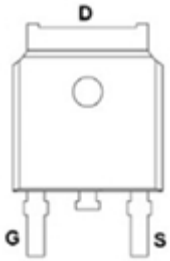
Main Product Characteristics:

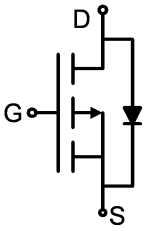
V_{DSS}	-40V
R_{DS}(on)	24mohm(typ.)
I_D	-30A



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
- 100% Avalanche Rated

Description:

It utilizes the latest trench 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 @ T_C = 25℃	Continuous Drain Current, V_{GS} @ 10V	-30①	A
I_D @ T_C = 100℃	Continuous Drain Current, V_{GS} @ 10V	-20①	
I_{DM}	Pulsed Drain Current ②	-120	
P_D @TC = 25℃	Power Dissipation ③	83	W
	Linear Derating Factor	1.02	W/℃
V_{DS}	Drain-Source Voltage	-40	V
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy @ L=0.3mH	93	mJ
I_{AS}	Avalanche Current @ L=0.3mH	25	A
T_J T_{STG}	Operating Junction Temperature Range Storage Temperature Range	-55 to + 150	℃

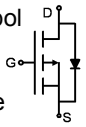
Thermal Resistance

Symbol	Characterizes	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-case ③	—	1.5	℃/W
$R_{\theta JA}$	Junction-to-ambient (t ≤ 10s) ④	—	62	℃/W
	Junction-to-Ambient (PCB mounted, steady-state) ④	—	40	℃/W

Electrical Characterizes @T_A=25℃ unless otherwise specified

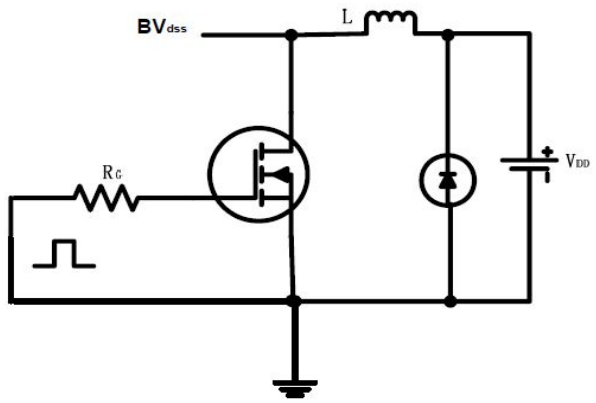
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source breakdown voltage	-40	—	—	V	V_{GS} = 0V, I_D =- 250μA
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	24	32	mΩ	V_{GS}=-10V,I_D = -10A
		—	33	45		V_{GS}=-4.5V,I_D = -6A
$V_{GS(th)}$	Gate threshold voltage	-1	—	-3	V	V_{DS} = V_{GS}, I_D = -250μA
I_{DSS}	Drain-to-Source leakage current	—	—	-1	μA	V_{DS} = -40V,V_{GS} = 0V
		—	—	-50		T_J = 125℃
I_{GSS}	Gate-to-Source forward leakage	—	—	100	nA	V_{GS} =20V
		—	—	-100		V_{GS} = -20V
Q_g	Total gate charge	—	26.2	—	nC	I_D =- 10A,
Q_{gs}	Gate-to-Source charge	—	7.2	—		V_{DS}=-20V,
Q_{gd}	Gate-to-Drain("Miller") charge	—	8.4	—		V_{GS} =- 10V
$t_{d(on)}$	Turn-on delay time	—	15.9	—	nS	V_{GS}=-10V, V_{DS} =-20V,
t_r	Rise time	—	49.0	—		R_L=1Ω,
$t_{d(off)}$	Turn-Off delay time	—	61.6	—		R_{GEN}=3Ω
t_f	Fall time	—	25.6	—		I_D =-20A
C_{iss}	Input capacitance	—	1820	—	pF	V_{GS} = 0V
C_{oss}	Output capacitance	—	248	—		V_{DS} =-25V
C_{rss}	Reverse transfer capacitance	—	162	—		f =1MHz

Source-Drain Ratings and Characteristics

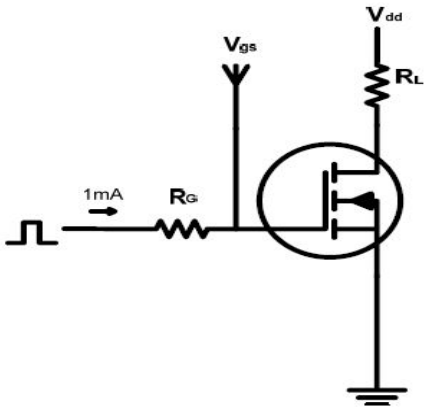
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	-30①	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode)	—	—	-120	A	
V_{SD}	Diode Forward Voltage	—	-0.72	-1.2	V	I_S=-2.1A, V_{GS}=0V
t_{rr}	Reverse Recovery Time	—	30.8	—	nS	T_J = 25℃, I_F =-20A, di/dt = 100A/μs
Q_{rr}	Reverse Recovery Charge	—	31.1	—	nC	

Test circuits and Waveforms

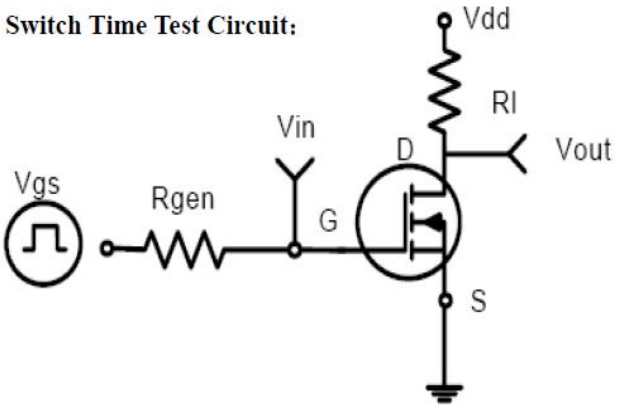
EAS test circuits:



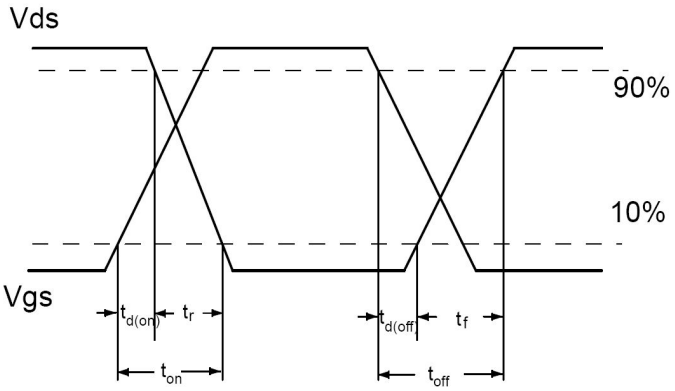
Gate charge test circuit:



Switch Time Test Circuit:



Switch Waveforms:



Notes:

①Calculated continuous current based on maximum allowable junction temperature. Package limitation current is 75A.

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

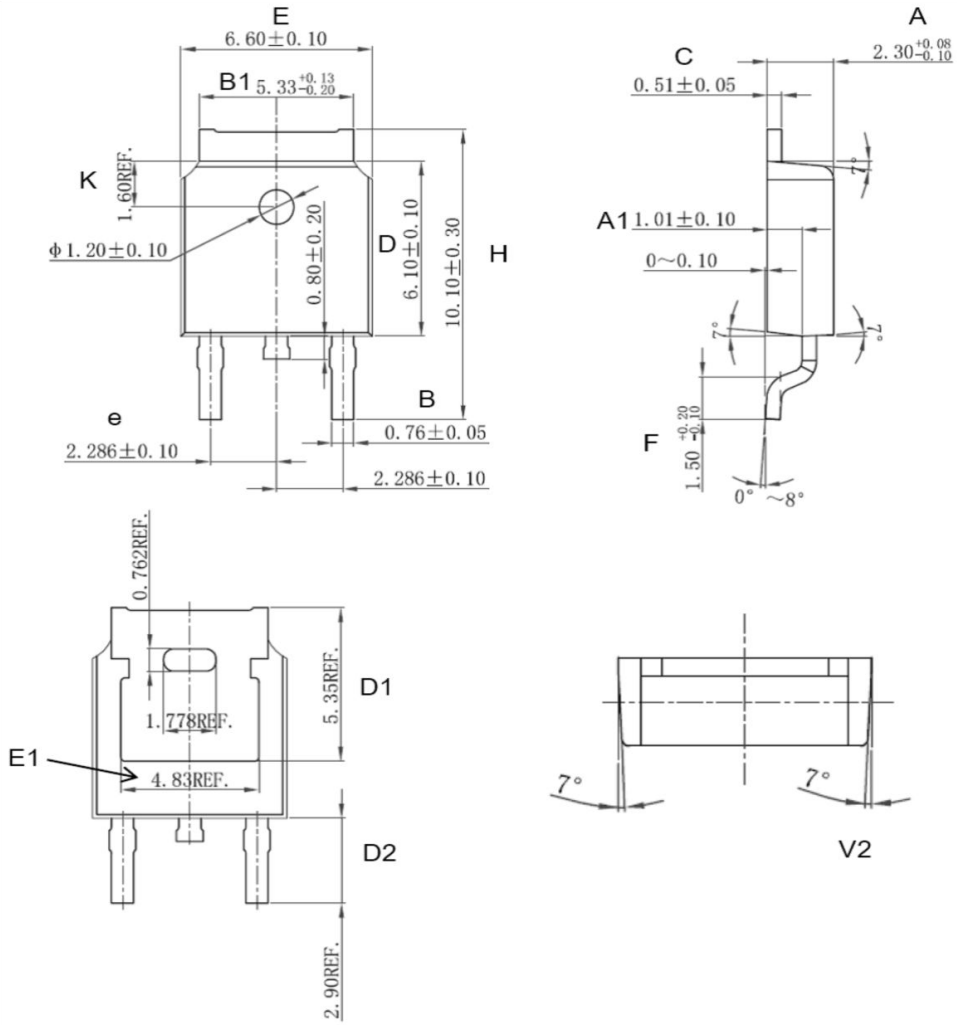
③The power dissipation PD is based on max. junction temperature, using junction-to-case thermal resistance.

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℃.

⑤These curves are based on the junction-to-case thermal impedence which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of $T_{J(MAX)}$=175℃.

Mechanical Data：

DPAK PACKAGE OUTLINE DIMENSION



Symbol	Dimension In Millimeters			Dimension In Inches		
	Min	Nom	Max	Min	Nom	Max
A	2.200	2.300	2.380	0.087	0.091	0.094
A1	0.910	1.010	1.110	0.036	0.040	0.044
B	0.710	0.760	0.810	0.028	0.030	0.032
B1	5.130	5.330	5.460	0.202	0.210	0.215
C	0.460	0.510	0.560	0.018	0.020	0.022
D	6.000	6.100	6.200	0.236	0.240	0.244
D1	5.350 (REF)			0.211 (REF)		
D2	2.900 (REF)			0.114 (REF)		
E	6.500	6.600	6.700	0.256	0.260	0.264
E1	4.83 (REF)			0.190 (REF)		
e	2.186	2.286	2.386	0.086	0.090	0.094
H	9.800	10.100	10.400	0.386	0.398	0.409
F	1.400	1.500	1.700	0.055	0.059	0.067
K	1.600 (REF)			0.063 (REF)		
V2	8^0 (REF)			8^0 (REF)		

Ordering and Marking Information

Device Marking: SSF4031C1

Package (Available)

DPAK（TO-252）

Operating Temperature Range

C : -55 to 150 ℃

Devices per Unit

Option1：

Package Type	Units/Tape	Tapes/Inner Box	Units/Inner Box	Inner Boxes/Carton Box	Units/Carton Box
TO-252	2500	2	5000	7	35000

Option2：

Package Type	Units/Tape	Tapes/Inner Box	Units/Inner Box	Inner Boxes/Carton Box	Units/Carton Box
TO-252	2500	1	2500	10	25000

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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