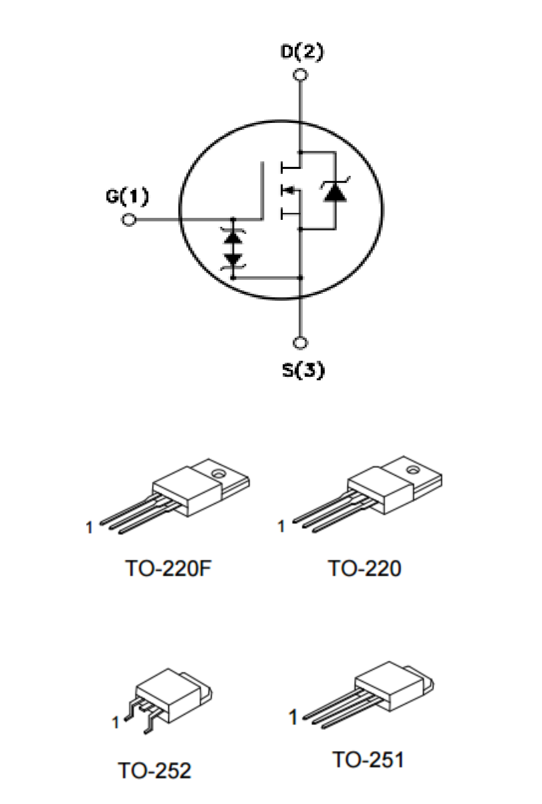
BL3N100E

Power MOSFET

1. Description

BL3N100E, 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
$V_{DS@Tj.max}$	1000	V
I_D	2.5	A
$R_{DS(ON).Typ}$	6.2	Ω

FEATURES

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

APPLICATIONS

- High frequency switching mode power supply

ORDERING INFORMATION

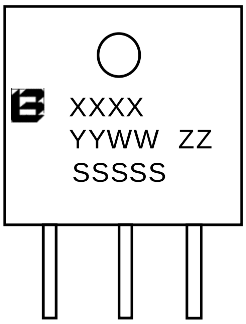
Ordering Codes	Package	Product Code	Packing
BL3N100E-P	TO-220	3N100E	Tube
BL3N100E-A	TO-220F		Tube
BL3N100E-U	TO-251		Tube
BL3N100E-D	TO-252		Tape Reel

BL3N100E-A

(2) Package type

(1) Chip name

(1)BL3N100E:1000V 2.5A
(2) A:TO-220F P:TO-220
U:TO-251 D：TO-252



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	1000	V
I_D	Continuous Drain Current	2.5	A
	Continuous Drain Current T_C = 100 °C	1.58	A
I_{DM}	Pulsed Drain Current(Note1)	10	A
V_{GS}	Gate-to-Source Voltage	±30	V
E_{AS}	Single Pulse Avalanche Energy(Note2)	200	mJ
$V_{ESD(G-S)}$	Gate source ESD (HBM-C= 100pF, R=1.5kΩ)	3000	V
dv/dt	Peak Diode Recovery dv/dt(Note3)	5.0	V/ns
P_D	Power Dissipation TO-251, TO-252	69	W
	Derating Factor above 25°C	0.56	W/℃
P_D	Power Dissipation TO-220	119	W
	Derating Factor above 25°C	1	W/℃
P_D	Power Dissipation TO-220F	42	W
	Derating Factor above 25°C	0.35	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-220

Symbol	Parameter	RATINGS	Units
$R_{θJC}$	Junction-to-Case	1.05	℃/W
$R_{θJA}$	Junction-to-Ambient	62.5	℃/W

Thermal characteristics (FullPAK) TO-220F

Symbol	Parameter	RATINGS	Units
$R_{θJC}$	Junction-to-Case	2.97	℃/W
$R_{θJA}$	Junction-to-Ambient	62.5	℃/W

Thermal characteristics (No FullPAK) TO-251/TO-252

Symbol	Parameter	RATINGS	Units
$R_{θJC}$	Junction-to-Case	1.8	℃/W
$R_{θJA}$	Junction-to-Ambient	150	℃/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	1000	--	--	V
$\Delta BV_{DSS}/\Delta T_J$	Bvdss Temperature Coefficient	ID=250uA, Reference25℃	--	0.75	--	V/℃
I_{DSS}	Drain to Source Leakage Current	V_{DS} =1000V, V_{GS}= 0V, Tj = 25℃	--	--	10	μA
		V_{DS} =800V, V_{GS}= 0V, Tj = 125℃	--	--	100	μA
$I_{GSS(F)}$	Gate to Source Forward Leakage	V_{GS} =+25V	--	--	10	μA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	V_{GS} =-25V	--	--	10	μA

ON Characteristics

Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
$R_{DS(ON)}$	Drain-to-Source On-Resistance	VGS=10V, ID=1.25A(Note4)	--	6.2	7.5	Ω
$V_{GS(TH)}$	Gate Threshold Voltage	VDS = VGS, ID = 250μA(Note4)	3	--	5	V
g_{fs}	Forward Transconductance	VDS=15V, ID =2.5A(Note4)	2	--	--	S

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
R_g	Gate resistance	f = 1.0MHz	--	4.5	--	Ω
C_{iss}	Input Capacitance	VGS = 0V, VDS = 25V, f = 1.0MHz	--	530	--	PF
C_{oss}	Output Capacitance		--	45	--	
C_{rss}	Reverse Transfer Capacitance		--	2.5	--	

Switching Characteristics						
Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	ID =2.5A VDD = 500V VGS = 10V RG =5Ω	--	23	--	ns
tr	Rise Time		--	63	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	33	--	
t_f	Fall Time		--	61	--	
Q_g	Total Gate Charge	ID =2.5A VDD =450V VGS = 10V	--	13.8	--	nC
Q_{gs}	Gate to Source Charge		--	4.6	--	
Q_{gd}	Gate to Drain ("Miller")Charge		--	4.8	--	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
I_S	Continuous Source Current (Body Diode)	TC=25 °C	--	--	2.5	A
I_{SM}	Maximum Pulsed Current (Body Diode)		--	--	10-	A
V_{SD}	Diode Forward Voltage	IS=2.5A, VGS=0V(Note4)	--	--	1.2	V
T_{rr}	Reverse Recovery Time	IS=2.5A, Tj = 25°C dIF/dt=100A/us, VGS=0V	--	2103	--	ns
Q_{rr}	Reverse Recovery Charge		--	1979	--	nC

Gate-source Zener diode						
Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
V_{GSO}	Gate-source breakdown voltage	IGS= ±1mA(Open Drain)	30	--	--	V

The built-in back-to-back Zener diodes have specifically been designed to enhance not only the device's ESD capability, but also to make them safely absorb possible voltage transients that may occasionally be applied from gate to source.

Note1: Pulse width limited by maximum junction temperature
Note2: L=120mH, VDS=50V, Start TJ=25℃
Note3: ISD =3A,di/dt ≤100A/us,VDD≤BVDS, Start TJ=25℃
Note4: Pulse width tp≤300μs, δ≤2%

5. Characteristics Curves

Figure 1a Safe Operating Area (TO-251/TO-252)

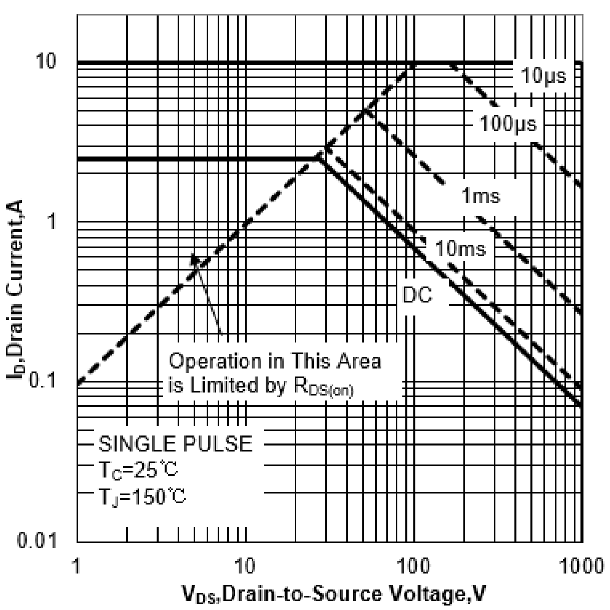


Figure 1b Safe Operating Area (TO-220F)

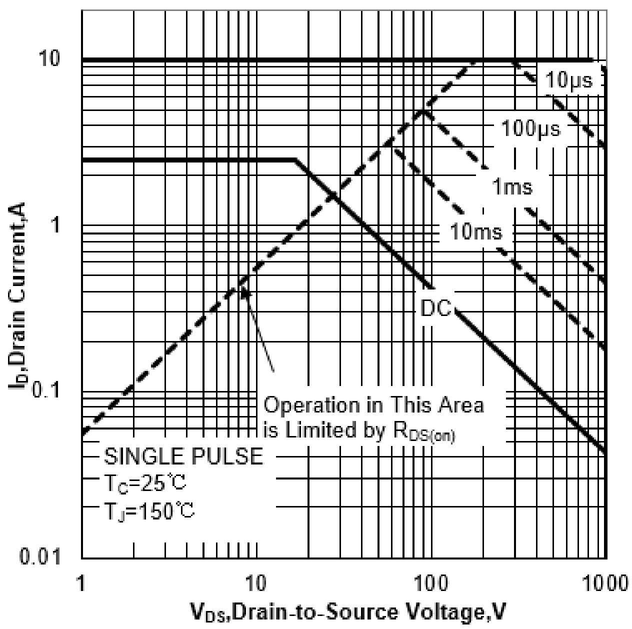


Figure 1c Safe Operating Area (TO-220)

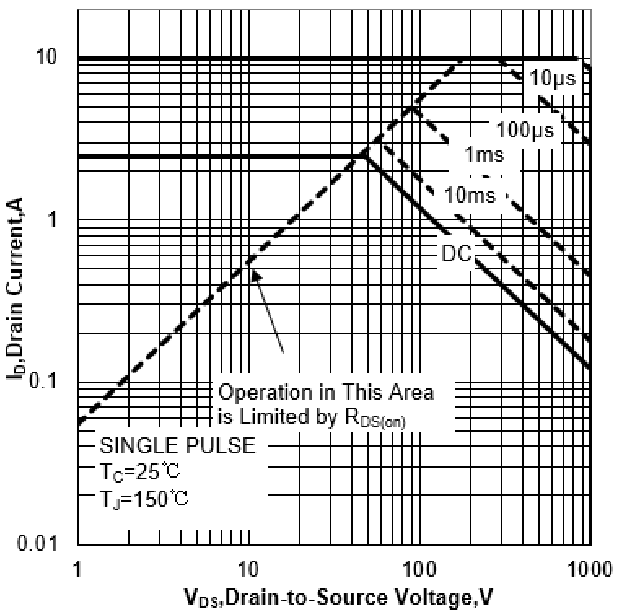


Figure 2a Power Dissipation (TO-251/252)

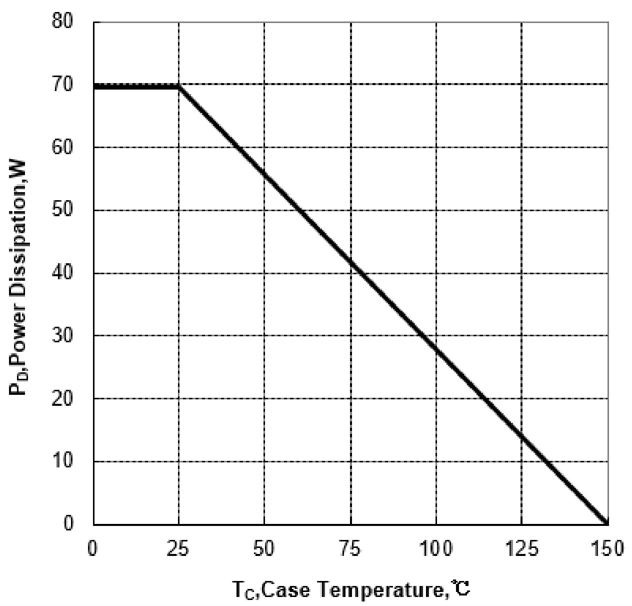


Figure 2b Power Dissipation (TO-220)

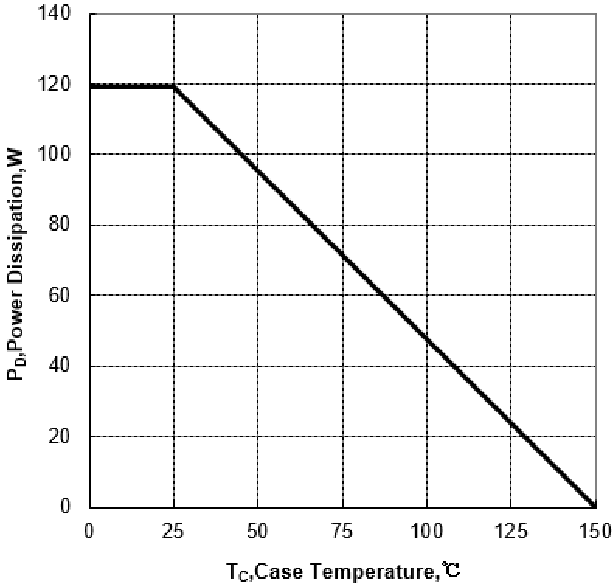


Figure 2c Power Dissipation (TO-220F)

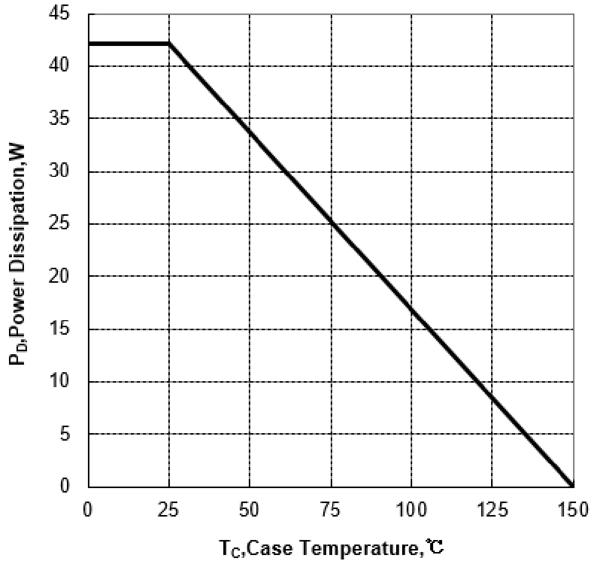


Figure 3a Max Thermal Impendance (TO-251/TO-252)

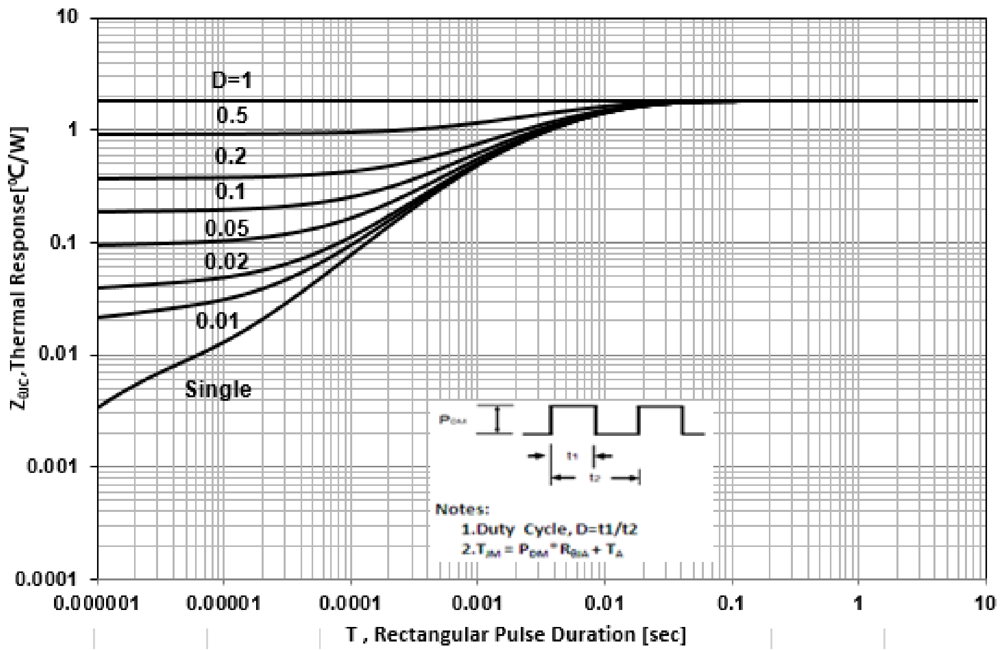


Figure 3b Max Thermal Impendance (TO-220)	Figure 3c Max Thermal Impendance (TO-220F)

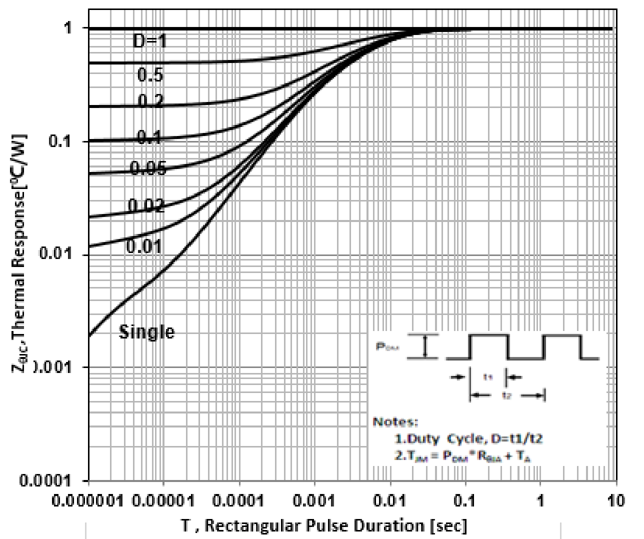
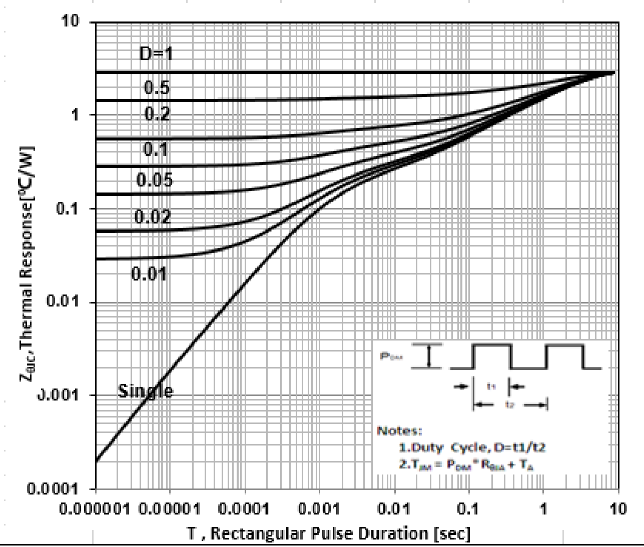

	

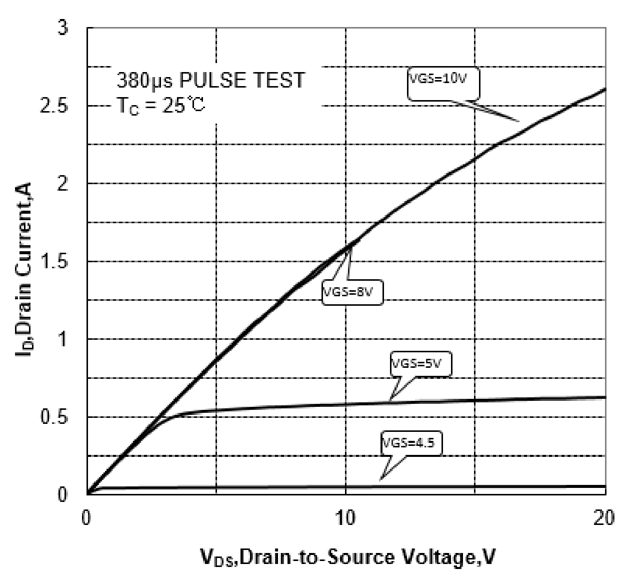
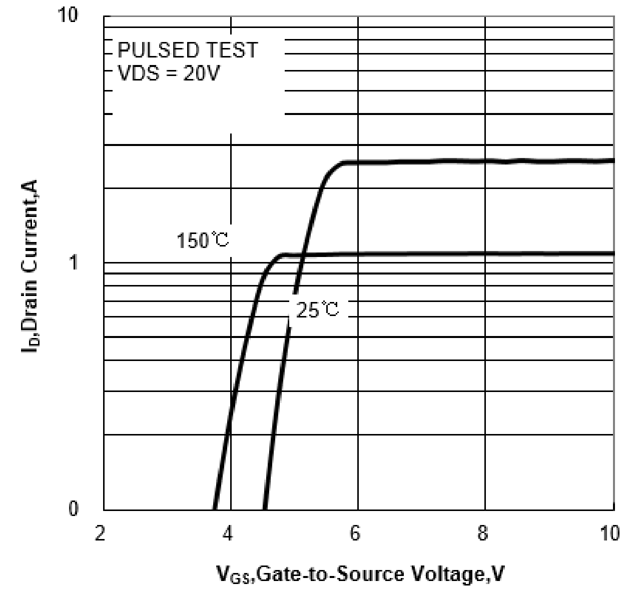
Figure 4 Typical Output Characteristics	Figure 5 Typical Transfer Characteristics
	

Figure 6 Typical Drain to Source ON Resistance vs Drain Current

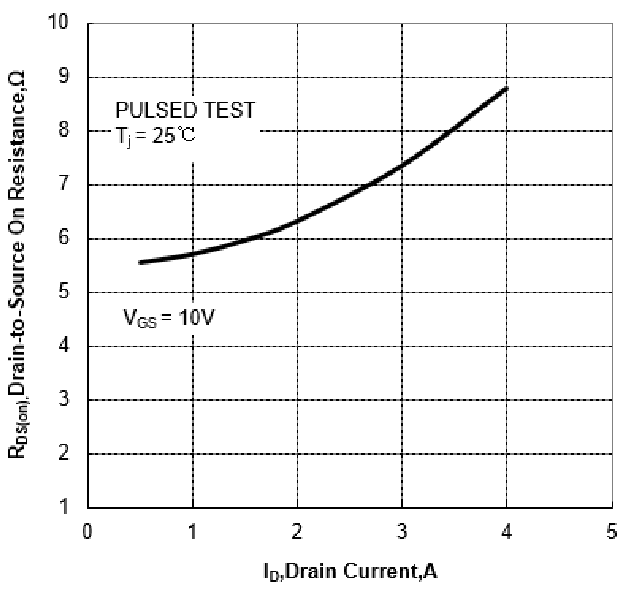


Figure 7 Typical Drian to Source on Resistance vs Junction Temperature

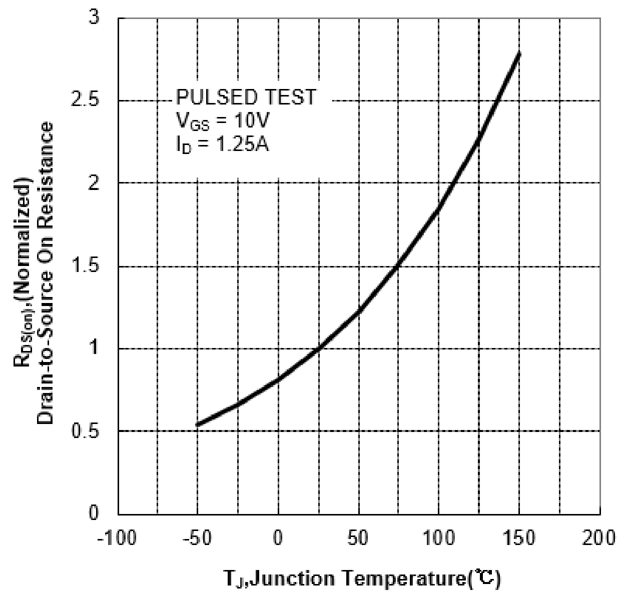


Figure 8 Typical Theshold Voltage vs Junction Temperature

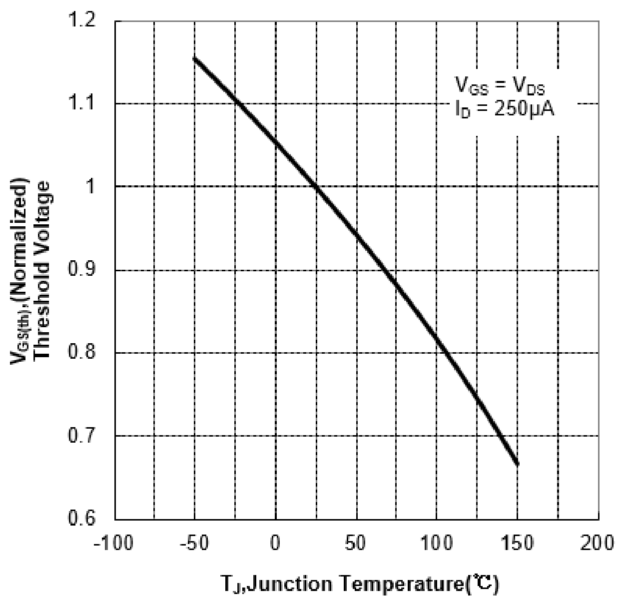


Figure 9 Typical Breakdown Voltage vs Junction Temperature

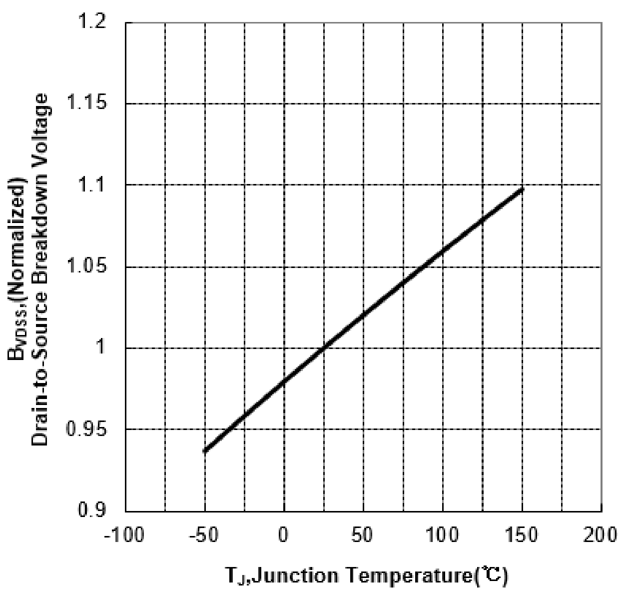
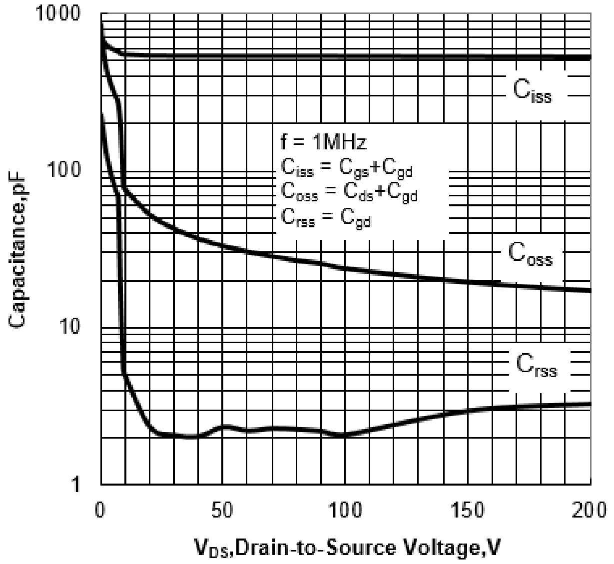
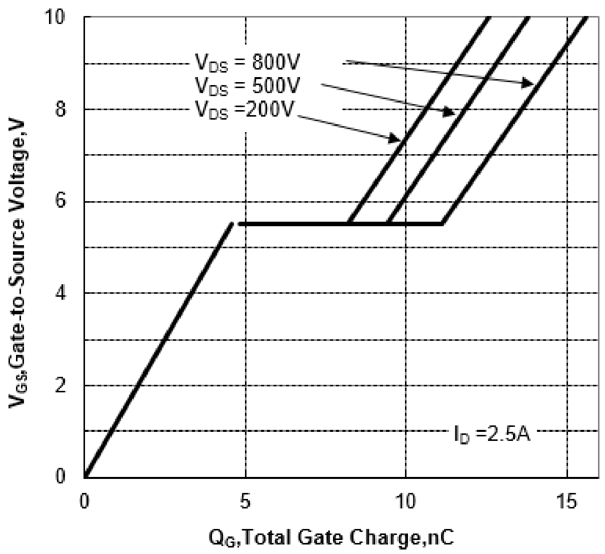


Figure 10 Typical Capacitance vs Drain to Source Voltage	Figure 11 Typical Gate Charge vs Gate to Source Voltage
	

6. Test Circuit and Waveform

Figure 12 Gate Charge Test Circuit

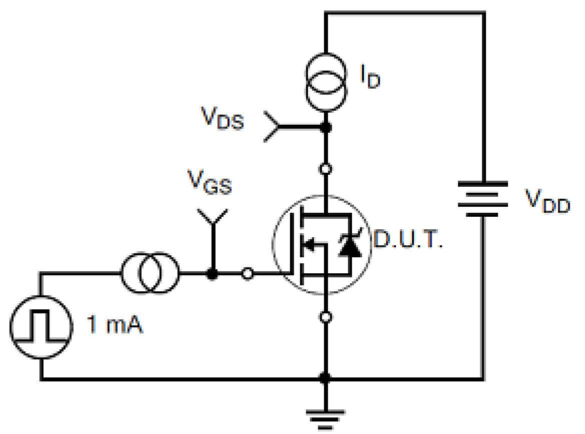


Figure 13 Gate Charge Waveforms

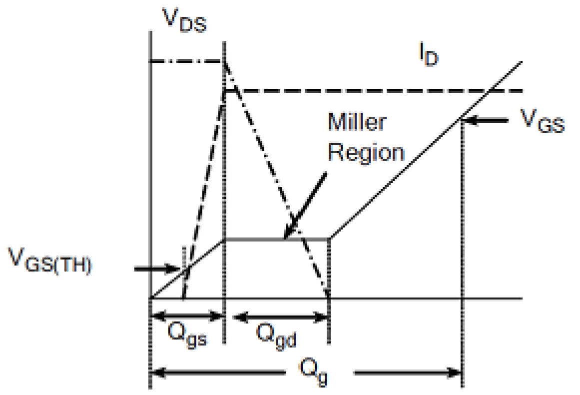


Figure 14 Resistive Switching Test Circuit

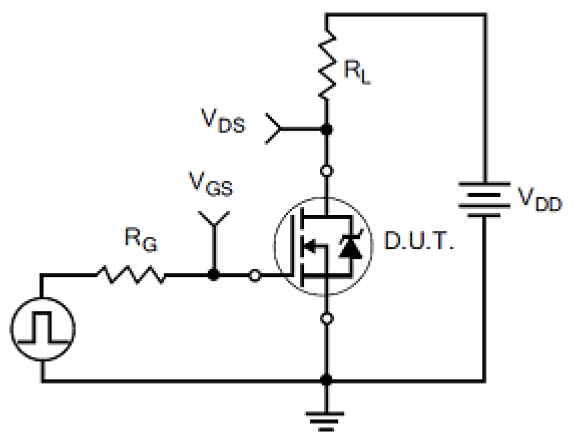


Figure 15 Resistive Switching Waveforms

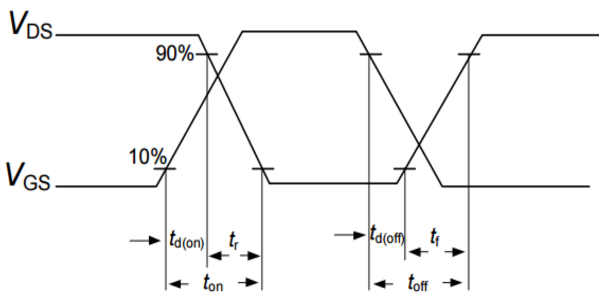


Figure 16 Diode Reverse Recovery Test Circuit

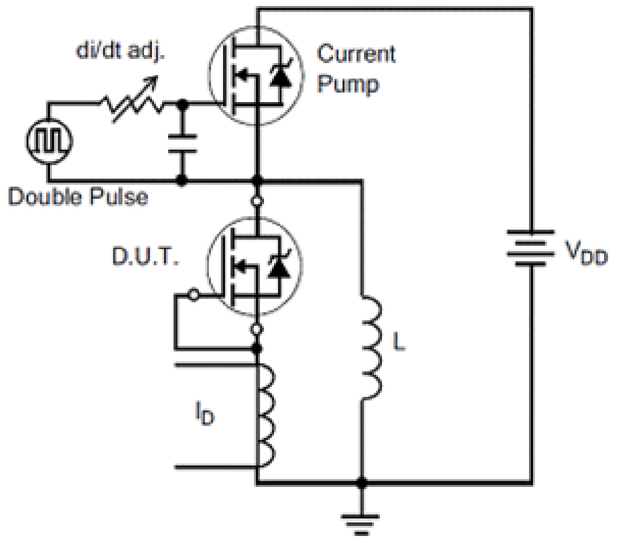


Figure 17 Diode Reverse Recovery Waveform

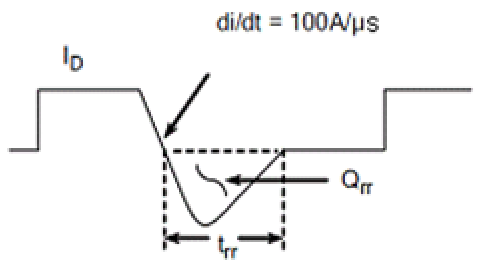


Figure 18 Unclamped Inductive Switching Test Circuit

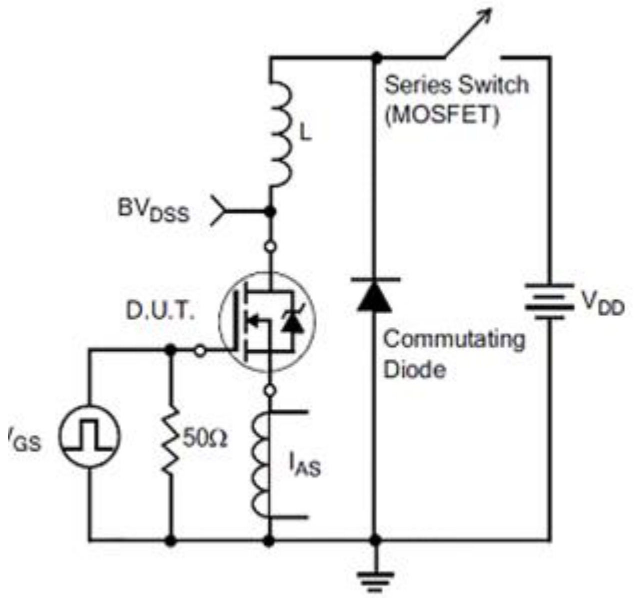
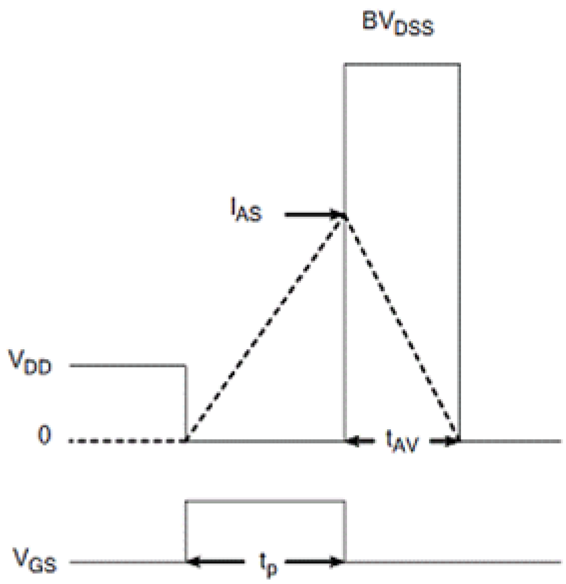
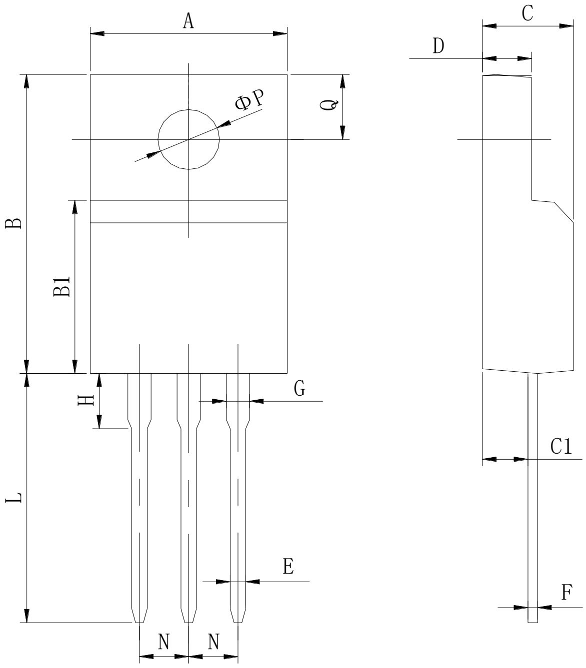


Figure 19 Unclamped Inductive Switching Waveform

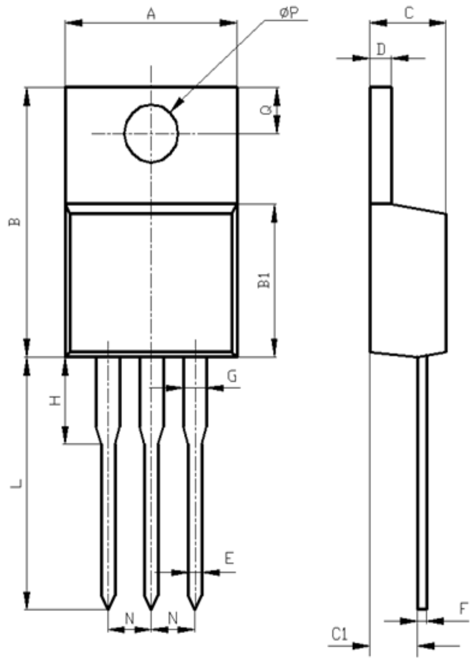


7. Package Description



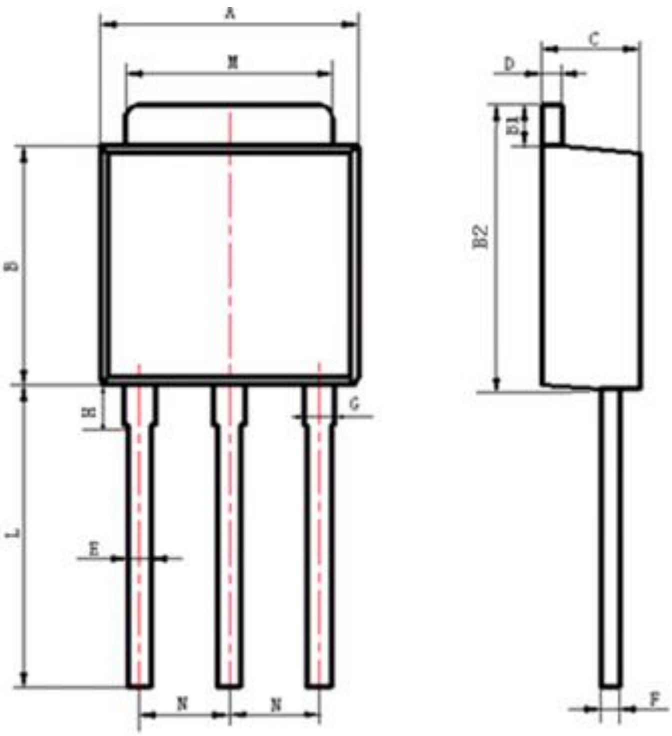
Items	Values(mm)	
	MIN	MAX
A	9.60	10.4
B	15.4	16.2
B1	8.90	9.50
C	4.30	4.90
C1	2.10	3.00
D	2.40	3.00
E	0.60	1.00
F	0.30	0.60
G	1.12	1.42
H	3.40	3.80
	1.60	2.90
L	12.0	14.0
N	2.34	2.74
Q	3.15	3.55
ΦP	2.90	3.30

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

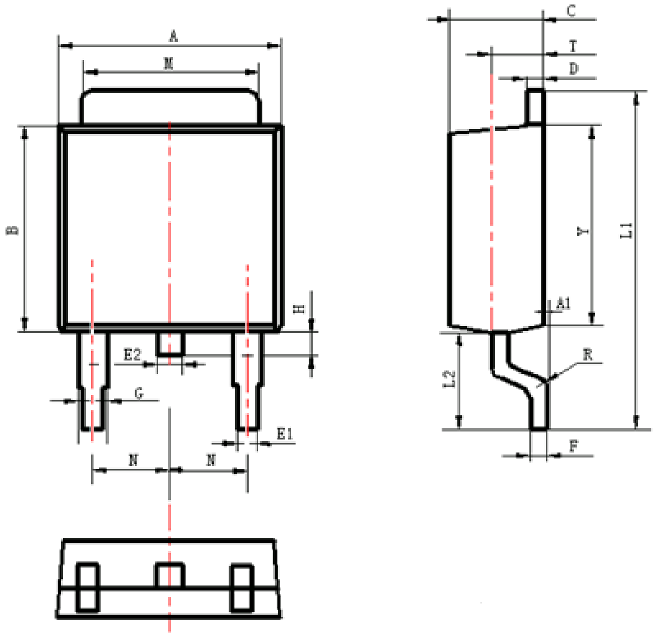
TO-220 Package



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

*： adjustable

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 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：021-64852222

邮箱：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