

SAMWIN

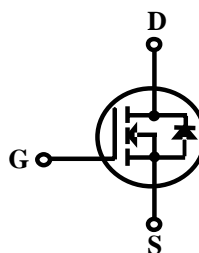
SW830

Features

- **N-Channel MOSFET**
- **BV_{DSS} (Minimum) : 500 V**
- **$R_{DS(ON)}$ (Maximum) : 1.4 ohm**
- **I_D : 5.0 A**
- **Q_g (Typical) : 28 nc**
- **P_D (@TC=25 °C) : 73 W**

General Description

This power MOSFET is produced in CHMC with advanced VDMOS technology of SAMWIN. This technology enable power MOSFET to have better characteristics, such as fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics. It is mainly suitable for half bridge or full bridge resonant topology like a electronic ballast, and also low power switching mode power appliances.



Absolute Maximum Ratings

| Symbol | Parameter | Value | Units |
|----------------|--|----------|-------|
| V_{DSS} | Drain to Source Voltage | 500 | V |
| I_D | Continuous Drain Current (@Tc=25°C) | 5.5 | A |
| | Continuous Drain Current (@Tc=100°C) | 3.7 | A |
| I_{DM} | Drain Current Pulsed (Note 1) | 22 | A |
| V_{GS} | Gate to Source Voltage | ±30 | V |
| E_{AS} | Single Pulsed Avalanche Energy (Note 2) | 390 | mJ |
| E_{AR} | Repetitive Avalanche Energy (Note 1) | 7.3 | mJ |
| dv/dt | Peak Diode Recovery dv/dt (Note 3) | 3.5 | V/ns |
| P_D | Total Power Dissipation (@Tc=25°C) | 73 | W |
| | Derating Factor above 25°C | 0.58 | W/°C |
| T_{STG}, T_J | Operating junction temperature & Storage temperature | -55~+150 | °C |
| T_L | Maximum Lead Temperature for soldering purpose, 1/8 from Case for 5 seconds. | 300 | °C |

Thermal Characteristics

| Symbol | Parameter | Value | | | Units |
|-----------------|---|-------|-----|------|-------|
| | | Min | Typ | Max | |
| $R_{\theta JC}$ | Thermal Resistance, Junction-to-Case | - | - | 1.71 | °C/W |
| $R_{\theta CS}$ | Thermal Resistance, Case-to-Sink | - | 0.5 | - | °C/W |
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient | - | - | 62 | °C/W |

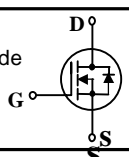
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Electrical Characteristics (Tc=25°C unless otherwise noted)

| Symbol | Parameter | Test Conditions | Value | | | Units |
|--------------------------------|---|---|-------|-----|------|-------|
| | | | Min | Typ | Max | |
| Off Characteristics | | | | | | |
| BV _{DSS} | Drain- Source Breakdown Voltage | V _{GS} =0V, I _D =250uA | 500 | - | - | V |
| $\Delta BV_{DSS}/\Delta T_j$ | Breakdown Voltage Temperature coefficient | I _D =250uA, referenced to 25°C | - | 0.6 | - | V/°C |
| I _{DSS} | Drain-Source Leakage Current | V _{DS} =500V, V _{GS} =0V | - | - | 1 | uA |
| | | V _{DS} =400V, Tc=125°C | | | | |
| I _{GSS} | Gate-Source Leakage Current | V _{GS} =30V, V _{DS} =0V | - | - | 100 | nA |
| | Gate-Source Leakage Reverse | V _{GS} =-30V, V _{DS} =0V | - | - | -100 | nA |
| On Characteristics | | | | | | |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} =V _{GS} , I _D =250uA | 2.0 | - | 4.0 | V |
| R _{DS(ON)} | Static Drain-Source On-state Resistance | V _{GS} =10V, I _D =2.5A | - | - | 1.4 | ohm |
| Dynamic Characteristics | | | | | | |
| C _{iss} | Input Capacitance | V _{GS} =0V, V _{DS} =25V, f=1MHz | - | - | 1100 | pF |
| C _{oss} | Output Capacitance | | - | - | 115 | |
| C _{rss} | Reverse Transfer Capacitance | | - | - | 32 | |
| Dynamic Characteristics | | | | | | |
| t _{d(on)} | Turn-on Delay Time | V _{DD} =250V, I _D =5A R _G =50ohm (Note4,5) | - | - | 40 | ns |
| t _r | Rise Time | | - | - | 50 | |
| t _{d(off)} | Turn-off Delay Time | | - | - | 170 | |
| t _f | Fall Time | | - | - | 50 | |
| Q _g | Total Gate Charge | V _{DS} =400V, V _{GS} =10V, I _D =5A (Note4,5) | - | 28 | 37 | nC |
| Q _{gs} | Gate-Source Charge | | - | 4 | - | |
| Q _{gd} | Gate-Drain Charge (Miller Charge) | | - | 12 | - | |

Source-Drain Diode Ratings and Characteristics

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit. |
|-----------------|---------------------------|--|------|------|------|-------|
| I _S | Continuous Source Current | Integral Reverse p-n Junction Diode in the MOSFET  | - | - | 5 | A |
| I _{SM} | Pulsed Source Current | | - | - | 20 | |
| V _{SD} | Diode Forward Voltage | I _S =5A, V _{GS} =0V | - | - | 1.5 | V |
| t _{rr} | Reverse Recovery Time | I _S =5A, V _{GS} =0V di/dt=100A/us | - | 330 | - | ns |
| Q _{rr} | Reverse Recovery Charge | | - | 1.5 | - | uc |

※NOTES

1. Repeatability rating: pulse width limited by junction temperature
2. L=28.1mH, I_{AS}=5A, V_{DD}=50V, R_G=0ohm, Starting T_J=25°C
3. I_{SD}≤5A, di/dt≤100A/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.

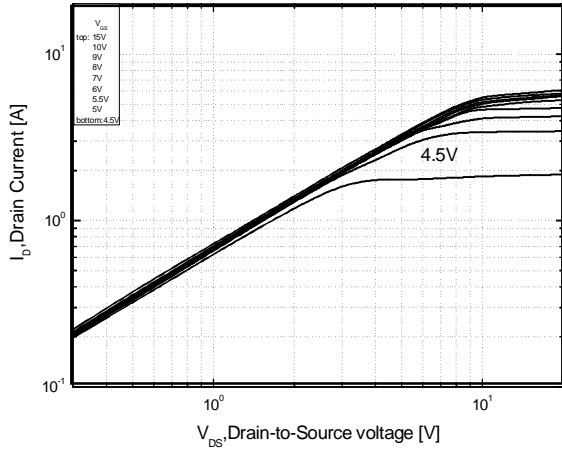


Fig 1. On-State Characteristics

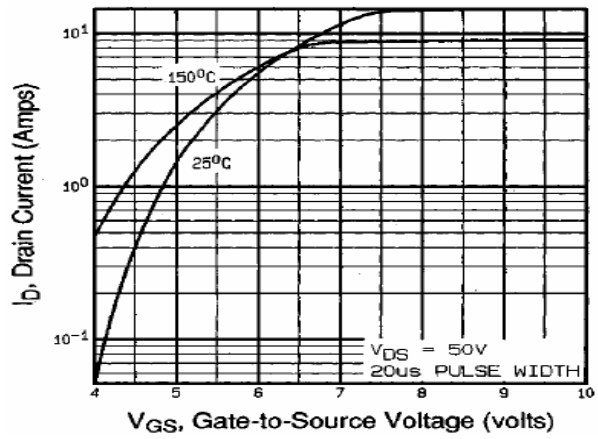


Fig 2. Transfer Characteristics

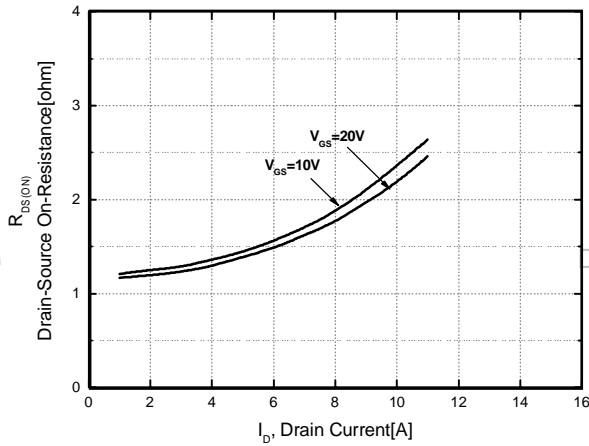


Fig 3. On Resistance Variation vs. Drain Current and Gate Voltage

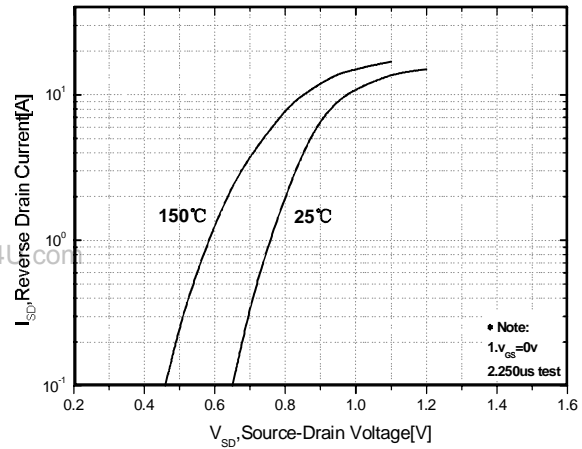


Fig 4. On State Current vs. Allowable Case Temperature

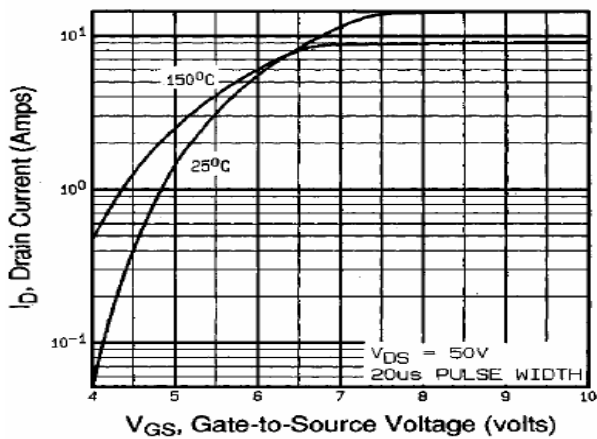


Fig 5. Capacitance Characteristics (Non-Repetitive)

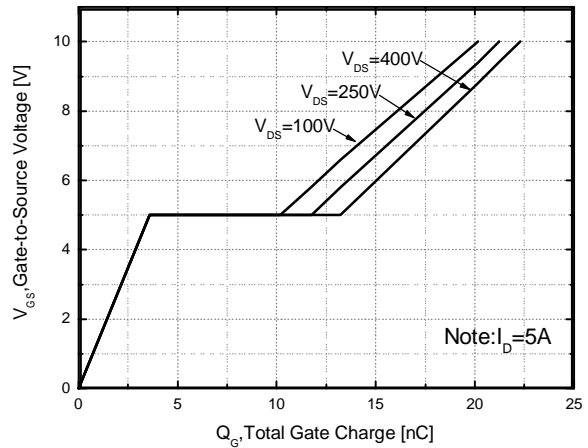


Fig 6. Gate Charge Characteristics

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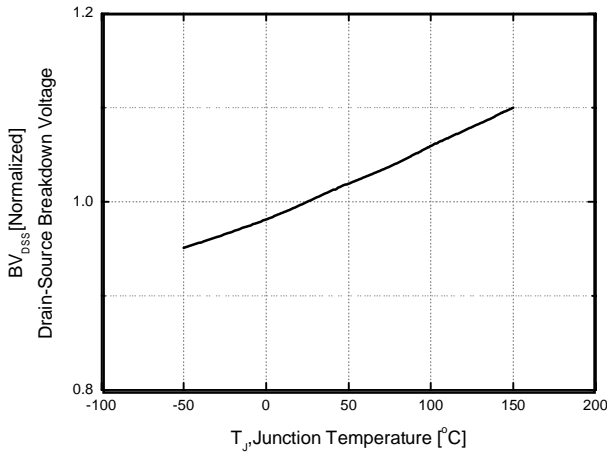


Fig 7. Breakdown Voltage Variation vs. Junction Temperature

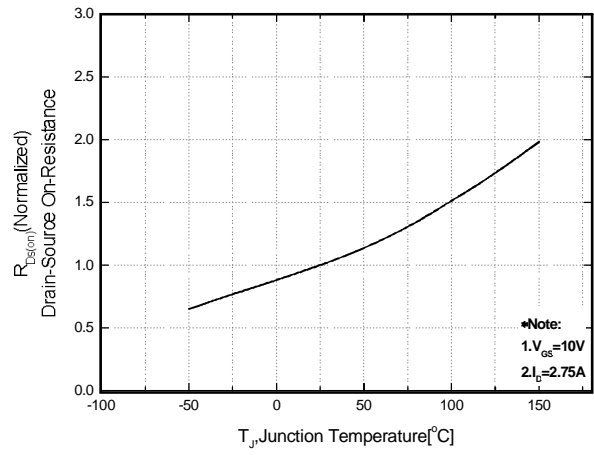


Fig 8. On-Resistance Variation vs. Junction Temperature

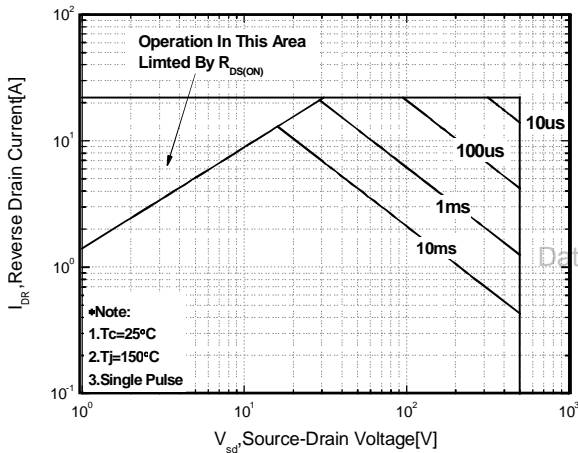


Fig 9. Maximum Safe Operating

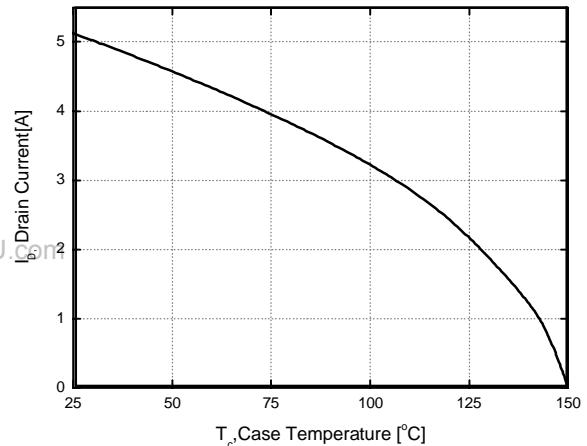


Fig 10. Maximum Drain Current Vs. Case Temperature

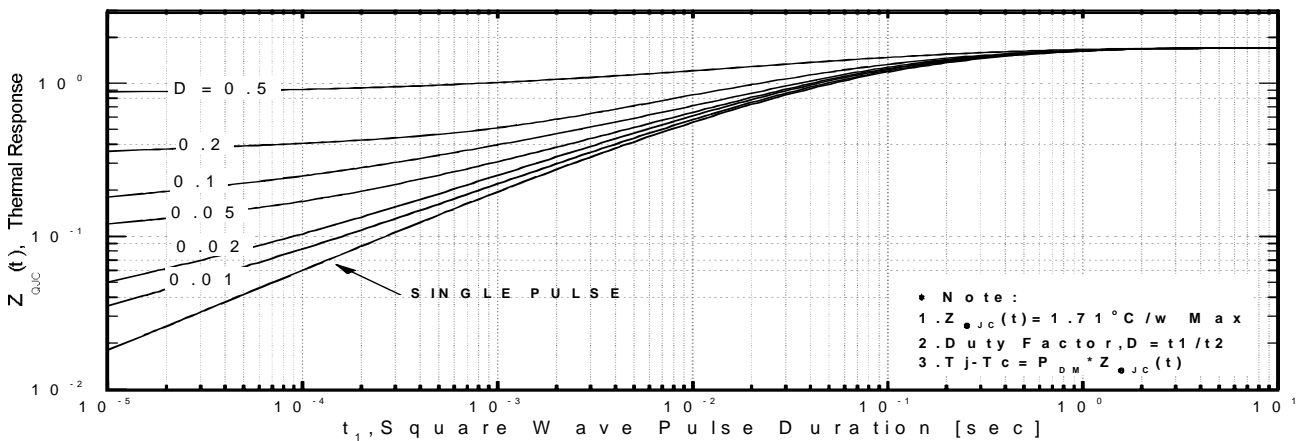


Fig 11. Transient Thermal Response Curve

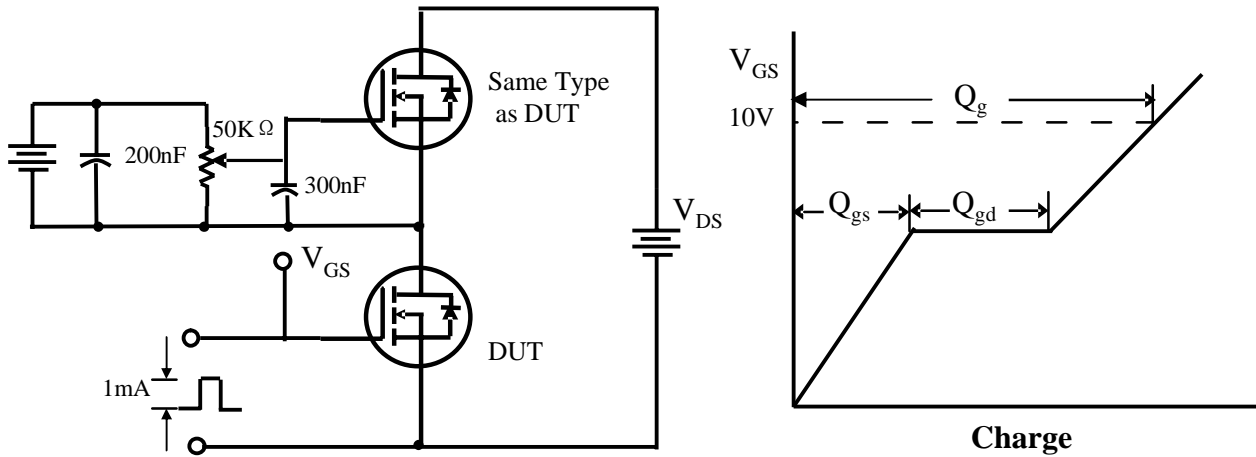


Fig 12. Gate Charge test Circuit & Waveforms

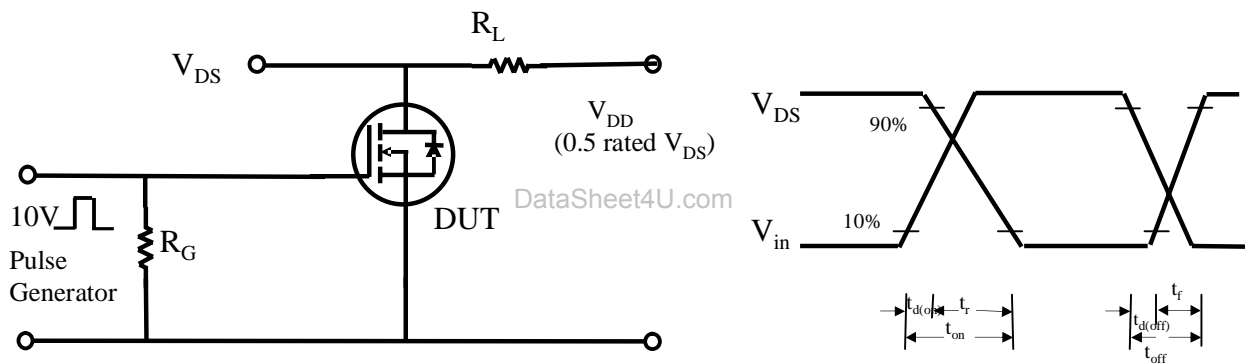


Fig 13. Switching test Circuit & Waveforms

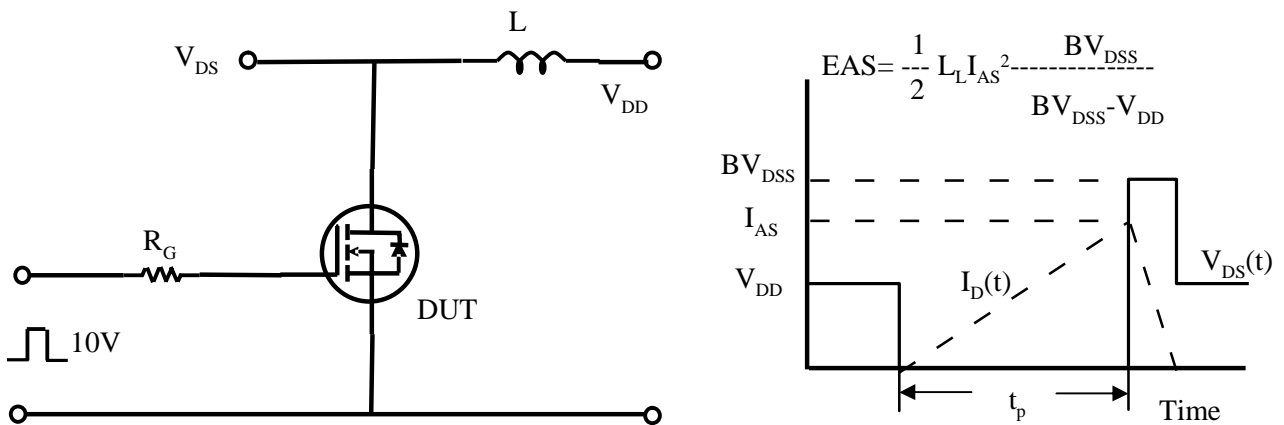


Fig 14. Unclamped Inductive Switching test Circuit & Waveforms

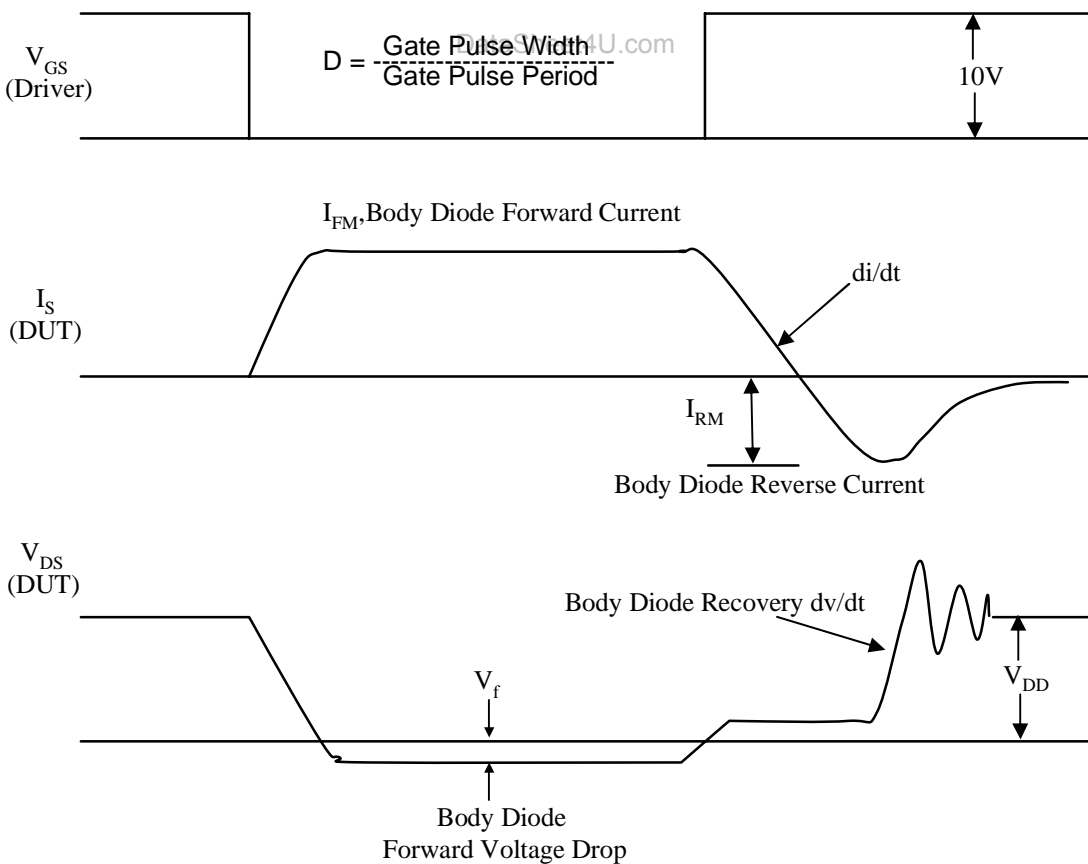
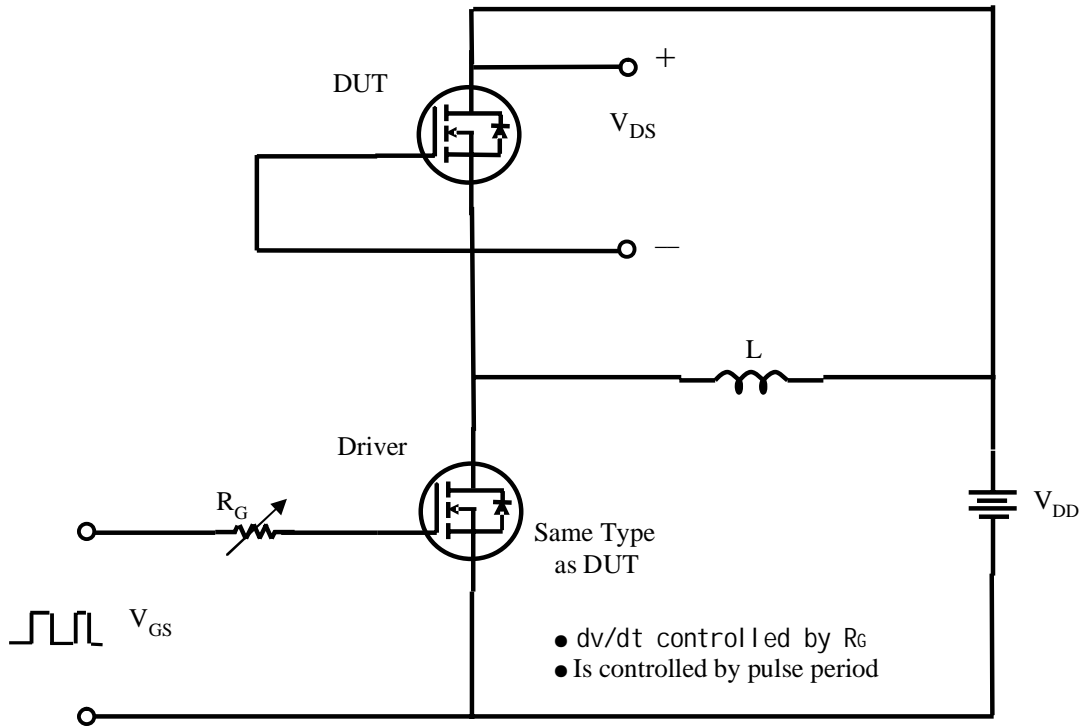


Fig 15. Peak Diode Recovery dv/dt test Circuit & Waveforms