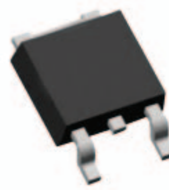
GOOD-ARK
SEMICONDUCTOR

SSF1N80D

800V N-Channel MOSFET

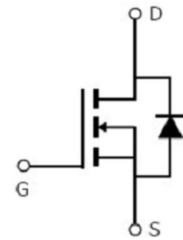
Main Product Characteristics

V_{DSS}	800V
R_{DS}(on)	13Ω (typ.)
I_D	1A



TO-252(DPAK)

Marking and Pin Assignment



Schematic Diagram

Features and Benefits

- Advanced MOSFET process technology
- Ideal 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

The SSF1N80D utilizes the latest processing techniques to achieve high cell density, low on-resistance and high repetitive avalanche rating. These features make this device extremely efficient and reliable device for use in power switching applications and a wide variety of other applications.

Absolute Max Ratings

Symbol	Parameter	Max.	Units
I_D @ T_C = 25°C	Continuous Drain Current, V_{GS} @ 10V①	1	A
I_D @ T_C = 100°C	Continuous Drain Current, V_{GS} @ 10V①	0.75	
I_{DM}	Pulsed Drain Current②	4	
P_D @T_C = 25°C	Power Dissipation③	44	W
	Linear Derating Factor	0.36	W/°C
V_{DS}	Drain-Source Voltage	800	V
V_{GS}	Gate-to-Source Voltage	± 30	V
E_{AS}	Single Pulse Avalanche Energy @ L=100mH	50	mJ
I_{AS}	Avalanche Current @ L=100mH	1	A
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 150	°C

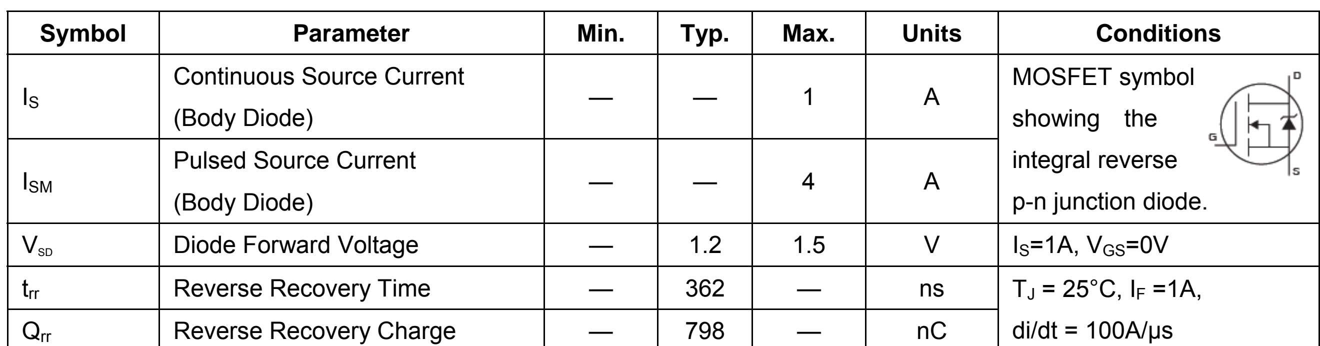
Thermal Resistance

Symbol	Characteristics	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case③	—	2.78	°C/W
$R_{\theta JA}$	Junction-to-Ambient ($t \leqslant 10s$) ④	—	100	°C/W
	Junction-to-Ambient (PCB mounted, steady-state) ④	—	40	°C/W

Electrical Characteristics (T_A=25°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 = 250μA
$R_{DS(on)}$	Static Drain-to-Source On-resistance	—	13	16	Ω	V_{GS}=10V,I_D = 0.5A
		—	18	—		T_J = 125°C
$V_{GS(th)}$	Gate Threshold Voltage	2	—	4	V	V_{DS} = V_{GS}, I_D = 250μA
		—	2.0	—		T_J = 125°C
I_{DSS}	Drain-to-Source Leakage Current	—	—	1	μA	V_{DS} = 800V,V_{GS} = 0V
		—	—	50		T_J = 125°C
I_{GSS}	Gate-to-Source Forward Leakage	—	—	100	nA	V_{GS} =30V
		—	—	-100		V_{GS} = -30V
Q_g	Total Gate Charge	—	8.9	—	nC	I_D = 1A,
Q_{gs}	Gate-to-Source Charge	—	2.1	—		V_{DS}=640V,
Q_{gd}	Gate-to-Drain("Miller") Charge	—	3.3	—		V_{GS} = 10V
$t_{d(on)}$	Turn-on Delay Time	—	8.1	—	ns	V_{GS}=10V, VDS=400V,
t_r	Rise Time	—	29	—		R_L=44Ω,
$t_{d(off)}$	Turn-Off Delay Time	—	19	—		R_{GEN}=25Ω
t_f	Fall Time	—	40	—		I_D=1A
C_{iss}	Input Capacitance	—	220	—	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	—	15	—		V_{DS} = 25V
C_{rss}	Reverse Transfer Capacitance	—	2	—		f = 1MHz

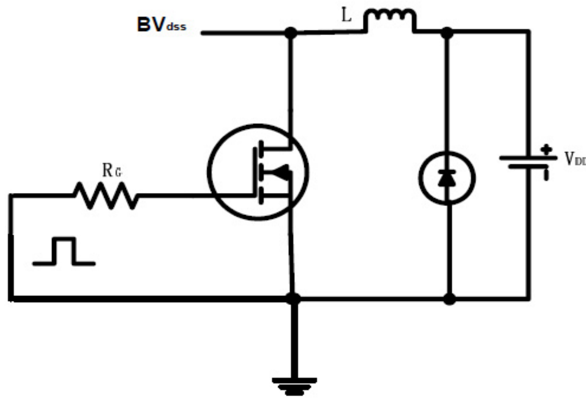
Source-Drain Ratings and Characteristics



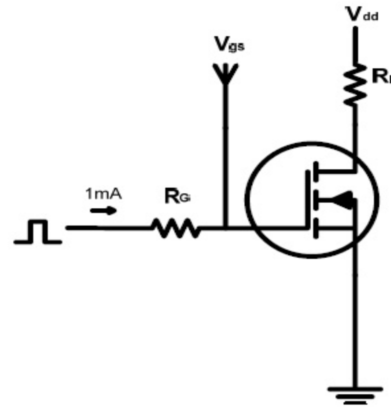
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	1	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode)	—	—	4	A	
V_{SD}	Diode Forward Voltage	—	1.2	1.5	V	I_S=1A, V_{GS}=0V
t_{rr}	Reverse Recovery Time	—	362	—	ns	T_J = 25°C, I_F =1A,
Q_{rr}	Reverse Recovery Charge	—	798	—	nC	di/dt = 100A/μs

Test Circuits and Waveforms

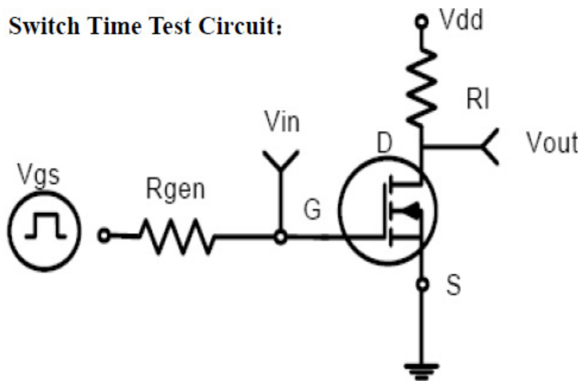
EAS test circuits:



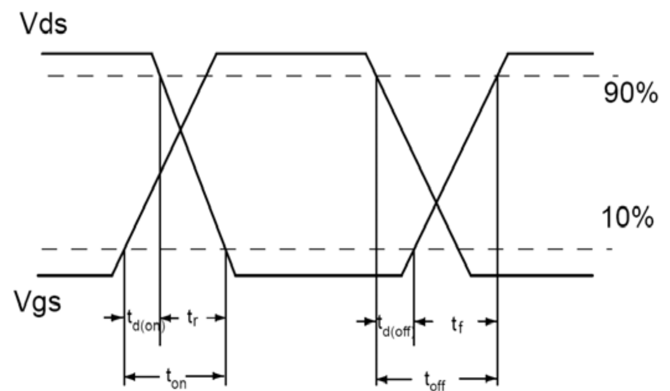
Gate charge test circuit:



Switch Time Test Circuit:



Switch Waveforms:



Notes:

①The maximum current rating is limited by bond-wires.

②Repetitive rating; pulse width limited by max. junction temperature.

③The power dissipation PD is based on max. junction temperature, using junction-to-case thermal resistance.

④The 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 TA =25°C

Typical Electrical and Thermal Characteristics

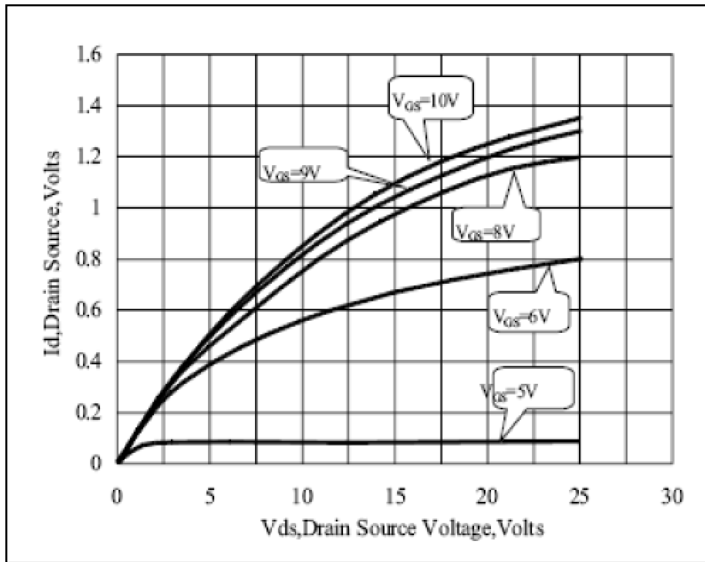


Figure 1. Typical Output Characteristics

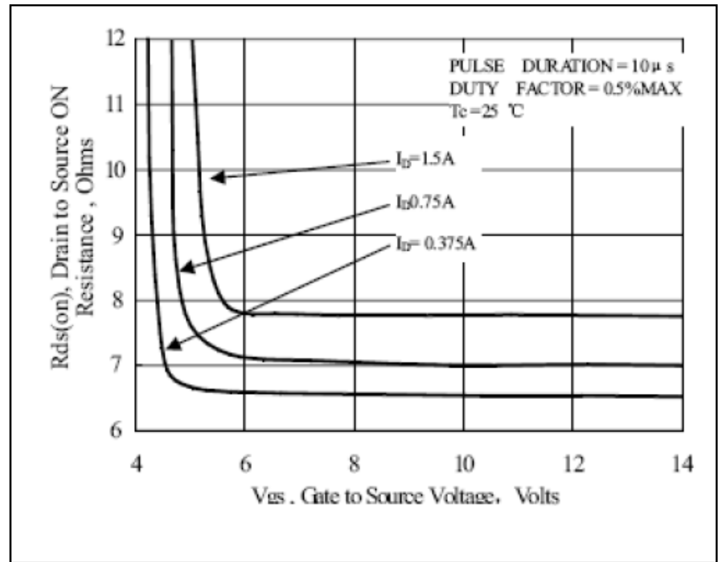


Figure 2. On-Resistance Vs. Gate to Source Voltage

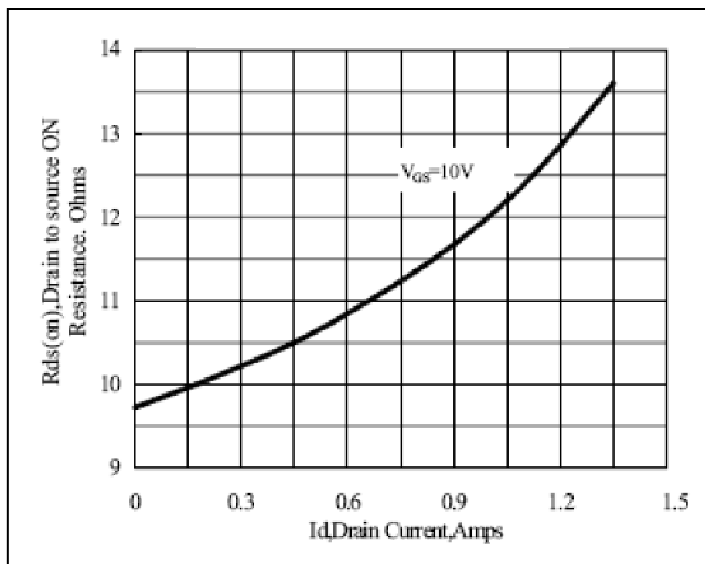


Figure 3. On-Resistance Vs. Drain to Source Current

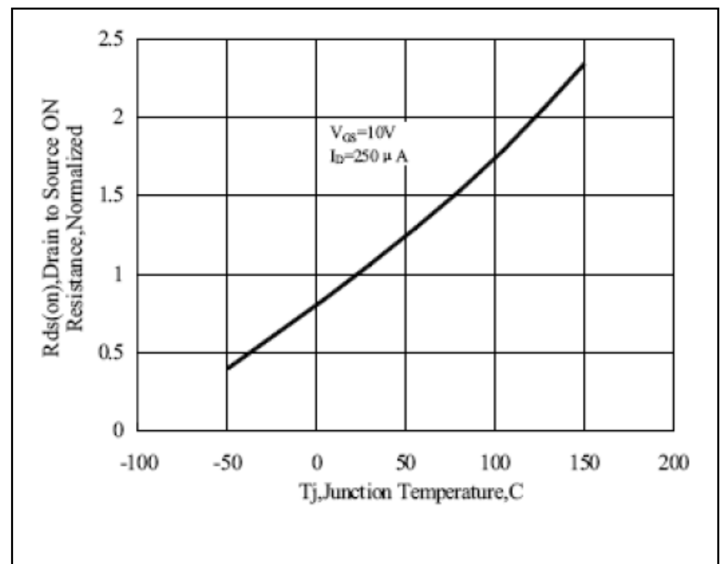
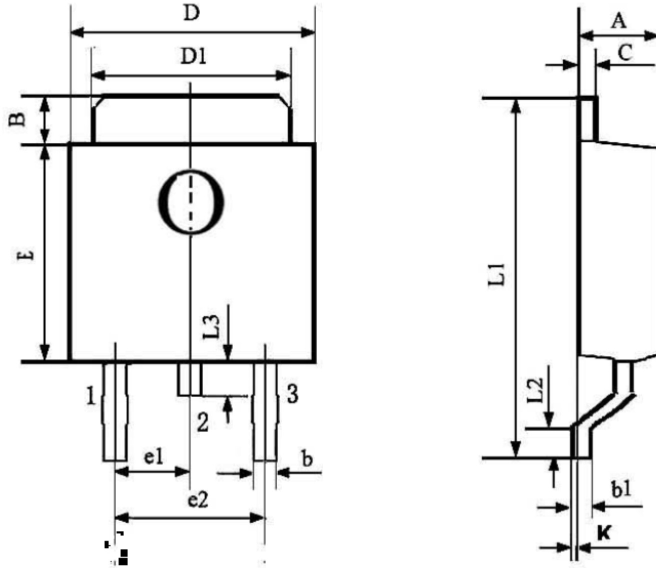


Figure 4. Normalized On-Resistance Vs. Case Temperature

Mechanical Data



Symbol	Dimension In Millimeters			Dimension In Inches		
	Min	Nom	Max	Min	Nom	Max
A	2.200	-	2.400	0.087	-	0.094
B	0.950	-	1.250	0.037	-	0.049
b	0.500	-	0.700	0.020	-	0.028
b1	0.450	-	0.550	0.018	-	0.022
C	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
e1	2.240	-	2.340	0.088	-	0.092
e2	4.430	-	4.730	0.174	-	0.186
L1	9.450	-	9.950	0.372	-	0.392
L2	1.250	-	1.750	0.049	-	0.069
L3	0.600	-	0.900	0.024	-	0.035
K	0.000	-	0.100	0.000	-	0.004

Ordering and Marking Information

Device Marking: SSF1N80D

Package (Available)
TO-252（DPAK）
Operating Temperature Range
C : -55 to 150 ºC

Devices per Unit（options）

Package Type	Units/Tape	Tapes/Inner Box	Units/Inner Box	Inner Boxes/Carton Box	Units/Carton Box
TO-252	2500	2	5000	7	35000
TO-252	2500	1	2500	10	25000
TO-252	800	5	4000	8	32000

Reliability Test Program

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