Description

JRS600R70, the silicon N-channel Enhanced MOSFETs, is obtained by advanced Super Junction technology which reduce the conduction loss, improve switching performance. The transistor is suitable device for SMPS, high speed switching and general purpose applications

FEATURES

- Fast Switching
- 100% avalanche tested
- Improved dv/dt capability

Product Summary

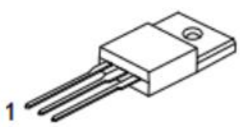
Parameter	Value	Units
$V_{DS@Tj.max}$	750	V
I_D	8	A
$R_{DS(ON).Typ}@V_{GS}=10V$	0.54	Ω

APPLICATIONS

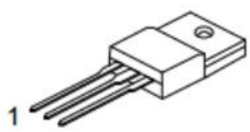
- High frequency switching mode power supply

100% DVDS Tested!
100% Avalanche Tested!

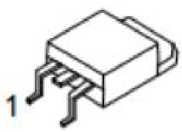
RoHS compliant



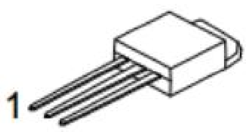
TO-220F



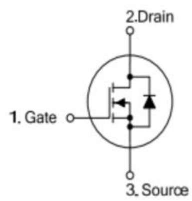
TO-220



TO-252



TO-251



Schematic Diagram

Ordering Information

Device	Device Package	Product Code	Packing
JRS600R70-P	TO-220	S600R70	Tube
JRS600R70-A	TO-220F	S600R70	Tube
JRS600R70-U	TO-251	S600R70	Tube
JRS600R70-D	TO-252	S600R70	Tape Reel

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

Parameter	Symbol	Rating	Units
Drain-to-Source Voltage	V_{DSS}	700	V
Continuous Drain Current	I_D	8	A
Continuous Drain Current T_C = 100 °C		5	A
Pulsed Drain Current(Note1)	I_{DM}	24	A
Gate-to-Source Voltage	V_{GS}	±30	V
Single Pulse Avalanche Energy(Note2)	E_{AS}	145	mJ
Peak Diode Recovery dv/dt(Note3)	dv/dt	15	V/ns
Power Dissipation TO-251\TO-252\TO-220	PD	90	W
Derating Factor above 25°C		0.73	W/℃
Power Dissipation TO-220F	P_D	28	W
Derating Factor above 25°C		0.22	W/℃
Operating Junction and Storage Temperature Range	T_J,T_{stg}	150，–55 to 150	℃
Maximum Temperature for Soldering	T_L	300	℃

Thermal characteristics
Thermal characteristics TO-251\TO-252\TO-220

Parameter	Symbol	Rating	Units
Junction-to-Case	$R_{θJC}$	1.39	℃/W
Junction-to-Ambient	$R_{θJA}$	62.5	℃/W

Thermal characteristics TO-220F

Parameter	Symbol	Rating	Units
Junction-to-Case	$R_{θJC}$	4.6	℃/W
Junction-to-Ambient	$R_{θJA}$	80	℃/W

Electrical Characteristics (TC=25℃unless otherwise noted)

Parameter	Symbol	Test Conditions	Values			Units
			Min	Typ	Max	
OFF Characteristics						
Drain to Source Breakdown Voltage	V_{DSS}	V_{GS}=0V, I_D=250μA	700	-	-	V
Bvdss Temperature Coefficient	ΔB_{VDSS} ΔT_J	I_D=250uA, Reference25℃	-	0.7	-	V/℃
Drain to Source Leakage Current	I_{DSS}	V_{DS} =700V, V_{GS}= 0V, T_j = 25℃	-	-	1	μA
		V_{DS} =560V, V_{GS}= 0V, T_j = 125℃	-	-	10	μA
Gate to Source Forward Leakage	$I_{GSS(F)}$	V_{GS} =+30V	- - -	- - -	100	nA
Gate to Source Reverse Leakage	$I_{GSS(R)}$	V_{GS} =-30V	-	-	-100	nA
ON Characteristics						
Drain-to-Source OnResistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=2.1A(Note4)	-	0.54	0.6	Ω
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D= 250μA(Note4)	3.0	-	4.0	V
Dynamic Characteristics						
Gate resistance	Rg	f = 1.0MHz	-	8.5	-	Ω
Output Capacitance	Ciss	V_{GS} = 0V V_{DS} = 25V f = 1.0MHz	-	490	-	PF
Input Capacitance	Coss		-	530	-	
Reverse Transfer Capacitance	Crss		-	12	-	

Switching Characteristics, at T_J =25 ℃

Parameter	Symbol	Test Conditions	Values			Units
			Min.	Typ.	Max.	
Turn-on Delay Time	$t_{d(on)}$	I_D =3A V_{DD} = 400V V_{GS} = 10V R_G =10Ω	-	10	-	ns
Rise Time	tr		-	7	-	
Turn-Off Delay Time	$t_{d(off)}$		-	41	-	
Fall Time	t_f		-	28	-	
Total Gate Charge	Qg	I_D =3A V_{DD}=480V V_{GS} = 10V	-	16	-	nC
Gate to Source Charge	Qgs		-	2.5	-	
Gate to Drain (“Miller”)Charge	Qgd		-	5.6	-	

Source-Drain Diode Characteristics

Parameter	Symbol	Test Conditions	Values			Units
			Min.	Typ.	Max.	
Continuous Source Current (Body Diode)	I_S	TC=25 °C	-	-	8	A
Maximum Pulsed Current (Body Diode)	I_{SM}		-	-	24	A
Diode Forward Voltage	V_{SD}	I_S=3A, V_{GS}=0V(Note4)	-	-	1.2	V
Reverse Recovery Time	T_{rr}	I_S=3A, T_j = 25°C dIF/dt=100A/us, V_{GS}=0V	-	196	-	ns
Reverse Recovery Charge	Q_{rr}		-	1568	-	nC
Reverse Recovery Current	I_{rrm}		-	16	-	A

Note1: Pulse width limited by maximum junction temperature
Note2: L=20mH, VDs=50V, Start TJ=25℃
Note3: ISD =3A,di/dt ≤100A/us,VDD≤BVDS, Start TJ=25℃
Note4: Pulse width tp≤300μs, δ≤2%

Characteristics Curves

Figure 1a Safe Operating Area (No FullPAK)

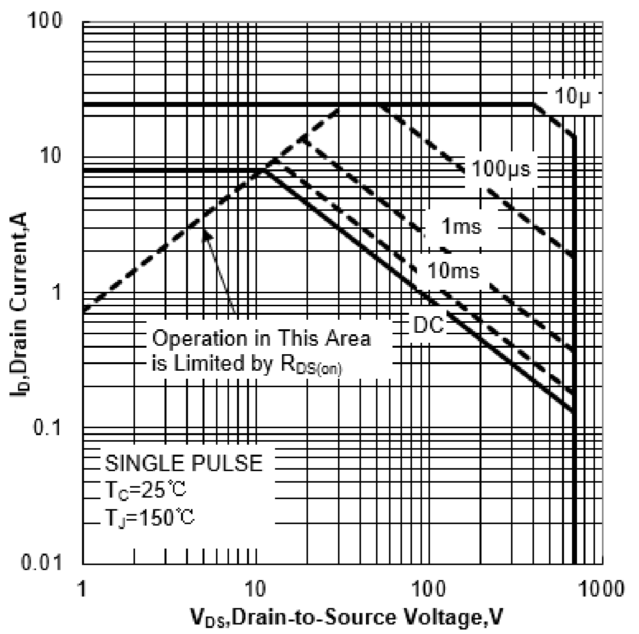


Figure 1b Safe Operating Area (FullPAK)

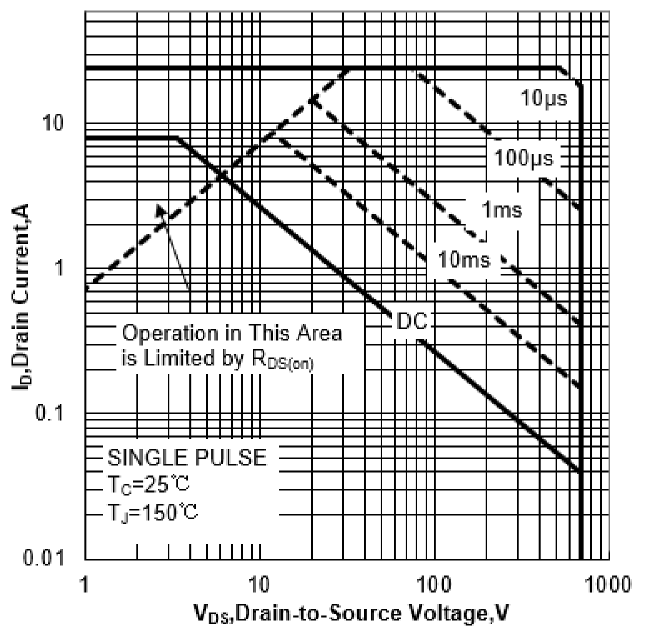


Figure 2a Power Dissipation (No FullPAK)

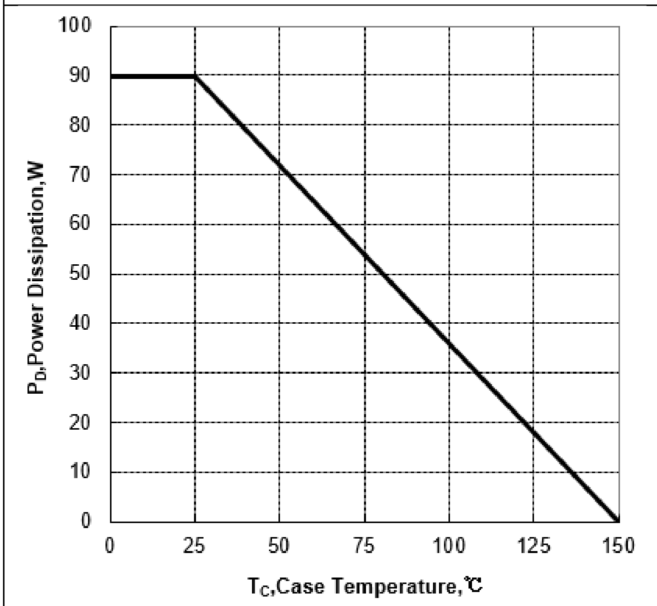


Figure 2b Power Dissipation (FullPAK)

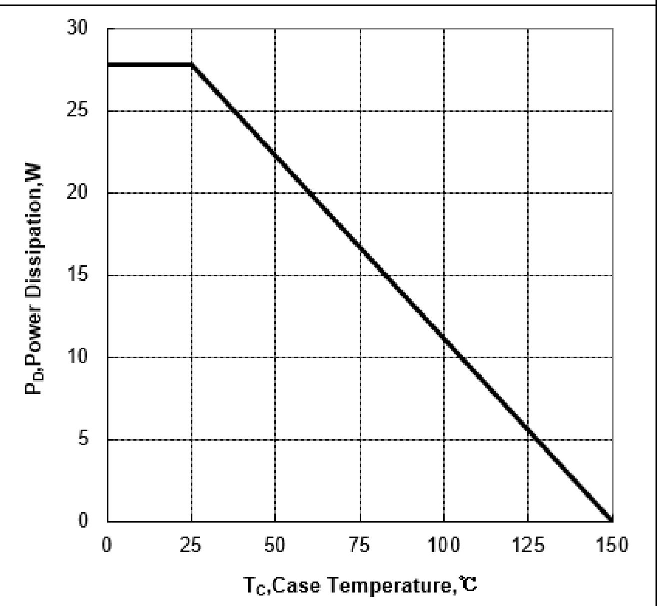


Figure 3a Max Thermal Impendance (No FullPAK)

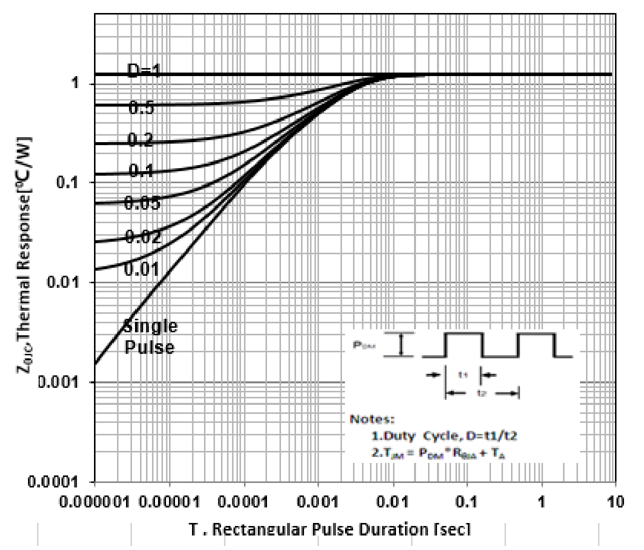


Figure 3b Max Thermal Impendance (FullPAK)

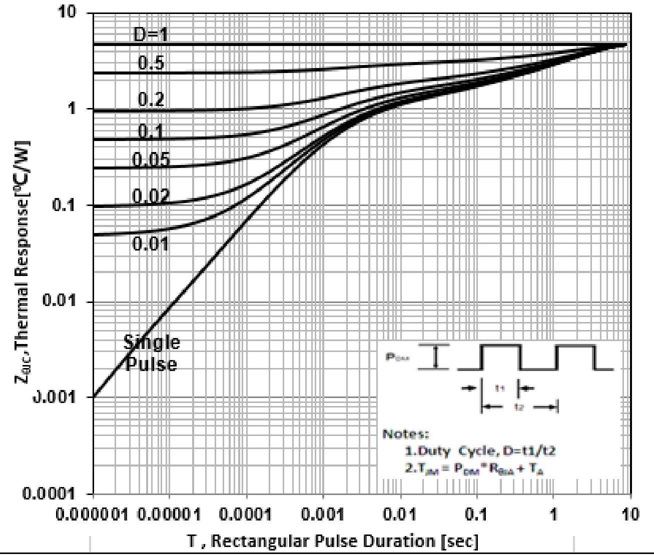


Figure 4 Typical Output Characteristics

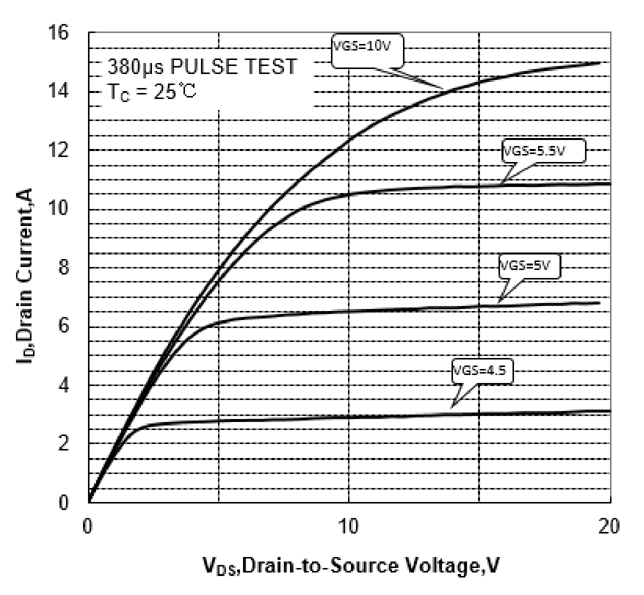


Figure 5 Typical Transfer Characteristics

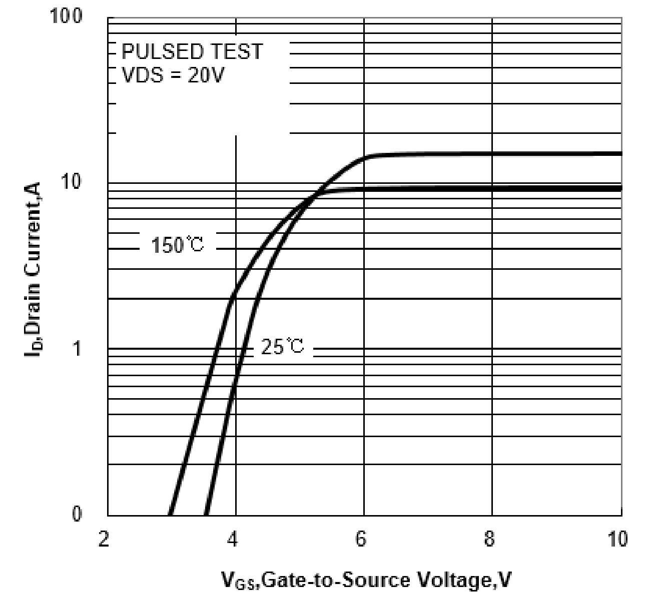


Figure 6 Typical Drain to Source ON Resistance vs Drain Current

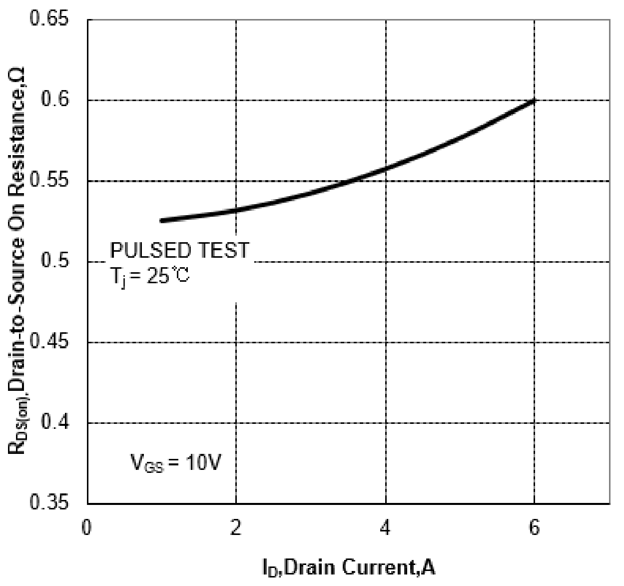


Figure 7 Typical Drian to Source on Resistance vs Junction Temperature

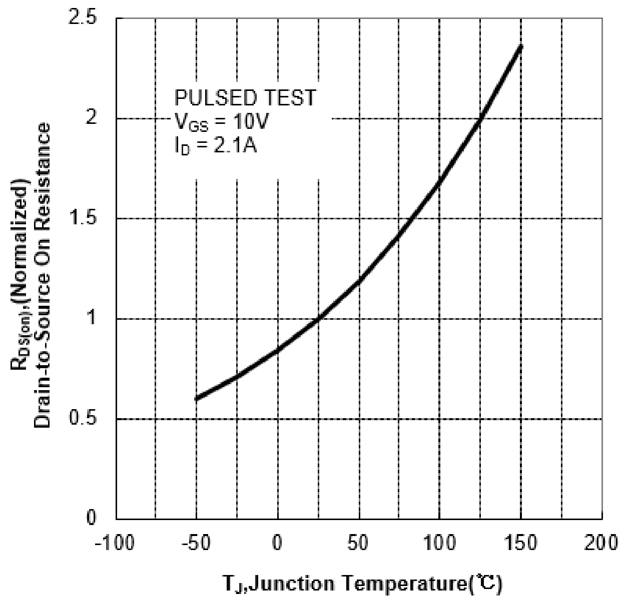


Figure 8 Typical Theshold Voltage vs Junction Temperature

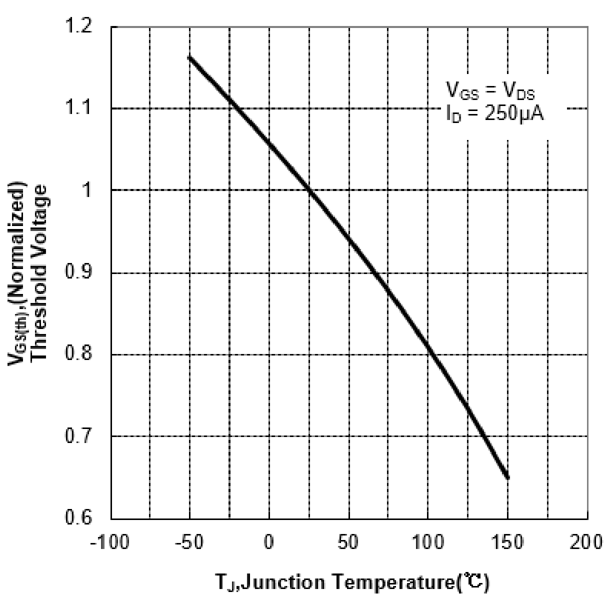


Figure 9 Typical Breakdown Voltage vs Junction Temperature

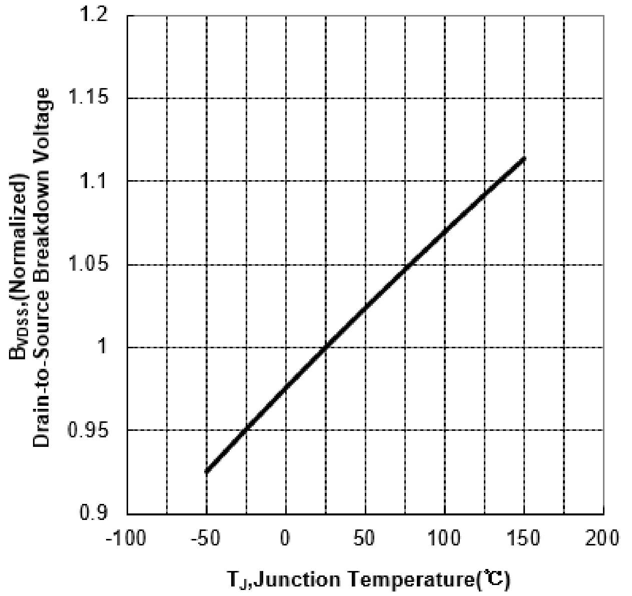
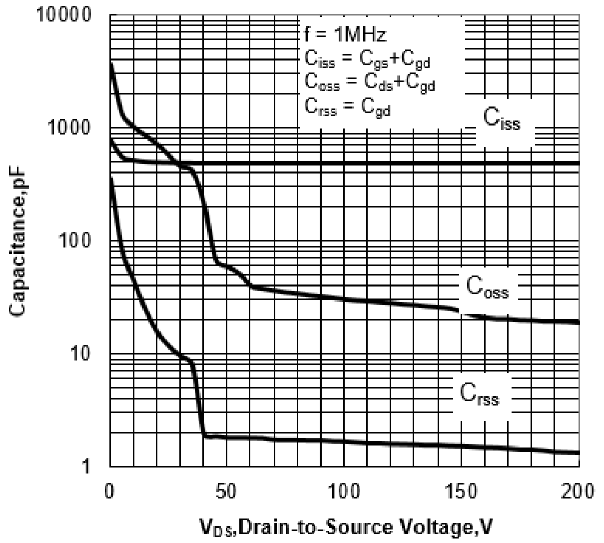
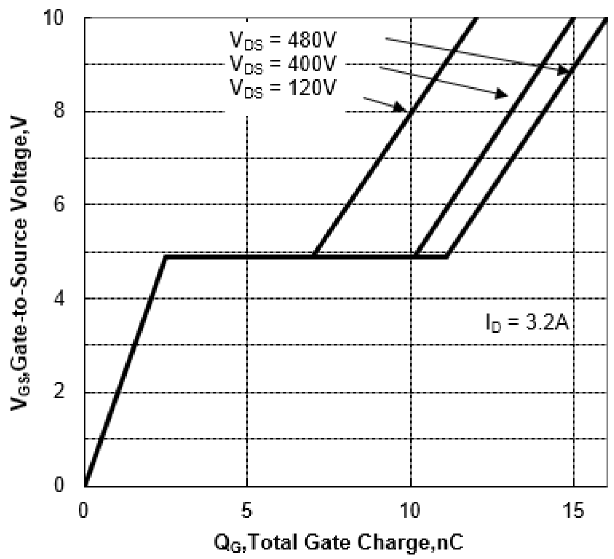


Figure 10 Typical Theshold Voltage vs Junction Temperature	Figure 11 Typical Breakdown Voltage vs Junction Temperature
	

Test Circuit and Waveform

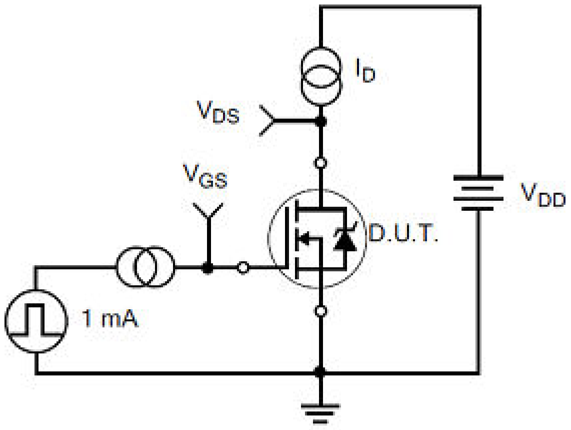
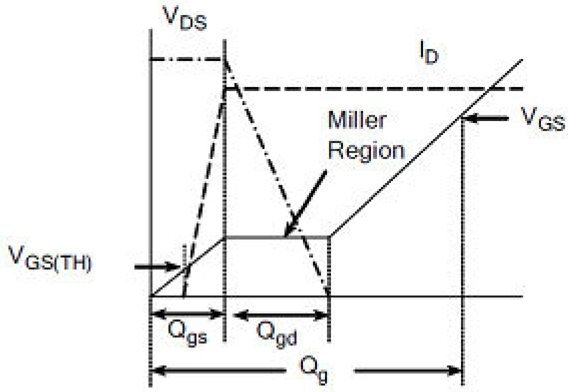
Figure 12 Gate Charge Test Circuit	Figure 13 Gate Charge Waveforms
	

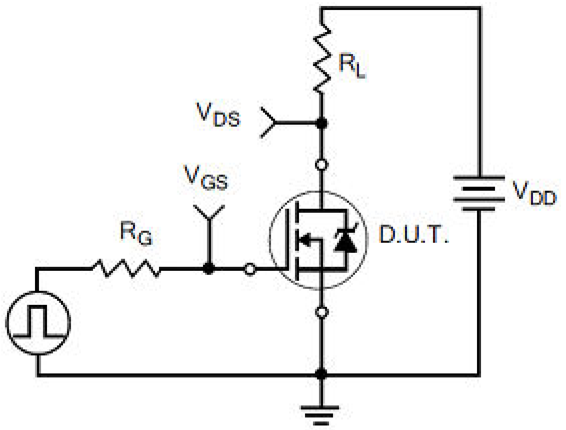
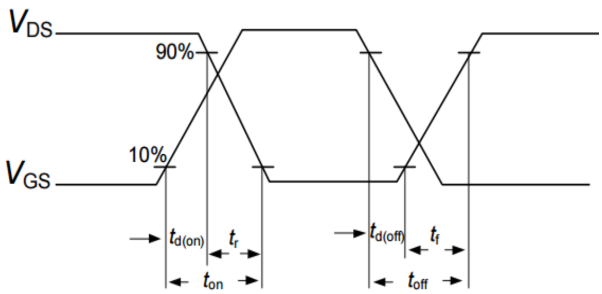
Figure 14 Resistive Switching Test Circuit	Figure 15 Resistive Switching Waveforms
	

Figure 16 Diode Reverse Recovery Test Circuit

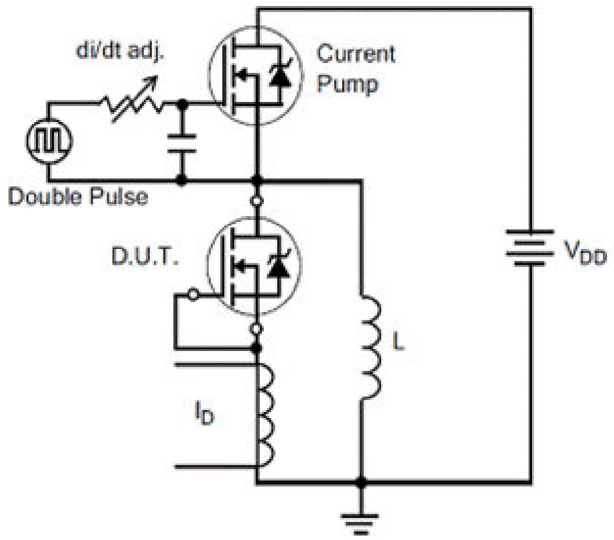


Figure 17 Diode Reverse Recovery Waveform

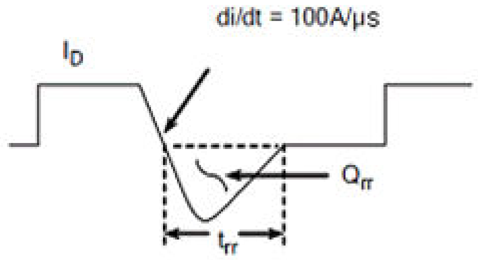


Figure 18 Unclamped Inductive Switching Test Circuit

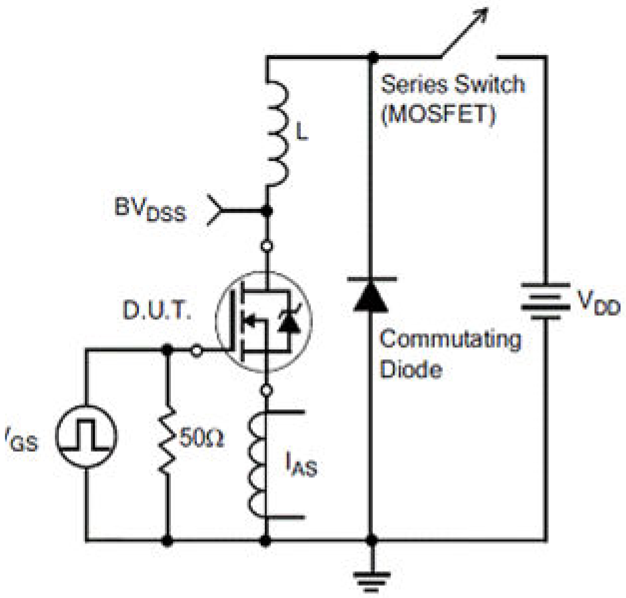
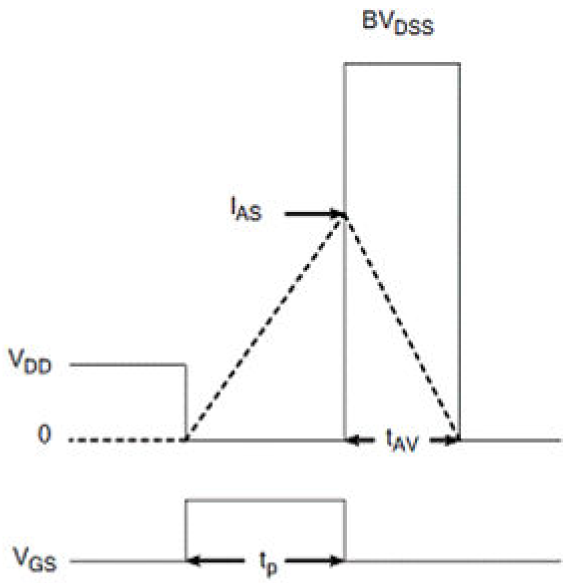
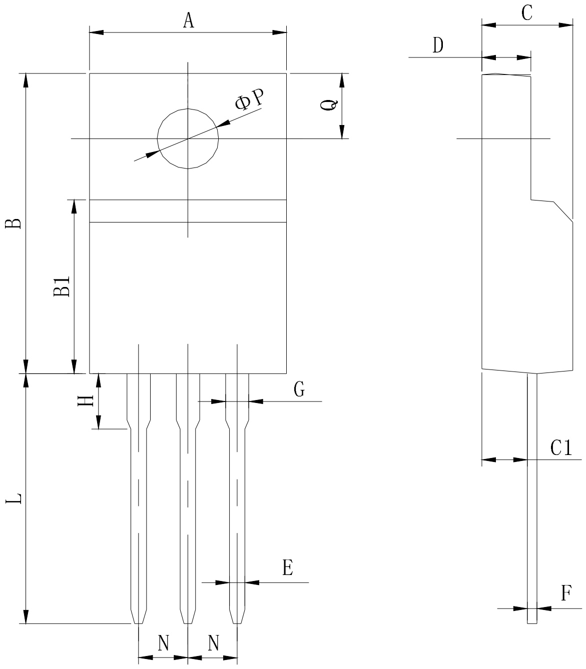


Figure 19 Unclamped Inductive Switching Waveform

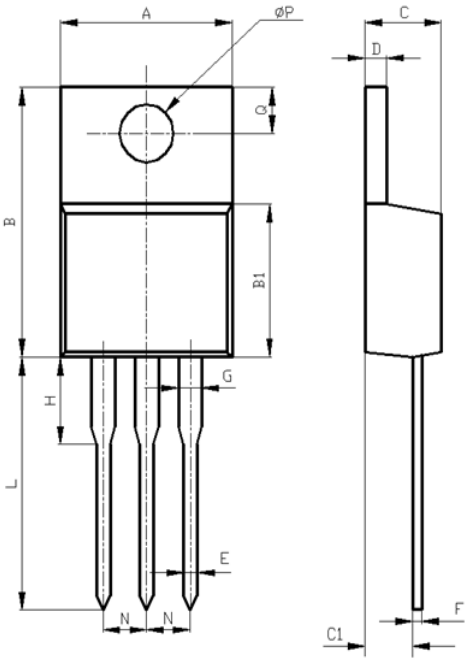


Package Description



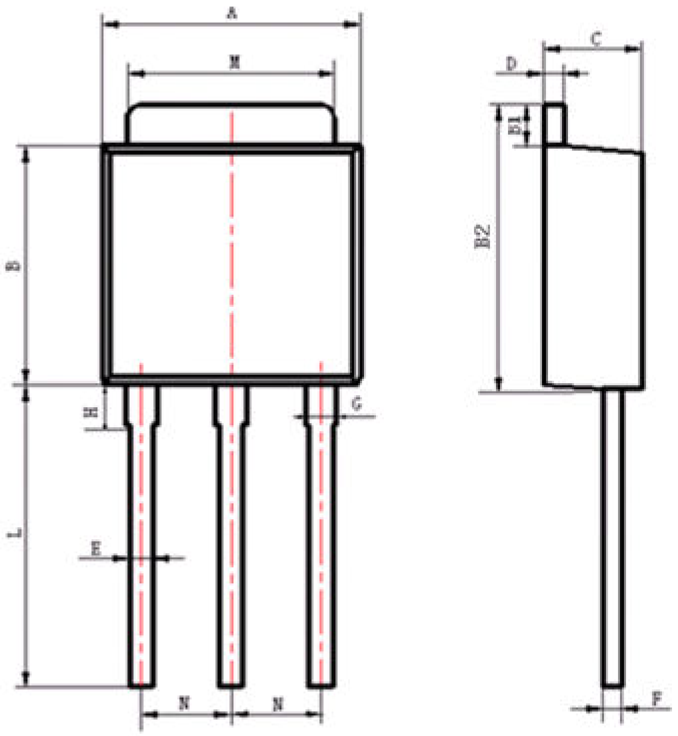
Items	Values(mm)	
	MIN	MAX
A	9.60	10.4
B	15.4	16.2
B1	8.90	9.50
C	4.30	4.90
C1	2.10	3.00
D	2.40	3.00
E	0.60	1.00
F	0.30	0.60
G	1.12	1.42
H	3.40	3.80
	1.60	2.90
L	12.0	14.0
N	2.34	2.74
Q	3.15	3.55
Φ P	2.90	3.30

TO-220F Package



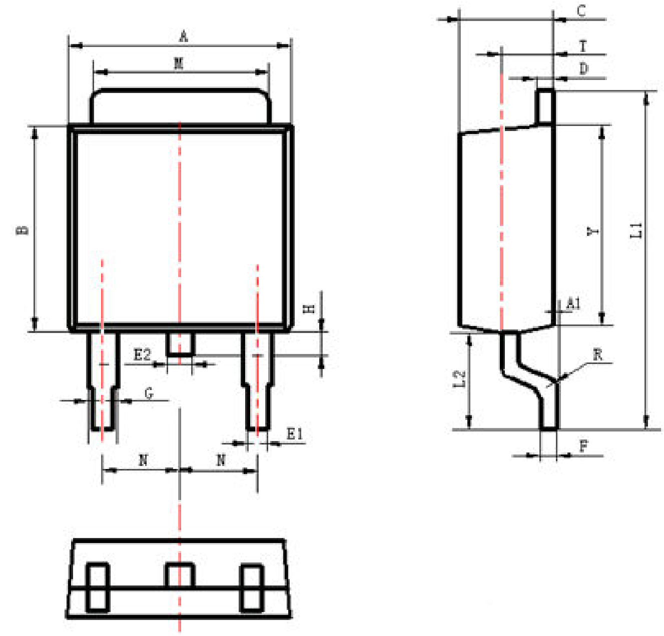
Items	Values(mm)	
	MIN	MAX
A	9.60	10.6
B	15.0	16.0
B1	8.90	9.50
C	4.30	4.80
C1	2.30	3.10
D	1.20	1.40
E	0.70	0.90
F	0.30	0.60
G	1.17	1.37
H	2.70	3.80
L	12.6	14.8
N	2.34	2.74
Q	2.40	3.00
ΦP	3.50	3.90

TO-220 Package



Items	Values(mm)	
	MIN	MAX
A	6.30	6.90
B	5.70	6.30
B1	1.00	1.20
B2	6.80	7.40
C	2.10	2.50
D	0.30	0.60
E	0.50	0.70
F	0.30	0.60
G	0.70	1.00
H	1.60	2.40
L	3.9	4.3
M	5.10	5.50
N	2.09	2.49

TO-251 Package



Items	Values(mm)	
	MIN	MAX
A	6.30	6.90
A1	0	0.13
B	5.70	6.30
C	2.10	2.50
D	0.30	0.60
E1	0.60	0.90
E2	0.70	1.00
F	0.30	0.60
G	0.70	1.20
L1	9.60	10.50
L2	2.70	3.10
H	0.60	1.00
M	5.10	5.50
N	2.09	2.49
R	0.3	
T	1.40	1.60
Y	5.10	6.30

TO-252 Package

NOTE:

1. Exceeding the maximum ratings of the device in performance may cause damage to the device, even the permanent failure, which may affect the dependability of the machine. Please do not exceed the absolute maximum ratings of the device when circuit designing.
2. When installing the heat sink, please pay attention to the torsional moment and the smoothness of the heat sink.
3. MOSFETs is the device which is sensitive to the static electricity, it is necessary to protect the device from being damaged by the static electricity when using it.
4. Shanghai Jerrett reserves the right to make changes in this specification sheet and is subject to change without prior notice.