

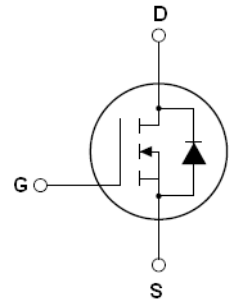
Features

- Extremely high dv/dt capability
- Low Gate Charge Qg results in Simple Drive Requirement
- 100% avalanche tested
- Gate charge minimized
- Very low intrinsic capacitances
- Very good manufacturing repeatability

Vdss = 600V

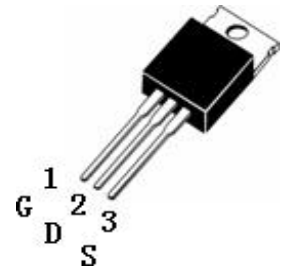
Id = 4A

Rdson = 2.3Ω (typ.)



Description

The SSF4N60 is a new generation of high voltage N-Channel enhancement mode power MOSFETs and is obtained through an extreme optimization layout design, in addition to pushing on-resistance significantly down, special care is taken to ensure a very good dv/dt capability, provide superior switching performance, withstand high energy pulse in the avalanche, and increases packing density.



SSF4N60 TOP View (TO220)

Application

- High current, high speed switching
- Lighting
- Ideal for off-line power supply, adaptor, PFC

Absolute Maximum Ratings

	Parameter	Max.	Units
ID@Tc=25 °C	Continuous Drain Current, VGS@10V	4	A
ID@Tc=100°C	Continuous Drain Current, VGS@10V	2.2	
IDM	Pulsed Drain Current ①	16	
PD@TC=25°C	Power Dissipation	80	W
	Linear Derating Factor	0.67	W/ °C
VGS	Gate-to-Source Voltage	±30	V
EAS	Single Pulse Avalanche Energy ②	90	mJ
IAR	Avalanche Current ①	4	A
EAR	Repetitive Avalanche Energy ①	8.5	mJ
dv/dt	Peak Diode Recovery dv/dt ③	4.5	V/ns
TJ TSTG	Operating Junction and Storage Temperature Range	-55 to +150	°C

Thermal Resistance

	Parameter	Min.	Typ.	Max.	Units
RθJC	Junction-to-case	—	—	1.56	°C/W
RθCS	Case-to-Sink, Flat, Greased Surface	—	0.50	—	
RθJA	Junction-to-Ambient	—	—	62.5	

Electrical Characteristics @T_J=25 °C(unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
V(BR)DSS	Drain-to-Source Breakdown Voltage	600	—	—	V	V _{GS} =0V, I _D =250μA
Δ V(BR)DSS/Δ T _J	Breakdown Voltage Temp. Coefficient	—	0.6	—	V/°C	Reference to 25°C, I _D =250μA
RDS(on)	Static Drain-to-Source On-resistance	—	2.3	2.5	Ω	V _{GS} =10V, I _D =2.5A ④
VGS(th)	Gate Threshold Voltage	2.0	—	4.0	V	V _{DS} =V _{GS} , I _D =250μA
g _{fs}	Forward Transconductance	—	4.3	—	S	V _{DS} =40V, I _D =2.25A
IDSS	Drain-to-Source Leakage current	—	—	1	uA	V _{DS} =600V, V _{GS} =0V
		—	—	10		V _{DS} =480V, V _{GS} =0V, T _J =150°C
IGSS	Gate-to-Source Forward leakage	—	—	0.5	uA	V _{GS} =30V
	Gate-to-Source Reverse leakage	—	—	-0.5		V _{GS} =-30V
Qg	Total Gate Charge	—	11	15	nC	I _D =5A
Qgs	Gate-to-Source charge	—	3	—		V _{DS} =400V
Qgd	Gate-to-Drain("Miller") charge	—	5	—		V _{GS} =10V
td(on)	Turn-on Delay Time	—	13	36	nS	V _{DD} =250V I _D =5A R _G =25Ω
t _r	Rise Time	—	22	54		
td(off)	Turn-Off Delay Time	—	28	66		
t _f	Fall Time	—	20	50		
Ciss	Input Capacitance	—	515	670	pF	V _{GS} =0V
Coss	Output Capacitance	—	55	72		V _{DS} =25V
Crss	Reverse Transfer Capacitance	—	6.5	8.5		f=1.0MHZ

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I _S	Continuous Source Current (Body Diode)	—	—	4	A	MOSFET symbol showing the integral reverse p-n junction diode.
ISM	Pulsed Source Current (Body Diode) ①	—	—	16		
V _{SD}	Diode Forward Voltage	—	—	1.3	V	T _J =25°C, I _S =4A, V _{GS} =0V ④
T _{rr}	Reverse Recovery Time	—	300	—	nS	T _J =25°C, I _F =4A
Q _{rr}	Reverse Recovery Charge	—	1.8	—	uC	di/dt=100A/μs ④

Notes:

- ① Repetitive rating; pulse width limited by maximum. junction temperature
- ② L = 15mH, I_{AS} = 2.2A, V_{DD} = 50V, R_G = 25Ω. Starting T_J = 25°C
- ③ I_{SD} ≤ 4A, di/dt ≤ 200A/μs, V_{DD} ≤ V(BR)DSS, T_J ≤ 25 °C
- ④ Pulse width ≤ 300μs; duty cycle ≤ 2%

Typical Performance Characteristics

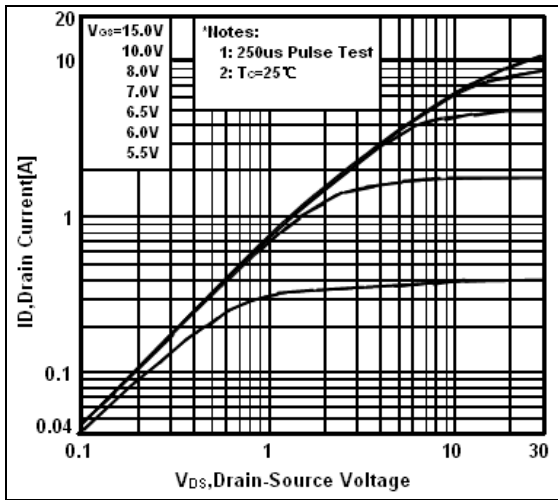


Figure 1 On-Region Characteristics

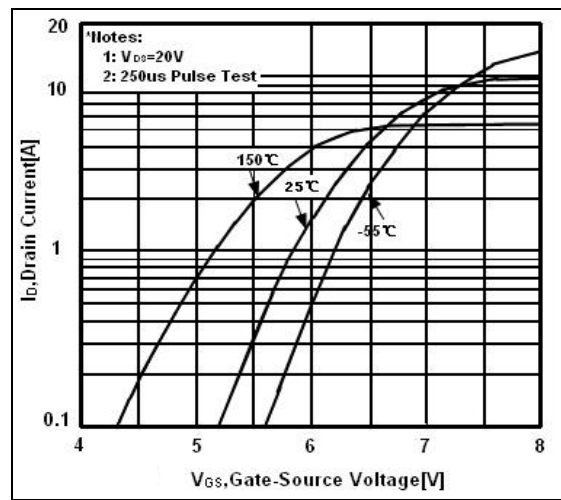


Figure 2 Transfer Characteristics

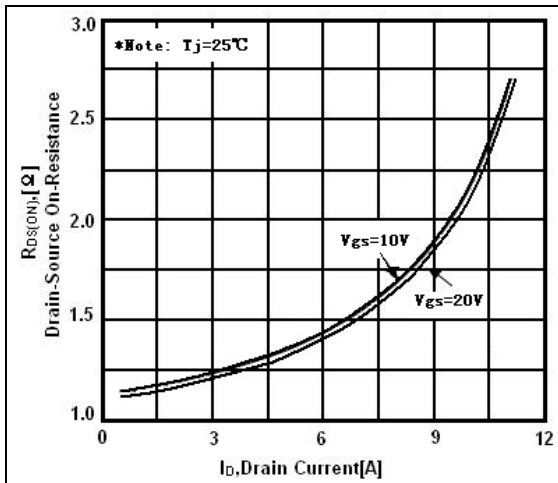


Figure 3 On-Resistance Variation vs. Drain Current and Gate Voltage

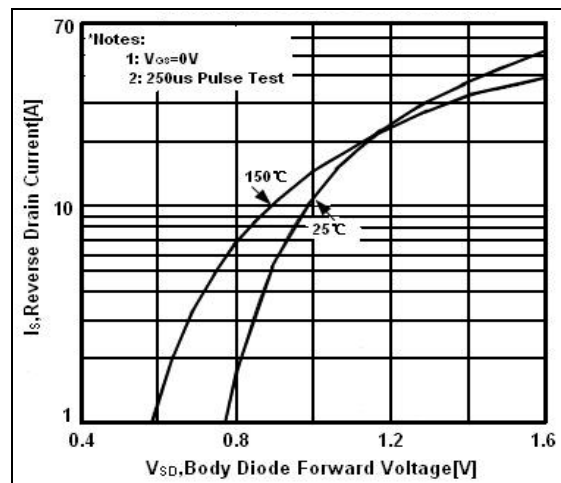


Figure 4 Body diode forward Voltage Variation vs. Source Current and temperature

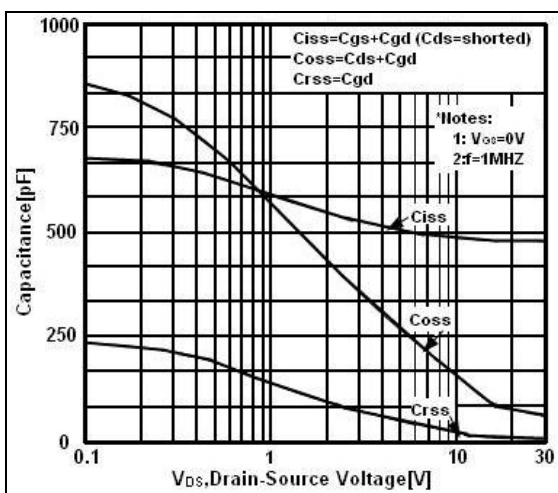


Figure 5 Capacitance Characteristics

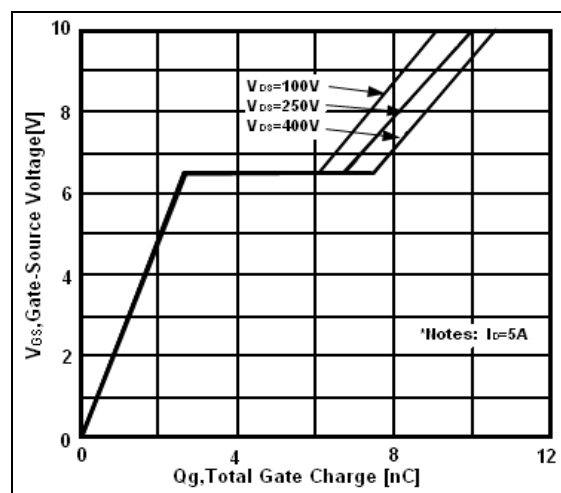


Figure 6 Gate Charge Characteristics

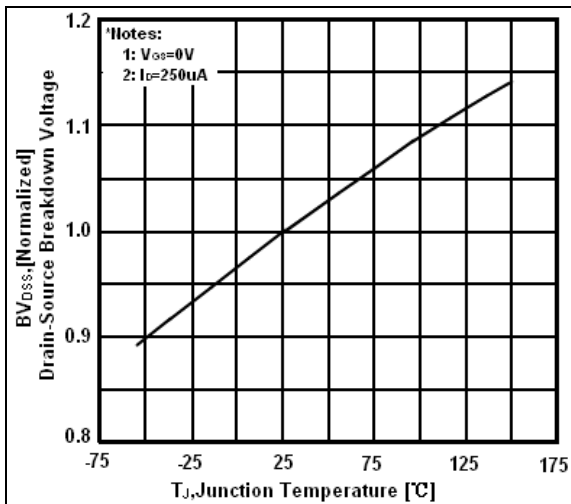


Figure 7 Breakdown Voltage Variation vs. Temperature

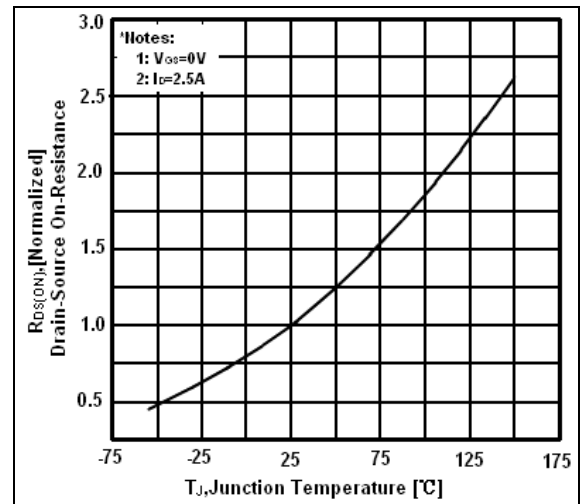


Figure 8 On-Resistance Variation vs. Temperature

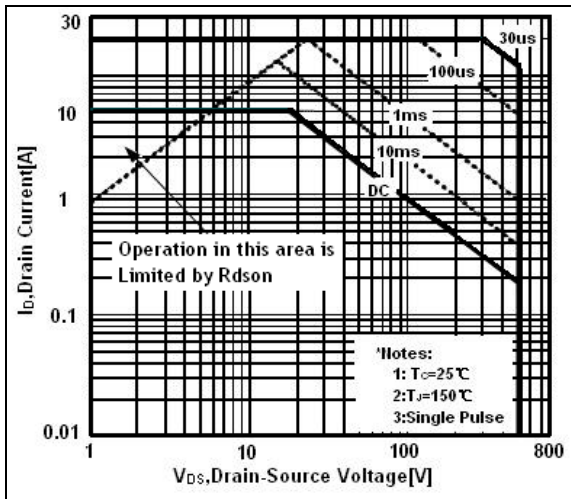


Figure 9 Maximum Safe Operation Area

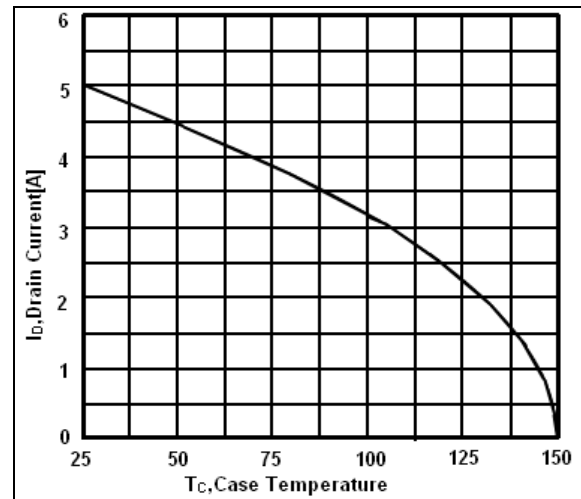


Figure 10 Maximum Drain Current vs. Case Temperature

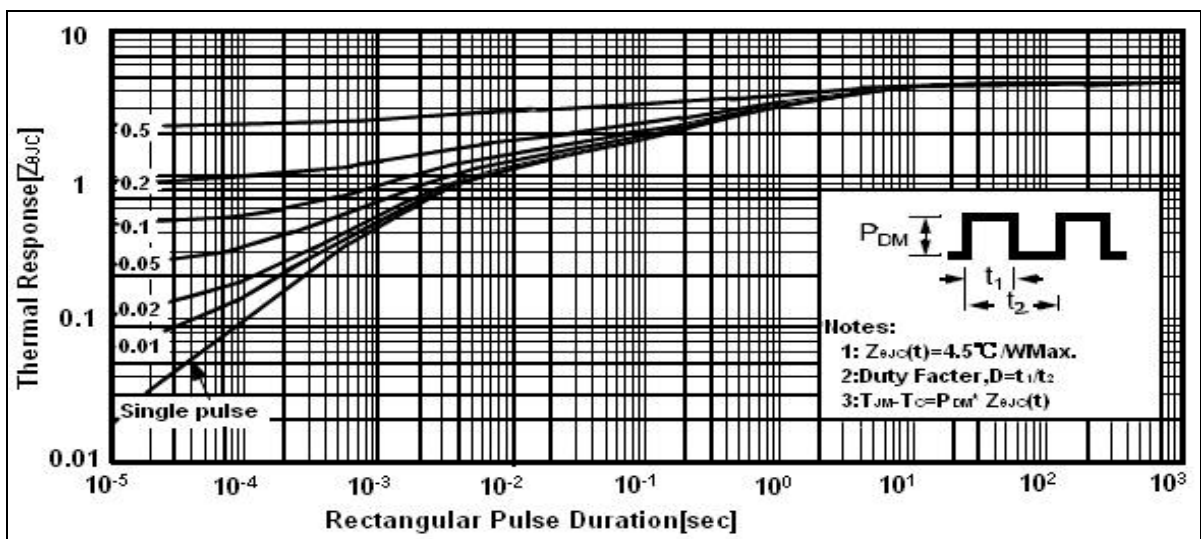
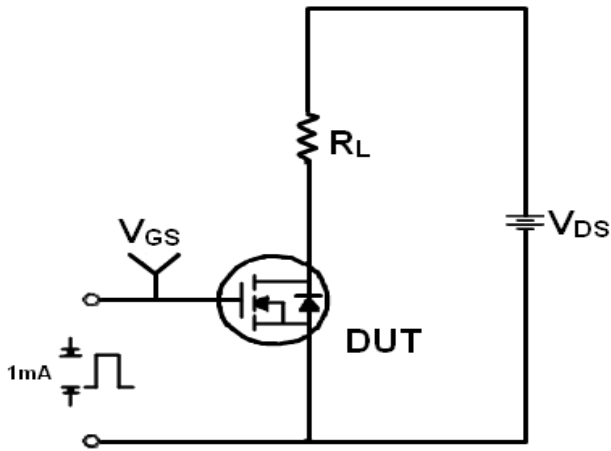
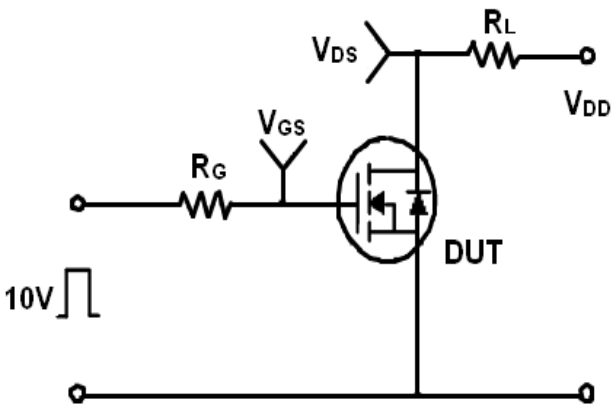


Figure 12 Transient Thermal Response Curve

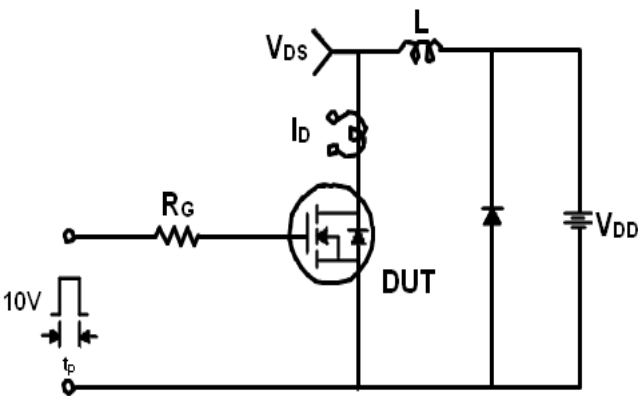
Test Circuit and Waveform



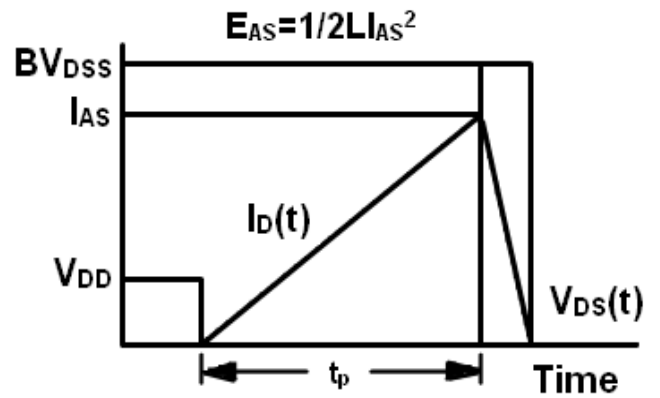
Gate Charge Test Circuit & Waveform



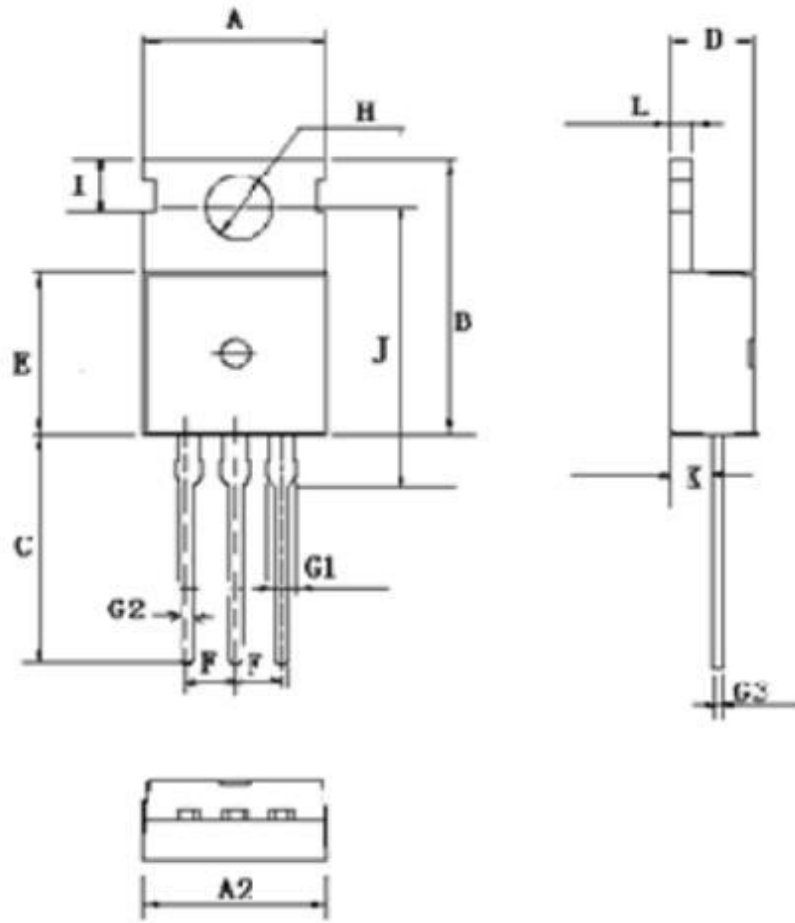
Resistive Switching Test Circuit & Waveform



Unclamped Inductive Switching Test Circuit & Waveform



TO-220 MECHANICAL DATA:



TO-220 3L

图形对应符号	产品外形尺寸
A(mm)	9.66~10.28
A2(mm)	9.80~10.20
B(mm)	15.6~15.8
C(mm)	12.70~14.27
D(mm)	4.30~4.70
E(mm)	8.59~9.40
F(mm)	2.54 (nom)
G1(mm)	1.42~1.62
G2(mm)	0.70~0.95
G3(mm)	0.45~0.60
H(mm) dia.	3.50~3.70
I(mm)	2.7~2.9
J(mm)	15.70~16.25
K(mm)	2.20~2.90
L(mm)	1.15~1.40
M(mm)	0.5