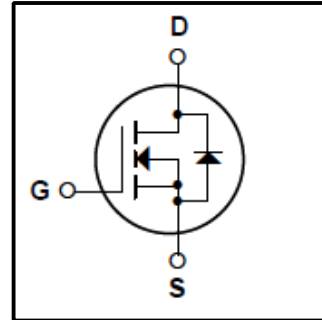


Silicon N-Channel MOSFET

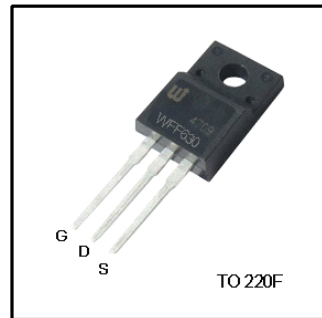
Features

- 9A, 200V, $R_{DS(on)}$ (Max 0.4 Ω)@ $V_{GS}=10V$
- Ultra-low Gate Charge(Typical 22nC)
- Fast Switching Capability
- 100%Avalanche Tested
- Maximum Junction Temperature Range(150°C)



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 low voltage applications such as automotive, high efficiency switching for DC/DC converters, and DC motor control.



Absolute Maximum Ratings

| Symbol | Parameter | Value | Units |
|----------------|---|----------|-------|
| V_{DSS} | Drain Source Voltage | 200 | V |
| I_D | Continuous Drain Current(@ $T_c=25^\circ C$) | 9 | A |
| | Continuous Drain Current(@ $T_c=100^\circ C$) | 5.7 | A |
| I_{DM} | Drain Current Pulsed (Note1) | 36 | A |
| V_{GS} | Gate to Source Voltage | ± 30 | V |
| E_{AS} | Single Pulsed Avalanche Energy (Note 2) | 160 | mJ |
| E_{AR} | Repetitive Avalanche Energy (Note 1) | 7.2 | mJ |
| dv/dt | Peak Diode Recovery dv/dt (Note 3) | 5.5 | V/ns |
| P_D | Total Power Dissipation(@ $T_c=25^\circ C$) | 40 | W |
| | Derating Factor above 25°C | 0.35 | W/°C |
| T_J, T_{stg} | Junction and Storage Temperature | -55~150 | °C |
| T_L | Maximum lead Temperature for soldering purposes | 300 | °C |

Thermal Characteristics

| Symbol | Parameter | Value | | | Units |
|-----------|---|-------|-----|------|-------|
| | | Min | Typ | Max | |
| R_{QJC} | Thermal Resistance, Junction-to-Case | - | - | 3.12 | °C/W |
| R_{QCS} | Thermal Resistance, Case to Sink | - | 0.5 | - | °C/W |
| R_{QJA} | Thermal Resistance, Junction-to-Ambient | - | - | 62.5 | °C/W |

Electrical Characteristics (Tc = 25°C)

| Characteristics | Symbol | Test Condition | Min | Type | Max | Unit | |
|---|--------------------------------------|---|---|------|------|------|----|
| Gate leakage current | I _{GSS} | V _{GS} = ±30 V, V _{DS} = 0 V | - | - | ±100 | nA | |
| Gate-source breakdown voltage | V _{(BR)GSS} | I _G = ±10 μA, V _{DS} = 0 V | ±30 | - | - | V | |
| Drain cut-off current | I _{DSS} | V _{DS} = 200 V, V _{GS} = 0 V | - | - | 10 | μA | |
| Drain-source breakdown voltage | V _{(BR)DSS} | I _D = 250 μA, V _{GS} = 0 V | 200 | - | - | V | |
| Break Voltage Temperature Coefficient | $\frac{\Delta BV_{DSS}}{\Delta T_J}$ | I _D =250μA, Referenced to 25°C | - | 0.2 | - | V/°C | |
| Gate threshold voltage | V _{GS(th)} | V _{DS} = 10 V, I _D =250 μA | 2 | - | 4 | V | |
| Drain-source ON resistance | R _{DS(ON)} | V _{GS} = 10 V, I _D = 4.5A | - | - | 0.4 | Ω | |
| Forward Transconductance | g _{fs} | V _{DS} = 50 V, I _D = 4.5A | - | 7.05 | - | S | |
| Input capacitance | C _{iss} | V _{DS} = 25 V, | - | 500 | 720 | pF | |
| Reverse transfer capacitance | C _{rss} | V _{GS} = 0 V, | - | 23 | 30 | | |
| Output capacitance | C _{oss} | f = 1 MHz | - | 85 | 110 | | |
| Switching time | Rise time | t _r | V _{DD} = 100 V, I _D = 9 A R _G =12 Ω (Note4,5) | - | 11 | 30 | ns |
| | Turn-on time | t _{on} | | - | 70 | 150 | |
| | Fall time | t _f | | - | 60 | 130 | |
| | Turn-off time | t _{off} | | - | 65 | 140 | |
| Total gate charge (gate-source plus gate-drain) | Q _g | V _{DD} = 160 V, V _{GS} = 10 V, I _D = 9 A | - | 22 | 29 | nC | |
| Gate-source charge | Q _{gs} | (Note4,5) | - | 3.6 | - | | |
| 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} | - | - | - | 9 | A |
| Pulse drain reverse current | I _{DRP} | - | - | - | 36 | A |
| Forward voltage (diode) | V _{DSF} | I _{DR} = 9 A, V _{GS} = 0 V | - | 1.4 | 1.5 | V |
| Reverse recovery time | t _{rr} | I _{DR} = 9A, V _{GS} = 0 V, | - | 140 | - | ns |
| Reverse recovery charge | Q _{rr} | dI _{DR} / dt = 100 A / μs | - | 1.1 | 2.2 | μC |

- Note 1.Repeativity rating :pulse width limited by junction temperature
2.L=500uH,I_{AS}=9A,V_{DD}=50V,R_G=0Ω,Starting T_J=25°C
3.I_{SD}≤9A,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

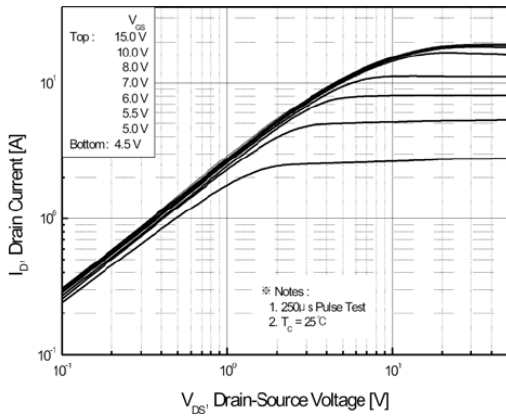


Fig. 1 On-State Characteristics

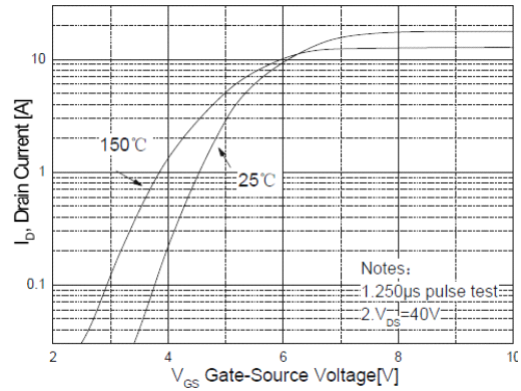


Fig. 2 Transfer Characteristics

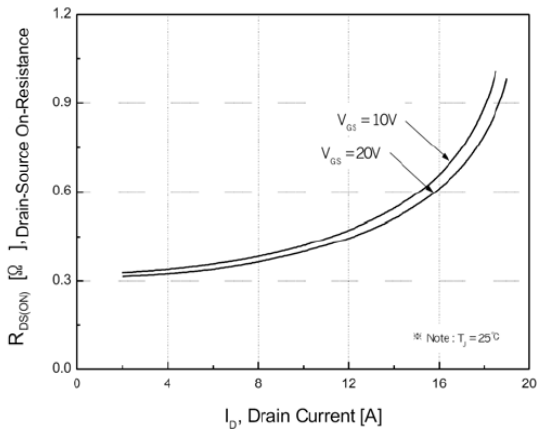


Fig. 3 On-Resistance Variation vs Drain Current

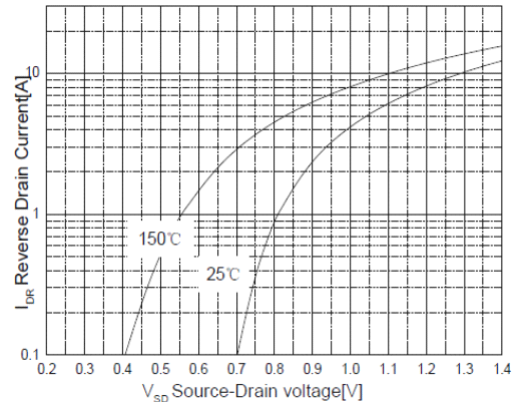


Fig. 4 Body Diode Forward Voltage Variation vs. Source Current and Temperature

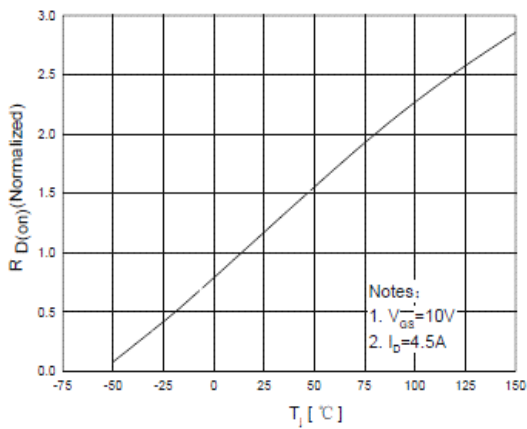


Fig. 5 On-Resistance Variation vs Junction Temperature

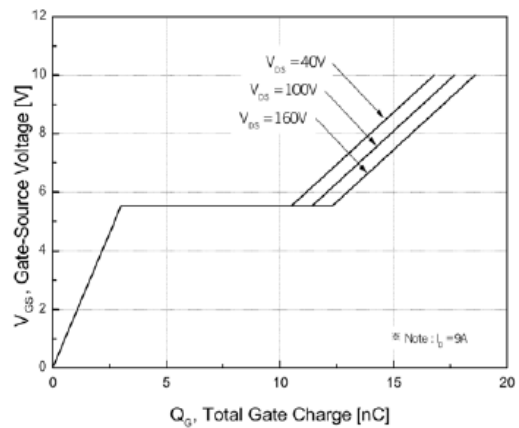


Fig. 6 Gate Charge Characteristics

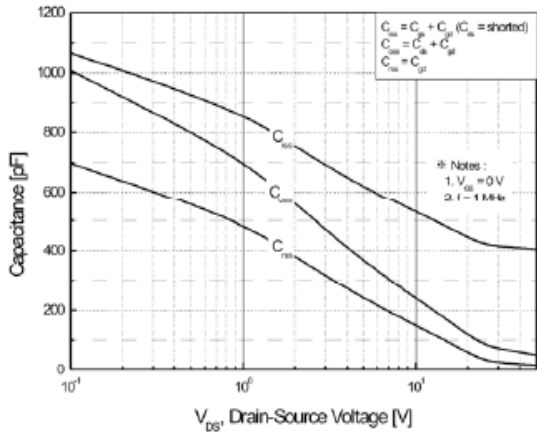


Fig.8 Capacitance Characteristics

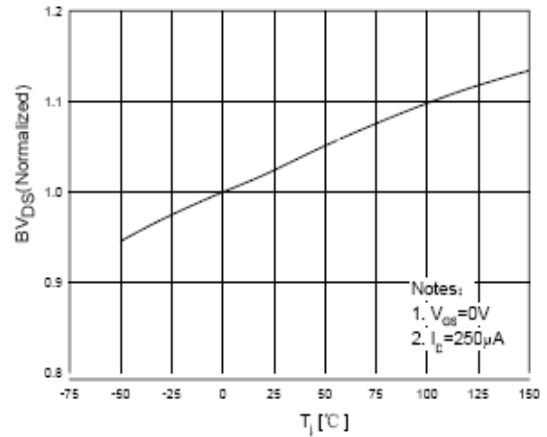


Fig.9 Breakdown Voltage Variation vs. Temperature

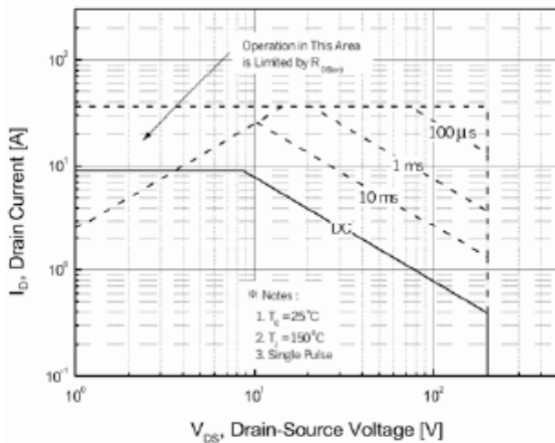


Fig.9 Maximum Safe Operation Area

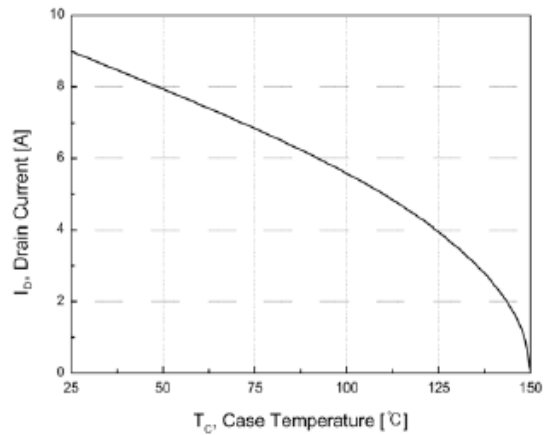


Fig.10 Maximum Drain Current vs Case Temperature

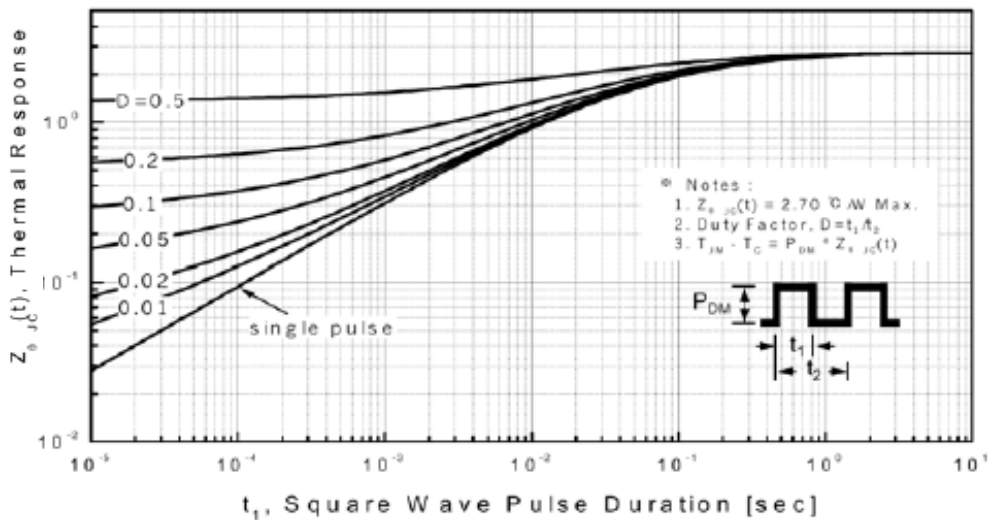


Fig.11 Transient Thermal Response Curve

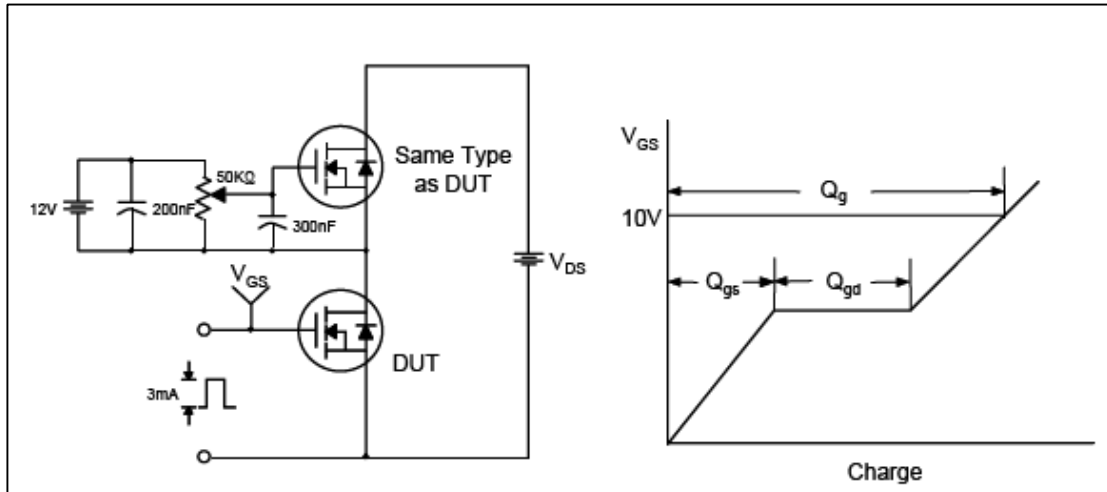


Fig.10 Gate Test Circuit & Waveform

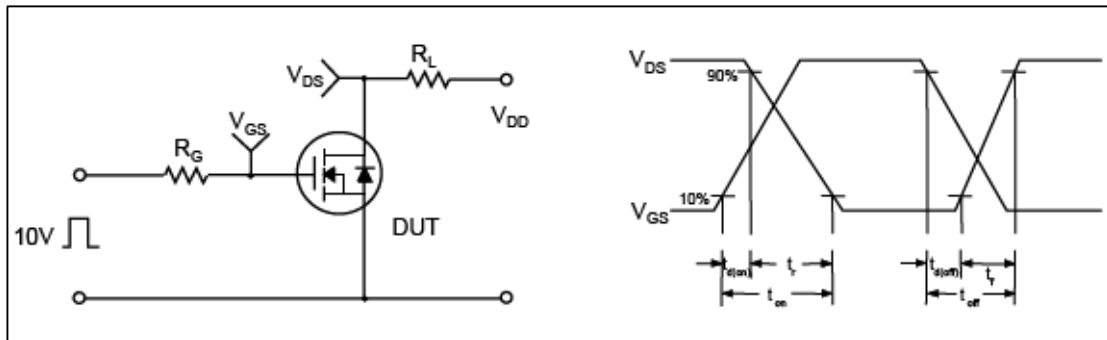


Fig.11 Resistive Switching Test Circuit & Waveform

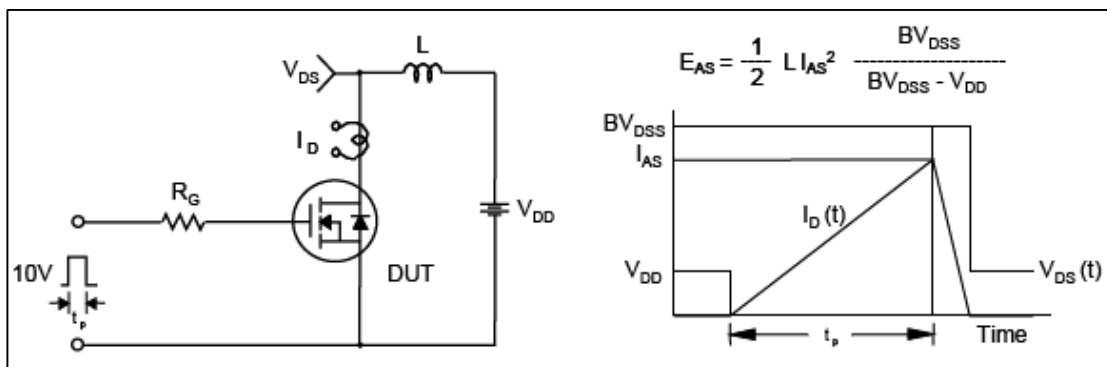


Fig.12 Unclamped Inductive Switching Test Circuit & Waveform

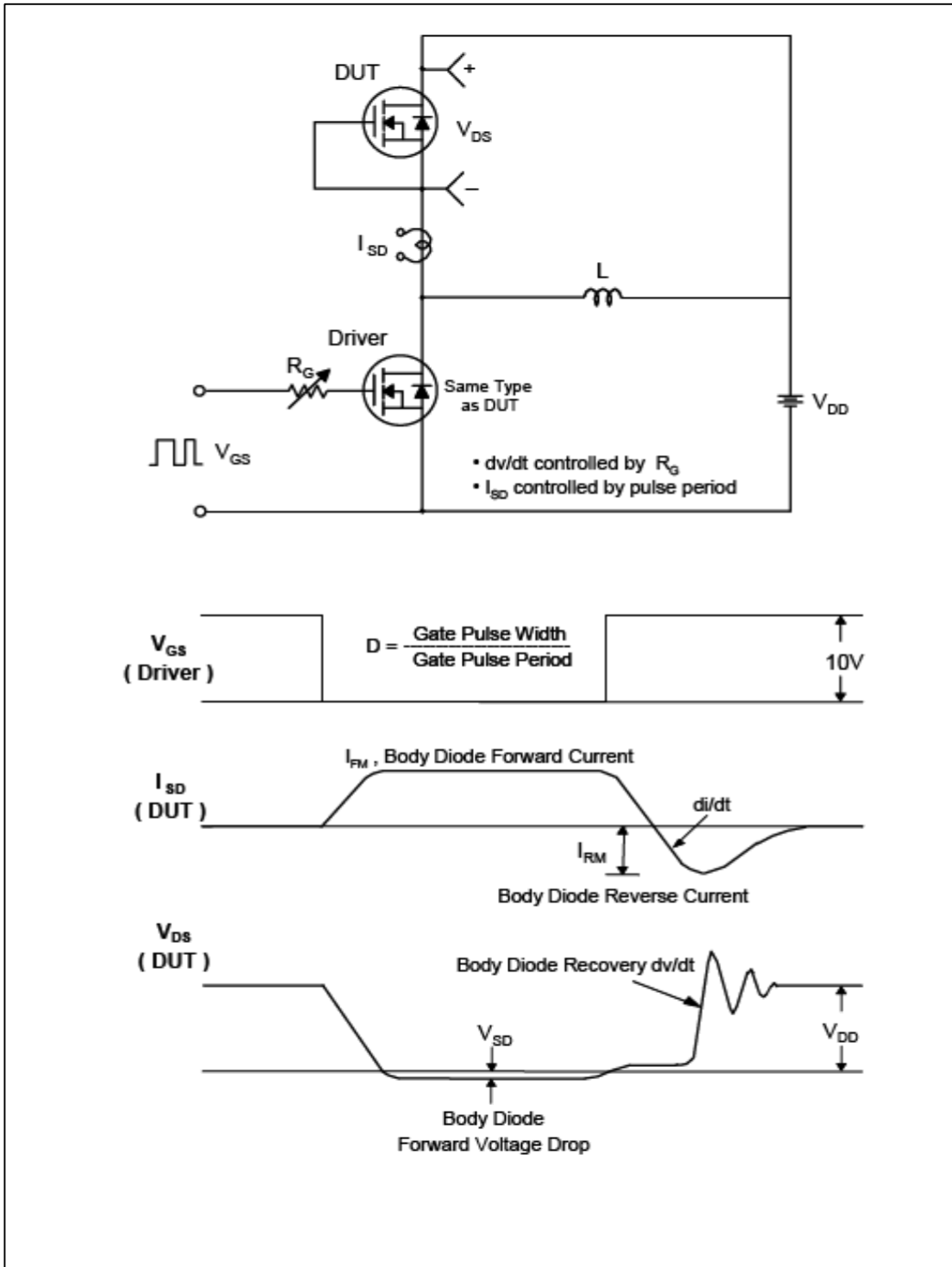


Fig.13 Peak Diode Recovery dv/dt Test Circuit & Waveform

TO-220F Package Dimension

