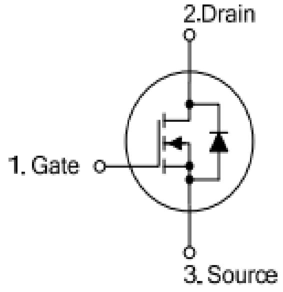
上海捷瑞德半导体
Jerrett Semiconductor

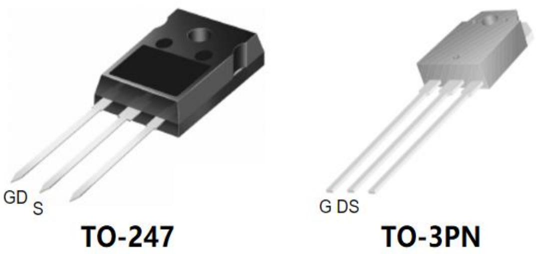
JR80N20L

Power MOSFET

1. Description

JR80N20L, the silicon N-channel Enhanced MOSFETs, is obtained by advanced MOSFET technology which reduce the conduction loss, improve switching performance and enhance the avalanche energy. The transistor is suitable device for SMPS, high speed switching and general purpose applications.





KEY CHARACTERISTICS

Parameter	Value	Unit
$V_{DS@Tj.max}$	200	V
I_D	80	A
$R_{DS(ON).Typ}$	23	mΩ
$Qg_{.Typ}$	155	nC

FEATURES

- Fast Switching
- Low Crss
- 100% avalanche tested
- Improved dv/dt capability
- RoHS product

APPLICATIONS

- High frequency switching mode power supply

ORDERING INFORMATION

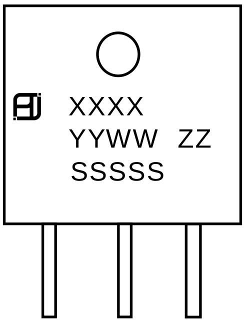
Ordering Codes	Package	Product Code	Packing
JR80N20L-W	TO-3PN	80N20L	Tube
JR80N20L-F	TO-247	80N20L	Tube

JR80N20L-A

(2) Package type

(1) Chip name

(1)JR80N20L:200V 80A
(2) W:TO-3PN F:TO-247



XXXX：Product Code

YYWW：Year&Week

ZZ：Assembly Code

SSSSS：Lot Code

2. ABSOLUTE RATINGS

at T_C = 25°C, unless otherwise specified

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	200	V
I_D	Continuous Drain Current	80	A
	Continuous Drain Current T_C = 100 °C	50	A
I_{DM}	Pulsed Drain Current(Note1)	320	A
V_{GS}	Gate-to-Source Voltage	±30	V
E_{AS}	Single Pulse Avalanche Energy(Note2)	2600	mJ
dv/dt	Peak Diode Recovery dv/dt(Note3)	5.0	V/ns
P_D	Power Dissipation TO-3PN\TO-247	390	W
	Derating Factor above 25°C	3.13	W/℃
T_J， T_{stg}	Operating Junction and Storage Temperature Range	150，–55 to 150	℃
T_L	Maximum Temperature for Soldering	300	℃

3. Thermal characteristics

Thermal characteristics (No FullPAK) TO-3PN\TO-247

Symbol	Parameter	RATINGS	Units
$R_{\theta JC}$	Junction-to-Case	0.32	℃/W
$R_{\theta JA}$	Junction-to-Ambient	40	℃/W

4. Electrical Characteristics

at T_C = 25°C, unless otherwise specified

OFF Characteristics

Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
V_{DSS}	Drain to Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	200	--	--	V
$\Delta BV_{DSS}/\Delta T_J$	Bvdss Temperature Coefficient	ID=250uA, Reference 25℃	--	0.25	--	V/℃
I_{DSS}	Drain to Source Leakage Current	V_{DS} =200V, V_{GS}= 0V, Tj = 25℃	--	--	1	μA
		V_{DS} =160V, V_{GS}= 0V, Tj = 125℃	--	--	10	μA
$I_{GSS(F)}$	Gate to Source Forward Leakage	V_{GS} =+30V	--	--	100	nA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	V_{GS} =-30V	--	--	100	nA

ON Characteristics

Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
$R_{DS(ON)}$	Drain-to-Source On-Resistance	VGS=10V, ID=40A(Note4)	--	23	28	mΩ
$V_{GS(TH)}$	Gate Threshold Voltage	VDS = VGS, ID = 250μA(Note4)	0.4	0.6	1.3	V
g_{fs}	Forward Transconductance	VDS=15V, ID =40A(Note4)	--	50	--	S

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
R_g	Gate resistance	f = 1.0MHz	--	0.95	--	Ω
C_{iss}	Input Capacitance	VGS = 0V, VDS = 25V, f = 1.0MHz	--	9650	--	PF
C_{oss}	Output Capacitance		--	968	--	
C_{rss}	Reverse Transfer Capacitance		--	57	--	

Switching Characteristics

Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	ID =80A VDD = 100V VGS = 10V RG =20Ω	--	60	--	ns
tr	Rise Time		--	250	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	92	--	
t_f	Fall Time		--	118	--	
Q_g	Total Gate Charge	ID =80A VDD =160V VGS = 10V	--	152	--	nC
Q_{gs}	Gate to Source Charge		--	56	--	
Q_{gd}	Gate to Drain (“Miller”)Charge		--	39.5	--	

Source-Drain Diode Characteristics

Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
I_S	Continuous Source Current (Body Diode)	TC=25 °C	--	--	80	A
I_{SM}	Maximum Pulsed Current (Body Diode)		--	--	320	A
V_{SD}	Diode Forward Voltage	IS=80A, VGS=0V(Note4)	--	--	1.2	V
T_{rr}	Reverse Recovery Time	IS=80A, Tj = 25°C dIF/dt=100A/us, VGS=0V	--	192	--	ns
Q_{rr}	Reverse Recovery Charge		--	1853	--	nC
I_{rrm}	Reverse Recovery Current		--	19.3	--	A

Note1: Pulse width limited by maximum junction temperature
Note2: L=20mH, VDs=50V, Start TJ=25℃
Note3: ISD =80A,di/dt ≤100A/us,VDD≤BVDS, Start TJ=25℃
Note4: Pulse width tp≤300μs, δ≤2%

5. Characteristics Curves

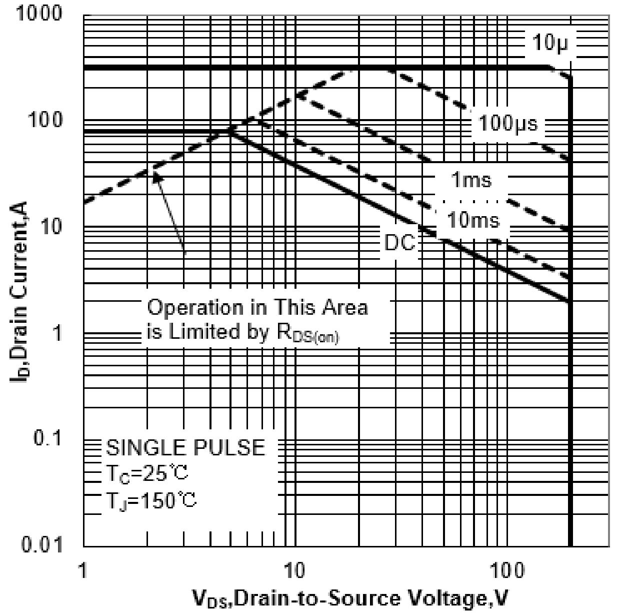
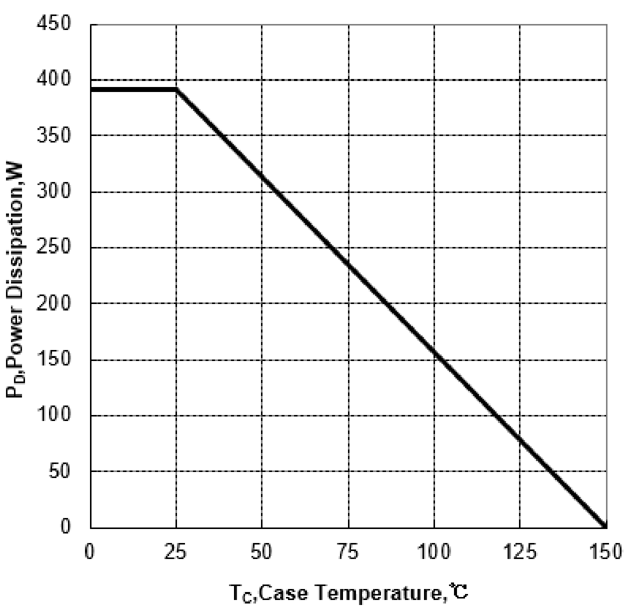
Figure 1a Safe Operating Area	Figure 2 Power Dissipation
	

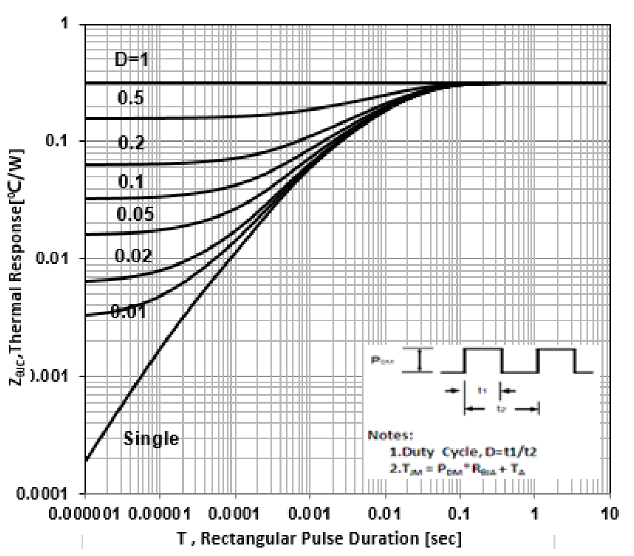
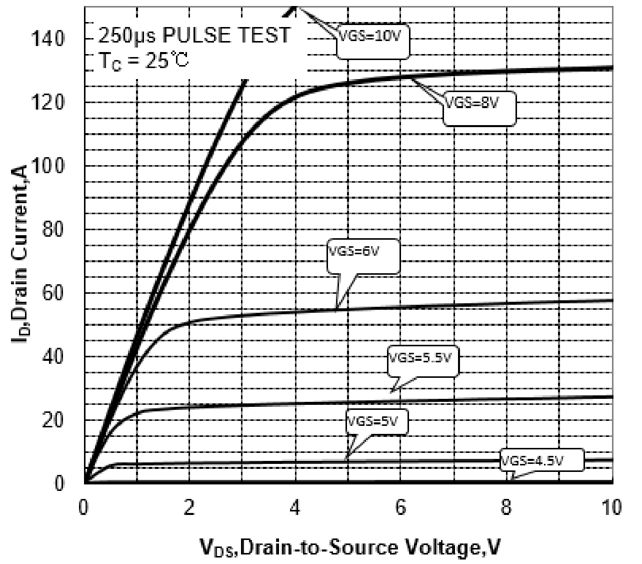
Figure 3 Max Thermal Impendance	Figure 4 Typical Output Characteristics
	

Figure 5 Typical Transfer Characteristics

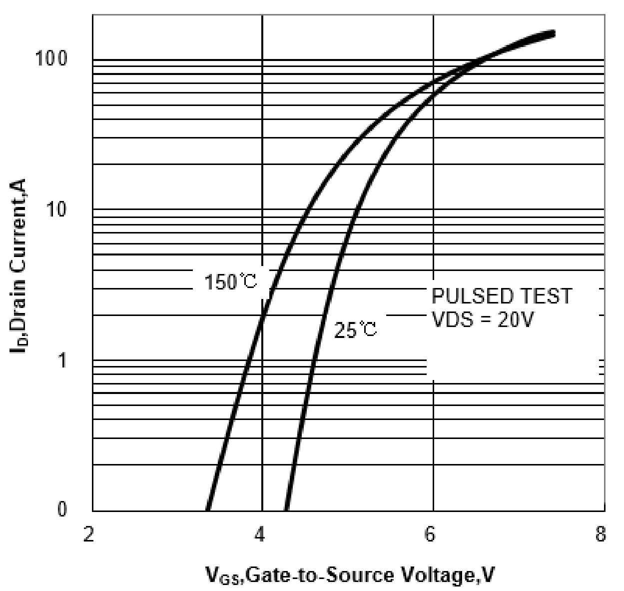


Figure 6 Typical Drain to Source ON Resistance vs Drain Current

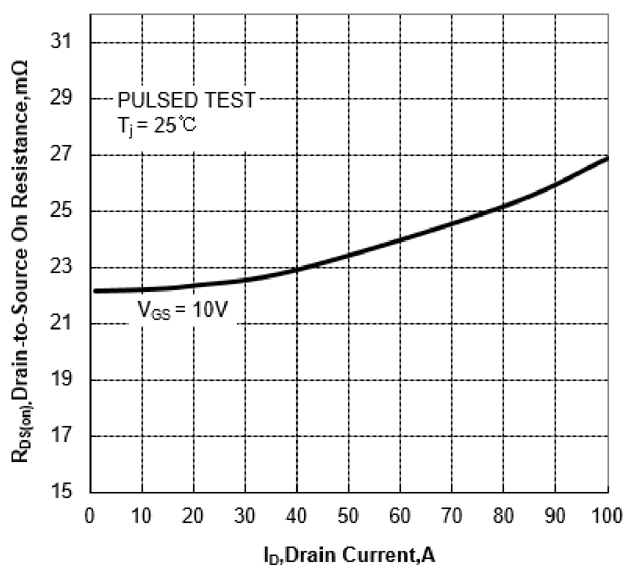


Figure 7 Typical Drian to Source on Resistance vs Junction Temperature

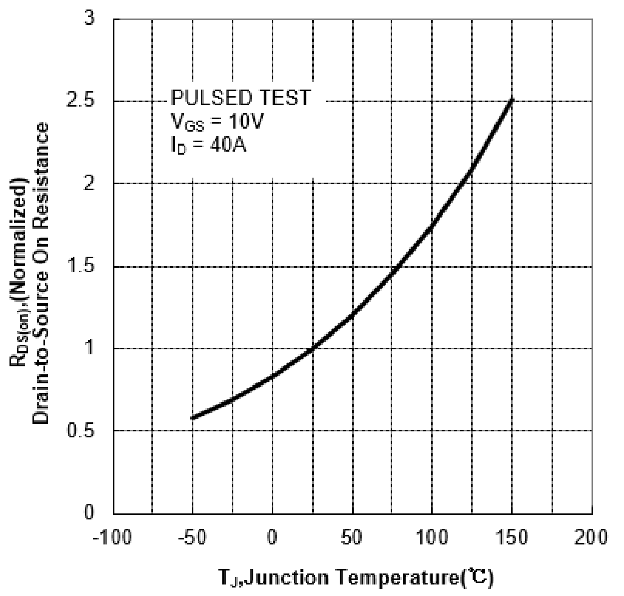


Figure 8 Typical Theshold Voltage vs Junction Temperature

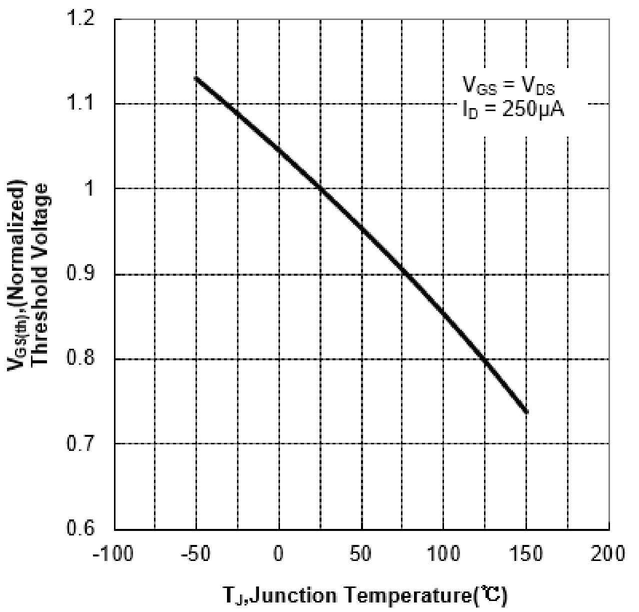


Figure 9 Typical Breakdown Voltage vs Junction Temperature

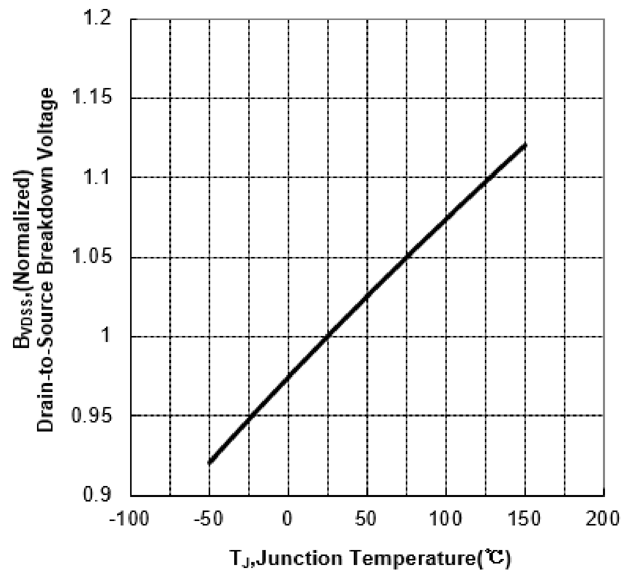


Figure 10 Typical Capacitance vs Drain to Source Voltage

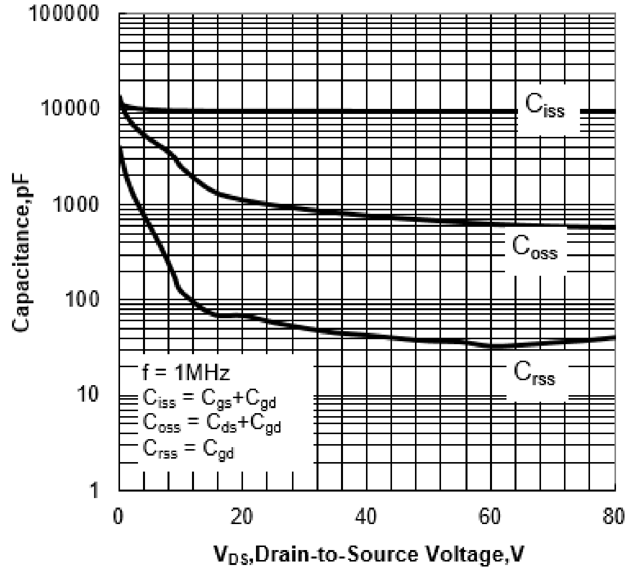
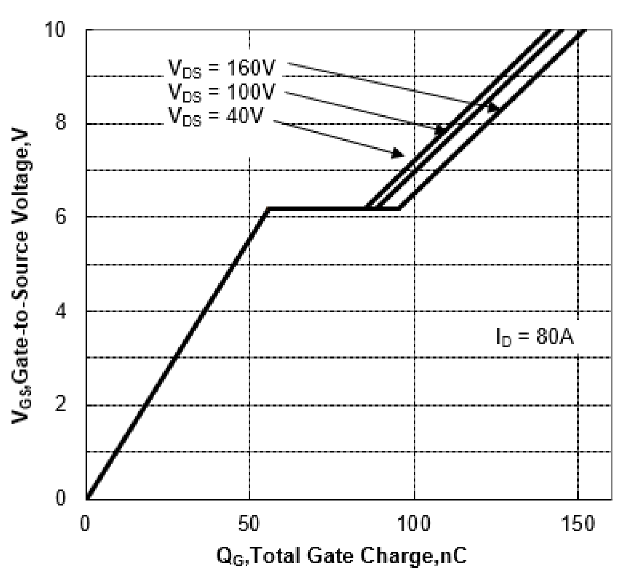


Figure 11 Typical Gate Charge vs Gate to Source Voltage



6. Test Circuit and Waveform

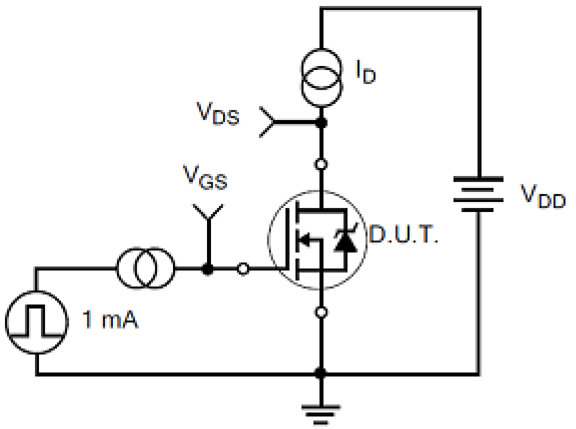
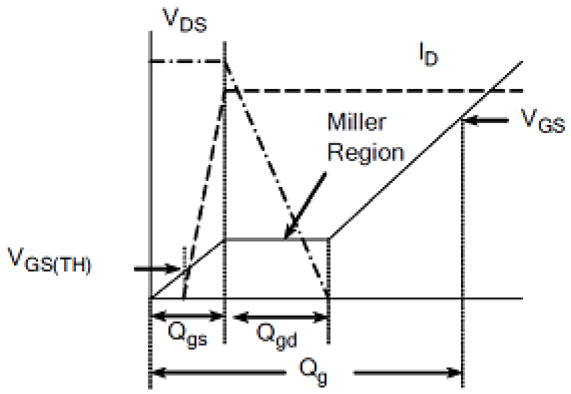
Figure 12 Gate Charge Test Circuit	Figure 13 Gate Charge Waveforms
	

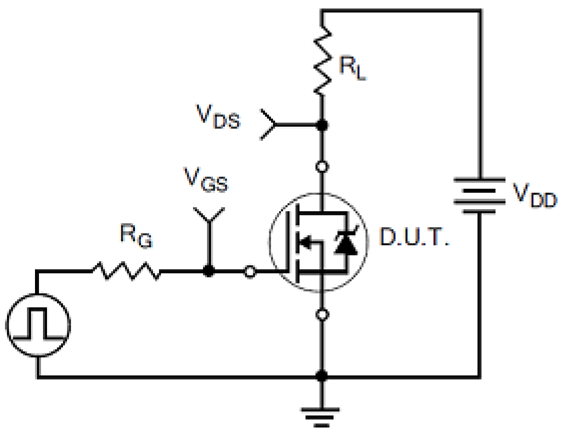
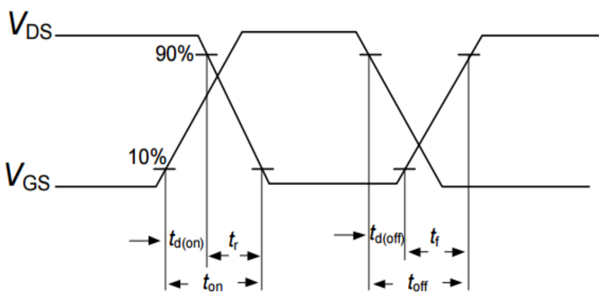
Figure 14 Resistive Switching Test Circuit	Figure 15 Resistive Switching Waveforms
	

Figure 16 Diode Reverse Recovery Test Circuit

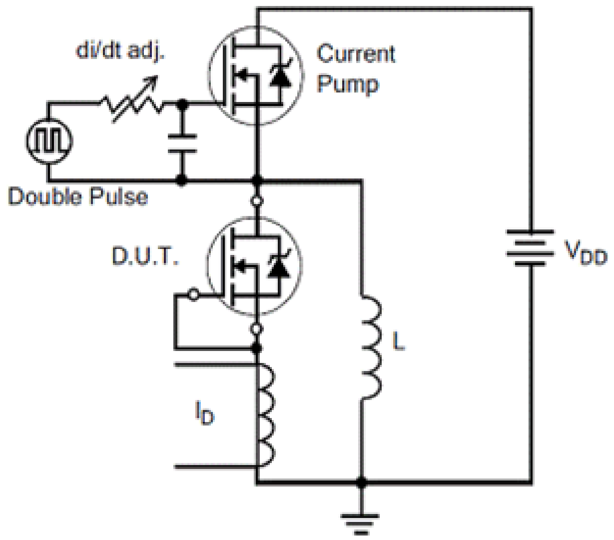


Figure 17 Diode Reverse Recovery Waveform

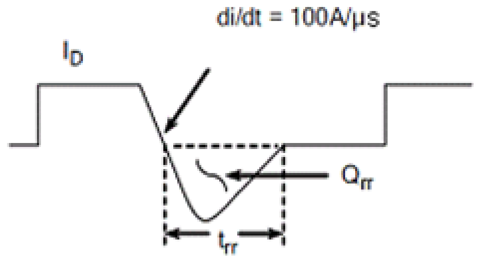


Figure 18 Unclamped Inductive Switching Test Circuit

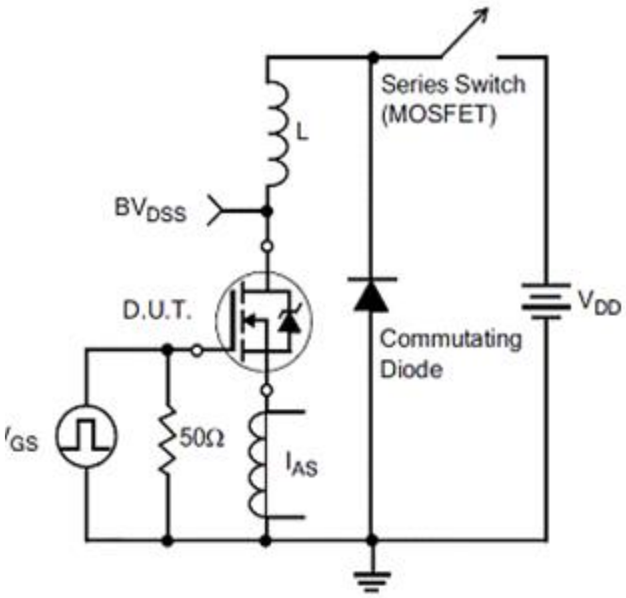
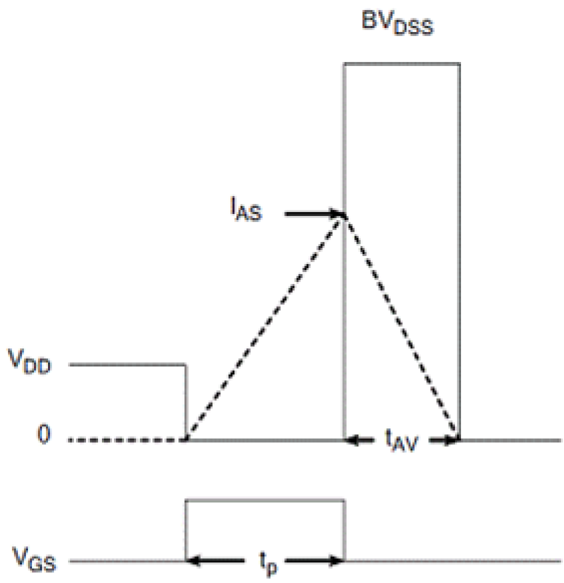
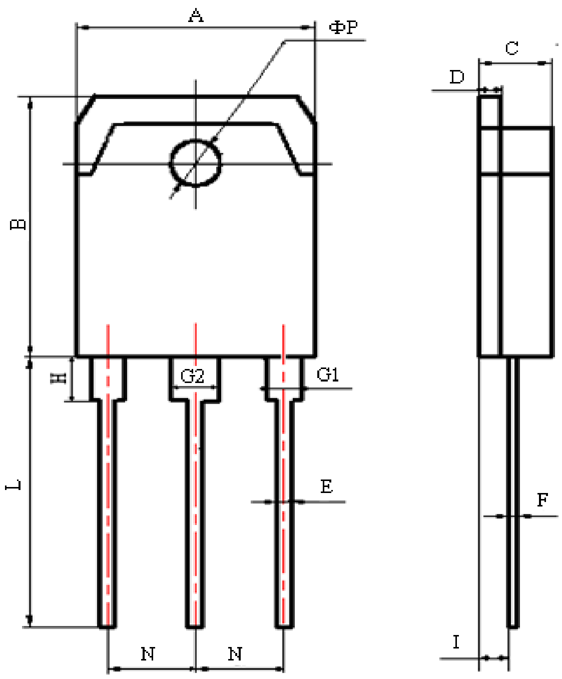


Figure 19 Unclamped Inductive Switching Waveform

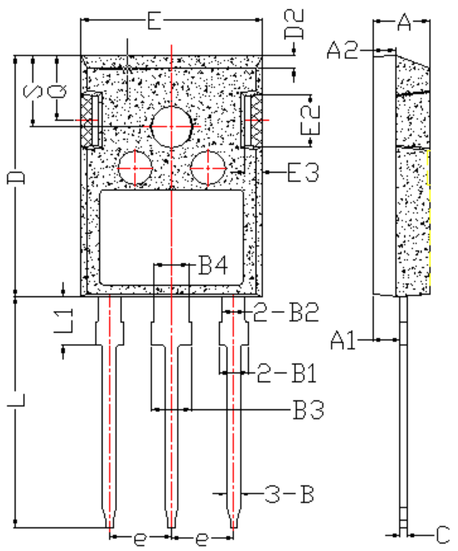


7. Package Description



Items	Values(mm)	
	MIN	MAX
A	15.00	16.00
B	19.20	20.60
C	4.60	5.00
D	1.40	1.60
E	0.90	1.10
F	0.50	0.70
G1	2.00	2.20
G2	3.00	3.20
H	3.00	3.70
I	1.20	1.70
	2.70	2.90
L	19.00	21.00
N	5.25	5.65
Φ P	3.10	3.30

TO-3PN Package



Items	Values(mm)	
	MIN	MAX
A	4.6	5.2
A1	2,2	2.6
B	0.9	1.4
B1	1.75	2.35
B2	1.75	2.15
B3	2.8	3.35
B4	2.8	3.15
C	0.5	0.7
D	20.60	21.30
D1	16	18
E	15.5	16.10
E1	13	14.7
E2	3.80	5.3
E3	0.8	2.60
e	5.2	5.7
L	19	20.5
L1	3.9	4.6
ΦP	3.3	3.70
Q	5.2	6.00
S	5.8	6.6

TO-247 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.