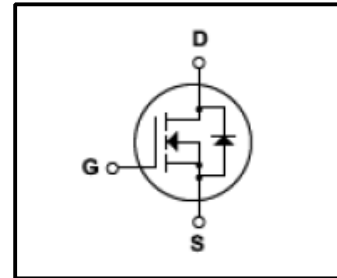


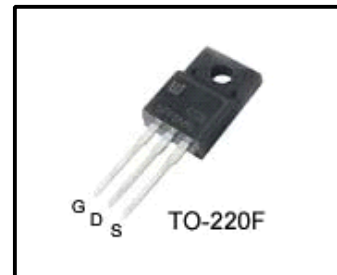
## Features

- 10A,600V , $R_{DS(on)}$ (Max0.75 $\Omega$ )@ $V_{GS}=10V$
- Ultra-low Gate Charge(34nC)
- Fast Switching Capability
- 100%Avalanche Tested
- Improved dv/dt capability



## General Description

This Power MOSFET is produced using Winsemi's advanced planar stripe,DMOS technology. This latest technology has been especially designed to minimize on-state resistance,have a high rugged avalanche characteristics. This devices is specially well suited for high efficiency switch model power supplies , power factor correction ,UPS and a electronic lamp ballast base on half bridge.



## Absolute Maximum Ratings

| Symbol         | Parameter                                        | Value    | Units          |
|----------------|--------------------------------------------------|----------|----------------|
| $V_{DSS}$      | Drain Source Voltage                             | 600      | V              |
| $I_D$          | Continuous Drain Current (@ $T_c=25^{\circ}C$ )  | 10*      | A              |
|                | Continuous Drain Current (@ $T_c=100^{\circ}C$ ) | 6.0*     | A              |
| $I_{DM}$       | Drain Current Pulsed (Note1)                     | 40*      | A              |
| $V_{GS}$       | Gate to Source Voltage                           | $\pm 30$ | V              |
| $E_{AS}$       | Single Pulsed Avalanche Energy (Note2)           | 713      | mJ             |
| $E_{AR}$       | Repetitive Avalanche Energy (Note1)              | 18       | mJ             |
| dv/dt          | Peak Diode Recovery dv/dt (Note3)                | 4.5      | V/ns           |
| $P_D$          | Total Power Dissipation (@ $T_c=25^{\circ}C$ )   | 50       | W              |
|                | Derating Factor above25 $^{\circ}C$              | 0.4      | W/ $^{\circ}C$ |
| $T_J, T_{stg}$ | Junction and Storage Temperature                 | -55~150  | $^{\circ}C$    |
| $T_L$          | Channel Temperature                              | 300      | $^{\circ}C$    |

\*Drain current limited by maximum junction temperature

## Thermal Characteristics

| Symbol    | Parameter                               | Value |     |      | Units         |
|-----------|-----------------------------------------|-------|-----|------|---------------|
|           |                                         | Min   | Typ | Max  |               |
| $R_{QJC}$ | Thermal Resistance, Junction-to-Case    | -     | -   | 2.5  | $^{\circ}C/W$ |
| $R_{QJA}$ | Thermal Resistance, Junction-to-Ambient | -     | -   | 62.5 | $^{\circ}C/W$ |

## Electrical Characteristics(Tc=25℃)

| Characteristics                                | Symbol               | Test Condition                                  | Min                    | Type | Max  | Unit |
|------------------------------------------------|----------------------|-------------------------------------------------|------------------------|------|------|------|
| Gate leakage current                           | I <sub>GSS</sub>     | V <sub>GS</sub> =±30V, V <sub>DS</sub> =0V      | -                      | -    | ±100 | nA   |
| Gate-source breakdown voltage                  | V <sub>(BR)GSS</sub> | I <sub>G</sub> =±10μA, V <sub>DS</sub> =0V      | ±30                    | -    | -    | V    |
| Drain cut -off current                         | I <sub>DSS</sub>     | V <sub>DS</sub> =600V, V <sub>GS</sub> =0V      | -                      | -    | 1    | μA   |
| Drain-source breakdown voltage                 | V <sub>(BR)DSS</sub> | I <sub>D</sub> =250μA, V <sub>GS</sub> =0V      | 500                    | -    | -    | V    |
| Gate threshold voltage                         | V <sub>GS(th)</sub>  | V <sub>DS</sub> =10V, I <sub>D</sub> =250μA     | 3                      | -    | 3.5  | V    |
| Drain-source ON resistance                     | R <sub>DS(ON)</sub>  | V <sub>GS</sub> =10V, I <sub>D</sub> =4.75A     | -                      | 0.66 | 0.75 | Ω    |
| Forward Trans conductance                      | g <sub>fs</sub>      | V <sub>DS</sub> =50V, I <sub>D</sub> =4.75A     | -                      | 8.2  | -    | S    |
| Input capacitance                              | C <sub>iss</sub>     | V <sub>DS</sub> =25V,                           | -                      | 1610 | 2065 | pF   |
| Reverse transfer capacitance                   | C <sub>rss</sub>     | V <sub>GS</sub> =0V,                            | -                      | 156  | 210  |      |
| Output capacitance                             | C <sub>oss</sub>     | f=1MHz                                          | -                      | 20   | 26   |      |
| Switching time                                 | Rise time            | t <sub>r</sub>                                  | V <sub>DD</sub> =300V, | -    | 68   | ns   |
|                                                | Turn-on time         | t <sub>on</sub>                                 | I <sub>D</sub> =10A,   | -    | 109  |      |
|                                                | Fall time            | t <sub>f</sub>                                  | R <sub>G</sub> =25Ω    | -    | 214  |      |
|                                                | Turn-off time        | t <sub>off</sub>                                | (Note4,5)              | -    | 85   |      |
| Total gate charge(gate-source plus gate-drain) | Q <sub>g</sub>       | V <sub>DD</sub> =480V,<br>V <sub>GS</sub> =10V, | -                      | 34   | 45   | nC   |
| Gate-source charge                             | Q <sub>gs</sub>      | I <sub>D</sub> =10A                             | -                      | 6.9  | -    |      |
| Gate-drain("miller")Charge                     | Q <sub>gd</sub>      | (Note4,5)                                       | -                      | 12   | -    |      |

## Source-Drain Ratings and Characteristics(Ta=25℃)

| Characteristics                  | Symbol           | Test condition                             | Min | Type | Max  | Unit |
|----------------------------------|------------------|--------------------------------------------|-----|------|------|------|
| Continuous drain reverse current | I <sub>DR</sub>  | -                                          | -   | -    | 10   | A    |
| Pulse drain reverse current      | I <sub>DRP</sub> | -                                          | -   | -    | 38   | A    |
| Forward voltage(diode)           | V <sub>DSF</sub> | I <sub>DR</sub> =10A, V <sub>GS</sub> =0V  | -   | 1.05 | 1.4  | V    |
| Reverse recovery time            | t <sub>rr</sub>  | I <sub>DR</sub> =10A, V <sub>GS</sub> =0V, | -   | 442  | 633  | ns   |
| Reverse recovery charge          | Q <sub>rr</sub>  | dI <sub>DR</sub> /dt=100 A / μs            | -   | 2.16 | 3.24 | μC   |

Note 1. Repeativity rating: pulse width limited by junction temperature

2. L=14.5mH, I<sub>AS</sub>=10A, V<sub>DD</sub>=50V, R<sub>G</sub>=25Ω, Starting T<sub>J</sub>=25℃

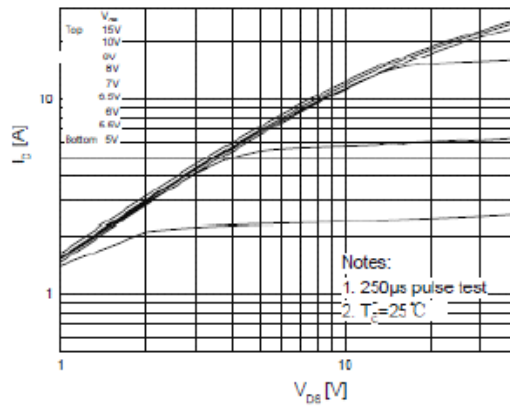
3. I<sub>SD</sub>≤10A, di/dt≤300A/us, V<sub>DD</sub><BV<sub>DSS</sub>, STARTING T<sub>J</sub>=25℃

4. Pulse Test: Pulse Width ≤300us, Duty Cycles≤2%

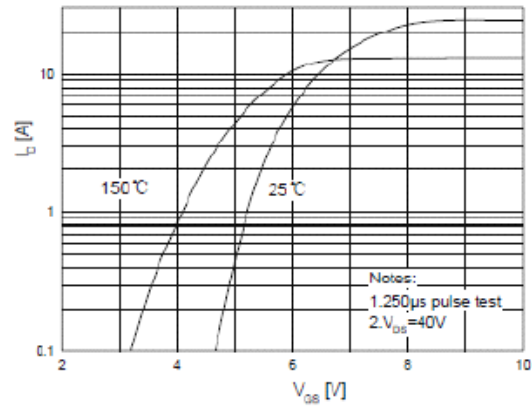
5. Essentially independent of operating temperature.

This transistor is an electrostatic sensitive device

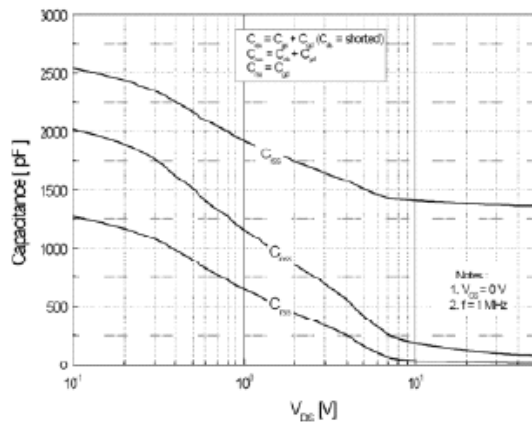
Please handle with caution



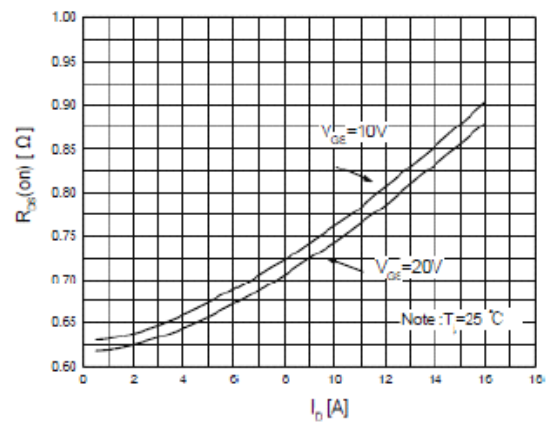
**Fig.1 On-State Characteristics**



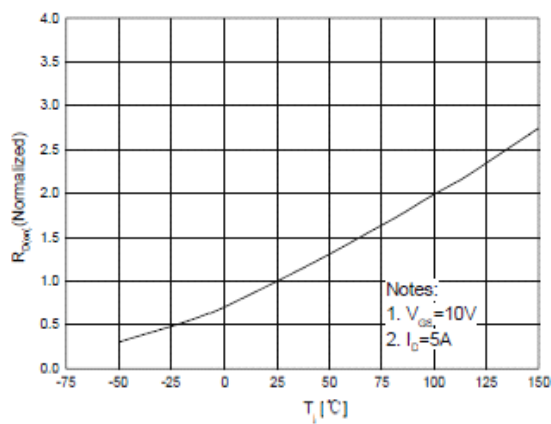
**Fig.2 Transfer characteristics**



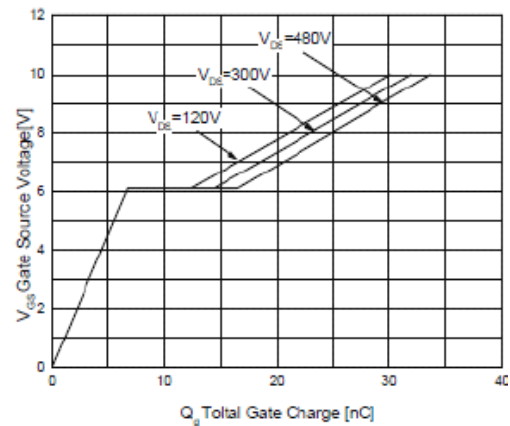
**Fig.3 Capacitance Variation vs Drain Voltage**



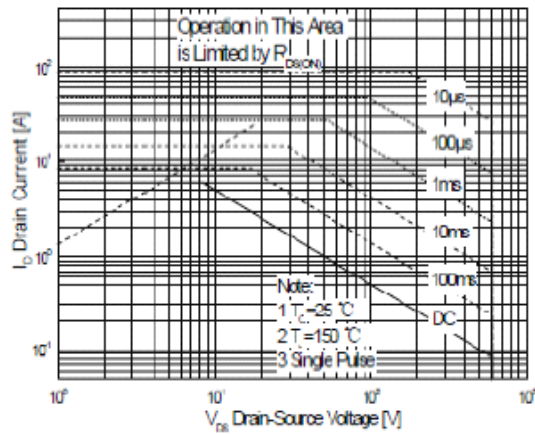
**Fig.4 On-Resistance Variation Energy vs Drain Current and Gate Voltage**



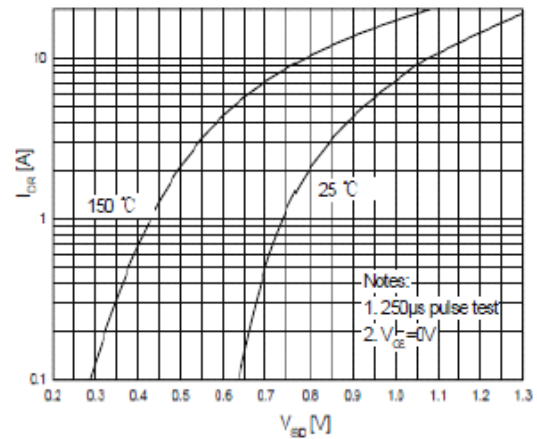
**Fig.5 On-Resistance Variation vs Junction temperature**



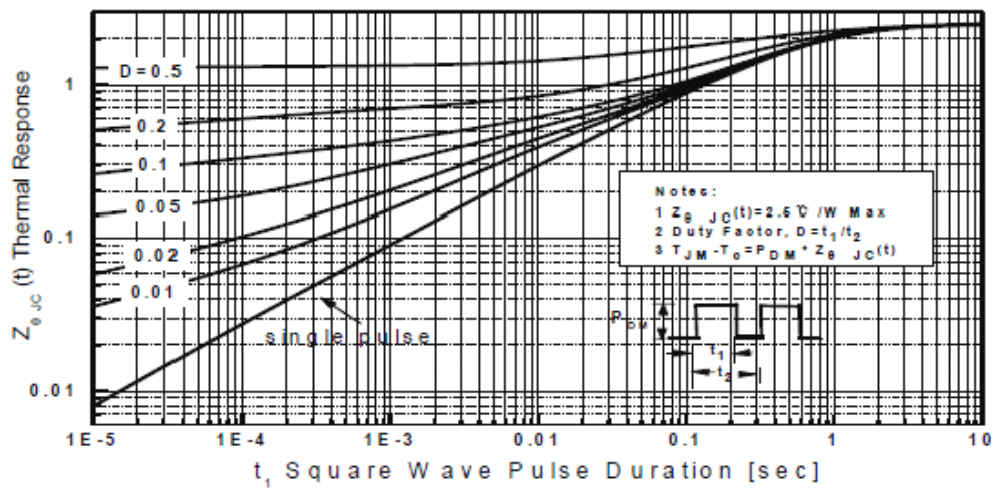
**Fig.6 Gate Charge characteristics**



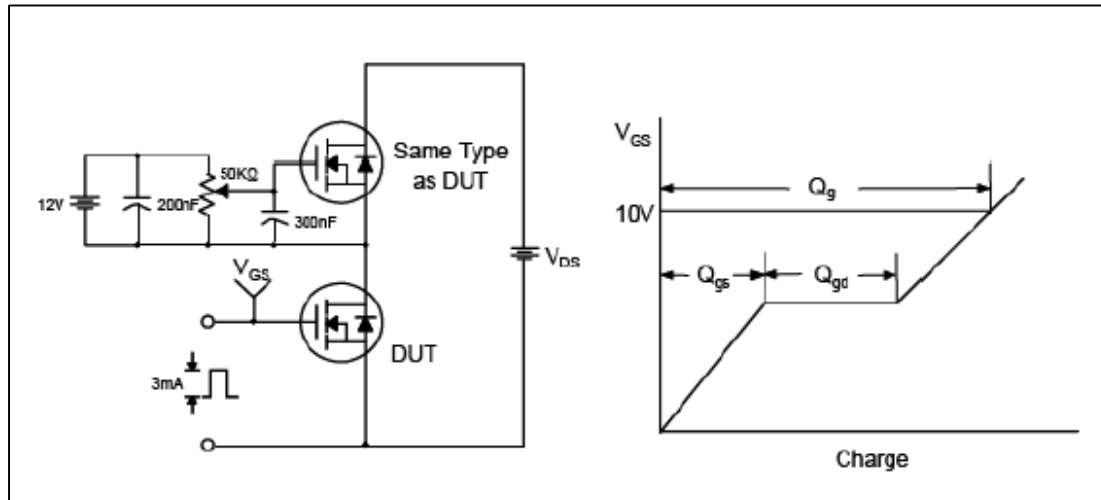
**Fig.7 Maximum Safe Operation Area**



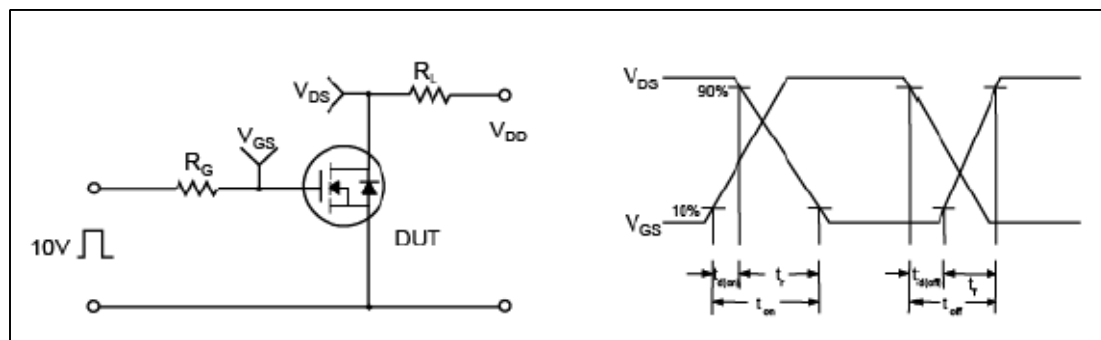
**Fig.8 diode Forward voltage Variation vs Source Current and Temperature**



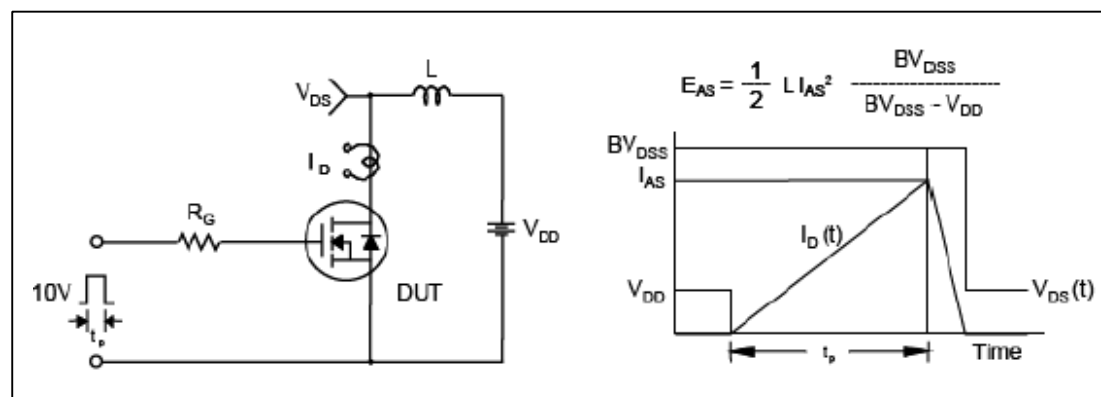
**Fig.9 Transient Thermal response Curve**



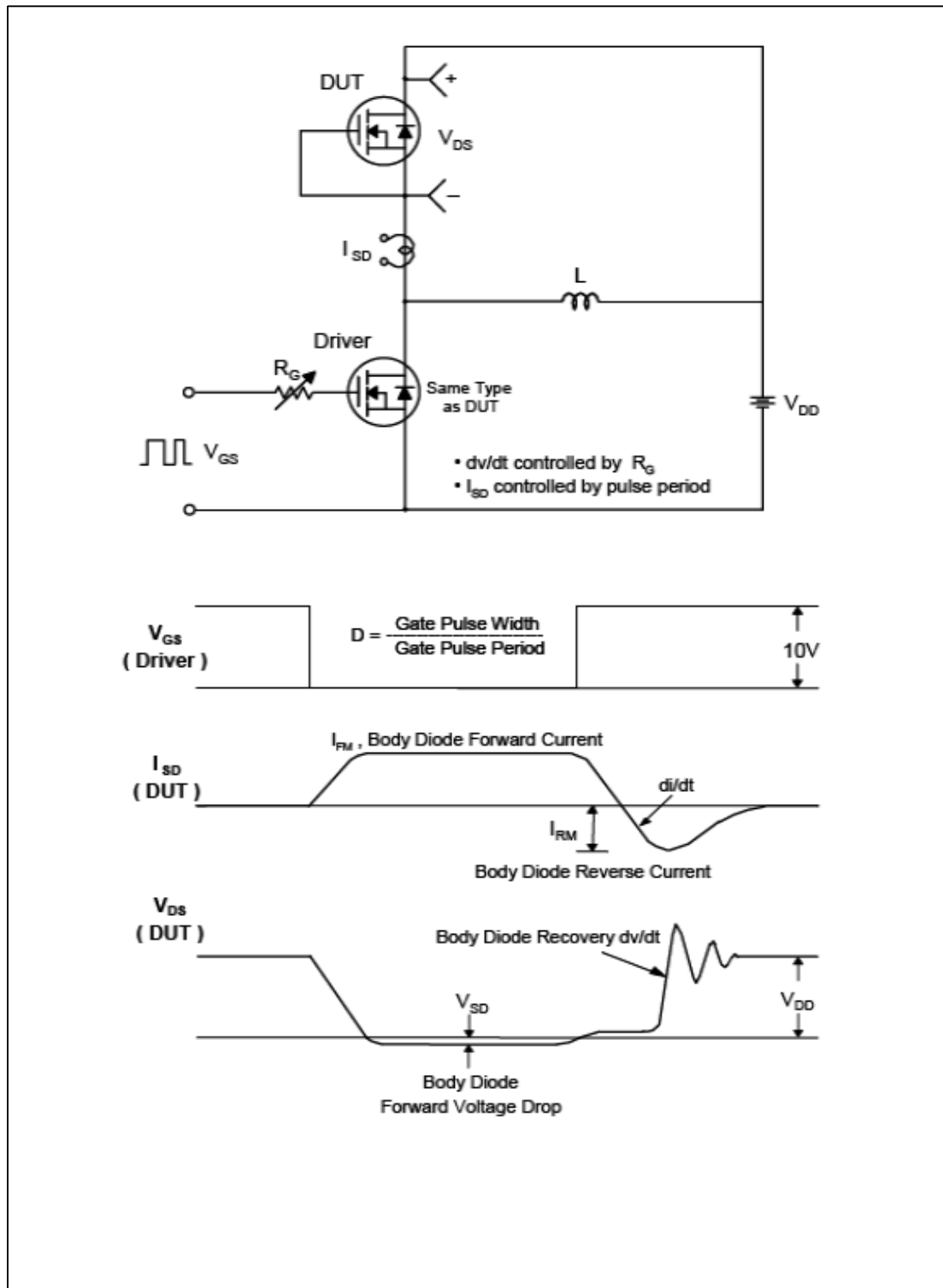
**Fig.10 Gate Test Circuit & Waveform**



**Fig.11 Resistive Switching Test Circuit & Waveform**



**Fig.12 Unclamped Inductive switching Test Circuit & Waveform**



**Fig.13 Peak Diode Recovery  $dv/dt$  Test Circuit & Waveform**

## TO-220F Package Dimension

**Unit :mm**

