

Main Product Characteristics

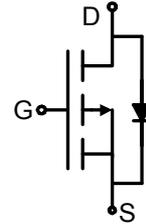
V_{DSS}	-40V
$R_{DS(on)}$	11m Ω (typ.)
I_D	-20A



TO-252 (D-PAK)



Marking and Pin Assignment



Schematic Diagram

Features and Benefits

- Advanced trench MOSFET process technology
- Special designed for PWM, load switching and general purpose applications
- Ultra low on-resistance with low gate charge
- High Power and current handling capability
- 175°C operating temperature
- Lead free product



Description:

It utilizes the advanced trench processing techniques to achieve extremely low on resistance and low gate charge. These features combine to make this design an extremely efficient and reliable device for use in PWM, load switching and a wide variety of other applications.

Absolute Max Rating

Symbol	Parameter	Max.	Units
I_D @ TC = 25°C	Continuous Drain Current, VGS @ 10V ^①	-20	A
I_D @ TC = 100°C	Continuous Drain Current, VGS @ 10V ^①	-16	
IDM	Pulsed Drain Current ^②	-50	
ISM	Pulsed Source Current (Body Diode) ^②	-50	
PD @TC = 25°C	Power Dissipation ^③	75	W
VDS	Drain-Source Voltage	-40	V
VGS	Gate-to-Source Voltage	± 20	V
EAS	Single Pulse Avalanche Energy @ L=0.1mH	40	mJ
IAS	Single Pulse Avalanche Current @ L=0.1mH	28	A
TJ TSTG	Operating Junction and Storage Temperature Range	-55 to + 175	°C

Thermal Resistance

Symbol	Characteristics	Value	Unit
R _{θJA}	Junction-to-ambient (t ≤ 10s) ④	14	°C/W
	Junction-to-Ambient (PCB mounted, steady-state) ④	40	°C/W
R _{θJC}	Maximum Junction-to-Case ⑤	2	°C/W

Electrical Characteristics @T_A=25°C unless otherwise specified

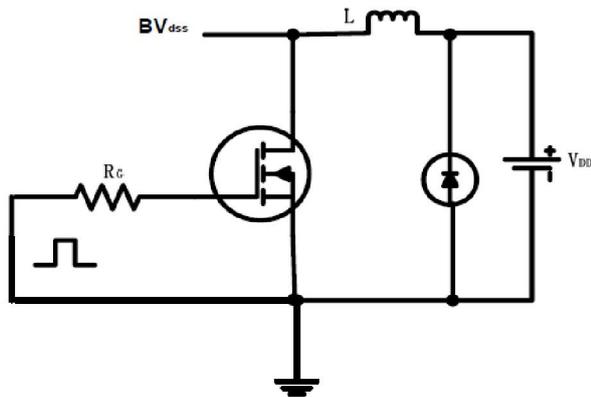
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
BVDSS	Drain-to-Source breakdown voltage	-40	—	—	V	VGS = 0V, ID = 250μA
RDS(on)	Static Drain-to-Source on-resistance	—	11	15	mΩ	VGS=10V, ID = 12A
		—	14.3	—		TJ = 125°C
		—	18.5	25		VGS=4.5V, ID = 8A
		—	23.6	—		TJ = 125°C
VGS(th)	Gate threshold voltage	-1	—	-3	V	VDS = VGS, ID = 250uA
IDSS	Drain-to-Source leakage current	—	—	-1	μA	VDS = -40V, VGS = 0V
		—	—	-5		TJ = 55°C
IGSS	Gate-to-Source forward leakage	—	—	100	nA	VGS = 20V
	Gate-to-Source reverse leakage	-100	—	—		VGS = -20V
G(fs)	Forward transconductance	5	27	—	S	VDS = -5V, ID = -12.0A
Qg	Total gate charge	—	57.4	40	nC	ID = -20A, VDD = -12V, VGS = -10V
Qgs	Gate-to-Source charge	—	10.8	6		
Qgd	Gate-to-Drain("Miller") charge	—	11.9	15		
td(on)	Turn-on delay time	—	15.2	—	ns	VDD = -18.8V, ID = -12.5A, RL = 1.50Ω, RG = 3.00Ω, VGS = -10V
tr	Rise time	—	23.7	—		
td(off)	Turn-Off delay time	—	53.3	—		
tf	Fall time	—	12.7	—		
Ciss	Input capacitance	—	5188	—	pF	Vds = -20V, Vgs = 0V, f = 1MHz
Coss	Output capacitance	—	376	—		
Crss	Reverse transfer capacitance	—	293	—		

Source-Drain Ratings and Characteristics

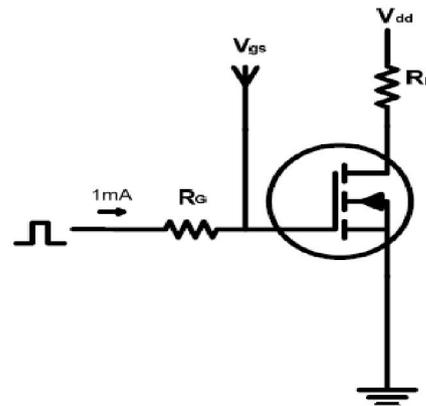
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
IS	Maximum Body-Diode Continuous Current	—	20	—	A	
VSD	Diode Forward Voltage	—	-0.74	1.2	V	TJ=25°C, IS=-1A, VGS=0V

Test circuits and Waveforms

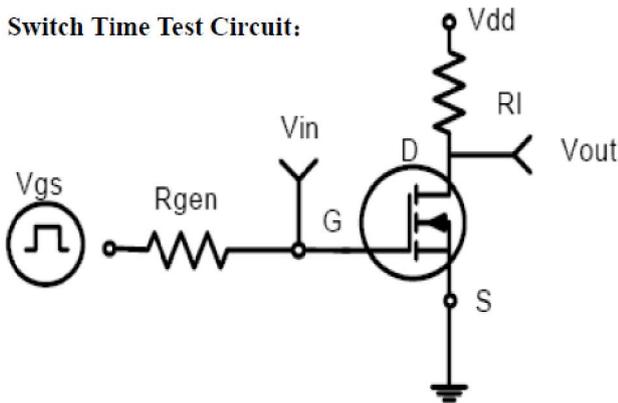
EAS test circuits:



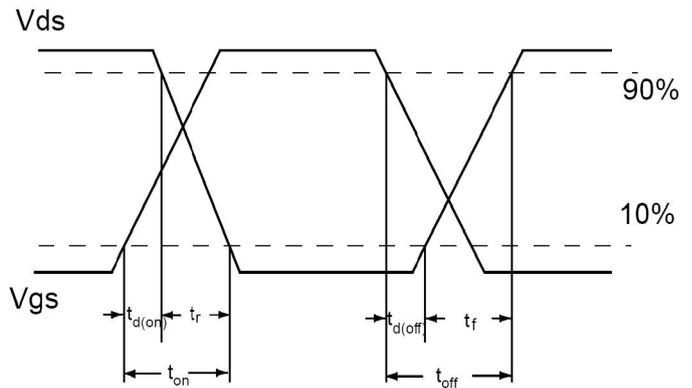
Gate charge test circuit:



Switch Time Test Circuit:



Switch Waveforms:



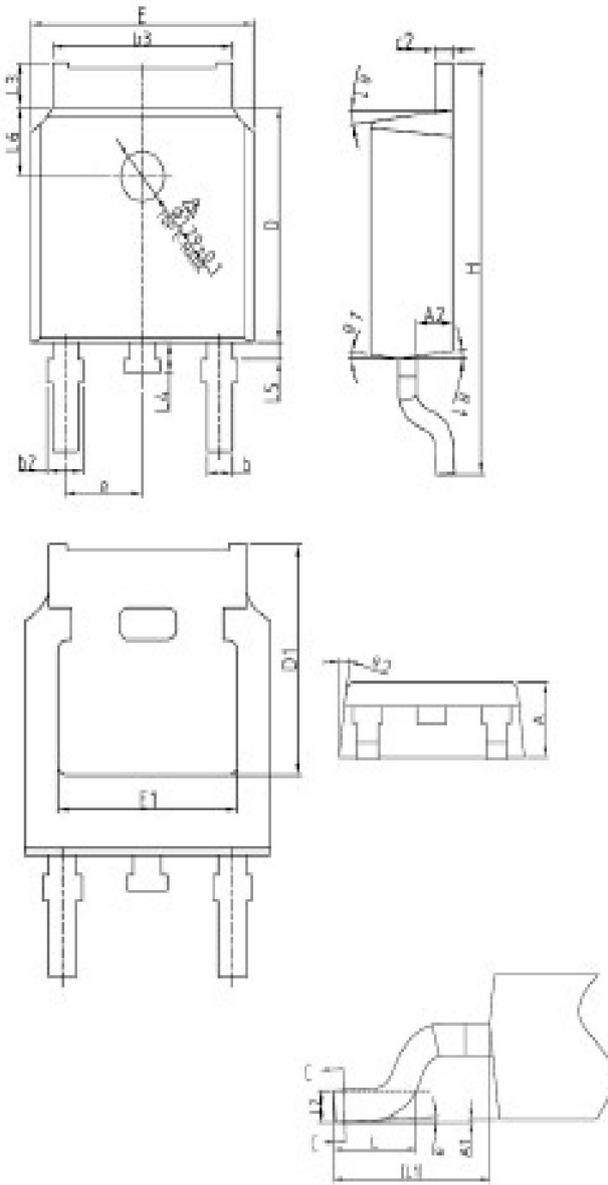
Notes:

- 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 $T_A = 25^\circ\text{C}$
- ⑤ These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of $T_J(\text{MAX}) = 175^\circ\text{C}$

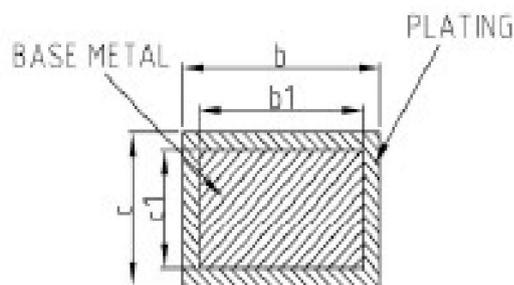
Mechanical Data

TO-252E-2-M PACKAGE INFORMATION

Dimensions in Millimeters



SYMBOL	MIN	NOM	MAX
A	2.20	2.30	2.38
A1	0	—	0.10
A2	0.90	1.01	1.10
b	0.72	—	0.85
b1	0.71	0.76	0.81
b2	0.72	—	0.90
b3	5.13	5.33	5.46
c	0.47	—	0.60
c1	0.46	0.51	0.56
c2	0.47	—	0.60
D	6.00	6.10	6.20
D1	5.25	—	—
E	6.50	6.60	6.70
E1	4.70	—	—
e	2.186	2.286	2.386
H	9.80	10.10	10.40
L	1.40	1.50	1.70
L1	2.90REF		
L2	0.51BSC		
L3	0.90	—	1.25
L4	0.60	0.80	1.00
L5	0.15	—	0.75
L6	1.80REF		
θ	0°	—	8°
θ 1	5°	7°	9°
θ 2	5°	7°	9°





Ordering and Marking Information

Device Marking: SSF4015

Package (Available)
TO-252
Operating Temperature Range
C : -55 to 175°C

Devices per Unit

Option1:

Package Type	Units/Tube	Tubes/Inner Box	Units/Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
TO-252	80	50	4000	10	40000

Option2:

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

Option3:

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