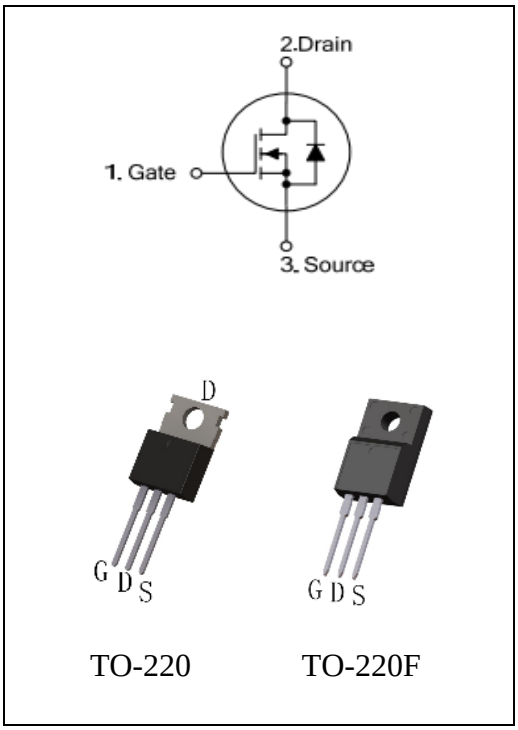
1. Description

BL19N40, 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}	400	V
I_D	19	A
$R_{DS(ON).Typ}$	0.22	Ω

FEATURES

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

APPLICATIONS

- High frequency switching mode power supply
- Electronic ballast

ORDERING INFORMATION

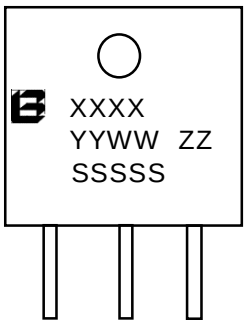
Ordering Codes	Package	Product Code	Packing
BL19N40-P	TO-220	19N40	Tube
BL19N40-A	TO-220F		Tube

BL19N40-A

(2) Package type

(1) Chip name

(1) BL19N40: 400V 19A
(2) A:TO-220F P:TO-220



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	400	V
I_D	Continuous Drain Current	19	A
	Continuous Drain Current T_C = 100 °C	12.6	A
I_{DM}	Pulsed Drain Current(Note1)	76	A
V_{GS}	Gate-to-Source Voltage	±30	V
E_{AS}	Single Pulse Avalanche Energy(Note2)	900	mJ
dv/dt	Peak Diode Recovery dv/dt(Note3)	5.0	V/ns
P_D	Power Dissipation TO-220	278	W
	Derating Factor above 25°C	2.2	W/℃
P_D	Power Dissipation TO-220F	62	W
	Derating Factor above 25°C	0.5	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 TO-220

Symbol	Parameter	RATINGS	Units
$R_{\theta JC}$	Junction-to-Case	0.45	℃/W
$R_{\theta JA}$	Junction-to-Ambient	62.5	℃/W

Thermal characteristics TO-220F

Symbol	Parameter	RATINGS	Units
$R_{\theta JC}$	Junction-to-Case	2	℃/W
$R_{\theta JA}$	Junction-to-Ambient	62.5	℃/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	400	--	--	V
$\Delta BV_{DSS}/\Delta T_J$	Bvdss Temperature Coefficient	ID=250uA, Reference25℃	--	0.45	--	V/℃
I_{DSS}	Drain to Source Leakage Current	V_{DS} =400V, V_{GS}= 0V, Tj = 25℃	--	--	1	μA
		V_{DS} =320V, 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=4A(Note4)	--	0.22	0.27	Ω
$V_{GS(TH)}$	Gate Threshold Voltage	VDS = VGS, ID = 250μA(Note4)	2	3	4	V
g_{fs}	Forward Transconductance	VDS=15V, ID =9.5A(Note4)	--	10.0	--	S

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
R_g	Gate resistance	f = 1.0MHz	--	1.4	--	Ω
C_{iss}	Input Capacitance	VGS = 0V VDS = 25V f = 1.0MHz	--	2300	--	PF
C_{oss}	Output Capacitance		--	210	--	
C_{rss}	Reverse Transfer Capacitance		--	3.3	--	

Switching Characteristics						
Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	ID =19A VDD = 250V VGS = 10V RG =10Ω	--	32	--	ns
tr	Rise Time		--	26	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	80	--	
t_f	Fall Time		--	35	--	
Q_g	Total Gate Charge	ID =19A VDD =320V VGS = 10V	--	40	--	nC
Q_{gs}	Gate to Source Charge		--	12.5	--	
Q_{gd}	Gate to Drain (“Miller”)Charge		--	10.5	--	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
I_S	Continuous Source Current (Body Diode)	TC=25 °C	--	--	19	A
I_{SM}	Maximum Pulsed Current (Body Diode)		--	--	76	A
V_{SD}	Diode Forward Voltage	IS=19A, VGS=0V(Note4)	--	--	1.2	V
T_{rr}	Reverse Recovery Time	IS=19A, Tj = 25°C dIF/dt=100A/us, VGS=0V	--	285	--	ns
Q_{rr}	Reverse Recovery Charge		--	3900	--	nC

Note1: Pulse width limited by maximum junction temperature

Note2: L=10mH, VDs=50V, Start TJ=25℃

Note3: ISD =19A,di/dt ≤100A/us,VDD≤BVDS, Start TJ=25℃

Note4: Pulse width tp≤300μs, δ≤2%

5. Characteristics Curves

Figure 1a Safe Operating Area (No FullPAK)

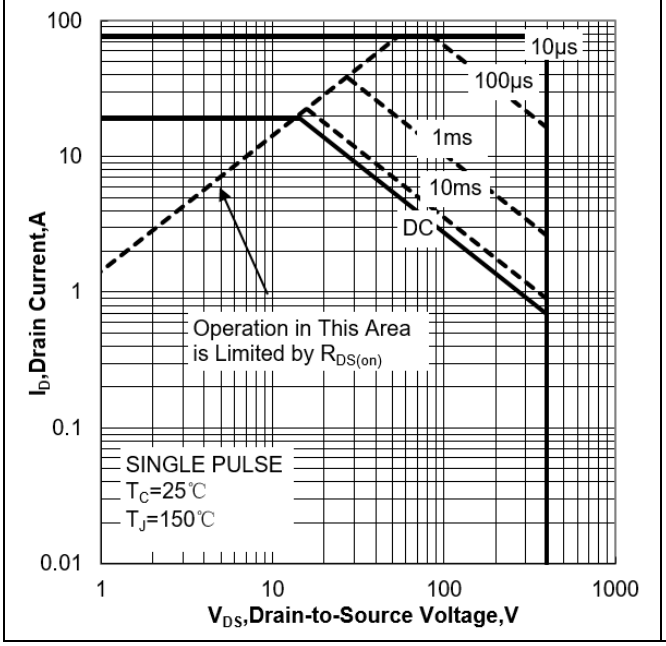


Figure 1b Safe Operating Area (FullPAK)

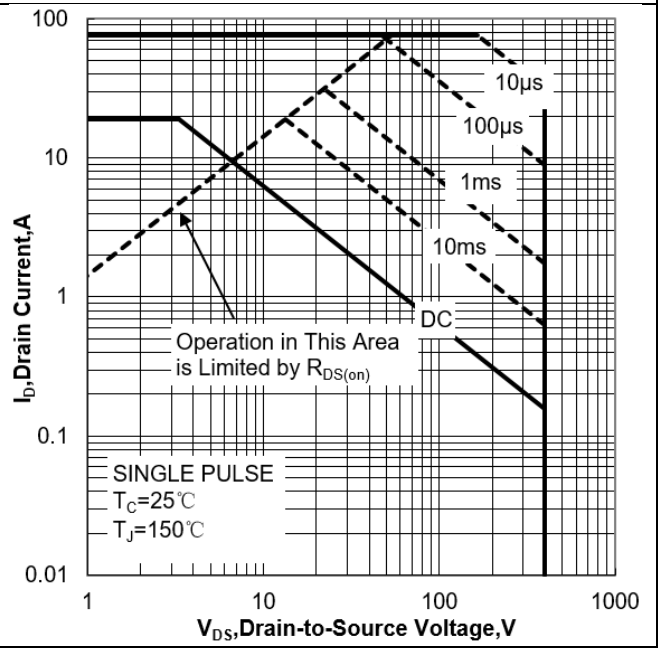


Figure 2a Power Dissipation (No FullPAK)

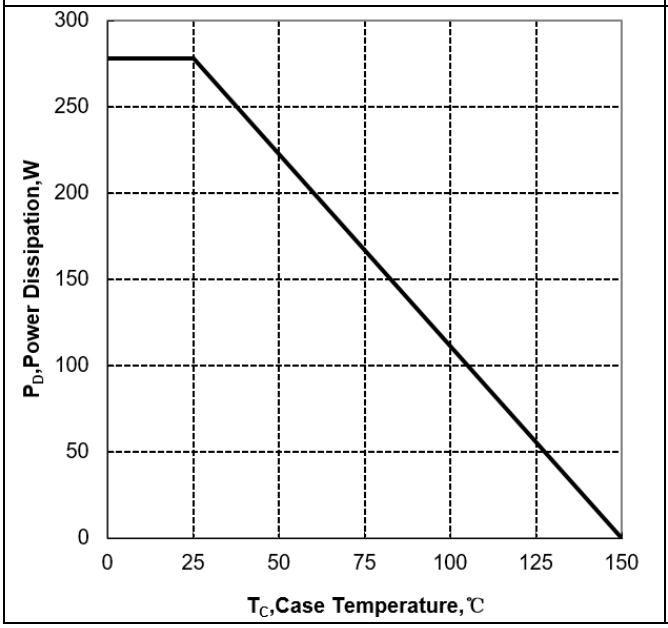


Figure 2b Power Dissipation (FullPAK)

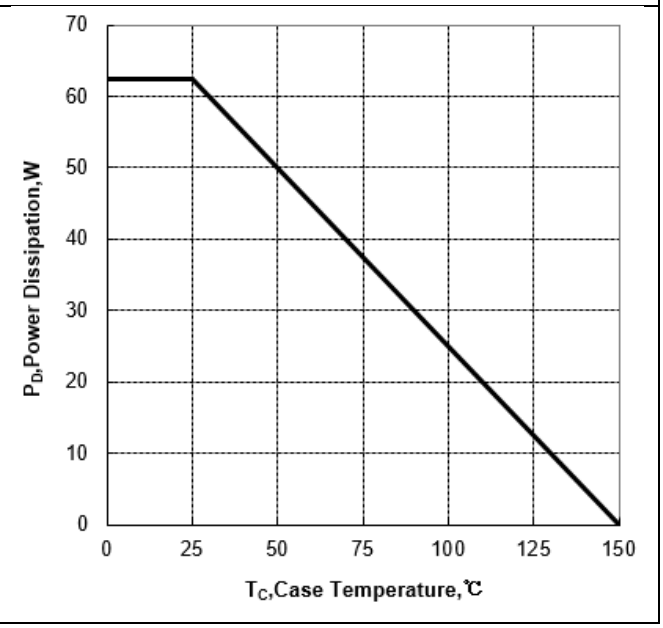


Figure 3a Max Thermal Impendance (No FullPAK)

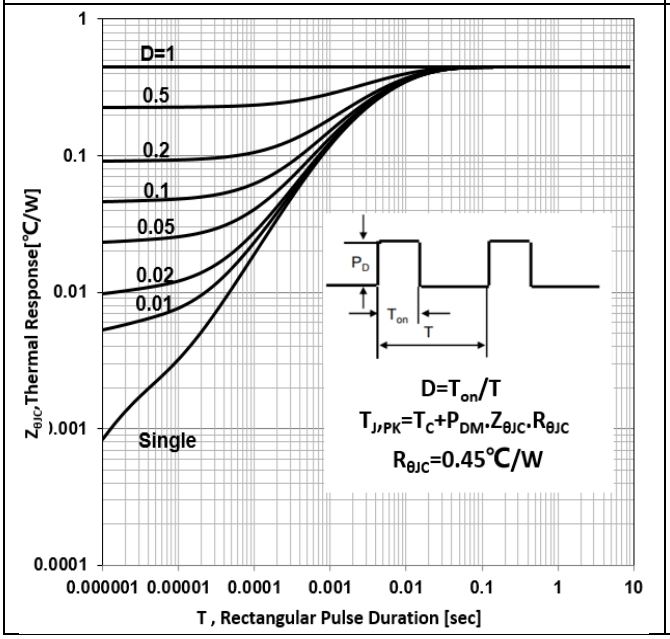


Figure 3b Max Thermal Impendance (FullPAK)

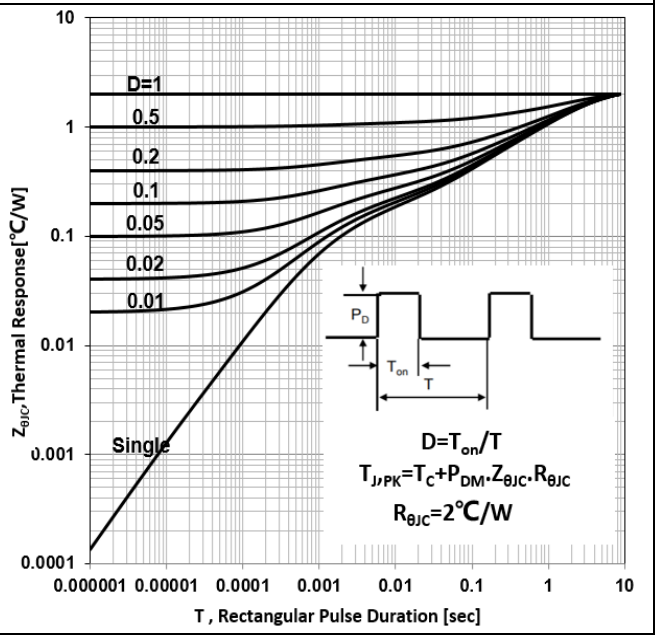


Figure 4 Typical Output Characteristics

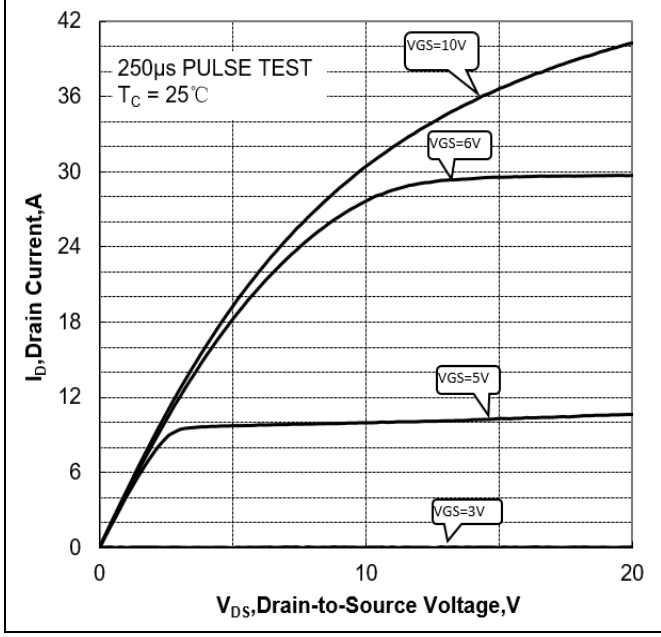


Figure 5 Typical Transfer Characteristics

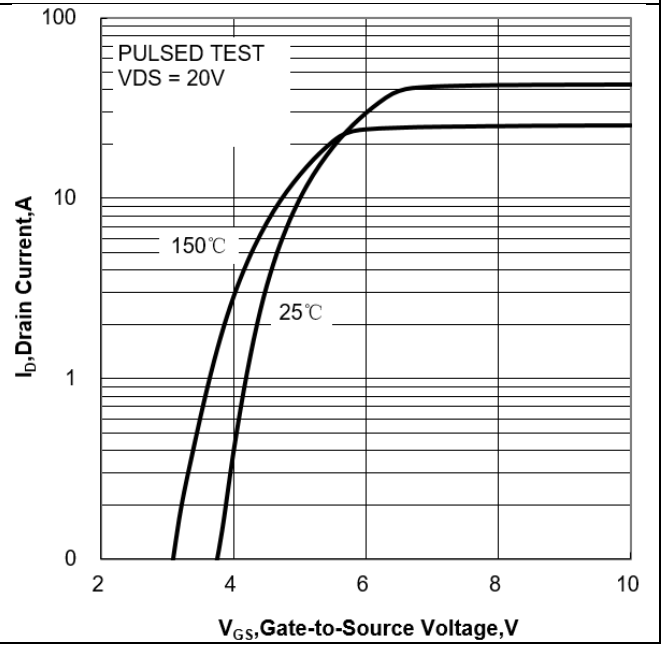


Figure 6 Typical Drain to Source ON Resistance vs Drain Current

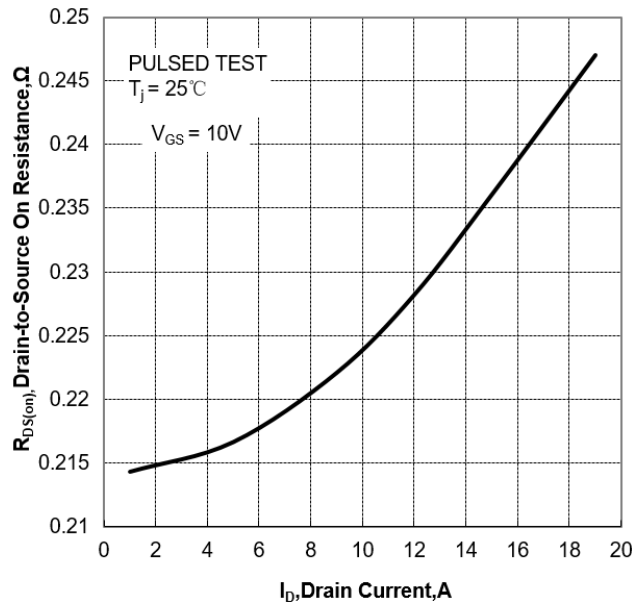


Figure 7 Typical Drian to Source on Resistance vs Junction Temperature

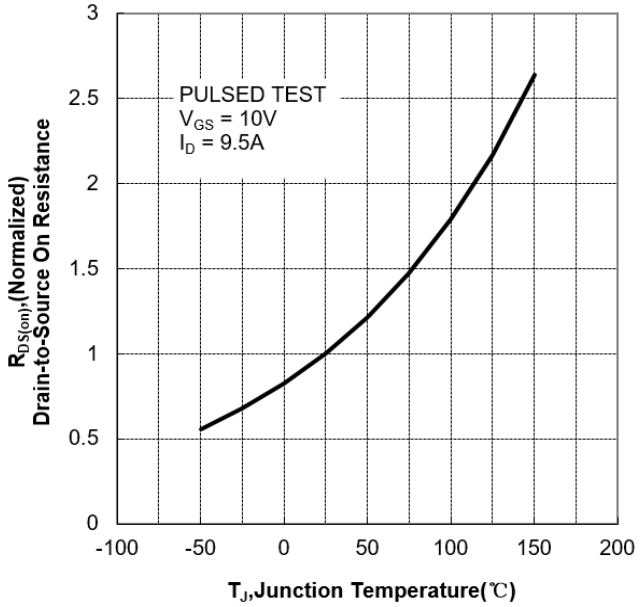


Figure 8 Typical Theshold Voltage vs Junction Temperature

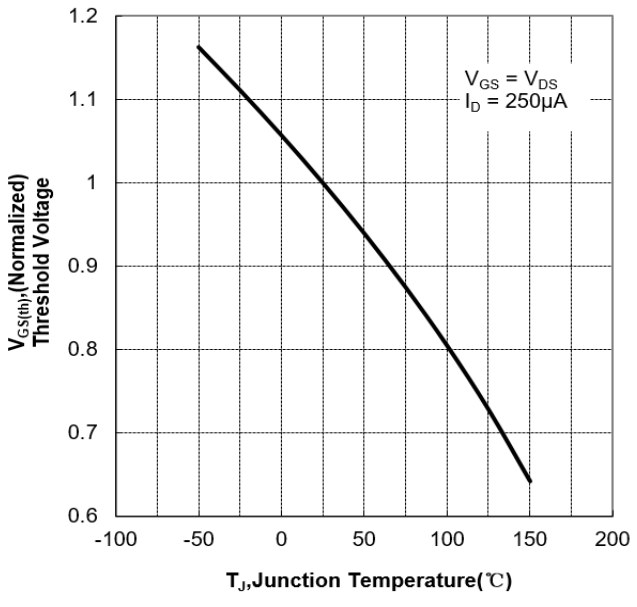


Figure 9 Typical Breakdown Voltage vs Junction Temperature

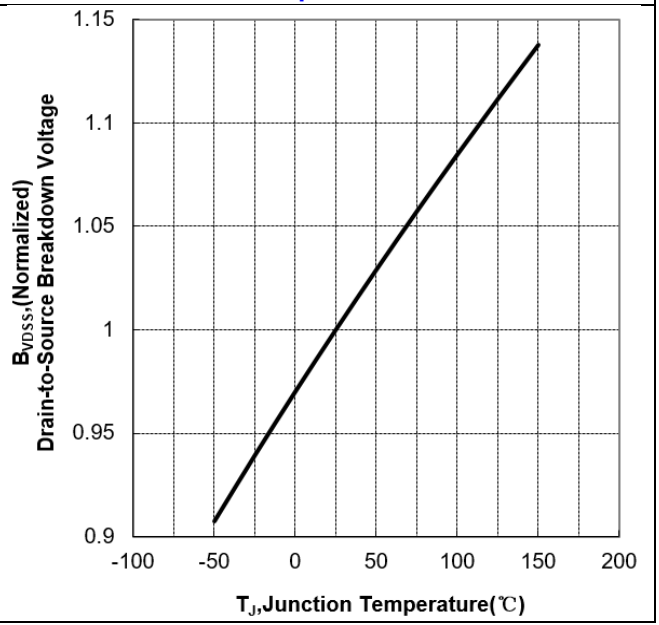


Figure 10 Typical Capacitance vs Drain to Source Voltage

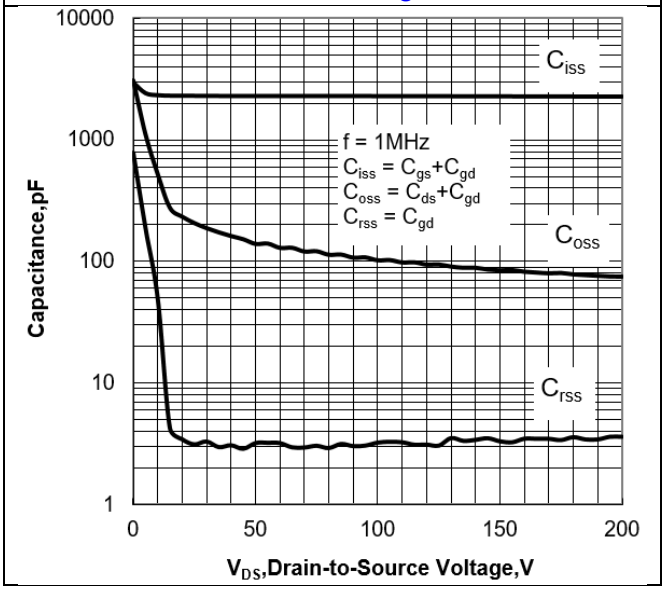
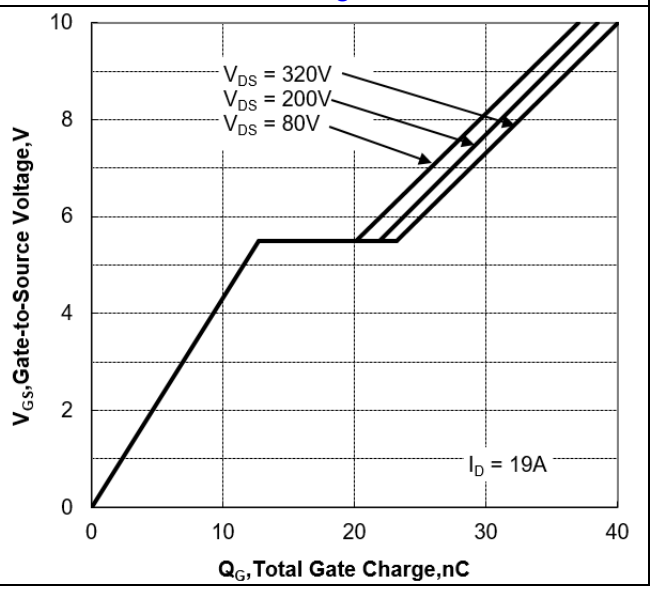
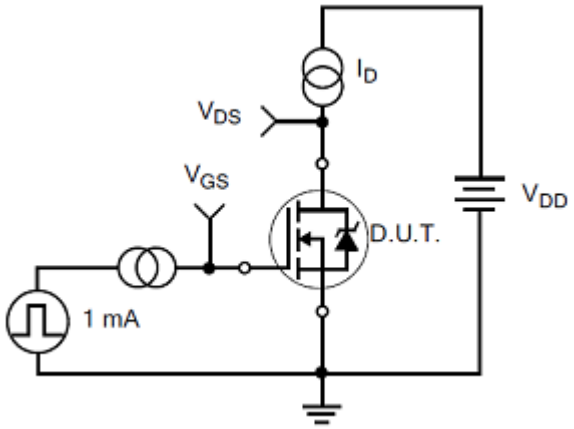
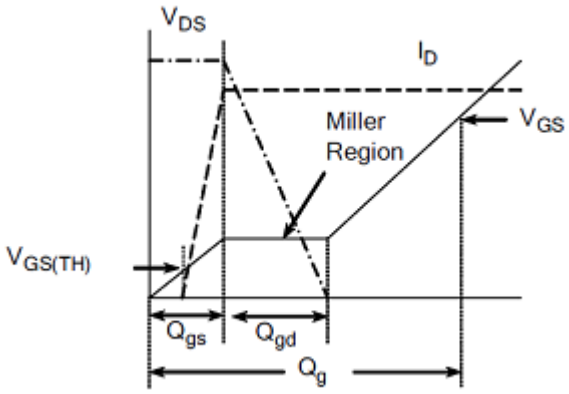
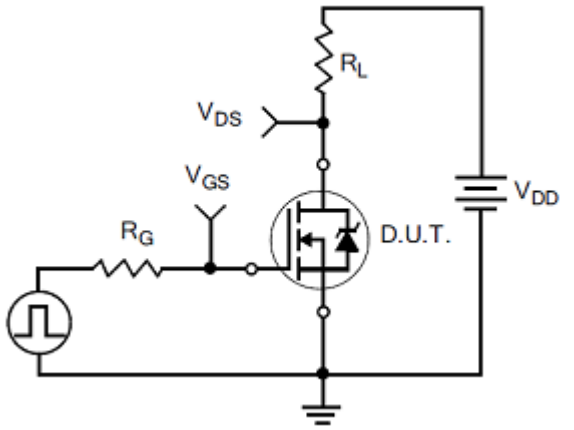
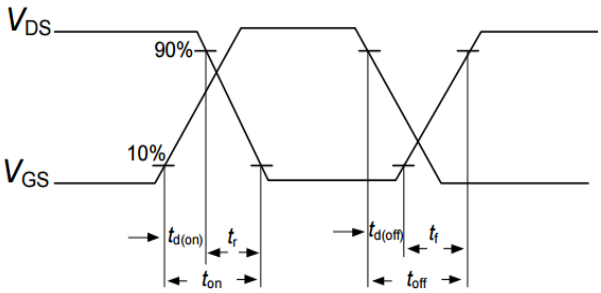


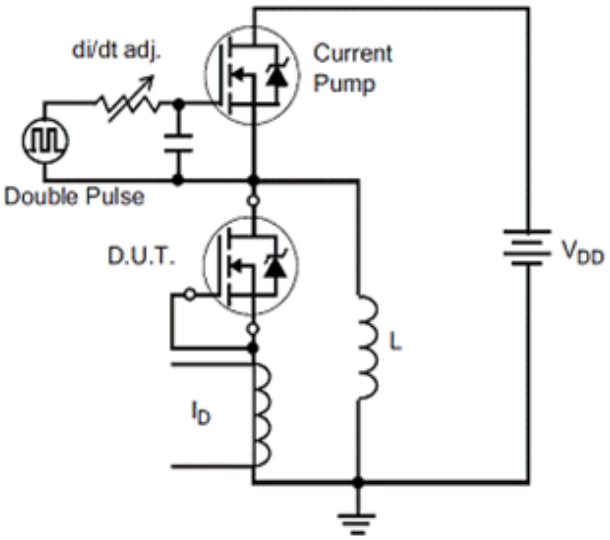
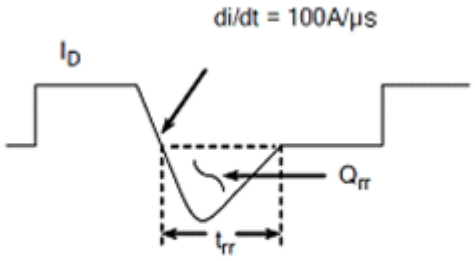
Figure 11 Typical Gate Charge vs Gate to Source Voltage

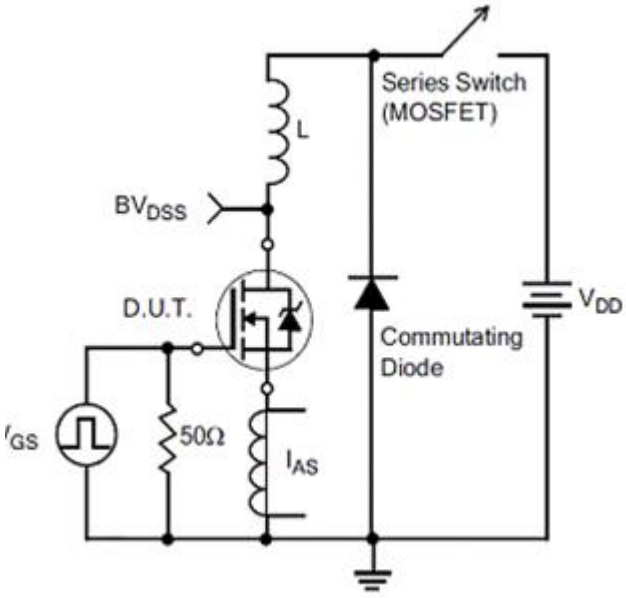
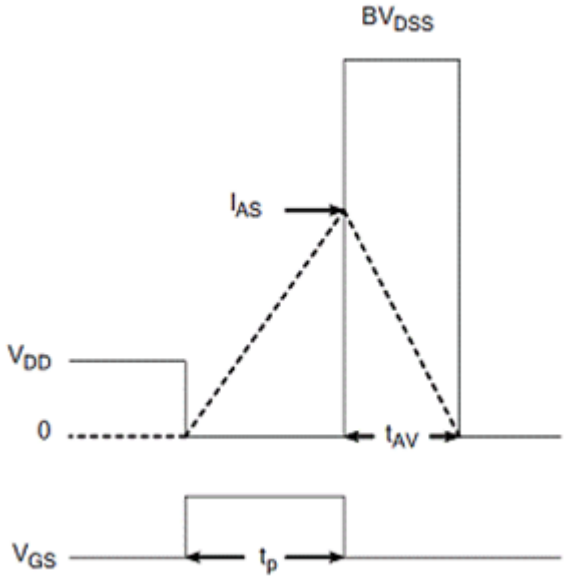


6. Test Circuit and Waveform

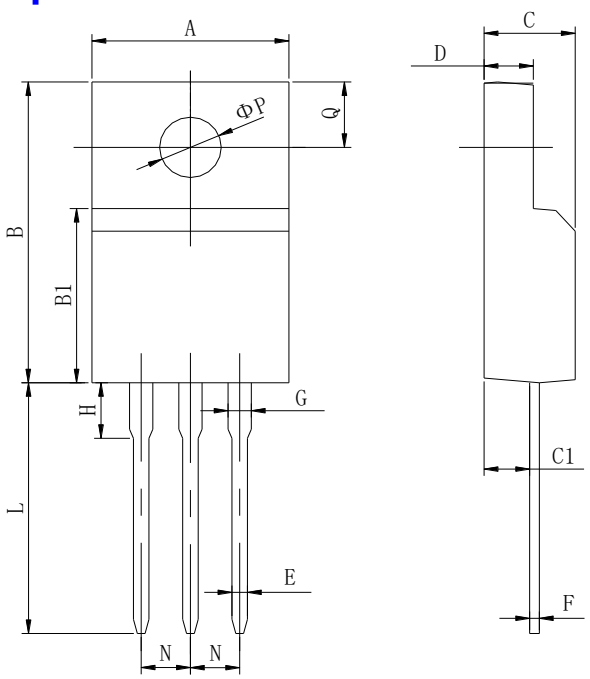
Gate Charge Test Circuit	Gate Charge Waveforms
	

Resistive Switching Test Circuit	Resistive Switching Waveforms
	

Diode Reverse Recovery Test Circuit	Diode Reverse Recovery Waveform
	

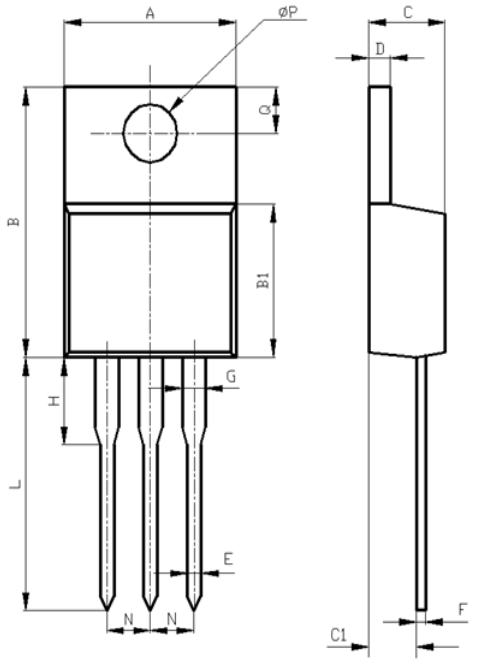
Unclamped Inductive Switching Test Circuit	Unclamped Inductive Switching Waveform
	

7. 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

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 Belling reserves the right to make changes in this specification sheet and is subject to change without prior notice.

CONTACT:

上海贝岭股份有限公司（总部）

地址：上海市宜山路 810 号

邮编：200233

电话：021-24261000

产品业务咨询及技术支持

电话：021-24261326

传真 2：021-64852222

邮箱 2：marketing@belling.com.cn

上海贝岭深圳分公司（华南区）

地址：深圳市福田中心区民田路新华保险大厦 1510 室

邮编：518031

电话：0755-33336776 0755-33336770

传真：0755-33336788

上海贝岭北京办事处（华北区）

地址：北京市西城区新华里 16 号院锦官苑小区 10 号楼 1 单元 1505 室

邮编：100044

电话：010-64179374

传真：010-8835 9236