Advanced Power MOSFET

SFF9250L

FEATURES

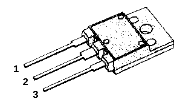
- ❑ Logic-Level Gate Drive
- ❑ Avalanche Rugged Technology
- ❑ Rugged Gate Oxide Technology
- ❑ Lower Input Capacitances
- ❑ Improved Gate Charge
- ❑ Extended Safe Operating Area
- ❑ Lower Leakage Current : 10uA (Max.) @ V_{DS}=-200V
- ❑ Lower $R_{DS(ON)}$: 0.175 Ω (Typ.)

BV_{DSS} = -200 V

$R_{DS(on)}$ = 0.23 Ω

I_D = -12.6 A

TO-3PF



1.Gate 2. Drain 3. Source

Absolute Maximum Ratings

Symbol	Characteristic	Value	Units
V_{DSS}	Drain-to-Source Voltage	-200	V
I_D	Continuous Drain Current (T_C=25 °C)	-12.6	A
	Continuous Drain Current (T_C=100 °C)	-7.9	
I_{DM}	Drain Current-Pulsed ①	-50.4	A
V_{GS}	Gate-to-Source Voltage	±20	V
E_{AS}	Single Pulsed Avalanche Energy ②	990	mJ
I_{AR}	Avalanche Current ①	-12.6	A
E_{AR}	Repetitive Avalanche Energy ①	20.4	mJ
dv/dt	Peak Diode Recovery dv/dt ③	-5.0	V/ns
P_D	Total Power Dissipation (T_C=25 °C)	90	W
	Linear Derating Factor	0.72	W/ °C
T_J , T_{STG}	Operating Junction and Storage Temperature Range	- 55 to +150	°C
T_L	Maximum Lead Temp. for Soldering Purposes, 1/8″ from case for 5-seconds	300	

Thermal Resistance

Symbol	Characteristic	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	--	0.61	°C /W
$R_{\theta JA}$	Junction-to-Ambient	--	40	

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

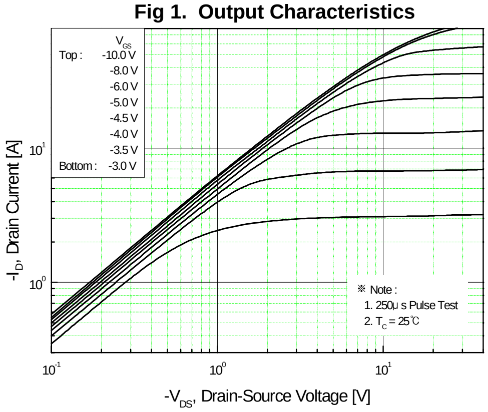
Symbol	Characteristic	Min.	Typ.	Max.	Units	Test Condition
BV_{DSS}	Drain-Source Breakdown Voltage	-200	--	--	V	V_{GS}=0V,I_D=-250μA
$\Delta BV/\Delta T_J$	Breakdown Voltage Temp. Coeff.	--	-0.17	--	V/ °C	I_D=-250μA ***See Fig 7***
$V_{GS(th)}$	Gate Threshold Voltage	-1.0	--	-2.0	V	V_{DS}=-5V,I_D=-250μA
I_{GSS}	Gate-Source Leakage , Forward	--	--	100	nA	V_{GS}=-20V
	Gate-Source Leakage , Reverse	--	--	-100		V_{GS}=20V
I_{DSS}	Drain-to-Source Leakage Current	--	--	10	μA	V_{DS}=-200V
		--	--	100		V_{DS}=-160V,T_C=125 °C
$R_{DS(on)}$	Static Drain-Source On-State Resistance	--	.175	0.23	Ω	V_{GS}=-5V,I_D=-6.3A ④
g_{fs}	Forward Transconductance	--	13	--	S	V_{DS}=-40V,I_D=-6.3A ④
C_{iss}	Input Capacitance	--	2500	3250	pF	V_{GS}=0V,V_{DS}=-25V,f =1MHz ***See Fig 5***
C_{oss}	Output Capacitance	--	400	520		
C_{rss}	Reverse Transfer Capacitance	--	210	270		
$t_{d(on)}$	Turn-On Delay Time	--	20	50	ns	V_{DD}=-100V,I_D=-12.6A, R_G=6.2Ω ***See Fig 13*** ④ ⑤
t_r	Rise Time	--	150	310		
$t_{d(off)}$	Turn-Off Delay Time	--	100	210		
t_f	Fall Time	--	65	140		
Q_g	Total Gate Charge	--	90	120	nC	V_{DS}=-160V,V_{GS}=-5V, I_D=-12.6A ***See Fig 6 & Fig 12*** ④ ⑤
Q_{gs}	Gate-Source Charge	--	12	--		
Q_{gd}	Gate-Drain(Miller) Charge	--	54	--		

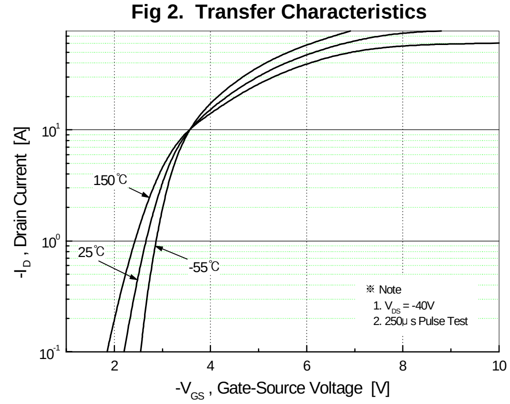
Source-Drain Diode Ratings and Characteristics

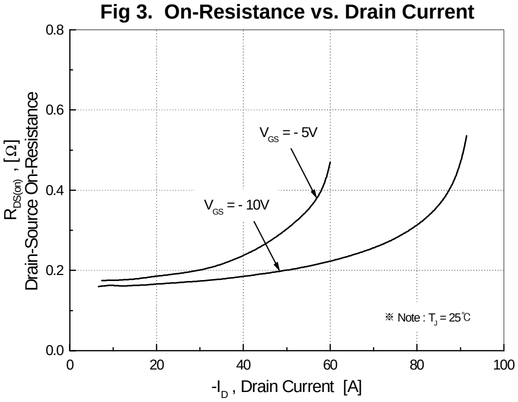
Symbol	Characteristic	Min.	Typ.	Max.	Units	Test Condition
I_S	Continuous Source Current	--	--	-12.6	A	Integral reverse pn-diode in the MOSFET
I_{SM}	Pulsed-Source Current ①	--	--	-50.4		
V_{SD}	Diode Forward Voltage ④	--	--	-1.5	V	T_J=25 °C,I_S=-12.6A,V_{GS}=0V
t_{rr}	Reverse Recovery Time	--	260	--	ns	T_J=25 °C,I_F=-19.5A,V_{DD}=-160V
Q_{rr}	Reverse Recovery Charge	--	2.8	--	μC	di_F/dt=100A/μs ④

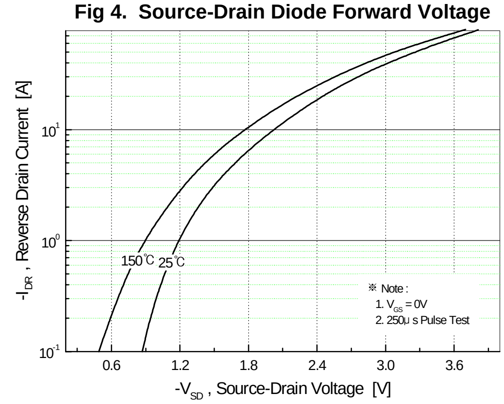
Notes ;

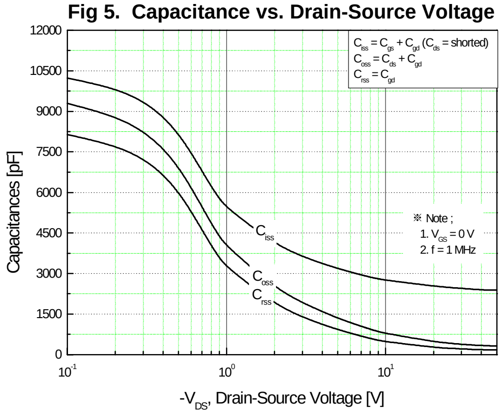
① Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature
② L=3.9mH, I_{AS}=-19.5A, V_{DD}=-50V, R_G=27Ω, Starting T_J =25℃
③ I_{SD}≤-19.5A, di/dt≤500A/μs, V_{DD}≤BV_{DSS} , Starting T_J =25℃
④ Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%
⑤ Essentially Independent of Operating Temperature











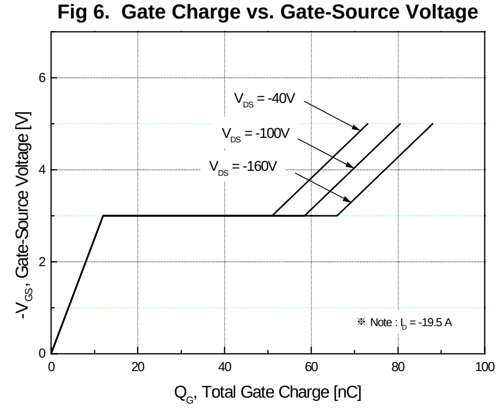


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Fig 7. Breakdown Voltage vs. Temperature

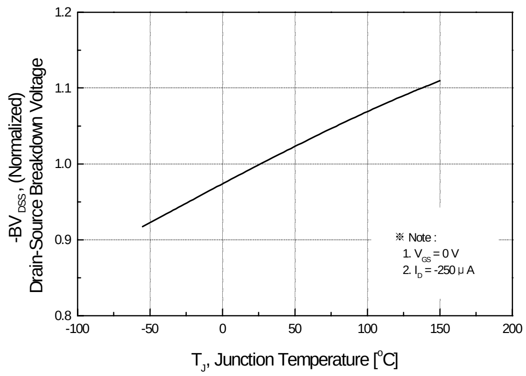


Fig 8. On-Resistance vs. Temperature

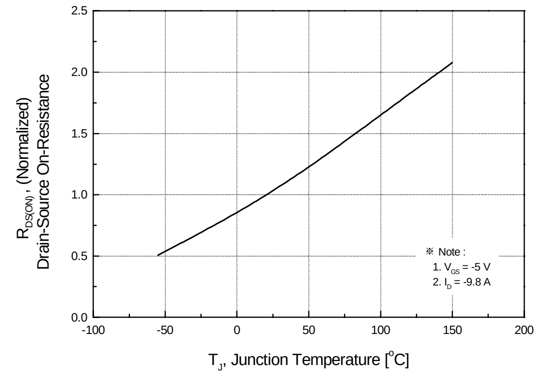


Fig 9. Max. Safe Operating Area

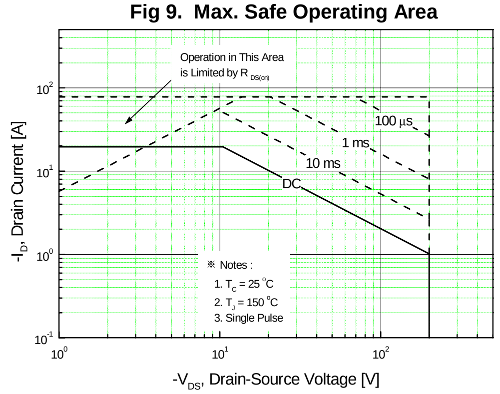


Fig 10. Max. Drain Current vs. Case Temperature

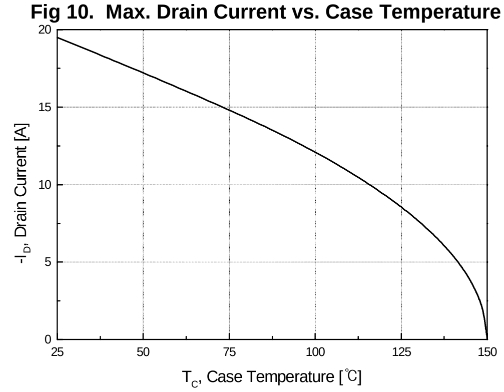


Fig 11. Thermal Response

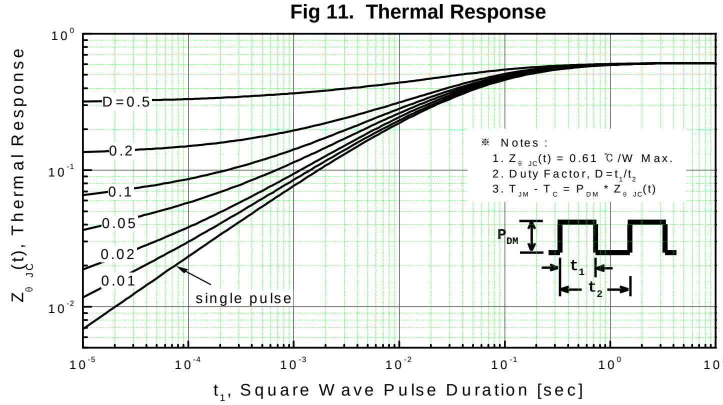


Fig 12. Gate Charge Test Circuit & Waveform

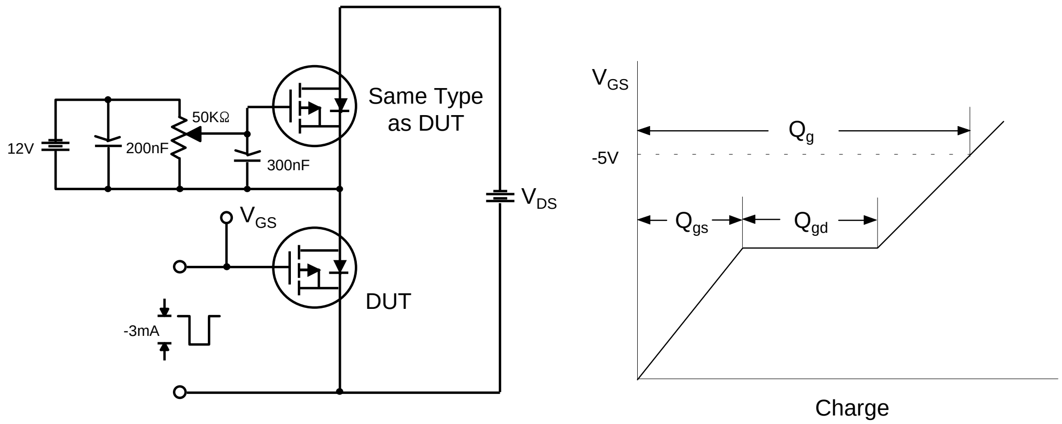


Fig 13. Resistive Switching Test Circuit & Waveforms

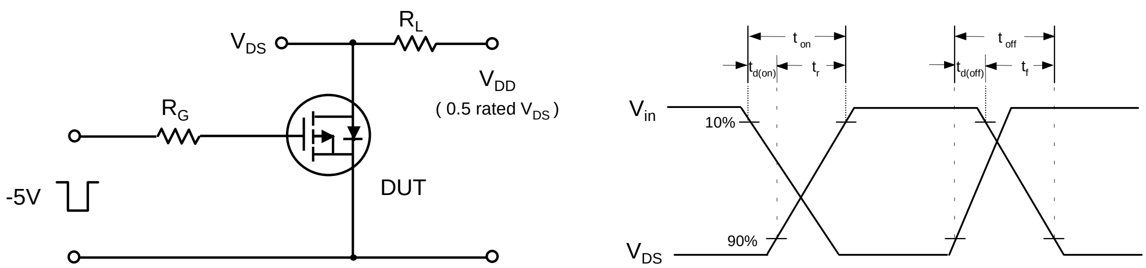


Fig 14. Unclamped Inductive Switching Test Circuit & Waveforms

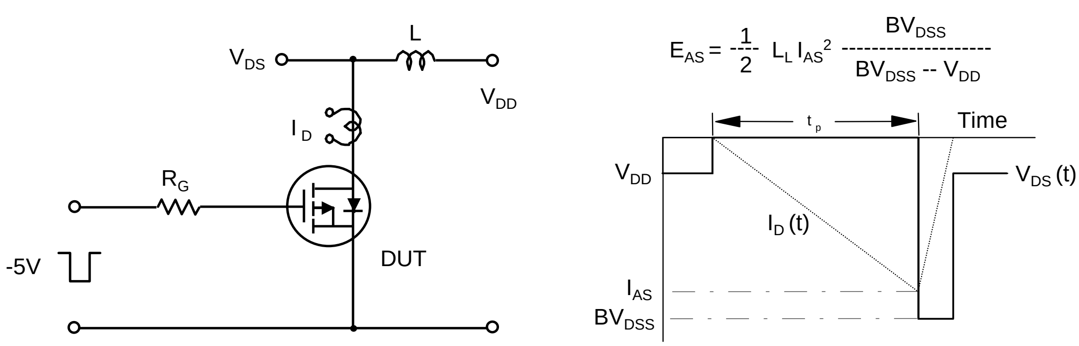
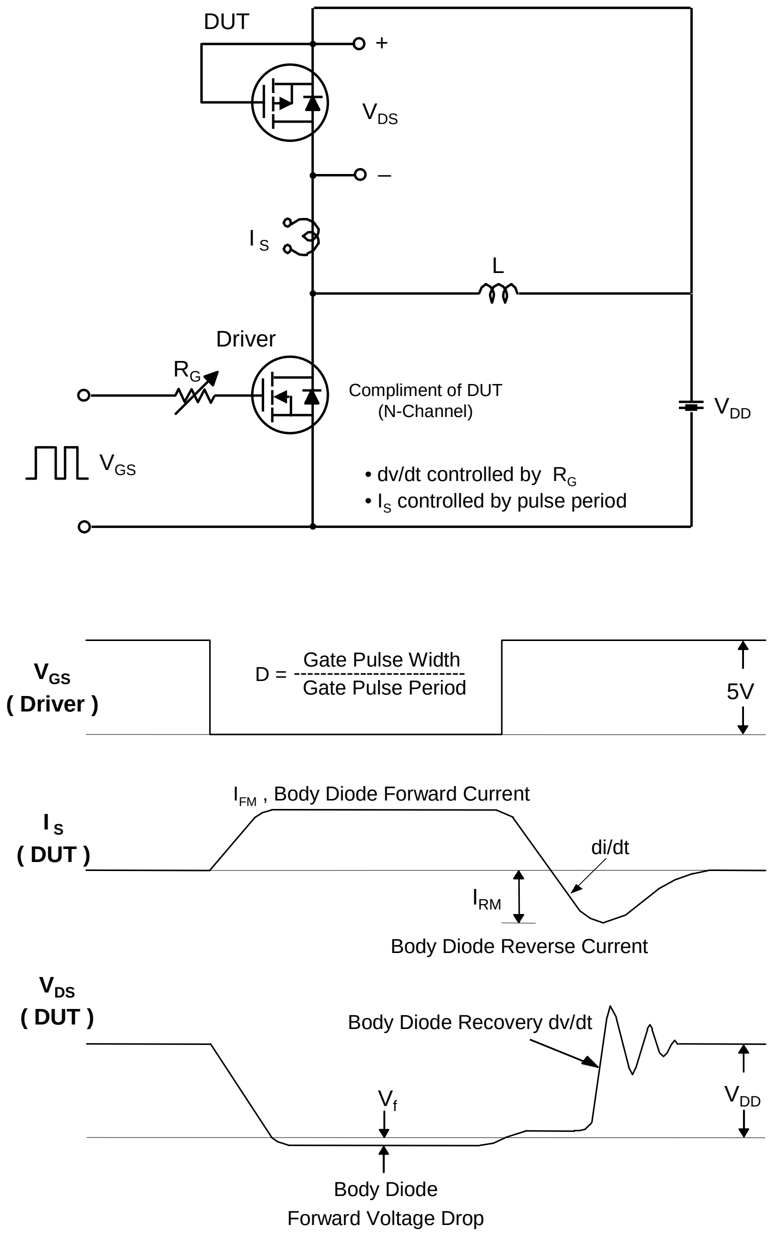


Fig 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms



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