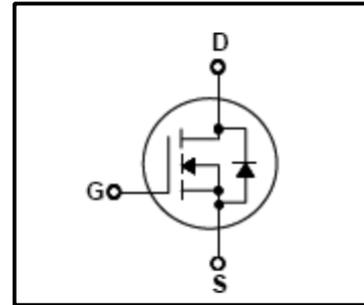


Silicon N-Channel MOSFET

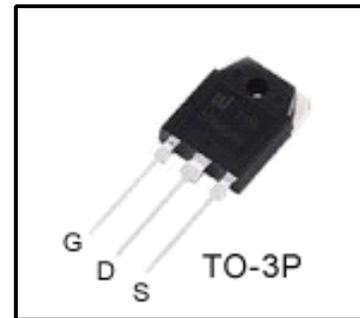
Features

- 13A,500V, $R_{DS(on)}$ (Max0.46Ω) $@V_{GS}=10V$
- Ultra-low Gate charge(Typical 43nC)
- 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 device is specially well suited for high efficiency switch mode power supplies, power factor correction and half bridge and full bridge resonant topology line a electronic lamp ballast.



Absolute Maximum Ratings

| Symbol | Parameter | Value | Units |
|----------------|--|---------|-------|
| V_{DSS} | Drain Source Voltage | 500 | V |
| I_D | Continuous Drain Current(@Tc=25°C) | 13 | A |
| | Continuous Drain Current(@Tc=100°C) | 8 | A |
| I_{DM} | Drain Current Pulsed (Note1) | 52 | A |
| V_{GS} | Gate to Source Voltage | ±30 | V |
| E_{AS} | Single Pulsed Avalanche Energy (Note2) | 845 | mJ |
| E_{AR} | Repetitive Avalanche Energy (Note1) | 5 | mJ |
| dv/dt | Peak Diode Recovery dv /dt (Note3) | 3.5 | V/ ns |
| P_D | Total Power Dissipation(@Tc=25°C) | 218 | W |
| | Derating Factor above 25°C | 1.56 | W/°C |
| T_J, T_{stg} | Junction and Storage Temperature | -55~150 | °C |
| T_L | Channel Temperature | 300 | °C |

Thermal Characteristics

| Symbol | Parameter | Value | | | Units |
|-----------|---|-------|-----|------|-------|
| | | Min | Typ | Max | |
| R_{QJC} | Thermal Resistance , Junction -to -Case | - | - | 0.58 | °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} =±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} =500V,V _{GS} =0V | - | - | 1 | μA |
| | | | V _{DS} =400V,TC=125°C | | | 10 | μA |
| Drain -source breakdown voltage | | V _{(BR)DSS} | I _D =250 μA,V _{GS} =0V | 500 | - | - | V |
| Breakdown voltage Temperature Coefficient | | ΔBV _{DSS} /ΔT _J | I _D =250μA,Referenced to 25°C | - | 0.5 | - | V/°C |
| Gate threshold voltage | | V _{GS(th)} | V _{DS} =10V,I _D =250 μA | 3 | - | 4.5 | V |
| Drain -source ON resistance | | R _{DS(ON)} | V _{GS} =10V,I _D =6.5A | - | 0.37 | 0.46 | Ω |
| Forward Transconductance | | g _{fs} | V _{DS} =50V,I _D =6.5A | - | 15 | - | S |
| Input capacitance | | C _{iss} | V _{DS} =25V, | - | 1580 | 2055 | pF |
| Reverse transfer capacitance | | C _{rss} | V _{GS} =0V, | - | 20 | 25 | |
| Output capacitance | | C _{oss} | f=1MHz | - | 180 | 235 | |
| Switching time | Rise time | t _r | V _{DD} =250V, | - | 25 | 60 | ns |
| | Turn-on time | t _{on} | I _D =13A | - | 100 | 210 | |
| | Fall time | t _f | R _G =9.1Ω | - | 130 | 270 | |
| | Turn-off time | t _{off} | R _D =31Ω (Note4,5) | - | 100 | 210 | |
| Total gate charge(gate-source plus gate-drain) | | Q _g | V _{DD} =400V, V _{GS} =10V, | - | 43 | 56 | nC |
| Gate-source charge | | Q _{gs} | I _D =13A | - | 7.5 | - | |
| Gate-drain("miller") Charge | | Q _{gd} | (Note4,5) | - | 18.5 | - | |

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

| Characteristics | Symbol | Test Condition | Min | Type | Max | Unit |
|----------------------------------|------------------|---|-----|------|------|------|
| Continuous drain reverse current | I _{DR} | - | - | - | 13 | A |
| Pulse drain reverse current | I _{DRP} | - | - | - | 52 | A |
| Forward voltage(diode) | V _{DSF} | I _{DR} =13A,V _{GS} =0V | - | - | 1.4 | V |
| Reverse recovery time | t _{rr} | I _{DR} =13A,V _{GS} =0V, | - | 442 | 633 | ns |
| Reverse recovery charge | Q _{rr} | dI _{DR} / dt =100 A / μs | - | 2.16 | 3.24 | μC |

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

2.L=500uH I_{AS}=13A,V_{DD}=50V,R_G=0Ω,Starting T_J=25°C

3.I_{SD}≤13A,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



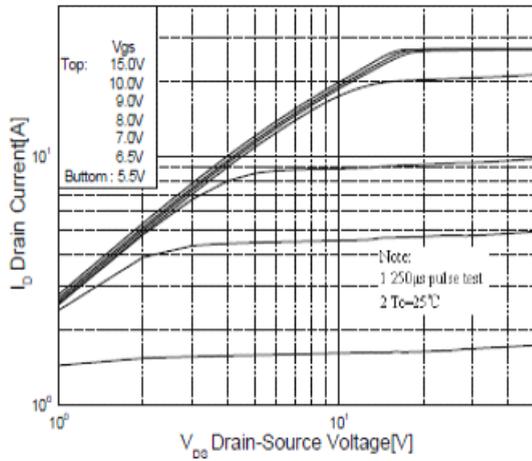


Fig.1 On State Characteristics

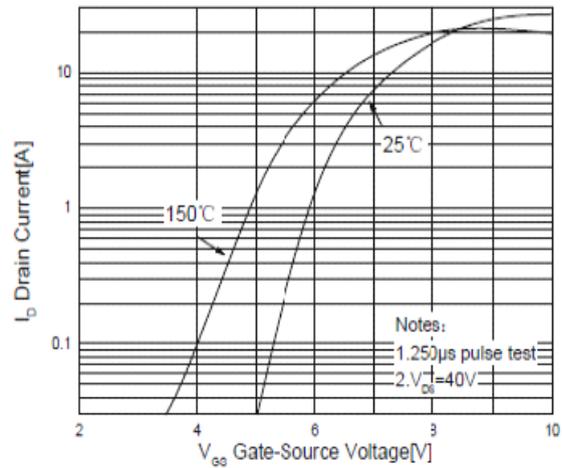


Fig.2 Transfer Characteristics

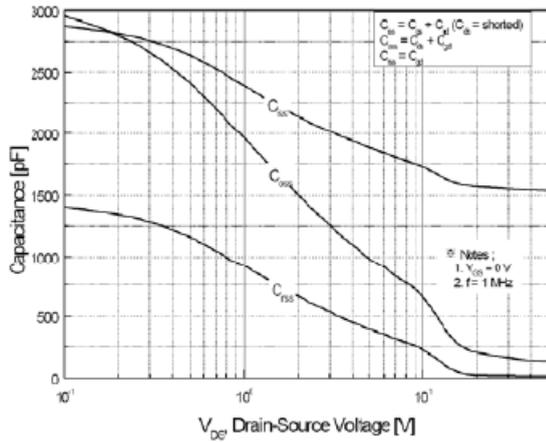


Fig.3 Capacitance Variation vs Drain Voltage

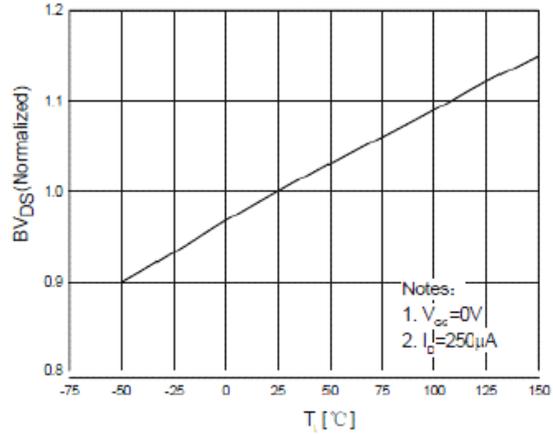


Fig.4 Maximum Avalanche Energy vs On-State Current

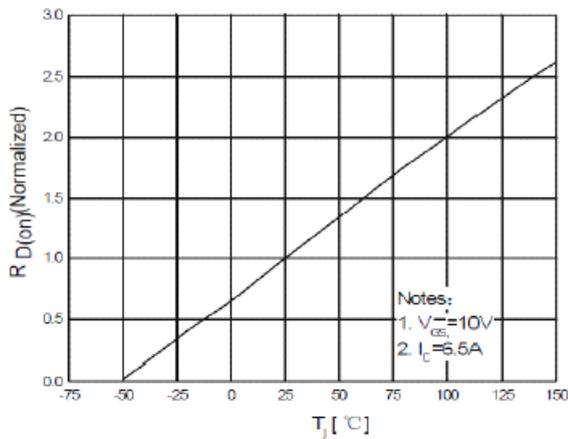


Fig.5 On-Resistance Variation vs Junction temperature

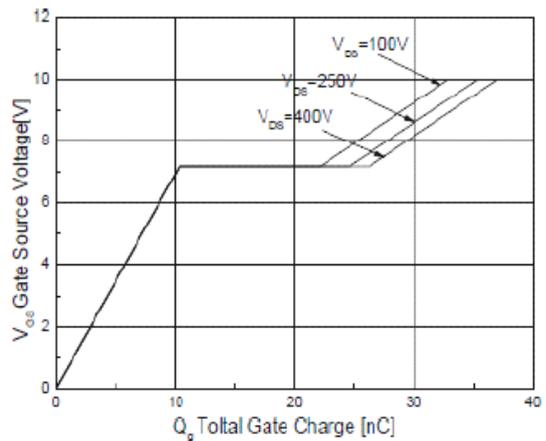


Fig.6 Gate Charge Characteristics

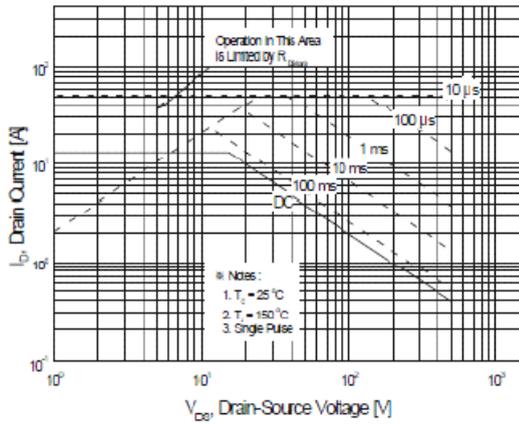


Fig.7 Maximum Safe Operation Area

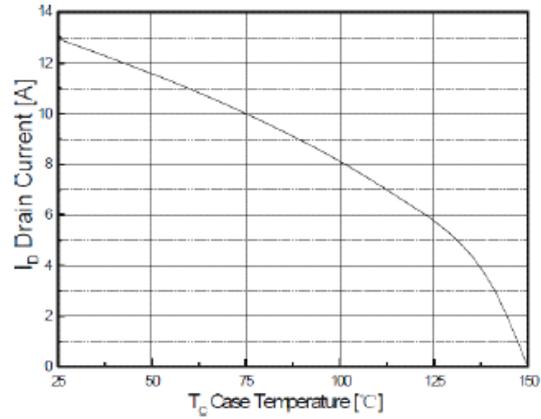


Fig.8 Maximum Drain Current vs Case temperature

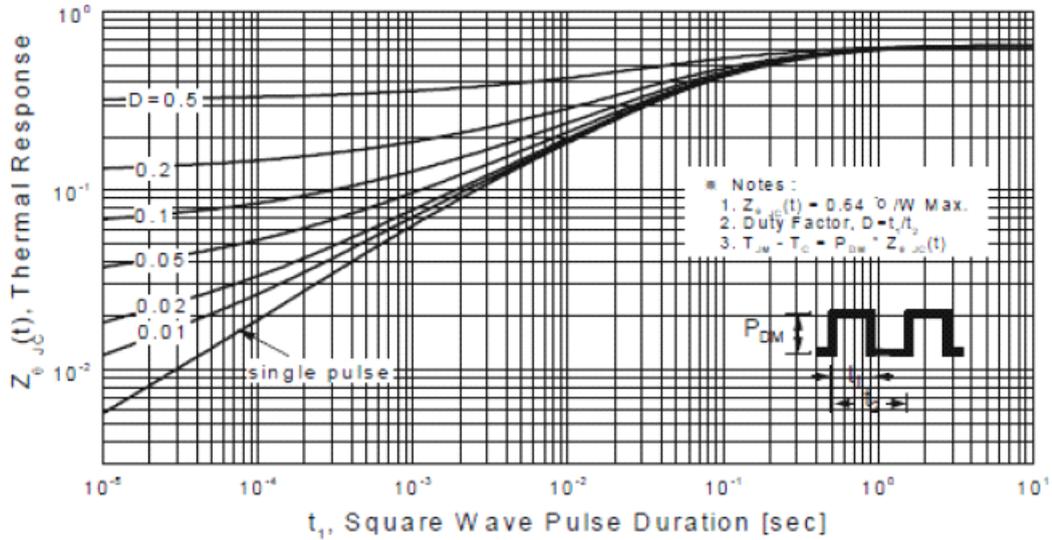


Fig.9 Transient thermal Response Curve

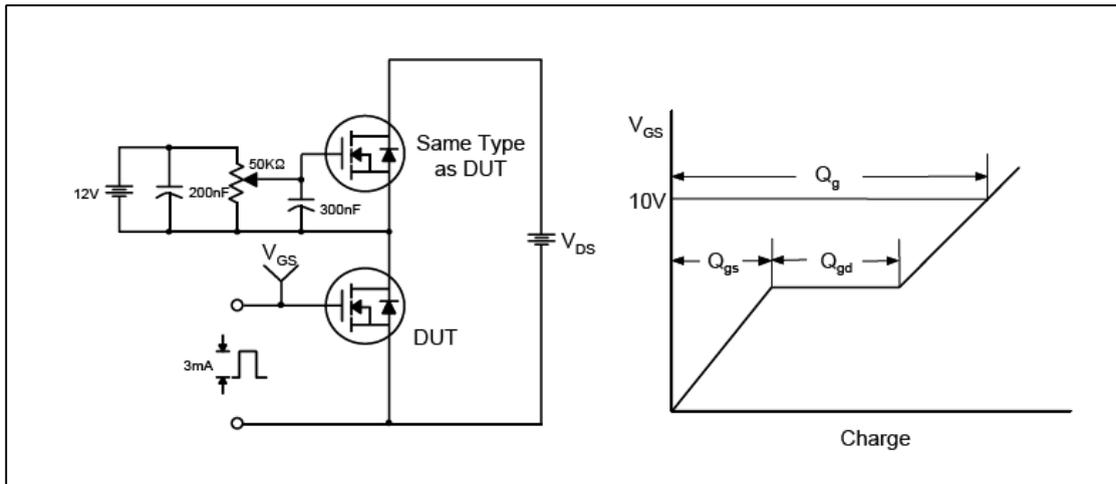


Fig.10 Gate Test circuit & Waveform

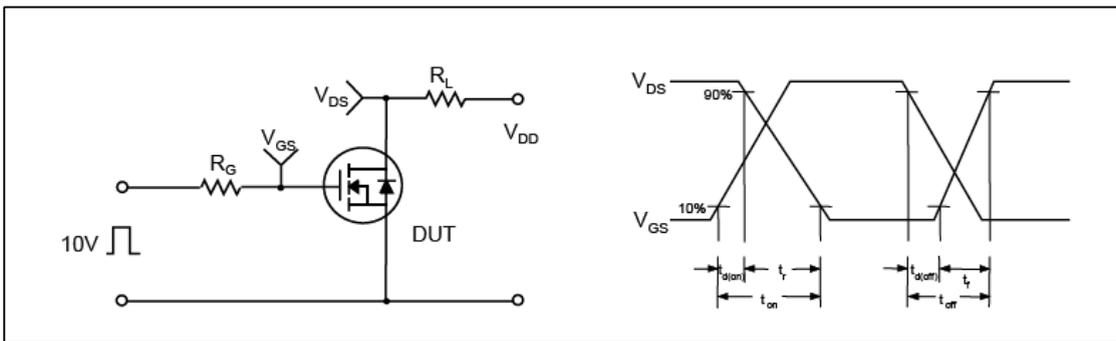


Fig.11 Resistive Switching Test Circuit & Waveform

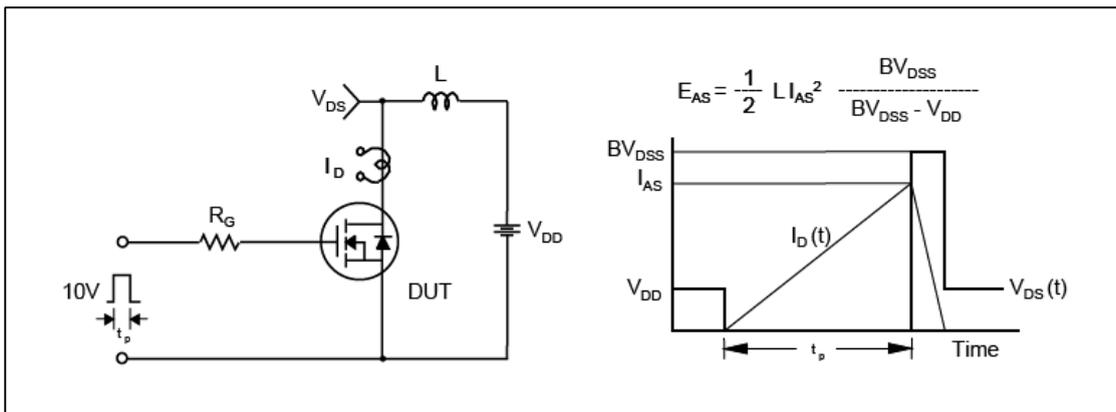


Fig.12 Unclamped Inductive Switching Test Circuit & Waveform

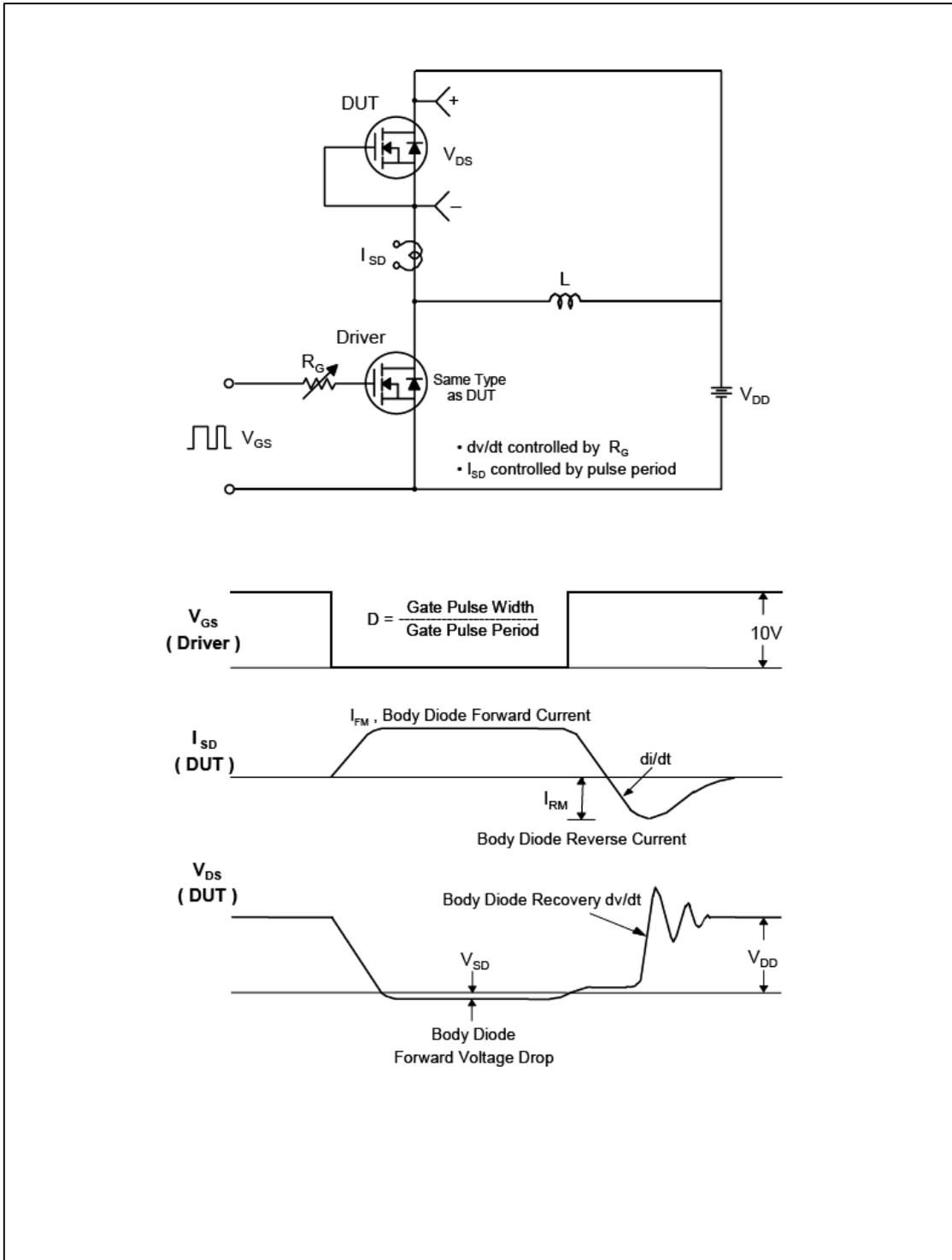


Fig.13 Peak Diode Recovery dv/dt Test Circuit & Waveform

TO-3P Package Dimension

