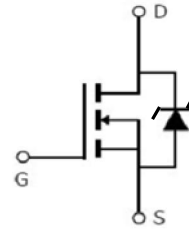


### Main Product Characteristics

$V_{DSS}$	30V
$R_{DS(on)}$	5.0mohm(typ.)
$I_D$	50A



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
- Fast switching and reverse body recovery
- 175°C operating temperature
- Lead free product



### Description

It utilizes the latest FRRMOS (fast reverse recovery MOS) trench processing techniques to achieve the high cell density and reduces the on-resistance, fast switching and soft reverse recovery time. 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
$I_D @ TC = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$ <sup>①</sup>	50	A
$I_D @ TC = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$ <sup>①</sup>	40	
$I_{DM}$	Pulsed Drain Current <sup>②</sup>	200	
$P_D @ TC = 25^\circ C$	Power Dissipation <sup>③</sup>	100	W
	Linear Derating Factor	0.55	W/°C
$V_{DS}$	Drain-Source Voltage	30	V
$V_{GS}$	Gate-to-Source Voltage	± 20	V
$E_{AS}$	Single Pulse Avalanche Energy @ L=0.1mH	100	mJ
$I_{AS}$	Avalanche Current @ L=0.1mH	44	A
$T_J \quad T_{STG}$	Operating Junction and Storage Temperature Range	-55 to + 175	°C

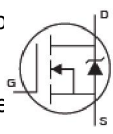
### Thermal Resistance

Symbol	Characteristics	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-case <sup>③</sup>	—	1.5	$^{\circ}C/W$
$R_{\theta JA}$	Junction-to-ambient ( $t \leq 10s$ ) <sup>④</sup>	—	45	$^{\circ}C/W$
	Junction-to-Ambient (PCB mounted, steady-state) <sup>④</sup>	—	20	$^{\circ}C/W$

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

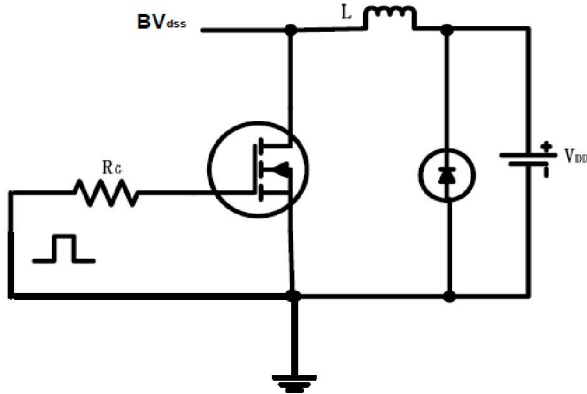
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source breakdown voltage	30	36.5	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	5	8	$m\Omega$	$V_{GS}=10V, I_D=20A$
		—	7.5	10	$m\Omega$	$V_{GS}=4.5V, I_D=10A$
$V_{GS(th)}$	Gate threshold voltage	1	—	3	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
$I_{DSS}$	Drain-to-Source leakage current	—	—	10	$\mu A$	$V_{DS} = 30V, V_{GS} = 0V$
$I_{GSS}$	Gate-to-Source forward leakage	—	—	100	nA	$V_{GS} = 20V$
		-100	—	—		$V_{GS} = -20V$
$Q_g$	Total gate charge	—	36	—	nC	$V_{DS}=15V,$ $I_D=20A,$ $V_{GS}=10V$
$Q_{gs}$	Gate-to-Source charge	—	6.1	—		
$Q_{gd}$	Gate-to-Drain("Miller") charge	—	9.6	—		
$t_{d(on)}$	Turn-on delay time	—	10.9	—	ns	$V_{GS}=10V, V_{DS}=15V,$ $R_{GEN}=3\Omega, I_D=20A$
$t_r$	Rise time	—	46.5	—		
$t_{d(off)}$	Turn-Off delay time	—	27.5	—		
$t_f$	Fall time	—	7.1	—		
$C_{iss}$	Input capacitance	—	1862	—	pF	$V_{GS} = 0V$ $V_{DS} = 15V$ $f = 1MHz$
$C_{oss}$	Output capacitance	—	360	—		
$C_{rss}$	Reverse transfer capacitance	—	235	—		

### Source-Drain Ratings and Characteristics

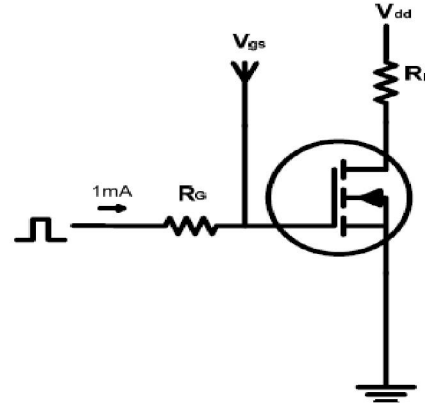
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$I_S$	Continuous Source Current	—	—	50	A	MOSFET symbt showing the integral reverse p-n junction diode. 
$I_{SM}$	Pulsed Source Current	—	—	200	A	
$V_{SD}$	Diode Forward Voltage	—	0.65	1.3	V	$I_S=1.0A, V_{GS}=0V$
$t_{rr}$	Reverse Recovery Time	—	24	—	ns	$T_J = 25^{\circ}C, I_F = 20A, di/dt = 350A/\mu s$
$Q_{rr}$	Reverse Recovery Charge	—	26	—	nC	

## Test Circuits and Waveforms

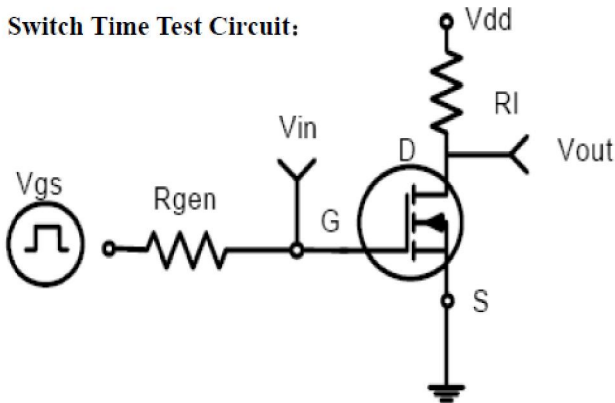
EAS test circuits:



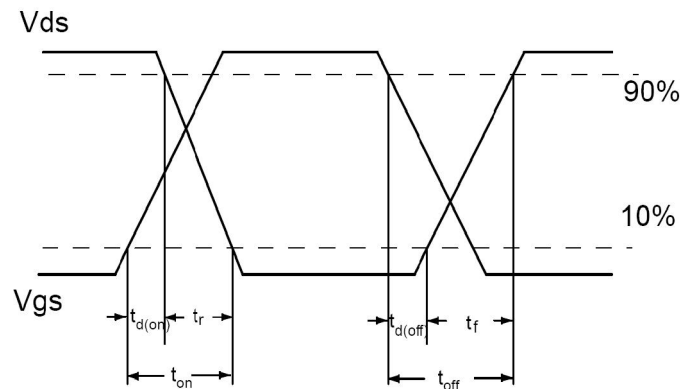
Gate charge test circuit:



Switch Time Test Circuit:



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 Characteristics

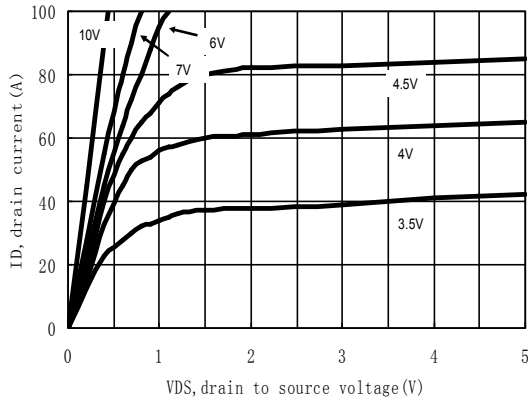


Figure 1: Typical Output Characteristics

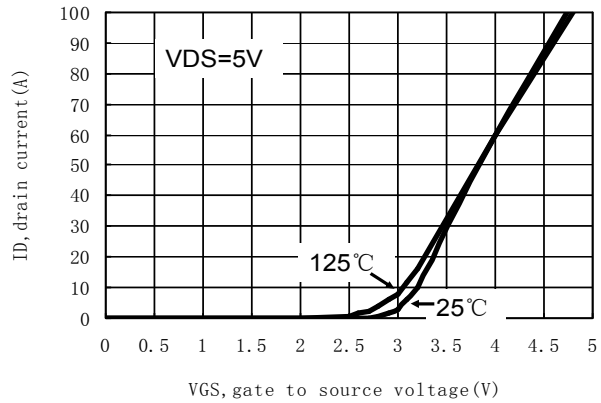


Figure 2: Typical Transfer Characteristics

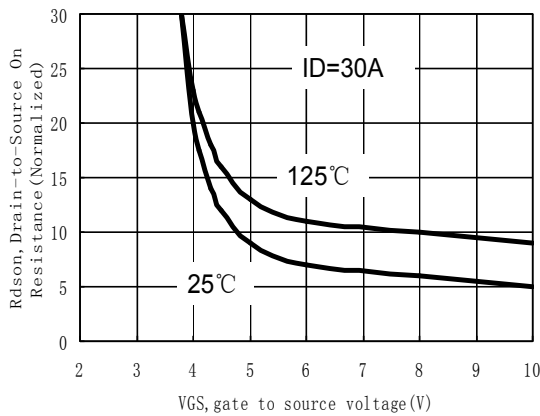


Figure 3: On-Resistance vs. Gate-Source Voltage

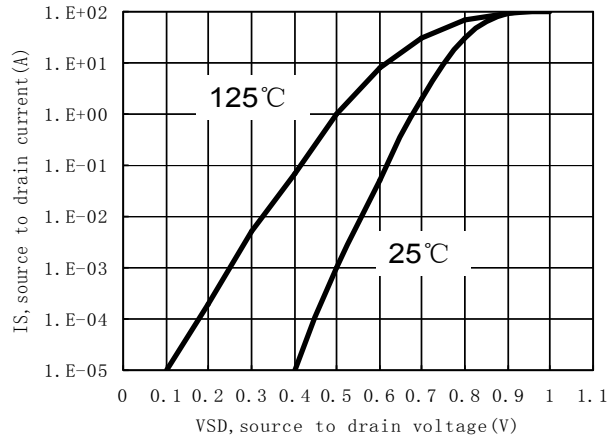


Figure 4: Body-Diode Characteristics

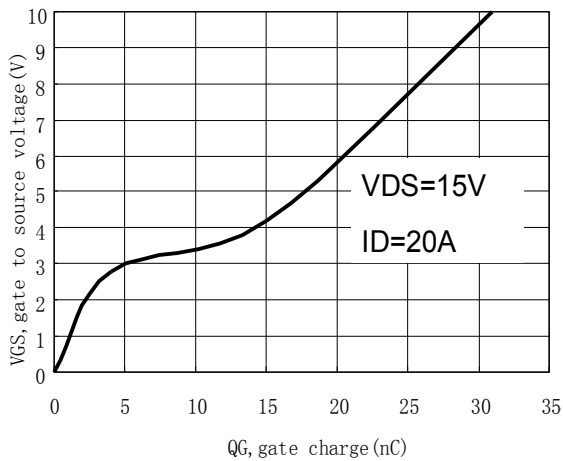


Figure 5: Gate-Charge Characteristics

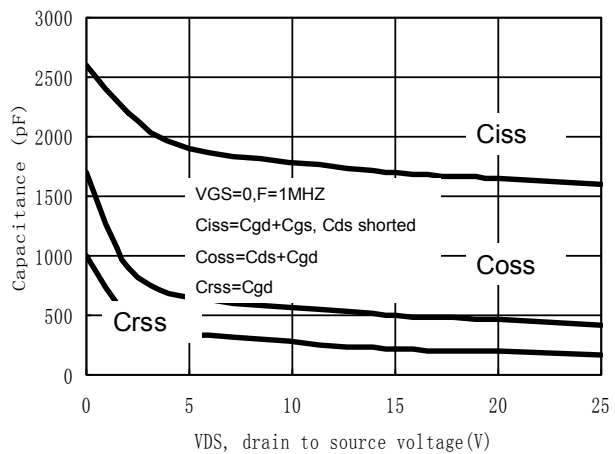
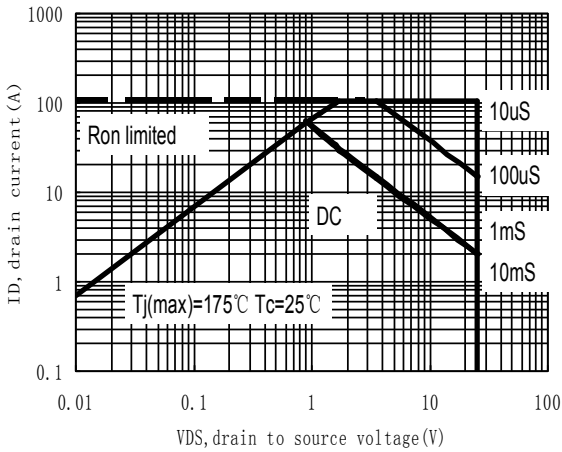
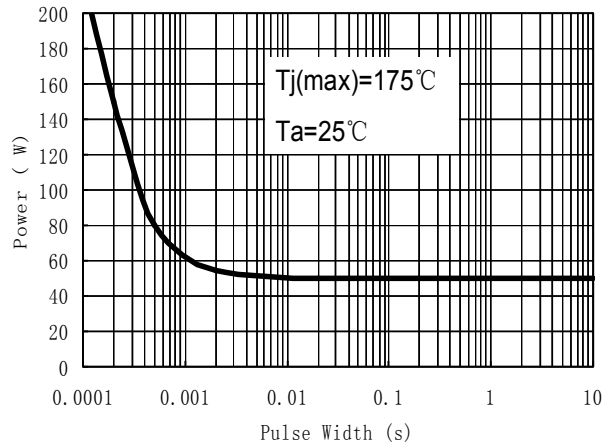


Figure 6: Capacitance Characteristics

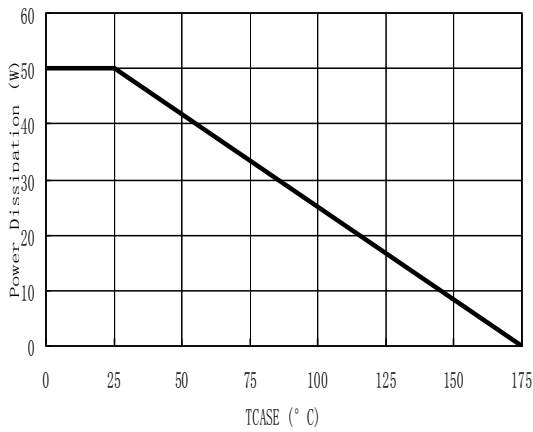
## Typical Thermal Characteristics



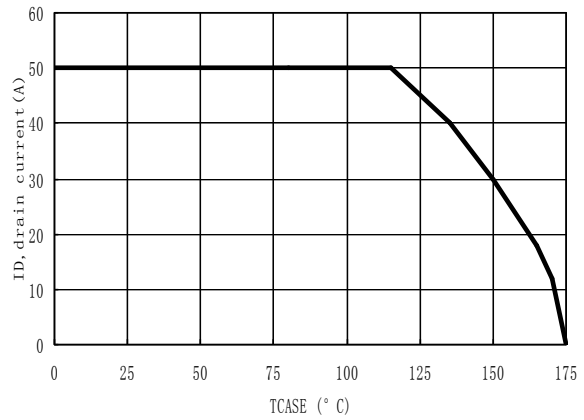
**Figure 7: Maximum Forward Biased Safe Operating Area**



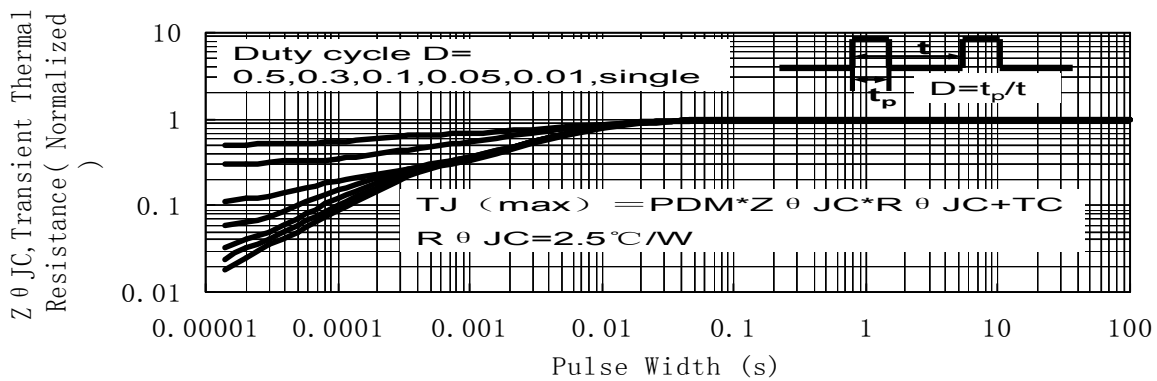
**Figure 8: Single Pulse Power Rating Junction-to-Case**



**Figure 9: Power De-rating**



**Figure 10: Current De-rating**

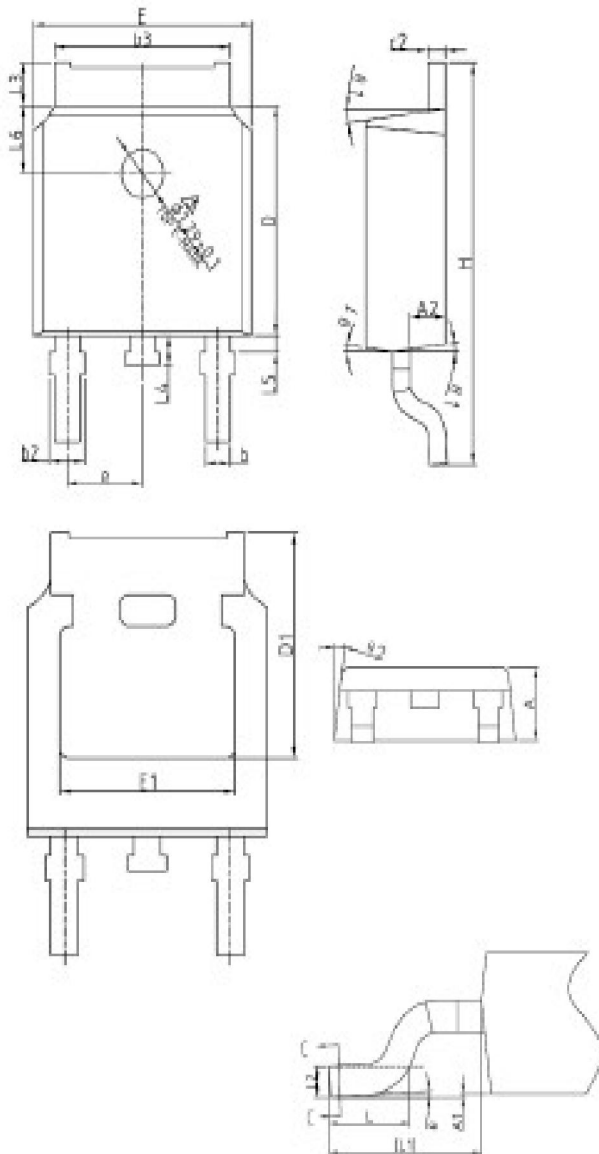


**Figure 11: Normalized Thermal transient Impedance Curve**

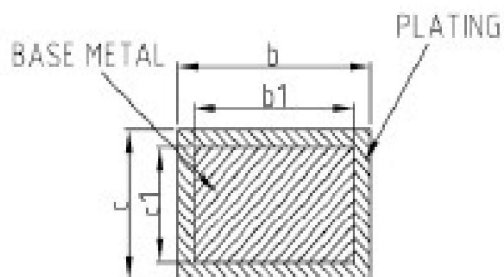
## Mechanical Data

### 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°





# SSFM3008

30V N-Channel MOSFET

## Ordering and Marking Information

**Device Marking: SSFM3008**

Package (Available)

TO-252

Operating Temperature Range

C : -55 to 175 °C

## Devices per Unit

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

## Reliability Test Program

Test Item	Conditions	Duration	Sample Size
High Temperature Reverse Bias(HTRB)	$T_J=125^{\circ}\text{C}$ to $175^{\circ}\text{C}$ @ 80% of Max $V_{DSS}/V_{CES}/V_R$	168 hours 500 hours 1000 hours	3 lots x 77 devices
High Temperature Gate Bias(HTGB)	$T_J=125^{\circ}\text{C}$ to $175^{\circ}\text{C}$ @ 100% of Max $V_{GSS}$	168 hours 500 hours 1000 hours	3 lots x 77 devices