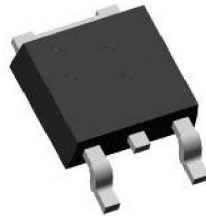
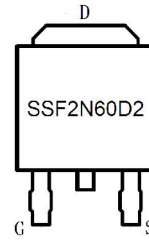


## Main Product Characteristics

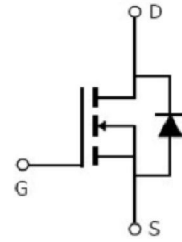
$V_{DSS}$	600V
$R_{DS(on)}$	3.7 $\Omega$ (typ.)
$I_D$	2A



TO-252



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, $V_{GS} @ 10V$ ①	2	A
$I_D @ TC = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$ ①	1.3	
$I_{DM}$	Pulsed Drain Current②	8	
$P_D @ TC = 25^\circ C$	Power Dissipation③	34	W
	Linear Derating Factor	0.27	W/°C
$V_{DS}$	Drain-Source Voltage	600	V
$V_{GS}$	Gate-to-Source Voltage	$\pm 30$	V
$E_{AS}$	Single Pulse Avalanche Energy @ L=30mH	115	mJ
$I_{AS}$	Avalanche Current @ L=30mH	2.52	A
$T_J$ $T_{STG}$	Operating Junction and Storage Temperature Range	-55 to +150	°C

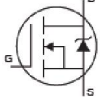
## Thermal Resistance

Symbol	Characteristics	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-case <sup>③</sup>	—	3.7	°C/W
$R_{\theta JA}$	Junction-to-ambient ( $t \leq 10s$ ) <sup>④</sup>	—	110	°C/W

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

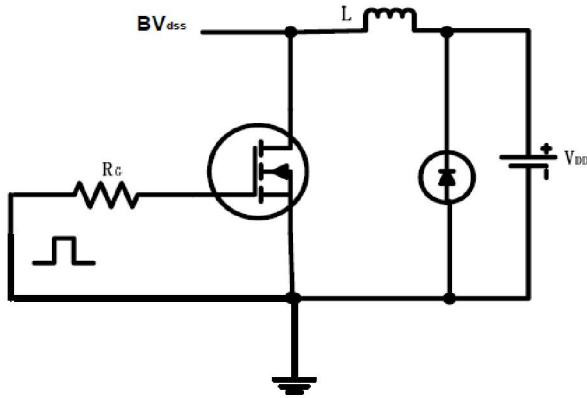
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source breakdown voltage	600	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	3.7	4.2	$\Omega$	$V_{GS}=10V, I_D = 1.0A$
		—	8.2	—		$T_J = 125^\circ\text{C}$
$V_{GS(th)}$	Gate threshold voltage	2	—	4	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
		—	2.2	—		$T_J = 125^\circ\text{C}$
$I_{DSS}$	Drain-to-Source leakage current	—	—	1	$\mu A$	$V_{DS} = 600V, V_{GS} = 0V$
		—	—	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	—	5.67	—	nC	$I_D = 2.0A,$ $V_{DS}=480V,$ $V_{GS} = 10V$
$Q_{gs}$	Gate-to-Source charge	—	1.74	—		
$Q_{gd}$	Gate-to-Drain("Miller") charge	—	1.99	—		
$t_{d(on)}$	Turn-on delay time	—	9.2	—	ns	$V_{GS}=10V, V_{DS}=300V,$ $R_{GEN}=25\Omega, I_D=2.0A$
$t_r$	Rise time	—	23.4	—		
$t_{d(off)}$	Turn-Off delay time	—	15.3	—		
$t_f$	Fall time	—	20.1	—		
$C_{iss}$	Input capacitance	—	250.1	—	pF	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1MHz$
$C_{oss}$	Output capacitance	—	35.7	—		
$C_{rss}$	Reverse transfer capacitance	—	1.1	—		

## Source-Drain Ratings and Characteristics

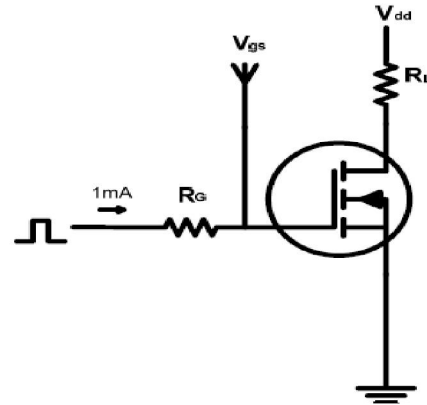
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$I_S$	Continuous Source Current (Body Diode)	—	—	2	A	MOSFET symbol showing the integral reverse p-n junction diode. 
$I_{SM}$	Pulsed Source Current (Body Diode)	—	—	8	A	
$V_{SD}$	Diode Forward Voltage	—	—	1.4	V	$I_S=2.0A, V_{GS}=0V$
$t_{rr}$	Reverse Recovery Time	—	356.8	—	ns	$T_J = 25^\circ\text{C}, I_F = 2A,$ $di/dt = 100A/\mu s$
$Q_{rr}$	Reverse Recovery Charge	—	1030	—	nC	

## Test Circuits and Waveforms

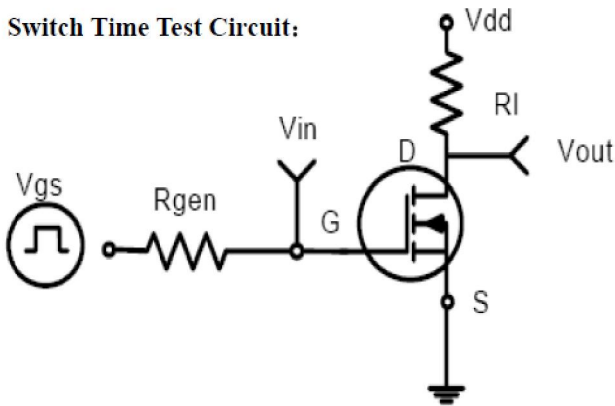
EAS test circuits:



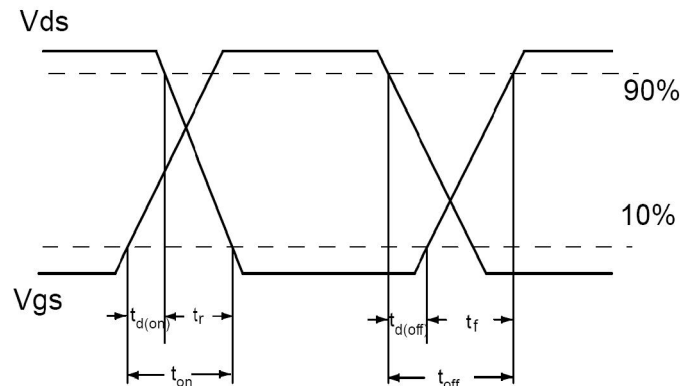
Gate charge test circuit:



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  $T_A = 25^\circ\text{C}$

## Typical Electrical and Thermal Characteristics

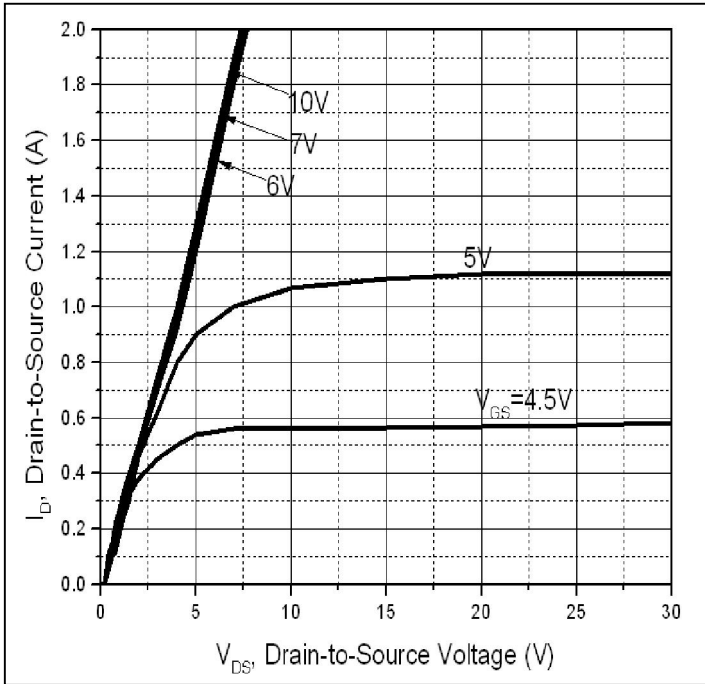


Figure 1: Typical Output Characteristics

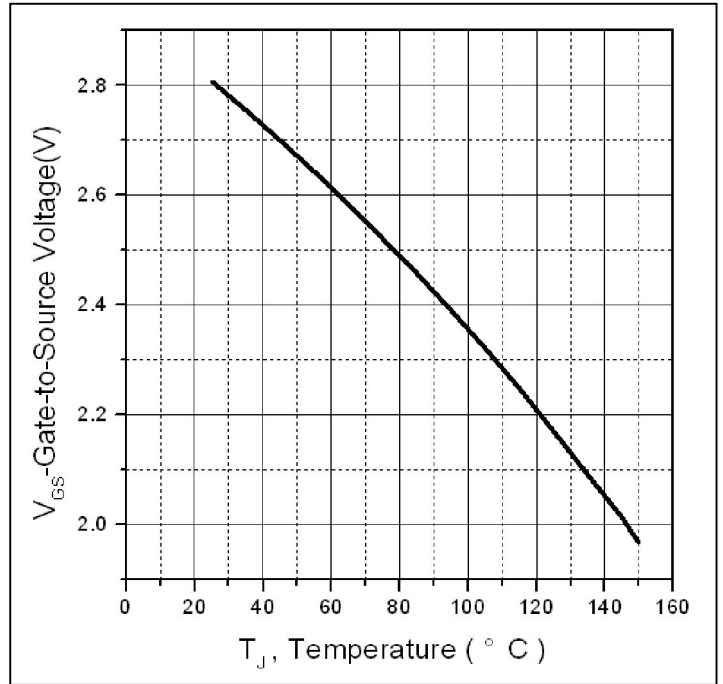


Figure 2: Gate to source cut-off voltage

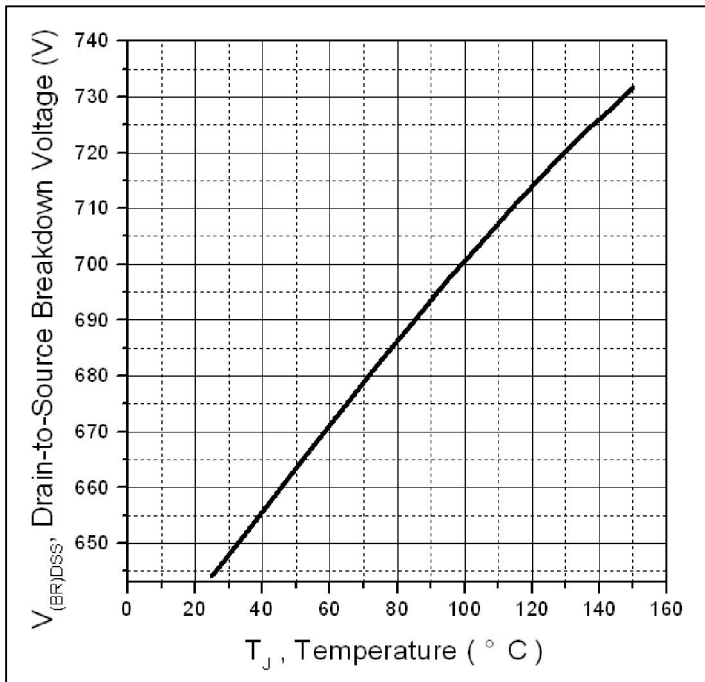


Figure 3: Drain-to-Source Breakdown Voltage Vs. Case Temperature

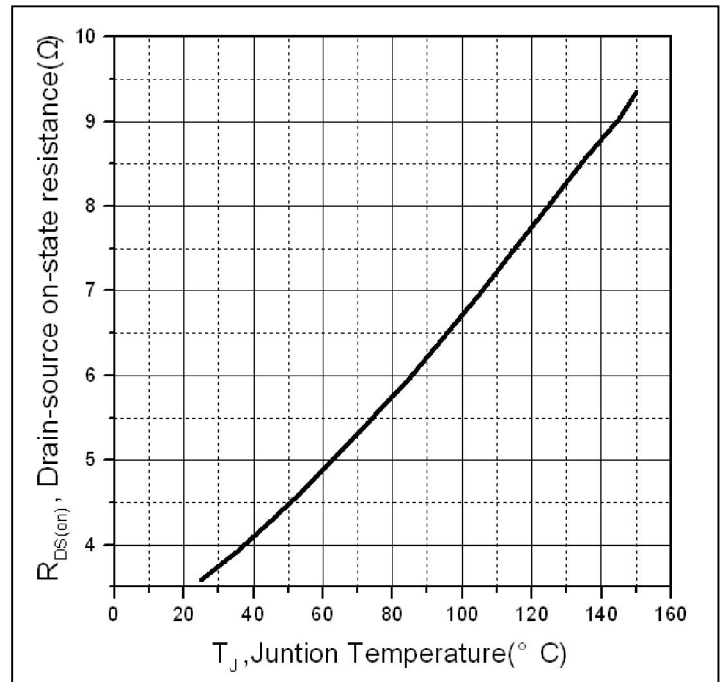


Figure 4: Normalized On-Resistance Vs. Case Temperature

## Typical Electrical and Thermal Characteristics

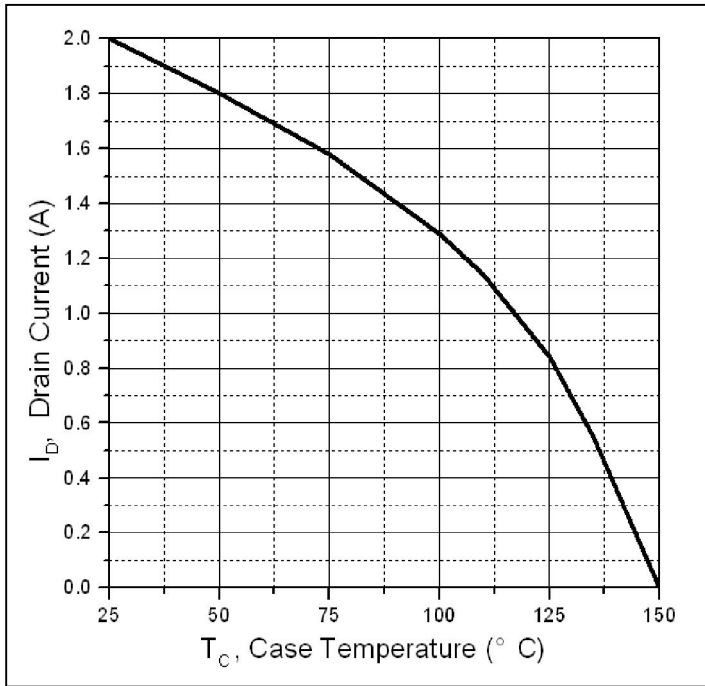


Figure 5. Maximum Drain Current Vs. Case Temperature

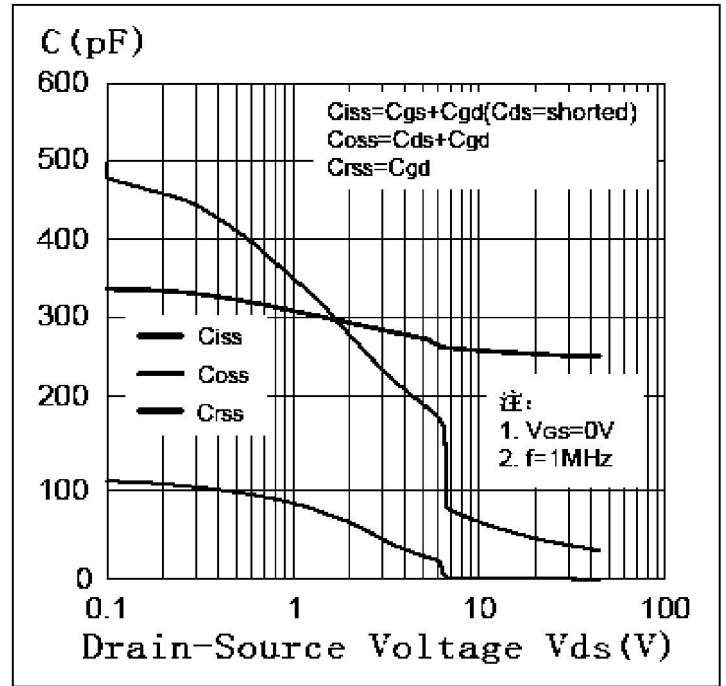
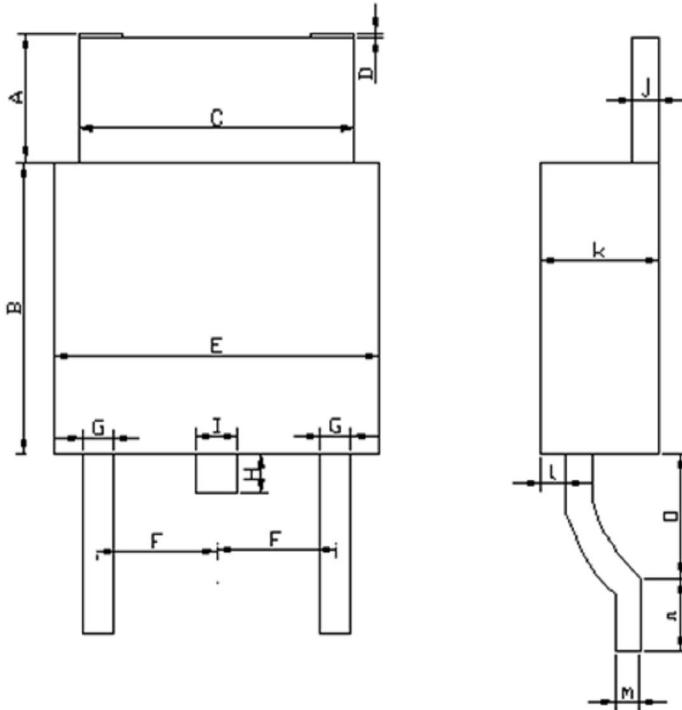


Figure 6. Typical Capacitance Vs. Drain-to-Source Voltage

**Mechanical Data**

TO-252 PACKAGE OUTLINE DIMENSION



Symbol	Dimension In Millimeters			Dimension In Inches		
	Min	Nom	Max	Min	Nom	Max
A	0.400	0.900	1.400	0.016	0.035	0.055
B	5.350	5.850	6.350	0.211	0.230	0.250
C	4.800	5.300	5.800	0.189	0.209	0.228
D	0.980	0.100	1.020	0.039	0.004	0.040
E	5.800	6.300	6.800	0.228	0.248	0.268
F	2.200	2.300	2.400	0.087	0.091	0.094
G	0.600	0.700	0.800	0.024	0.028	0.031
H	0.200	0.700	1.200	0.008	0.028	0.047
I	0.700	0.800	0.900	0.028	0.031	0.035
J	0.408	0.508	0.608	0.016	0.020	0.024
K	2.050	2.300	2.550	0.081	0.091	0.100
L	0.550	0.800	1.050	0.022	0.031	0.041
M	0.408	0.508	0.608	0.016	0.020	0.024
N	1.050	1.300	1.550	0.041	0.051	0.061
O	1.250	1.500	1.750	0.049	0.059	0.069



## Ordering and Marking Information

### Device Marking: SSF2N60D2

Package (Available)  
TO-252 (DPAK)  
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-252	80	50	4000	10	40000

## 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