Advanced Power MOSFET

SSH10N90A

FEATURES

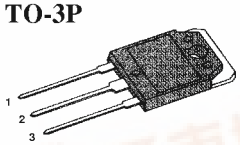
- Avalanche Rugged Technology
- Rugged Gate Oxide Technology
- Lower Input Capacitance
- Improved Gate Charge
- Extended Safe Operating Area
- Lower Leakage Current : 25 µA (Max.) @ V_{DS} = 900V
- Low $R_{DS(ON)}$: 0.938 Ω (Typ.)

BV_{DSS} = 900 V

$R_{DS(on)}$ = 1.2 Ω

I_D = 10 A

TO-3P



1.Gate 2. Drain 3. Source

Absolute Maximum Ratings

Symbol	Characteristic	Value	Units
V_{DSS}	Drain-to-Source Voltage	900	V
I_D	Continuous Drain Current (T_C=25 °C)	10	A
	Continuous Drain Current (T_C=100 °C)	6.3	
I_{DM}	Drain Current-Pulsed ¤	40	A
V_{GS}	Gate-to-Source Voltage	± 30	V
E_{AS}	Single Pulsed Avalanche Energy ¤ Ł	794	mJ
I_{AR}	Avalanche Current ¤	10	A
E_{AR}	Repetitive Avalanche Energy ¤	28	mJ
dv/dt	Peak Diode Recovery dv/dt ¤ Ø	1.5	V/ns
P_D	Total Power Dissipation (T_C=25 °C)	280	W
	Linear Derating Factor	2.22	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	--	0.45	°C /W
$R_{\theta CS}$	Case-to-Sink	0.24	--	
$R_{\theta JA}$	Junction-to-Ambient	--	40	

SAMSUNG ELECTRONICS

Electrical Characteristics (T_C=25 ℃ unless otherwise specified)

Symbol	Characteristic	Min.	Typ.	Max.	Units	Test Condition
BV_{DSS}	Drain-Source Breakdown Voltage	900	--	--	V	V_{GS}=0V, I_D=250μA
$\Delta BV/\Delta T_J$	Breakdown Voltage Temp. Coeff.	--	1.11	--	V/ ℃	I_D=250μA ***See Fig 7***
$V_{GS(th)}$	Gate Threshold Voltage	2.0	--	3.5	V	V_{DS}=5V, I_D=250μA
I_{GSS}	Gate-Source Leakage , Forward	--	--	100	nA	V_{GS}=30V
	Gate-Source Leakage , Reverse	--	--	-100		V_{GS}=-30V
I_{DSS}	Drain-to-Source Leakage Current	--	--	25	μA	V_{DS}=900V
		--	--	250		V_{DS}=720V, T_C=125 ℃
$R_{DS(on)}$	Static Drain-Source On-State Resistance	--	--	1.2	Ω	V_{GS}=10V, I_D=5A ④*
g_{fs}	Forward Transconductance	--	7.85	--	℧	V_{DS}=50V, I_D=5A ④
C_{iss}	Input Capacitance	--	2760	3580	pF	V_{GS}=0V, V_{DS}=25V, f =1MHz ***See Fig 5***
C_{oss}	Output Capacitance	--	245	290		
C_{rss}	Reverse Transfer Capacitance	--	105	125		
$t_{d(on)}$	Turn-On Delay Time	--	29	70	ns	V_{DD}=450V, I_D=10A, R_G=9.6 Ω ***See Fig 13*** ④ ⑤
t_r	Rise Time	--	54	120		
$t_{d(off)}$	Turn-Off Delay Time	--	161	330		
t_f	Fall Time	--	47	105		
Q_g	Total Gate Charge	--	127	165	nC	V_{DS}=720V, V_{GS}=10V, I_D=10A ***See Fig 6 & Fig 12*** ④ ⑤
Q_{gs}	Gate-Source Charge	--	19.2	--		
Q_{gd}	Gate-Drain("Miller") Charge	--	56.8	--		

Source-Drain Diode Ratings and Characteristics

Symbol	Characteristic	Min.	Typ.	Max.	Units	Test Condition
I_S	Continuous Source Current	--	--	10	A	Integral reverse pn-diode in the MOSFET
I_{SM}	Pulsed-Source Current ①	--	--	40		
V_{SD}	Diode Forward Voltage ④	--	--	1.4	V	T_J=25℃, I_S=10A, V_{GS}=0V
t_{rr}	Reverse Recovery Time	--	690	--	ns	T_J=25℃, I_F=10A di_F/dt=100A/μs ④
Q_{rr}	Reverse Recovery Charge	--	11.94	--	μC	

Notes ;

¤ Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature

¤ ŁL=15mH, I_{AS}=10A, V_{DD}=50V, R_G=27Ω, Starting T_J=25 ℃

¤ ØI_{SD}≤10A, di/dt ≤190A/μs, V_{DD} ≤ BV_{DSS} , Starting T_J=25 ℃

¤ ŒPulse Test : Pulse Width = 250 μs, Duty Cycle ≤2%

¤ º Essentially Independent of Operating Temperature

Fig 1. Output Characteristics

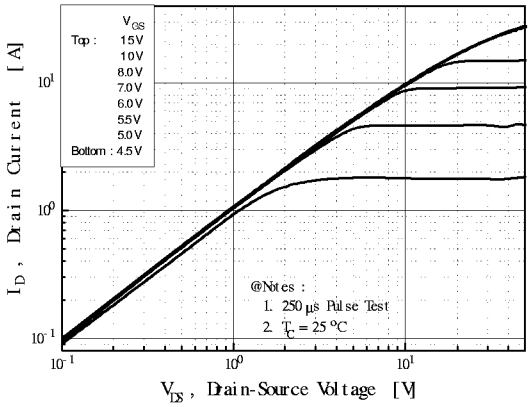


Fig 2. Transfer Characteristics

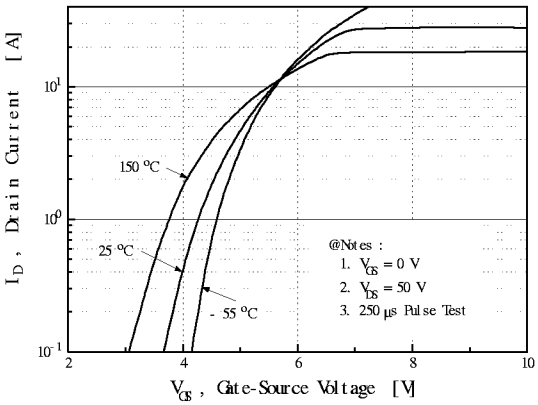


Fig 3. On-Resistance vs. Drain Current

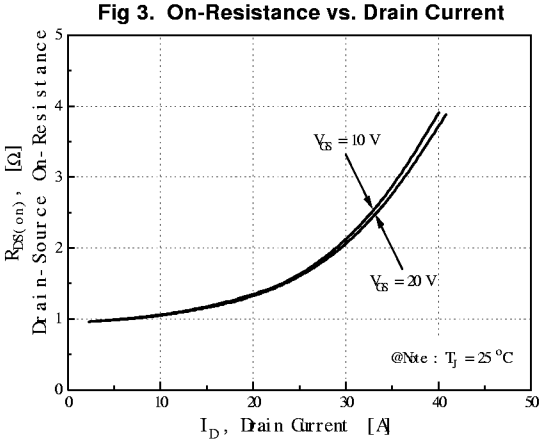


Fig 4. Source-Drain Diode Forward Voltage

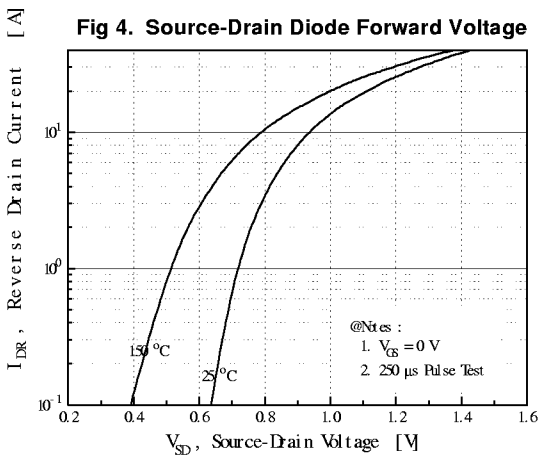


Fig 5. Capacitance vs. Drain-Source Voltage

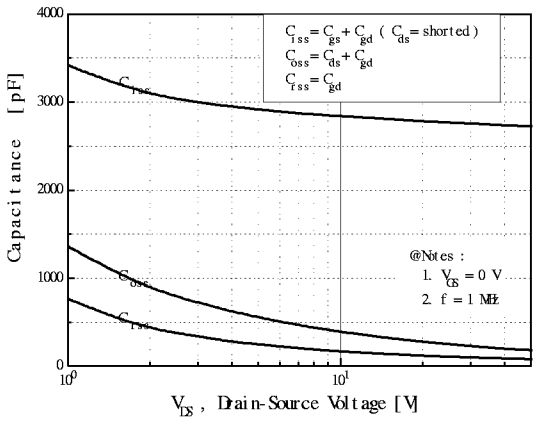


Fig 6. Gate Charge vs. Gate-Source Voltage

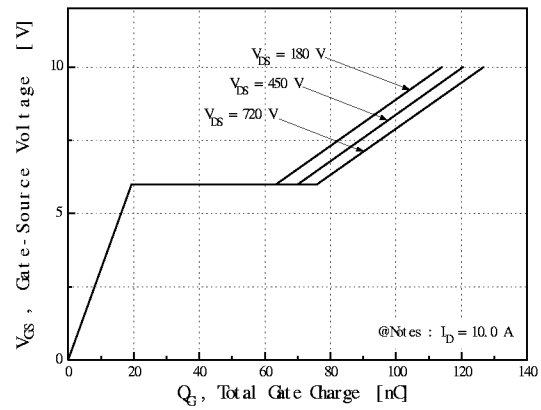


Fig 7. Breakdown Voltage vs. Temperature

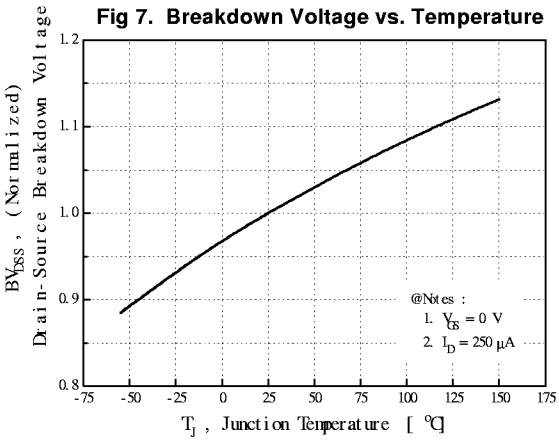


Fig 8. On-Resistance vs. Temperature

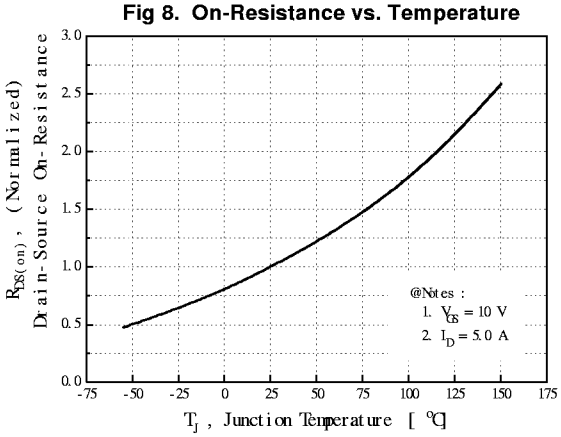


Fig 9. Max. Safe Operating Area

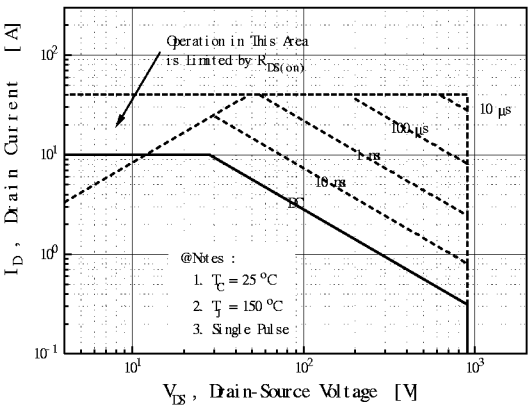


Fig 10. Max. Drain Current vs. Case Temperature

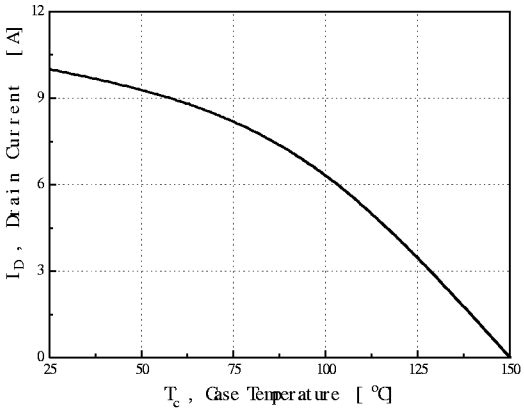
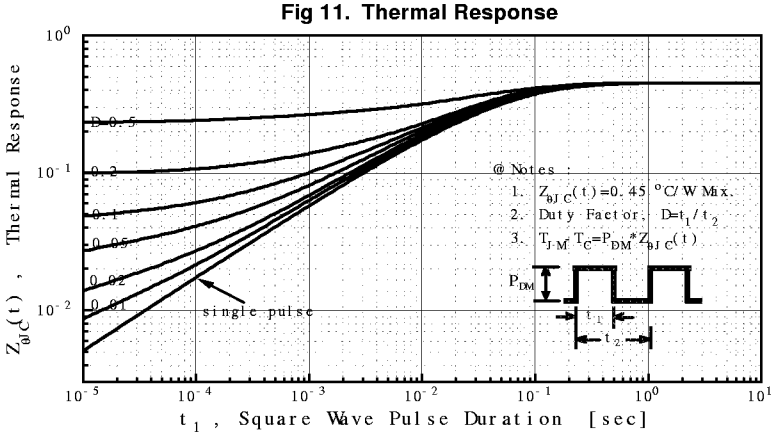


Fig 11. Thermal Response



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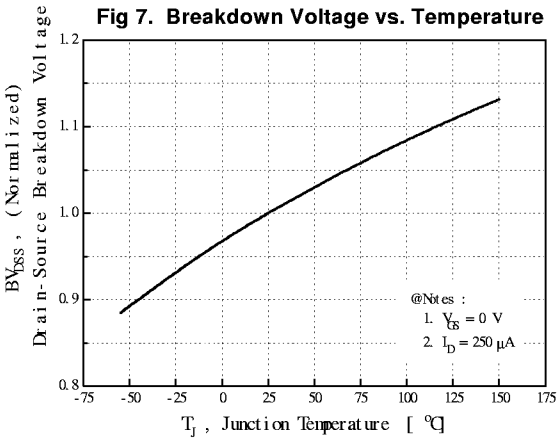

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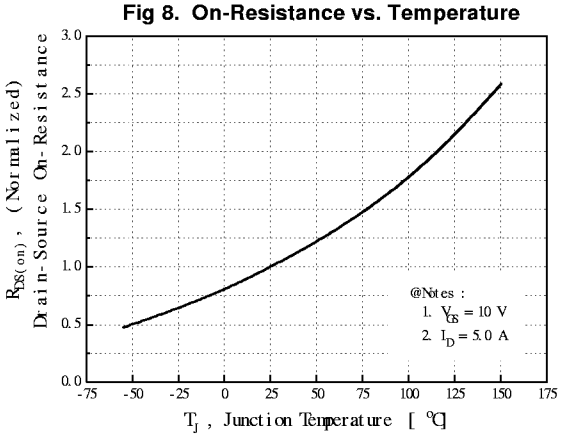

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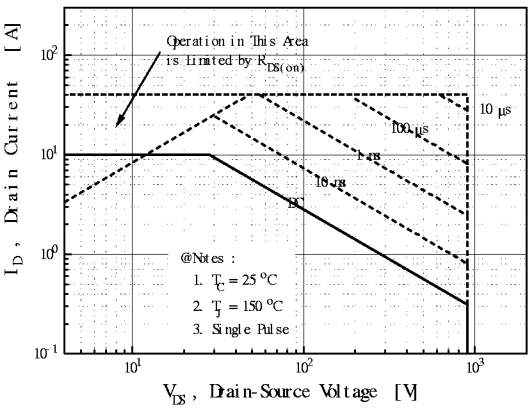
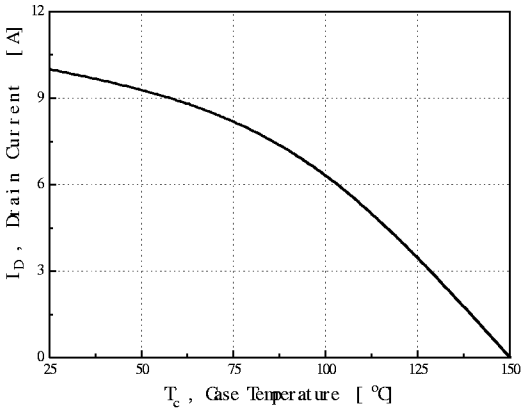


Fig 10. Max. Drain Current vs. Case Temperature



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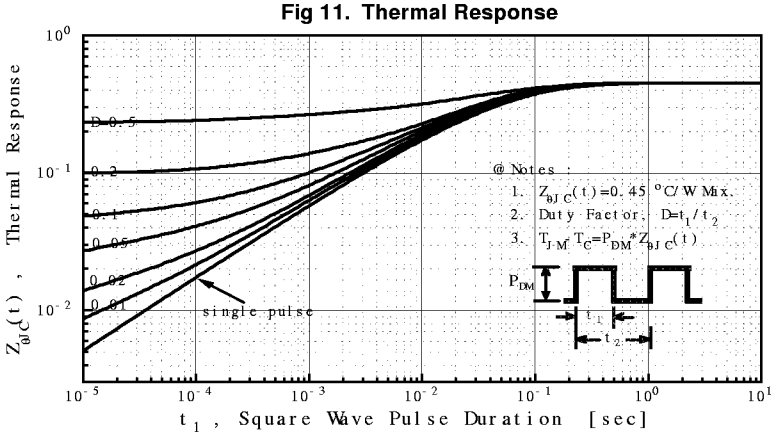

Fig 12. Gate Charge Test Circuit & Waveform

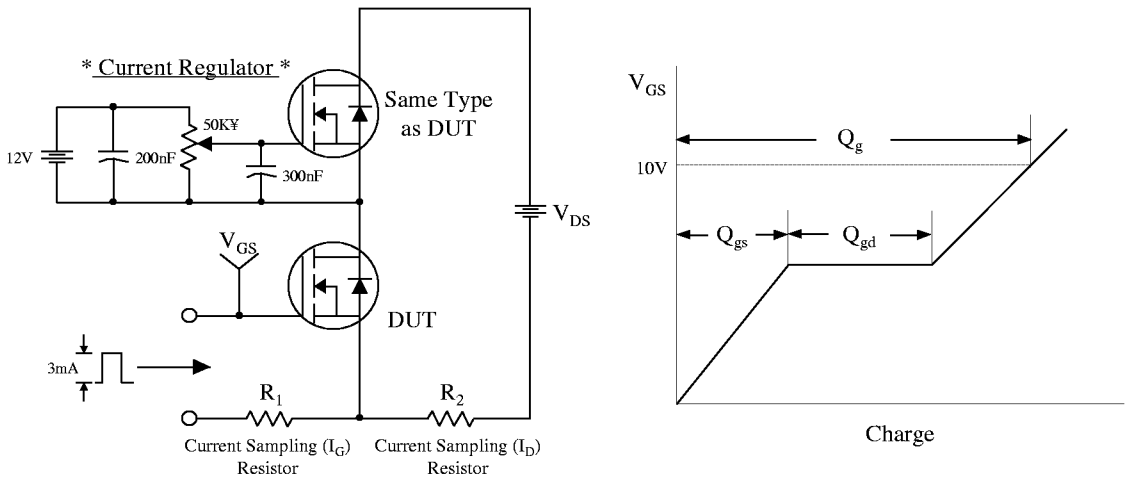

Fig 13. Resistive Switching Test Circuit & Waveforms

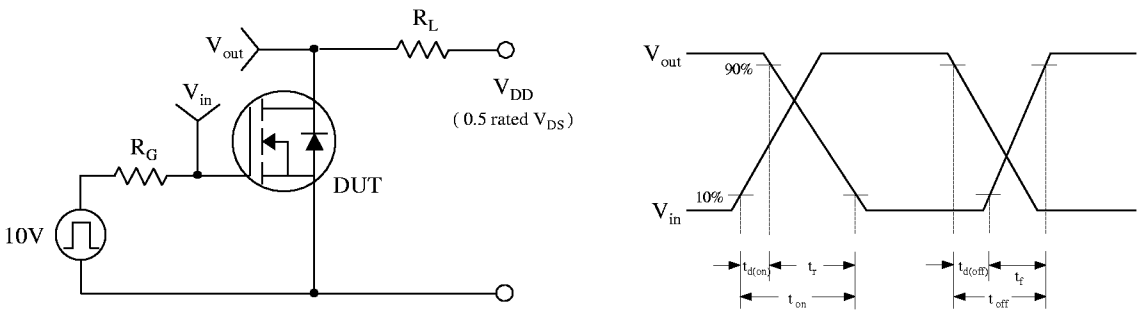

Fig 14. Unclamped Inductive Switching Test Circuit & Waveforms