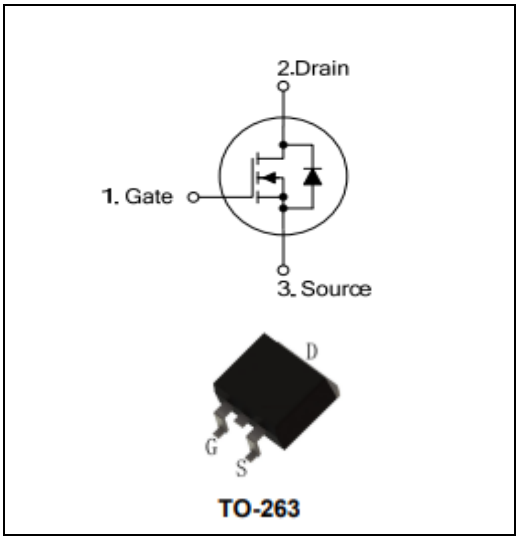
## 1. Description

BLQ3N120, 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 |
|---|---|---|
| $V_{DS}$ | 1200 | V |
| $I_D$ | 3 | A |
| $R_{DS(ON).Typ}$ | 5 | Ω |

### FEATURES

- Fast Switching
- Low Crss
- 100% avalanche tested
- Improved dv/dt capability
- RoHS product
- AEC-Q101 qualified

### APPLICATIONS

- High frequency switching mode power supply

### ORDERING INFORMATION

| Ordering Codes | Product Code | Package | Device Marking | Packing |
|---|---|---|---|---|
| BLQ3N120-B | BLQ3N120 | TO-263 | Q3N120 | Reel |

BLQ3N120-B

(2) Package type

(1) Chip name

(1)BLQ3N120:1200V 3A
(2) B:TO-263

XXXX
YYWW ZZ
SSSSS

XXXX：Device Marking

YYWW：Year&Week

ZZ：Assembly Code

SSSSS：Lot Code



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## 2. ABSOLUTE RATINGS

at $T_C$ = 25°C, unless otherwise specified

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $V_{DSS}$ | Drain-to-Source Voltage | 1200 | V |
| $I_D$ | Continuous Drain Current | 3 | A |
| | Continuous Drain Current $T_C$ = 100 °C | 1.8 | A |
| $I_{DM}$ | Pulsed Drain Current(Note1) | 12 | A |
| $V_{GS}$ | Gate-to-Source Voltage | ±30 | V |
| $E_{AS}$ | Single Pulse Avalanche Energy(Note2) | 45 | mJ |
| dv/dt | Peak Diode Recovery dv/dt(Note3) | 5.0 | V/ns |
| $P_D$ | Power Dissipation | 125 | W |
| | Derating Factor above 25°C | 1 | 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

| Symbol | Parameter | RATINGS | Units |
|---|---|---|---|
| $R_{\theta JC}$ | Junction-to-Case | 1 | ℃/W |
| $R_{\theta JA}$ | Junction-to-Ambient | 62.5 | ℃/W |


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## 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 | 1200 | -- | -- | V |
| $\Delta BV_{DSS}/\Delta T_J$ | Bvdss Temperature Coefficient | ID=250uA, Reference25℃ | -- | 1.1 | -- | V/℃ |
| $I_{DSS}$ | Drain to Source Leakage Current | $V_{DS}$ =1200V, $V_{GS}$= 0V, Tj = 25℃ | -- | -- | 10 | μA |
| | | $V_{DS}$ =960V, $V_{GS}$= 0V, Tj = 125℃ | -- | -- | 100 | 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=1.5A(Note4) | -- | 5.0 | 6.0 | Ω |
| $V_{GS(TH)}$ | Gate Threshold Voltage | VDS = VGS, ID = 250μA(Note4) | 3.0 | -- | 5.0 | V |

| Dynamic Characteristics | | | | | | |
|---|---|---|---|---|---|---|
| Symbol | Parameter | Test Conditions | Values | | | Units |
| | | | Min. | Typ. | Max. | |
| $R_g$ | Gate resistance | f = 1.0MHz | -- | 2.7 | -- | Ω |
| $C_{iss}$ | Input Capacitance | VGS = 0V VDS = 25V f = 1.0MHz | -- | 951 | -- | PF |
| $C_{oss}$ | Output Capacitance | | -- | 73 | -- | |
| $C_{rss}$ | Reverse Transfer Capacitance | | -- | 4 | -- | |


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| Switching Characteristics | | | | | | |
|---|---|---|---|---|---|---|
| Symbol | Parameter | Test Conditions | Values | | | Units |
| | | | Min. | Typ. | Max. | |
| $t_{d(ON)}$ | Turn-on Delay Time | ID =3A<br>VDD =600V<br>VGS = 10V<br>RG =10Ω | -- | 28 | -- | ns |
| tr | Rise Time | | -- | 75 | -- | |
| $t_{d(OFF)}$ | Turn-Off Delay Time | | -- | 20 | -- | |
| $t_f$ | Fall Time | | -- | 23 | -- | |
| $Q_g$ | Total Gate Charge | ID =3A<br>VDD =960V<br>VGS = 10V | -- | 27 | -- | nC |
| $Q_{gs}$ | Gate to Source Charge | | -- | 8 | -- | |
| $Q_{gd}$ | Gate to Drain (“Miller”)Charge | | -- | 12 | -- | |

| Source-Drain Diode Characteristics | | | | | | |
|---|---|---|---|---|---|---|
| Symbol | Parameter | Test Conditions | Values | | | Units |
| | | | Min. | Typ. | Max. | |
| $I_S$ | Continuous Source Current (Body Diode) | TC=25 °C | -- | -- | 3 | A |
| $I_{SM}$ | Maximum Pulsed Current (Body Diode) | | -- | -- | 12 | A |
| $V_{SD}$ | Diode Forward Voltage | IS=3A, VGS=0V(Note4) | -- | -- | 1.2 | V |
| $T_{rr}$ | Reverse Recovery Time | IS=3A, Tj = 25°C dIF/dt=100A/us, VGS=0V | -- | 500 | -- | ns |
| $Q_{rr}$ | Reverse Recovery Charge | | -- | 2300 | -- | nC |

Note1: Pulse width limited by maximum junction temperature

Note2: L=10mH, VDs=100V, Start TJ=25℃

Note3: ISD =3A,di/dt ≤100A/us,VDD≤BVDS, Start TJ=25℃

Note4: Pulse width tp≤300μs, δ≤2%


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## 5. Characteristics Curves

**Figure 1 Safe Operating Area**

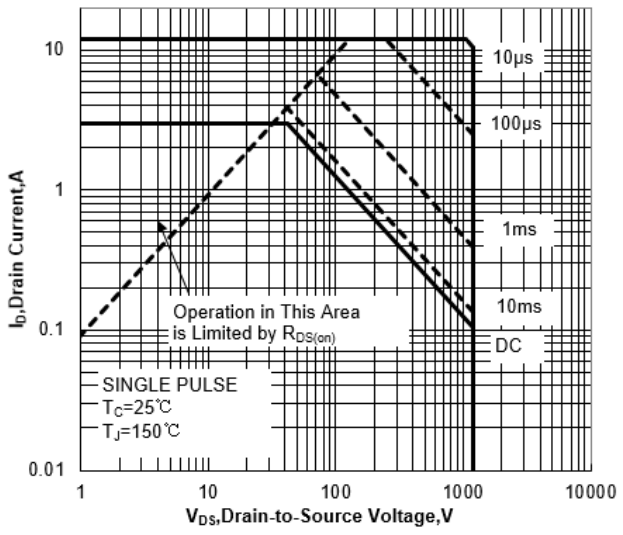



**Figure 2 Power Dissipation**

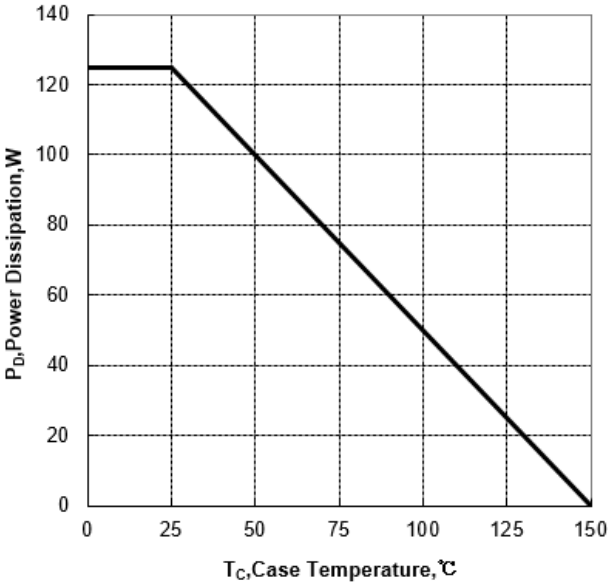
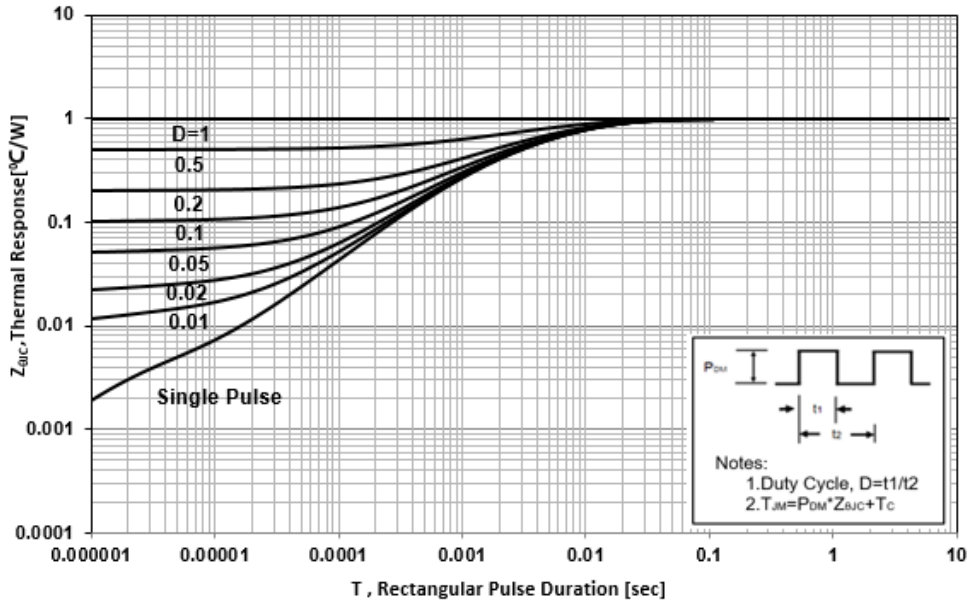



**Figure 3 Max Thermal Impendance**





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**Figure 4 Typical Output Characteristics**

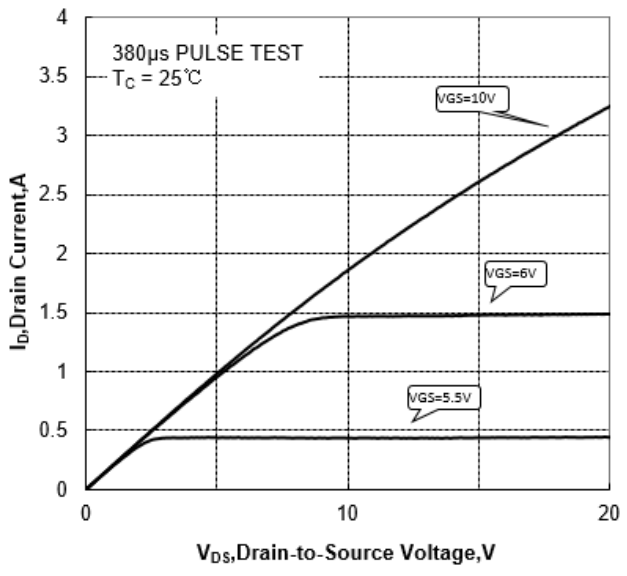



**Figure 5 Typical Transfer Characteristics**

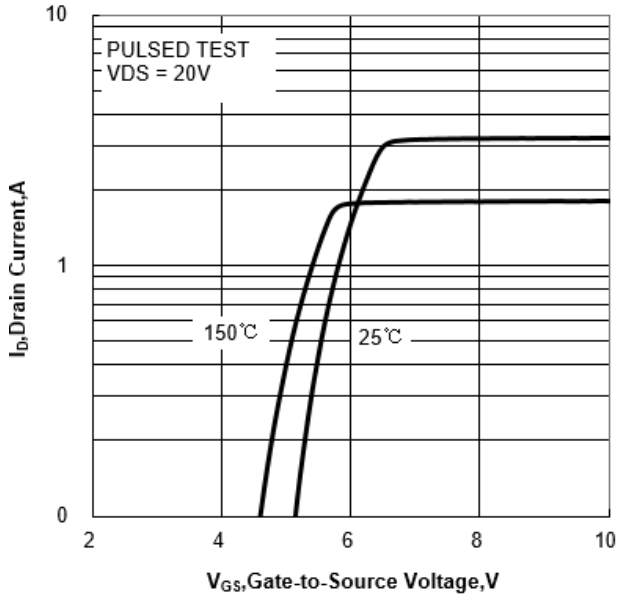



**Figure 6 Typical Drain to Source ON Resistance vs Drain Current**

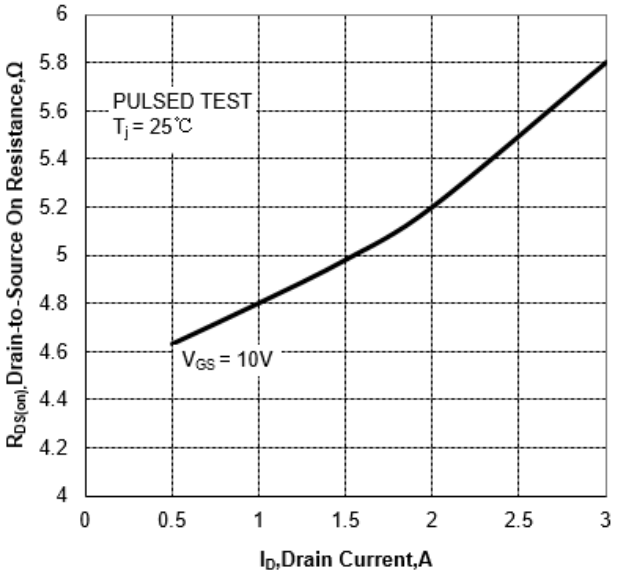
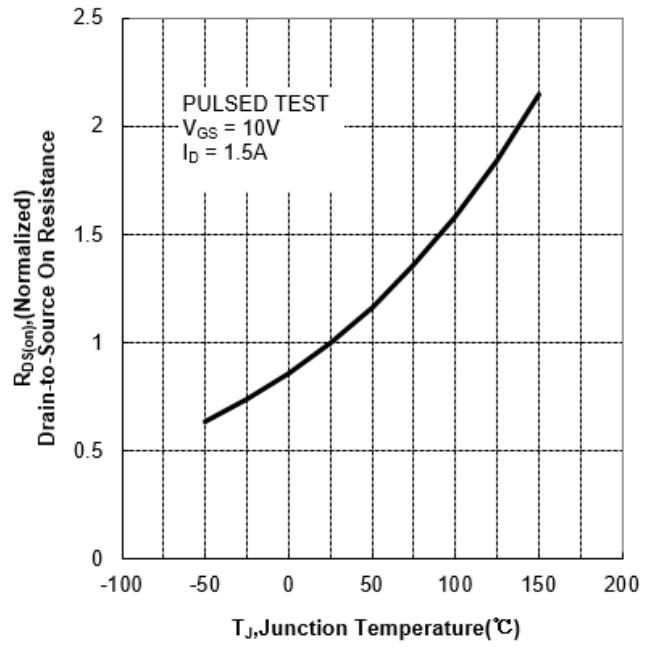



**Figure 7 Typical Drian to Source on Resistance vs Junction Temperature**






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**Figure 8 Typical Theshold Voltage vs Junction Temperature**

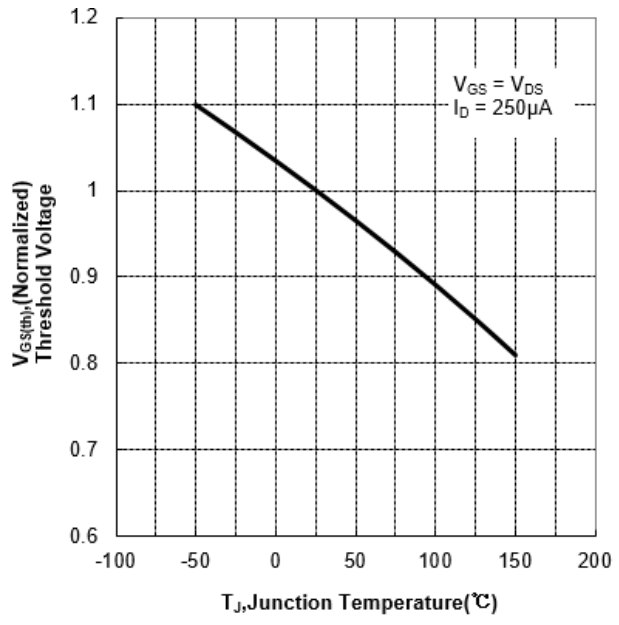



**Figure 9 Typical Breakdown Voltage vs Junction Temperature**

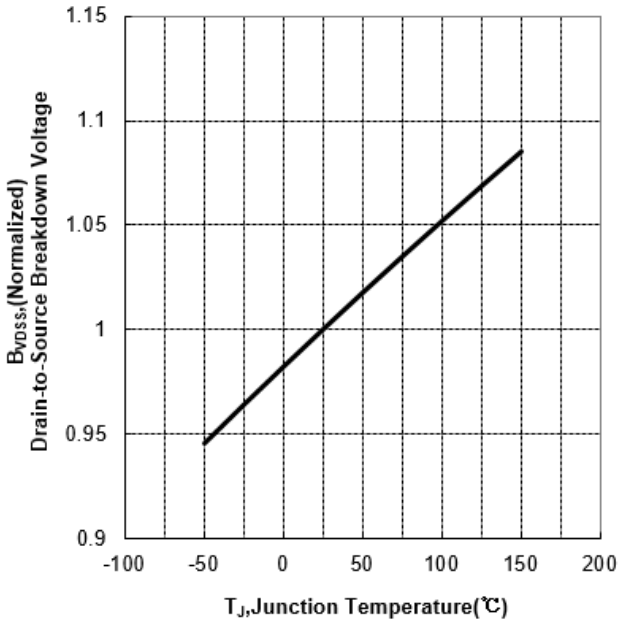



**Figure 10 Typical Capacitance vs Drain to Source Voltage**

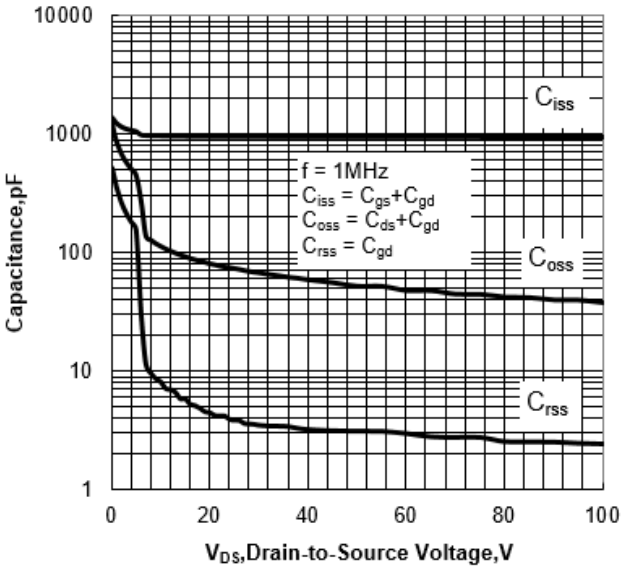
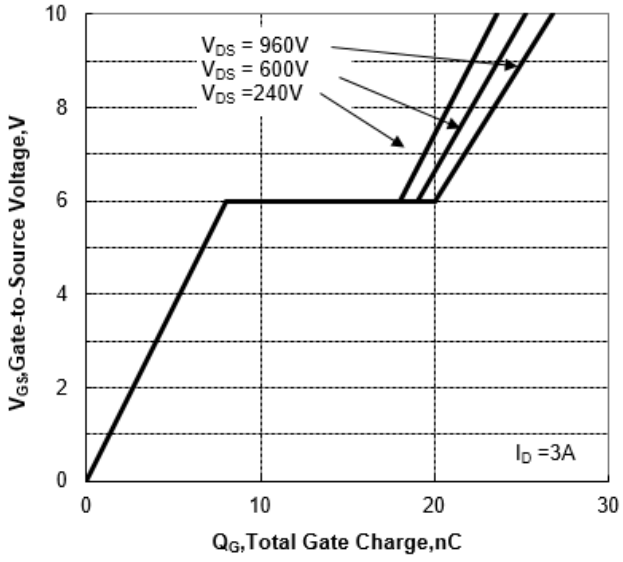


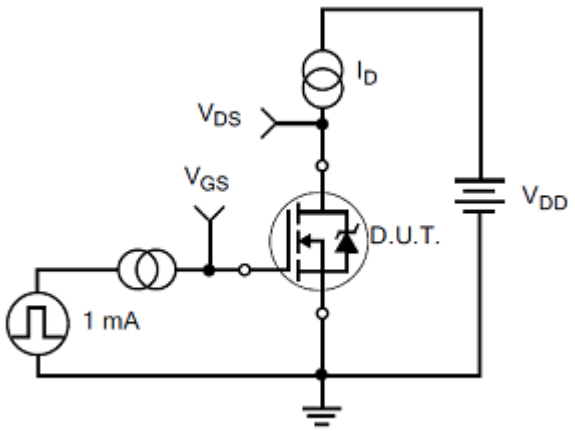
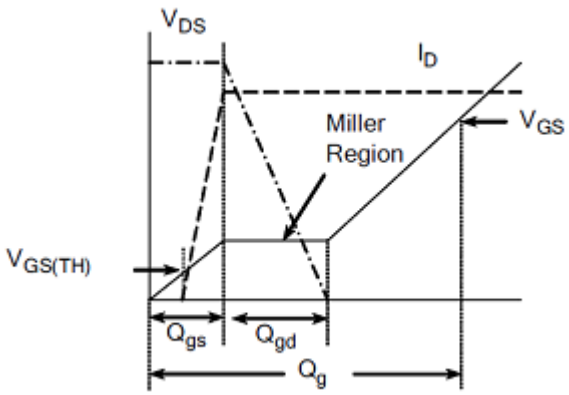

**Figure 11 Typical Gate Charge vs Gate to Source Voltage**

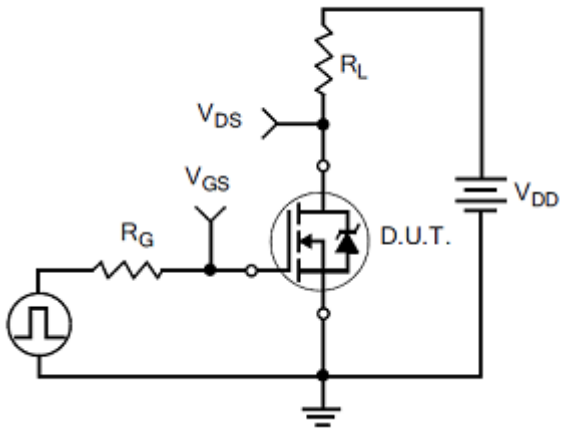
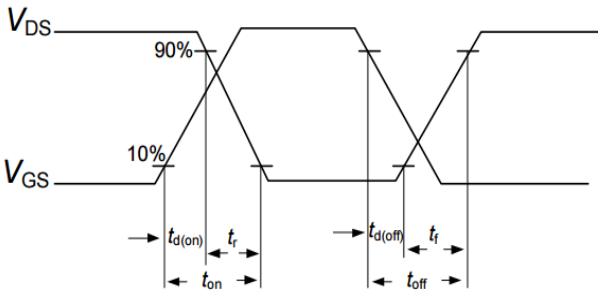




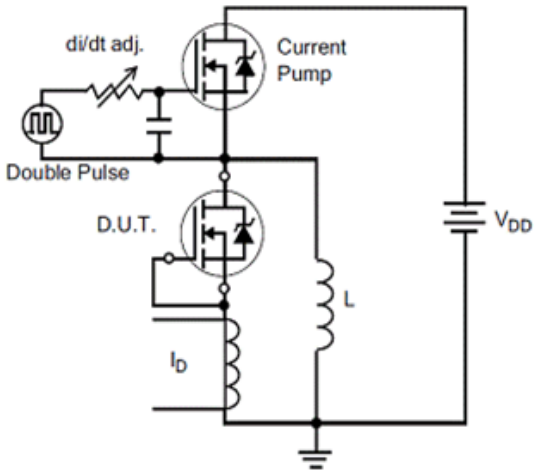
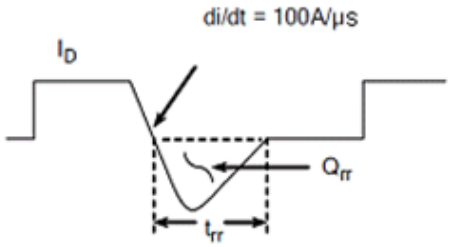
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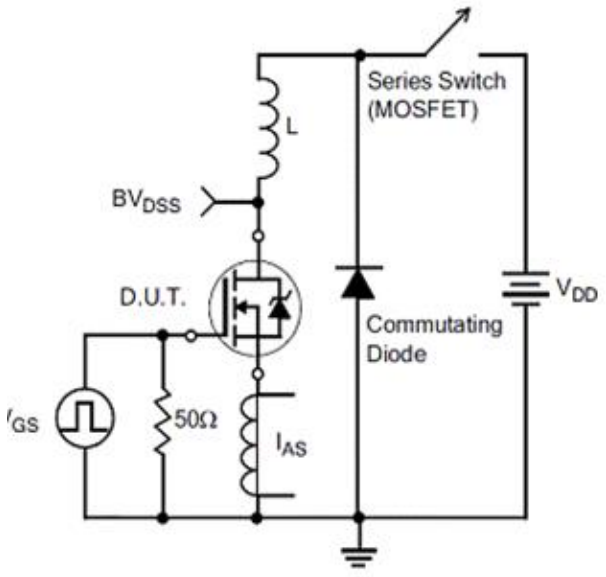
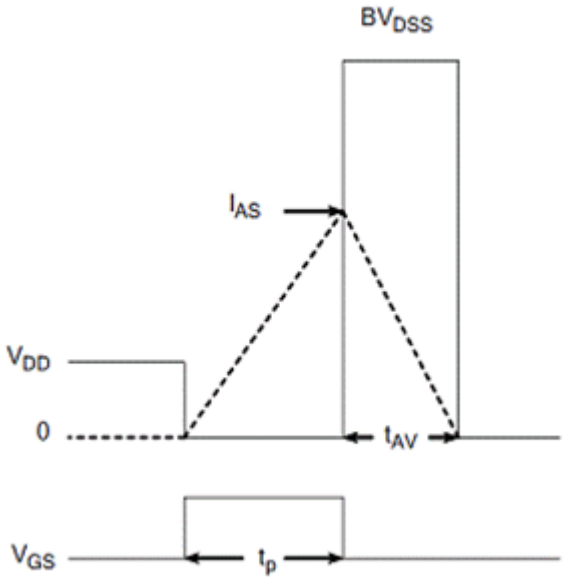
## 6. Test Circuit and Waveform

| Gate Charge Test Circuit | Gate Charge Waveforms |
|---|---|
|  |  |

| Resistive Switching Test Circuit | Resistive Switching Waveforms |
|---|---|
|  |  |


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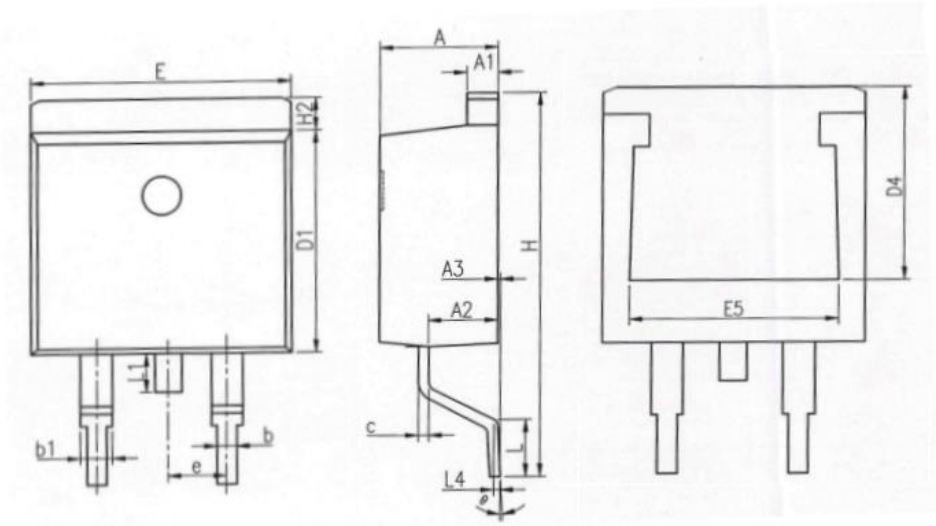
| Diode Reverse Recovery Test Circuit | Diode Reverse Recovery Waveform |
|---|---|
|  |  |

| Unclamped Inductive Switching Test Circuit | Unclamped Inductive Switching Waveform |
|---|---|
|  |  |



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## 7. Package Description




| Items | Values(mm) | |
|---|---|---|
| | MIN | MAX |
| A | 4.37 | 4.77 |
| A1 | 1.22 | 1.42 |
| A2 | 2.49 | 2.89 |
| A3 | 0.00 | 0.25 |
| b | 0.70 | 0.96 |
| b1 | 1.17 | 1.47 |
| c | 0.30 | 0.53 |
| D1 | 8.5 | 8.9 |
| D4 | 6.60 | |
| E | 9.86 | 10.36 |
| E5 | 7.06 | |
| e | 2.54BCS | |
| H | 14.7 | 15.5 |
| H2 | 1.07 | 1.47 |
| L | 2.00 | 2.60 |
| L1 | 1.40 | 1.70 |
| L4 | 0.25BCS | |
| θ | 0° | 9° |

TO-263 Package


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## Revision History:

BLQ3N120 Revision: 2023-02-24, Rev. 1.0

Previous Revision

| Revision | Date | Revision Date Subjects (major changes since last revision) |
|---|---|---|
| 1.0 | 2023-02-24 | - |

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**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.

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