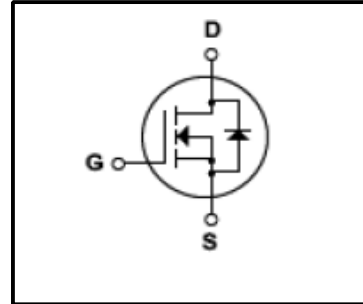


Silicon N-Channel MOSFET

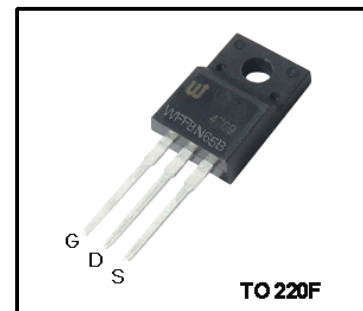
Features

- 7.5A,650V, $R_{DS(on)}$ (Max1.3 Ω)@ $V_{GS}=10V$
- Ultra-low Gate charge(Typical 25nC)
- Fast Switching Capability
- 100%Avalanche Tested
- Isolation Voltage ($V_{ISO}=4000V$ AC)
- 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 device 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(@ $T_c=25^{\circ}C$) | 7.5* | A |
| | Continuous Drain Current(@ $T_c=100^{\circ}C$) | 4.3* | A |
| I_{DM} | Drain Current Pulsed (Note1) | 30* | A |
| V_{GS} | Gate to Source Voltage | ± 30 | V |
| E_{AS} | Single Pulsed Avalanche Energy (Note2) | 590 | mJ |
| E_{AR} | Repetitive Avalanche Energy (Note1) | 14 | mJ |
| dv/dt | Peak Diode Recovery dv/dt (Note3) | 4.5 | V/ns |
| P_D | Total Power Dissipation(@ $T_c=25^{\circ}C$) | 48 | W |
| | Derating Factor above $25^{\circ}C$ | 0.38 | 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 junction temperature

Thermal Characteristics

| Symbol | Parameter | Value | | | Units |
|-----------|---|-------|-----|------|---------------|
| | | Min | Typ | Max | |
| R_{QJC} | Thermal Resistance , Junction -to -Case | - | - | 2.6 | $^{\circ}C/W$ |
| R_{QJA} | Thermal Resistance , Junction-to -Ambient | - | - | 62.5 | $^{\circ}C/W$ |

Electrical Characteristics(Tc=25 °C)

| Characteristics | Symbol | Test Condition | Min | Type | Max | Unit | |
|--|------------------------------|---|--|------|------|------|----|
| Gate leakage current | I _{GSS} | V _{GS} =±30V,V _{DS} =0V | - | - | ±100 | nA | |
| Gate-source breakdown voltage | V _{(BR)GSS} | I _G =±10 μA,V _{DS} =0V | ±30 | - | - | V | |
| Drain cut -off current | I _{DSS} | V _{DS} =650V,V _{GS} =0V,Tc=25 °C | - | - | 10 | μA | |
| | | V _{DS} =500V,Tc=125 °C | - | - | 100 | μA | |
| Drain -source breakdown voltage | V _{(BR)DSS} | I _D =250 μA,V _{GS} =0V | 650 | - | - | V | |
| Breakdown Voltage Temperature Coefficient | $\Delta BV_{DSS}/\Delta T_J$ | I _D =250 μA, referenced to 25 °C | - | 0.65 | - | V/°C | |
| Gate threshold voltage | V _{GS(th)} | V _{DS} =V _{GS} ,I _D =250 μA | 2 | - | 4 | V | |
| Drain -source ON resistance | R _{DS(ON)} | V _{GS} =10V,I _D =3.75A | - | 1.1 | 1.3 | Ω | |
| Forward Transconductance | g _{fs} | V _{DS} =40V,I _D =3.75A | - | 6.2 | - | S | |
| Input capacitance | C _{iss} | V _{DS} =25V, | - | 1120 | 1350 | pF | |
| Reverse transfer capacitance | C _{rss} | V _{GS} =0V, | - | 23 | 30 | | |
| Output capacitance | C _{oss} | f=1MHz | - | 115 | 150 | | |
| Switching time | Turn-On Rise time | t _r | V _{DD} =300V, I _D =7.5A R _G =25Ω (Note4,5) | - | 80 | 170 | ns |
| | Turn-On time | T _{d(on)} | | - | 30 | 70 | |
| | Turn-Off Fall time | t _f | | - | 60 | 110 | |
| | Turn-Off time | T _{d(off)} | | - | 125 | 260 | |
| Total gate charge(gate-source plus gate-drain) | Q _g | V _{DD} =480V, V _{GS} =10V, I _D =7.5A | - | 25 | 35 | nC | |
| Gate-source charge | Q _{gs} | (Note4,5) | - | 6 | - | | |
| Gate-drain("miller") Charge | Q _{gd} | (Note4,5) | - | 10 | - | | |

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

| Characteristics | Symbol | Test Condition | Min | Type | Max | Unit |
|----------------------------------|------------------|--|-----|------|-----|------|
| Continuous drain reverse current | I _{DR} | - | - | - | 7.5 | A |
| Pulse drain reverse current | I _{DRP} | - | - | - | 30 | A |
| Forward voltage(diode) | V _{DSF} | I _{DR} =7.5A,V _{GS} =0V | - | - | 1.4 | V |
| Reverse recovery time | t _{rr} | I _{DR} =7.5A,V _{GS} =0V, | - | 315 | - | ns |
| Reverse recovery charge | Q _{rr} | dI _{DR} / dt =100 A / μs | - | 2.6 | - | μC |

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

2.L=19.5mH I_{AS}=7.5A,V_{DD}=50V,R_G=0Ω,Starting T_J=25 °C

3.I_{SD}≤7.5.A,di/dt≤300A/us,V_{DD}<BV_{DSS},STARTING T_J=25 °C

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

5. Essentially independent of operating temperature.

This transistor is an electrostatic sensitive device

Please handle with caution

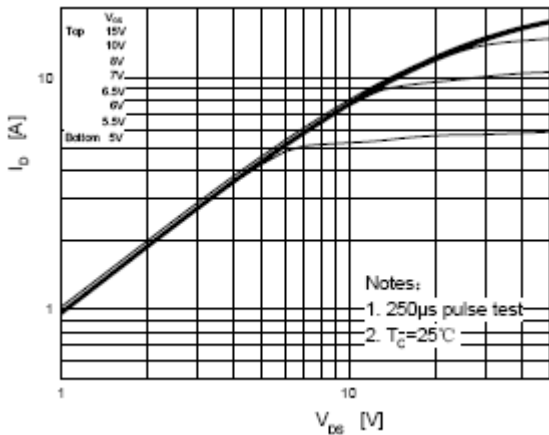


Fig.1 On Region Characteristics

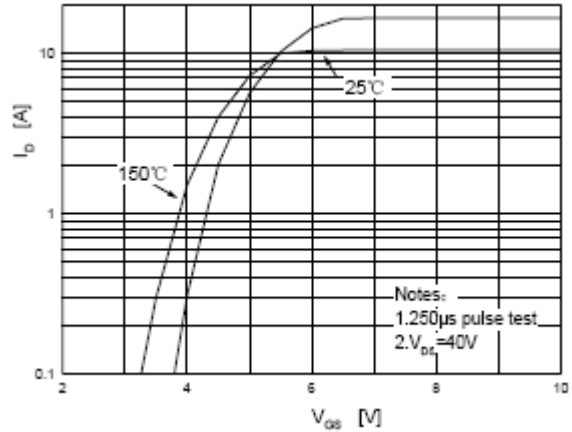


Fig.2 Transfer Characteristics

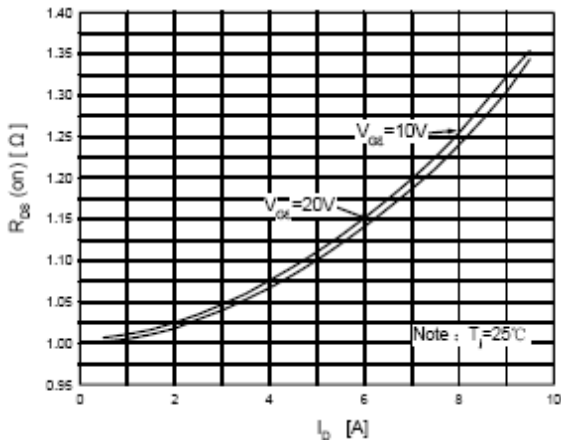


Fig.3 On-Resistance Variation vs Drain Current and Gate Voltage

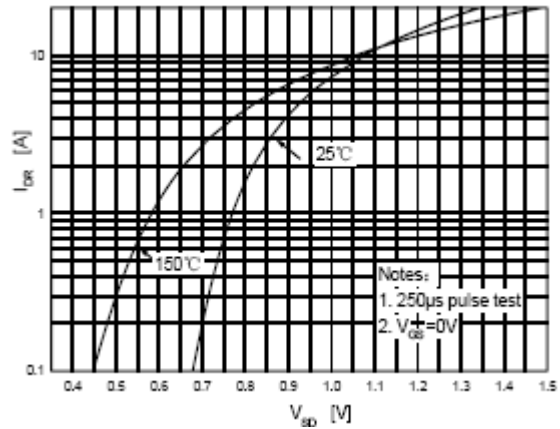


Fig.4 Body Diode Forward Voltage Variation with Source Current and Temperature

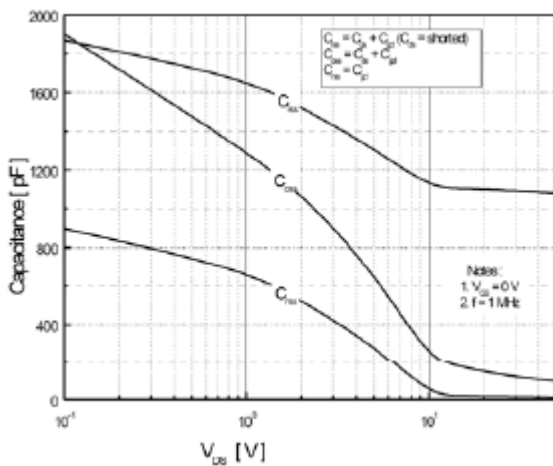


Fig.5 Capacitance Characteristics

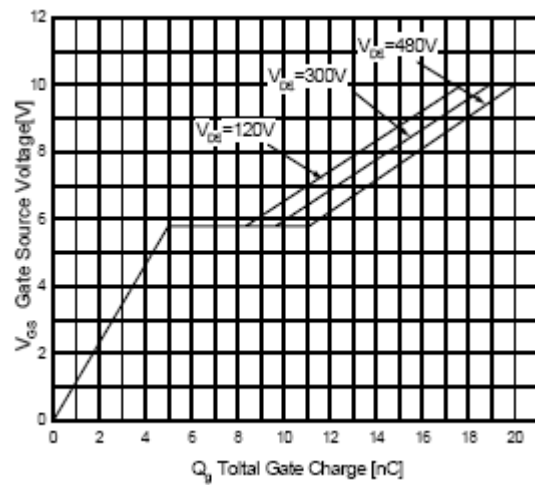


Fig.6 Gate Charge Characteristics

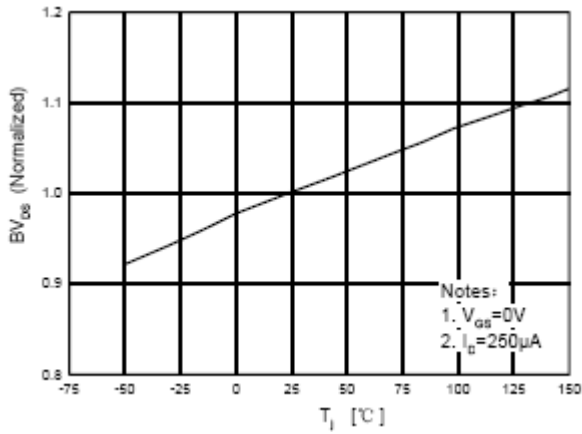


Fig.7 Breakdown Voltage Variation Vs. Temperature

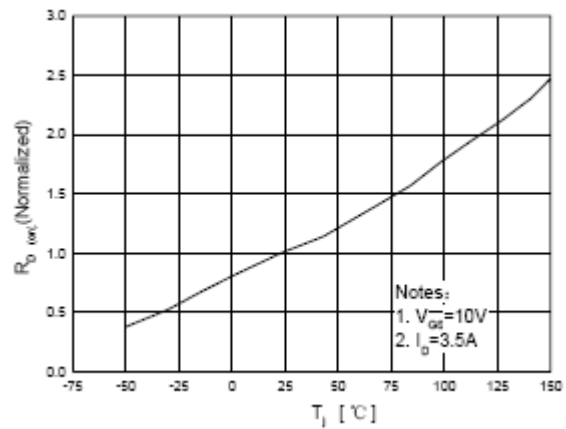


Fig.8 On-Resistance Variation Vs. Temperature

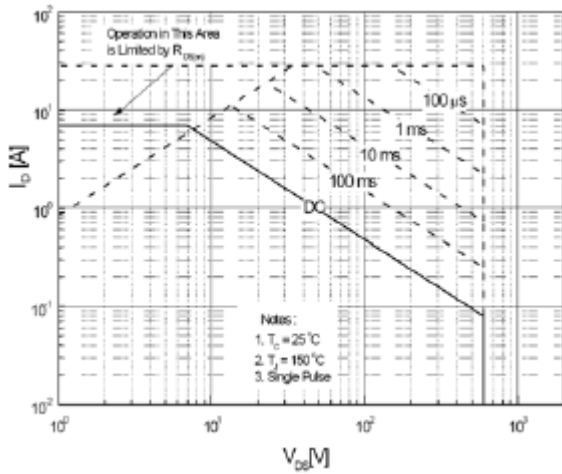


Fig.9 Maximum Safe Operation Area

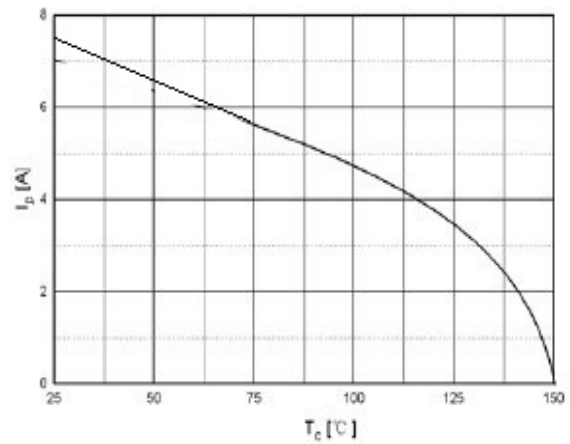


Fig.10 Maximum Drain Current vs. case Temperature

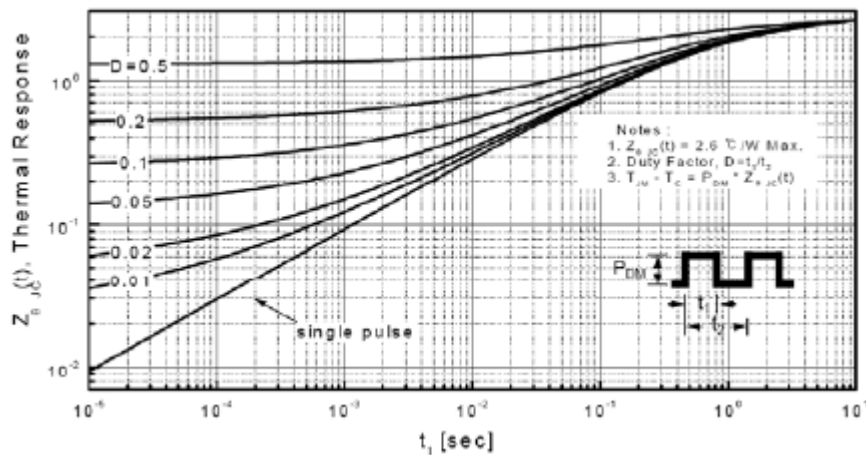


Fig.11 Transient Thermal Response Curve

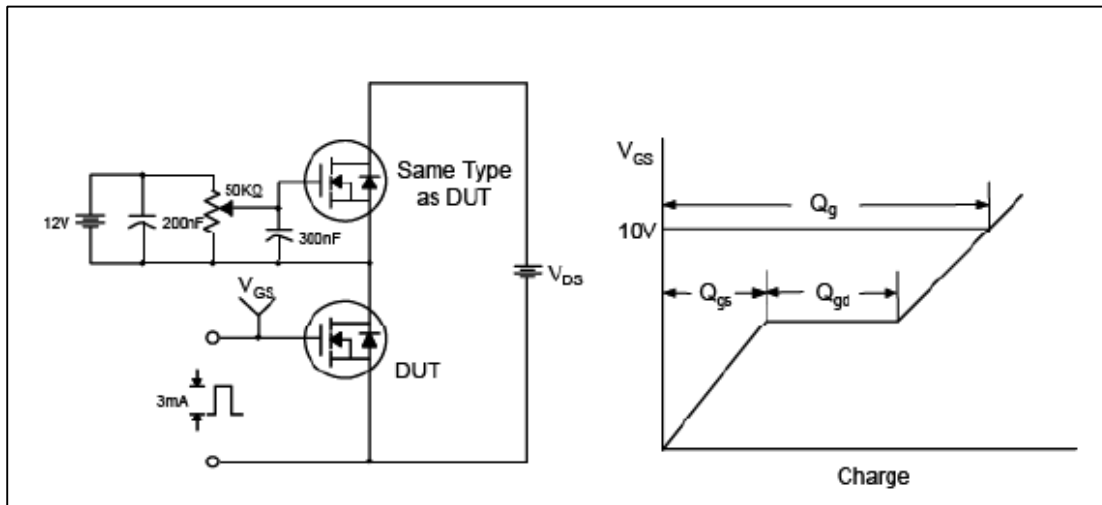


Fig.12 Gate Test Circuit & Waveform

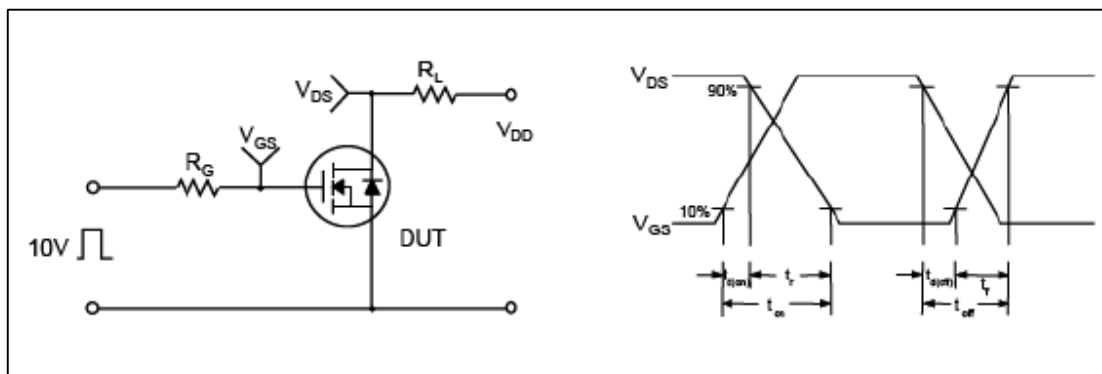


Fig.13 Resistive Switching Test Circuit & Waveform

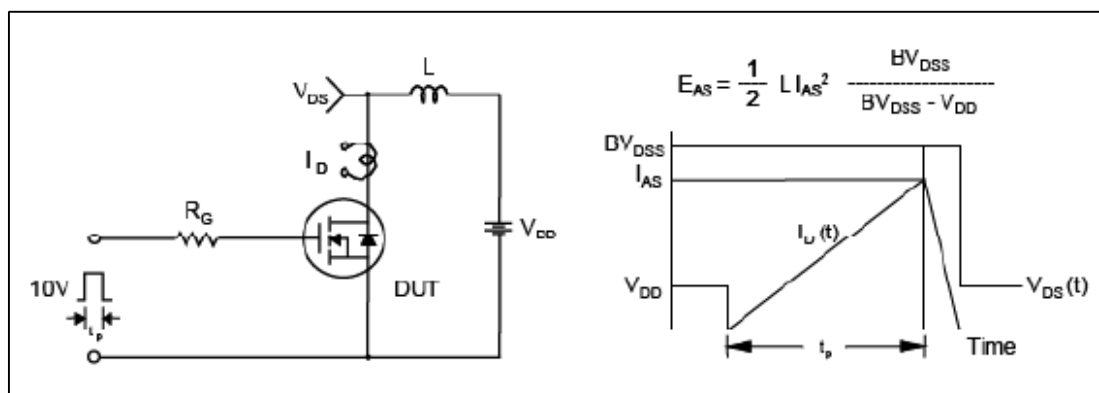


Fig.14 Unclamped Inductive Switching Test Circuit & Waveform

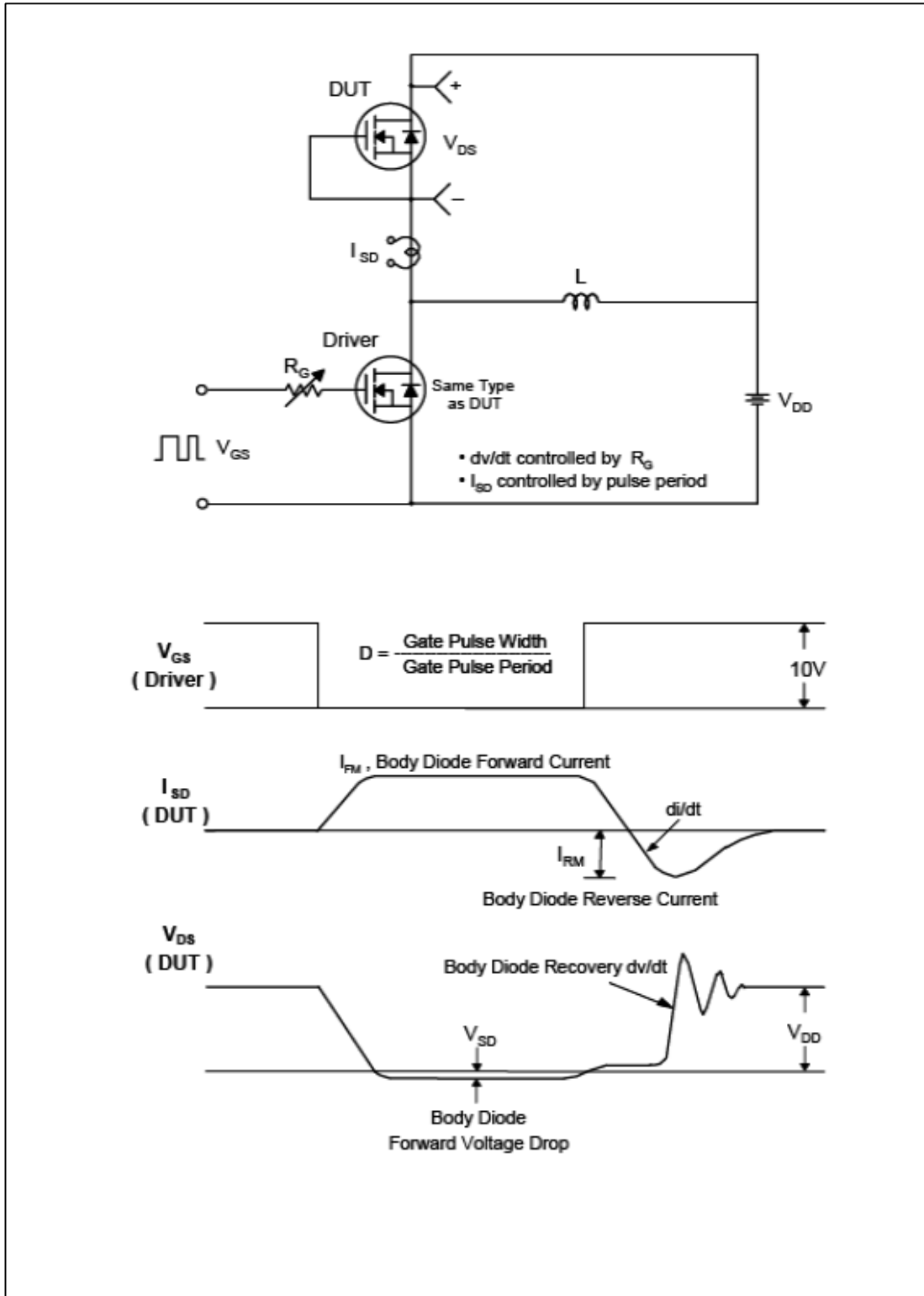


Fig.15 Peak Diode Recovery dv/dt Test Circuit & Waveform

TO-220F Package Dimension

