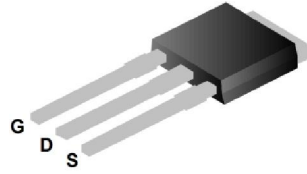
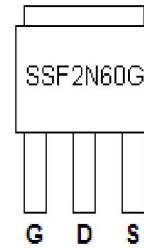


## Main Product Characteristics

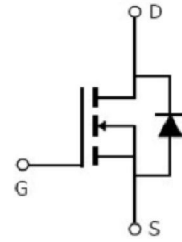
$V_{DSS}$	600V
$R_{DS(on)}$	3.5Ω (typ.)
$I_D$	2A



TO-251



Marking and Pin Assignment



Schematic Diagram

## Features and Benefits

- Advanced MOSFET process technology
- Special designed for PWM, load switching and general purpose applications
- Ultra low on-resistance with low gate charge
- Fast switching and reverse body recovery
- 150°C operating temperature
- Lead free product



## Description

It utilizes the latest processing techniques to achieve the high cell density and reduces the on-resistance with high repetitive avalanche rating. These features combine to make this design an extremely efficient and reliable device for use in power switching application and a wide variety of other applications.

## Absolute Max Rating

Symbol	Parameter	Max.	Units
$I_D @ TC = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$ <sup>①</sup>	2	A
$I_D @ TC = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$ <sup>①</sup>	1.3	
$I_{DM}$	Pulsed Drain Current <sup>②</sup>	8	
$P_D @ TC = 25^\circ C$	Power Dissipation <sup>③</sup>	35	W
	Linear Derating Factor	0.28	W/°C
$V_{DS}$	Drain-Source Voltage	600	V
$V_{GS}$	Gate-to-Source Voltage	± 30	V
$E_{AS}$	Single Pulse Avalanche Energy @ L=30mH	135	mJ
$I_{AS}$	Avalanche Current @ L=30mH	3.0	A
$T_J \quad T_{STG}$	Operating Junction and Storage Temperature Range	-55 to +150	°C

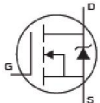
### Thermal Resistance

Symbol	Characteristics	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-case <sup>③</sup>	—	3.57	$^{\circ}C/W$
$R_{\theta JA}$	Junction-to-ambient ( $t \leq 10s$ ) <sup>④</sup>	—	110	$^{\circ}C/W$

### Electrical Characteristics @ $T_A=25^{\circ}C$ unless otherwise specified

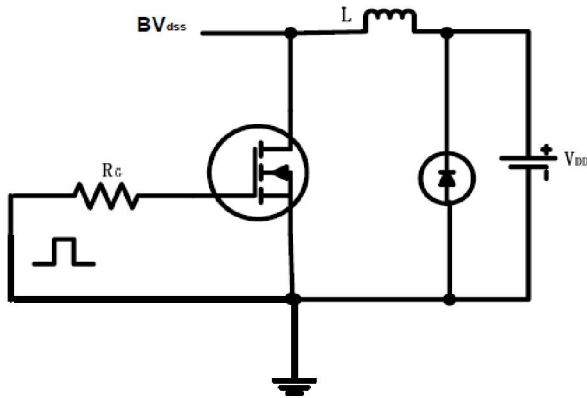
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source breakdown voltage	600	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	3.5	4.2	$\Omega$	$V_{GS}=10V, I_D = 1.0A$
		—	8.2	—		$T_J = 125^{\circ}C$
$V_{GS(th)}$	Gate threshold voltage	2	—	4	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
		—	1.9	—		$T_J = 125^{\circ}C$
$I_{DSS}$	Drain-to-Source leakage current	—	—	1	$\mu A$	$V_{DS} = 600V, V_{GS} = 0V$
		—	—	50		$T_J = 125^{\circ}C$
$I_{GSS}$	Gate-to-Source forward leakage	—	—	100	nA	$V_{GS} = 30V$
		—	—	-100		$V_{GS} = -30V$
$Q_g$	Total gate charge	—	5.7	—	nC	$I_D = 2.0A,$ $V_{DS}=480V,$ $V_{GS} = 10V$
$Q_{gs}$	Gate-to-Source charge	—	1.7	—		
$Q_{gd}$	Gate-to-Drain("Miller") charge	—	2.0	—		
$t_{d(on)}$	Turn-on delay time	—	9.6	—	ns	$V_{GS}=10V, V_{DS}=300V,$ $R_{GEN}=25\Omega, I_D=2.0A$
$t_r$	Rise time	—	6.9	—		
$t_{d(off)}$	Turn-Off delay time	—	15.5	—		
$t_f$	Fall time	—	10.9	—		
$C_{iss}$	Input capacitance	—	258	—	pF	$V_{GS} = 0V$
$C_{oss}$	Output capacitance	—	39	—		$V_{DS} = 25V$
$C_{rss}$	Reverse transfer capacitance	—	2.5	—		$f = 1MHz$

### Source-Drain Ratings and Characteristics

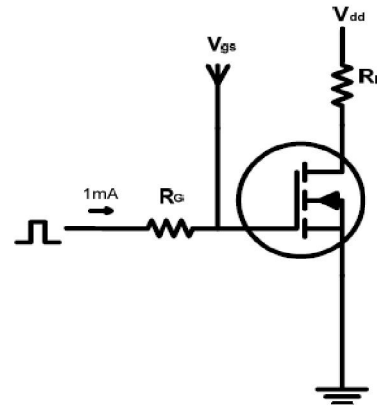
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$I_S$	Continuous Source Current (Body Diode)	—	—	2	A	MOSFET symbol showing the integral reverse p-n junction diode. 
$I_{SM}$	Pulsed Source Current (Body Diode)	—	—	8	A	
$V_{SD}$	Diode Forward Voltage	—	—	1.4	V	$I_S=2.0A, V_{GS}=0V$
$t_{rr}$	Reverse Recovery Time	—	357	—	ns	$T_J = 25^{\circ}C, I_F = 2A,$
$Q_{rr}$	Reverse Recovery Charge	—	1030	—	nC	$di/dt = 100A/\mu s$

## Test Circuits and Waveforms

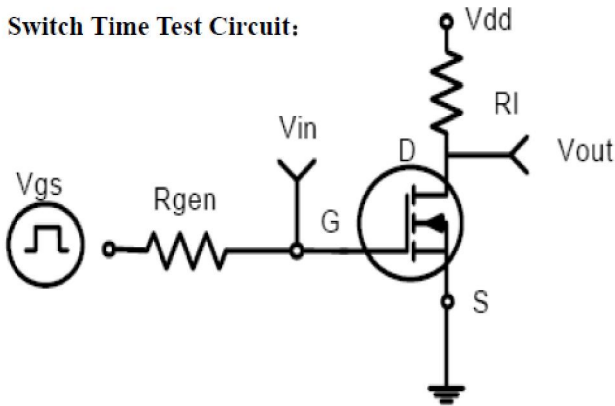
EAS test circuits:



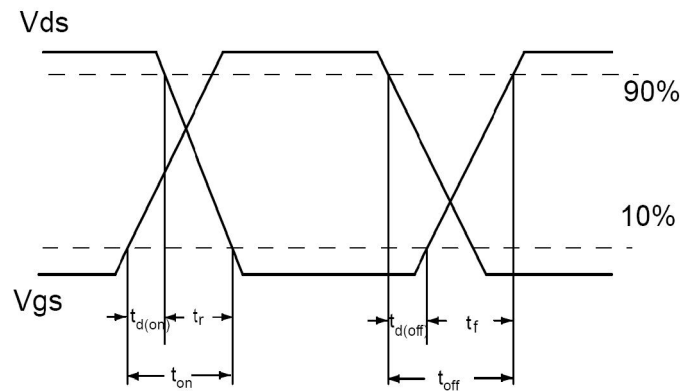
Gate charge test circuit:



Switch Time Test Circuit:



Waveforms:



### Notes:

- ① The maximum current rating is limited by bond-wires.
- ② Repetitive rating; pulse width limited by max. junction temperature.
- ③ The power dissipation PD is based on max. junction temperature, using junction-to-case thermal resistance.
- ④ The value of  $R_{\theta JA}$  is measured with the device mounted on 1in 2 FR-4 board with 2oz. Copper, in a still air environment with  $T_A = 25^\circ C$

## Typical Electrical and Thermal Characteristics

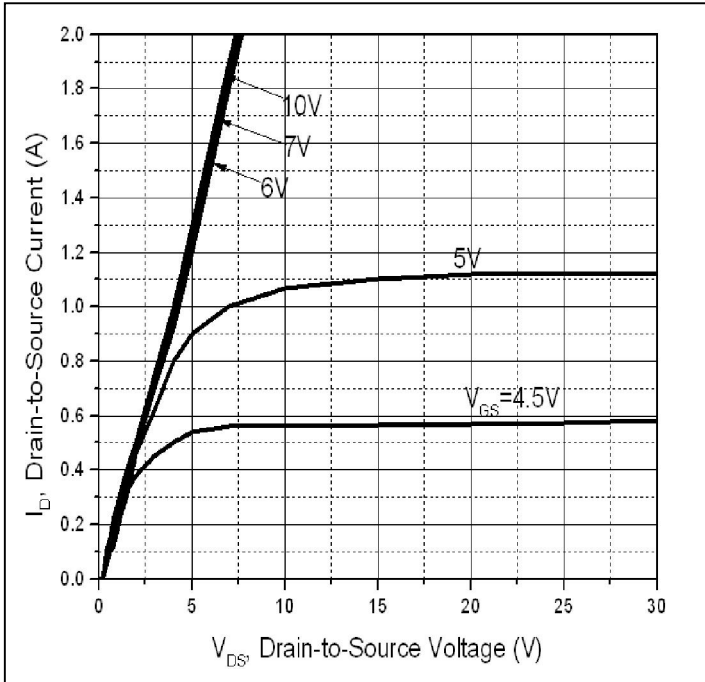


Figure 1: Typical Output Characteristics

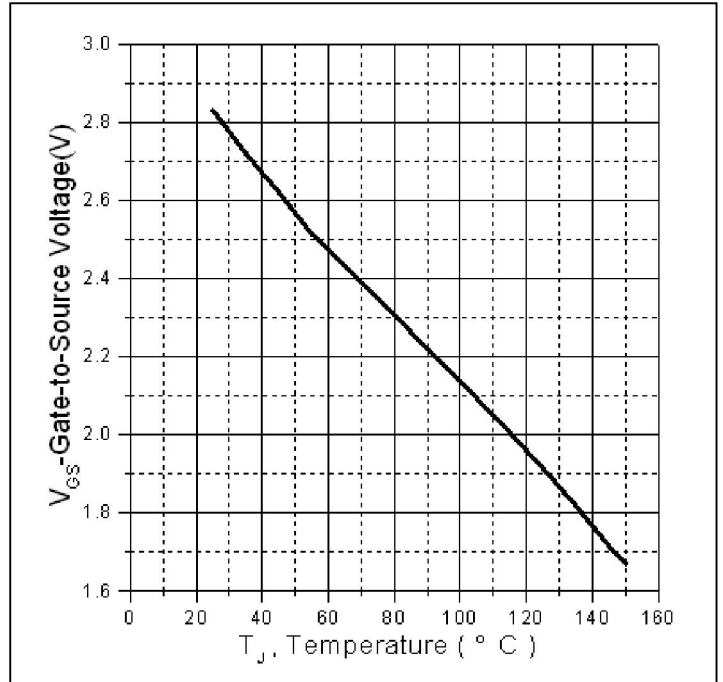


Figure 2. Gate to source cut-off voltage

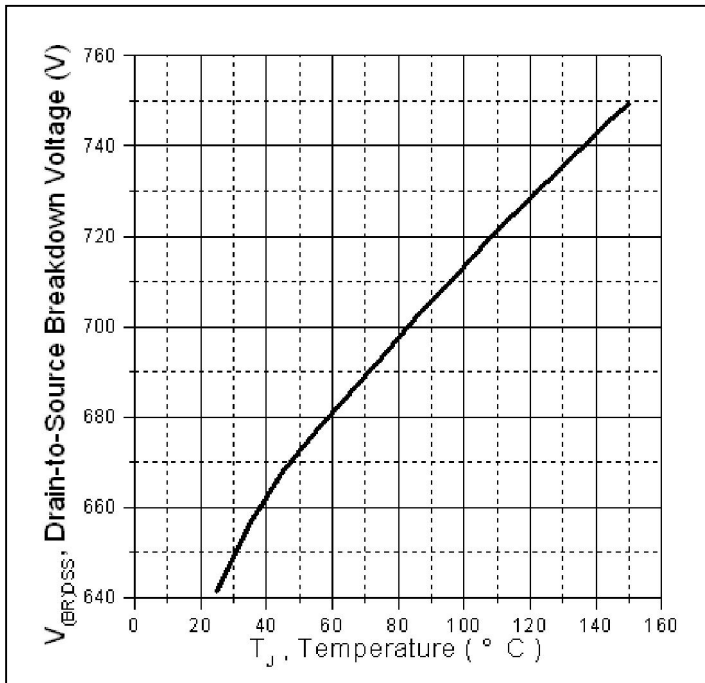


Figure 3. Drain-to-Source Breakdown Voltage Vs. Case Temperature

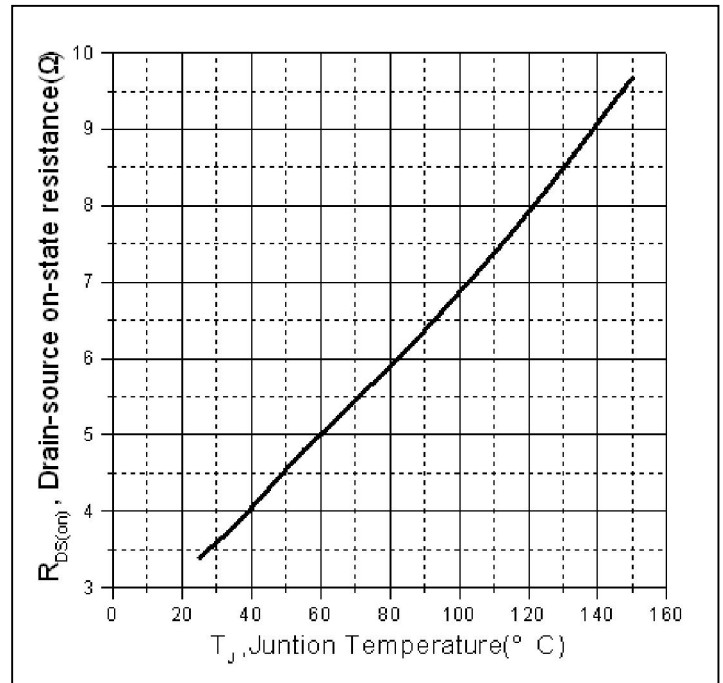
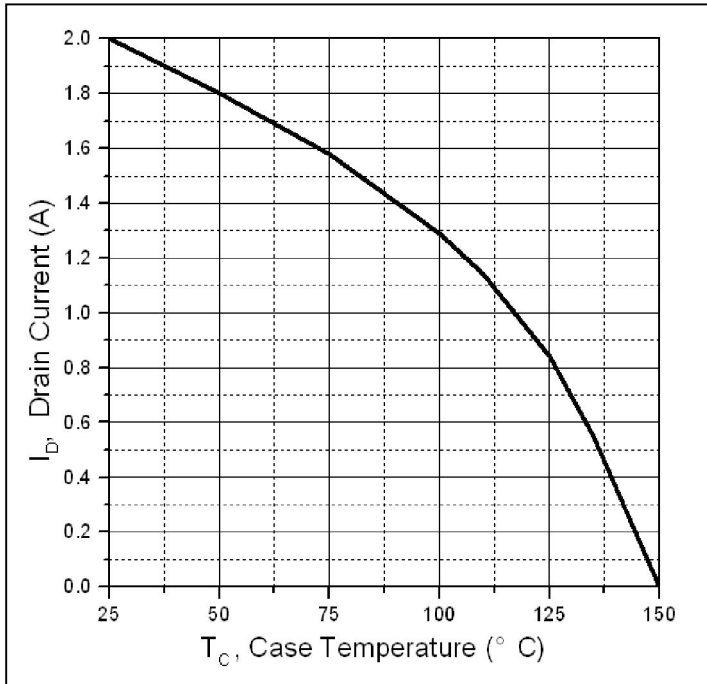
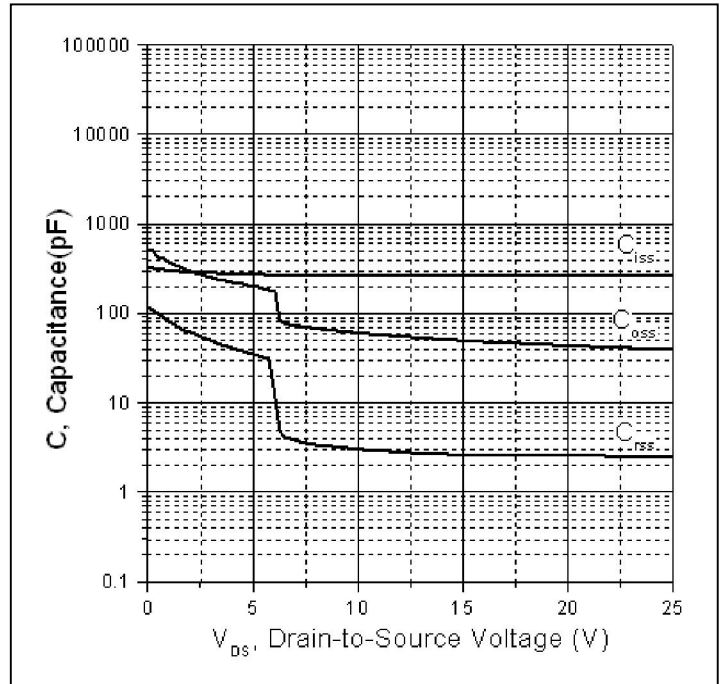


Figure 4: Normalized On-Resistance Vs. Case Temperature

**Typical Electrical and Thermal Characteristics**



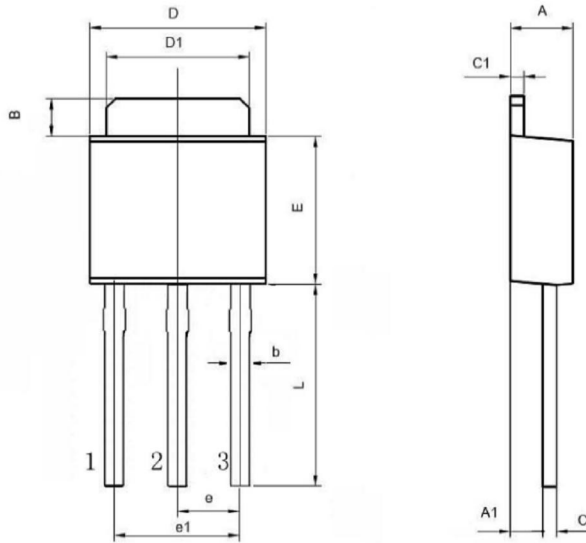
**Figure 5. Maximum Drain Current Vs. Case Temperature**



**Figure 6. Typical Capacitance Vs. Drain-to-Source Voltage**

**Mechanical Data**

TO-251 PACKAGE OUTLINE DIMENSION



Symbol	Dimension In Millimeters			Dimension In Inches		
	Min	Nom	Max	Min	Nom	Max
A	2.200	-	2.400	0.087	-	0.094
A1	0.950	-	1.150	0.037	-	0.045
B	0.950	-	1.250	0.037	-	0.049
b	0.500	-	0.700	0.020	-	0.028
c	0.450	-	0.550	0.018	-	0.022
c1	0.450	-	0.550	0.018	-	0.022
D	6.450	-	6.750	0.254	-	0.266
D1	5.200	-	5.400	0.205	-	0.213
E	5.950	-	6.250	0.234	-	0.246
e	2.240	-	2.340	0.088	-	0.092
e1	4.430	-	4.730	0.174	-	0.186
L	9.000	-	9.400	0.354	-	0.370



## Ordering and Marking Information

### Device Marking: SSF2N60G

Package (Available)  
TO-251 (IPAK)  
Operating Temperature Range  
C : -55 to 150 °C

## Devices per Unit

Package Type	Units/Tube	Tubes/Inner Box	Units/Inner Box	Inner Boxes/Carton Box	Units/Carton Box
TO-251	80	60	4800	5	24000

## Reliability Test Program

Test Item	Conditions	Duration	Sample Size
High Temperature Reverse Bias(HTRB)	$T_j=125^{\circ}\text{C}$ to $150^{\circ}\text{C}$ @ 80% of Max $V_{DSS}/V_{CES}/V_R$	168 hours 500 hours 1000 hours	3 lots x 77 devices
High Temperature Gate Bias(HTGB)	$T_j=150^{\circ}\text{C}$ @ 100% of Max $V_{GSS}$	168 hours 500 hours 1000 hours	3 lots x 77 devices