

**FEATURES**

- Avalanche Rugged Technology
- Rugged Gate Oxide Technology
- Lower Input Capacitance
- Improved Gate Charge
- Extended Safe Operating Area
- Lower Leakage Current : 25  $\mu$ A (Max.) @  $V_{DS} = 800V$
- Low  $R_{DS(ON)}$  : 1.824  $\Omega$  (Typ.)

$$BV_{DSS} = 800 V$$

$$R_{DS(on)} = 2.2 \Omega$$

$$I_D = 3 A$$

TO-220F



1.Gate 2. Drain 3. Source

**Absolute Maximum Ratings**

| Symbol         | Characteristic  | Value        | Units      |
|----------------|---|--------------|------------|
| $V_{DSS}$      | Drain-to-Source Voltage   | 800          | V          |
| $I_D$          | Continuous Drain Current ( $T_C=25^\circ C$ )                           | 3            | A          |
|                | Continuous Drain Current ( $T_C=100^\circ C$ )                          | 1.9          |            |
| $I_{DM}$       | Drain Current-Pulsed  | 20           | A          |
| $V_{GS}$       | Gate-to-Source Voltage ①  | $\pm 30$     | V          |
| $E_{AS}$       | Single Pulsed Avalanche Energy ②  | 336          | mJ         |
| $I_{AR}$       | Avalanche Current ①   | 3            | A          |
| $E_{AR}$       | Repetitive Avalanche Energy ①   | 4.5          | mJ         |
| dv/dt          | Peak Diode Recovery dv/dt ③   | 2.0          | V/ns       |
| $P_D$          | Total Power Dissipation ( $T_C=25^\circ C$ )                            | 45           | W          |
|                | Linear Derating Factor  | 0.36         |            |
| $T_J, T_{STG}$ | Operating Junction and Storage Temperature Range                        | - 55 to +150 | $^\circ C$ |
| $T_L$          | Maximum Lead Temp. for Soldering Purposes, 1/8" from case for 5-seconds | 300          |            |

**Thermal Resistance**

| Symbol          | Characteristic      | Typ. | Max. | Units                    |
|-----------------|---------------------|------|------|--------------------------|
| $R_{\theta JC}$ | Junction-to-Case    | --   | 2.78 | $i \text{ } \acute{E}/W$ |
| $R_{\theta JA}$ | Junction-to-Ambient | --   | 62.5 |                          |

### Electrical Characteristics (T<sub>C</sub>=25 °C unless otherwise specified)

| Symbol              | Characteristic                          | Min. | Typ. | Max. | Units | Test Condition   |
|---------------------|---|------|------|------|-------|--|
| BV <sub>DSS</sub>   | Drain-Source Breakdown Voltage          | 800  | --   | --   | V     | V <sub>GS</sub> =0V, I <sub>D</sub> =250μA   |
| ΔBV/ΔT <sub>J</sub> | Breakdown Voltage Temp. Coeff.          | --   | 0.97 | --   | V/°C  | I <sub>D</sub> =250μA <b>See Fig 7</b>   |
| V <sub>GS(th)</sub> | Gate Threshold Voltage                  | 2.0  | --   | 3.5  | V     | V <sub>DS</sub> =5V, I <sub>D</sub> =250μA   |
| I <sub>GSS</sub>    | Gate-Source Leakage, Forward            | --   | --   | 100  | nA    | V <sub>GS</sub> =30V   |
|                     | Gate-Source Leakage, Reverse            | --   | --   | -100 |       | V <sub>GS</sub> =-30V  |
| I <sub>DSS</sub>    | Drain-to-Source Leakage Current         | --   | --   | 25   | μA    | V <sub>DS</sub> =700V  |
|                     |   | --   | --   | 250  |       | V <sub>DS</sub> =560V, T <sub>C</sub> =125 °C  |
| R <sub>DS(on)</sub> | Static Drain-Source On-State Resistance | --   | --   | 2.2  | Ω     | V <sub>GS</sub> =10V, I <sub>D</sub> =2A <b>④*</b>   |
| g <sub>fs</sub>     | Forward Transconductance                | --   | 2.92 | --   | Ω     | V <sub>DS</sub> =50V, I <sub>D</sub> =2A <b>④</b>  |
| C <sub>iss</sub>    | Input Capacitance                       | --   | 1100 | 1430 | pF    | V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, f = 1MHz<br><b>See Fig 5</b>  |
| C <sub>oss</sub>    | Output Capacitance                      | --   | 110  | 130  |       |  |
| C <sub>rss</sub>    | Reverse Transfer Capacitance            | --   | 46   | 55   |       |  |
| t <sub>d(on)</sub>  | Turn-On Delay Time                      | --   | 21   | 50   | ns    | V <sub>DD</sub> =350V, I <sub>D</sub> =6A,<br>R <sub>G</sub> =11.5Ω<br><b>See Fig 13</b> <b>④ ⑤</b>            |
| t <sub>r</sub>      | Rise Time                               | --   | 40   | 90   |       |  |
| t <sub>d(off)</sub> | Turn-Off Delay Time                     | --   | 91   | 190  |       |  |
| t <sub>f</sub>      | Fall Time                               | --   | 32   | 75   |       |  |
| Q <sub>g</sub>      | Total Gate Charge                       | --   | 52   | 68   | nC    | V <sub>DS</sub> =560V, V <sub>GS</sub> =10V,<br>I <sub>D</sub> =6A<br><b>See Fig 6 &amp; Fig 12</b> <b>④ ⑤</b> |
| Q <sub>gs</sub>     | Gate-Source Charge                      | --   | 8.9  | --   |       |  |
| Q <sub>gd</sub>     | Gate-Drain("Miller") Charge             | --   | 24.7 | --   |       |  |

### Source-Drain Diode Ratings and Characteristics

| Symbol          | Characteristic                 | Min. | Typ. | Max. | Units | Test Condition   |
|-----------------|--------------------------------|------|------|------|-------|--|
| I <sub>S</sub>  | Continuous Source Current      | --   | --   | 3    | A     | Integral reverse pn-diode in the MOSFET                        |
| I <sub>SM</sub> | Pulsed-Source Current <b>①</b> | --   | --   | 20   |       |  |
| V <sub>SD</sub> | Diode Forward Voltage <b>④</b> | --   | --   | 1.4  | V     | T <sub>J</sub> =25 °C, I <sub>S</sub> =3A, V <sub>GS</sub> =0V |
| t <sub>rr</sub> | Reverse Recovery Time          | --   | 470  | --   | ns    | T <sub>J</sub> =25 °C, I <sub>F</sub> =5A                      |
| Q <sub>rr</sub> | Reverse Recovery Charge        | --   | 4.96 | --   | μC    | di <sub>F</sub> /dt=100A/μs <b>④</b>                           |

#### Notes ;

- ① Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature
- ② L=70mH, I<sub>AS</sub>=3A, V<sub>DD</sub>=50V, R<sub>G</sub>=27Ω, Starting T<sub>J</sub>=25 °C
- ③ I<sub>SD</sub>≤5A, di/dt≤130A/μs, V<sub>DD</sub>≤BV<sub>DSS</sub>, Starting T<sub>J</sub>=25 °C
- ④ Pulse Test : Pulse Width = 250 μs, Duty Cycle ≤2%
- ⑤ Essentially Independent of Operating Temperature

Fig 1. Output Characteristics

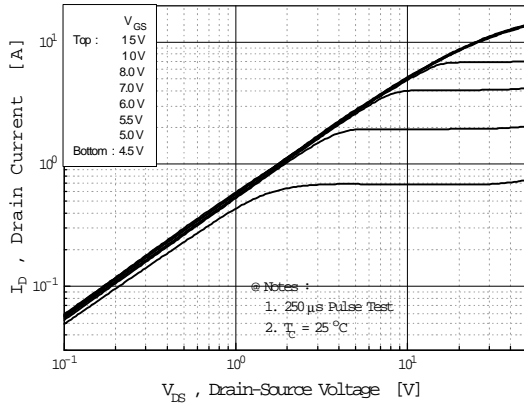


Fig 2. Transfer Characteristics

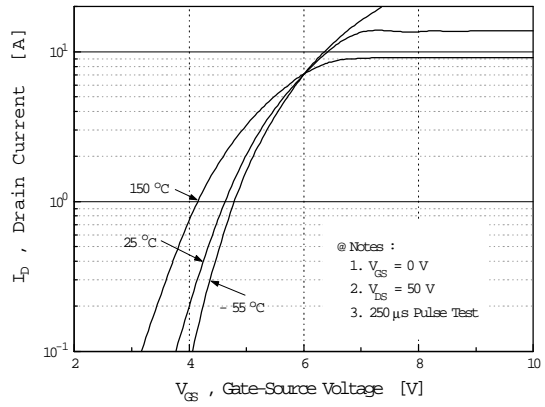


Fig 3. On-Resistance vs. Drain Current

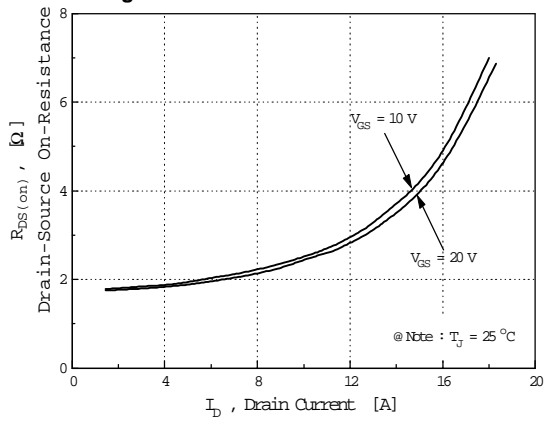


Fig 4. Source-Drain Diode Forward Voltage

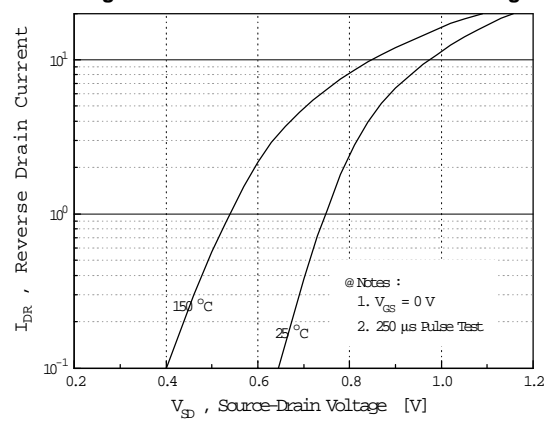


Fig 5. Capacitance vs. Drain-Source Voltage

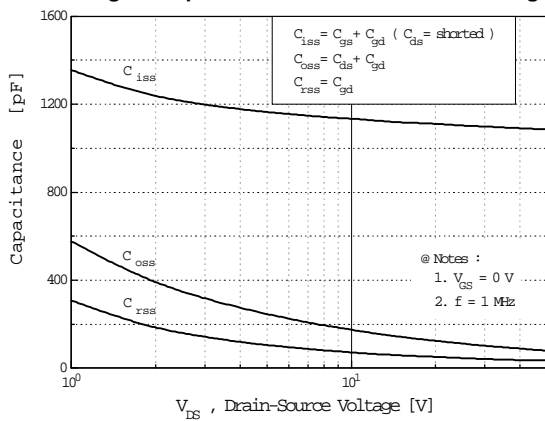
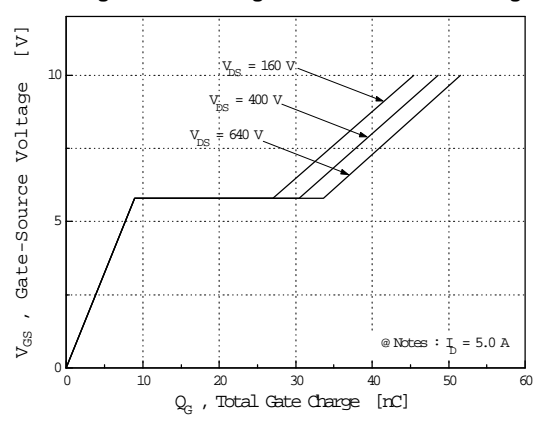


Fig 6. Gate Charge vs. Gate-Source Voltage



# SSS5N80A

## N-CHANNEL POWER MOSFET

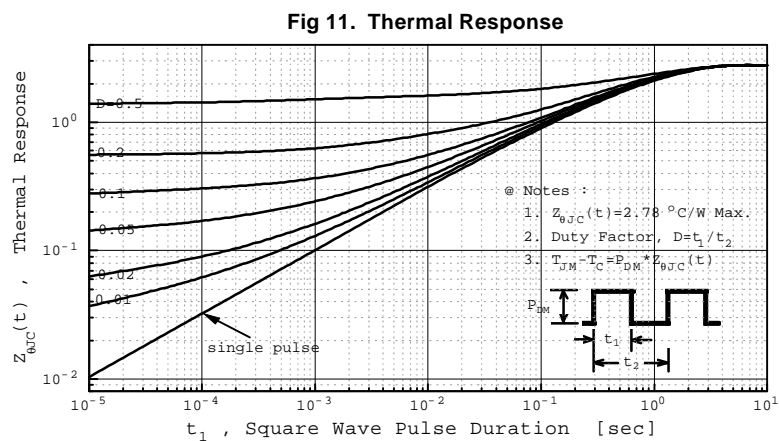
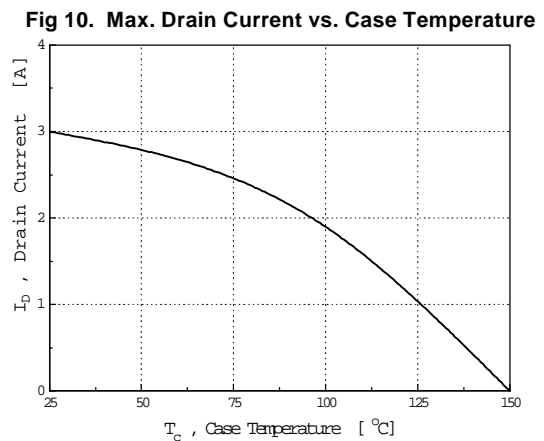
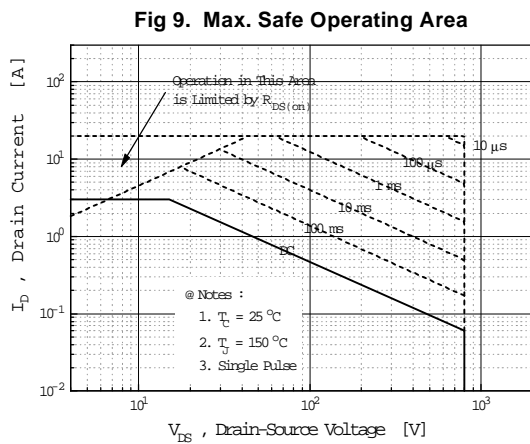
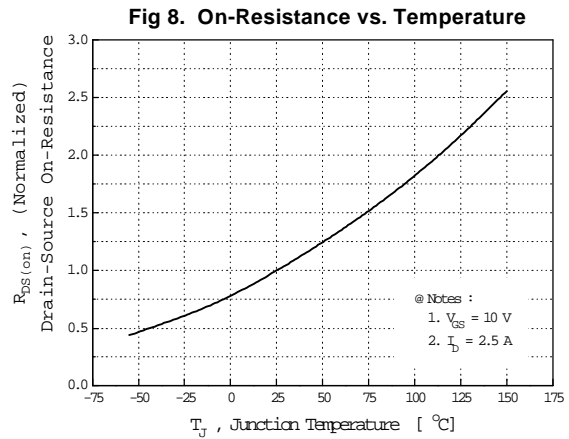
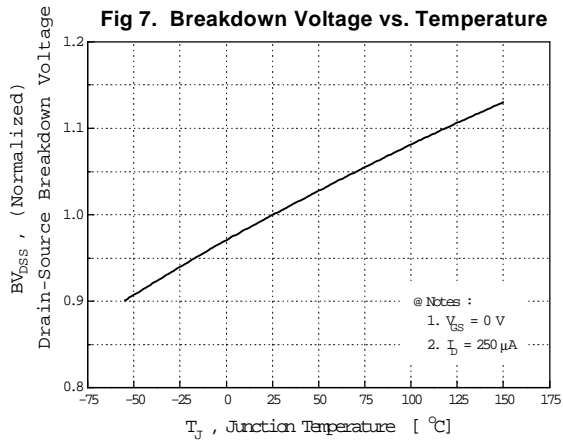


Fig 12. Gate Charge Test Circuit & Waveform

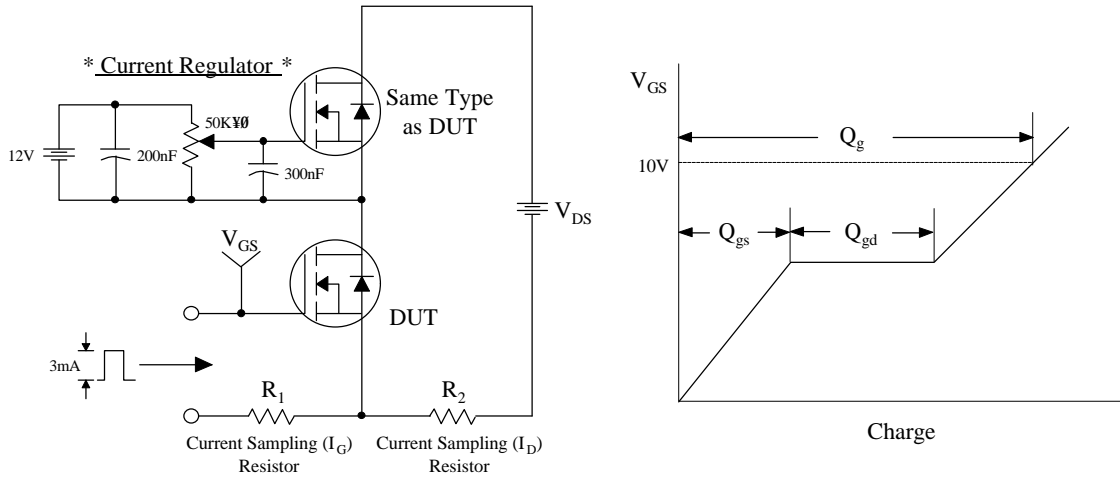


Fig 13. Resistive Switching Test Circuit & Waveforms

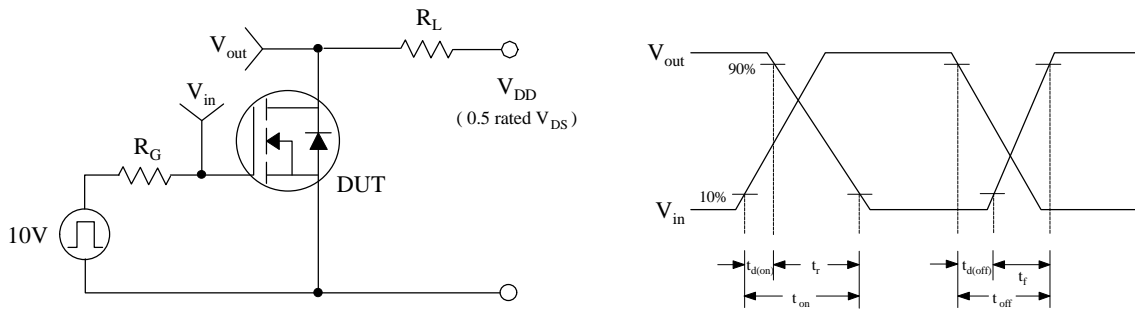


Fig 14. Unclamped Inductive Switching Test Circuit & Waveforms

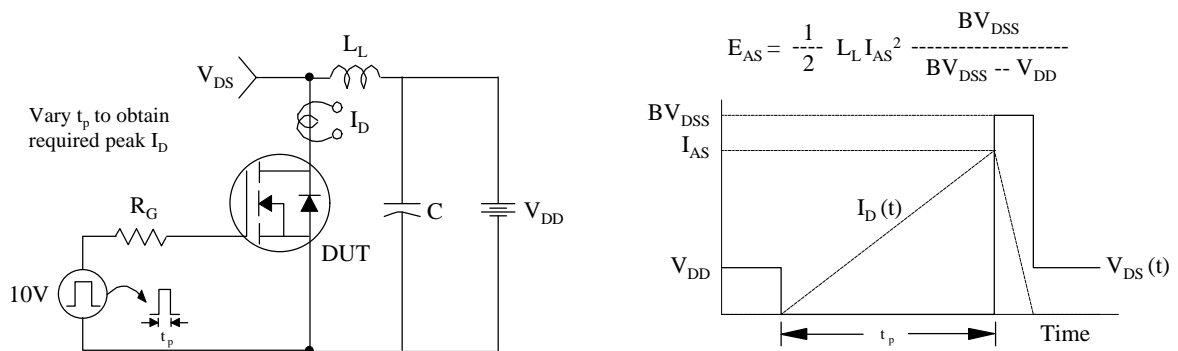


Fig 12. Gate Charge Test Circuit & Waveform

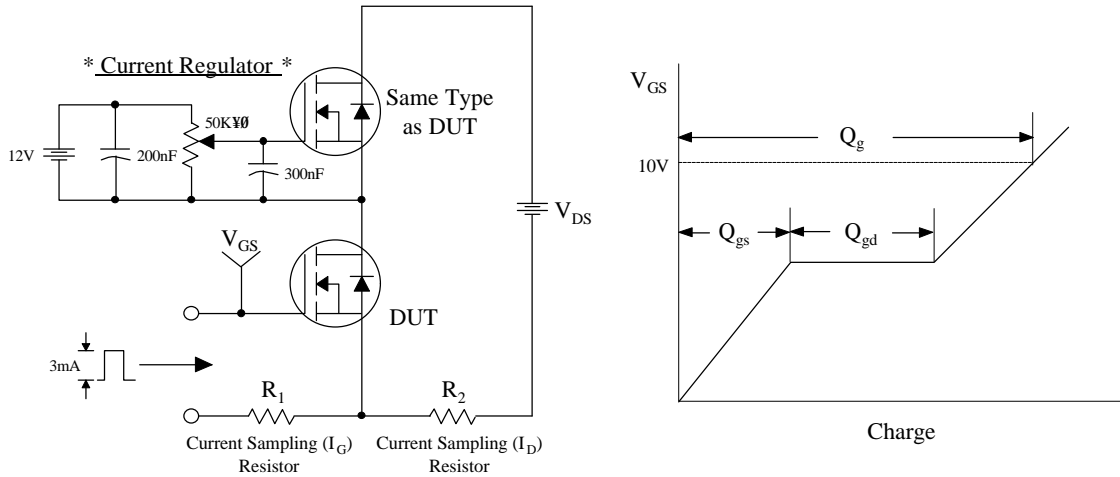


Fig 13. Resistive Switching Test Circuit & Waveforms

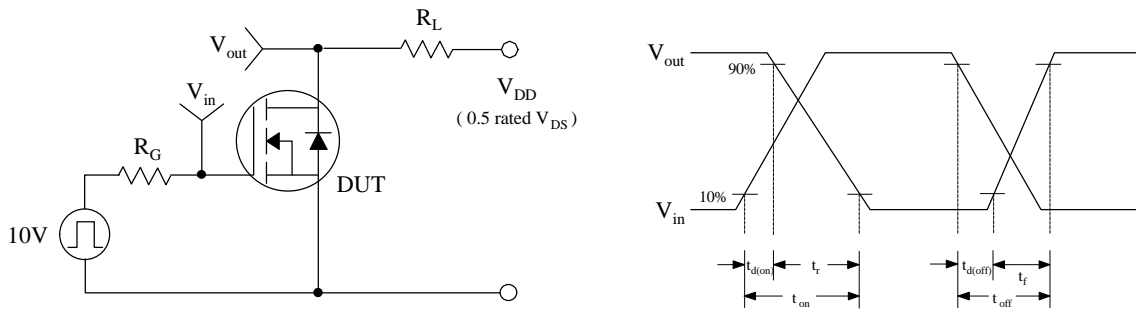


Fig 14. Unclamped Inductive Switching Test Circuit & Waveforms

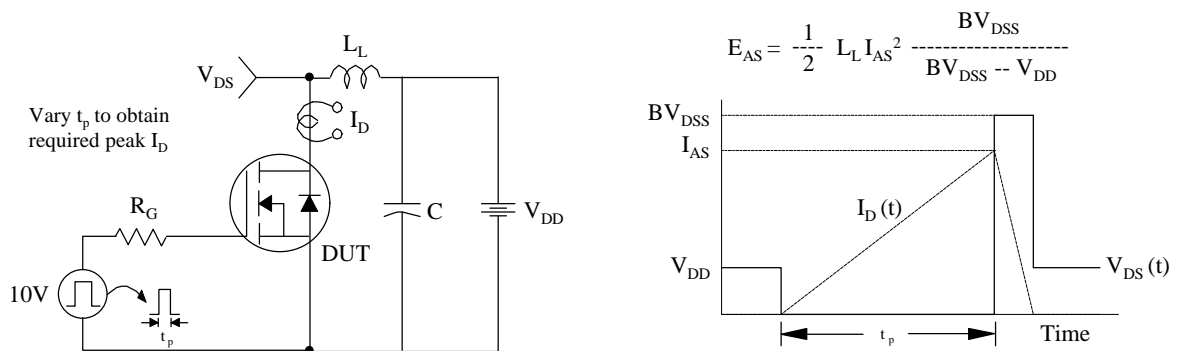
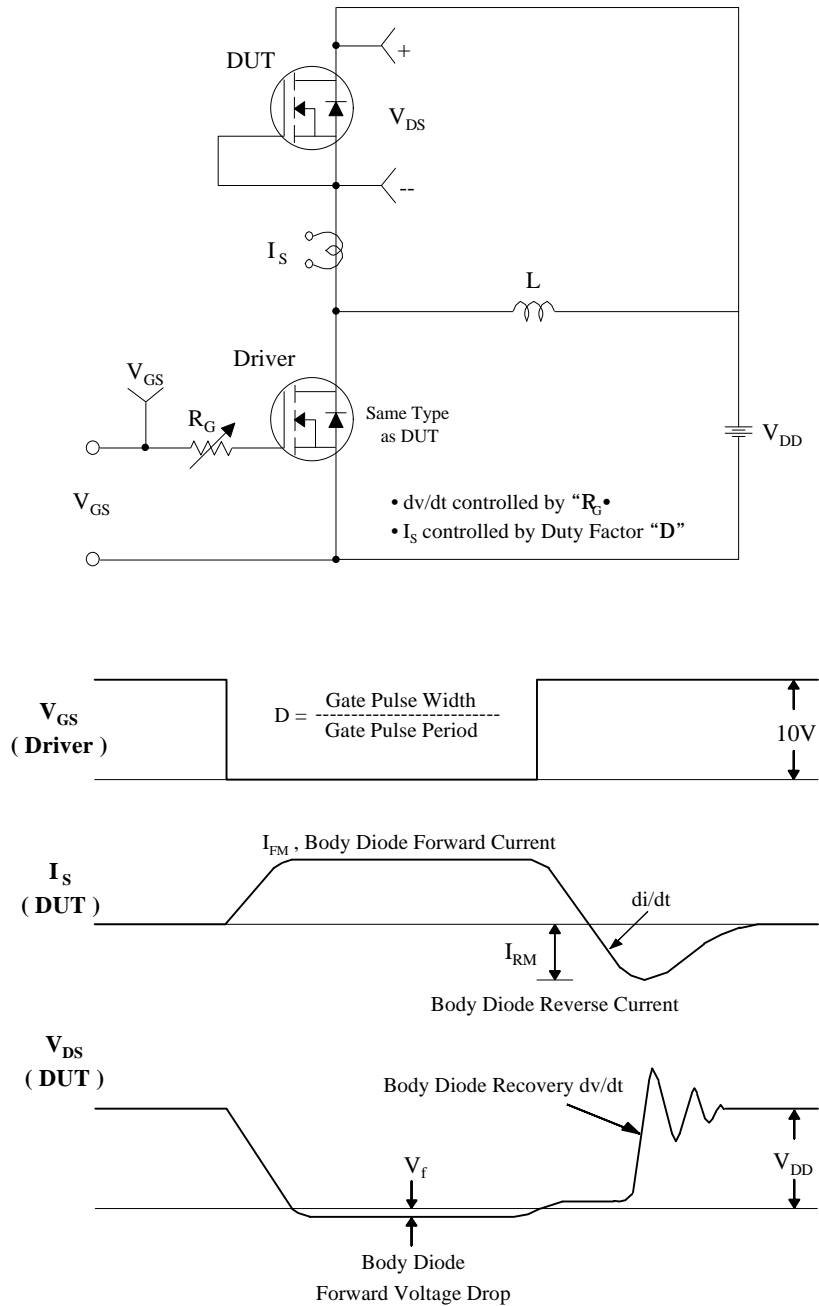


Fig 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms



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| FACT™                | QST™          |      |
| FACT Quiet Series™   | Quiet Series™ |      |
| FAST®                | SuperSOT™-3   |      |
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