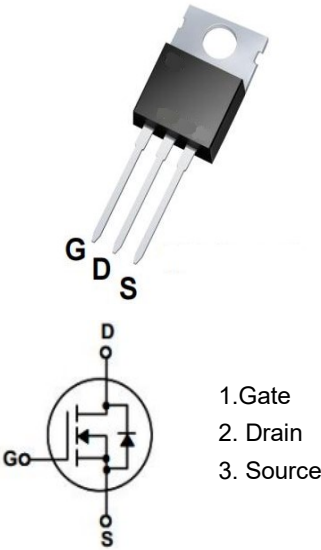




1.Features

- $R_{DS(ON)} \leq 10.5\Omega$  @  $V_{GS}=10V$   $I_D=20A$
- Excellent  $R_{DS(ON)}$  and Low Gate Charge
- Advanced SGT process
- Lead free product is acquired

TO-220



2.Mechanical Data

- Case:Molded Plastic,TO-220;
- Epoxy:UL 94V-0 rate flame retardant
- Terminals:Plated Leads Solderable per MIL-STD-750,Method-2026.
- Marking: marked on body.
- Mounting Position : Any.

3.Maximum Ratings and Electrical Characteristics

Rating at 25°C Cambient temperature unless otherwise specified

| Characteristics                        |                    | Symbol          | Ratings     | Unit          |
|----------------------------------------|--------------------|-----------------|-------------|---------------|
| Drain-Source Voltage                   |                    | $V_{DS}$        | 100         | V             |
| Drain Current Continuous               | $T_C=25^{\circ}C$  | $I_D$           | 65          | A             |
|                                        | $T_C=100^{\circ}C$ |                 | 45          |               |
| Drain Current Pulsed(Note 1)           |                    | $I_{DM}$        | 260         | A             |
| Gate-Source Voltage                    |                    | $V_{GS}$        | $\pm 20$    | V             |
| Power Dissipation( $T_C=25^{\circ}C$ ) |                    | $P_D$           | 100         | W             |
| Maximum Junction Temperature           |                    | $T_J$           | 150         | $^{\circ}C$   |
| Storage Temperature Range              |                    | $T_{stg}$       | -55 to +150 | $^{\circ}C$   |
| Thermal Resistance, Junction-to-Case   |                    | $R_{\theta JC}$ | 1.25        | $^{\circ}C/W$ |



| Characteristics                           | Symbol               | Test conditions                                                                           | Min | TYP  | Max  | Unit |
|-------------------------------------------|----------------------|-------------------------------------------------------------------------------------------|-----|------|------|------|
| <b>Off Characteristics</b>                |                      |                                                                                           |     |      |      |      |
| Drain -Source Breakdown Voltage           | BV <sub>DSS</sub>    | V <sub>GS</sub> = 0V,I <sub>D</sub> =250μA                                                | 100 | -    | -    | V    |
| Zero Gate Voltage Drain Current           | I <sub>DSS</sub>     | V <sub>DS</sub> = 100V,V <sub>GS</sub> = 0V                                               | -   | -    | 1    | uA   |
| Gate-Source Leakage Current               | I <sub>GSS</sub>     | V <sub>GS</sub> = 20V                                                                     | -   | -    | 100  | nA   |
| Gate-Source Leakage Current               |                      | V <sub>GS</sub> = -20V                                                                    | -   | -    | -100 | nA   |
| <b>On Characteristics</b>                 |                      |                                                                                           |     |      |      |      |
| Gate Threshold Voltage                    | V <sub>GS (th)</sub> | V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> =250μA                                 | 1.2 | 1.8  | 2.6  | V    |
| Drain-Source On-State Resistance          | R <sub>DS(on)</sub>  | V <sub>GS</sub> =10V, I <sub>D</sub> =20A                                                 | -   | 8.8  | 10.5 | mΩ   |
|                                           |                      | V <sub>GS</sub> =4.5V, I <sub>D</sub> =10A                                                | -   | 11   | 14.5 | mΩ   |
| <b>Dynamic Characteristics</b>            |                      |                                                                                           |     |      |      |      |
| Input Capacitance                         | C <sub>iss</sub>     | V <sub>DS</sub> =50V<br>V <sub>GS</sub> =0V<br>f=1.0MHZ                                   | -   | 2155 | -    | pF   |
| Output Capacitance                        | C <sub>oss</sub>     |                                                                                           | -   | 288  | -    |      |
| Reverse Transfer Capacitance              | C <sub>rss</sub>     |                                                                                           | -   | 20   | -    |      |
| <b>Switching Characteristics</b>          |                      |                                                                                           |     |      |      |      |
| Turn-on Delay Time                        | t <sub>d(on)</sub>   | V <sub>DD</sub> =50V, V <sub>GS</sub> =10V<br>R <sub>G</sub> =1.6Ω; I <sub>D</sub> =32.5A | -   | 13   | -    | ns   |
| Turn-on Rise Time                         | t <sub>r</sub>       |                                                                                           | -   | 10   | -    |      |
| Turn-off Delay Time                       | t <sub>d(off)</sub>  |                                                                                           | -   | 31   | -    |      |
| Turn-off Fall Time                        | t <sub>f</sub>       |                                                                                           | -   | 8    | -    |      |
| Total Gate Charge                         | Q <sub>g</sub>       | V <sub>DS</sub> =50V, V <sub>GS</sub> =10A<br>I <sub>D</sub> =32.5A                       | -   | 50   | -    | nC   |
| Gate-Source Charge                        | Q <sub>gs</sub>      |                                                                                           | -   | 15   | -    |      |
| Gate-Drain Charge                         | Q <sub>gd</sub>      |                                                                                           | -   | 17   | -    |      |
| <b>Drain-Source Diode Characteristics</b> |                      |                                                                                           |     |      |      |      |
| Diode Forward Voltage                     | V <sub>SD</sub>      | I <sub>S</sub> =32.5A,V <sub>GS</sub> =0V                                                 | -   | -    | 1.2  | V    |
| Continuous Source Current                 | I <sub>S</sub>       |                                                                                           | -   | -    | 65   | A    |
| Pulsed Source Current                     | I <sub>SM</sub>      |                                                                                           | -   | -    | 260  | A    |

### Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. Essentially independent of operating temperature



### 4. Rating And Characteristic Curves

Fig.1 Output Characteristics

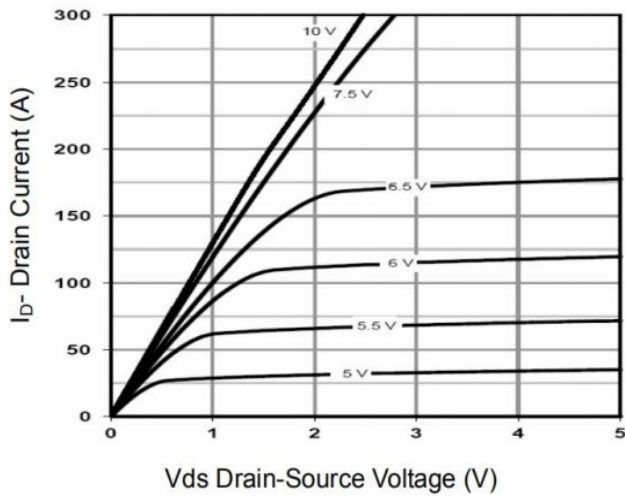


Fig.2 Transfer Characteristics

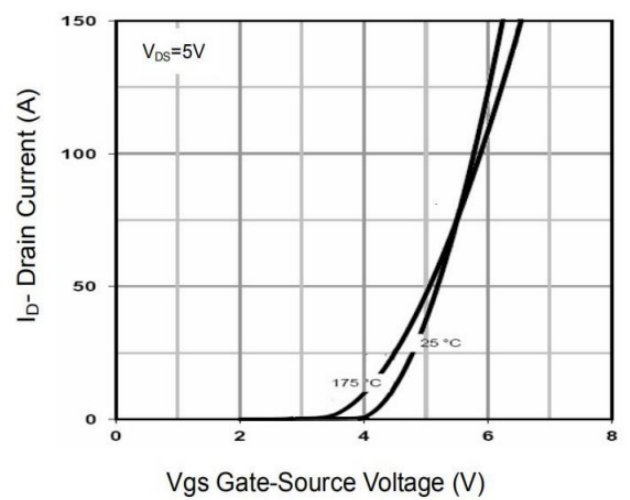


Fig.3 On-Resistance versus Drain Current

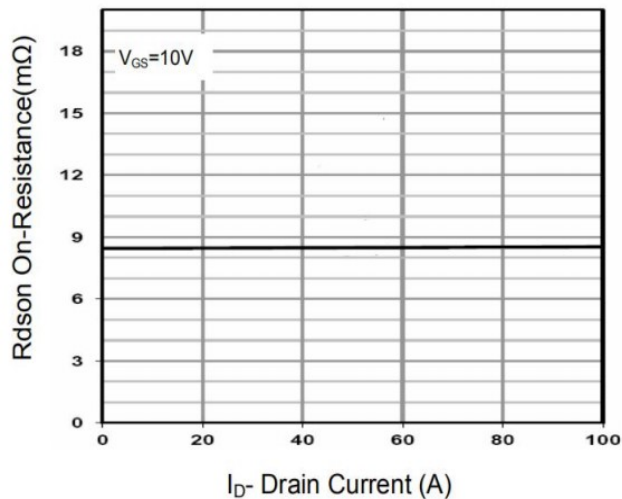


Fig.4  $R_{DSon}$ -Junction Temperature

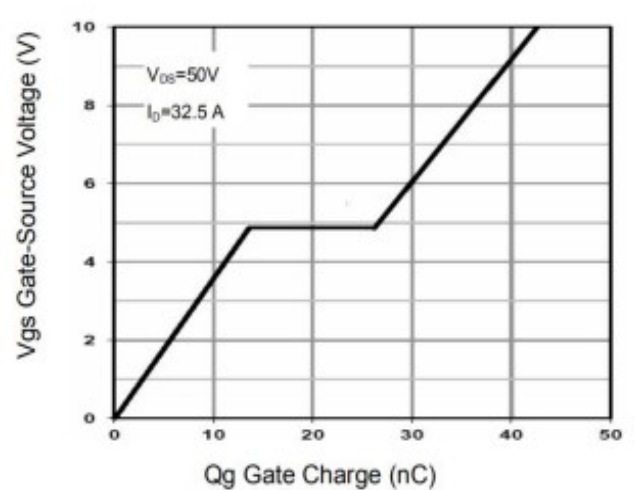


Fig.5 Gate Charge

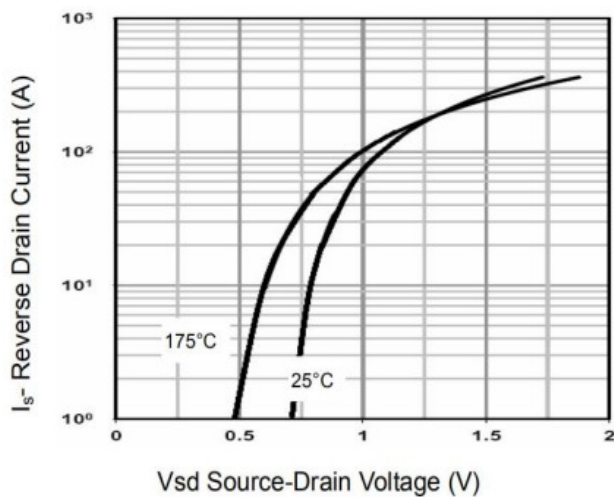


Fig.6 Source- Drain Diode Forward

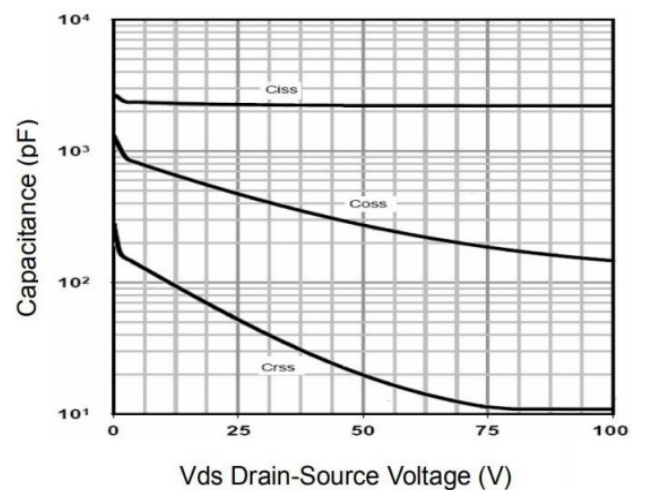




Fig.7 Capacitance vs  $V_{DS}$

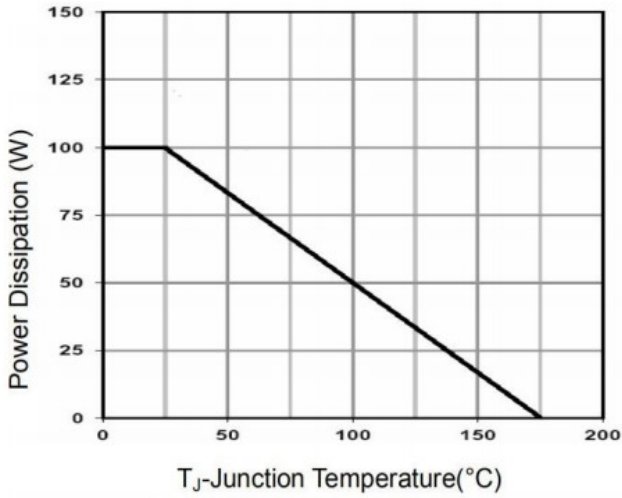


Fig.8 Safe Operation Area

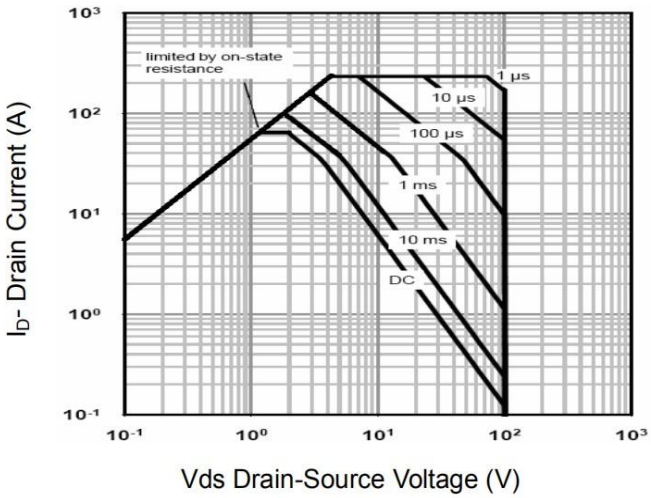


Fig.9 Maximum Safe Operating Area

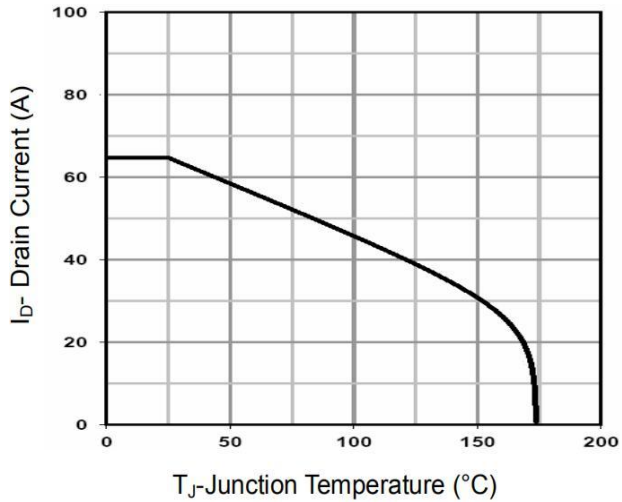
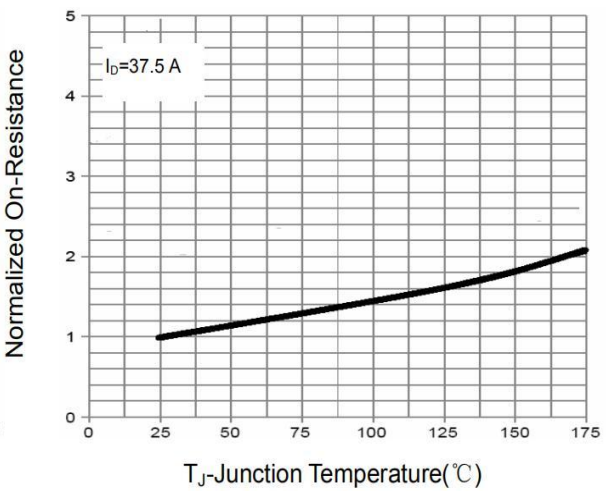


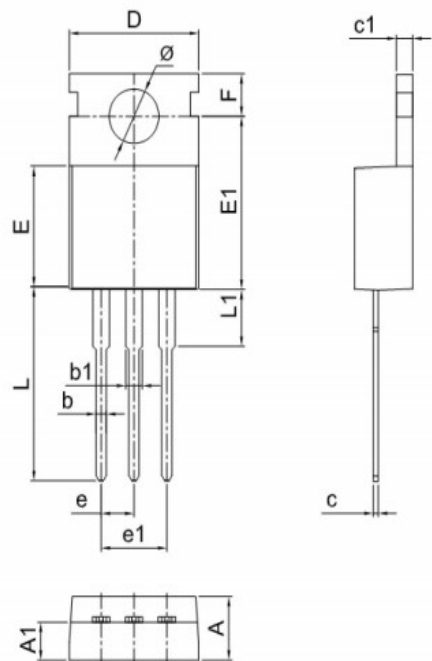
Fig 10  $R_{DS(on)}$ -Junction Temperature





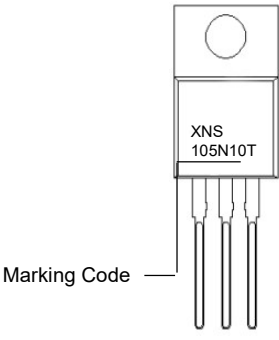
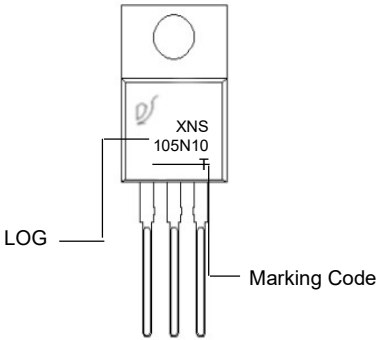
5.Dimensions

TO-220 Mechanical Drawing



| Dimensions | Inches |       | Millimeters |       |
|------------|--------|-------|-------------|-------|
|            | Min    | Max   | Min         | Max   |
| A          | 0.169  | 0.181 | 4.30        | 4.60  |
| A1         | 0.098  | 0.110 | 2.50        | 2.80  |
| b          | 0.028  | 0.035 | 0.70        | 0.90  |
| b1         | 0.047  | 0.059 | 1.20        | 1.50  |
| c          | 0.012  | 0.024 | 0.30        | 0.60  |
| c1         | 0.045  | 0.055 | 1.15        | 1.40  |
| D          | 0.390  | 0.402 | 9.90        | 10.20 |
| E          | 0.335  | 0.354 | 8.50        | 9.00  |
| E1         | 0.472  | 0.492 | 12.00       | 12.50 |
| e          | 0.094  | 0.104 | 2.40        | 2.65  |
| e1         | 0.191  | 0.209 | 4.85        | 5.30  |
| F          | 0.102  | 0.110 | 2.60        | 2.80  |
| L          | 0.520  | 0.543 | 13.20       | 13.80 |
| L1         | 0.150  | 0.165 | 3.80        | 4.20  |
| Ø          | 0.142  | 0.157 | 3.60        | 4.00  |

6. Part Marking System

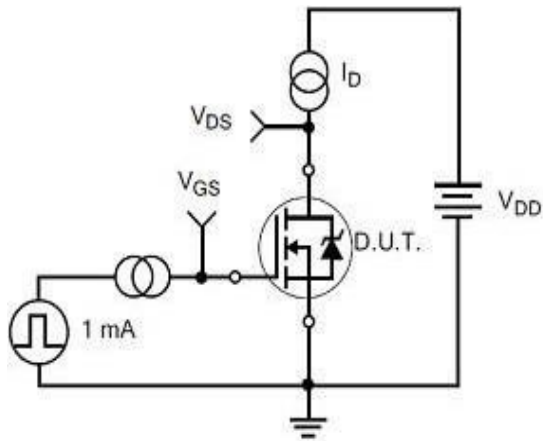


7. Package Information

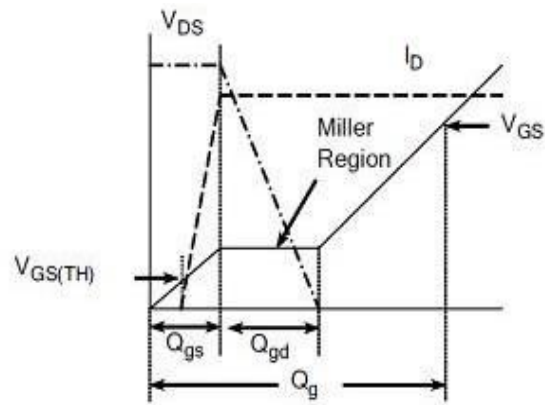
| Package | Packing Type | Quantity(pcs) |
|---------|--------------|---------------|
| TO-220  | Tube         | 50            |



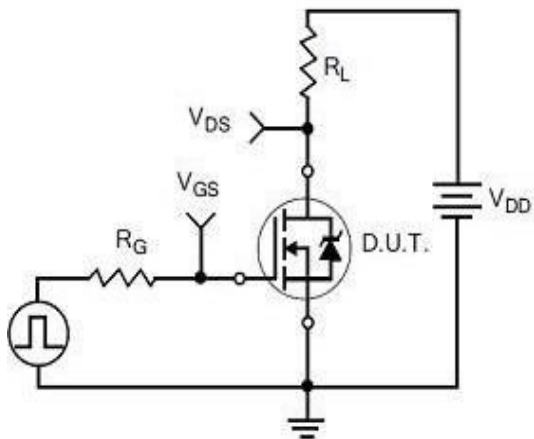
### 8. Test circuits



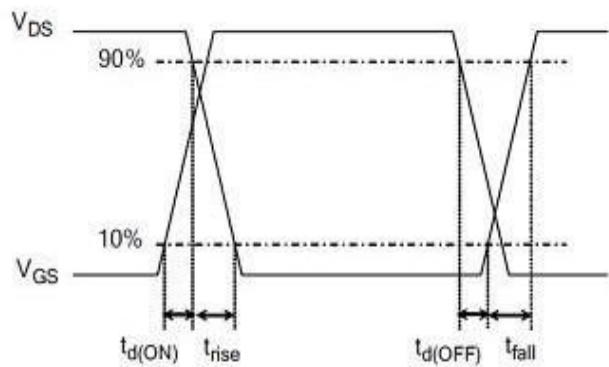
Gate Charge Test Circuit



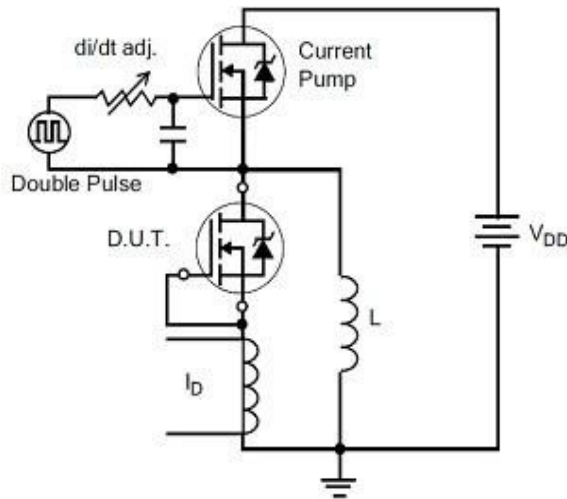
Gate Charge Waveform



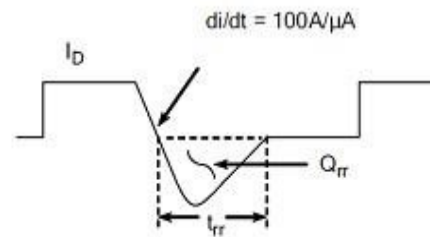
Resistive Switching Test Circuit



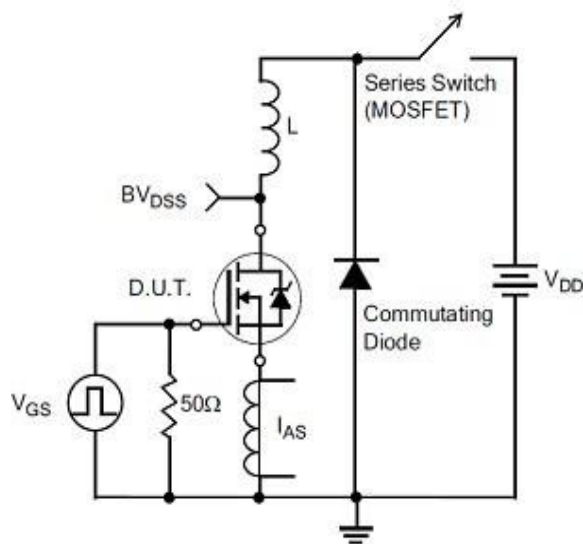
Resistive Switching Waveforms



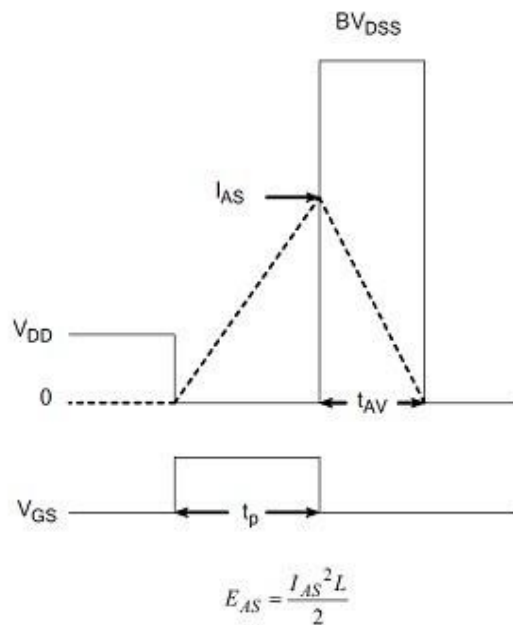
Diode Reverse Recovery Test Circuit



Diode Reverse Recovery Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms



### Important Notice and Disclaimer

- Reproducing and modifying information of the document is prohibited without from XINNUO.
- XINNUO reserves the right to make changes to this document and its products and specifications.
- XINNUO disclaims any and all liability arising out of the application or use of any product including damages incidentally and consequentially occurred.
- XINNUO does not assume any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.
- Applications shown on the here in document are examples of standard use and operation. Customers are responsible in comprehending the suitable use in particular applications. XINNUO makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.
- The products shown her are not designed and authorized for equipments requiring high level of reliability or relating to human life and for any applications concerning life-saving or life-sustaining, such as medical instruments, transportation equipment, aerospace machinery et cetera. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify XINNUO for any damages resulting from such improper use or sale.
- Since XINNUO uses lot number as the tracking base, please provide the lot number for tracking when complaining.