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
Drain-source breakdown voltage	BV_{DSS}	40			V	V_{GS}=0 V, I_D=250 A
Gate threshold voltage	$V_{GS(th)}$	1.3		2.5	V	V_{DS}=V_{GS}, I_D=250 A
Drain-source on-state resistance	$R_{DS(ON)}$		1.5	2.0		V_{GS}=10 V, I_D=55 A
Drain-source on-state resistance	$R_{DS(ON)}$		2.5	3.0		V_{GS}=4.5 V, I_D=55 A
Gate-source leakage current	I_{GSS}			100	nA	V_{GS}=20 V
				-100		V_{GS}=-20 V

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	

Electrical Characteristics Diagrams

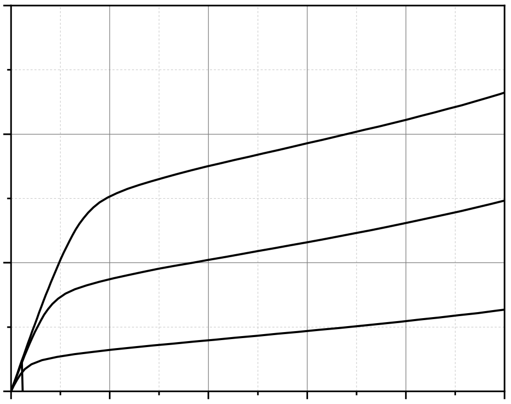


Figure 1. Typ. output characteristics

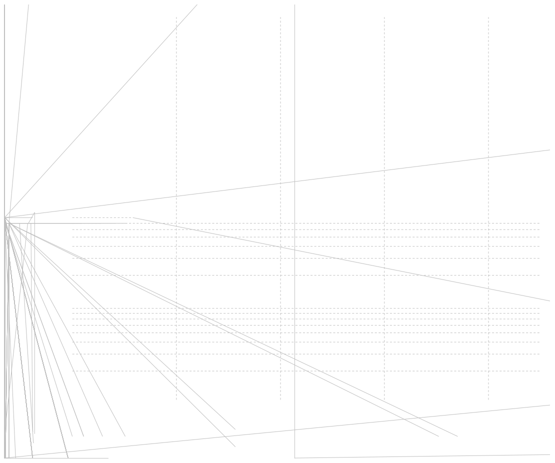


Figure 2. Typ. transfer characteristics

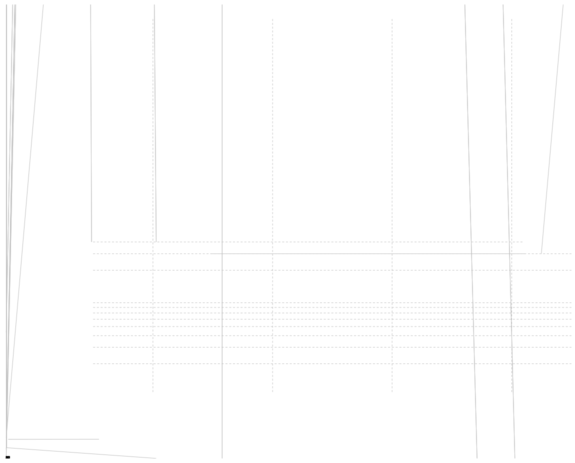


Figure 3. Typ. capacitances

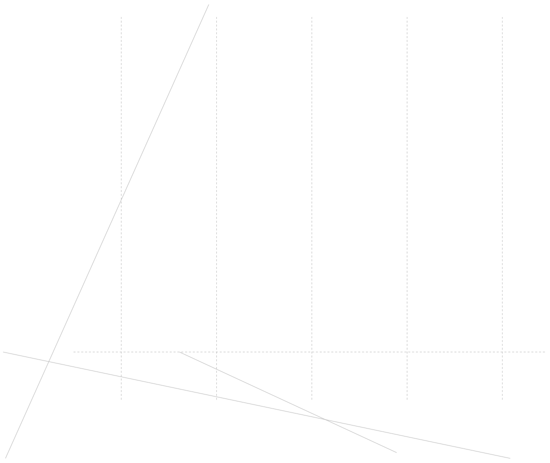


Figure 4. Typ. gate charge

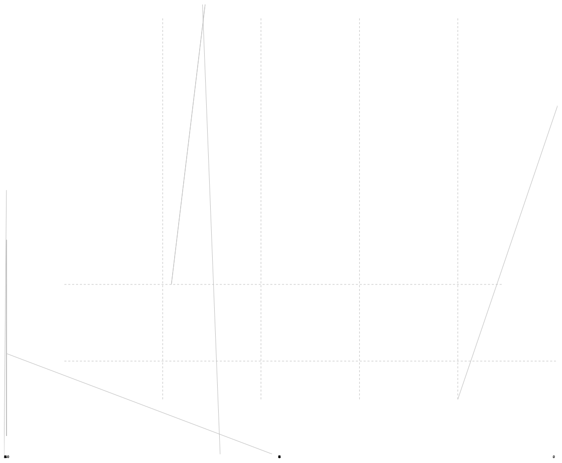


Figure 5. Drain-source breakdown voltage

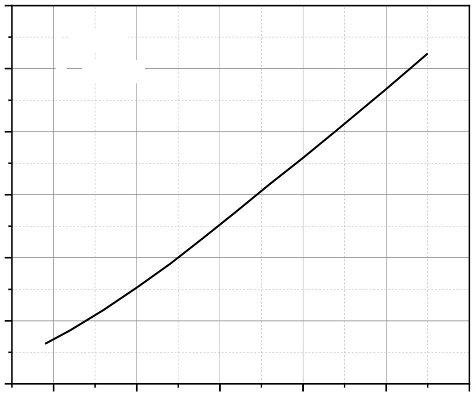


Figure 6. Drain-source on-state resistance

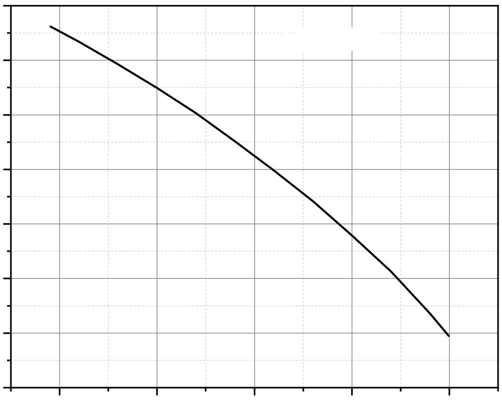


Figure 7. Threshold voltage

Figure 8. Forward characteristic of body diode

Figure 9. Drain-source on-state resistance

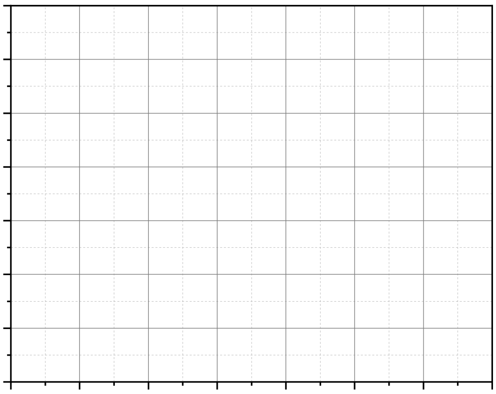


Figure 10. Drain current

Figure 11. Safe operation area T_C=25 °C

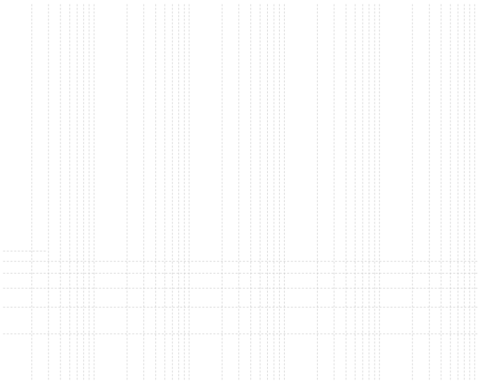


Figure 12. Max transient thermal impedance

Test circuits and waveforms

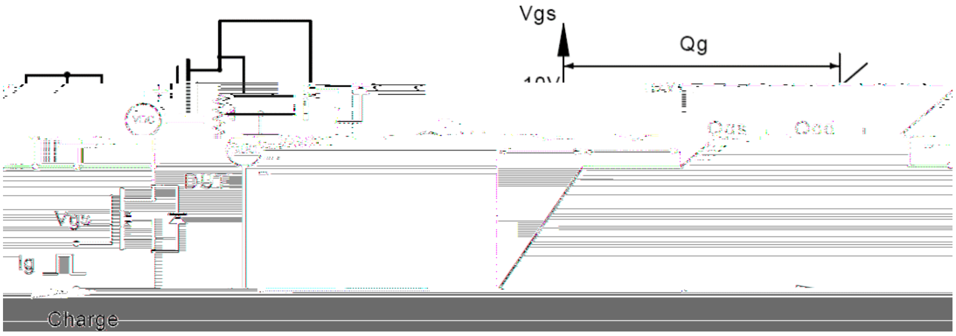


Figure 1. Gate charge test circuit & waveform

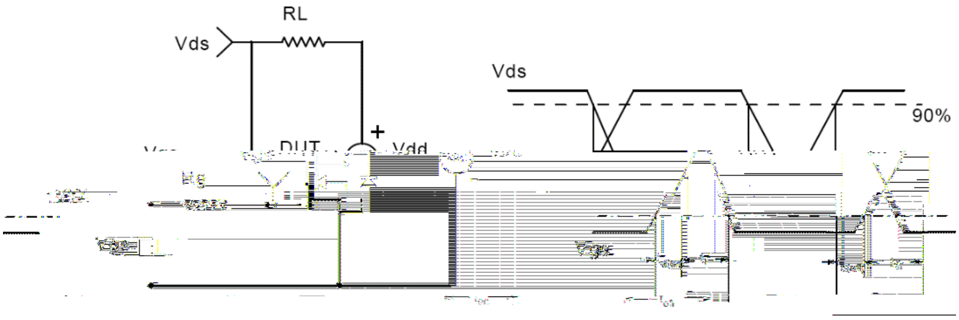


Figure 2. Switching time test circuit & waveforms

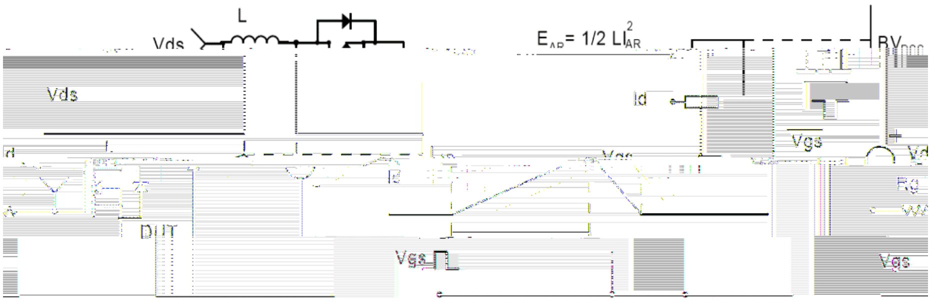


Figure 3. Unclamped inductive switching (UIS) test circuit & waveforms

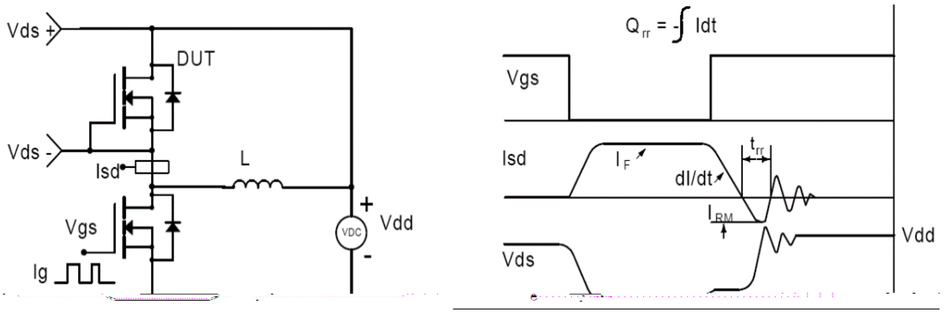
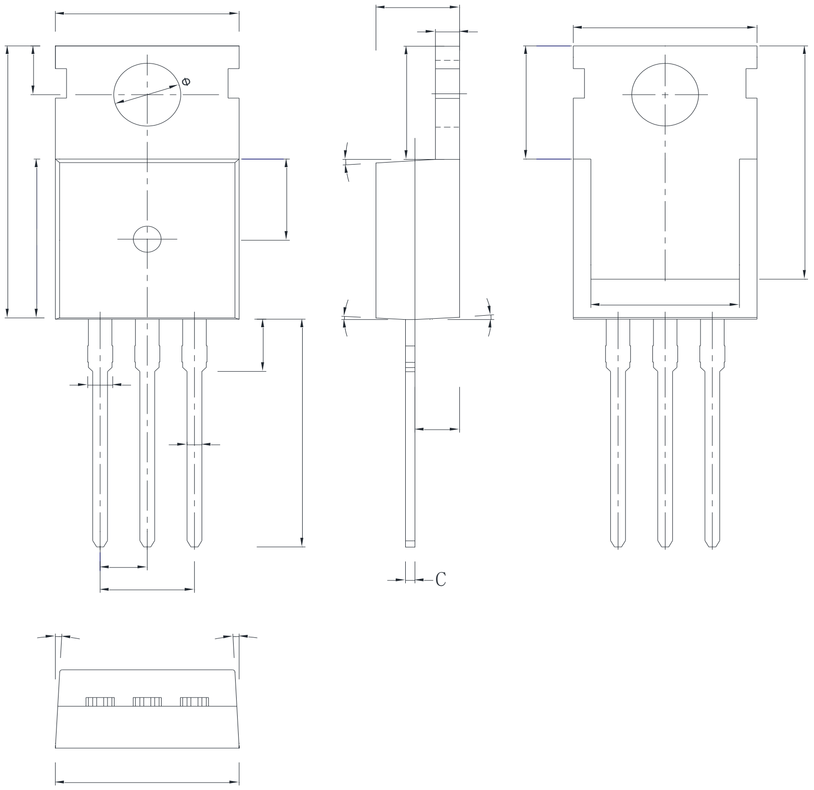


Figure 4. Diode reverse recovery test circuit & waveforms

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		

Package Information



Symbol	mm		
	Min	Nom	Max
A	4.40	4.50	4.60
A1	1.27	1.30	1.33
A2	2.30	2.40	2.50
b	0.70	-	0.90
b1	1.27	-	1.40
c	0.45	0.50	0.60
D	15.30	15.70	16.10
D1	9.10	9.20	9.30
D2	13.10	-	13.70
E	9.70	9.90	10.20
E1	7.80	8.00	8.20
e	2.54 BSC		
e1	5.08 BSC		
H1	6.30	6.50	6.70
L	12.78	13.08	13.38
L1	-	-	3.50
L2	4.60 REF		
	3.55	3.60	3.65
Q	2.73	-	2.87
1	1		

Version 2: TO220-C 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
TO220-C	50	20	1000	5	5000

Product Information

Product	Package	Pb Free	RoHS	Halogen Free
SFS04R02PF	TO220	yes	yes	yes

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