

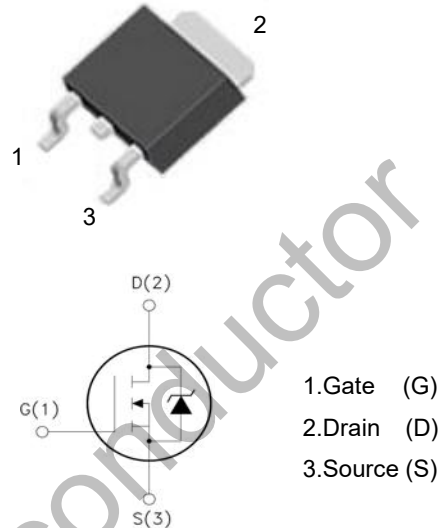


WGD13N50SE

Features:

- Low Intrinsic Capacitances
- Excellent Switching Characteristics
- Extended Safe Operating Area
- Unrivalled Gate Charge :Qg= 50nC (Typ.)
- BVDSS=500V, ID=13A
- R_{DS(on)} :0.50Ω (Max) @VG=10V
- 100% Avalanche Tested

TO-252


Absolute Maximum Ratings (Ta=25°C unless otherwise noted)

Symbol	Parameter	Value	Unit
V _{DSS}	Drain-Source Voltage	500	V
I _D	Drain Current	T _j =25°C	13
		T _j =100°C	7.9
V _{GS(TH)}	Gate Threshold Voltage	±30	V
E _{AS}	Single Pulse Avalanche Energy (note1)	500	mJ
I _{AR}	Avalanche Current (note2)	13	A
P _D	Power Dissipation (T _j =25°C)	50	W
T _j	Junction Temperature(Max)	150	°C
T _{stg}	Storage Temperature	-55~+150	°C
TL	Maximum lead temperature for soldering purpose, 1/8" from case for 5 seconds	300	°C

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
R _{θJC}	Thermal Resistance, Junction to Case	-	2.50	°C/W
R _{θJA}	Thermal Resistance, Junction to Ambient	-	62.5	°C/W

Electrical Characteristics (Ta=25°C 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
ΔBV _{DSS} /ΔT _J	Breakdown Voltage Temperature Coefficient	I _D =250μA, Reference to 25°C	-	0.65	-	V/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =500V, V _{GS} =0V	-	-	1	μA
		V _{DS} =400V, T _J =125°C	-	-	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 =6.5A, V _{GS} =10V	-	0.45	0.50	Ω
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0, f=1.0MHz	-	1680	-	pF
C _{oss}	Output Capacitance		-	120	-	
C _{rss}	Reverse Transfer Capacitance		-	12	-	
Switching Characteristics						
T _{d(on)}	Turn-On Delay Time	V _{DD} =250V, I _D =13A R _G =25Ω (Note 3,4)	-	40	-	nS
T _r	Turn-On Rise Time		-	140	-	
T _{d(off)}	Turn-Off Delay Time		-	125	-	
T _f	Turn-Off Rise Time		-	85	-	
Q _g	Total Gate Charge	V _{DS} =400V, V _{GS} =10V, I _D =13A (Note 3,4)	-	50	-	nC
Q _{gs}	Gate-Source Charge		-	9.8	-	
Q _{gd}	Gate-Drain Charge		-	18.5	-	
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Max. Diode Forward Current	-	-	-	13	A
I _{SM}	Max. Pulsed Forward Current	-	-	-	52	
V _{SD}	Diode Forward Voltage	I _D =13A	-	-	1.4	V
T _{rr}	Reverse Recovery Time	I _S =13A, V _{GS} =0V diF/dt=100A/μs	-	420	-	nS
Q _{rr}	Reverse Recovery Charge	(Note3)	-	4.2	-	μC

Notes : 1, L=17.1mH, I_{AS}=13A, V_{DD}=50V, R_G=25Ω, Starting T_J=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

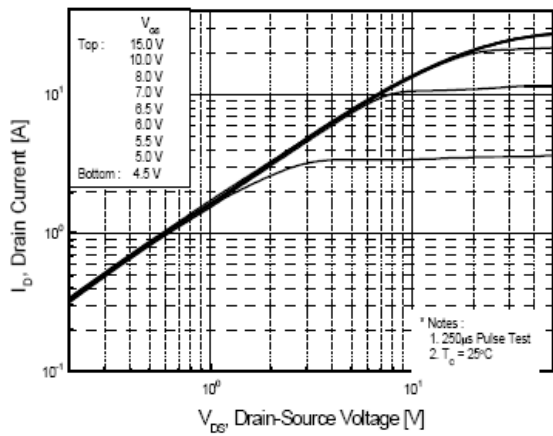


Fig1 Typical Output Characteristics, Tc=25°C

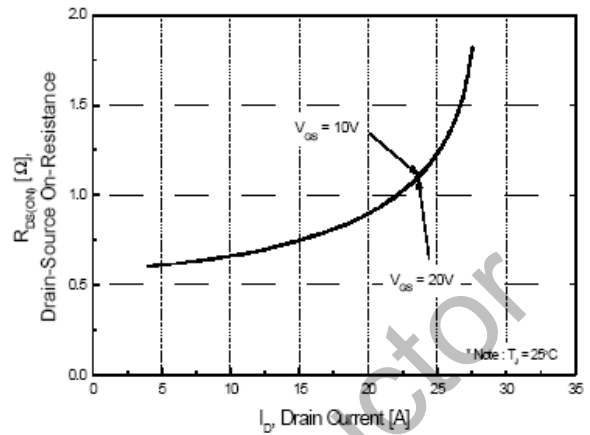


Fig2 On-Resistance Vs. Drain Current and Gate Voltage

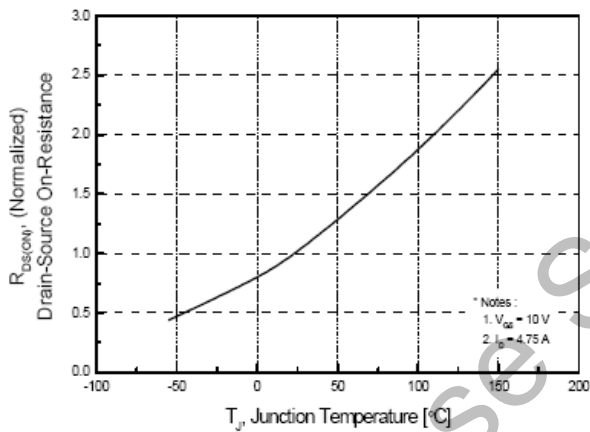


Fig3 Normalized On-Resistance Vs. Temperature

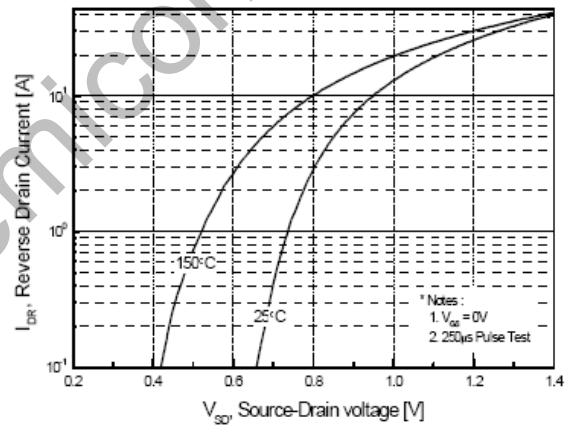


Fig4 Typical Source-Drain Diode Forward Voltage

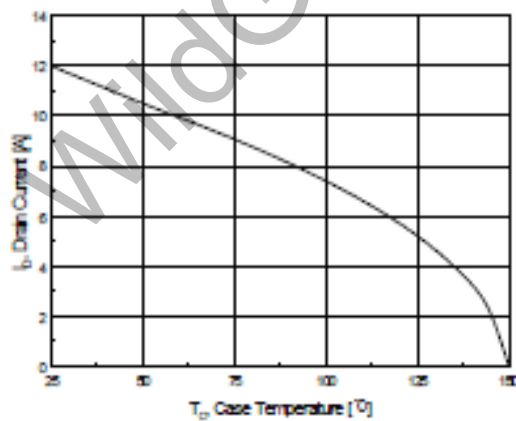


Fig5 Maximum Drain Current Vs. Case Temperature

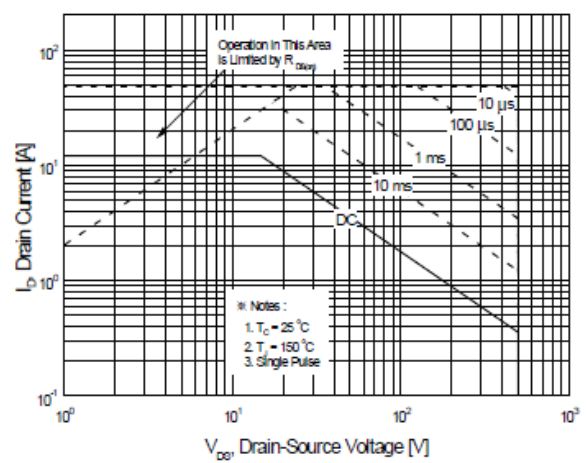
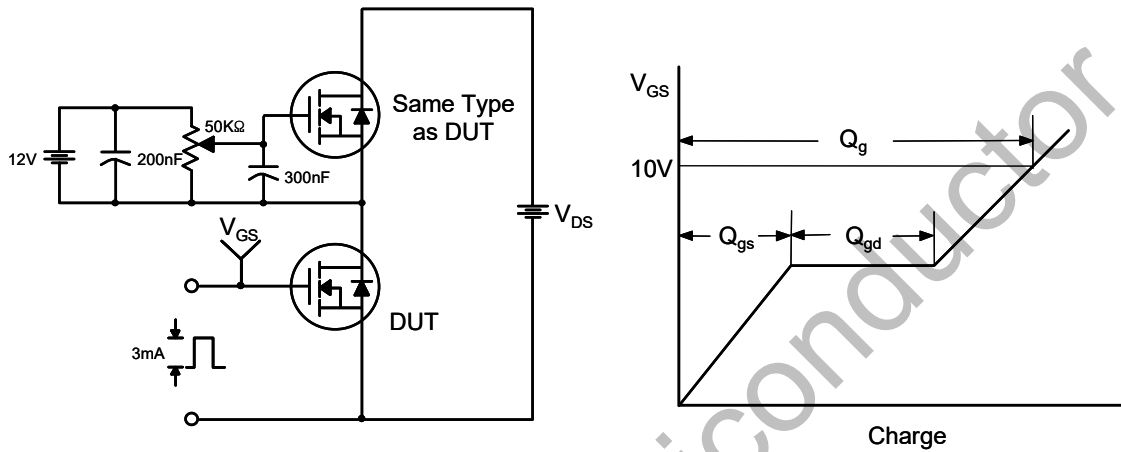
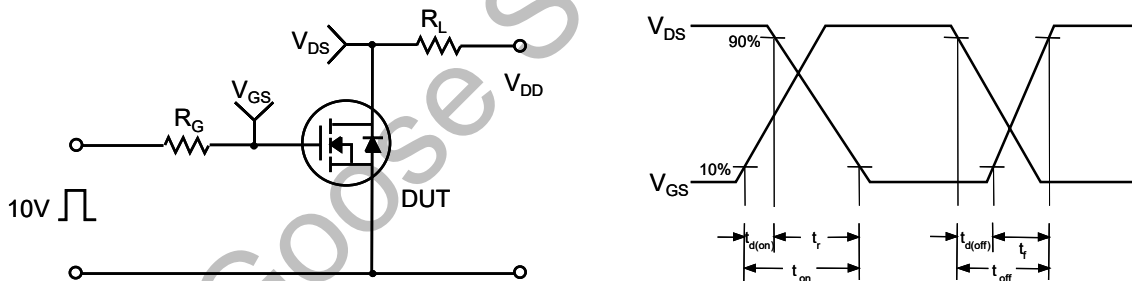


Fig6 Maximum Safe Operating Area

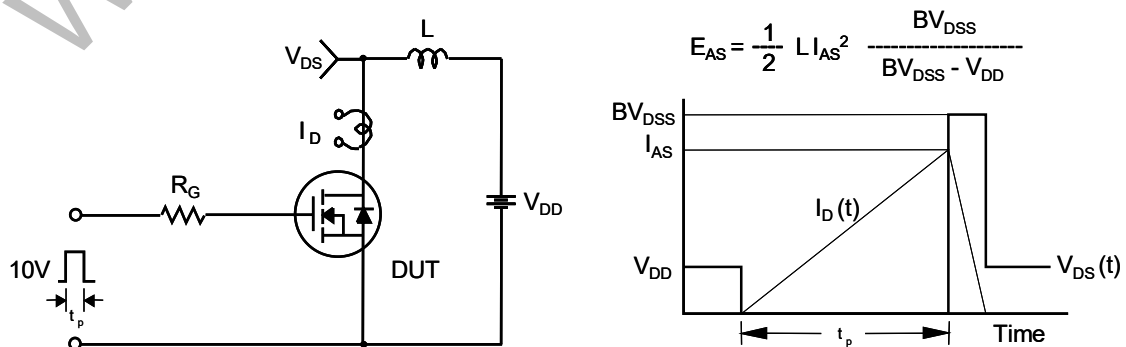
Gate Charge Test Circuit & Waveform



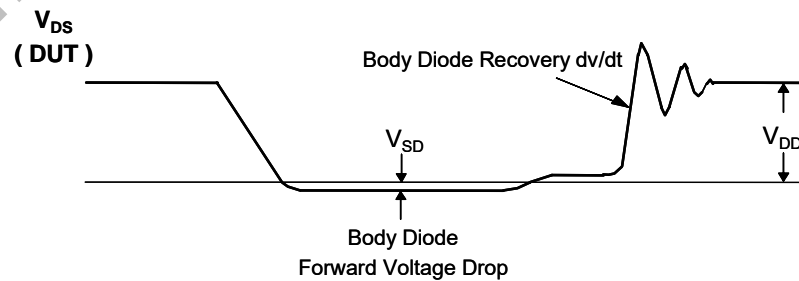
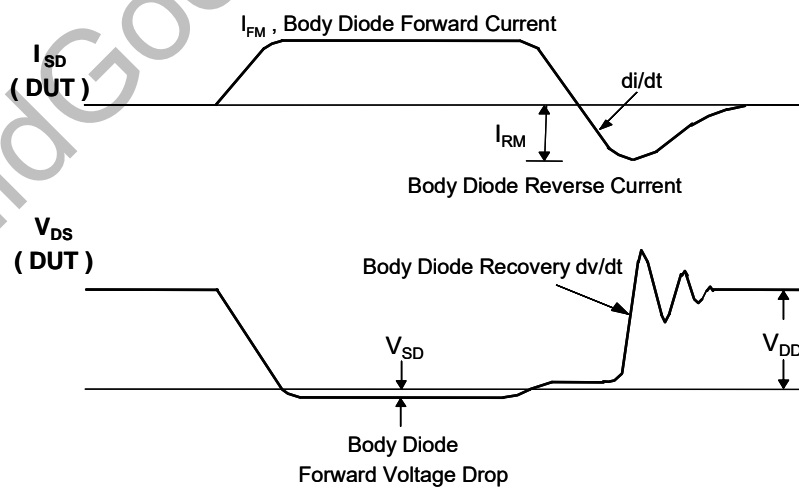
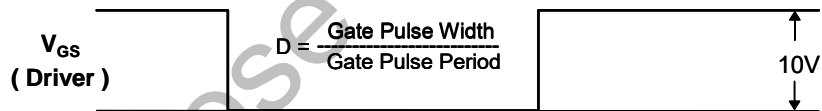
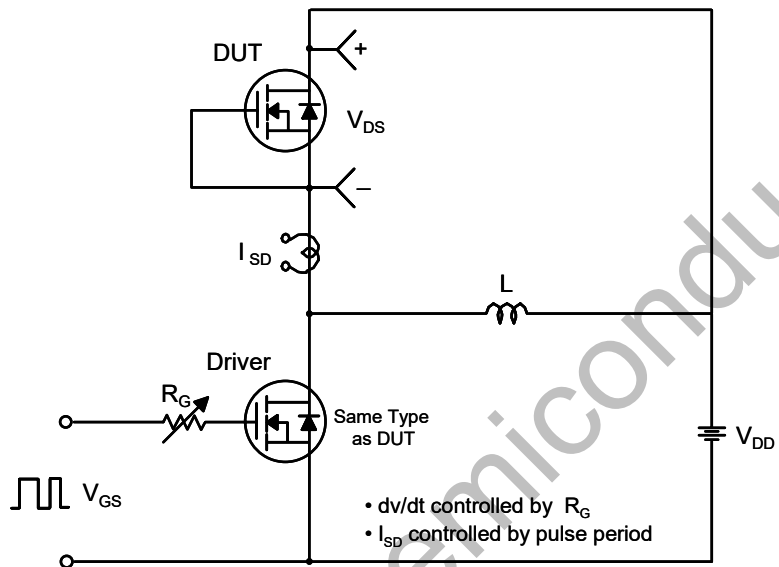
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



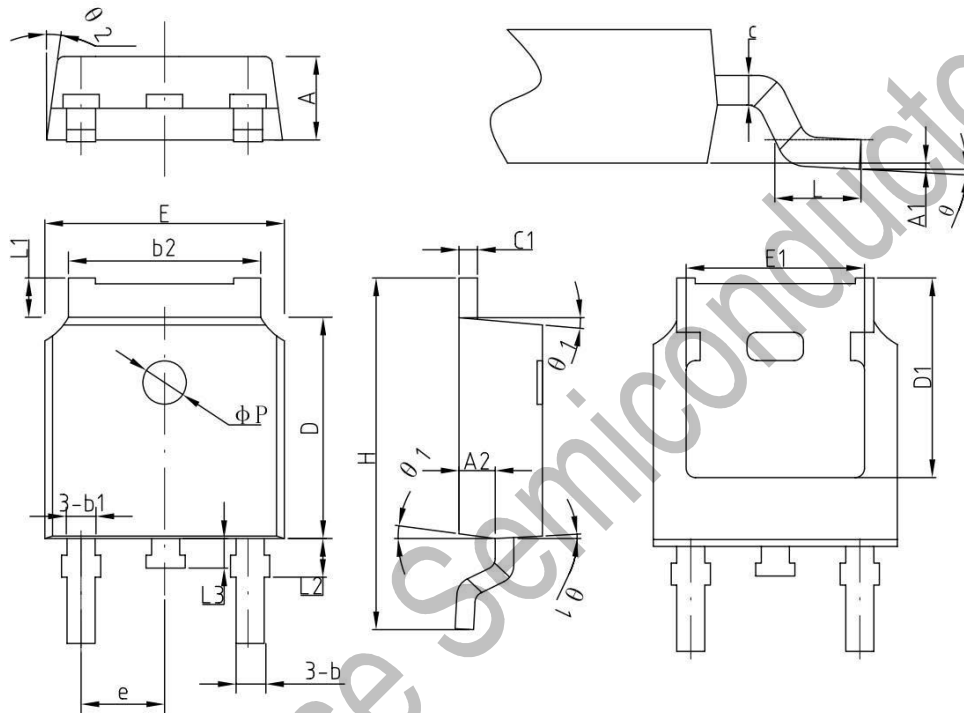
Peak Diode Recovery dv/dt Test Circuit & Waveforms



Package Dimension

TO-252

Unit: mm



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	2.2	2.30	2.38
A1	0	—	0.10
A2	0.90	1.01	1.10
b	0.71	0.76	0.86
b1		0.76	
b2	5.13	5.33	5.46
c	0.47	0.50	0.60
c1	0.47	0.50	0.60
D	6.0	6.10	6.20
D1	—	5.30	—
E	6.50	6.60	6.70
E1	—	4.80	—
e	2.286BSC		
H	9.70	10.10	10.40
L	1.40	1.50	1.70
L1	0.90	—	1.25
L2		1.05	
L3		0.8	
φP		1.2	
θ	0°	—	8°
θ 1	5°	7°	9°
θ 2	5°	7°	9°

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