General Description

SFGMOS®

$R_{DS(ON)}$, low gate charge, fast switching and excellent avalanche characteristics. The cd al S‡Q WR§ BF78P.&[@BF78

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	100	A
Pulsed drain current[2], T_C=25 °C	$I_{D, pulse}$	300	A
Continuous diode forward current[1], T_C=25 °C	I_S	100	A
Diode pulsed current[2], T_C=25 °C	$I_{S, pulse}$	300	A
Power dissipation[3], T_C=25 °C	P_D	148	W
Single pulsed avalanche energy[5]	E_{AS}	135	mJ
Operation and storage temperature	T_{stg}, T_j	-55 to 150	°C

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal resistance, junction-case	R	0.84	°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}	80			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	$R_{DS(ON)}$		6	6.5		V_{GS}=10 V, I_D=12 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}=80 V, V_{GS}=0 V
Gate resistance	R_G		3.1			

Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	C_{iss}		4242		pF	V_{GS}=0 V, V_{DS}=25 V, kHz
Output capacitance	C_{oss}		1779		pF	
Reverse transfer capacitance	C_{rss}		84.1		pF	
Turn-on delay time	$t_{d(on)}$		28		ns	V_{GS}=10 V, V_{DS}=40 V, R_G I_D=50 A
Rise time	t_r		6.5		ns	
Turn-off delay time	$t_{d(off)}$		48.5		ns	
Fall time	t_f		7.5		ns	

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total gate charge	Q_g		53.2		nC	V_{GS}=10 V, V_{DS}=40 V, I_D=50 A
Gate-source charge	Q_{gs}		17.5		nC	
Gate-						

Electrical Characteristics Diagrams

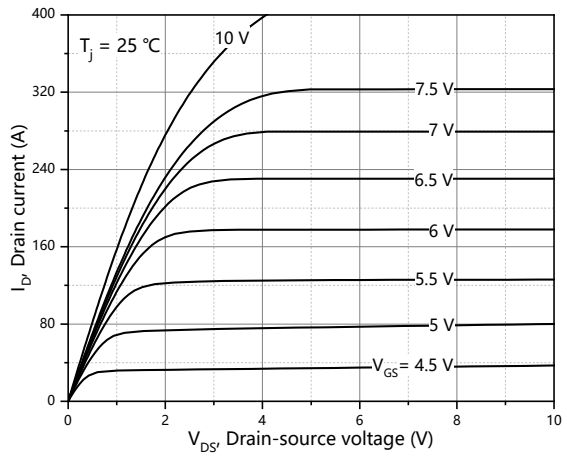


Figure 1. Typ. output characteristics

Figure 2. Typ. transfer characteristics

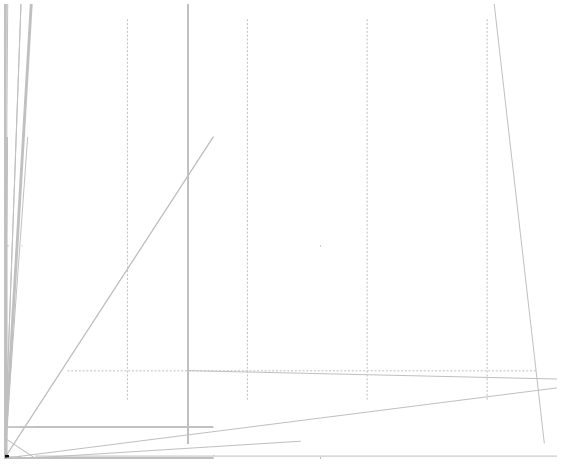


Figure 3. Typ. capacitances

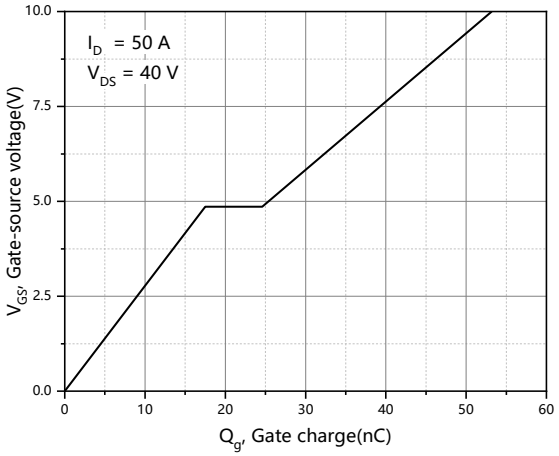


Figure 4. Typ. gate charge

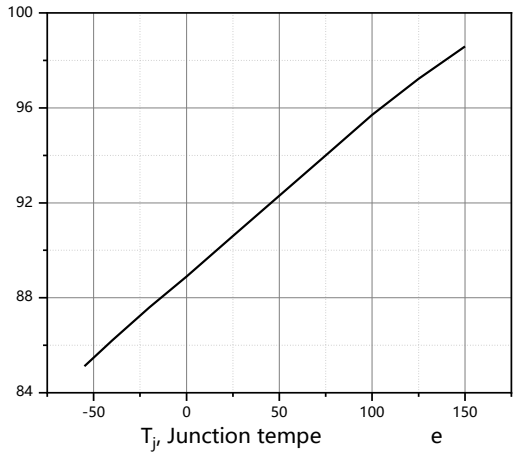


Figure 5. Drain-source breakdown voltage

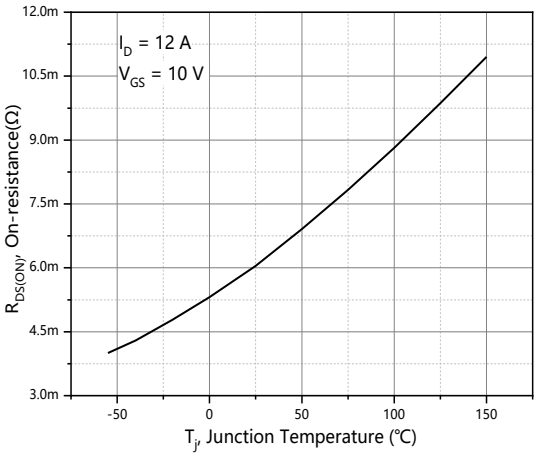


Figure 6. Drain-source on-state resistance

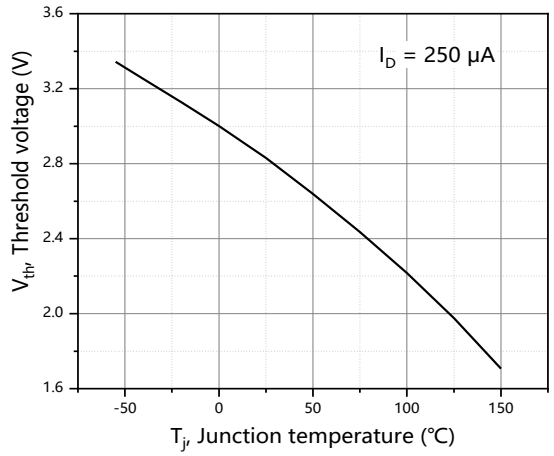


Figure 7. Threshold voltage

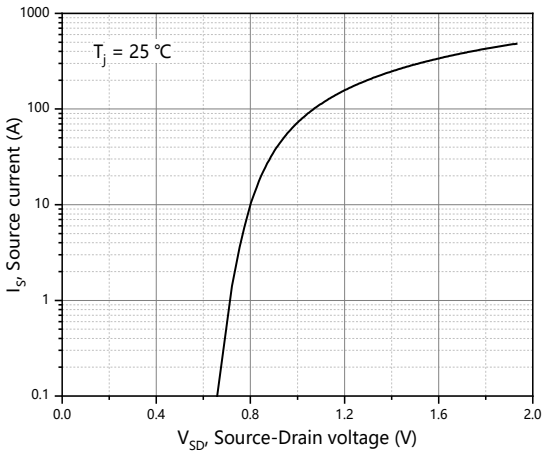


Figure 8. Forward characteristic of body diode

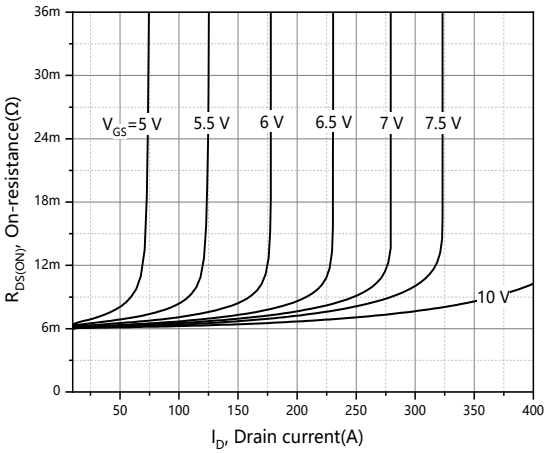


Figure 9. Drain-source on-state resistance

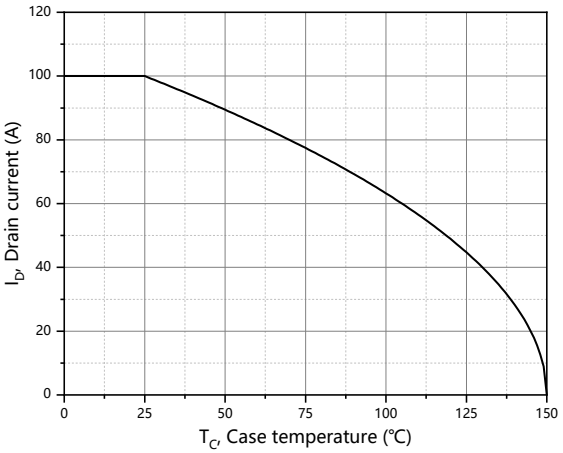


Figure 10. Drain current

Figure 11. Safe operation area T_C=25 °C

Figure 12. Max transient thermal impedance

Test circuits and waveforms

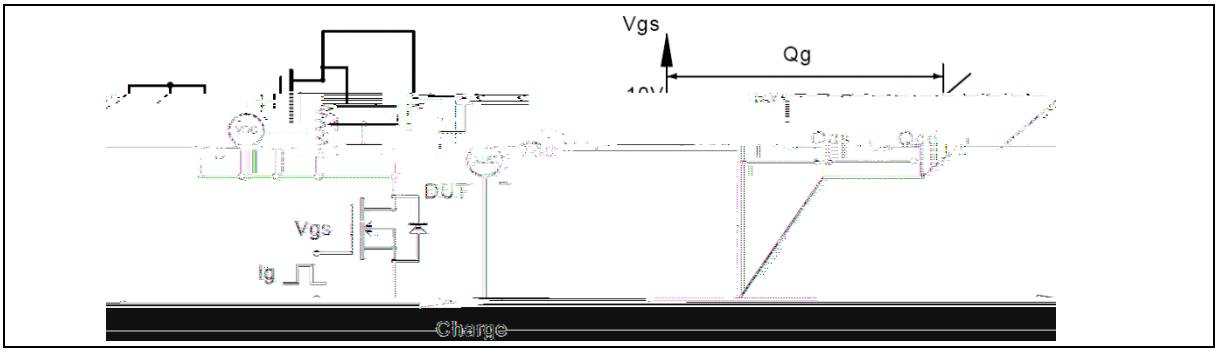


Figure 1. Gate charge test circuit & waveform

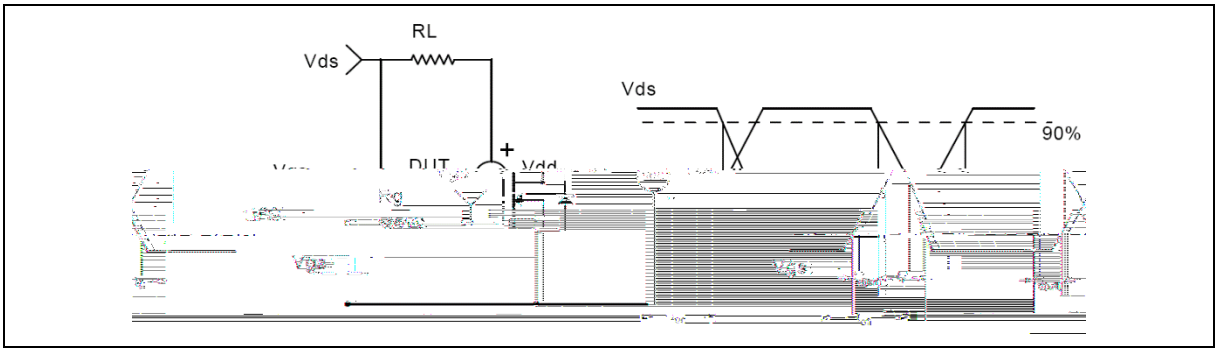


Figure 2. Switching time test circuit & waveforms

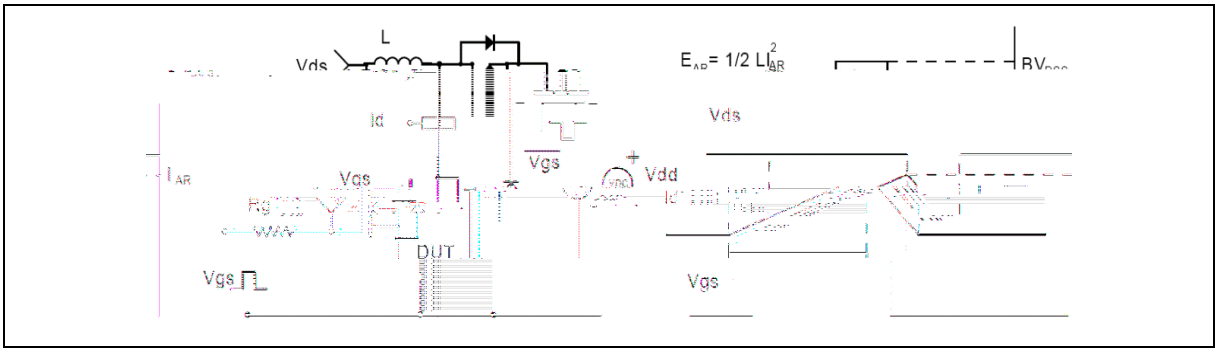


Figure 3. Unclamped inductive switching (UIS) test circuit & waveforms

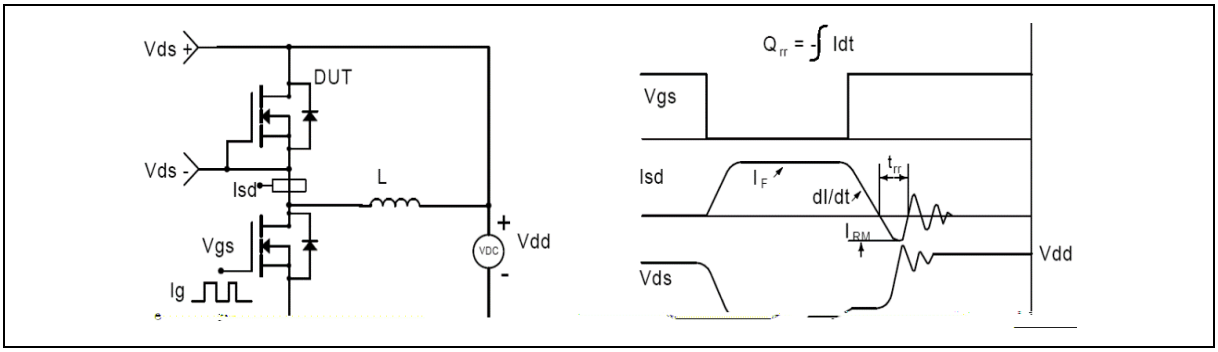
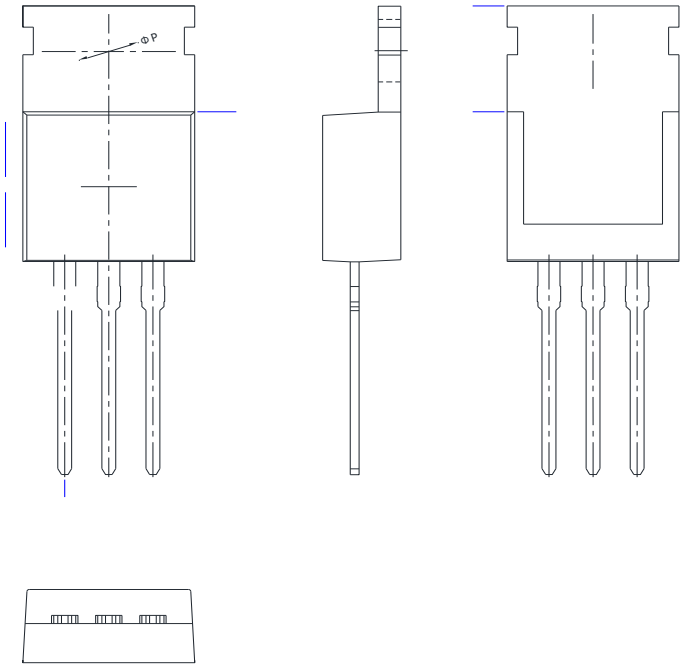


Figure 4. Diode reverse recovery test circuit & waveforms

Package Information



Symbol	mm		
	Min	Nom	Max
A	4.40	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°	3°	5°

Version 1: TO220-J package outline dimension

Ordering Information

Package Type	Units/ Tube	Tubes/ Inner Box	Units/ Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
TO220-J	50	20	1000	5	5000

Product Information

Product	Package	Pb Free	RoHS	Halogen Free