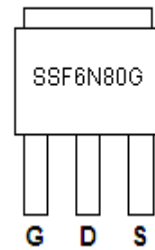
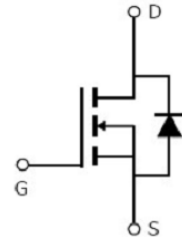


Main Product Characteristics:

V_{DS}	800V
$R_{DS(on)}$	2.35 Ω (typ.)
I_D	5.5A


TO-251 (IPAK)

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


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°C	Continuous Drain Current, V_{GS} @ 10V ^①	5.5	A
I_D @ TC = 100°C	Continuous Drain Current, V_{GS} @ 10V ^①	3.2	
I_{DM}	Pulsed Drain Current ^②	22	
P_D @TC = 25°C	Power Dissipation ^③	69	W
	Linear Derating Factor	0.55	W/°C
V_{DS}	Drain-Source Voltage	800	V
V_{GS}	Gate-to-Source Voltage	± 30	V
E_{AS}	Single Pulse Avalanche Energy @ L=33.5mH	339	mJ
I_{AS}	Avalanche Current @ L=33.5mH	4.5	A
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to +150	°C

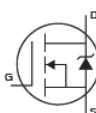
Thermal Resistance

Symbol	Characterizes	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-case ^③	—	1.8	°C/W
$R_{\theta JA}$	Junction-to-ambient ($t \leq 10s$) ^④	—	62	°C/W
	Junction-to-Ambient (PCB mounted, steady-state) ^④	—	40	°C/W

Electrical Characterizes @ $T_A=25^\circ\text{C}$ unless otherwise specified

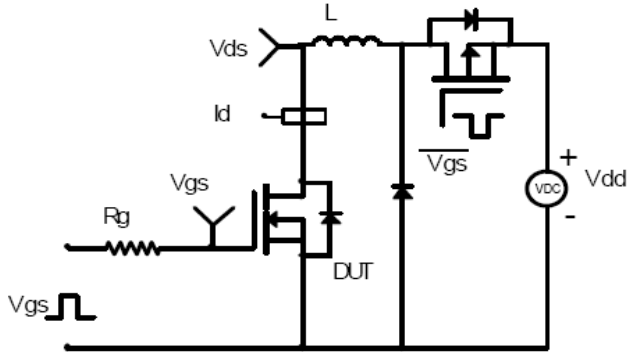
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source breakdown voltage	800	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	2.35	2.7	Ω	$V_{GS}=10V, I_D = 2.5A$
		—	5.2	—		$T_J = 125^\circ\text{C}$
$V_{GS(th)}$	Gate threshold voltage	2	—	4	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
		—	1.8	—		$T_J = 125^\circ\text{C}$
I_{DSS}	Drain-to-Source leakage current	—	—	1	μA	$V_{DS} = 800V, V_{GS} = 0V$
		—	—	50		$T_J = 125^\circ\text{C}$
I_{GSS}	Gate-to-Source forward leakage	—	—	100	nA	$V_{GS} = 30V$
		—	—	-100		$V_{GS} = -30V$
Q_g	Total gate charge	—	15	—	nC	$I_D = 5.5A,$ $V_{DS}=100V,$ $V_{GS} = 10V$
Q_{gs}	Gate-to-Source charge	—	5.0	—		
Q_{gd}	Gate-to-Drain("Miller") charge	—	4.8	—		
$t_{d(on)}$	Turn-on delay time	—	14	—	ns	$V_{GS}=10V, V_{DS}=415V,$ $R_L=75\Omega,$ $R_{GEN}=25\Omega$ $I_D=5.5A$
t_r	Rise time	—	27	—		
$t_{d(off)}$	Turn-Off delay time	—	38	—		
t_f	Fall time	—	25	—		
C_{iss}	Input capacitance	—	698	—	pF	$V_{GS} = 0V$
C_{oss}	Output capacitance	—	75	—		$V_{DS} = 25V$
C_{rss}	Reverse transfer capacitance	—	3.9	—		$f = 1MHz$

Source-Drain Ratings and Characteristics

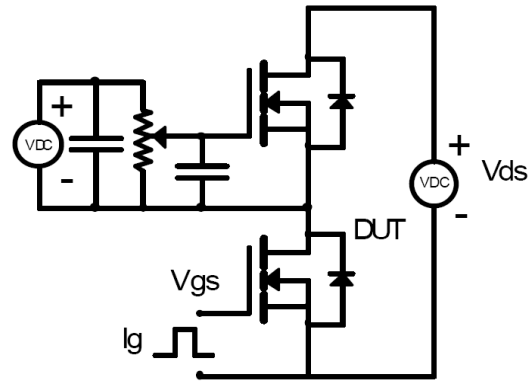
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	5.5	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode)	—	—	22	A	
V_{SD}	Diode Forward Voltage	—	0.87	1.4	V	$I_S=5A, V_{GS}=0V$
t_{rr}	Reverse Recovery Time	—	1029	—	ns	$T_J = 25^\circ\text{C}, I_F = 5.5A,$ $di/dt = 100A/\mu s$
Q_{rr}	Reverse Recovery Charge	—	3835	—	nC	

Test circuits and Waveforms

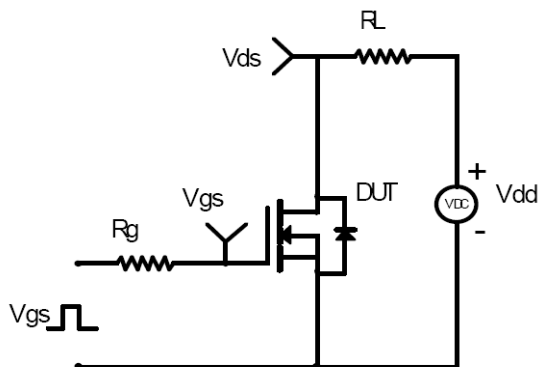
EAS Test Circuit:



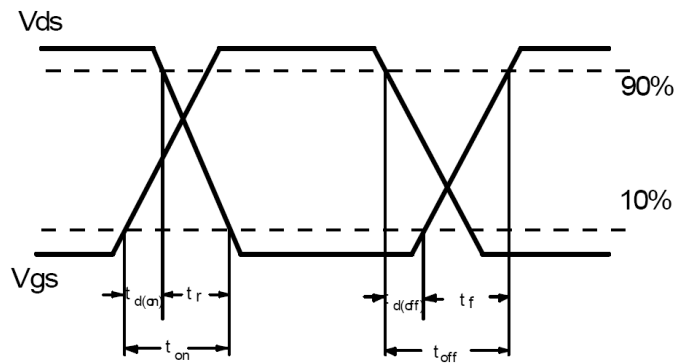
Gate charge test circuit:



Switching Time Test Circuit:



Switching Waveforms:



Notes:

- ① Calculated continuous current based on maximum allowable junction temperature.
- 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 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with $T_A = 25^\circ\text{C}$

Typical electrical and thermal characteristics

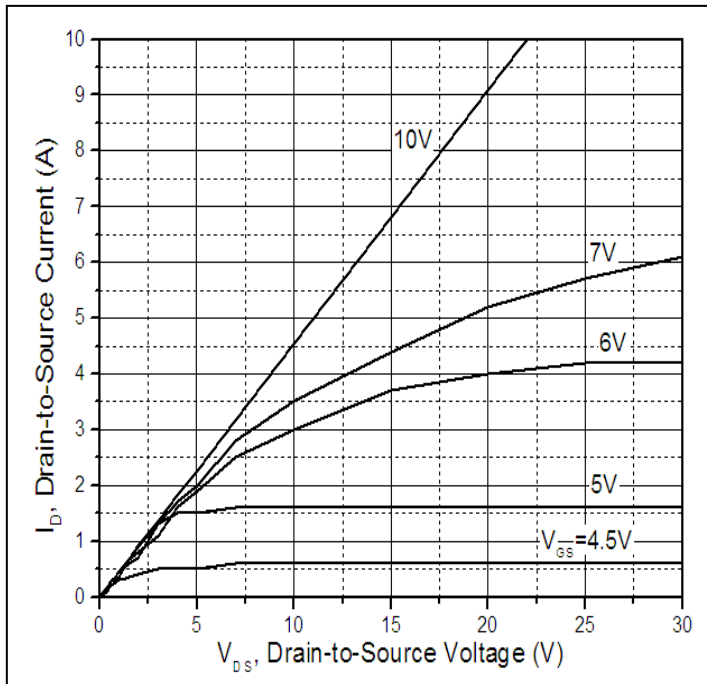


Figure 1: Typical Output Characteristics

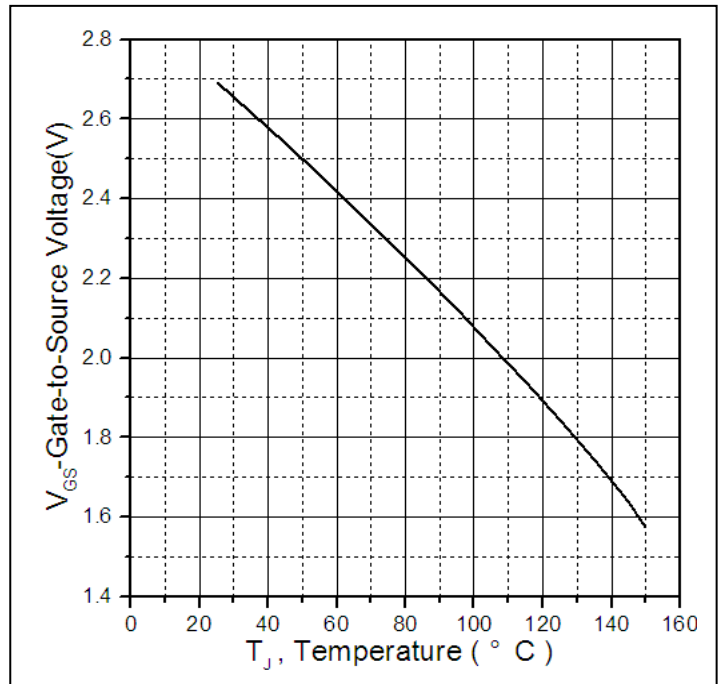


Figure 2. Gate to source cut-off voltage

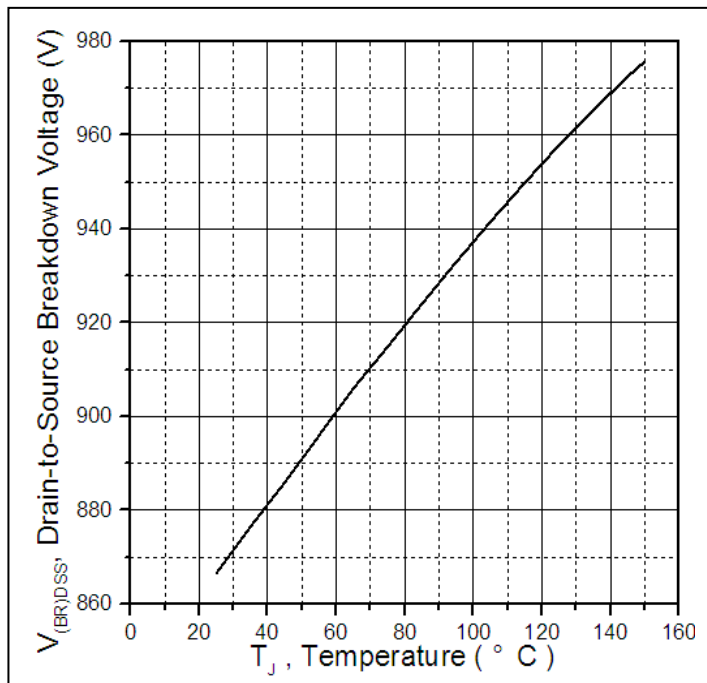


Figure 3. Drain-to-Source Breakdown Voltage Vs. Case Temperature

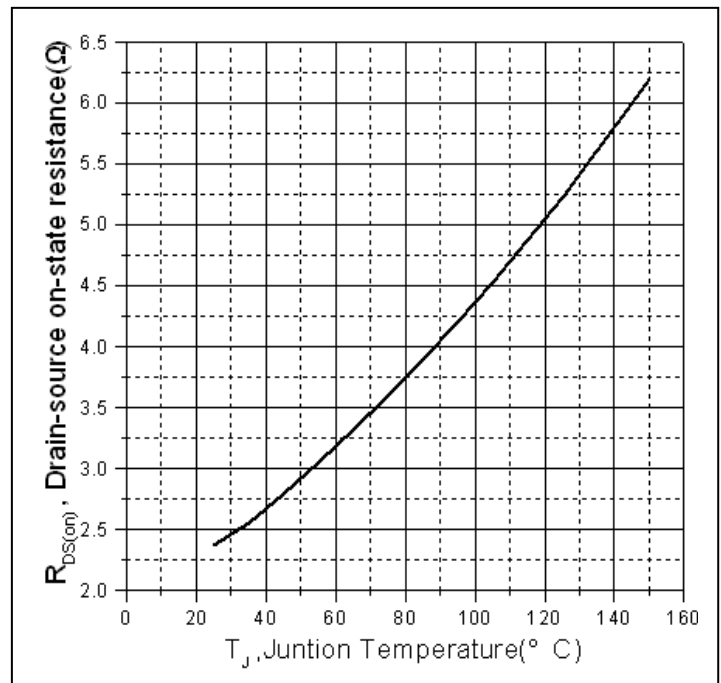


Figure 4: Normalized On-Resistance Vs. Case Temperature

Typical electrical and thermal characteristics

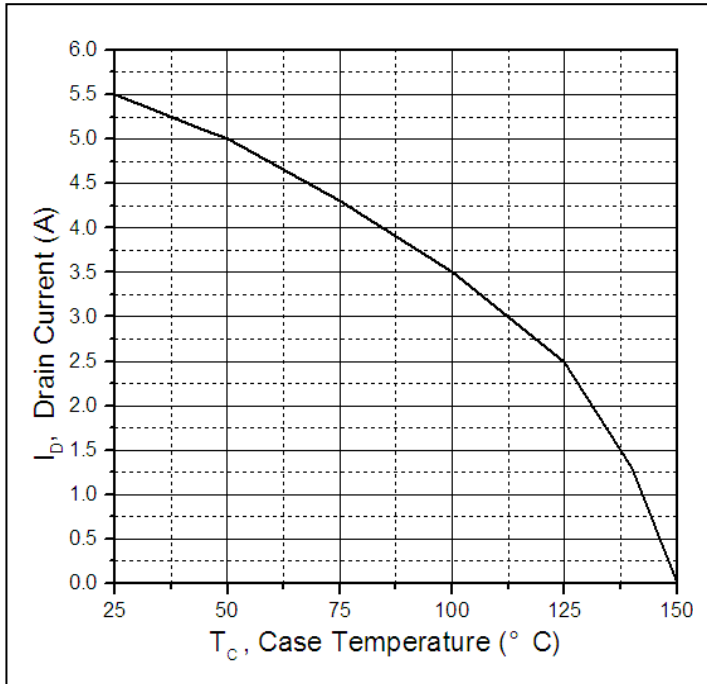


Figure 5. Maximum Drain Current Vs. Case Temperature

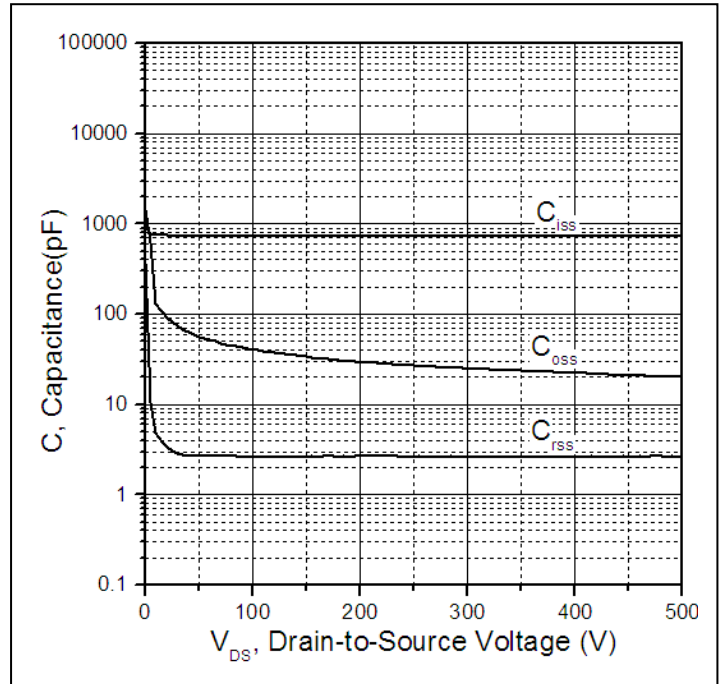


Figure 6. Typical Capacitance Vs. Drain-to-Source Voltage

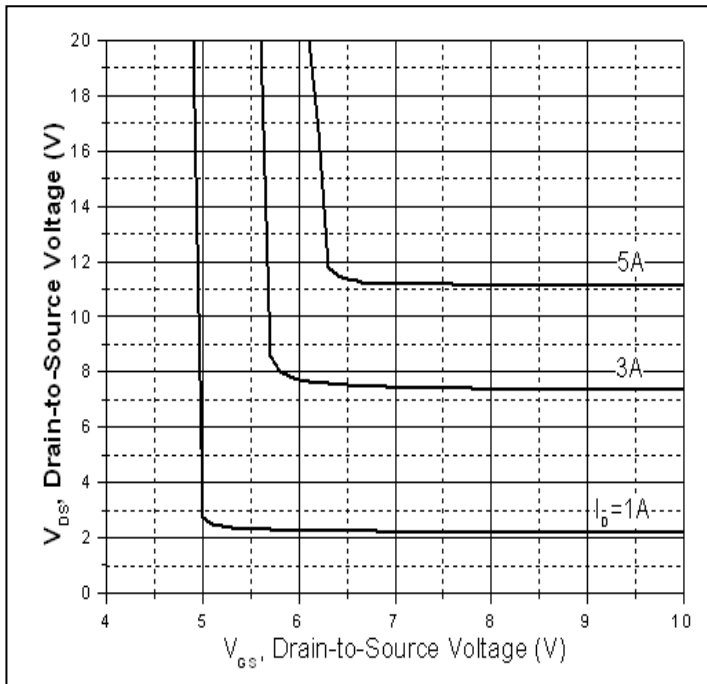


Figure 7. Drain-to-Source Voltage Vs. Gate-to-Source Voltage

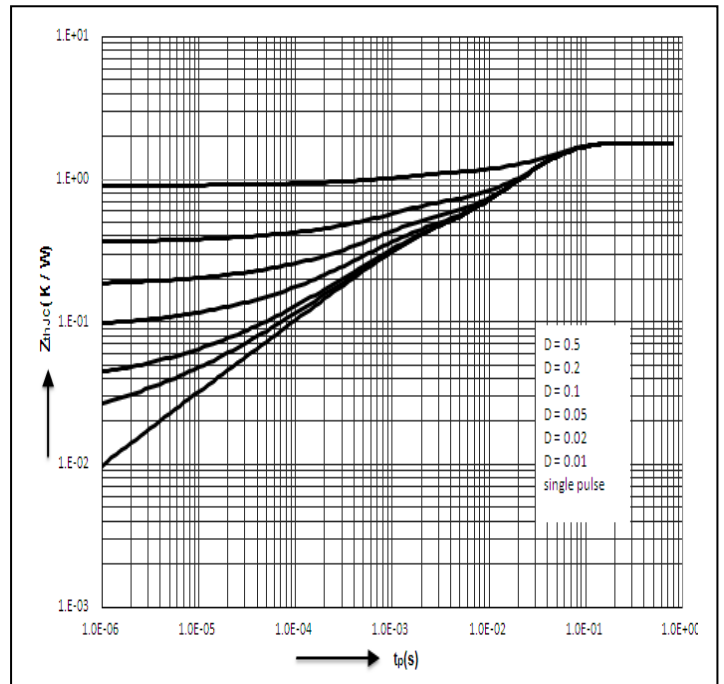
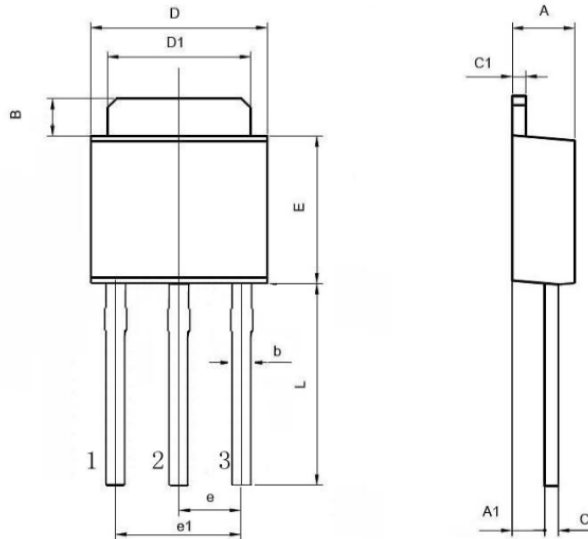


Figure 8. Maximum Effective Transient Thermal Impedance, Junction-to-Case

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: SSF6N80G**

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	75	48	3600	5	18000

Reliability Test Program

Test Item	Conditions	Duration	Sample Size
High Temperature Reverse Bias(HTRB)	$T_j=125^{\circ}\text{C}$ to 150°C @ 80% of Max $V_{\text{DSS}}/V_{\text{CES}}/V_{\text{R}}$	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

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