General Description

FSMOS® low $R_{DS(ON)}$, low gate charge, fast switching and excellent avalanche characteristics. The low V_{th} series is specially designed to use in synchronous rectification power systems with low driving voltage.

Features

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

Applications

- PD charger
- Motor driver
- Switching voltage regulator
- DC-DC convertor
- Switched mode power supply

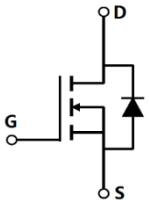
Key Performance Parameters

Parameter	Value	Unit
$V_{DS,\ min}$ @ $T_{j(max)}$	40	V
$I_{D,\ pulse}$	390	A
$R_{DS(ON)\ max}$ @ V_{GS}=10V	2.0	
Q_g	96.8	nC

Marking Information

Product Name	Package	Marking
SFS04R02KF	TO263	SFS04R02K

Package & Pin information



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Absolute Maximum Ratings at T_j=25℃ unless otherwise noted

Parameter	Symbol	Value	Unit
Drain source voltage	V_{DS}	40	V
Gate source voltage	V_{GS}	±20	V
Continuous drain current[1], T_C=25 ℃	I_D	130	A
Pulsed drain current[2], T_C=25 ℃	$I_{D, pulse}$	390	A
Continuous diode forward current[1], T_C=25 ℃	I_S	130	A
Diode pulsed current[2], T_C=25 ℃	$I_{S, Pulse}$	390	A
Power dissipation[3], T_C=25 ℃	P_D	140	W
Single pulsed avalanche energy[5]	E_{AS}	300	mJ
Operation and storage temperature	T_{stg} T_j	-55 to 175	℃

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal resistance, junction-case	R	1.07	℃/W
Thermal resistance, junction-ambient[4]	R	62	℃/W

Electrical Characteristics at T_j=25℃ unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
[redacted]e voltage	BV_{DSS}	40			V	V_{GS}=0 V, I_D=250

Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	C_{iss}		6587		pF	V_{GS}=0 V, V_{DS}=20 V, kHz
Output capacitance	C_{oss}		2537		pF	
Reverse transfer capacitance	C_{rss}		178		pF	
Turn-on delay time	$t_{d(on)}$		26.6		ns	V_{GS}=10 V, V_{DS}=20 V, R_G I_D=20 A
Rise time	t_r		9.3		ns	
Turn-off delay time	$t_{d(off)}$		96		ns	
Fall time	t_f					

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Electrical Characteristics Diagrams

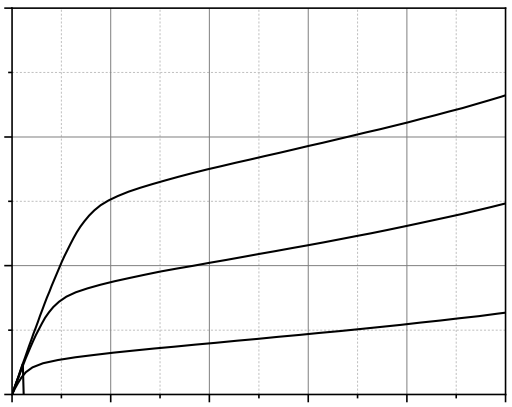

Figure 1. Typ. output characteristics

Figure 2. Typ. transfer characteristics

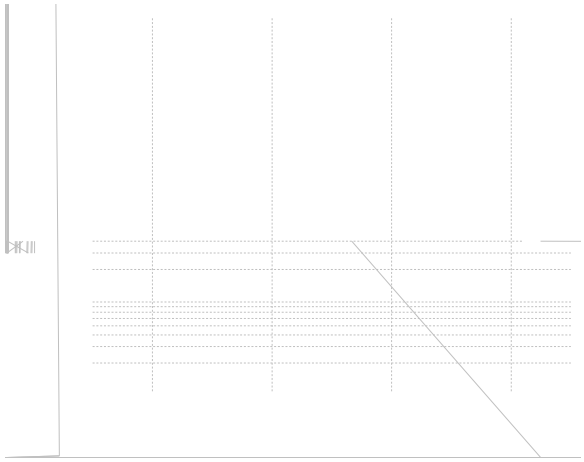

Figure 3. Typ. capacitances

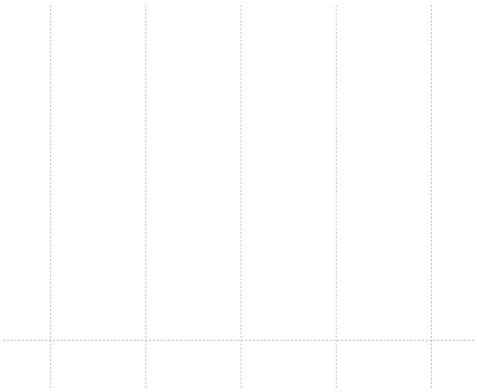

Figure 4. Typ. gate charge

Figure 5. Drain-source breakdown voltage

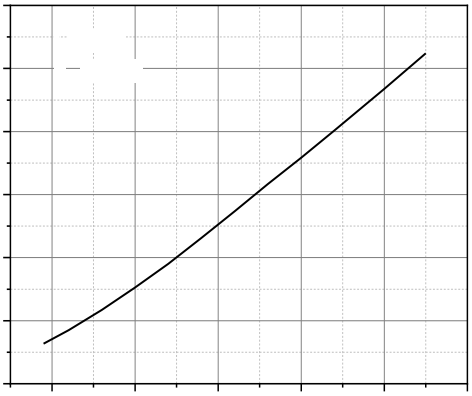

Figure 6. Drain-source on-state resistance

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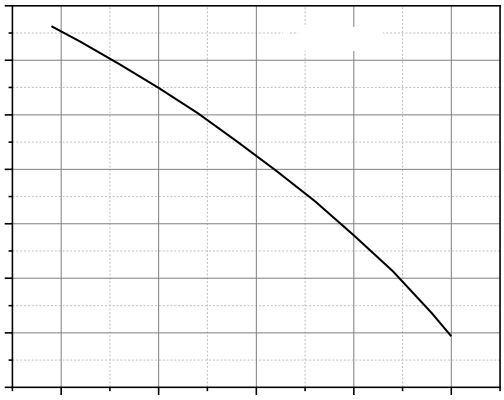

Figure 7. Threshold voltage

Figure 8. Forward characteristic of body diode

Figure 9. Drain-source on-state resistance

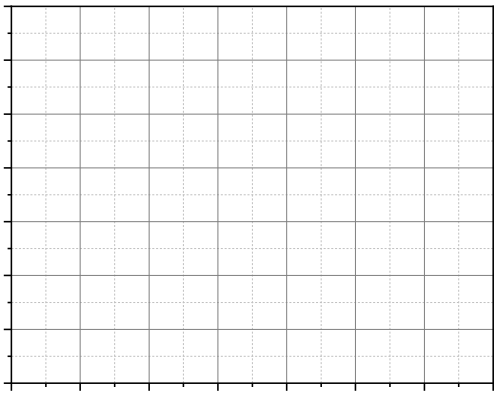

Figure 10. Drain current

Figure 11. Safe operation area T_C=25 °C

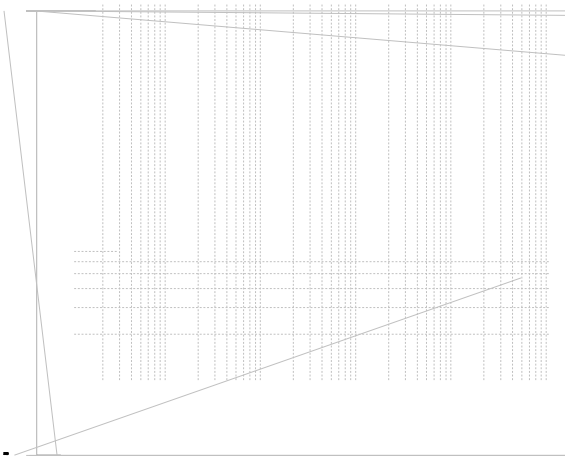

Figure 12. Max transient thermal impedance

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Test circuits and waveforms

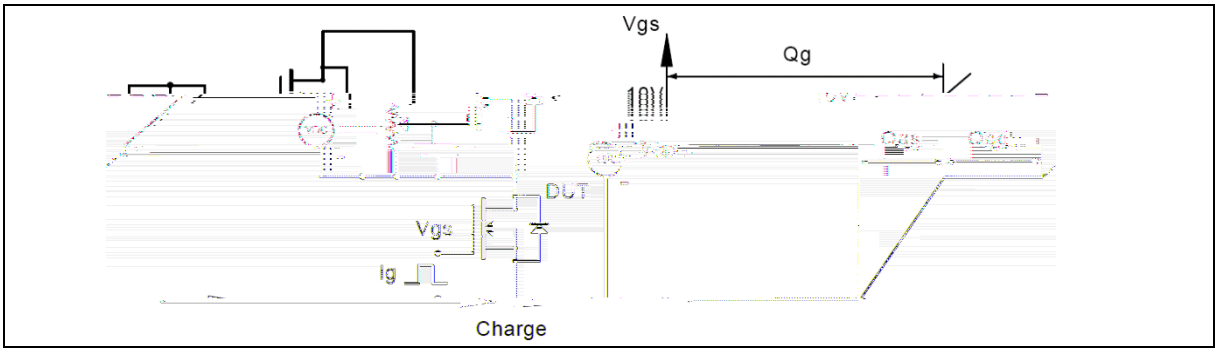

Figure 1. Gate charge test circuit & waveform

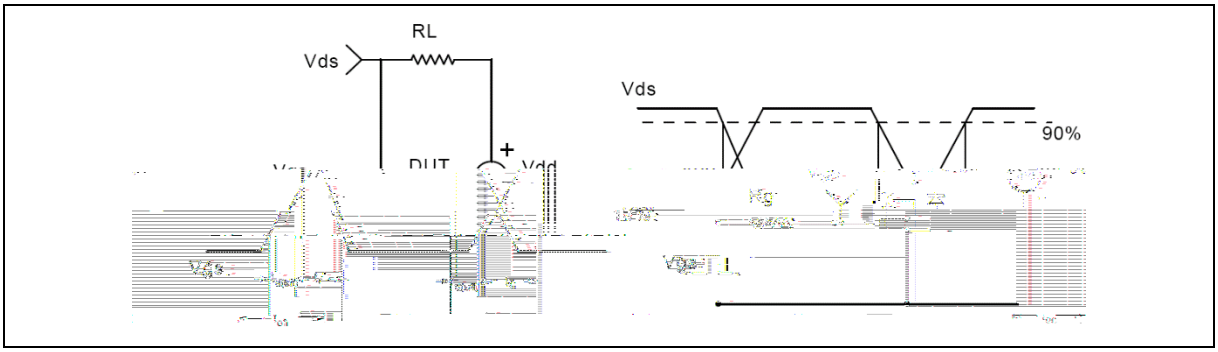

Figure 2. Switching time test circuit & waveforms

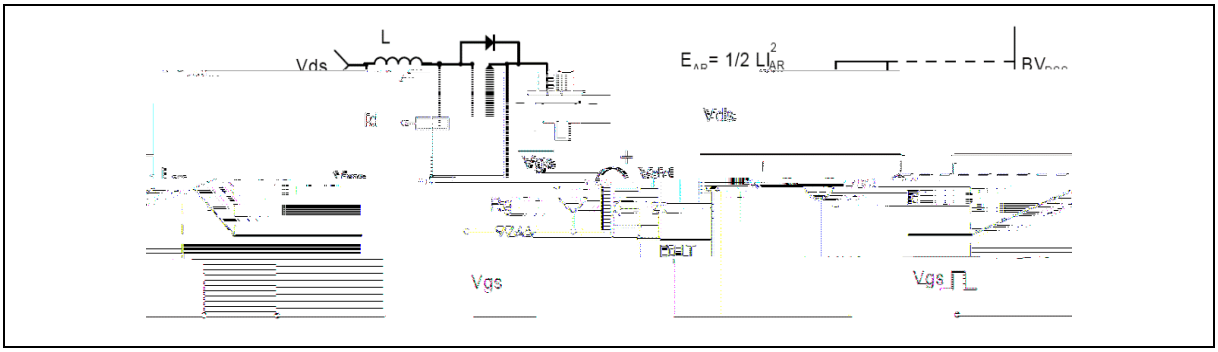

Figure 3. Unclamped inductive switching (UIS) test circuit & waveforms

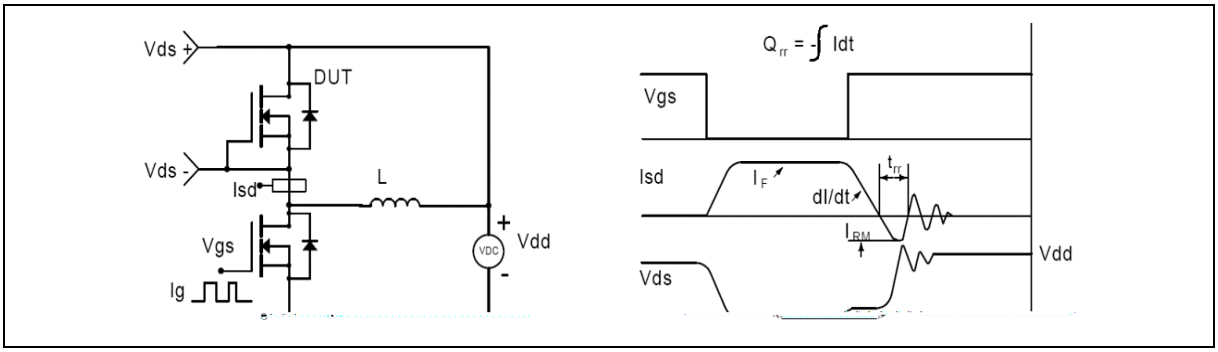

Figure 4. Diode reverse recovery test circuit & waveforms

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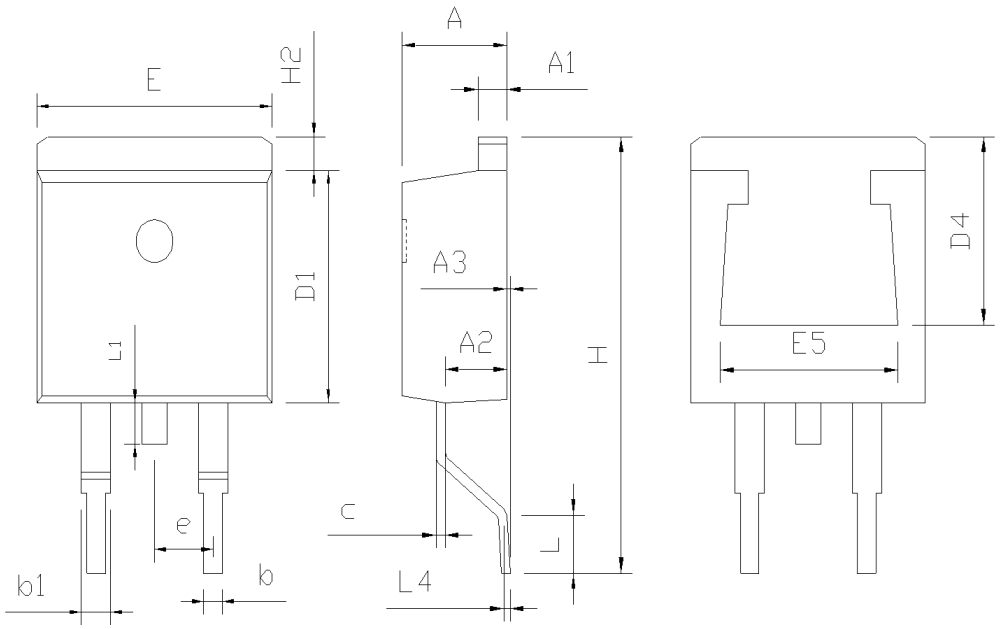
Package Information



Symbol	mm		
	Min	Nom	Max
A	4.37	4.57	4.77
A1	1.22	1.27	1.42
A2	2.49	2.69	2.89
A3	0.00	0.13	0.25
b	0.70	0.81	0.96
b1	0.17	1.27	1.47
c	0.30	0.38	0.53
D1	8.50	8.70	8.90
D4	6.60	-	-
E	9.86	10.16	10.36
E5	7.06	-	-
e	2.54 BSC		
H	14.70	15.10	15.50
H2	1.07	1.27	1.47
L2	2.00	2.30	2.60
L1	1.40	1.55	1.70
L4	0.25 BSC		

Version 1: TO263-C 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
TO263-C	800	1	800	5	4000

Product Information

Product	Package	Pb Free	RoHS	Halogen Free
SFS04R02KF	TO263	yes	yes	yes

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