AT70R180BF

700V Super Junction Power MOSFET

Features

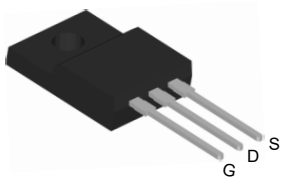
- Low drain-source on-resistance:$R_{DS(ON)}$=0.145Ω（typ)
- Easy to control gate switching
- Enhancement mode: V_{th} = 2.0 to 4.0V
- 100% avalanche tested
- RoHS compliant

Key Performance Parameters

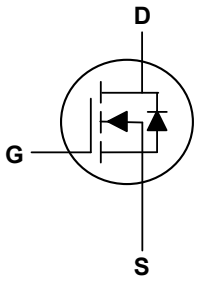
Parameter	Value	Unit
V_{DS} @ $T_{j,max}$	700	V
$R_{DS(ON),max}$	180	mΩ
I_D	28	A
$Q_{g,typ}$	48	nC
I_{DM}	84	A

Applications

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)
- Charger,Lighting



TO-220F Top View



Absolute Maximum Ratings(T_C=25℃, unless otherwise noted)

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	700	V
Gate-Source Voltage	V_{GS}	±30	V
Continuous Drain Current[1]	I_D	28	A
Pulsed Drain Current[2]	I_{DM}	84	A
Single Pulse Avalanche Energy[3]	E_{AS}	980	mJ
Total Power Dissipation[4]	P_D	34	W
Storage Temperature Range	T_{STG}	-55 to 150	℃
Operating Junction Temperature Range	T_J	-55 to 150	℃

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance Junction-Ambient (Max)	$R_{\theta JA}$	80	℃/W
Thermal Resistance Junction-Case (Max)	$R_{\theta JC}$	3.65	℃/W

Electrical Characteristics (T_J=25℃, unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V , I_D=10mA	700	---	---	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V , I_D=10A	---	145	180	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS} , I_D =250uA	2.0	---	4.0	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=700V , V_{GS}=0V , T_J=25℃	---	---	1	uA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±30V , V_{DS}=0V	---	---	±100	nA
Gate Resistance	R_G	f = 1.0MHz, open drain	---	5.5	---	Ω
Total Gate Charge	Q_g	V_{DD}=400V , V_{GS}=10V , I_D=11.3A	---	48	---	nC
Gate-Source Charge	Q_{gs}		---	8.5	---	
Gate-Drain Charge	Q_{gd}		---	8.3	---	
Turn-On Delay Time	$T_{d(on)}$	V_{DD}=400V , V_{GS}=10V , R_G=1.7Ω, I_D=11.3A	---	12.4	---	ns
Rise Time	T_r		---	21.6	---	
Turn-Off Delay Time	$T_{d(off)}$		---	50	---	
Fall Time	T_f		---	18.4	---	
Input Capacitance	C_{iss}	V_{DS}=50V , V_{GS}=0V , f=10kHz	---	2385	---	pF
Output Capacitance	C_{oss}		---	218	---	
Reverse Transfer Capacitance	C_{rss}		---	5.07	---	

Drain-Source Diode Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Diode Forward Voltage[2]	V_{SD}	V_{GS}=0V , I_F=1A , T_J=25℃	---	0.8	---	V
Reverse recovery time	trr	VR=400V, IF=11.3 A, diF/dt=100A/μs	---	288	---	ns
Reverse recovery charge	Qrr		---	4.3	---	uC
Peak reverse recovery current	Irrm		---	26.2	---	A

Note:

1. Limited by $T_{j,max.}$ Maximum Duty Cycle D = 0.50
2. Pulse width t_p limited by $T_{j,max}$
3. Identical low side and high side switch with identical R_G

Typical Characteristics

Diagram 1: Typ. output characteristics

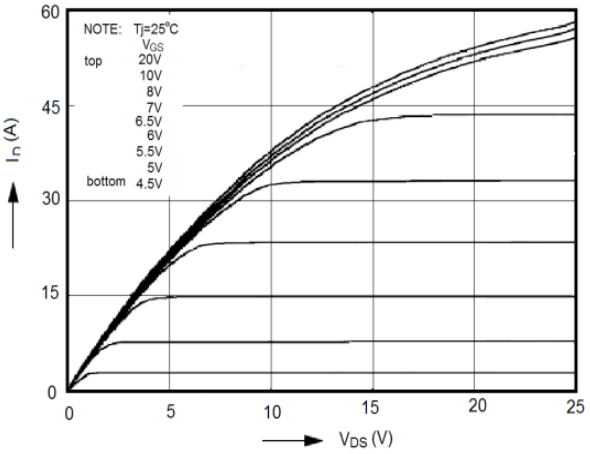


Diagram 2: Typ. Coss stored energy

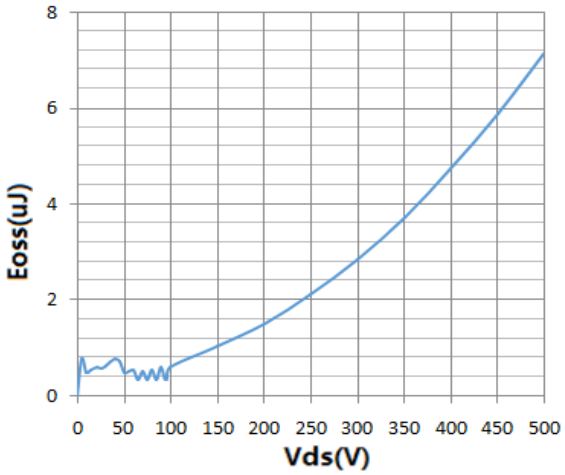


Diagram 3: Typ. transfer characteristics

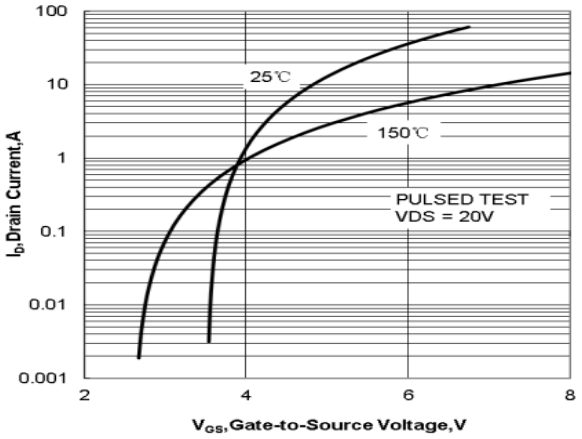


Diagram 4: Typ. gate charge

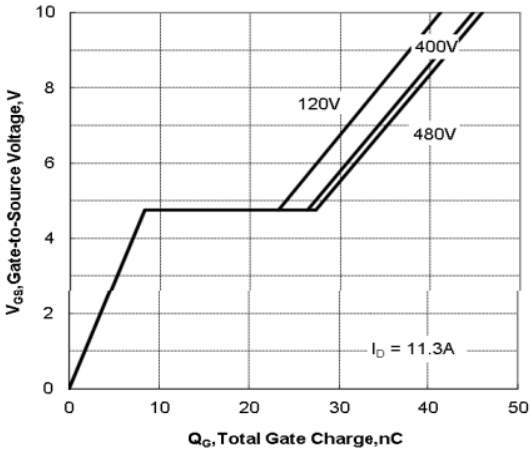


Diagram 5: Drain-source breakdown voltage

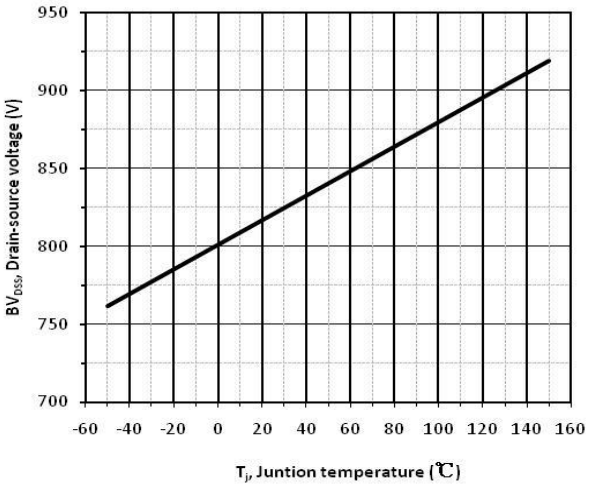


Diagram 6: Typ. capacitances

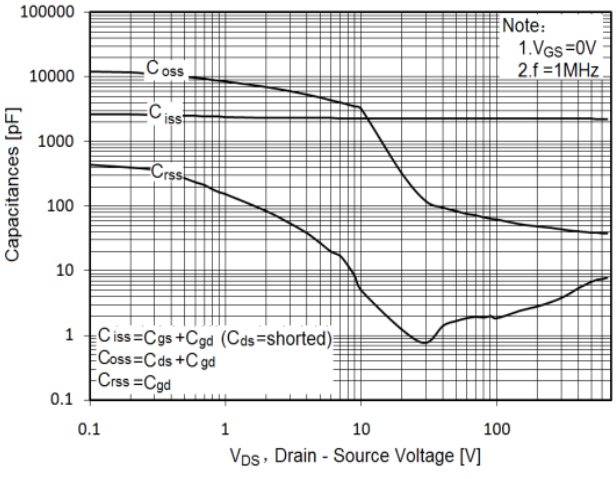


Diagram 7: Power Dissipation

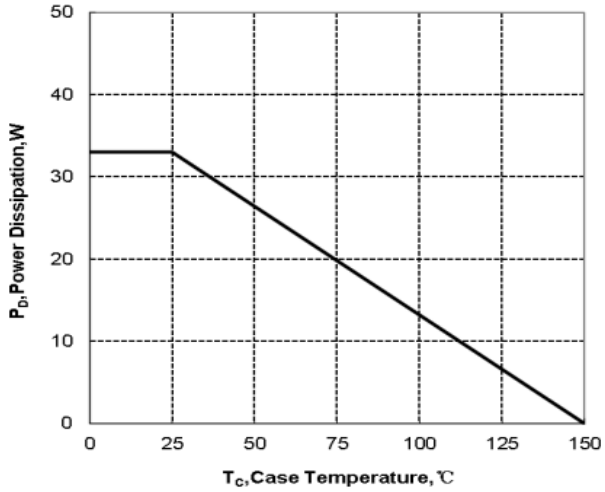


Diagram 8: Safe operating area T_C=25 °C，

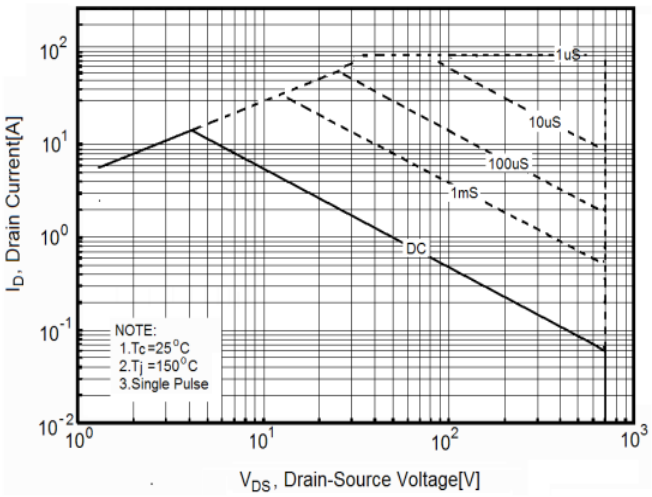


Table 9 Diode characteristics

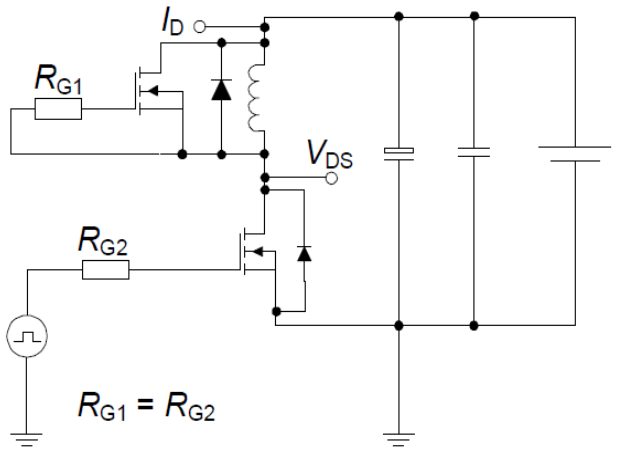
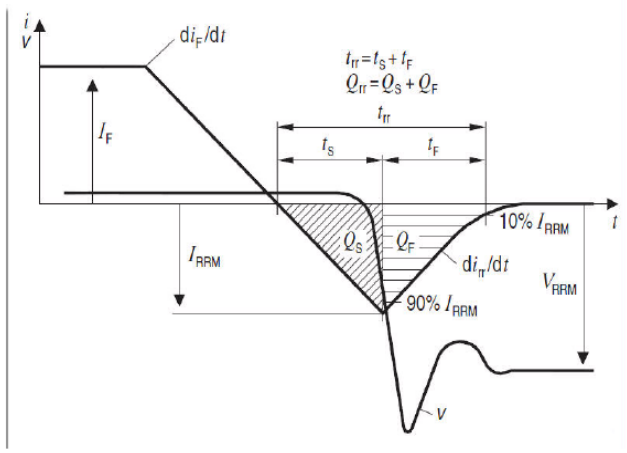
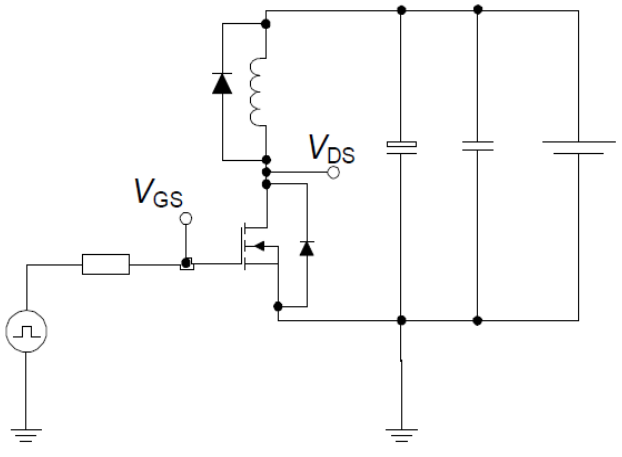
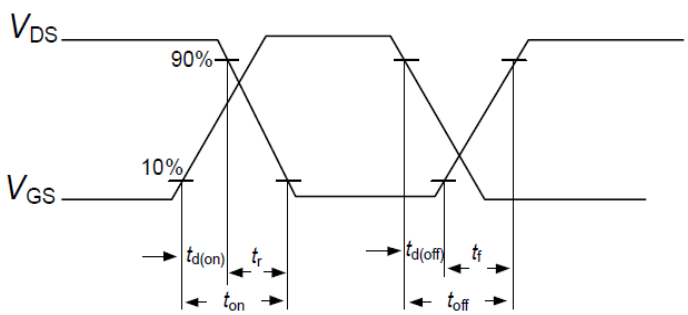
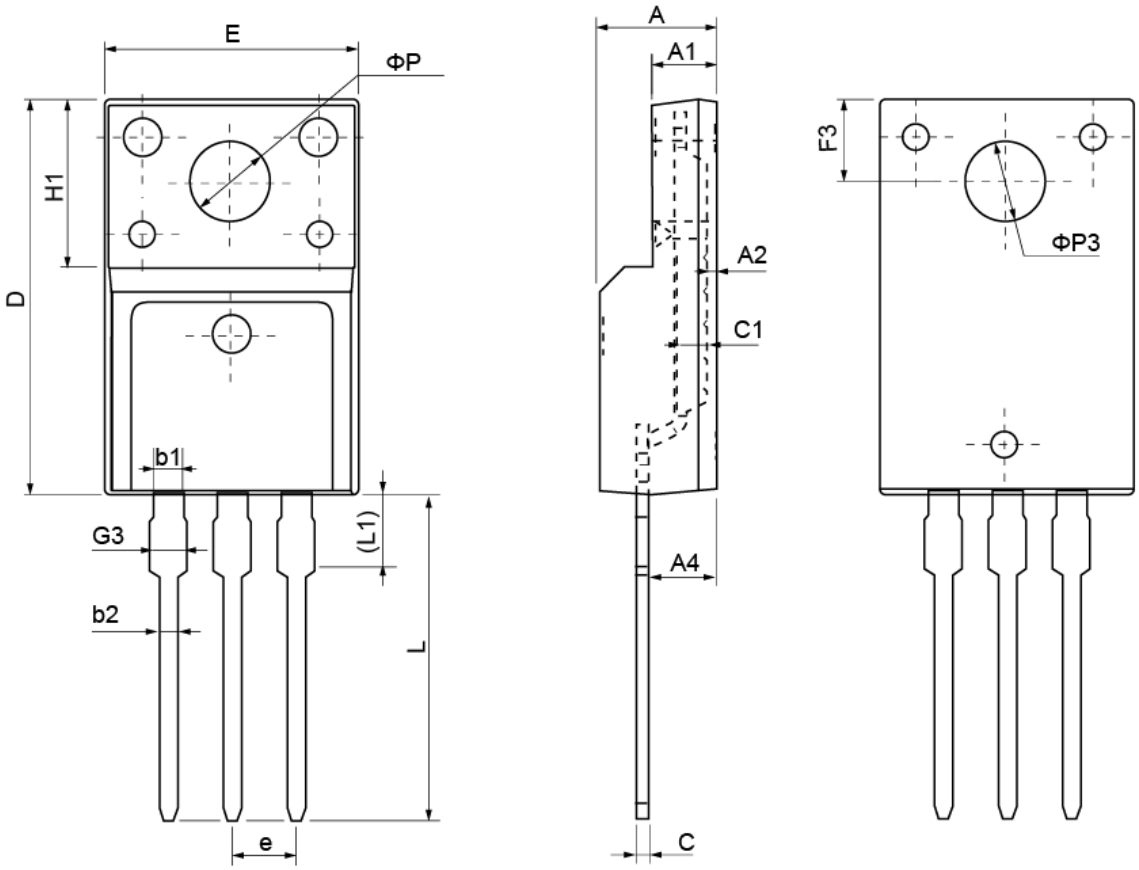
Test circuit for diode characteristics	Diode recovery waveform
	

Table 10 Switching times

Switching times test circuit for inductive load	Switching times waveform
	

TO-220F Package Outline Dimensions



Symbol	Dimensions (unit:mm)			Symbol	Dimensions (unit:mm)		
	Min	Typ	Max		Min	Typ	Max
A	4.40	4.70	5.00	**H1**	6.70 REF		
A1	2.30	2.55	2.80	**L**	12.30	12.98	13.30
A2	0.30	0.50	0.70	**L1**	2.95	3.10	3.50
A4	2.45	2.80	3.05	**ϕP**	3.03	3.20	3.50
c	0.30	0.50	0.70	**ϕP3**	3.15	3.45	3.65
c1	1.20	1.30	1.40	**b1**	1.10	1.30	1.45
D	15.40	15.90	16.40	**b2**	0.60	0.80	1.00
E	9.86	10.16	10.46	**F3**	3.05	3.30	3.55
e	2.54 BSC			**G3**	1.15	1.35	1.55