SHEN ZHEN LONG JING MICRO-ELECTRONICS CO.,LTD

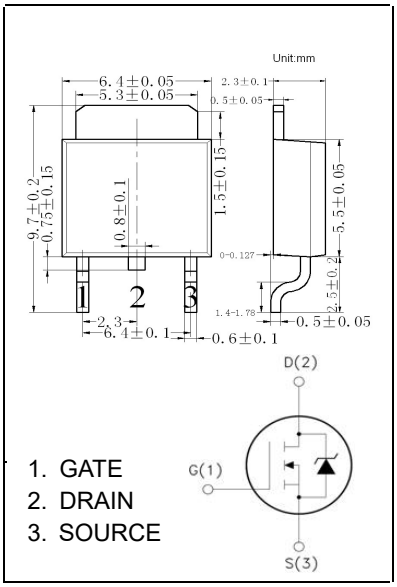
TO-252 Plastic-Encapsulate MOSFETS

D50N04

40V N-Channel MOSFET

Features:

- ☐ Low Intrinsic Capacitances.
- ☐ Excellent Switching Characteristics.
- ☐ Extended Safe Operating Area.
- ☐ Unrivalled Gate Charge :Qg= 22nC (Typ.).
- ☐ V_{DSS}=40V,I_D=50A
- ☐ R_{DS}(on) : 8mΩ (Max) @V_G=10V
- ☐ 100% Avalanche Tested



Absolute Maximum Ratings (T_C=25℃unless otherwise noted)

Symbol	Parameter	Limit	Unit
V_{DSS}	Drain-Source Voltage	40	V
V_{GSS}	Gate-Source Voltage	±20	V
I_D	Drain Current-Continuous	50	A
I_D (100℃)	Drain Current-Continuous(T_C=100℃)	31	A
I_{DM}	Pulsed Drain Current	100	A
P_D	Power Dissipation(T_C=25℃)	54	W
P_D	Power Dissipation(T_C=70℃)	21.6	W
E_{AS}	Single pulse avalanche energy (Note 5)	125	mJ
T_J,T_{STG}	Operating Junction and Storage Temperature Range	-55 To 150	℃

Thermal Characteristic

$R_{\theta JC}$	Thermal Resistance,Junction-to-Case(Note 2)	2.31	℃/W

Electrical Characteristics (T_C=25℃unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V I_D=250μA	40	45	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=40V,V_{GS}=0V	-	-	1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 3)						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	1.2	1.5	2.5	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=30A	-	8.0	9.0	mΩ
g_{FS}	Forward Transconductance	V_{DS}=10V,I_D=25A	15	-	-	S
Dynamic Characteristics (Note4)						
C_{lss}	Input Capacitance	V_{DS}=20V,V_{GS}=0V, F=1.0MHz	-	1300	-	PF
C_{oss}	Output Capacitance		-	-	180	PF
C_{rss}	Reverse Transfer Capacitance		-	-	120	PF
Switching Characteristics (Note 4)						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=20V, R_L=1Ω V_{GS}=10V,R_G=3Ω	-	13	-	nS
t_r	Turn-on Rise Time		-	14	-	nS
$t_{d(off)}$	Turn-Off Delay Time		-	45	-	nS
t_f	Turn-Off Fall Time		-	9	-	nS
Q_g	Total Gate Charge	V_{DS}=20V,I_D=25A, V_{GS}=10V	-	25	-	nC
Q_{gs}	Gate-Source Charge		-	4.2	-	nC
Q_{gd}	Gate-Drain Charge		-	4.0	-	nC
Drain-Source Diode Characteristics						
V_{SD}	Diode Forward Voltage (Note 3)	V_{GS}=0V,I_S=25A	-		1.0	V
I_S	Diode Forward Current (Note 2)		-		50	A
t_{rr}	Reverse Recovery Time	TJ = 25°C, IF = 40A di/dt = 100A/μs(Note3)	-	-	45	nS
Qrr	Reverse Recovery Charge		-	-	50	nC

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. E_{AS} condition : Tj=25℃,V_{DD}=20V,V_G=10V,L=1mH,Rg=25Ω，I_{AS}=42A

Typical Characteristics

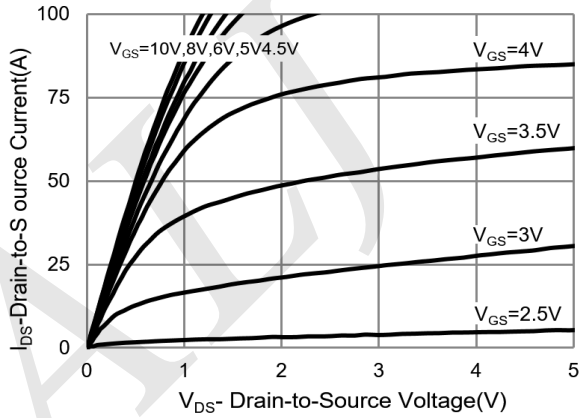


Fig.1 Output Characteristics

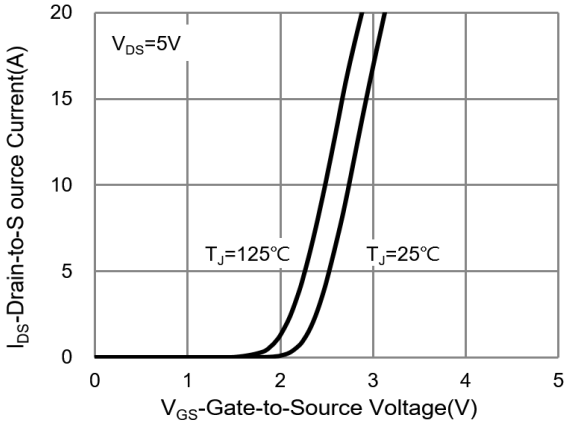


Fig.2 Transfer Characteristics

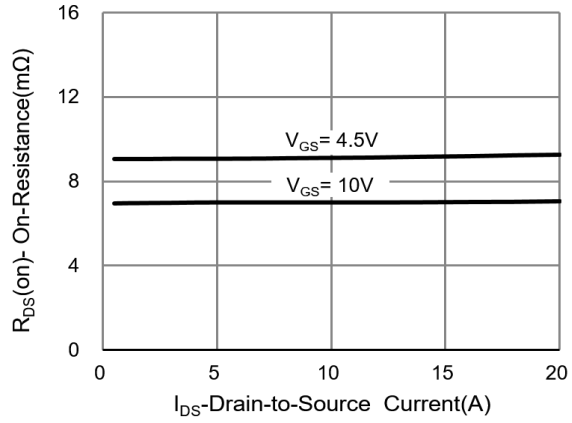


Fig.3 On-Resistance vs. Drain Current

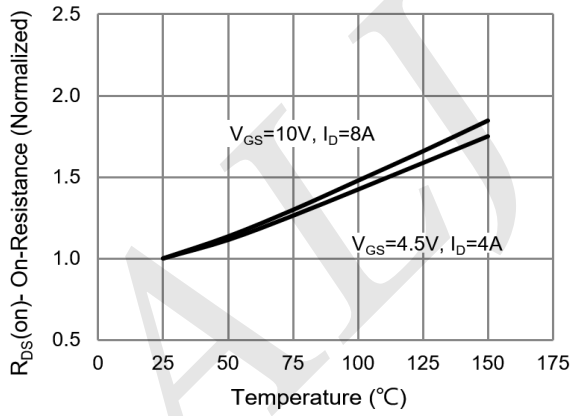


Fig.4 On-Resistance vs. Junction temperature

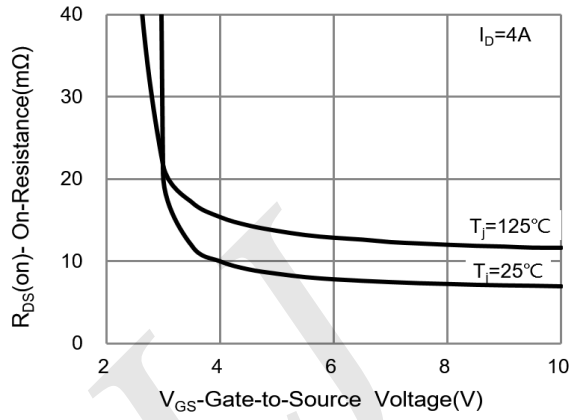


Fig.5 On-Resistance Variation with V_{GS}

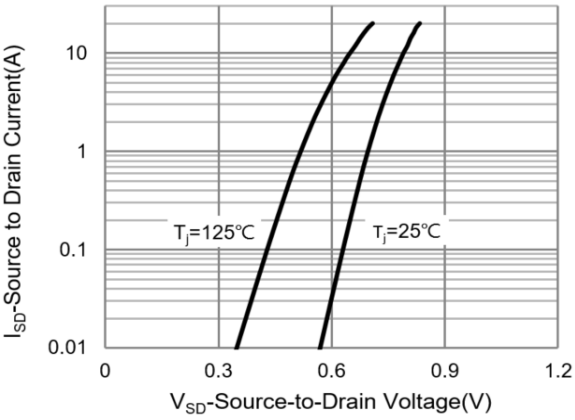


Fig.6 Source-Drain Diode Forward Voltage

Typical Characteristics

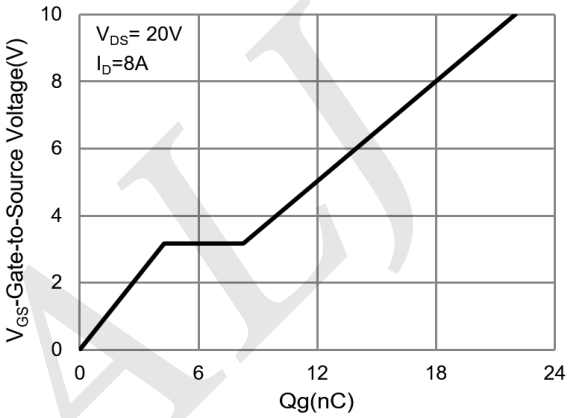


Fig.7 Gate-Charge Characteristics

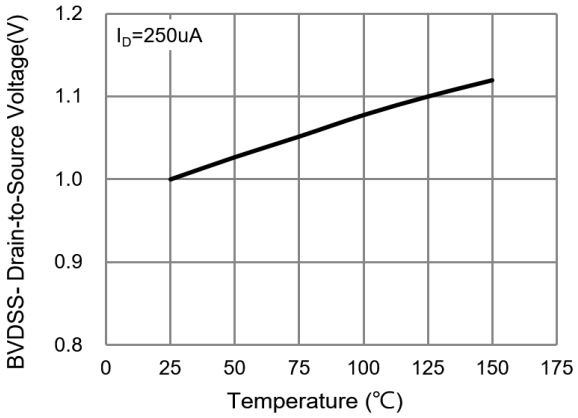


Fig.8 Breakdown Voltage Variation vs. Temperature

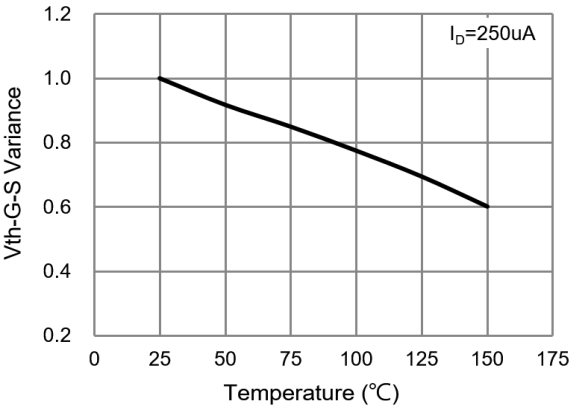


Fig.9 Threshold Voltage Variation with Temperature

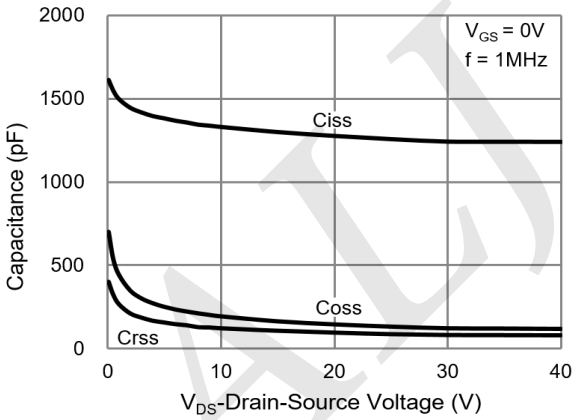


Fig.10 Capacitance vs. Drain-Source Voltage

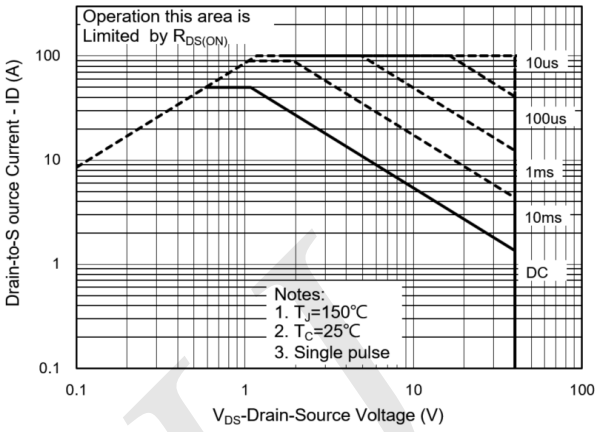


Fig.11 Maximum Safe Operating Area

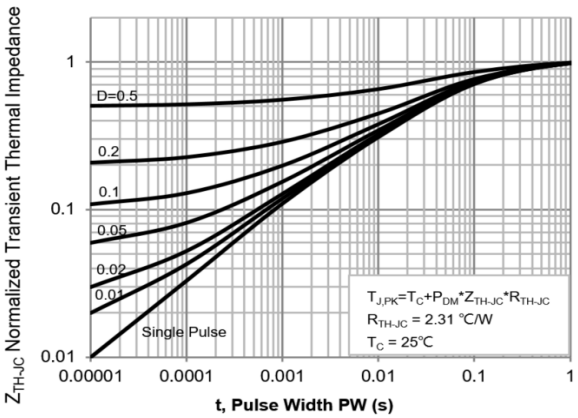
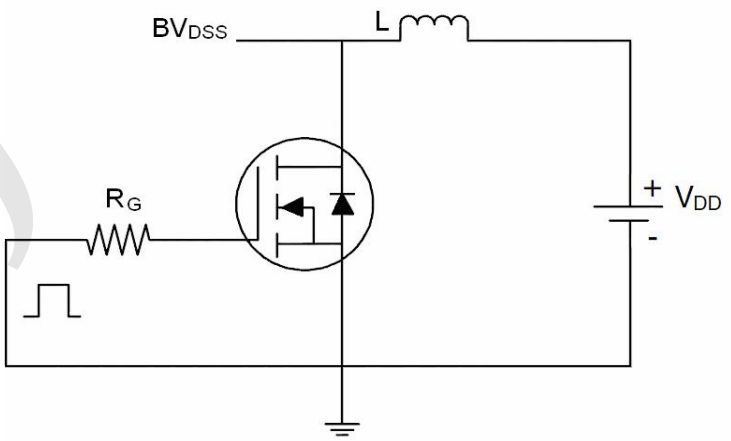


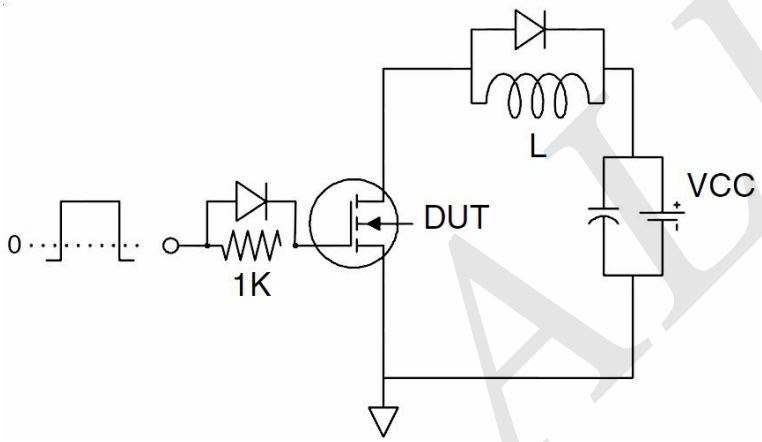
Fig.12 Normalized Transient Thermal Impedance

Test Circuit

1) E_{AS} test Circuit



2) Gate charge test Circuit



3) Switch Time Test Circuit