General Description

FSMOS® MOSFET is based on Oriental Semiconductor's unique device design to achieve low $R_{DS(ON)}$, low gate charge, fast switching and excellent avalanche characteristics. The high V_{th} series is specially designed to use in power supply systems with driving voltage of more than 10V.

Features

- Low $R_{DS(ON)}$ & FOM
- Extremely low switching loss
- Excellent reliability and uniformity
- Fast switching and soft recovery

RoHS
compliant

Applications

- Switched mode power supply
- Motor driver
- Battery protection
- DC-DC convertor
- Inverter
- UPS

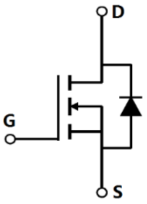
Key Performance Parameters

Parameter	Value	Unit
$V_{DS,\ min}$ @ $T_{j(max)}$	80	V
$I_{D,\ pulse}$	420	A
$R_{DS(ON),\ max}$ @ V_{GS}=10V	5	mΩ
Q_g	30	nC
PD	98	W

Marking Information

Product Name	Package	Marking
SFS08R05PNF	TO220	SFS08R05PN

Package & Pin information



Absolute Maximum Ratings at T_j=25°C unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	80	V
Gate-source voltage	V_{GS}	±20	V
Continuous drain current[1], T_C=25 °C	I_D	105	A
Pulsed drain current[2], T_C=25 °C	$I_{D,\ pulse}$	420	A
Continuous diode forward current[1], T_C=25 °C	I_S	105	A
Diode pulsed current[2], T_C=25 °C	$I_{S,\ pulse}$	420	A
Power dissipation[3], T_C=25 °C	P_D	98	W
Single pulsed avalanche energy[4]	E_{AS}	109	mJ
Operation and storage temperature	T_{stg}, T_j	-55 to 150	°C

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal resistance, junction-case	$R_{\theta JC}$	1.27	°C/W
Thermal resistance, junction-ambient	$R_{\theta JA}$	62	°C/W

Electrical Characteristics at T_j=25°C unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Drain-source breakdown voltage	BV_{DSS}	80			V	V_{GS}=0 V, I_D=250 μA
Gate threshold voltage	$V_{GS(th)}$	2.5		3.5	V	V_{DS}=V_{GS}, I_D=250 μA
Drain-source on-state resistance	$R_{DS(ON)}$		4.66	5	mΩ	V_{GS}=10 V, I_D=50 A
Gate-source leakage current	I_{GSS}			100	nA	V_{GS}=20 V
				-100		V_{GS}=-20 V
Drain-source leakage current	I_{DSS}			1	μA	V_{DS}=80 V, V_{GS}=0 V
Gate resistance	R_G		2.2		Ω	f=1 MHz, Open drain

Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	C_{iss}		2057		pF	V_{GS}=0 V, V_{DS}=25 V, ƒ=100 kHz
Output capacitance	C_{oss}		1342		pF	
Reverse transfer capacitance	C_{rss}		81		pF	
Turn-on delay time	$t_{d(on)}$		13		ns	V_{GS}=10 V, V_{DS}=40 V, R_G=2 Ω, I_D=40 A
Rise time	t_r		6		ns	
Turn-off delay time	$t_{d(off)}$		22		ns	
Fall time	t_f		7		ns	

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total gate charge	Q_g		30		nC	V_{GS}=10 V, V_{DS}=40 V, I_D=40 A
Gate-source charge	Q_{gs}		9		nC	
Gate-drain charge	Q_{gd}		7.5		nC	
Gate plateau voltage	$V_{plateau}$		4.5		V	

Body Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Diode forward voltage	V_{SD}			1.3	V	I_S=50 A, V_{GS}=0 V
Reverse recovery time	t_{rr}		26		ns	V_R=50 V, I_S=50 A, di/dt=400 A/μs
Reverse recovery charge	Q_{rr}		51		nC	
Peak reverse recovery current	I_{rrm}		3.6		A	

Note

1) Calculated continuous current based on maximum allowable junction temperature.
2) Repetitive rating; pulse width limited by max. junction temperature.
3) Pd is based on max. junction temperature, using junction-case thermal resistance.
4) V_{DD}=50 V,V_{GS}=10 V, L=0.3 mH, starting T_j=25 °C.

Electrical Characteristics Diagrams

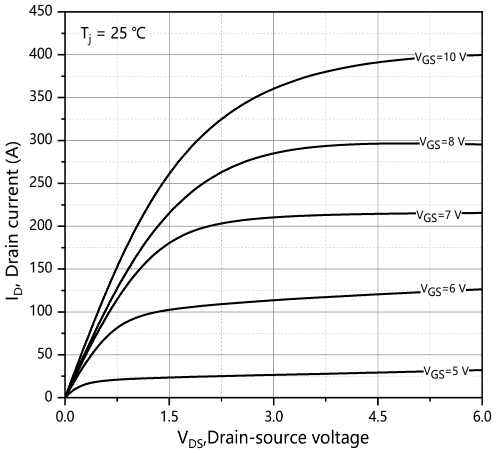


Figure 1. Typ. output characteristics

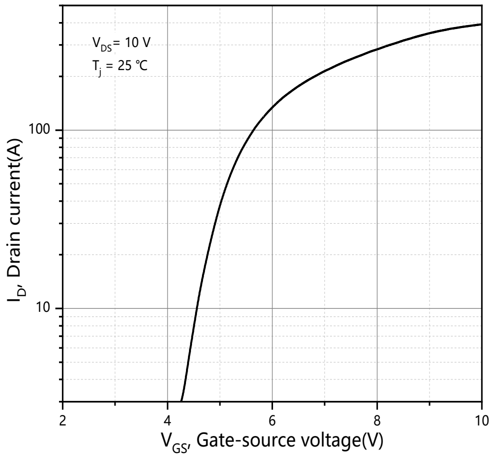


Figure 2. Typ. transfer characteristics

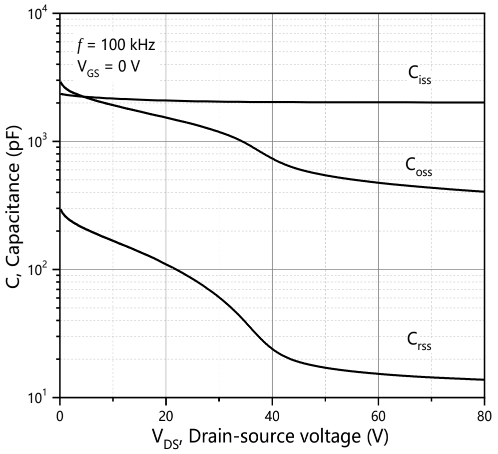


Figure 3. Typ. capacitances

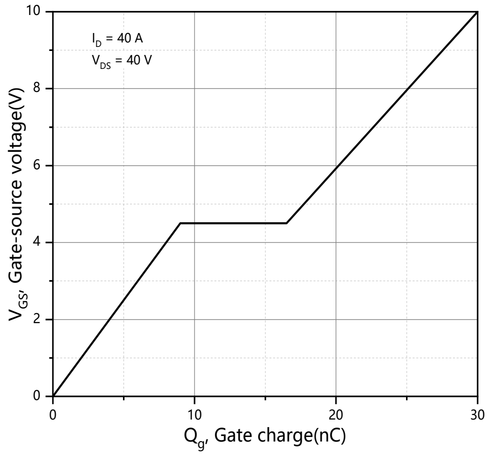


Figure 4. Typ. gate charge

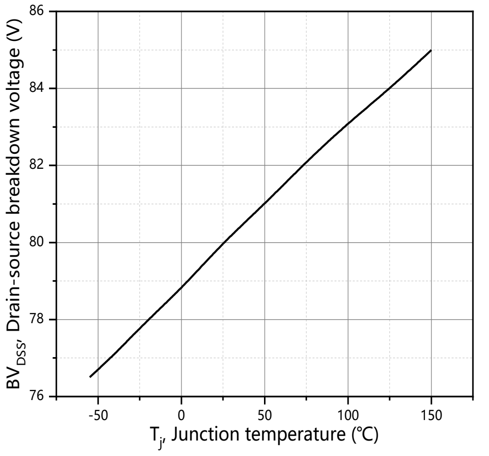


Figure 5. Drain-source breakdown voltage

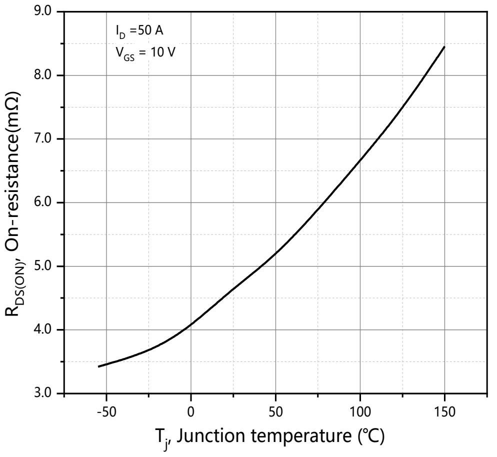


Figure 6. Drain-source on-state resistance

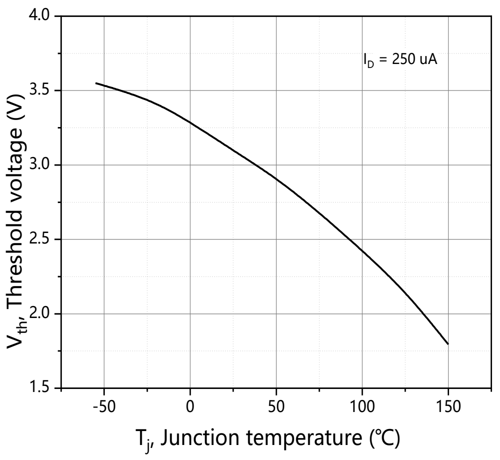


Figure 7. Threshold voltage

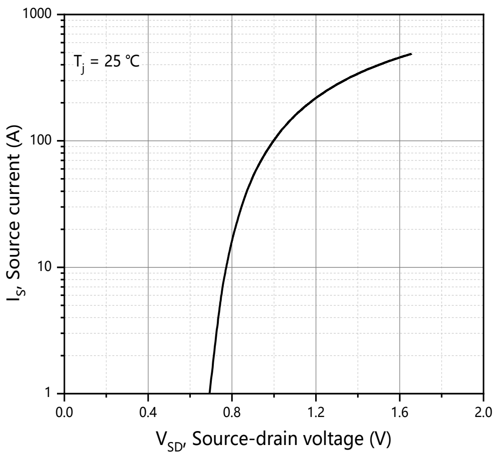


Figure 8. Forward characteristic of body diode

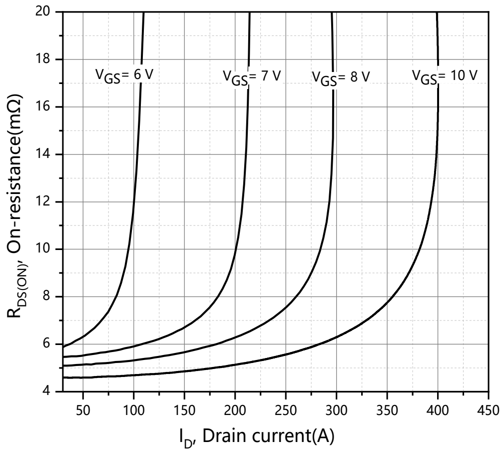


Figure 9. Drain-source on-state resistance

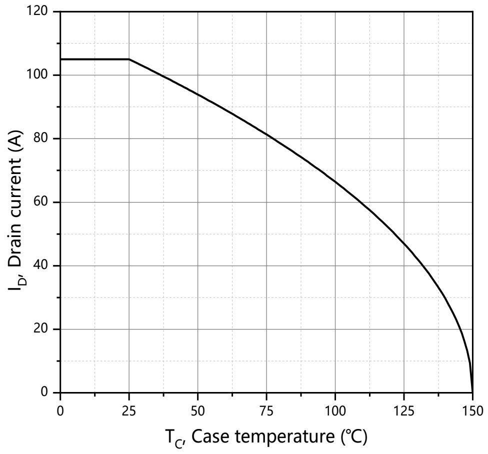


Figure 10. Drain current

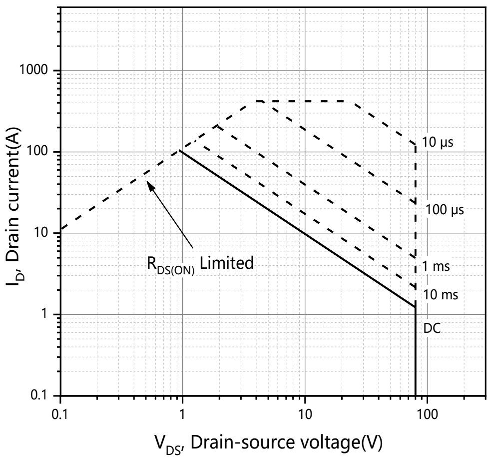


Figure 11. Safe operation area Tc=25 ℃

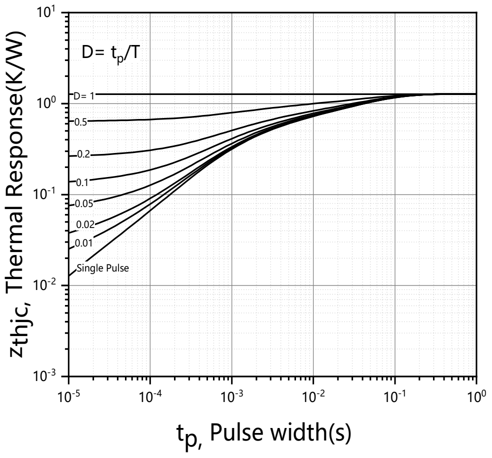


Figure 12. Max. transient thermal impedance

Test circuits and waveforms

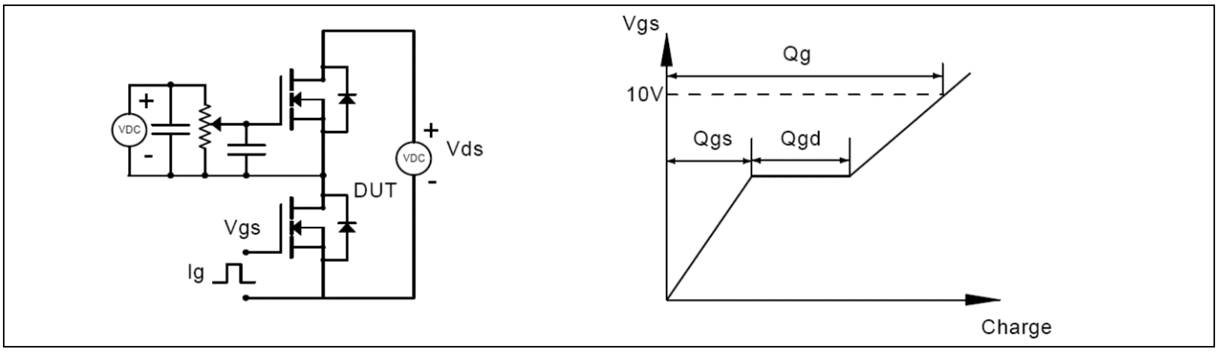


Figure 1. Gate charge test circuit & waveform

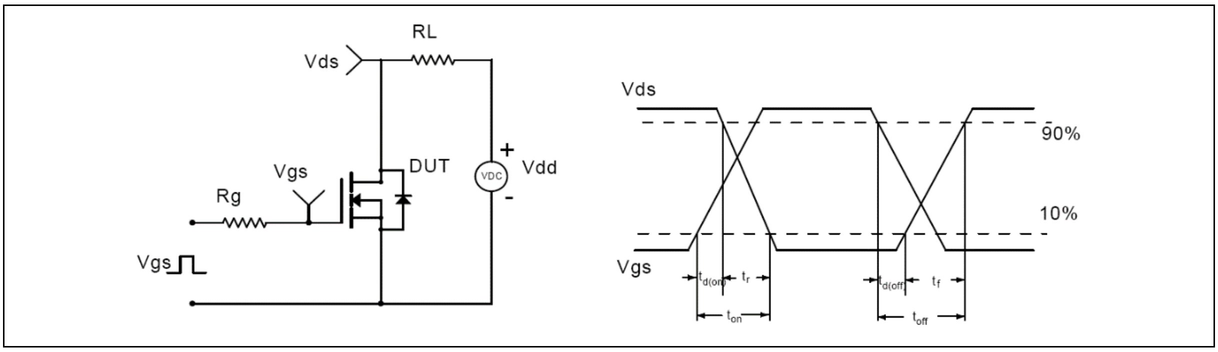


Figure 2. Switching time test circuit & waveforms

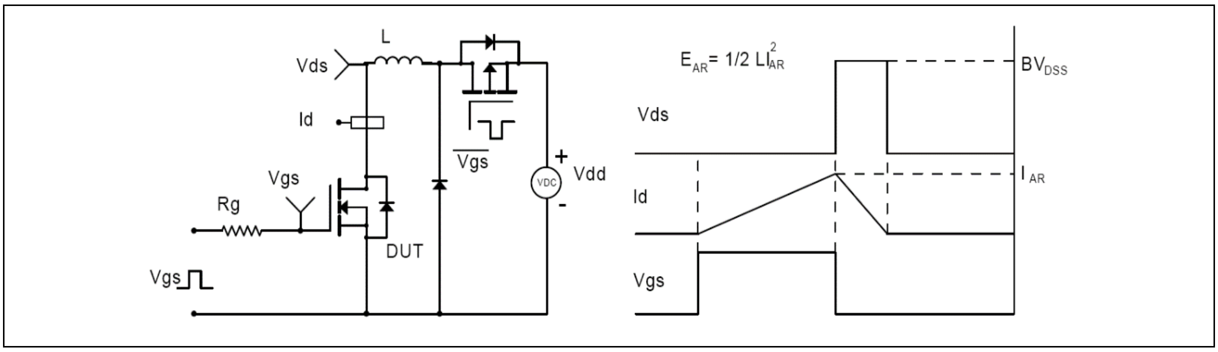


Figure 3. Unclamped inductive switching (UIS) test circuit & waveforms

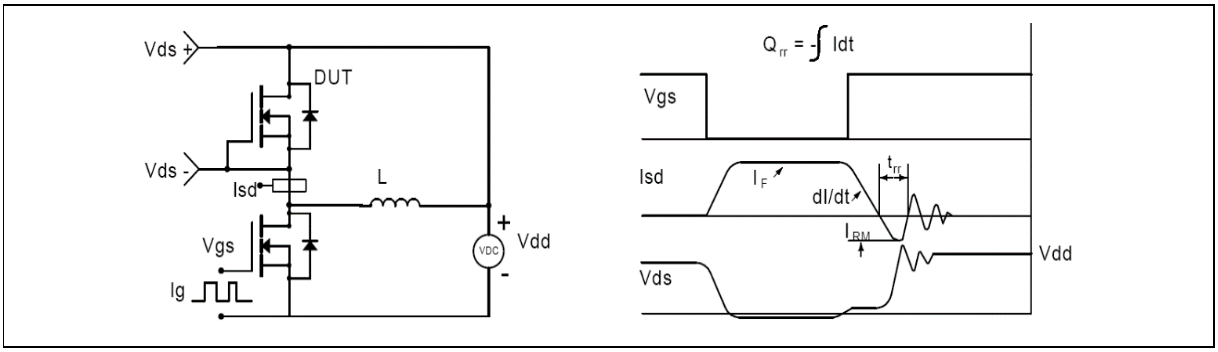
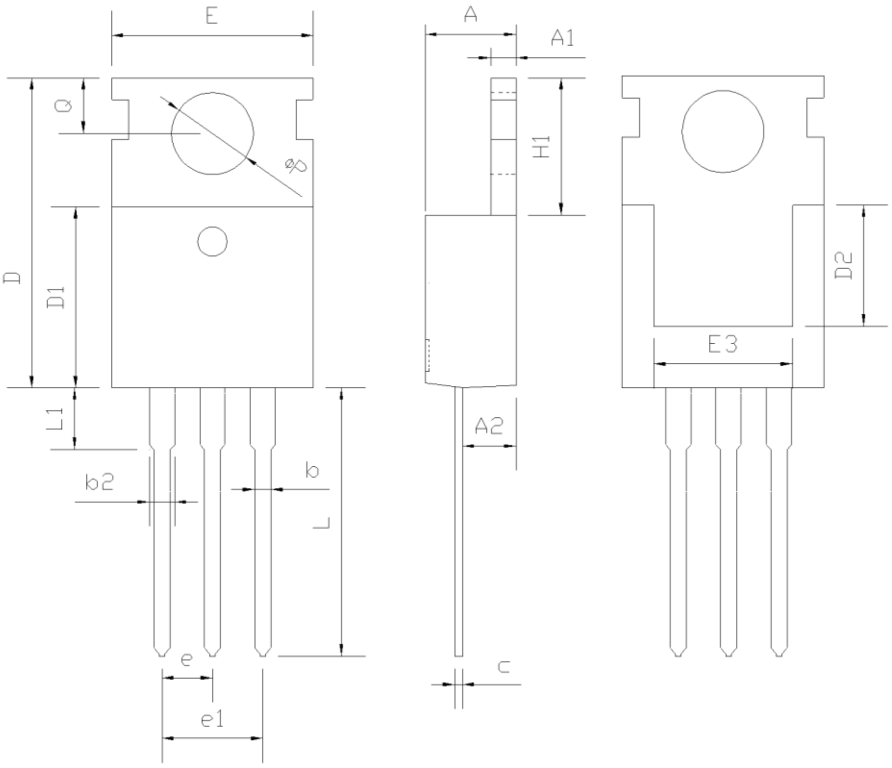


Figure 4. Diode reverse recovery test circuit & waveforms

Package Information



Symbol	mm		
	Min	Nom	Max
A	4.37	4.57	4.77
A1	1.25	1.30	1.45
A2	2.20	2.40	2.60
b	0.70	0.80	0.95
b2	1.17	1.27	1.47
c	0.40	0.50	0.65
D	15.10	15.60	16.10
D1	8.80	9.10	9.40
D2	5.50	-	-
E	9.70	10.00	10.30
E3	7.00	-	-
e	2.54 BSC		
e1	5.08 BSC		
H1	6.25	6.50	6.85
L	12.75	13.50	13.80
L1	-	3.10	3.40
ΦP	3.40	3.60	3.80
Q	2.60	2.80	3.00

Version 1: TO220-P package outline dimension

Ordering Information

Package Type	Units/ Tube	Tubes/ Inner Box	Units/ Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
TO220-P	50	20	1000	6	6000

Product Information

Product	Package	Pb Free	RoHS	Halogen Free
SFS08R05PNF	TO220	yes	yes	yes

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