

Main Product Characteristics

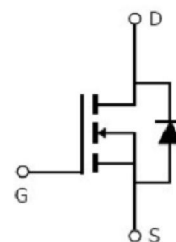
V_{DS}	30V
$R_{DS(on)}$	3.8m Ω (typ.)
I_D	90A



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	90	A
I_D @ TC = 100°C	Continuous Drain Current, VGS @ 10V ^①	66	
I_{DM}	Pulsed Drain Current ^②	360	
I_{SM}	Pulsed Source Current (Body Diode) ^②	360	
P_D @ TC = 25°C	Power Dissipation ^③	75	W
P_D @ TC = 100°C	Power Dissipation ^③	78	W
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-to-Source Voltage	± 20	V
dv/dt	Peak diode recovery voltage	1.5	V/nS
E_{AS}	Single Pulse Avalanche Energy @ L=0.1mH	90	mJ
I_{AS}	Avalanche Current @ L=0.1mH	42	A
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 175	°C

Thermal Resistance

Symbol	Characteristics	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-case ^③	—	2	°C/W
$R_{\theta JA}$	Junction-to-ambient ($t \leq 10s$) ^④	—	100	°C/W
	Junction-to-Ambient (PCB mounted, steady-state) ^④	—	50	°C/W

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

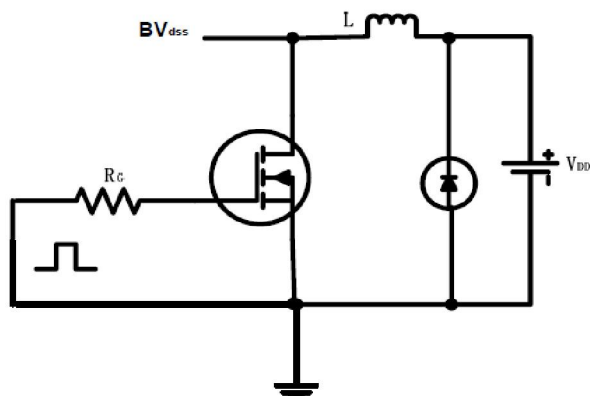
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source breakdown voltage	30	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	3.8	6	mΩ	$V_{GS}=10V, I_D = 15A$
		—	6.4	—		$T_J = 125^\circ\text{C}$
		—	4.9	8.5		$V_{GS}=4.5V, I_D = 11.5A$
		—	7.2	—		$T_J = 125^\circ\text{C}$
$V_{GS(th)}$	Gate threshold voltage	1	1.5	3	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
		—	1.21	—		$T_J = 125^\circ\text{C}$
I_{DSS}	Drain-to-Source leakage current	—	—	1	μA	$V_{DS} = 30V, V_{GS} = 0V$
		—	—	50		$T_J = 125^\circ\text{C}$
I_{GSS}	Gate-to-Source forward leakage	—	—	100	nA	$V_{GS} = 20V$
		-100	—	—		$V_{GS} = -20V$
Q_g	Total gate charge	—	35	—	nC	$I_D = 32A,$
Q_{gs}	Gate-to-Source charge	—	8	—		$V_{DS}=15V,$
Q_{gd}	Gate-to-Drain("Miller") charge	—	18	—		$V_{GS} = 4.5V$
$t_{d(on)}$	Turn-on delay time	—	12	—	ns	$V_{GS}=4.5V, V_{DS}=15V,$ $R_{GEN}=2\Omega, I_D = 32A,$
t_r	Rise time	—	63	—		
$t_{d(off)}$	Turn-Off delay time	—	41	—		
t_f	Fall time	—	11	—		
C_{iss}	Input capacitance	—	3833	—	pF	$V_{GS} = 0V$
C_{oss}	Output capacitance	—	459	—		$V_{DS} = 15V$
C_{rss}	Reverse transfer capacitance	—	427	—		$f = 800kHz$

Source-Drain Ratings and Characteristics

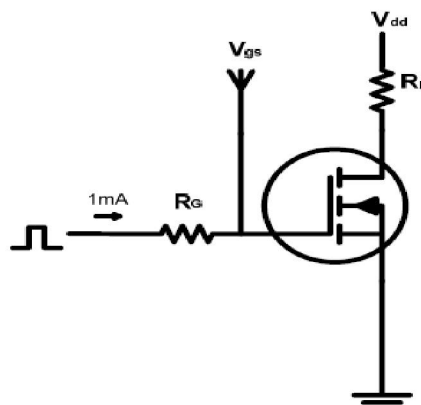
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Maximum Body-Diode Continuous Current	—	—	90	A	
V_{SD}	Diode Forward Voltage	—	0.72	1.2	V	$I_S=2.8A, V_{GS}=0V$
t_{rr}	Reverse Recovery Time	—	16	—	ns	$T_J = 25^\circ\text{C}, I_F = 30A,$ $di/dt = 150A/\mu s$
Q_{rr}	Reverse Recovery Charge	—	8.8	—	nC	

Test Circuits and Waveforms

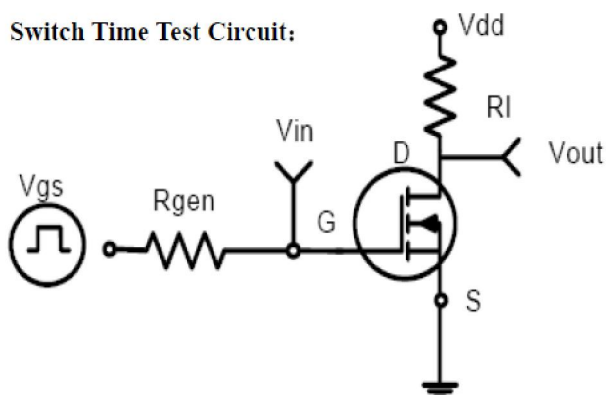
EAS test circuits:



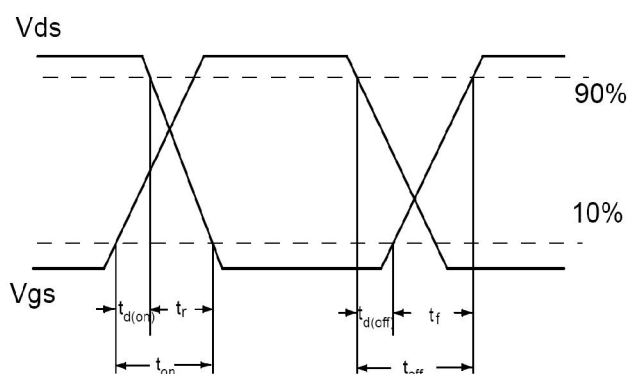
Gate charge test circuit:



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 $T_{J(MAX)} = 175^\circ\text{C}$.

Typical Electrical and Thermal Characteristics

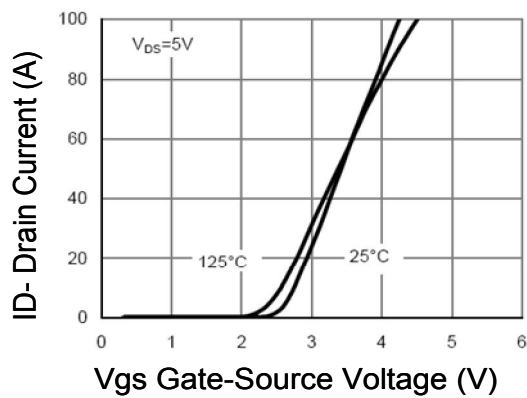


Figure 1: Typical Transfer Characteristics

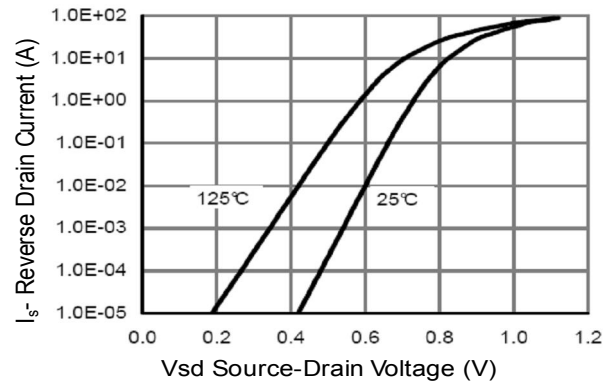


Figure 6: Body-Diode Characteristics

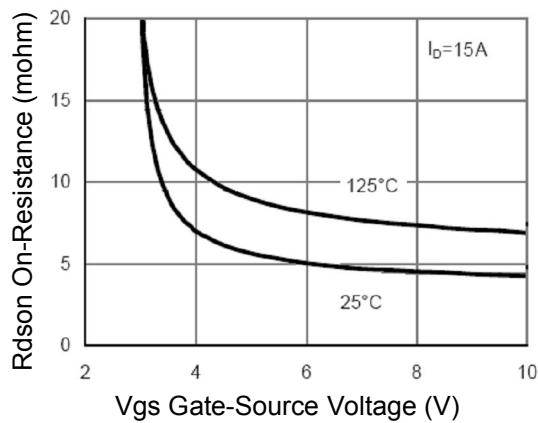


Figure 5: On-Resistance vs. Gate-Source Voltage

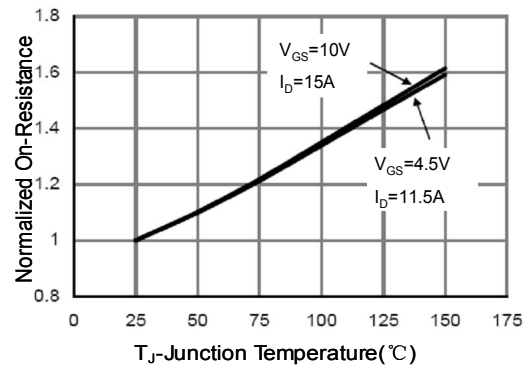


Figure 4: On-Resistance vs. Junction Temperature

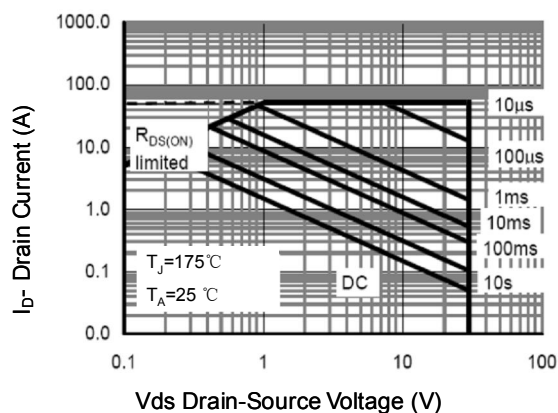


Figure 5: Maximum Forward Biased Safe Operating Area⑤

Typical Electrical and Thermal Characteristics

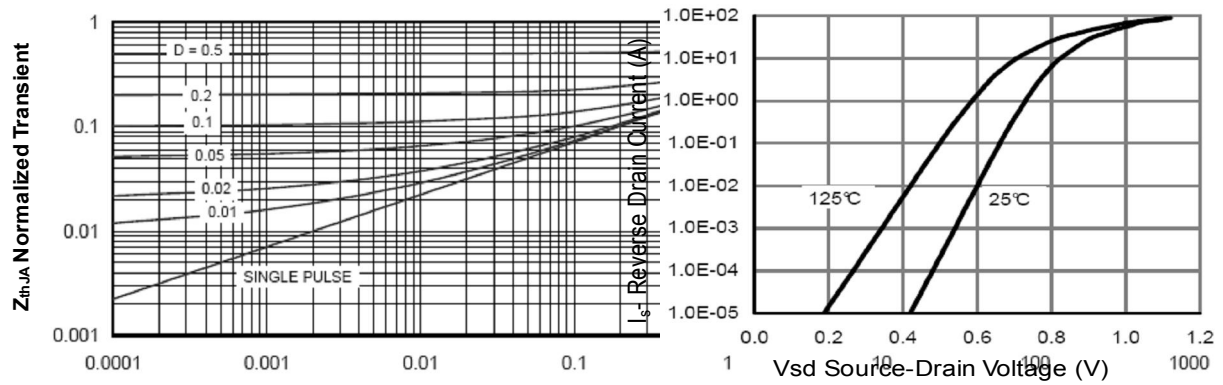
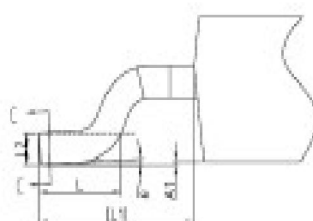
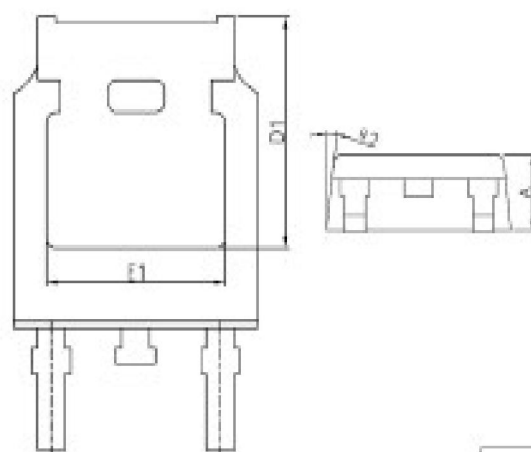
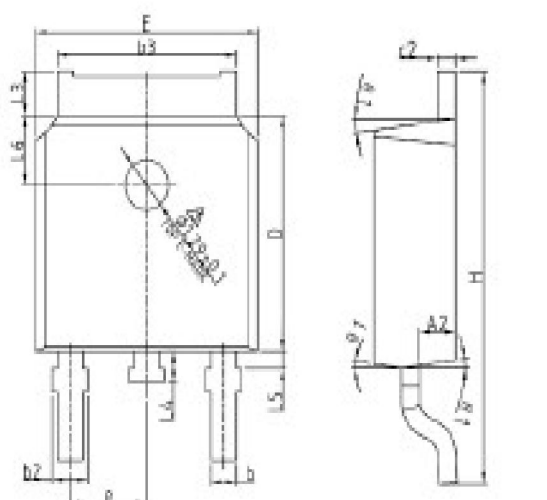


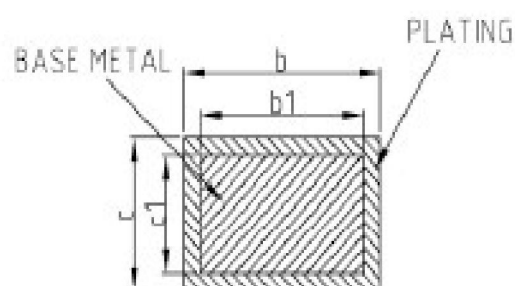
Figure 6: Normalized Maximum Transient Thermal Impedance^⑥

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		
Ø	0°	—	8°
Ø 1	5°	7°	9°
Ø 2	5°	7°	9°



Ordering and Marking Information

Device Marking: SSFD3006

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