General Description

SFGMOS®

$R_{DS(ON)}$, 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 stability and uniformity
- Fast switching and soft recovery

Applications

- Switched mode power supply
- Motor driver
- Battery protection
- DC-DC convertor
- Solar inverter
- UPS and energy inverter

Key Performance Parameters

Parameter	Value	Unit
$V_{DS,\ min}$ @ $T_{j(max)}$	120	V
$I_{D,\ pulse}$	330	A
$R_{DS(ON),\ max}$ @ V_{GS}=10V	6.5	
Q_g	68.9	nC

Marking Information

Product Name	Package	Marking
SFG110N12IF	TO262	SFG110N12I

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

Parameter	Symbol	Value	Unit
Drain source voltage	V_{DS}	120	V
Gate source voltage	V_{GS}	±20	V
Continuous drain current[1], T_C=25 °C	I_D	110	A
Pulsed drain current[2], T_C=25 °C	$I_{D, pulse}$	330	A
Continuous diode forward current[1], T_C=25 °C	I_S	110	A
Diode pulsed current[2], T_C=25 °C	$I_{S, pulse}$	330	A
Power dissipation[3], T_C=25 °C	P_D	192	W
Single pulsed avalanche energy[5]	E_{AS}	400	mJ
Operation and storage temperature	T_{stg}, T_j	-55 to 150	°C

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal resistance, junction-case	R	0.65	°C/W
Thermal resistance, junction-ambient[4]	R	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}	120			V	V_{GS}=0 V, I_D=250 A
Gate threshold voltage	$V_{GS(th)}$	2.0		4.0	V	V_{DS}=V_{GS}, I_D=250 A
Drain-source on-state resistance	$R_{DS(ON)}$		5.0	6.5		V_{GS}=10 V, I_D=30 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	A	V_{DS}=120 V, V_{GS}=0 V

Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	C_{iss}		5823		pF	V_{GS}=0 V, V_{DS}=50 V, 100 kHz
Output capacitance	C_{oss}		779		pF	
Reverse transfer capacitance	C_{rss}		17.5		pF	
Turn-on delay time	$t_{d(on)}$		30.3		ns	V_{GS}=10 V, V_{DS}=50 V, R_G I_D=25 A
Rise time	t_r		33		ns	
Turn-off delay time	$t_{d(off)}$		59.5		ns	
Fall time	t_f		11.7		ns	

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total gate charge	Q_g		68.9		nC	V_{GS}=10 V, V_{DS}=50 V, I_D=25 A
Gate-source charge	Q_{gs}		18.1		nC	
Gate-drain charge	Q_{gd}		15.9		nC	
Gate plateau voltage	$V_{plateau}$		4.8		V	

Body Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Diode forward voltage	V_{SD}			1.3	V	I_S=30 A, V_{GS}=0 V
Reverse recovery time	t_{rr}		85		ns	V_R=50 V, I_S=25 A,
Reverse recovery charge	Q_{rr}		240		nC	
Peak reverse recovery current	I_{rrm}		4.6		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) The value of R 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}=50 V,V_{GS}=10 V, L=0.3 mH, starting T_j=25 °C.

Electrical Characteristics Diagrams

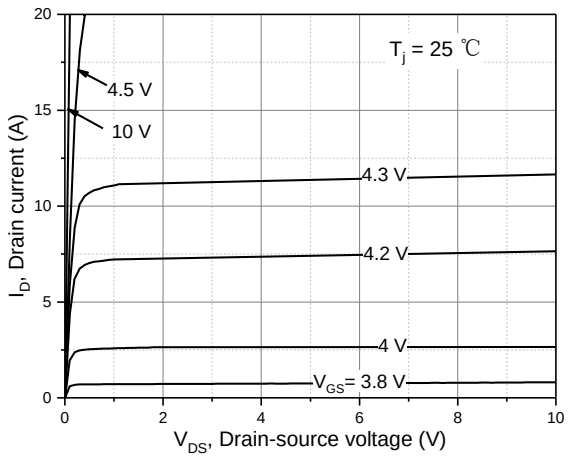


Figure 1. Typ. output characteristics

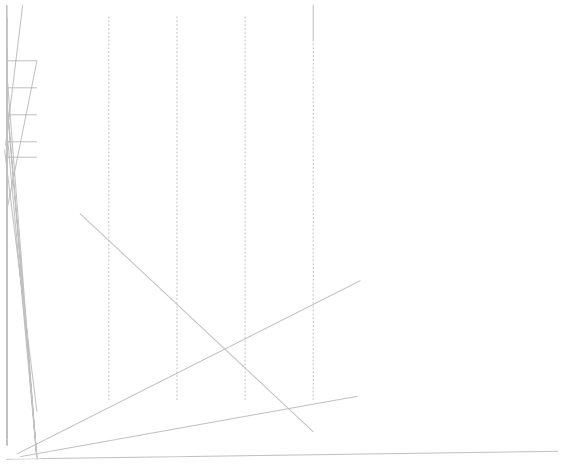


Figure 2. Typ. transfer characteristics

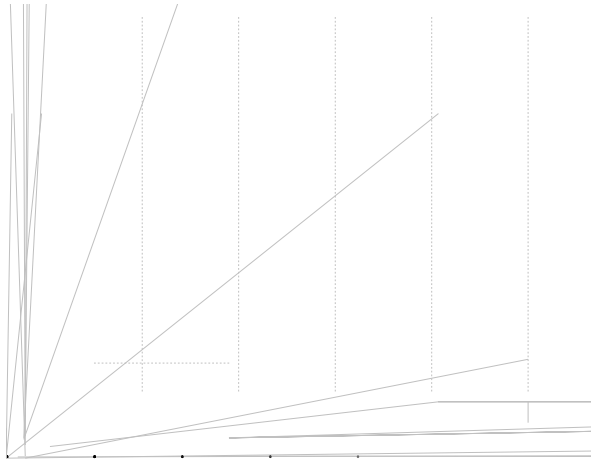


Figure 3. Typ. capacitances

Figure 4. Typ. gate charge

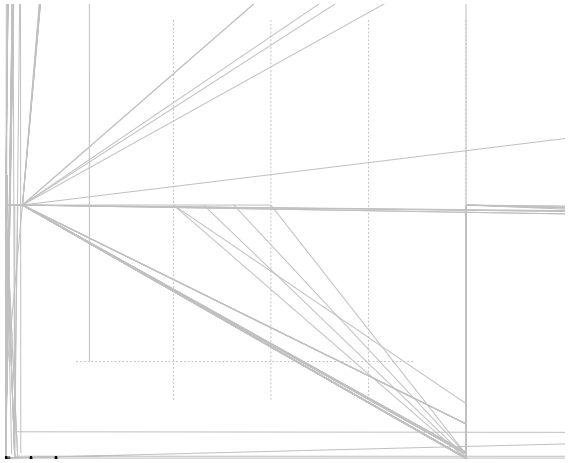


Figure 5. Drain-source breakdown voltage

Figure 6. Drain-source on-state resistance

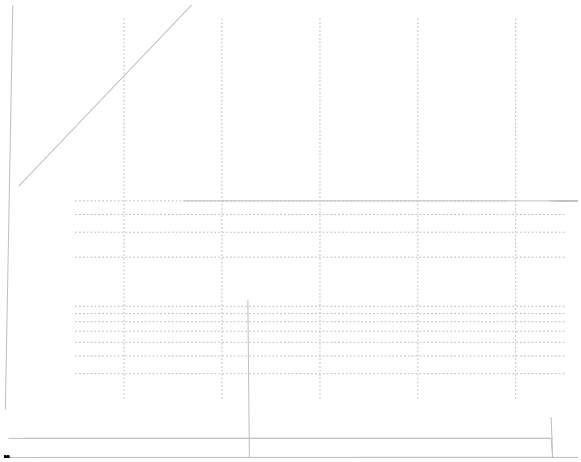


Figure 7. Forward characteristic of body diode

Figure 8. Drain current

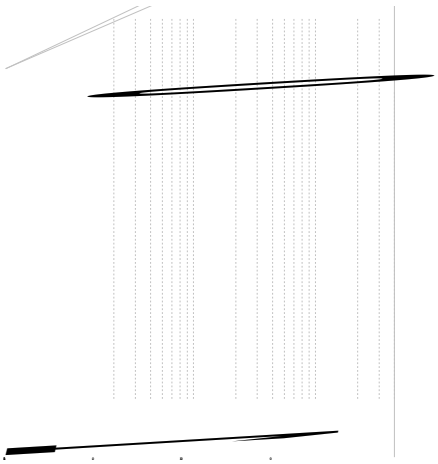


Figure 9. Safe operation area T_C=25 °C

Test circuits and waveforms

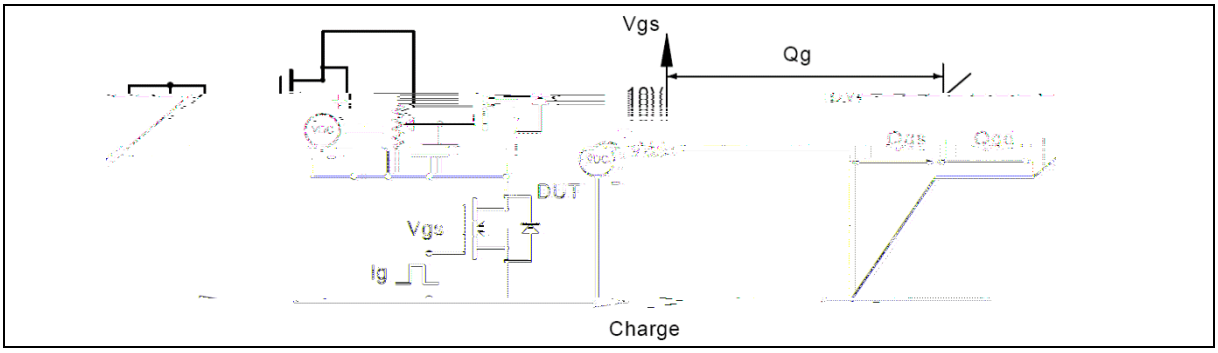


Figure 1. Gate charge test circuit & waveform

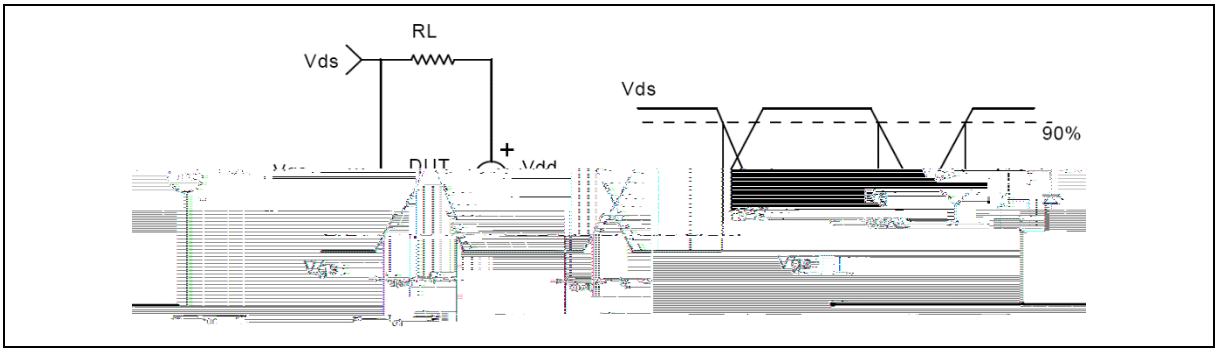


Figure 2. Switching time test circuit & waveforms

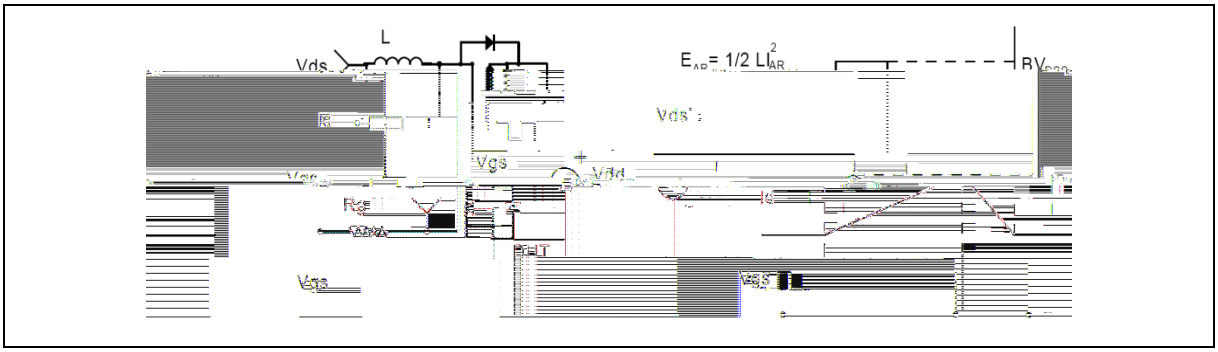


Figure 3. Unclamped inductive switching (UIS) test circuit & waveforms

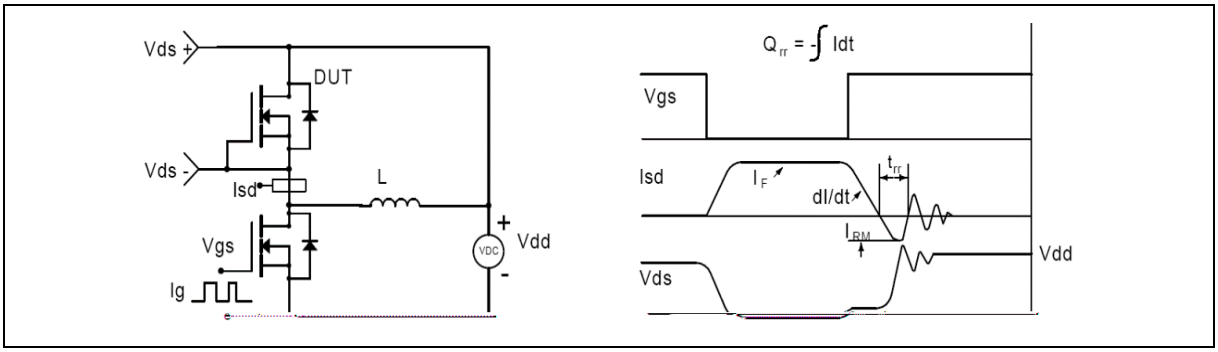
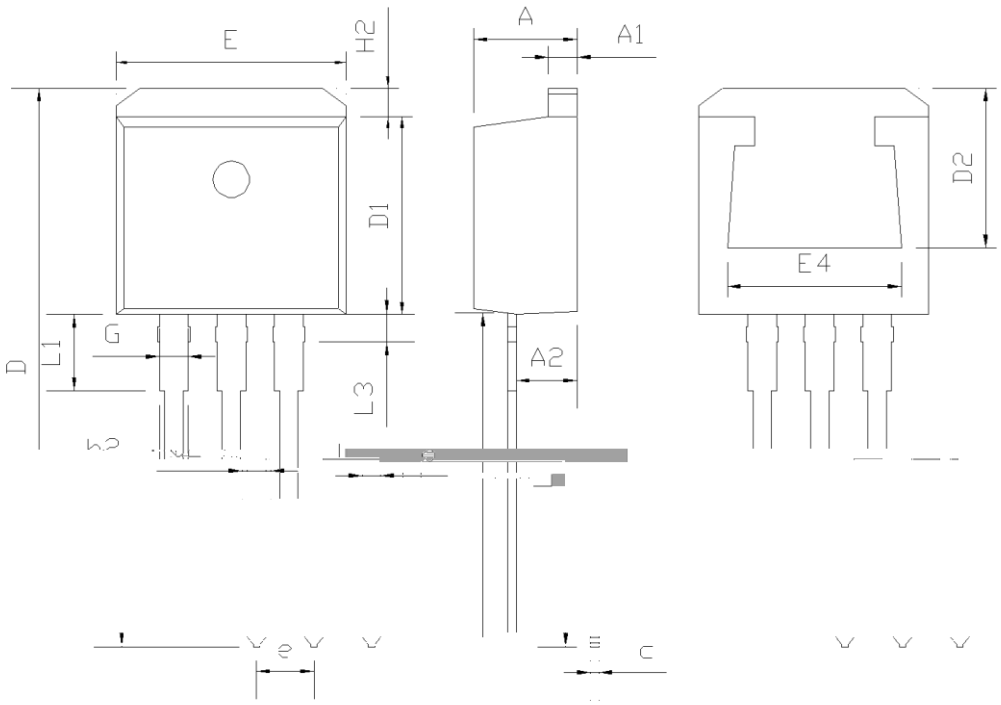


Figure 4. Diode reverse recovery test circuit & waveforms

Package Information



Symbol	mm		
	Min	Nom	Max
A	4.34	4.57	4.77
A1	1.22	1.27	1.42
A2	2.49	2.69	2.89
b	0.71	0.81	0.96
b2	1.17	1.27	1.42
c	0.28	0.38	0.53
D	23.20	23.70	24.02
D1	8.50	8.70	8.90
D2	6.00	-	-
E	9.86	10.16	10.36
E4	7.06	-	-
e	2.54 BSC		
H2	-	-	1.50
L	13.33	13.73	14.13
L1	3.50	3.75	4.00
L3	1.28	1.43	1.58
G	1.25	1.35	1.50

Version 1: TO262-C package outline dimension

Ordering Information

Package Type	Units/ Tube	Tubes / Inner Box	Units/ Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
TO262-C	50	20	1000	6	6000