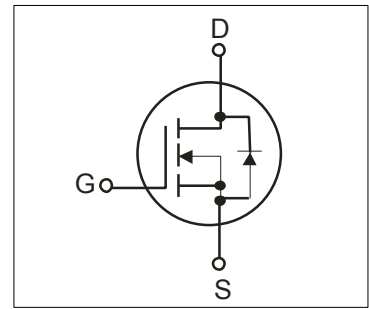


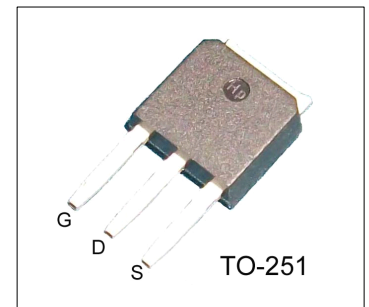
**Features**

- 5.0A,650V, $R_{DS(on)}$ (Max2.7 $\Omega$ )@ $V_{GS}=10V$
- Ultra-low Gate charge(Typical 12nC)
- Fast Switching Capability
- 100%Avalanche Tested
- Maximum Junction Temperature Range(150 $^{\circ}C$ )



**General Description**

This Power MOSFET is produced using Winsemi's advanced planar stripe,VDMOS 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 half bridge and full bridge resonant topology line a electronic lamp ballast, high efficiency switched mode power supplies, active power factor correction.



**Absolute Maximum Ratings**

| Symbol         | Parameter                                       | Value    | Units          |
|----------------|---|----------|----------------|
| $V_{DSS}$      | Drain Source Voltage                            | 650      | V              |
| $I_D$          | Continuous Drain Current(@ $T_c=25^{\circ}C$ )  | 5        | A              |
|                | Continuous Drain Current(@ $T_c=100^{\circ}C$ ) | 2.8      | A              |
| $I_{DM}$       | Drain Current Pulsed (Note1)                    | 16       | A              |
| $V_{GS}$       | Gate to Source Voltage                          | $\pm 30$ | V              |
| $E_{AS}$       | Single Pulsed Avalanche Energy (Note2)          | 202      | mJ             |
| $E_{AR}$       | Repetitive Avalanche Energy (Note1)             | 14       | mJ             |
| $P_D$          | Total Power Dissipation(@ $T_c=25^{\circ}C$ )   | 77       | W              |
|                | Derating Factor above 25 $^{\circ}C$            | 0.62     | W/ $^{\circ}C$ |
| $T_J, T_{stg}$ | Junction and Storage Temperature                | -55~150  | $^{\circ}C$    |
| $T_L$          | Channel Temperature                             | 300      | $^{\circ}C$    |

**Thermal Characteristics**

| Symbol    | Parameter                                 | Value |     |      | Units         |
|-----------|---|-------|-----|------|---------------|
|           |   | Min   | Typ | Max  |               |
| $R_{QJC}$ | Thermal Resistance , Junction -to -Case   | -     | -   | 1.62 | $^{\circ}C/W$ |
| $R_{QJA}$ | Thermal Resistance , Junction-to -Ambient | -     | -   | 110  | $^{\circ}C/W$ |

## Electrical Characteristics(Tc=25°C)

| 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> =±10 μA,V <sub>DS</sub> =0V               | ±30 | -    | -    | V    |
| Drain Cut -off current                         |                     | I <sub>DSS</sub>                    | V <sub>DS</sub> =650V,V <sub>GS</sub> =0V                | -   | -    | 1.0  | μA   |
|  |                     |                                     | V <sub>DS</sub> =500V,Tc=125°C                           | -   | -    | 100  | μA   |
| Breakdown voltage Temperature coefficient      |                     | ΔBV <sub>DSS</sub> /ΔT <sub>J</sub> | ID=250 μA,Referenced to 25 °C                            | -   | 0.65 | -    | V/°C |
| Drain -source breakdown voltage                |                     | V <sub>(BR)DSS</sub>                | I <sub>D</sub> =250 μA,V <sub>GS</sub> =0V               | 650 | -    | -    | V    |
| Gate threshold voltage                         |                     | V <sub>GS(th)</sub>                 | V <sub>DS</sub> =V <sub>GS</sub> ,I <sub>D</sub> =250 μA | 2   | -    | 4    | V    |
| Drain -source ON resistance                    |                     | R <sub>DS(ON)</sub>                 | V <sub>GS</sub> =10V,I <sub>D</sub> =2.0A                | -   | 2.3  | 2.7  | Ω    |
| Input capacitance                              |                     | C <sub>iSS</sub>                    | V <sub>DS</sub> =25V,                                    | -   | 512  | -    | pF   |
| Reverse transfer capacitance                   |                     | C <sub>rSS</sub>                    | V <sub>GS</sub> =0V,                                     | -   | 2.5  | -    |      |
| Output capacitance                             |                     | C <sub>oss</sub>                    | f=1MHz   | -   | 56   | -    |      |
| Switching time                                 | Turn-on Rise time   | t <sub>r</sub>                      | V <sub>DD</sub> =325V,                                   | -   | 27   | -    | ns   |
|  | Turn-on delay time  | T <sub>d(on)</sub>                  | I <sub>D</sub> =5.0A                                     | -   | 14   | -    |      |
|  | Turn-off Fall time  | t <sub>f</sub>                      | R <sub>G</sub> =25Ω                                      | -   | 28   | -    |      |
|  | Turn-off delay time | T <sub>d(off)</sub>                 | (Note3,4)  | -   | 34   | -    |      |
| Total gate charge(gate-source plus gate-drain) |                     | Q <sub>g</sub>                      | V <sub>DD</sub> =480V,<br>V <sub>GS</sub> =10V,          | -   | 12   | -    | nC   |
| Gate-source charge                             |                     | Q <sub>gs</sub>                     | I <sub>D</sub> =5.0A                                     | -   | 3.2  | -    |      |
| Gate-drain("miller") Charge                    |                     | Q <sub>gd</sub>                     | (Note3,4)  | -   | 5.0  | -    |      |

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

| Characteristics                  | Symbol           | Test Condition                             | Min | Type | Max | Unit |
|----------------------------------|------------------|--|-----|------|-----|------|
| Continuous drain reverse current | I <sub>DR</sub>  | -  | -   | -    | 5   | A    |
| Pulse drain reverse current      | I <sub>DRP</sub> | -  | -   | -    | 16  | A    |
| Forward voltage(diode)           | V <sub>DSF</sub> | I <sub>DR</sub> =5.0A,V <sub>GS</sub> =0V  | -   | -    | 1.4 | V    |
| Reverse recovery time            | t <sub>rr</sub>  | I <sub>DR</sub> =5.0A,V <sub>GS</sub> =0V, | -   | 431  | -   | ns   |
| Reverse recovery charge          | Q <sub>rr</sub>  | dI <sub>DR</sub> /dt =100 A /μs            | -   | 2.1  | -   | μC   |

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

2.L=30mH I<sub>AS</sub>=3.36A,V<sub>DD</sub>=100V,R<sub>G</sub>=25Ω,Starting T<sub>J</sub>=25°C

3.Pulse Test:Pulse Width≤300us,Duty Cycle≤2%

4. Essentially independent of operating temperature.

This transistor is an electrostatic sensitive device

Please handle with caution

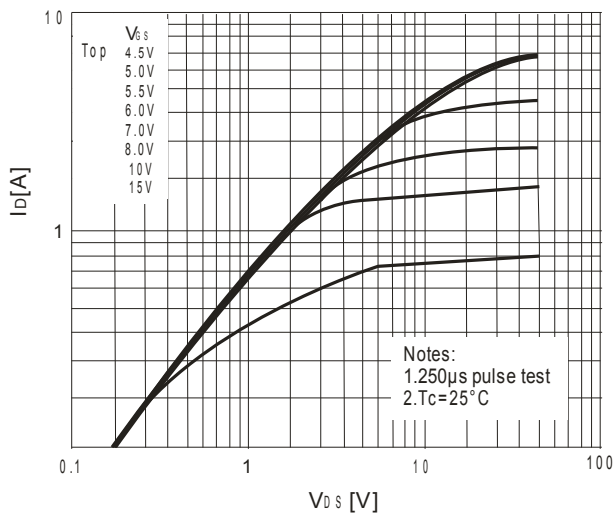


Fig.1 On Region Characteristics

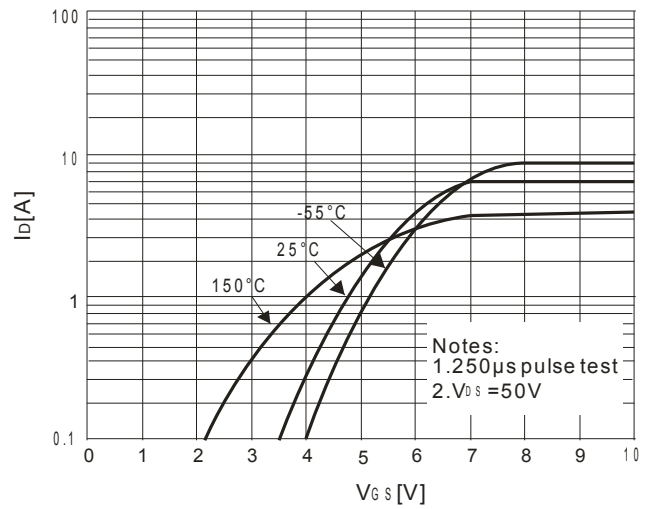


Fig.2 Transfer Characteristics

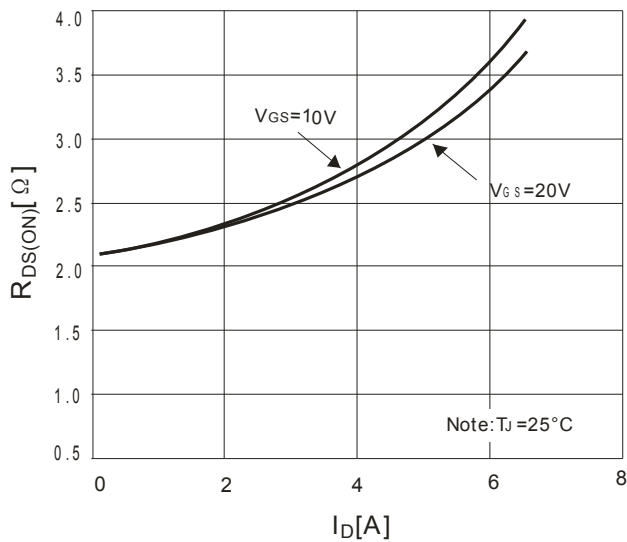


Fig.3 On-Resistance Variation vs Drain Current and Gate Voltage

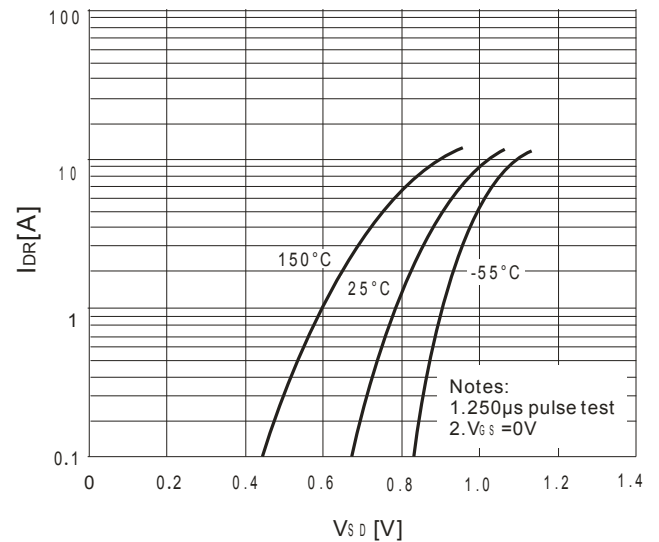


Fig.4 Body Diode Forward Voltage Variation vs. Source Current and Temperature

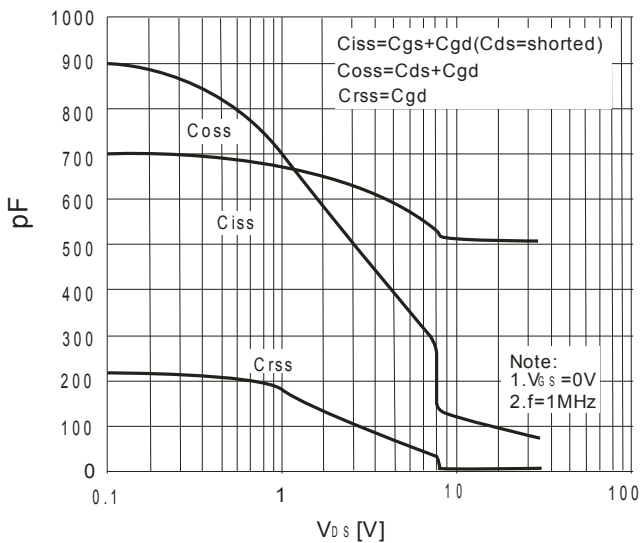


Fig.5 Capacitance Characteristics

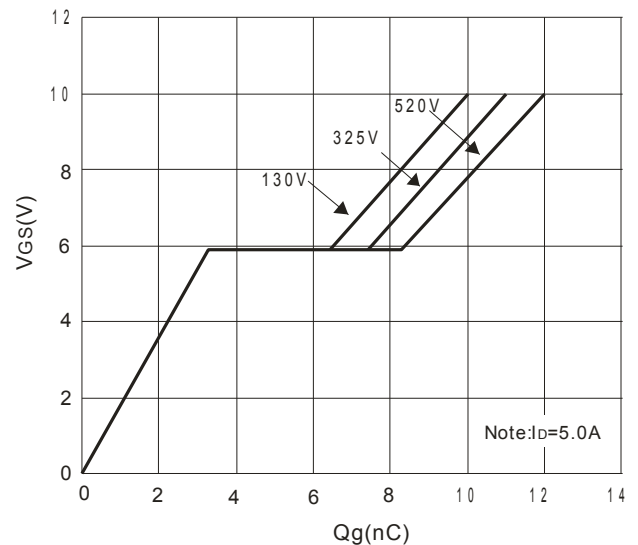


Fig.6 Gate Charge Characteristics

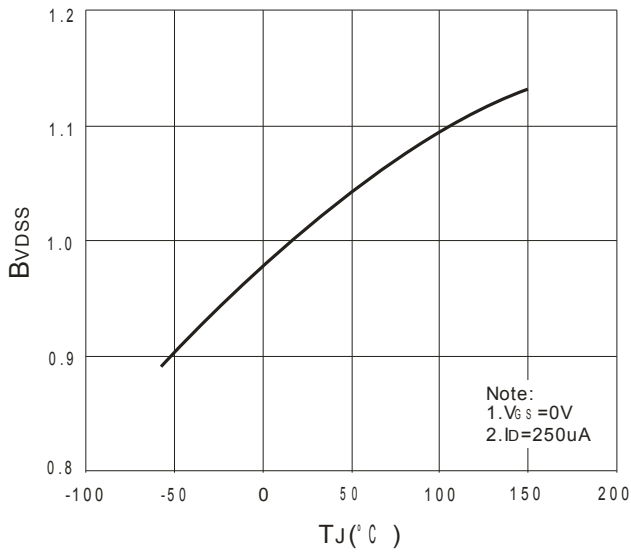


Fig.7 Breakdown Voltage Variation vs. Temperature

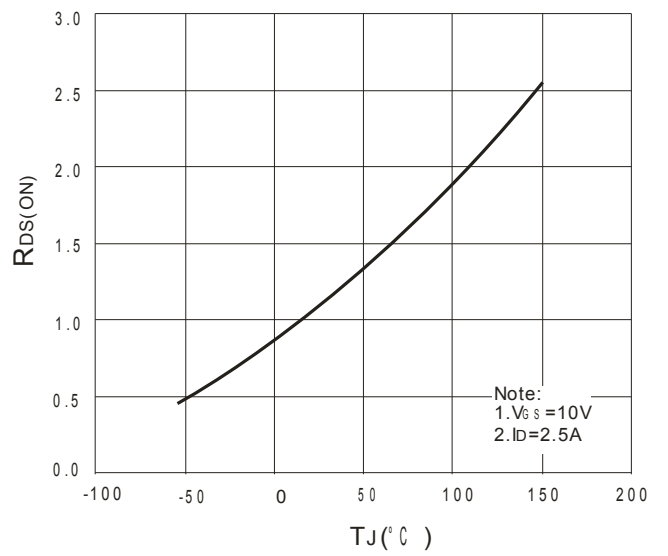


Fig.8 On-Resistance Variation vs. Temperature

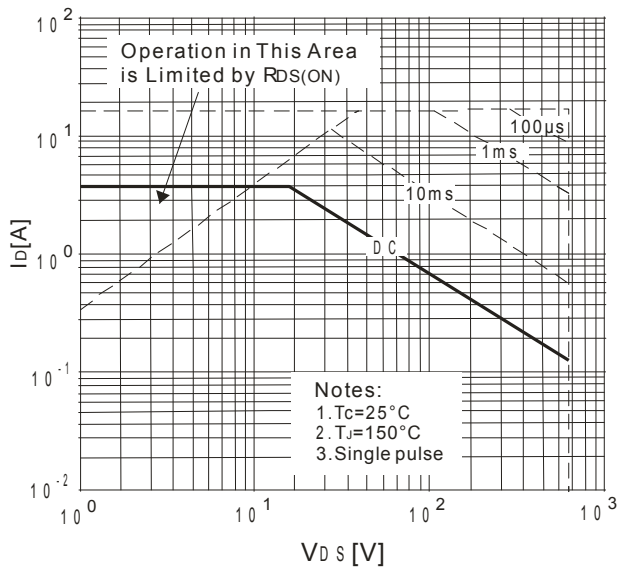


Fig.9 Maximum Safe Operation Area

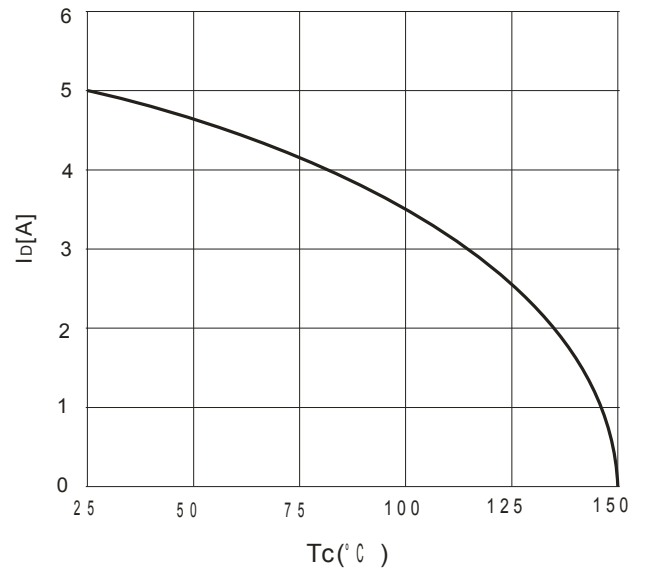


Fig.10 Maximum Drain Current vs Case temperature

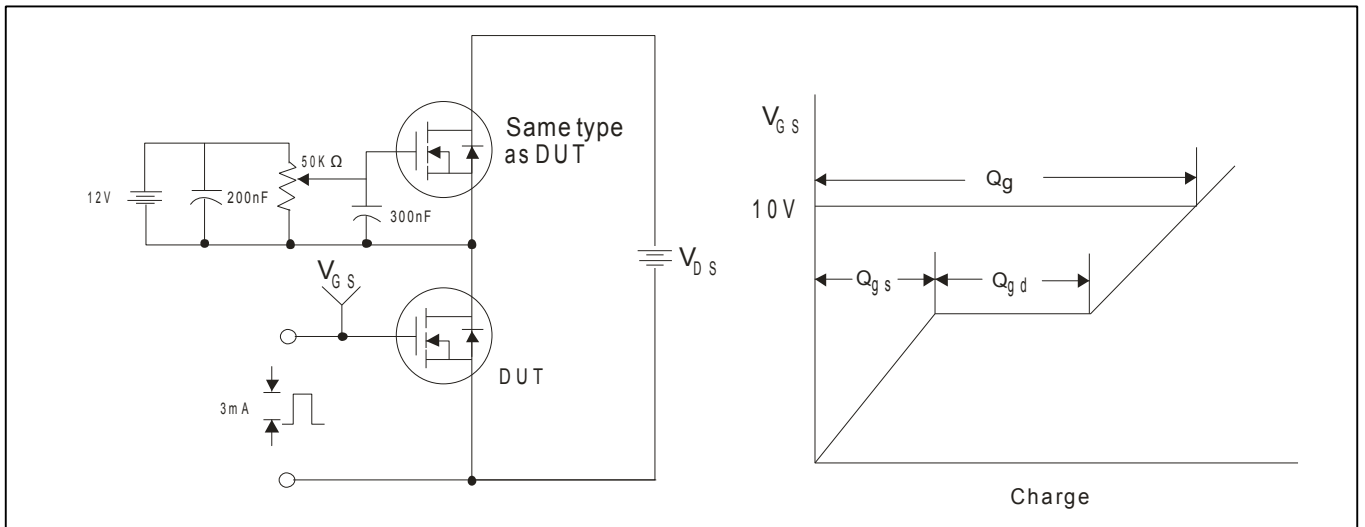


Fig.11 Gate Test circuit & Waveform

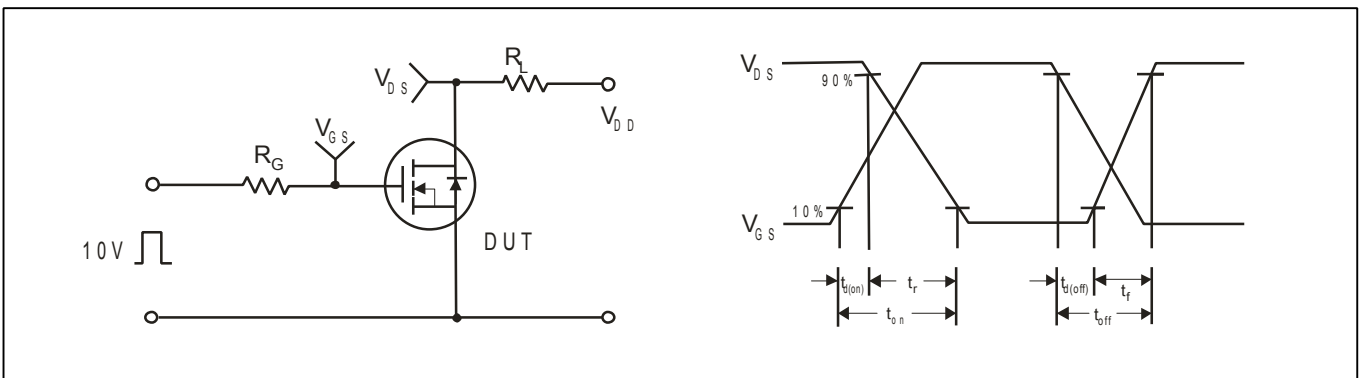


Fig.12 Resistive Switching Test Circuit & Waveform

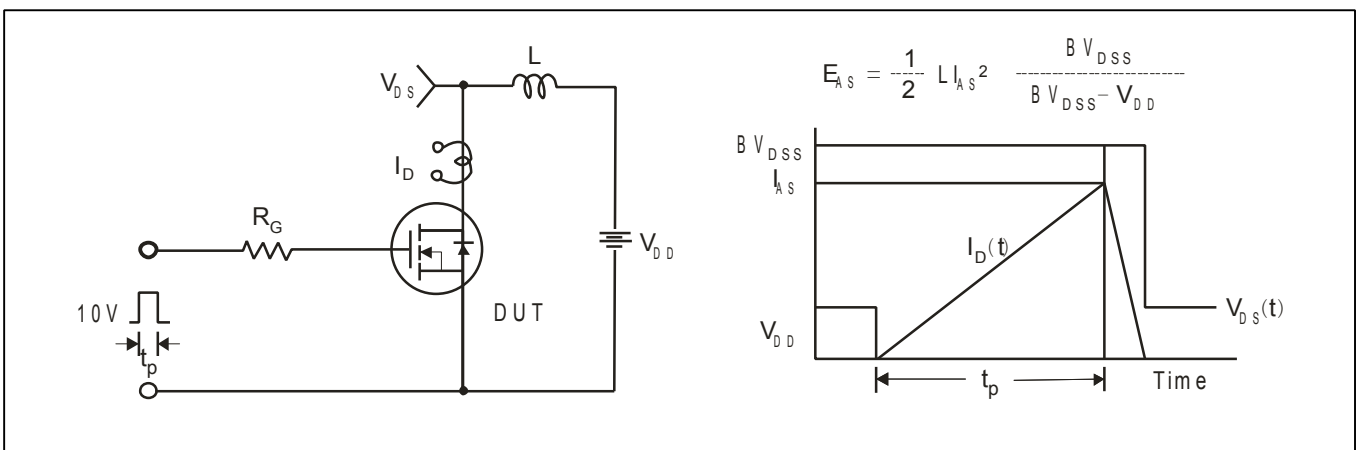


Fig.13 Unclamped Inductive Switching Test Circuit & Waveform

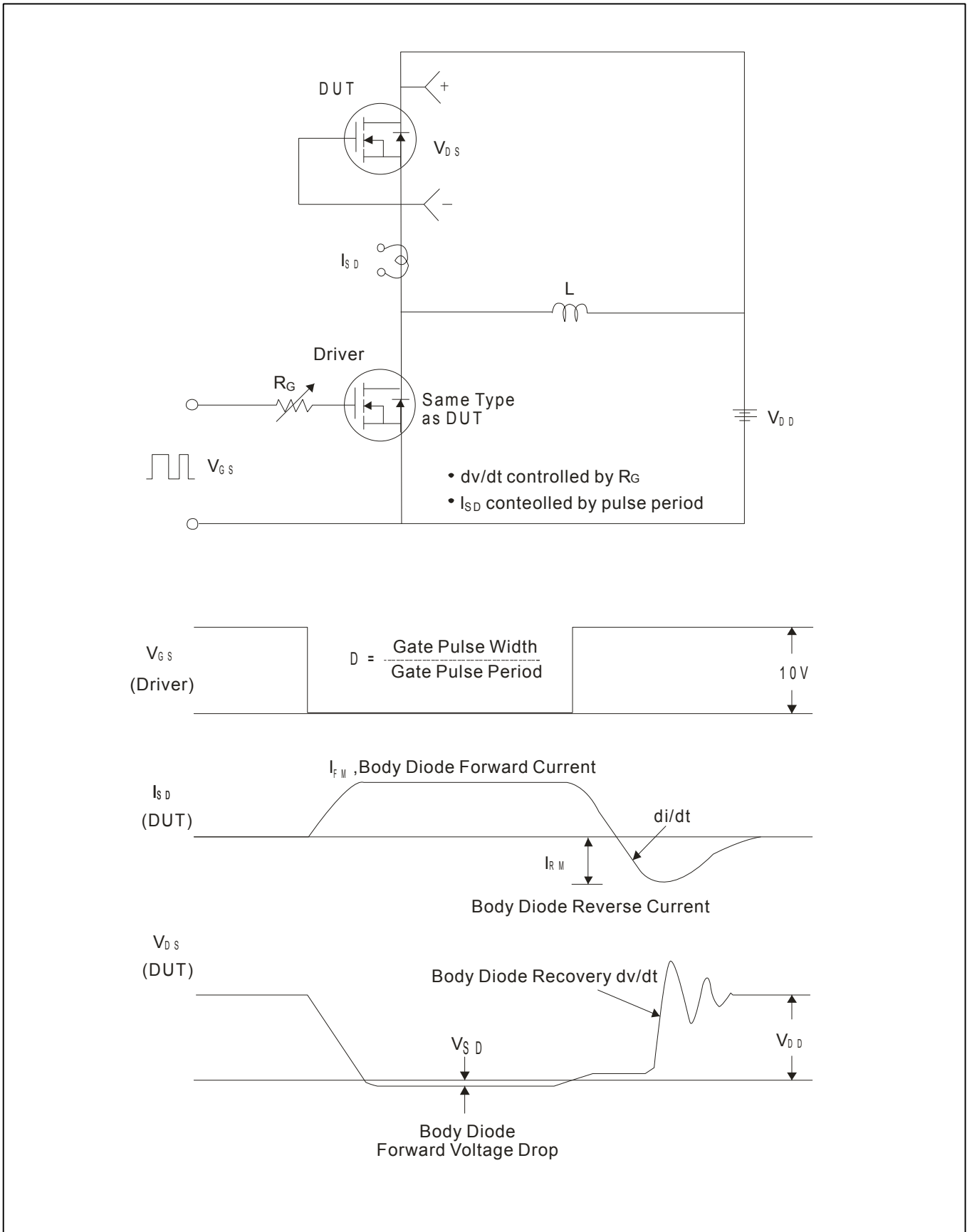
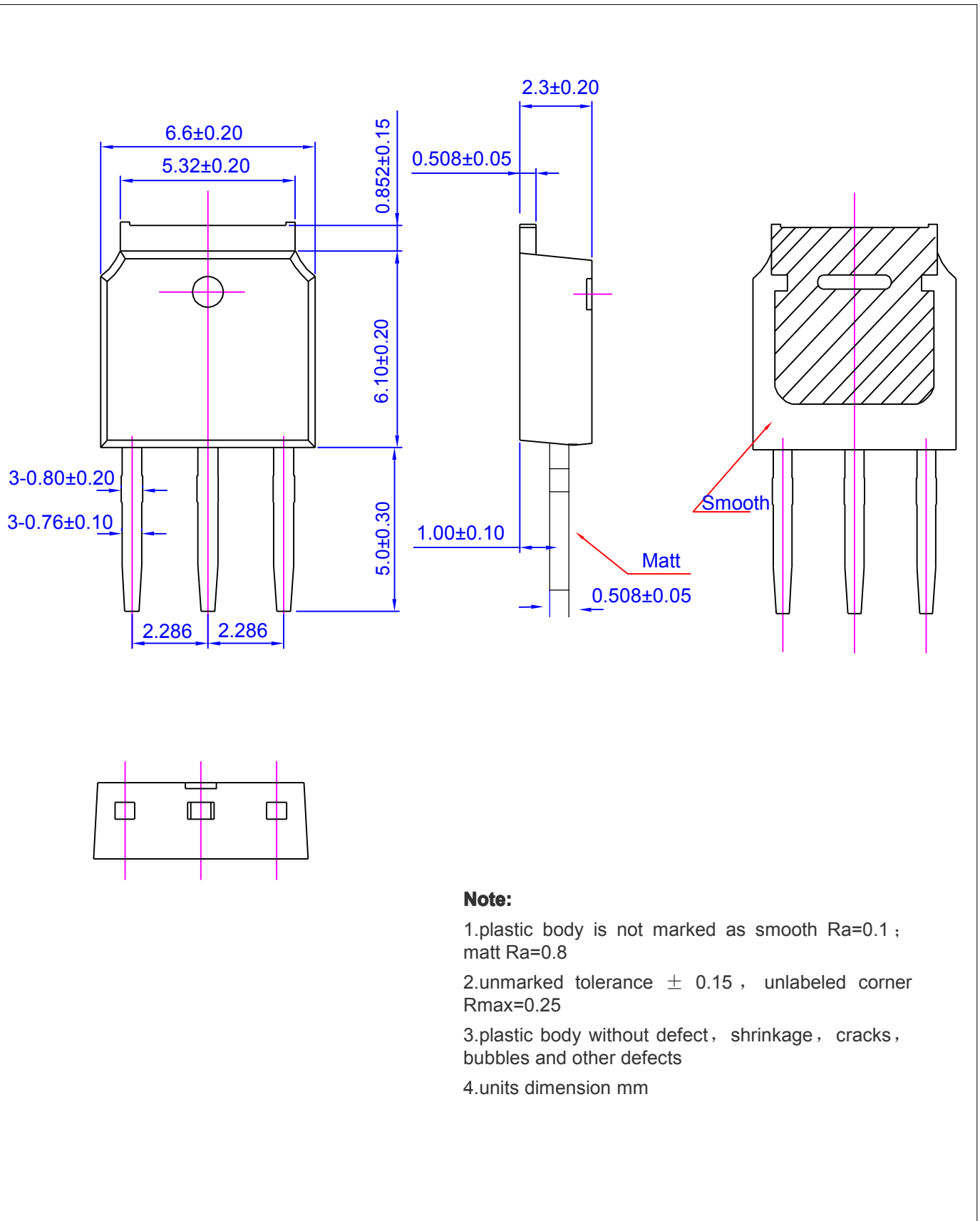


Fig.14 Peak Diode Recovery  $dv/dt$  Test Circuit & Waveform

TO-251 Package Dimension



**Note:**

1. plastic body is not marked as smooth Ra=0.1 ; matt Ra=0.8
2. unmarked tolerance  $\pm 0.15$  , unlabeled corner Rmax=0.25
3. plastic body without defect, shrinkage, cracks, bubbles and other defects
4. units dimension mm

**NOTE:**

- 1.We strongly recommend customers check carefully on the trademark when buying our product, if there is any question, please don't be hesitate to contact us.
- 2.Please do not exceed the absolute maximum ratings of the device when circuit designing.
- 3.Winsemi Microelectronics Co., Ltd reserved the right to make changes in this specification sheet and is subject to change without prior notice.

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