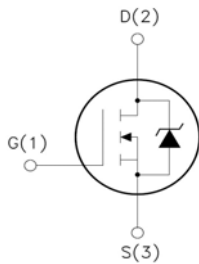


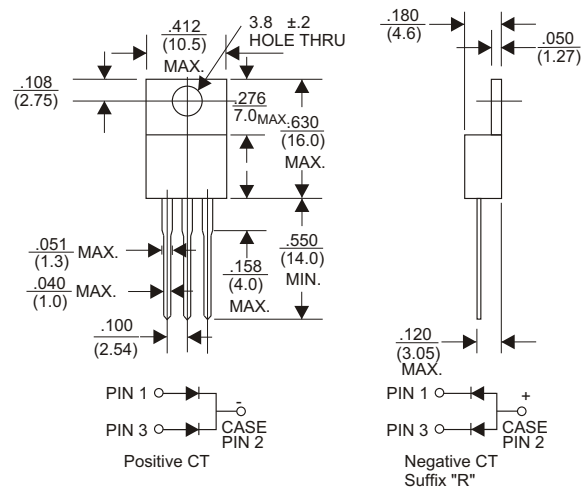
### Features:

- Low Intrinsic Capacitances.
- Excellent Switching Characteristics.
- Extended Safe Operating Area.
- Unrivalled Gate Charge : $Q_g=35\text{nC}$  (Typ.).
- $BVDSS=650\text{ V}, I_D=10\text{ A}$
- $r_{DS(on)} : 0.95\Omega$  (Max) @ $V_G=10\text{ V}$
- 100% Avalanche Tested



- 1.Gate (G)
- 2.Drain (D)
- 3.Source (S)

### TO-220AB



Dimensions in inches and (millimeters)

### Absolute Maximum Ratings ( $T_a=25^\circ\text{C}$ unless otherwise noted)

| Symbol    | Parameter  | Value                   | Unit             |
|-----------|--|-------------------------|------------------|
| $V_{DSS}$ | Drain-Source Voltage   | 650                     | V                |
| $I_D$     | Drain Current  | $T_j=25^\circ\text{C}$  | 10               |
|           |  | $T_j=100^\circ\text{C}$ | 6.7              |
| $V_{GSS}$ | Gate-source Voltage  | $\pm 30$                | V                |
| $E_{AS}$  | Single Pulse Avalanche Energy (note1)  | 380                     | mJ               |
| $I_{AR}$  | Avalanche Current (note2)  | 10                      | A                |
| $P_D$     | Power Dissipation ( $T_j=25^\circ\text{C}$ )                                 | 65                      | W                |
| $T_j$     | Junction Temperature(Max)  | 150                     | $^\circ\text{C}$ |
| $T_{stg}$ | Storage Temperature  | -55~+150                | $^\circ\text{C}$ |
| $T_L$     | Maximum lead temperature for soldering purpose, 1/8" from case for 5 seconds | 300                     | $^\circ\text{C}$ |

### Thermal Characteristics

| Symbol          | Parameter                               | Typ. | Max. | Unit                      |
|-----------------|---|------|------|---------------------------|
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case    | -    | 2.4  | $^\circ\text{C}/\text{W}$ |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | -    | 62.5 | $^\circ\text{C}/\text{W}$ |

# 10N65

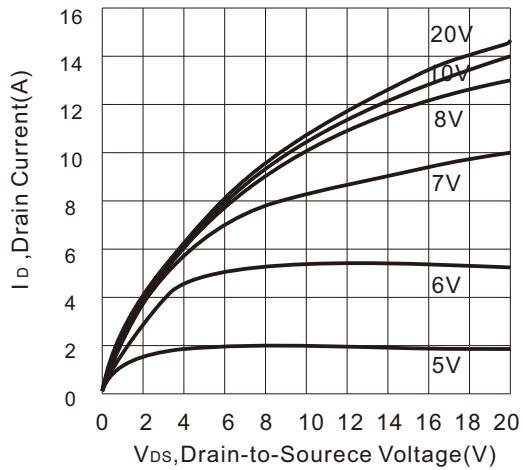
Electrical Characteristics (Ta=25°C unless otherwise noted)

| Symbol   | Parameter                                 | Test Condition                                  | Min. | Typ. | Max. | Unit     |
|--|---|---|------|------|------|----------|
| Off Characteristics                                    |   |   |      |      |      |          |
| $BV_{DSS}$   | Drain-Source Breakdown Voltage            | $I_D=250\mu A, V_{GS}=0$                        | 650  | -    | -    | V        |
| $\Delta BV_{DSS}/\Delta T_J$                           | Breakdown Voltage Temperature Coefficient | $I_D=250\mu A$ , Reference to 25°C              | -    | 0.67 | -    | V/°C     |
| $I_{DSS}$  | Zero Gate Voltage Drain Current           | $V_{DS}=650V, V_{GS}=0V$                        | -    | -    | 10   | $\mu A$  |
|  |   | $V_{DS}=520V, T_J=125^\circ C$                  |      |      | 100  |          |
| $I_{GSSF}$   | Gate-body leakage Current, Forward        | $V_{GS}=+30V, V_{DS}=0V$                        | -    | -    | 100  | nA       |
| $I_{GSSR}$   | Gate-body leakage Current, Reverse        | $V_{GS}=-30V, V_{DS}=0V$                        | -    | -    | -100 |          |
| On Characteristics                                     |   |   |      |      |      |          |
| $V_{GS(TH)}$   | Gate Threshold Voltage                    | $I_D=250\mu A, V_{DS}=V_{GS}$                   | 2    | -    | 4    | V        |
| $R_{DS(ON)}$   | Static Drain-Source On-Resistance         | $I_D=5.0A, V_{GS}=10V$                          | -    | 0.8  | 0.95 | $\Omega$ |
| Dynamic Characteristics                                |   |   |      |      |      |          |
| $C_{iss}$  | Input Capacitance                         | $V_{DS}=25V, V_{GS}=0, f=1.0MHz$                | -    | 1500 | -    | pF       |
| $C_{oss}$  | Output Capacitance                        |   | -    | 194  | -    |          |
| $C_{rss}$  | Reverse Transfer Capacitance              |   | -    | 18   | -    |          |
| Switching Characteristics                              |   |   |      |      |      |          |
| $T_d(on)$  | Turn-On Delay Time                        | $V_{DD}=325V, I_D=10A, R_G=25\Omega$ (Note 3,4) | -    | 23   |      | nS       |
| $T_r$  | Turn-On Rise Time                         |   |      | 15   |      |          |
| $T_d(off)$   | Turn-Off Delay Time                       |   |      | 90   |      |          |
| $T_f$  | Turn-Off Rise Time                        |   |      | 30   |      |          |
| $Q_g$  | Total Gate Charge                         | $V_{DS}=520V, V_{GS}=10V, I_D=10A$ (Note 3,4)   | -    | 35   |      | nC       |
| $Q_{gs}$   | Gate-Source Charge                        |   |      | 7    | -    |          |
| $Q_{gd}$   | Gate-Drain Charge                         |   |      | 18   | -    |          |
| Drain-Source Diode Characteristics and Maximum Ratings |   |   |      |      |      |          |
| $I_S$  | Max. Diode Forward Current                | -   |      | -    | 10   | A        |
| $I_{SM}$   | Max. Pulsed Forward Current               | -   |      | -    | 40   |          |
| $V_{SD}$   | Diode Forward Voltage                     | $I_D=10A$                                       | -    | -    | 1.4  | V        |
| $T_{rr}$   | Reverse Recovery Time                     | $I_S=10A, V_{GS}=0V$<br>$di_F/dt=100A/\mu s$    | -    | 320  | -    | nS       |
| $Q_{rr}$   | Reverse Recovery Charge                   | (Note 3)  | -    | 4.2  | -    | $\mu C$  |

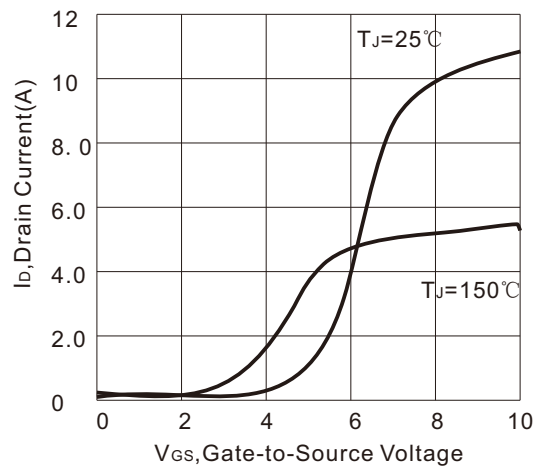
- Notes : 1, L=0.5mH, IAS= 10A, VDD=50V, RG=25 $\Omega$ , Starting T<sub>J</sub> =25°C  
 2, Repetitive Rating : Pulse width limited by maximum junction temperature  
 3, Pulse Test : Pulse Width  $\leq$  300 $\mu s$ , Duty Cycle  $\leq$  2%  
 4, Essentially Independent of Operating Temperature

## RATING AND CHARACTERISTIC CURVES (10N65)

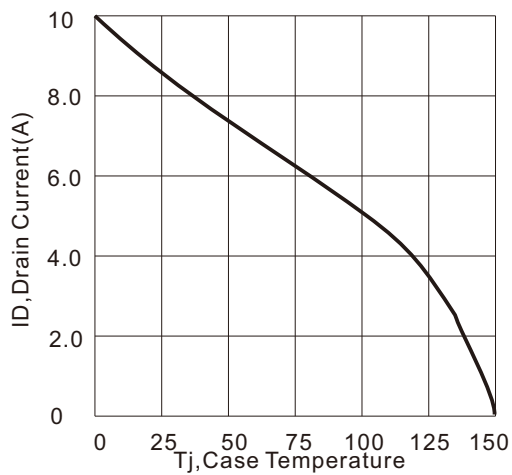
Output Characteristics



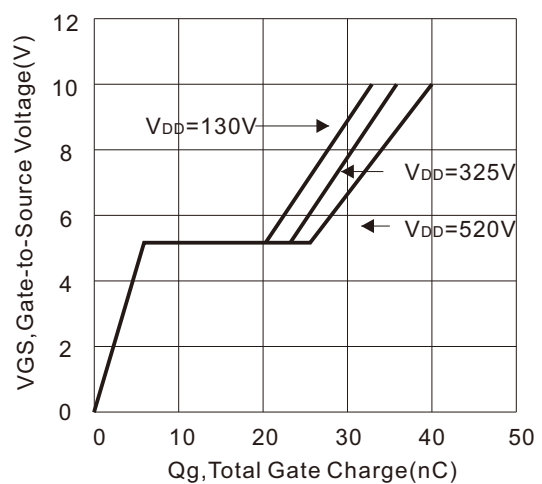
Transfer Characteristics



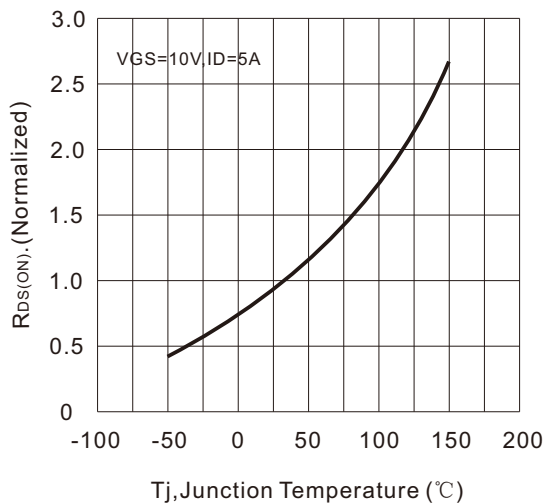
Drain Current VS. Temperature



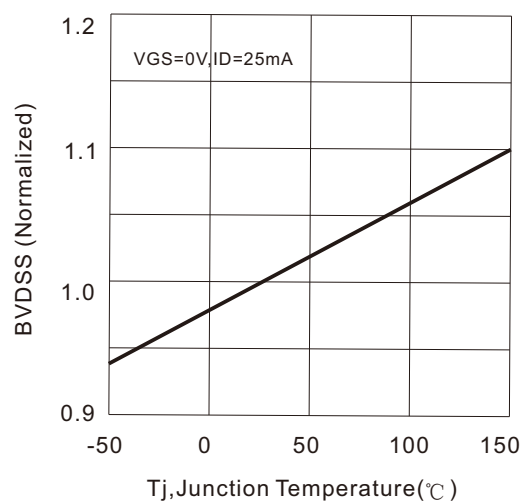
Gate Charge



On-Resistance vs. Junction Temperature

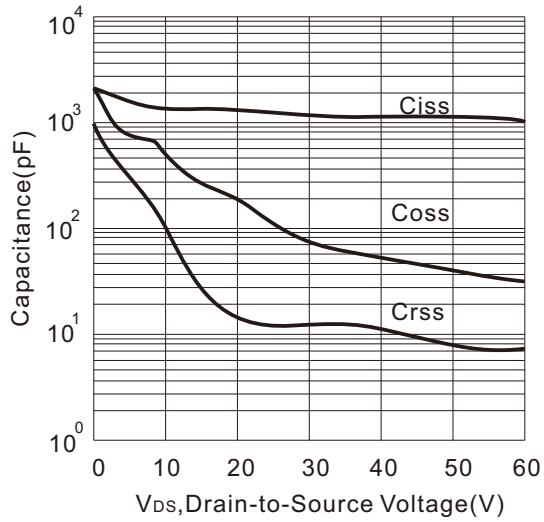


BVDS Variation VS. Temperature

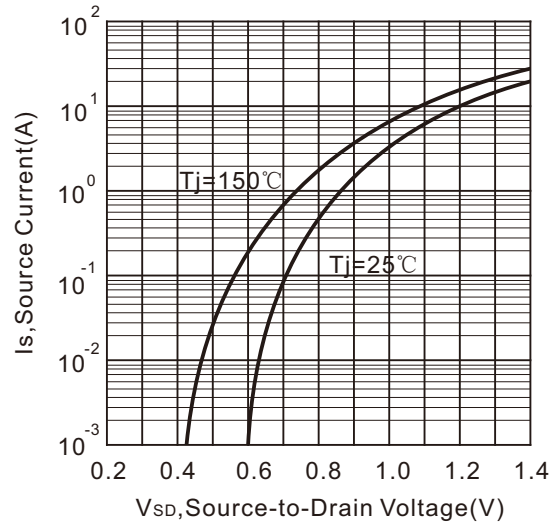


## RATING AND CHARACTERISTIC CURVES (10N65)

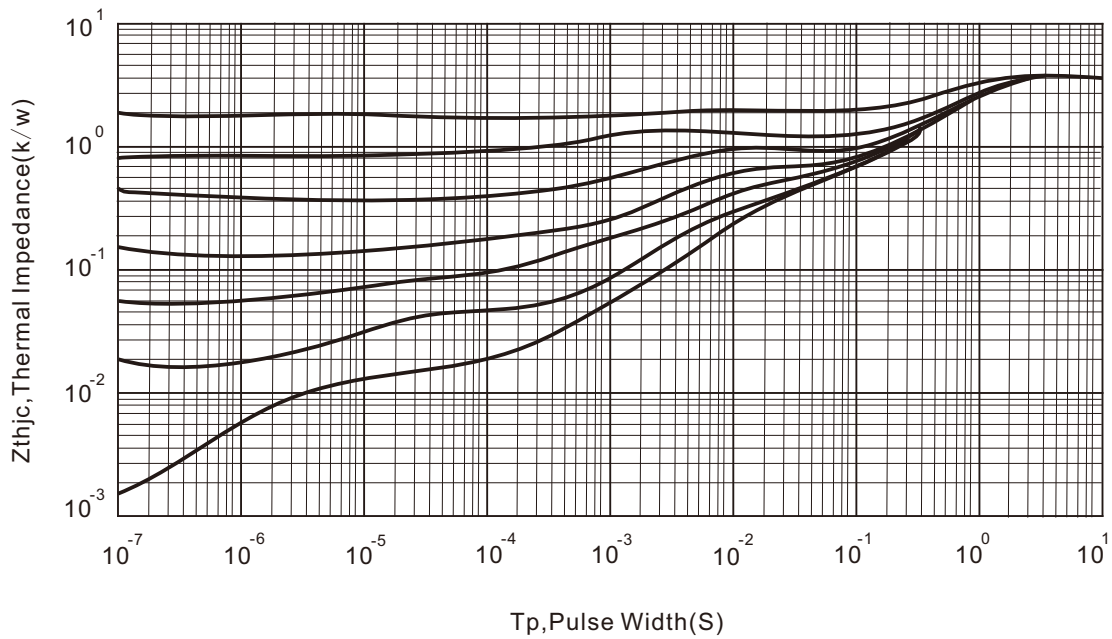
Capacitance



Body Diode Forward Voltage

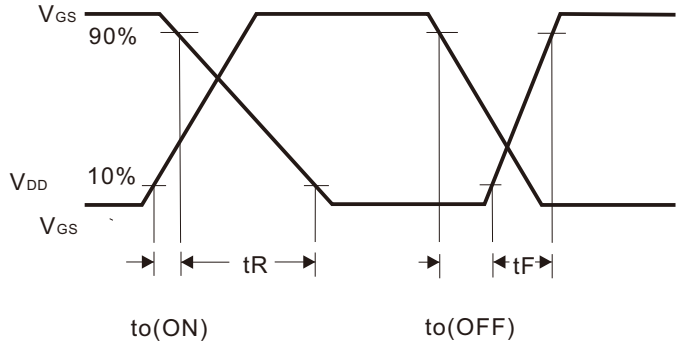
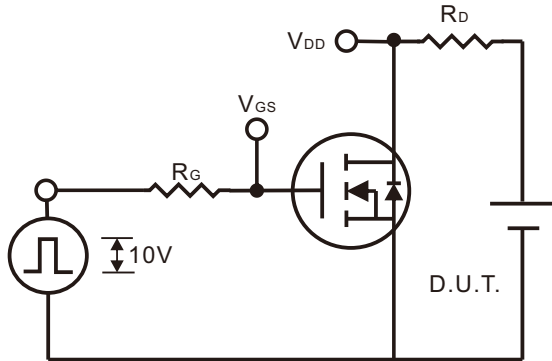


Transient Thermal Impedance

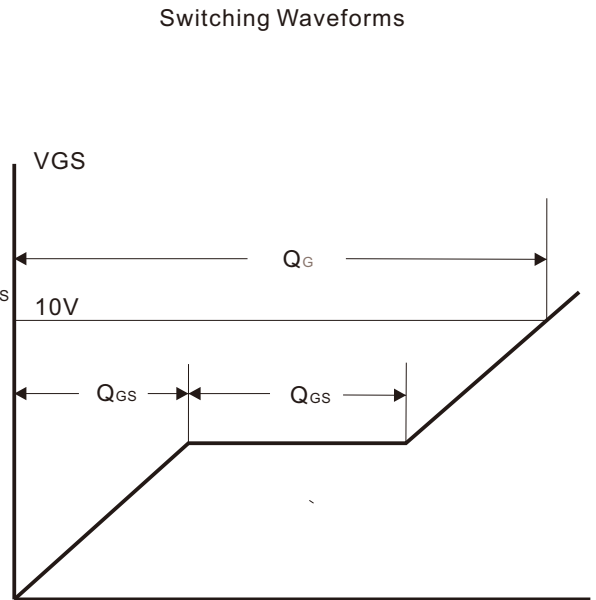
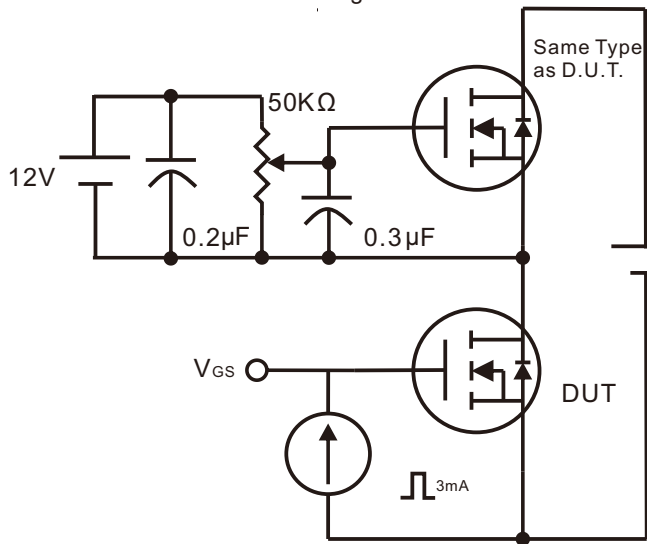




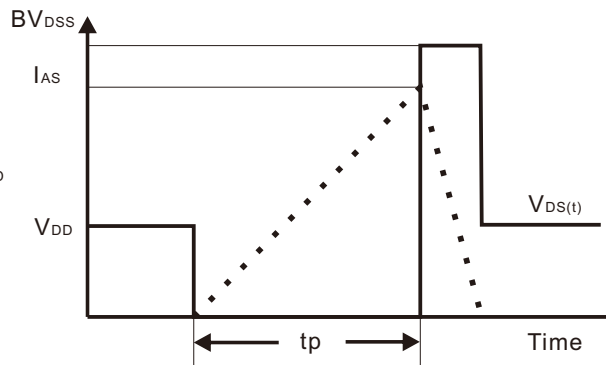
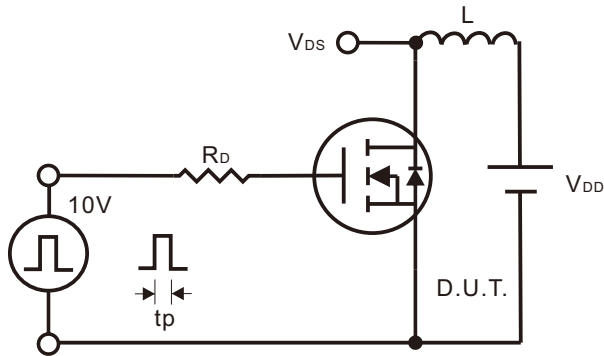
### Gate Charge Test Circuit & Waveform



### Switching Test Circuit



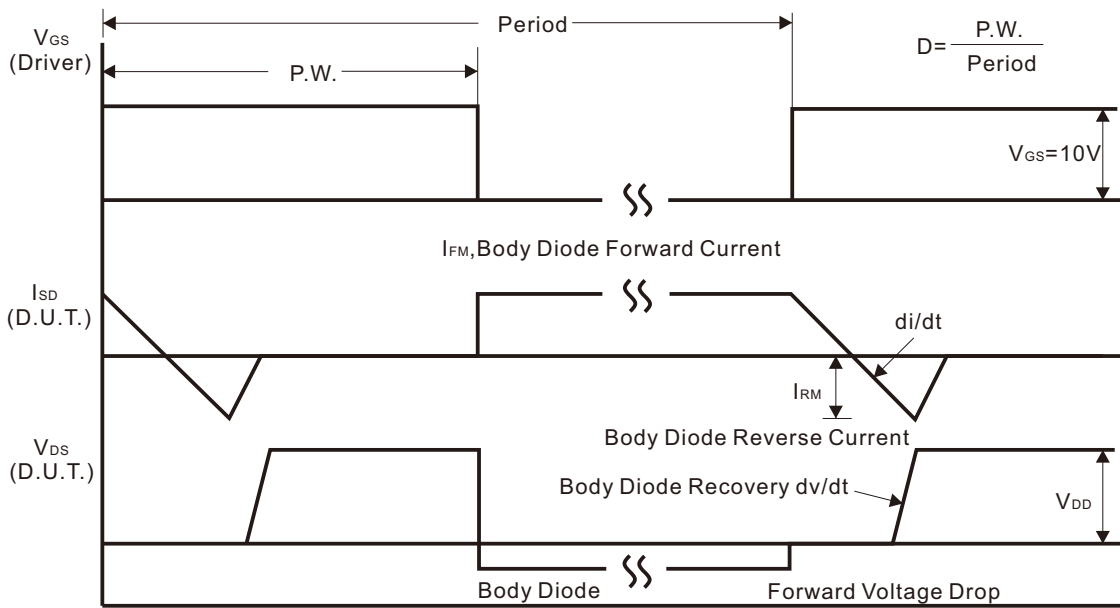
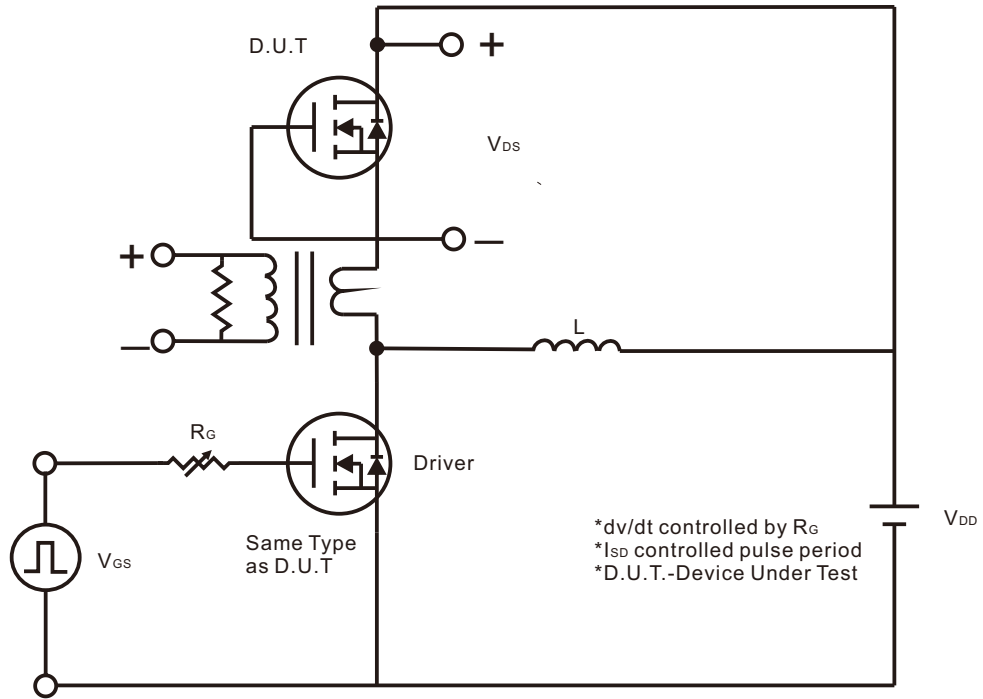
### Gate Charge Test Circuit



### Unclamped Inductive Switching Test Circuit

### Unclamped Inductive Switching Waveforms

### Peak Diode Recovery $dv/dt$ Test Circuit & Waveform



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