N-CHANNEL Small Signal MOSFET

2N7000

FEATURES

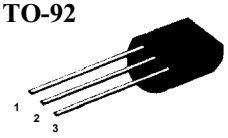
- Fast Switching Times
- Improved Inductive Ruggedness
- Lower Input Capacitance
- Extended Safe Operating Area
- Improved High Temperature Reliability

BV_{DSS} = 60 V

$R_{DS(on)}$ = 5.0Ω

I_D = 200 mA

TO-92



1.Source 2. Gate 3. Drain

Absolute Maximum Ratings

Symbol	Characteristic	Value	Units
V_{DSS}	Drain-to-Source Voltage	60	V
I_D	Continuous Drain Current (T_C=25℃)	200	mA
	Continuous Drain Current (T_C=100℃)	110	
I_{DM}	Drain Current-Pulsed ①	1000	mA
V_{GS}	Gate-to-Source Voltage	±30	V
P_D	Total Power Dissipation (T_C=25℃)	400	mW
	Linear Derating Factor	3.2	mW/℃
T_J , T_{STG}	Operating Junction and Storage Temperature Range	- 55 to +150	℃
T_L	Maximum Lead Temp. for Soldering Purposes, 1/8 " from case for 5-seconds	300	

Thermal Resistance

Symbol	Characteristic	Typ.	Max.	Units
$R_{\Theta JA}$	Junction-to-Ambient	-	312.5	℃/W

SAMSUNG ELECTRONICS

Electrical Characteristics (T_C=25℃ unless otherwise specified)

Symbol	Characteristic	Min.	Typ.	Max.	Units	Test Condition
BV_{DSS}	Drain-Source Breakdown Voltage	60	-	-	V	V_{GS}=0V,I_D=250μA
$V_{GS(th)}$	Gate Threshold Voltage	0.3	-	3.9	V	V_{DS}=5V,I_D=250μA
I_{GSS}	Gate-Source Leakage , Forward	-	-	100	nA	V_{GS}=15V
	Gate-Source Leakage , Reverse	-	-	-100		V_{GS}=-15V
I_{DSS}	Drain-to-Source Leakage Current	-	-	250	μA	V_{DS}=30V
		-	-	1000		V_{DS}=30V,T_C=125℃
$R_{DS(on)}$	Static Drain-Source On-State Resistance	- -	- -	5.0	Ω	V_{GS}=10V,I_D=0.5A
g_{fs}	Forward Transconductance	0.1	0.3	-	℧	V_{DS}=15V,I_D=0.5A
C_{iss}	Input Capacitance	-	30	-	pF	V_{DS}=25V,V_{GS}=0V, f =1.0MHz
C_{oss}	Output Capacitance	-	12	-		
C_{rss}	Reverse Transfer Capacitance	-	3.0	-		
$t_{d(on)}$	Turn-On Delay Time	-	-	10	ns	V_{DD}=30V,I_D=0.5A, R_G=15.0Ω ② ③
t_r	Rise Time	-	-	10		
$t_{d(off)}$	Turn-Off Delay Time	-	-	10		
t_f	Fall Time	-	-	10		
Q_g	Total Gate Charge	-	1.44	2.16	nC	V_{DS}=24V,V_{GS}=5V, I_D=60A ***See Fig 6 & Fig 12*** ④ ⑤
Q_{gs}	Gate-Source Charge	-	0.6	-		
Q_{gd}	Gate-Drain(" Miller ") Charge	-	0.9	-		

Notes ;

① Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature

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

③ Essentially Independent of Operating Temperature

Fig 1. Output Characteristics

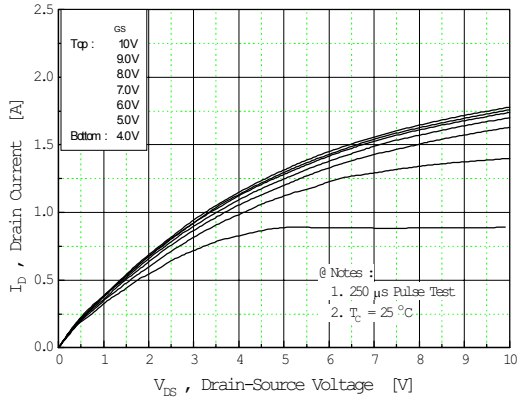


Fig 2. Transfer Characteristics

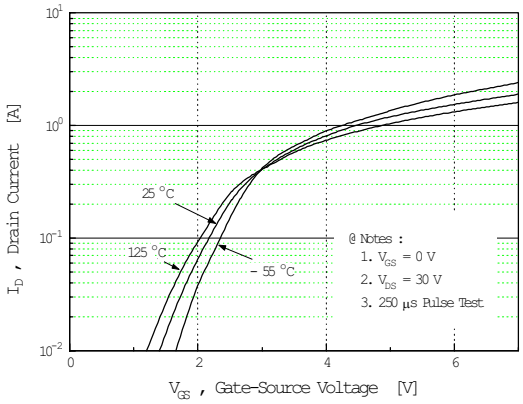


Fig 3. On-Resistance vs. Drain Current

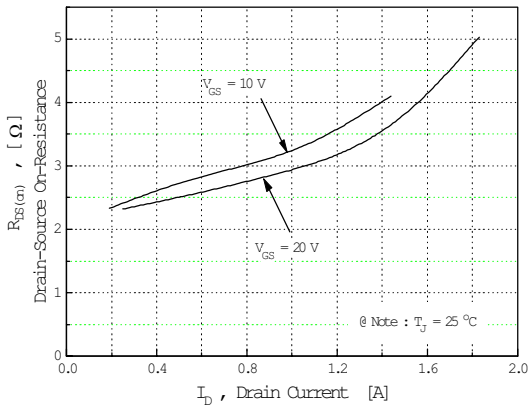


Fig 4. Source-Drain Diode Forward Voltage

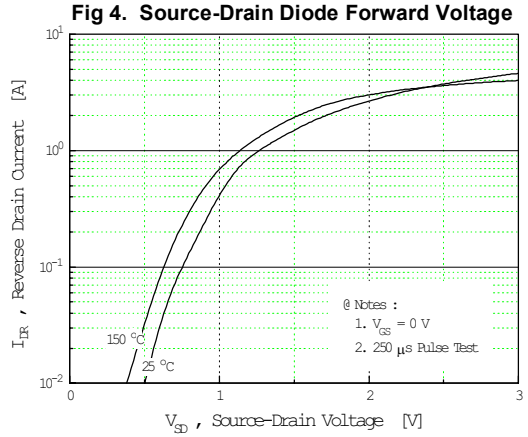


Fig 5. Capacitance vs. Drain-Source Voltage

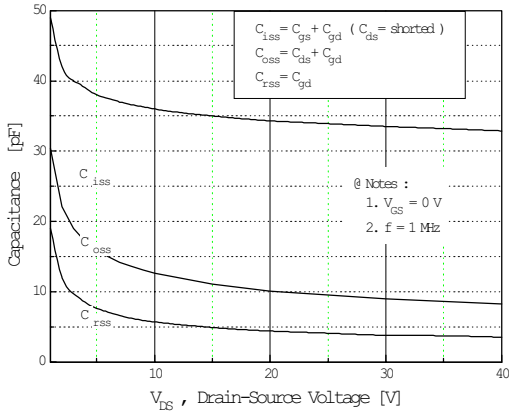


Fig 6. Gate Charge vs. Gate-Source Voltage

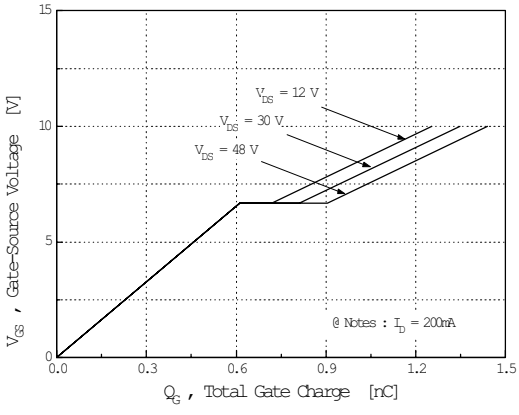


Fig 7. Breakdown Voltage vs. Temperature

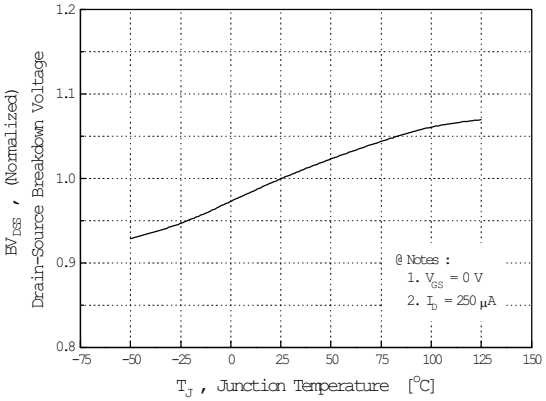


Fig 8. On-Resistance vs. Temperature

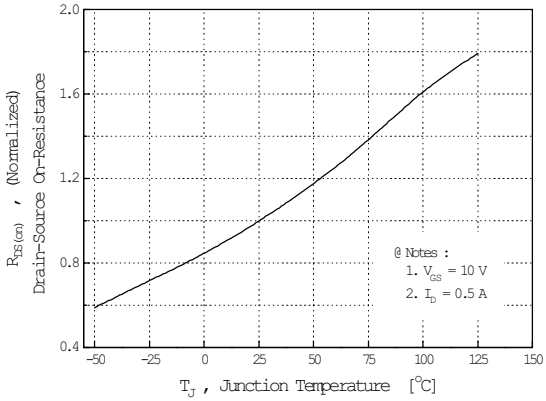


Fig 12. Gate Charge Test Circuit & Waveform

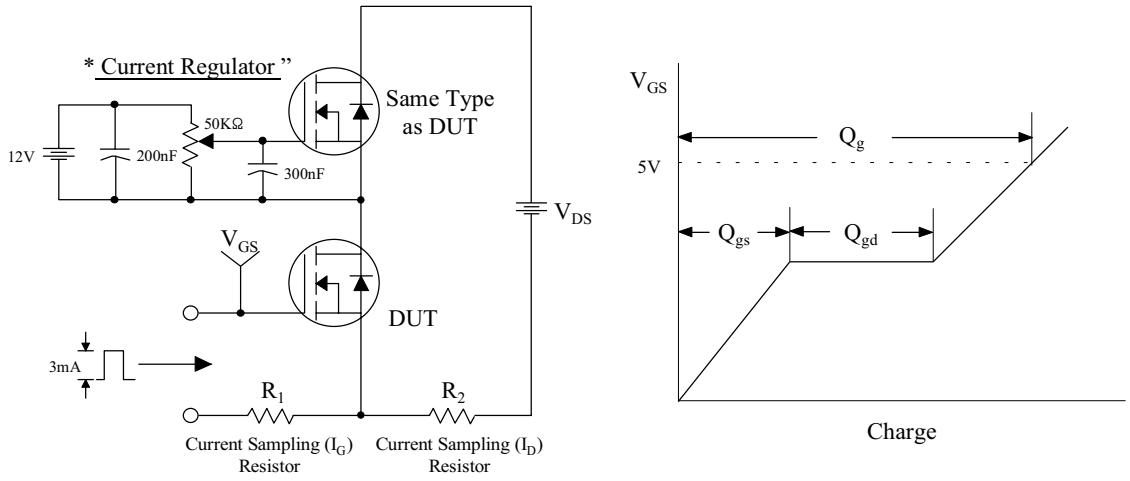


Fig 13. Resistive Switching Test Circuit & Waveforms

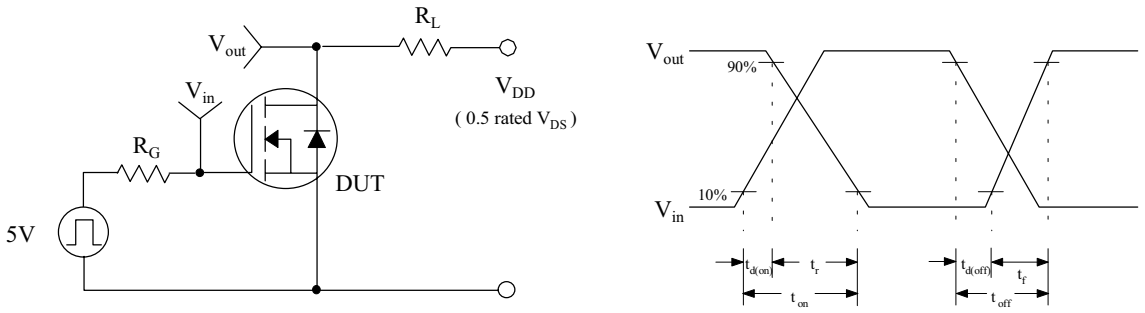


Fig 14. Unclamped Inductive Switching Test Circuit & Waveforms

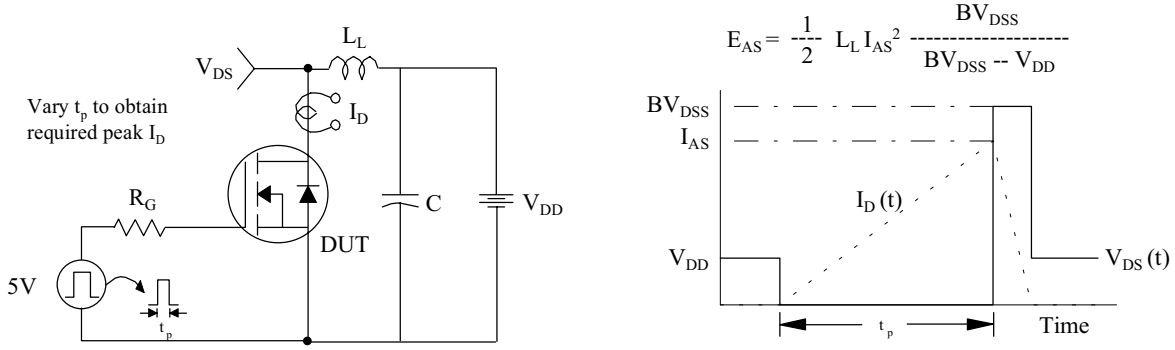


Fig 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms