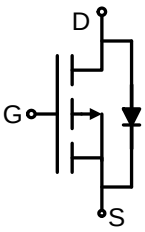
Main Product Characteristics:

V_{DSS}	-100V
R_{DS}(on)	36mΩ (typ.)
I_D	-30A

TO-252 (DPAK)

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℃ 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	-30	A
I_{DM}	Pulsed Drain Current ②	-120	
P_D @TC = 25°C	Power Dissipation ③	102	W
	Linear Derating Factor	0.82	W/°C
V_{DS}	Drain-Source Voltage	-100	V
V_{GS}	Gate-to-Source Voltage	± 30	V
E_{AS}	Single Pulse Avalanche Energy @ L=0.1mH	106	mJ
I_{AS}	Avalanche Current @ L=0.1mH	46	A
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to +150	°C

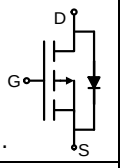
Thermal Resistance

Symbol	Characterizes	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-case③	—	1.22	℃/W
$R_{\theta JA}$	Junction-to-ambient (t ≤ 10s) ④	—	6.2	℃/W

Electrical Characterizes @T_A=25℃ unless otherwise specified

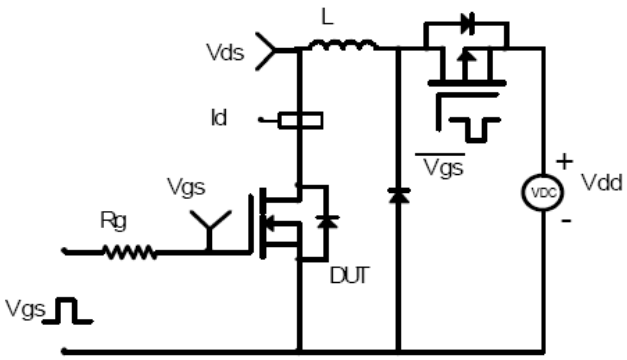
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source breakdown voltage	-100	—	—	V	V_{GS} = 0V, I_D = -250μA
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	36	45	mΩ	V_{GS}=-10V,I_D =-15A
		—	39	55		V_{GS}=- 4.5V,I_D =-10A
$V_{GS(th)}$	Gate threshold voltage	-1	—	-3	V	V_{DS} = V_{GS}, I_D =- 250μA
I_{DSS}	Drain-to-Source leakage current	—	—	-1	μA	V_{DS} =-100V,V_{GS} = 0V
I_{GSS}	Gate-to-Source forward leakage	—	—	100	nA	V_{GS} =30V
		—	—	-100		V_{GS} = -30V
Q_g	Total gate charge	—	90	—	nC	I_D = -10A,
Q_{gs}	Gate-to-Source charge	—	15	—		V_{DS}=-50V,
Q_{gd}	Gate-to-Drain("Miller") charge	—	11	—		V_{GS} = -10V
$t_{d(on)}$	Turn-on delay time	—	55	—	ns	V_{GS}=-10V, V_{DS}=-50V, R_{GEN}=25Ω I_D=-5A
t_r	Rise time	—	20	—		
$t_{d(off)}$	Turn-Off delay time	—	210	—		
t_f	Fall time	—	90	—		
C_{iss}	Input capacitance	—	7800	—	pF	V_{GS} = 0V
C_{oss}	Output capacitance	—	222	—		V_{DS} = -25V
C_{rss}	Reverse transfer capacitance	—	165	—		f = 1MHz

Source-Drain Ratings and Characteristics

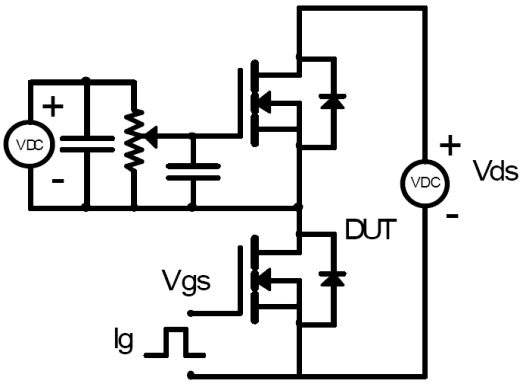
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	-30	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode)	—	—	-60	A	
V_{sd}	Diode Forward Voltage	—	—	-1.2	V	I_S=-6A, V_{GS}=0V

Test circuits and Waveforms

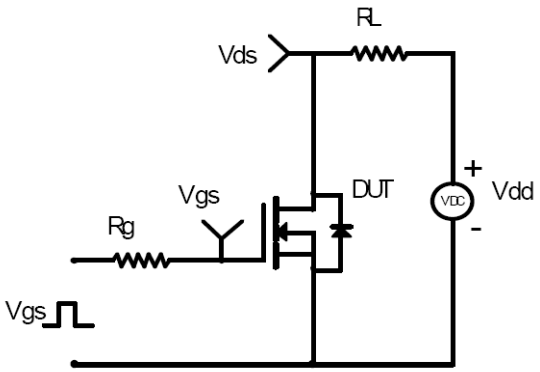
EAS Test Circuit:



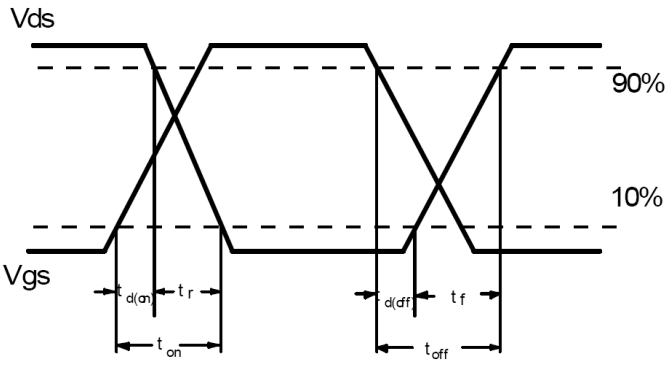
Gate charge test circuit:



Switching Time Test Circuit:



Switching Waveforms:



Notes:

①Calculated continuous current based on maximum allowable junction temperature.

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 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with TA =25°C

Typical electrical and thermal characteristics

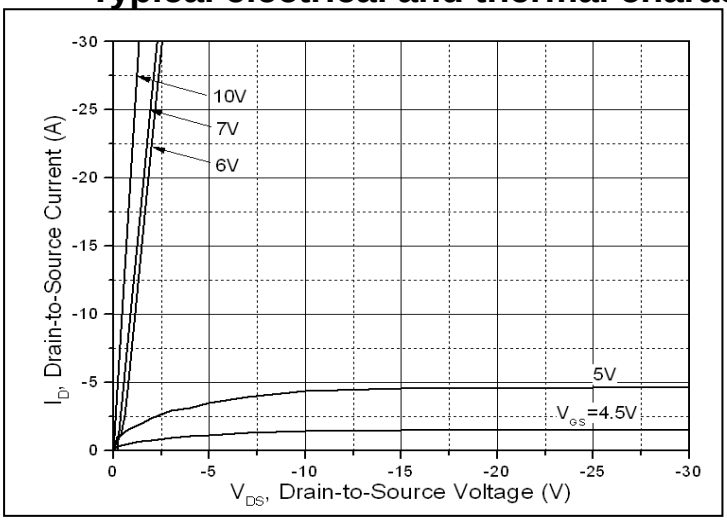


Figure 1: Typical Output Characteristics

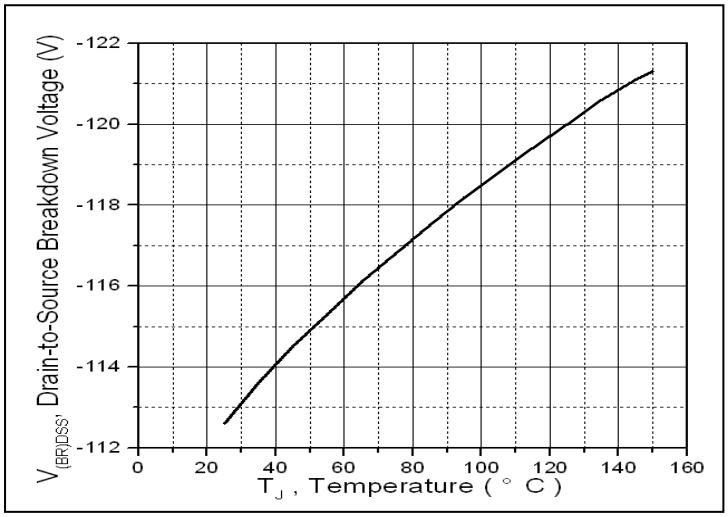


Figure 2: Drain-to-Source Breakdown Voltage vs. Temperature

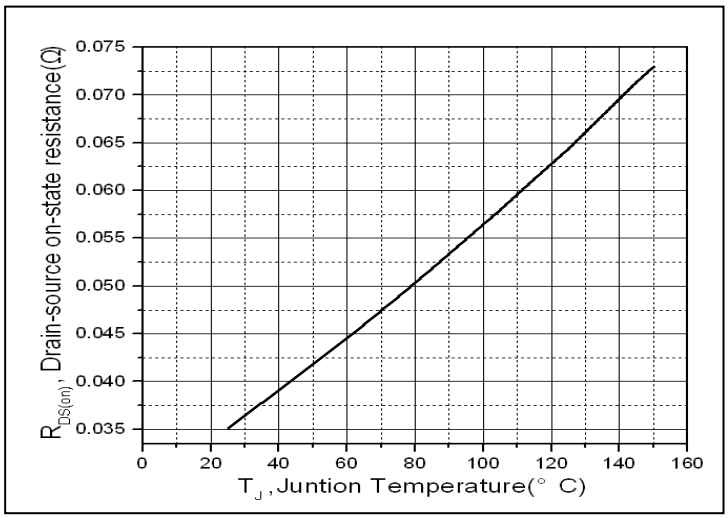


Figure 3: Normalized On-Resistance Vs. Case Temperature

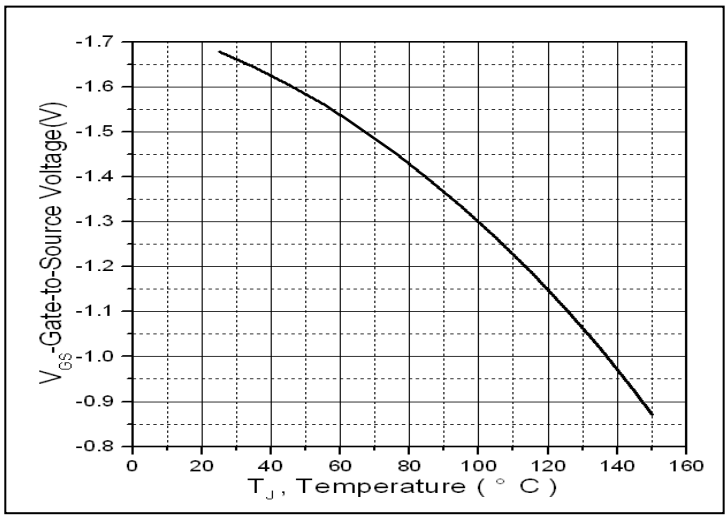


Figure 4: Gate to source cut-off voltage

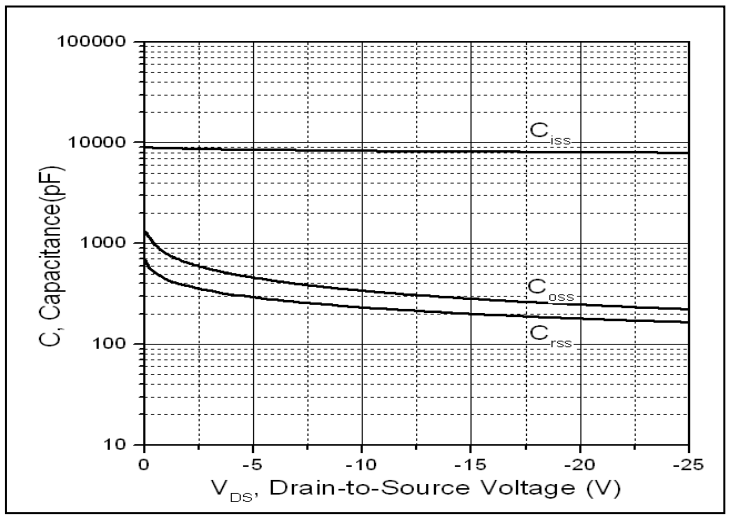


Figure 5: Typical Capacitance Vs. Drain-to-Source Voltage

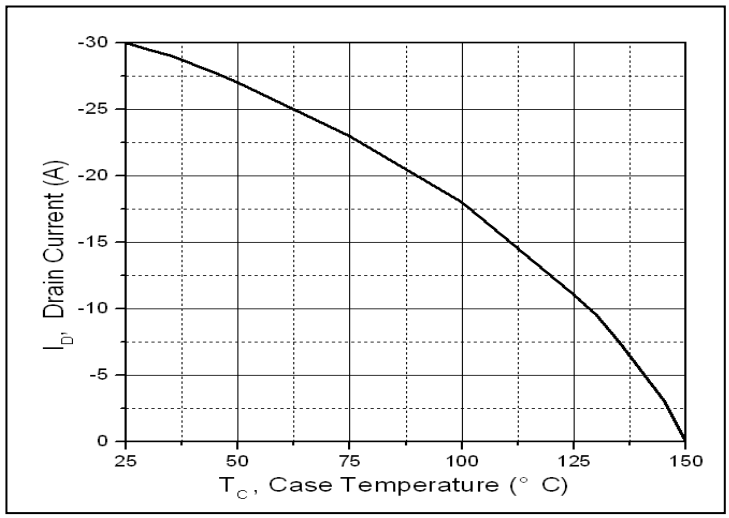
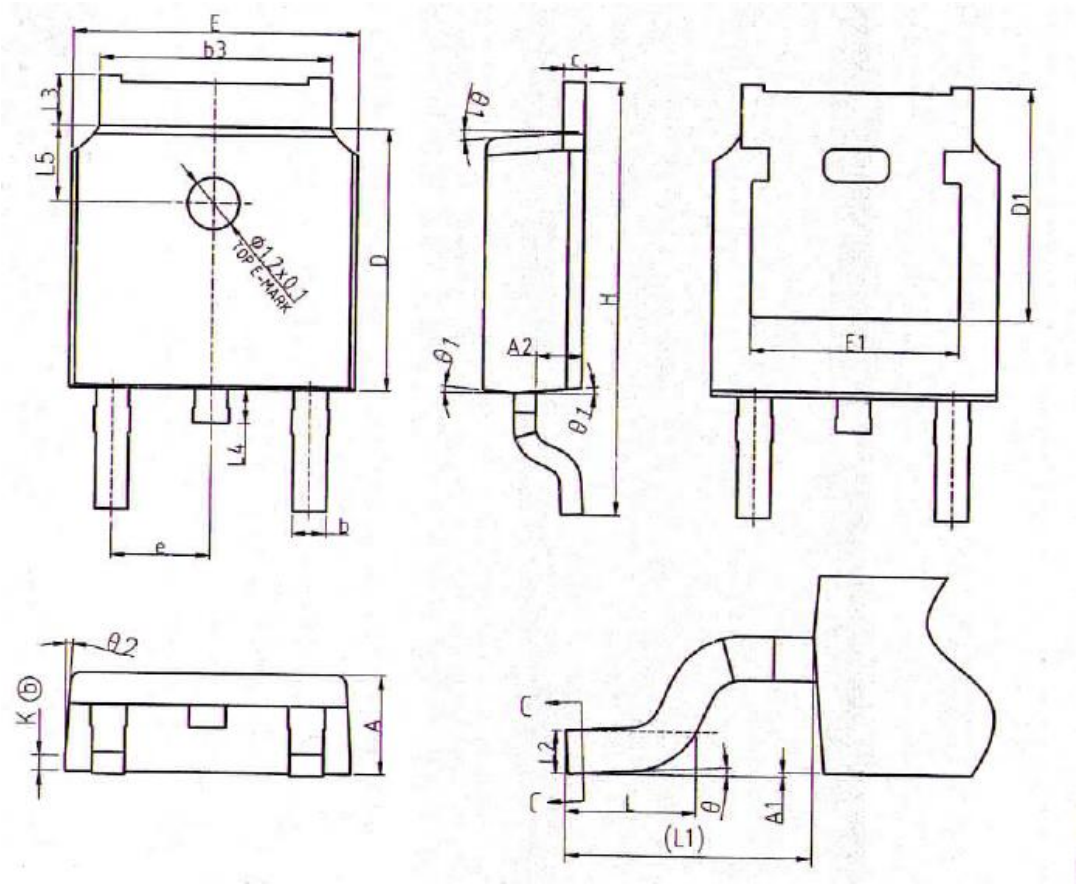
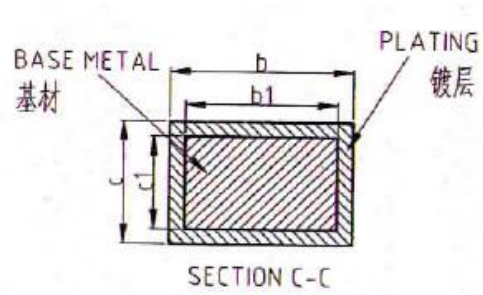


Figure 6: Maximum Drain Current Vs. Case Temperature

Mechanical Data：





COMMON DIMENSIONS

SYMBOL	mm		
	MIN	NOM	MAX
A	2.20	2.30	2.38
A1	0.00	-	0.10
A2	0.97	1.07	1.17
b	0.72	0.78	0.85
b1	0.71	0.76	0.81
b3	5.23	5.33	5.46
c	0.47	0.53	0.58
c1	0.46	0.51	0.56
D	6.00	6.10	6.20
D1		5.30REF	
E	6.50	6.60	6.70
E1	4.70	4.83	4.92
e		2.286BSC	
H	9.90	10.10	1030.00
L	1.40	1.50	1.70
L1		2.90REF	
L2		0.51BSC	
L3	0.90	-	1.25
L4	0.60	0.8	1.00
L5	1.70	1.8	1.90
θ	0°	-	8°
θ1	5°	7°	9°
θ2	5°	7°	9°
K		0.40REF	

Ordering and Marking Information

Device Marking: SSF1045D

Package (Available)

TO-252(DPAK)

Operating Temperature Range

C : -55 to 150 ºC

Devices per Unit

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

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