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 optimized for high systems with gate driving voltage greater 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
- Solar inverter
- UPS and energy inverter

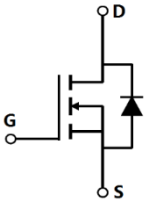
Key Performance Parameters

Parameter	Value	Unit
$V_{DS,\ min}$ @ $T_{j(max)}$	60	V
$I_{D,\ pulse}$	390	A
$R_{DS(ON),\ max}$ @ V_{GS}=10V	3.0	mΩ
Q_g	56.8	nC

Marking Information

Product Name	Package	Marking
SFS130N06GF	PDFN5*6	SFS130N06G

Package & Pin information



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

Parameter	Symbol	Value	Unit
Drain source voltage	V_{DS}	60	V
Gate source voltage	V_{GS}	±20	V
Continuous drain current[1], T_C=25 °C	I_D	130	A
Pulsed drain current[2], T_C=25 °C	$I_{D,\ pulse}$	390	A
Continuous diode forward current[1], T_C=25 °C	I_S	130	A
Diode pulsed current[2], T_C=25 °C	$I_{S,\ Pulse}$	390	A
Power dissipation[3], T_C=25 °C	P_D	140	W
Single pulsed avalanche energy[5]	E_{AS}	94	mJ
Operation and storage temperature	T_{stg}, T_j	-55 to 150	°C

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal resistance, junction-case	$R_{\theta JC}$	0.89	°C/W
Thermal resistance, junction-ambient[4]	$R_{\theta JA}$	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}	60			V	V_{GS}=0 V, I_D=250 uA
Gate threshold voltage	$V_{GS(th)}$	2		4	V	V_{DS}=V_{GS}, I_D=250 uA
Drain-source on-state resistance	$R_{DS(ON)}$		2.68	3.00	mΩ	V_{GS}=10 V, I_D=20 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	uA	V_{DS}=60 V, V_{GS}=0 V
Gate resistance	R_G		2.5		Ω	f=1 MHz, Open drain

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Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	C_{iss}		5411		pF	V_{GS}=0 V, V_{DS}=25 V, f=100 KHz
Output capacitance	C_{oss}		1522		pF	
Reverse transfer capacitance	C_{rss}		24.2		pF	
Turn-on delay time	$t_{d(on)}$		31.4		ns	V_{GS}=10 V, V_{DS}=50 V, R_G=2 Ω, I_D=50 A
Rise time	t_r		54.8		ns	
Turn-off delay time	$t_{d(off)}$		60.5		ns	
Fall time	t_f		112.5		ns	

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total gate charge	Q_g		56.8		nC	V_{GS}=10 V V_{DS}=50 V, I_D=50 A,
Gate-source charge	Q_{gs}		17.8		nC	
Gate-drain charge	Q_{gd}		6.3		nC	
Gate plateau voltage	$V_{plateau}$		4.4		V	

Body Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Diode forward voltage	V_{SD}			1.3	V	I_S=20 A, V_{GS}=0 V
Reverse recovery time	t_{rr}		216.7		ns	V_R=50 V, I_S=50 A, di/dt=100 A/μs
Reverse recovery charge	Q_{rr}		317.7		nC	
Peak reverse recovery current	I_{rrm}		3.1		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) The 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 T_a=25 °C.
5) V_{DD}=30 V,V_{GS}=10 V, L=0.3 mH, starting T_j=25 °C.

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Electrical Characteristics Diagrams

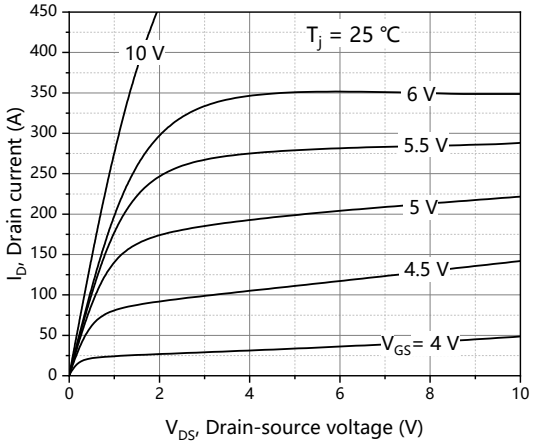

Figure 1. Typ. output characteristics

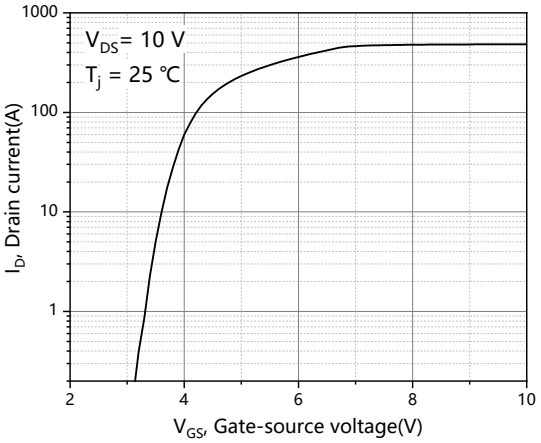

Figure 2. Typ. transfer characteristics

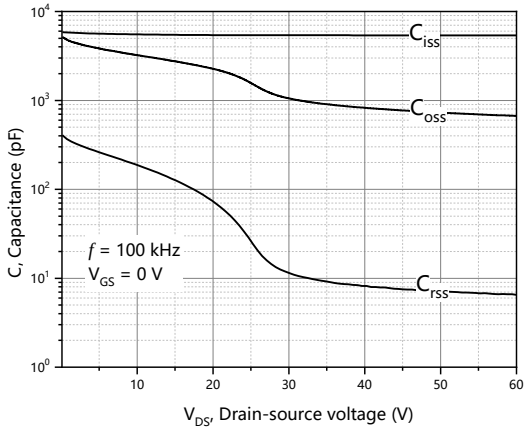

Figure 3. Typ. capacitances

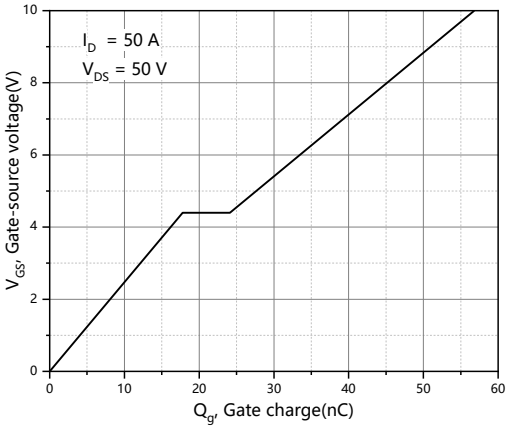

Figure 4. Typ. gate charge

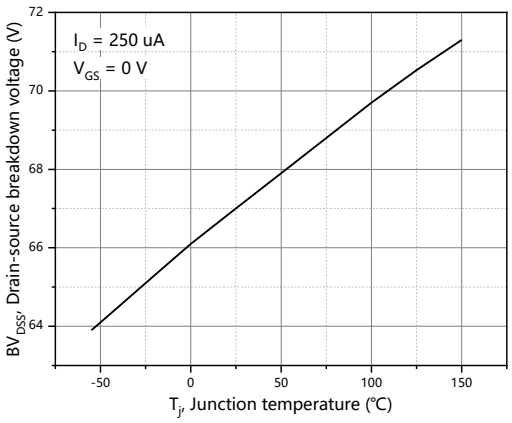

Figure 5. Drain-source breakdown voltage

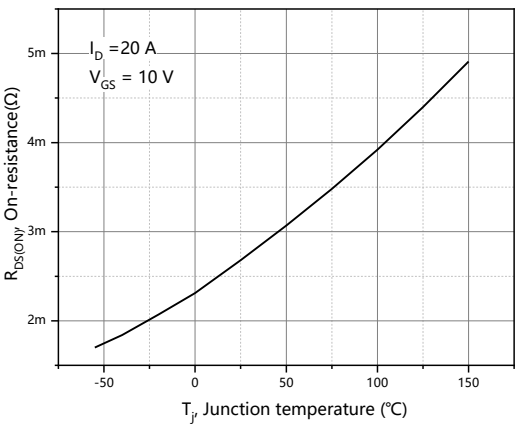

Figure 6. Drain-source on-state resistance

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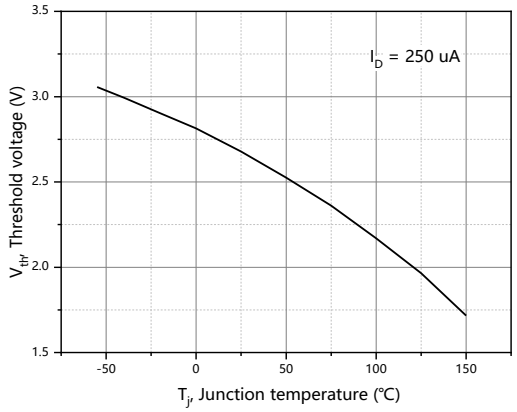

Figure 7. Threshold voltage

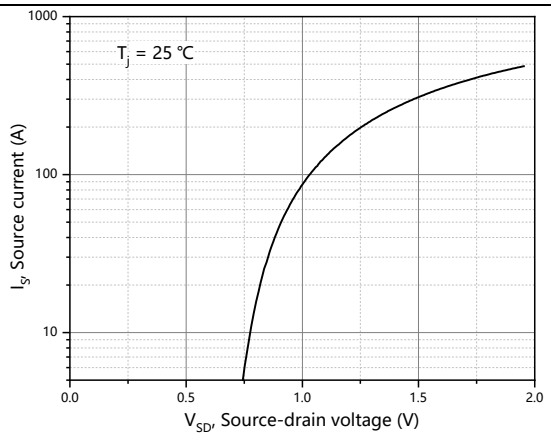

Figure 8. Forward characteristic of body diode

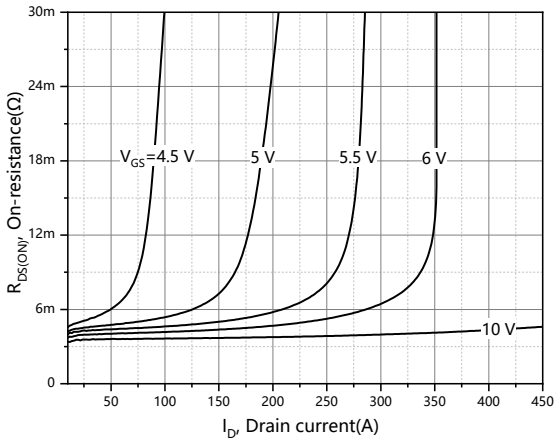

Figure 9. Drain-source on-state resistance

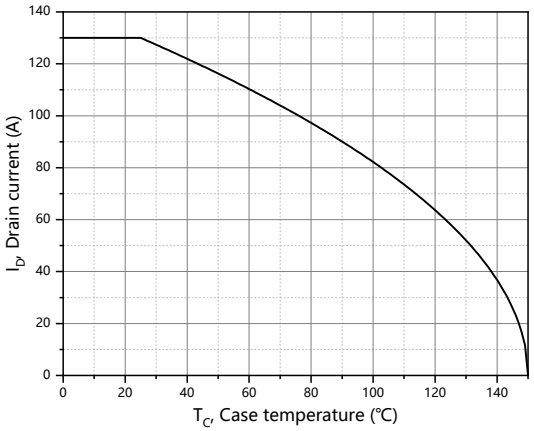

Figure 10. Drain current

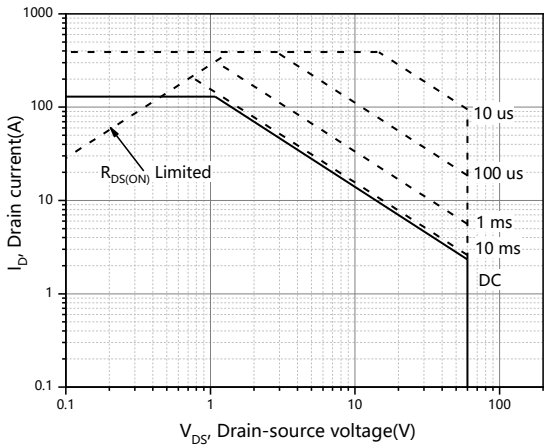

Figure 11. Safe operation area T_C=25 °C

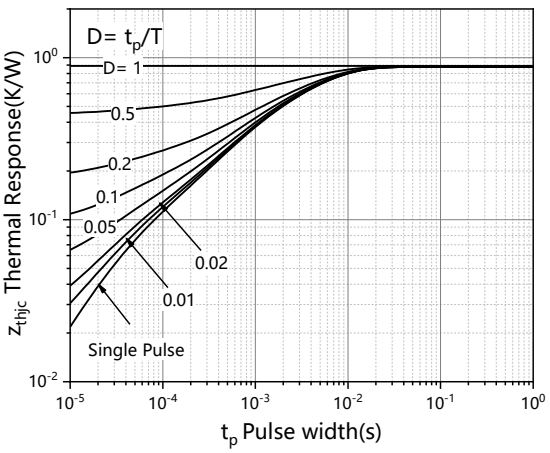

Figure 12. Max transient thermal impedance

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Test circuits and waveforms

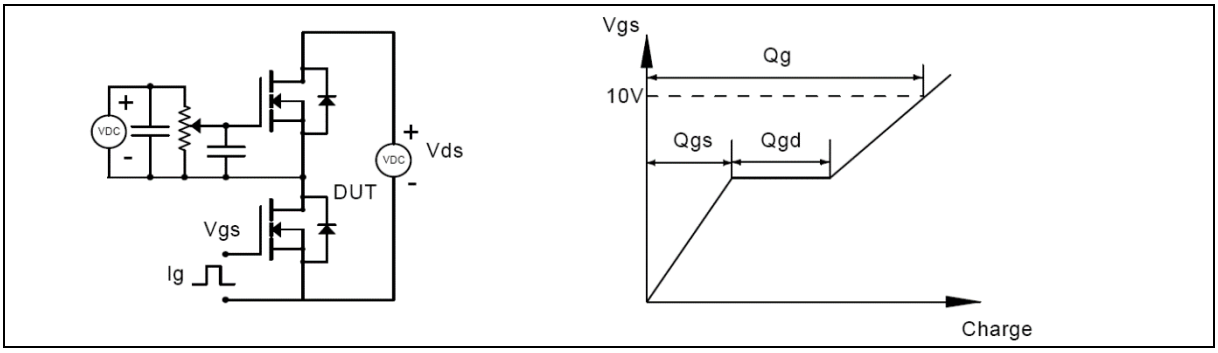

Figure 1. Gate charge test circuit & waveform

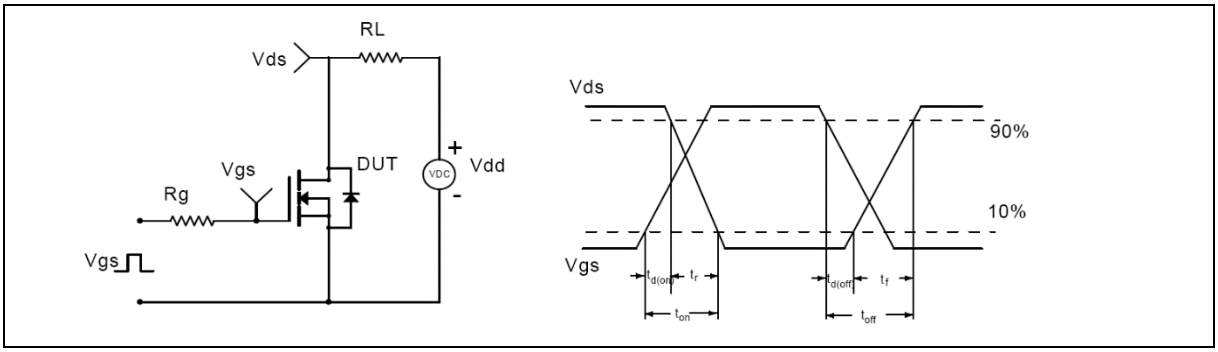

Figure 2. Switching time test circuit & waveforms

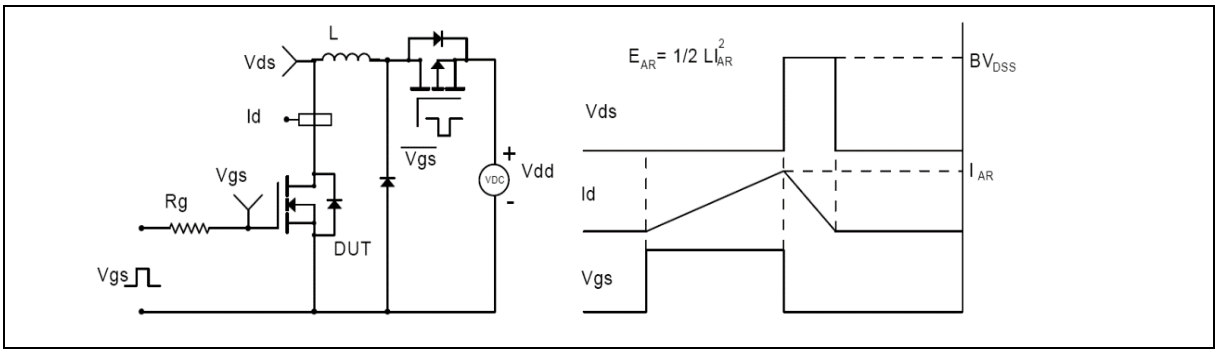

Figure 3. Unclamped inductive switching (UIS) test circuit & waveforms

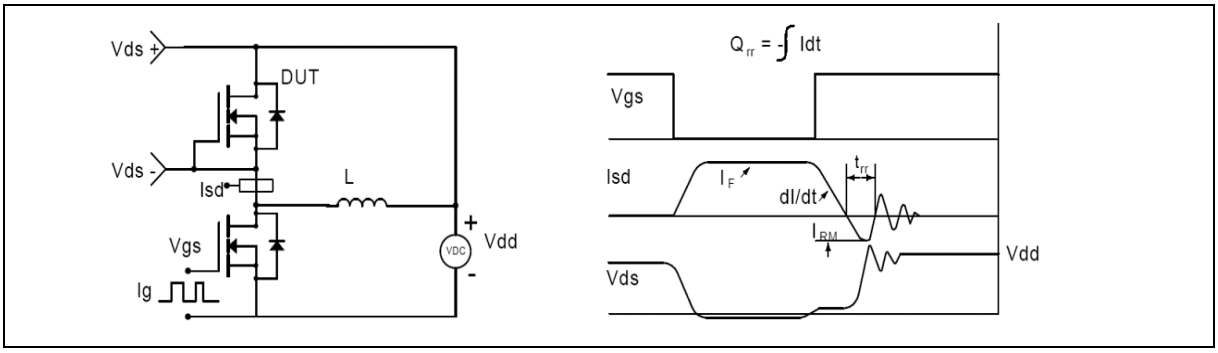

Figure 4. Diode reverse recovery test circuit & waveforms

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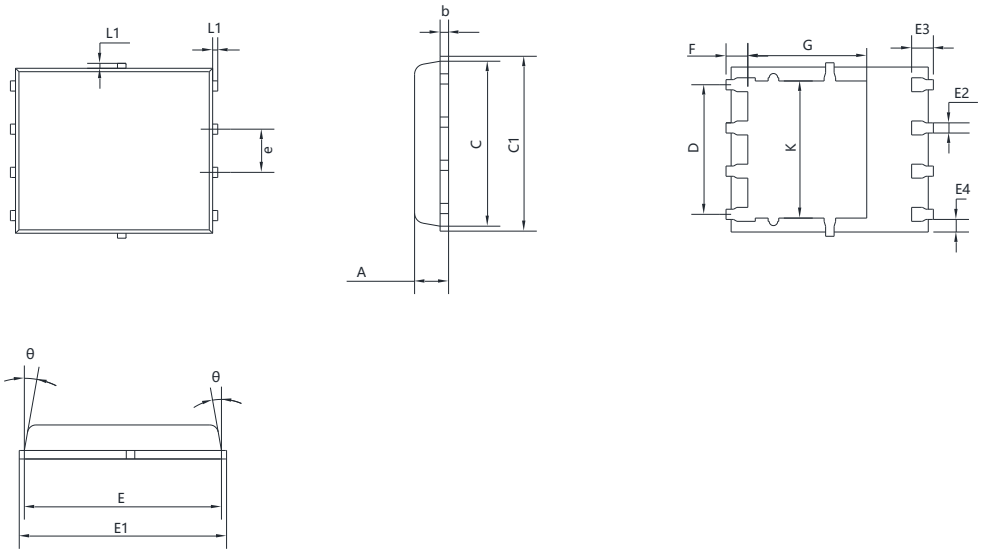
Package Information



Symbol	mm		
	Min	Nom	Max
A	0.90	1.00	1.10
b	0.15	0.25	0.35
c	4.70	4.90	5.10
c1	5.00	5.20	5.40
D	3.61	3.81	4.01
E	5.60	5.80	6.00
E1	5.90	6.10	6.30
E2	0.20	0.30	0.40
E3	0.53	0.63	0.73
E4	0.25	0.35	0.45
e	1.17	1.27	1.37
L1	0.05	0.15	0.25
F	0.63 BSC		
G	3.50 BSC		
θ	8°	10°	12°

Version 1: PDFN5*6-F package outline dimension

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Ordering Information

Package Type	Units/ Reel	Reels / Inner Box	Units/ Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
PDFN5*6-F	5000	2	10000	5	50000

Product Information

Product	Package	Pb Free	RoHS	Halogen Free
SFS130N06GF	PDFN5*6	yes	yes	yes

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