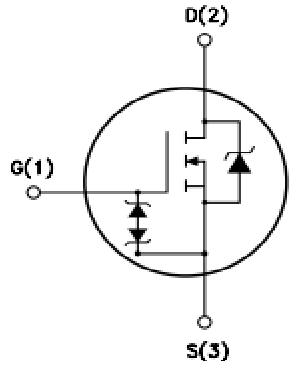
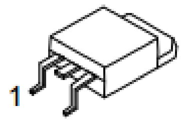
BLQ3N100E

Power MOSFET

1. Description

BLQ3N100E, 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.





TO-252

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
BLQ3N100E-D	TO-252	3N100E	Tape Reel

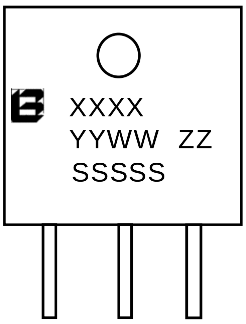
BLQ3N100E-D

(2) Package type

(1) Chip name

(1) BLQ3N100E:1000V 2.5A

(2) 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)	3	kV
dv/dt	Peak Diode Recovery dv/dt(Note3)	5.0	V/ns
P_D	Power Dissipation, TO-252	62.5	W
	Derating Factor above 25°C	0.5	W/°C
T_J，T_{stg}	Operating Junction and Storage Temperature Range	150，–55 to 150	°C
T_L	Maximum Temperature for Soldering	300	°C

3. Thermal characteristics

Symbol	Parameter	Package	RATINGS	Units
$R_{\theta JC}$	Junction-to-Case	TO-252	2.0	°C/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
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	I_D=250uA, Reference25°C	--	0.75	--	V/°C
I_{DSS}	Drain to Source Leakage Current	V_{DS}=1000V, V_{GS}=0V, T_J=5°C	--	--	10	μA
		V_{DS} =800V, V_{GS}=0V, T_J=125°C	--	--	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	V_{GS}=10V, I_D=1.25A (Note4)	--	6.2	7.5	Ω
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250µA (Note4)	3	--	5	V
g_{fs}	Forward Transconductance	V_{DS}=15V, I_D =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	V_{GS}=0V V_{DS}=25V f=1.0MHz	--	530	--	PF
C_{oss}	Output Capacitance		--	45	--	
C_{rss}	Reverse Transfer Capacitance		--	2.5	--	
Q_g	Total Gate Charge	I_D=2.5A V_{DD}=450V V_{GS}=10V	--	13.8	--	nC
Q_{gs}	Gate to Source Charge		--	4.6	--	
Q_{gd}	Gate to Drain (“Miller”) Charge		--	4.8	--	

Switching Characteristics

Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	I_D =2.5A V_{DD} = 500V V_{GS} = 10V R_G =5Ω T_J=25°C	--	23	--	ns
tr	Rise Time		--	63	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	33	--	
t_f	Fall Time		--	61	--	

Source-Drain Diode Characteristics

Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
I_S	Continuous Source Current (Body Diode)	T_C=25 °C	--	--	2.5	A
I_{SM}	Maximum Pulsed Current (Body Diode)		--	--	10-	A
V_{SD}	Diode Forward Voltage	I_S=2.5A,V_{GS}=0V(Note4)	--	--	1.2	V
T_{rr}	Reverse Recovery Time	I_S=2.5A, T_J = 25°C V_{GS}=0V,di_F/dt=100A/us	--	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	I_{GS}= ±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, V_{DS}=50V, Start T_J=25℃

Note3: I_{SD} =3A,di/dt ≤100A/us, V_{DD}≤BV_{DSS}, Start T_J=25℃

Note4: Pulse width tp≤300μs, δ≤2%

5. Characteristics Curves

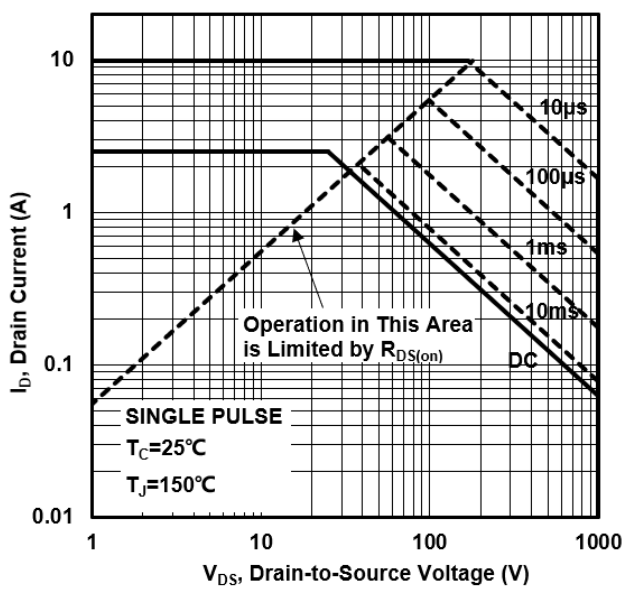
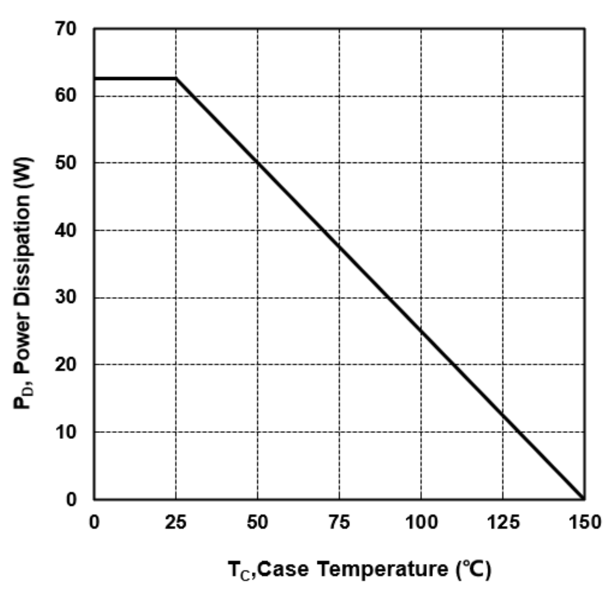
Figure 1 Safe Operating Area	Figure 2 Power Dissipation
	

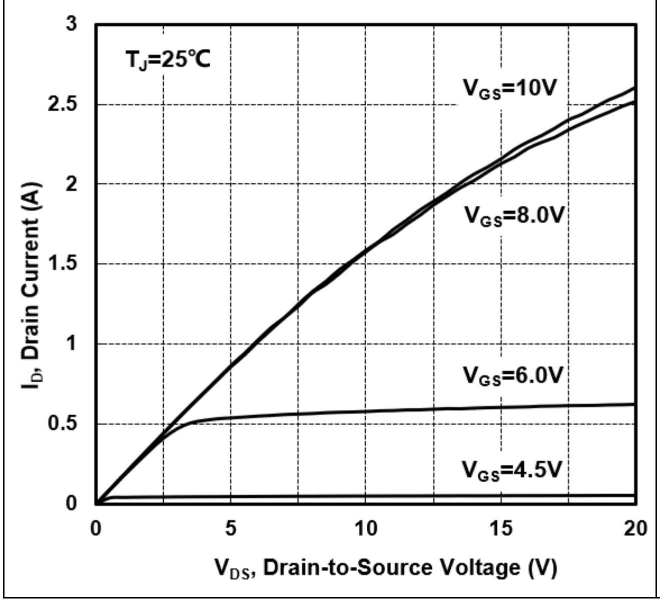
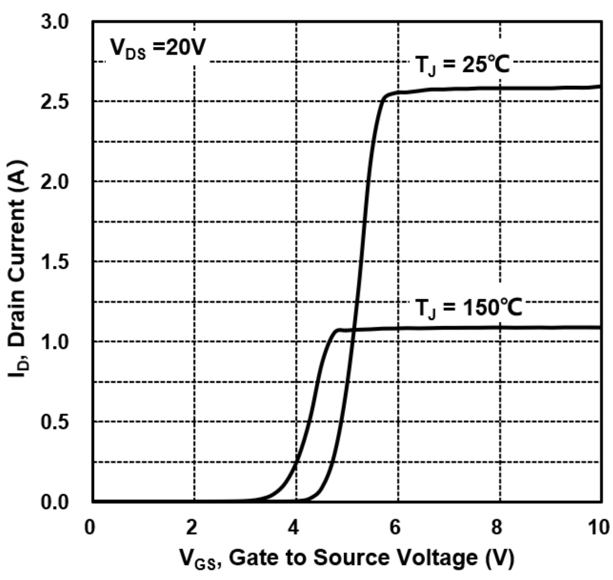
Figure 3 Typical Output Characteristics	Figure 4 Typical Transfer Characteristics
	

Figure 5 Typical Drain to Source ON Resistance vs Drain Current

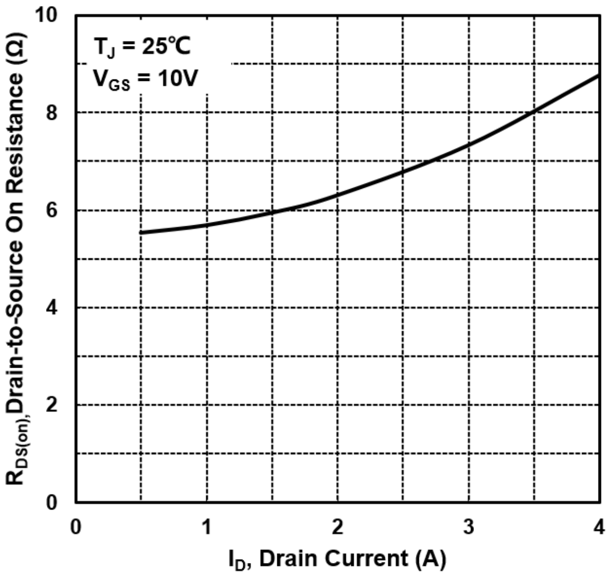


Figure 6 Typical Drian to Source on Resistance vs Junction Temperature

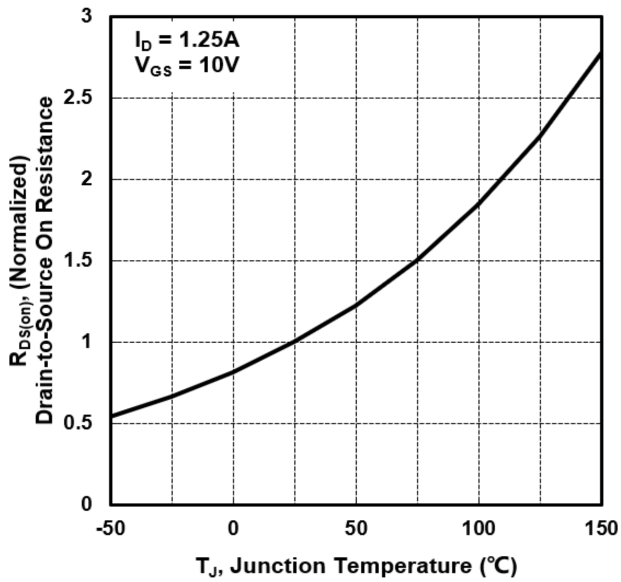


Figure 7 Typical Threshold Voltage vs Junction Temperature

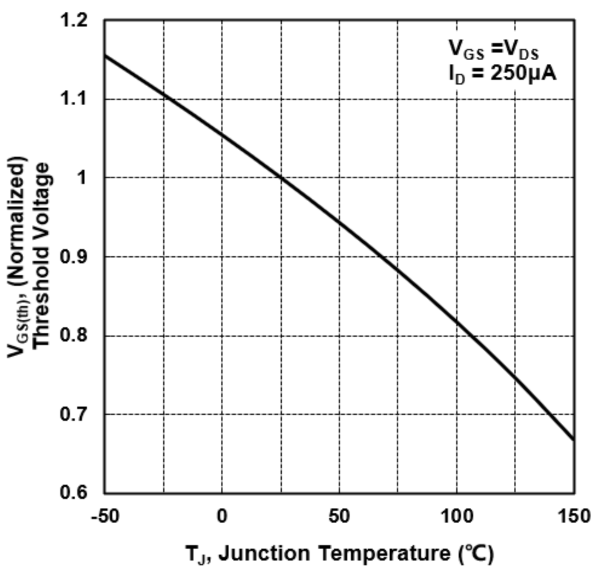


Figure 8 Typical Breakdown Voltage vs Junction Temperature

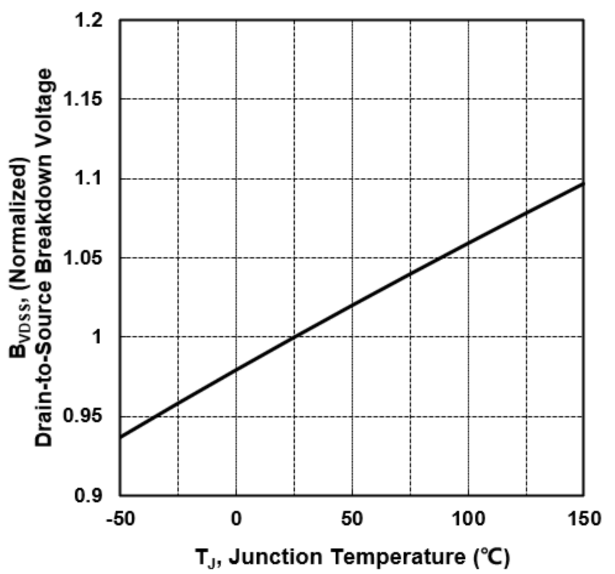


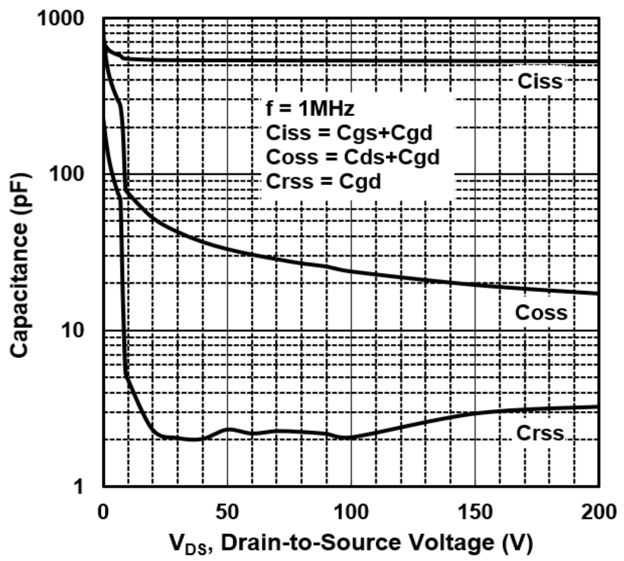
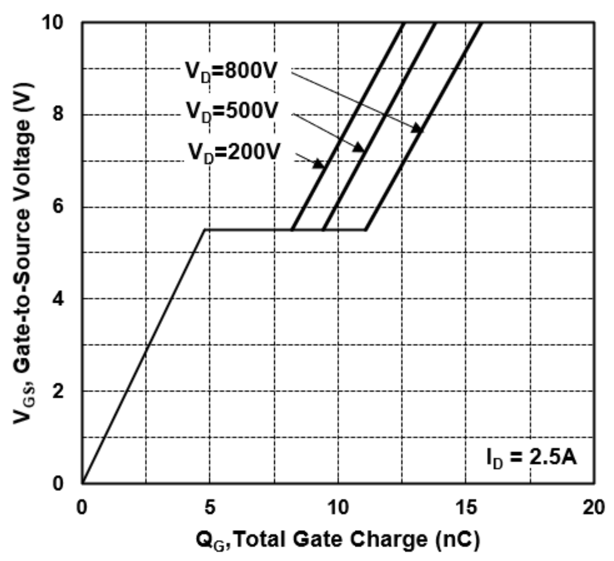
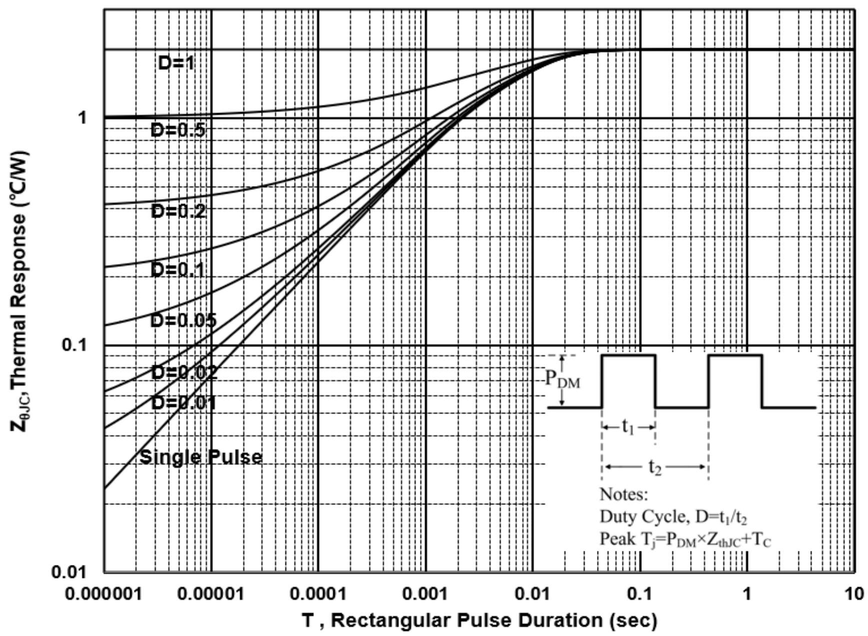
Figure 9 Typical Capacitance vs Drain to Source Voltage	Figure 10 Typical Gate Charge vs Gate to Source Voltage
	

Figure 11 Transient Thermal Impedance, Junction to Case



6. Test Circuit and Waveform

Figure 12 Gate Charge Test Circuit

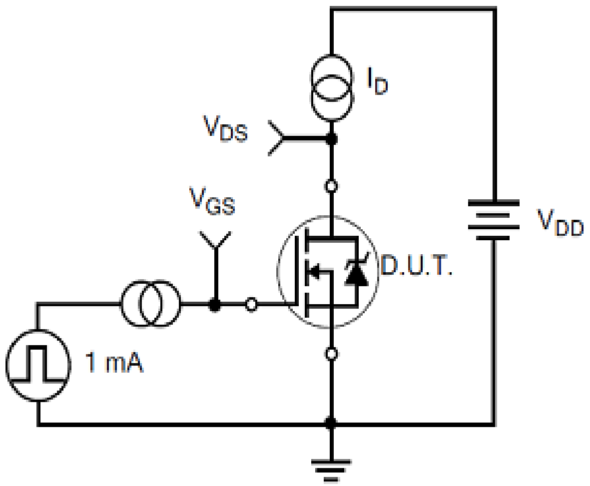


Figure 13 Gate Charge Waveforms

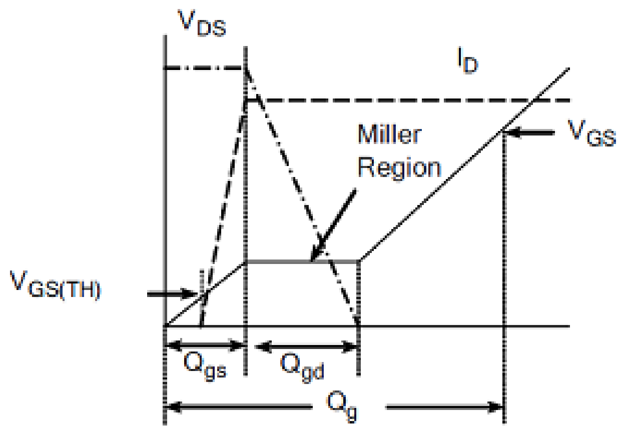


Figure 14 Resistive Switching Test Circuit

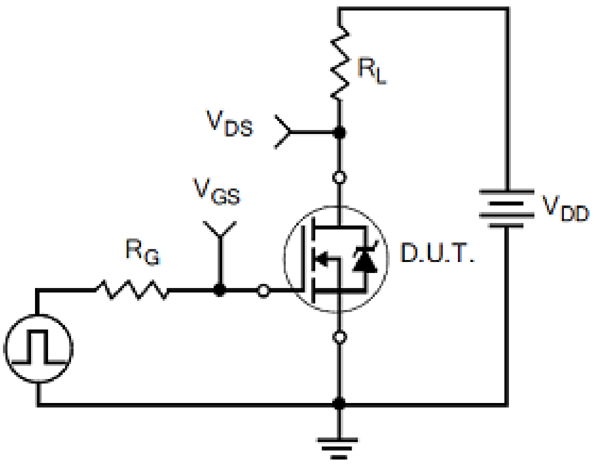


Figure 15 Resistive Switching Waveforms

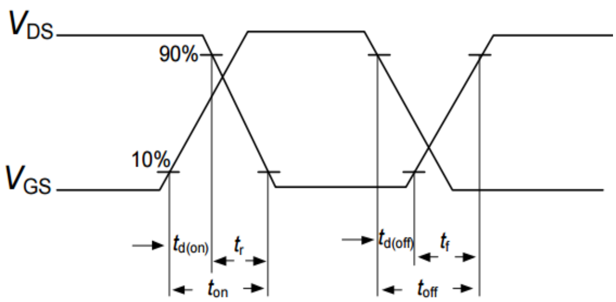


Figure 16 Diode Reverse Recovery Test Circuit

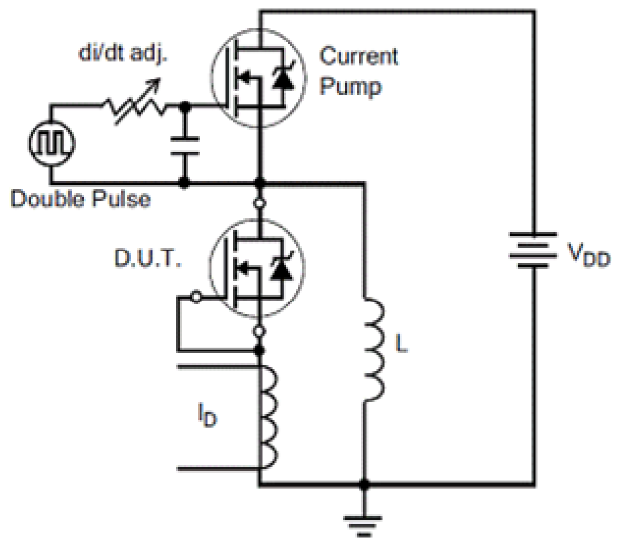


Figure 17 Diode Reverse Recovery Waveform

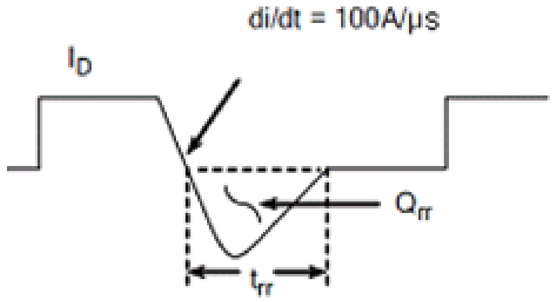


Figure 18 Unclamped Inductive Switching Test Circuit

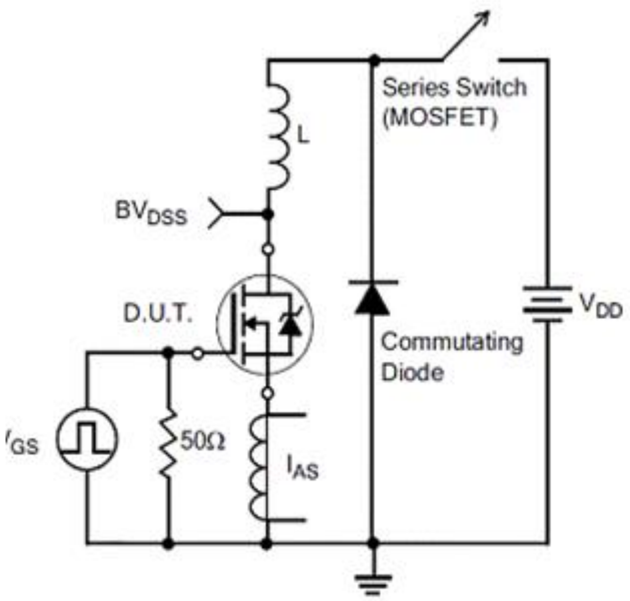
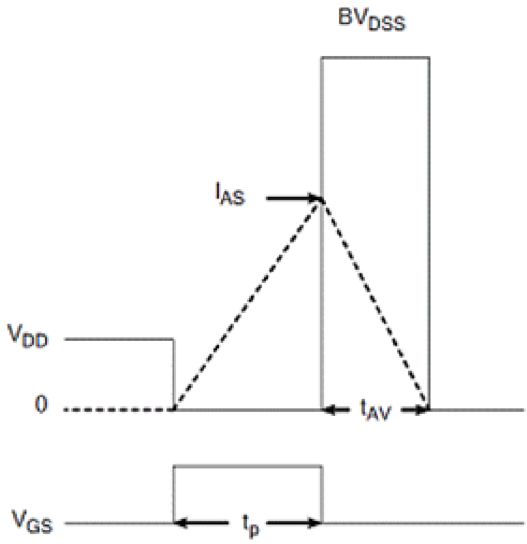
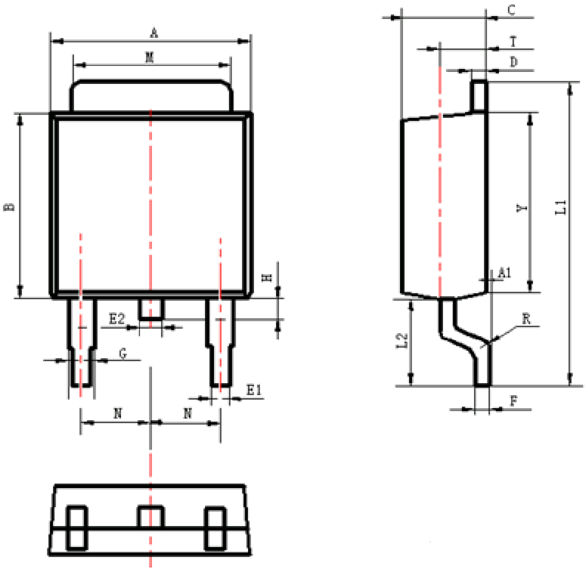


Figure 19 Unclamped Inductive Switching Waveform



7. Package Description



Items	Values(mm)	
	MIN	MAX
A	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. Any use beyond the maximum ratings of the device in performance may cause damage to the device or even the permanent failure, which may affect the dependability of the machine. Please do not exceed the absolute maximum ratings of the device when designing circuit.
2. When installing the heat sink, please pay attention to the torsional moment and the smoothness of the heat sink.
3. Semiconductor device is sensitive to the ESD, it is necessary to protect the device from being damaged by the ESD when using it.
4. Shanghai Belling reserves the right to make changes in this specification sheet and is subject to change without prior notice.

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