Diode Characteristics and Maximum Ratings						
I_S	Maximun Continuous Drain-Sourse Diode Forward Current		--	--	9	A
I_{SM}	Maximun Plused Drain-Sourse DiodeForwad Current		--	--	36	A
V_{SD}	Drain-Sourse Diode Forward Voltage	Id=9A	--	--	1.45	V
trr	Reverse Recovery Time	I_S=9.0A,V_{GS} =0V di_F/dt=100A/μs (Note3)	--	140	--	nS
Qrr	Reverse Recovery Charge		--	2.2	--	μC

*Notes
1, L=8mH, IAS=9A, VDD=50V, RG=25Ω, Starting TJ =25°C
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 Characteristics

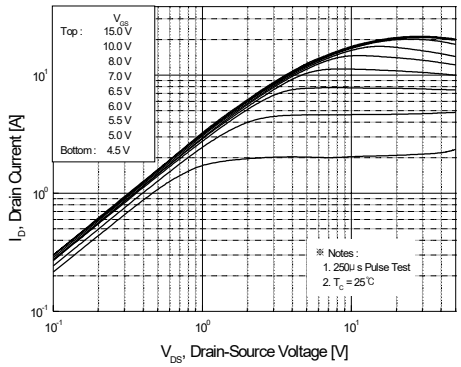


Figure 1. On-Region Characteristics

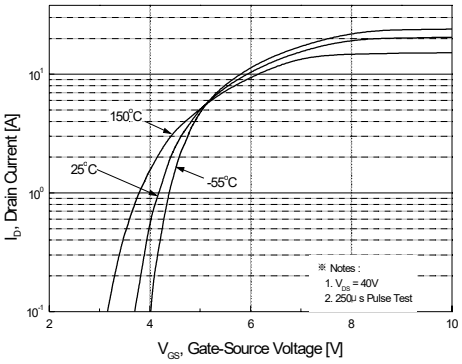


Figure 2. Transfer Characteristics

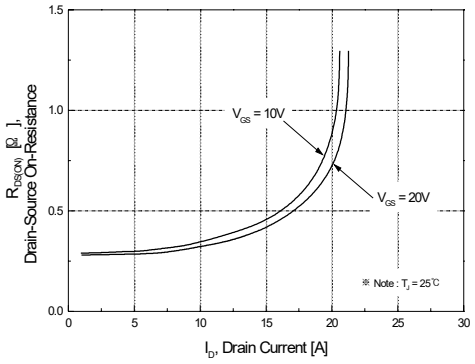


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

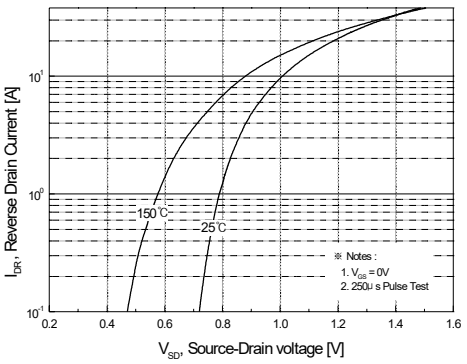


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

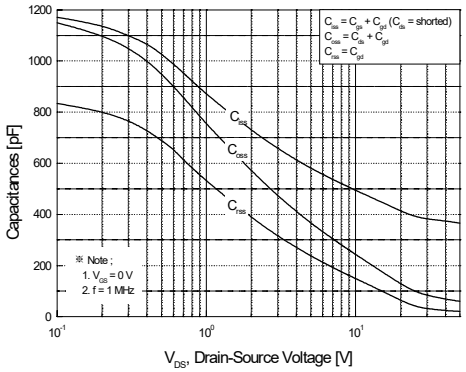


Figure 5. Capacitance Characteristics

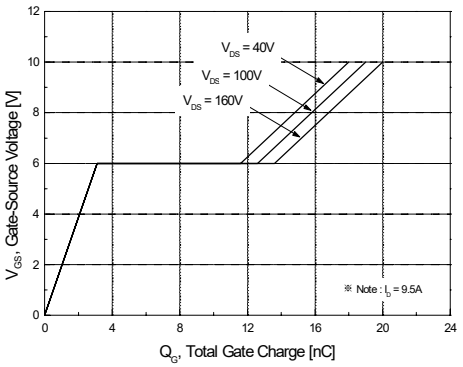


Figure 6. Gate Charge Characteristics

Typical Characteristics (Continued)

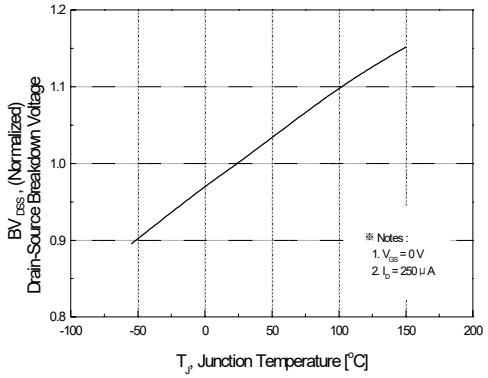


Figure 7. Breakdown Voltage Variation vs Temperature

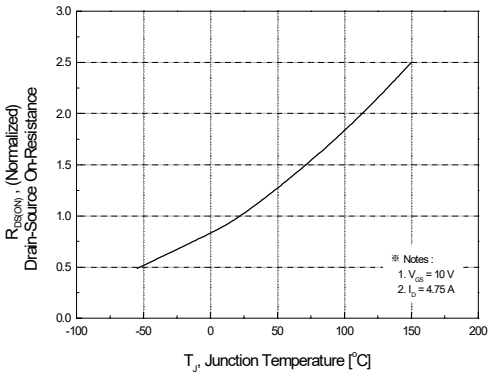


Figure 8. On-Resistance Variation vs Temperature

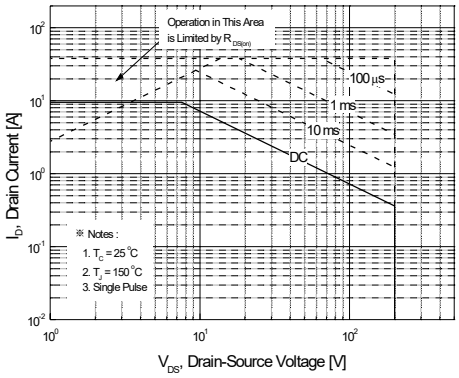


Figure 9-1. Maximum Safe Operating Area for WGP9N20

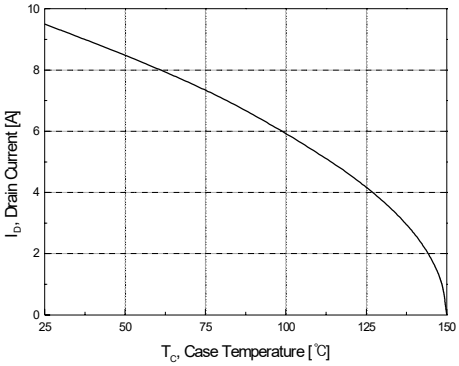


Figure 10. Maximum Drain Current vs Case Temperature

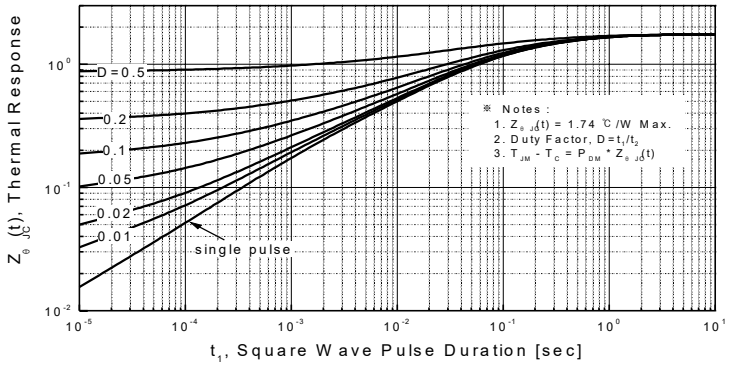
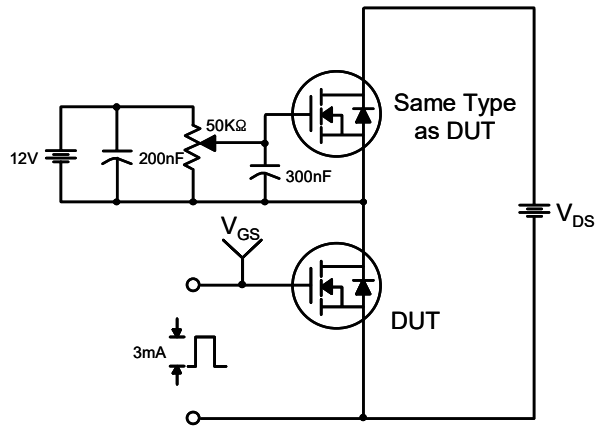
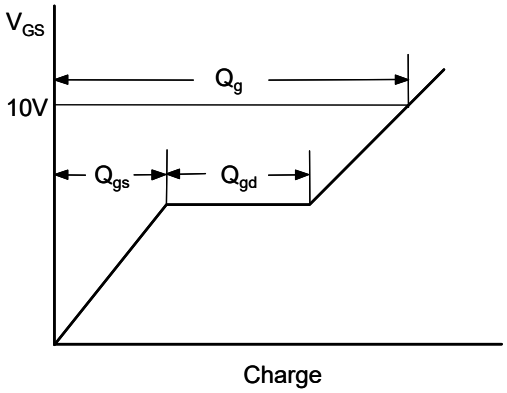


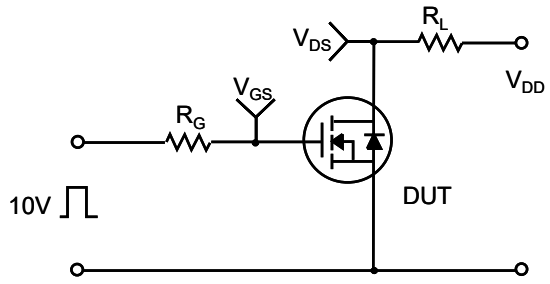
Figure 11-1. Transient Thermal Response Curve for WGP9N20

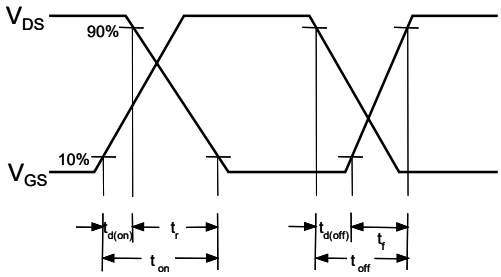
Gate Charge Test Circuit & Waveform



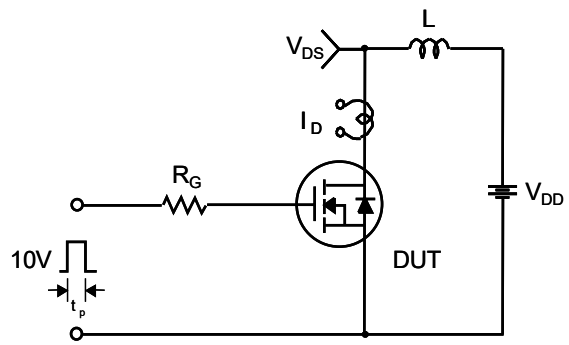


Resistive Switching Test Circuit & Waveforms

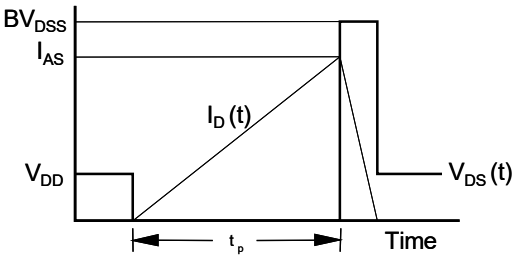




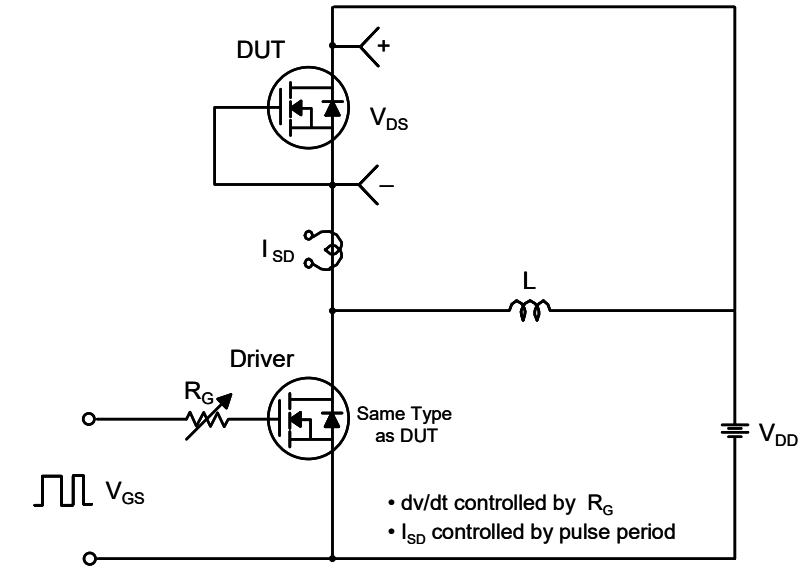
Unclamped Inductive Switching Test Circuit & Waveforms

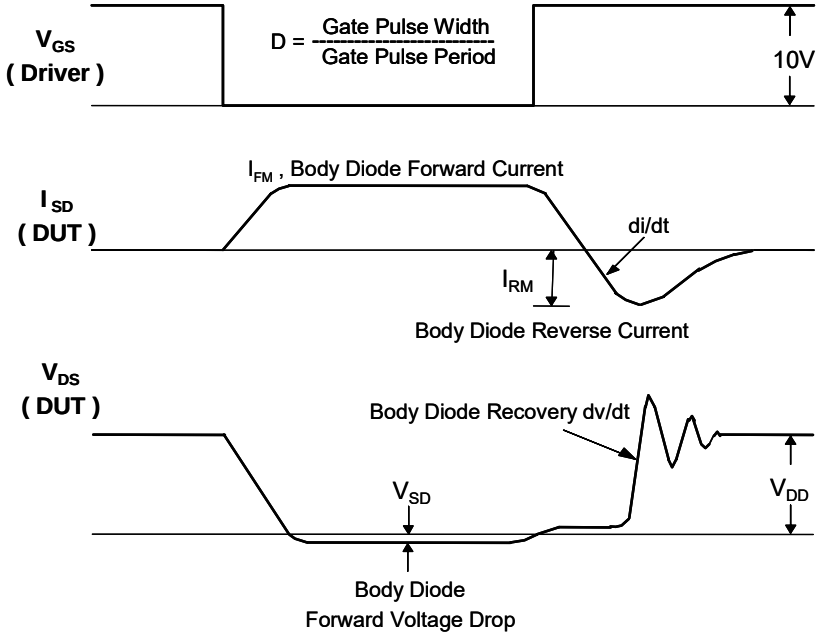


$$E_{AS} = \frac{1}{2} L I_{AS}^2 \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$



Peak Diode Recovery dv/dt Test Circuit & Waveforms





Package Dimension

TO-252

Unit: mm