

## SWITCHING REGULATOR APPLICATIONS

### Features

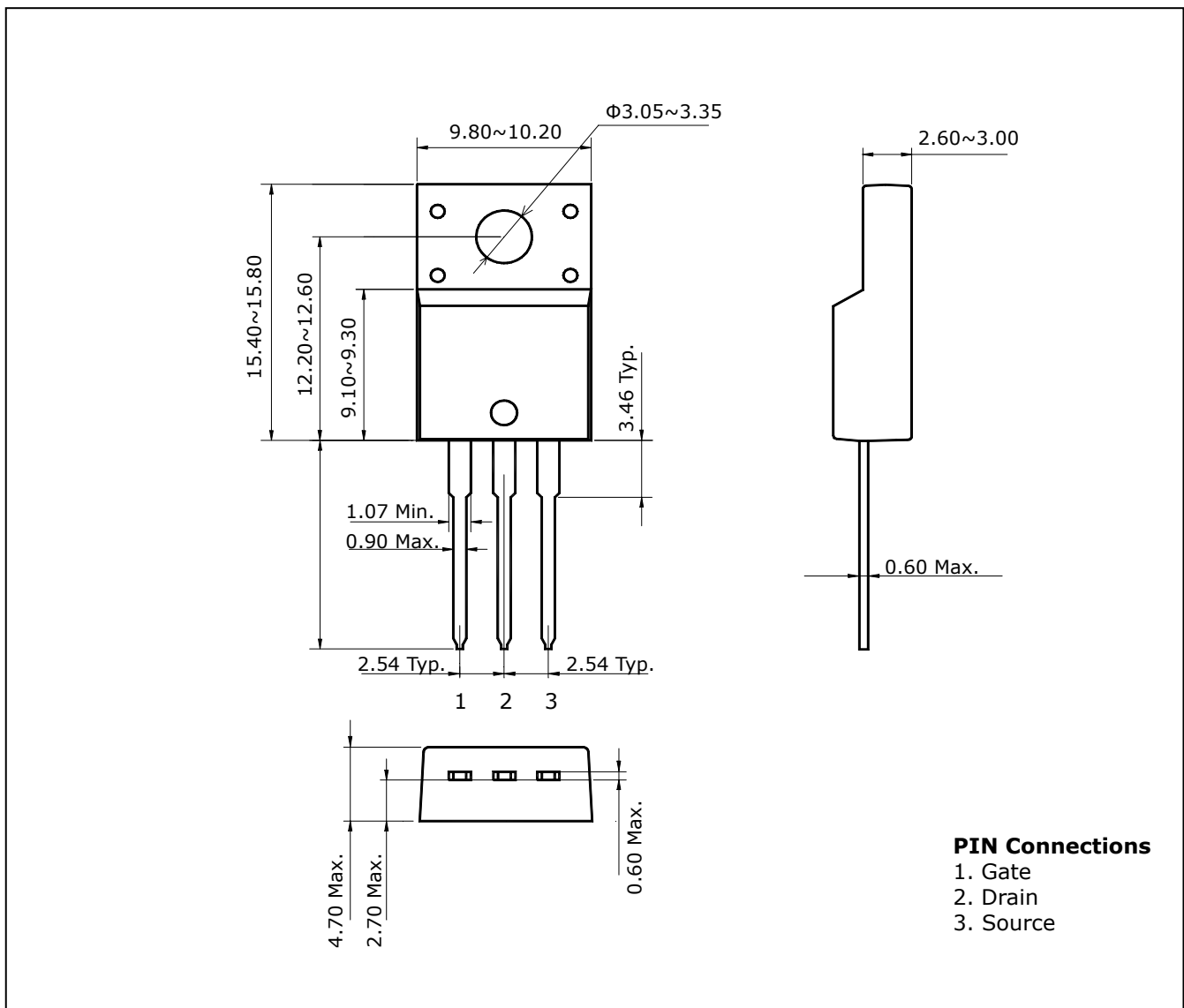
- High Voltage:  $BV_{DSS}=600V(\text{Min.})$
- Low  $C_{rSS}$  :  $C_{rSS}=6.0pF(\text{Typ.})$
- Low gate charge :  $Q_g=8.4nC(\text{Typ.})$
- Low  $R_{DS(on)}$  :  $R_{DS(on)}=4.0\Omega(\text{Max.})$

### Ordering Information

| Type NO. | Marking | Package Code |
|----------|---------|--------------|
| STK0260F | STK0260 | TO-220F-3L   |

### Outline Dimensions

unit : mm



**STK0260F****Absolute maximum ratings**

(Tc=25°C)

| Characteristic                   | Symbol    | Rating     | Unit |   |
|----------------------------------|-----------|------------|------|---|
| Drain-source voltage             | $V_{DSS}$ | 600        | V    |   |
| Gate-source voltage              | $V_{GSS}$ | ±30        | V    |   |
| Drain current (DC)               | $I_D$     | (Tc=25°C)  | 2.0  | A |
|                                  |           | (Tc=100°C) | 1.3  | A |
| Drain current (Pulsed) *         | $I_{DP}$  | 8.0        | A    |   |
| Drain Power dissipation          | $P_D$     | 22         | W    |   |
| Avalanche current (Single) ②     | $I_{AS}$  | 2.0        | A    |   |
| Single pulsed avalanche energy ② | $E_{AS}$  | 42         | mJ   |   |
| Avalanche current (Repetitive) ① | $I_{AR}$  | 2.0        | A    |   |
| Repetitive avalanche energy ①    | $E_{AR}$  | 3.7        | mJ   |   |
| Junction temperature             | $T_J$     | 150        | °C   |   |
| Storage temperature range        | $T_{stg}$ | -55~150    |      |   |

\* Limited by maximum junction temperature

| Characteristic     |                  | Symbol        | Typ. | Max  | Unit |
|--------------------|------------------|---------------|------|------|------|
| Thermal resistance | Junction-case    | $R_{th(J-C)}$ | -    | 5.68 | °C/W |
|                    | Junction-ambient | $R_{th(J-a)}$ | -    | 62.5 |      |

**Electrical Characteristics**

(Tc=25°C)

| Characteristic                 | Symbol       | Test Condition  | Min. | Typ. | Max.      | Unit     |     |
|--------------------------------|--------------|---|------|------|-----------|----------|-----|
| Drain-source breakdown voltage | $BV_{DSS}$   | $I_D=250\mu A, V_{GS}=0$                              | 600  | -    | -         | V        |     |
| Gate-threshold voltage         | $V_{GS(th)}$ | $I_D=250\mu A, V_{DS}=V_{GS}$                         | 2.0  | -    | 4.0       | V        |     |
| Drain-source leakage current   | $I_{DSS}$    | $V_{DS}=600V, V_{GS}=0V$                              | -    | -    | 1         | $\mu A$  |     |
| Gate-source leakage            | $I_{GSS}$    | $V_{DS}=0V, V_{GS}=\pm 30V$                           | -    | -    | $\pm 100$ | nA       |     |
| Drain-Source on-resistance ④   | $R_{DS(on)}$ | $V_{GS}=10V, I_D=1.0A$                                | -    | 3.8  | 4.7       | $\Omega$ |     |
| Forward transfer admittance ④  | $g_{fs}$     | $V_{DS}=10V, I_D=1.0A$                                | -    | 2.3  | -         | S        |     |
| Input capacitance              | $C_{iss}$    | $V_{GS}=0V, V_{DS}=25V, f=1MHz$                       | -    | 290  | 435       | pF       |     |
| Output capacitance             | $C_{oss}$    |   | -    | 33   | 49        |          |     |
| Reverse transfer capacitance   | $C_{rss}$    |   | -    | 6.0  | 9.0       |          |     |
| Turn-on delay time             | $t_{d(on)}$  | $V_{DD}=300V, V_{GS}=10V$<br>$I_D=2.0A, R_G=25\Omega$ | -    | 22   | -         | ns       |     |
| Rise time                      | $t_r$        |   | -    | 10.5 | -         |          |     |
| Turn-off delay time            | $t_{d(off)}$ |   | ③④   | -    | 7         |          | -   |
| Fall time                      | $t_f$        |   | -    | 10.5 | -         |          |     |
| Total gate charge              | $Q_g$        | $V_{DD}=300V, V_{GS}=10V$<br>$I_D=2.0A$               | -    | 8.4  | 12.6      | nC       |     |
| Gate-source charge             | $Q_{gs}$     |   | ③④   | -    | 1.4       |          | 2.1 |
| Gate-drain charge              | $Q_{gd}$     |   | -    | 2.6  | 3.9       |          |     |

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**Source-Drain Diode Ratings and Characteristics**

(Tc=25°C)

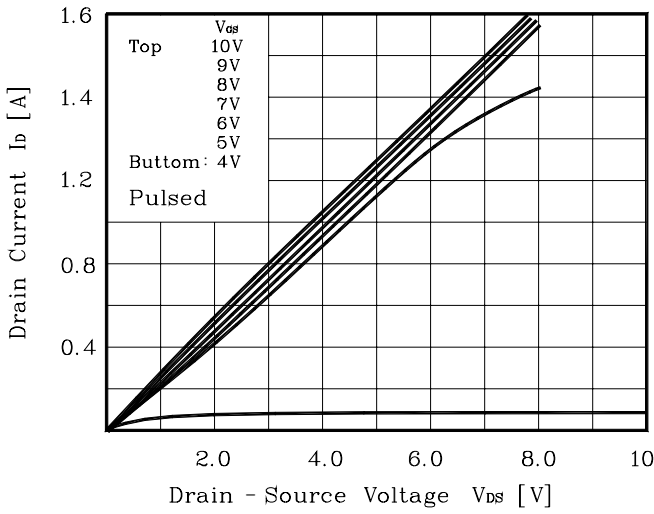
| Characteristic            | Symbol   | Test Condition                             | Min | Typ  | Max | Unit    |
|---------------------------|----------|--|-----|------|-----|---------|
| Continuous source current | $I_S$    | Integral reverse diode<br>in the MOSFET    | -   | -    | 2.0 | A       |
| Source current (Pulsed) ① | $I_{SM}$ |  | -   | -    | 8.0 |         |
| Forward voltage ④         | $V_{SD}$ | $V_{GS}=0V, I_S=2.0A$                      | -   | -    | 1.4 | V       |
| Reverse recovery time     | $t_{rr}$ | $I_S=2.0A, V_{GS}=0V$<br>$di_s/dt=100A/us$ | -   | 230  | -   | ns      |
| Reverse recovery charge   | $Q_{rr}$ |  | -   | 0.84 | -   | $\mu C$ |

Note ;

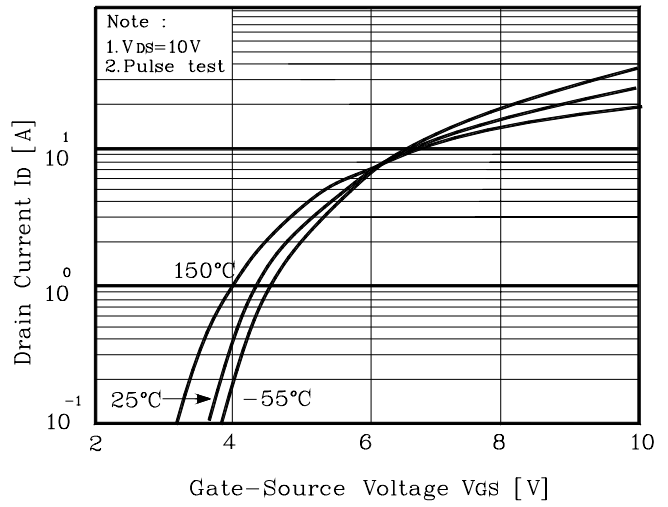
- ① Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature
- ②  $L=9.5mH, I_{AS}=2.0A, V_{DD}=50V, R_G=25\Omega$
- ③ Pulse Test : Pulse Width < 300us, Duty cycle  $\leq 2\%$
- ④ Essentially independent of operating temperature

## Electrical Characteristic Curves

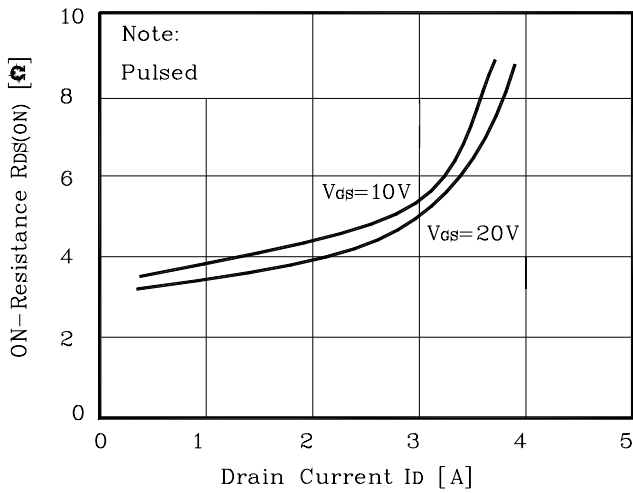
**Fig. 1  $I_D - V_{DS}$**



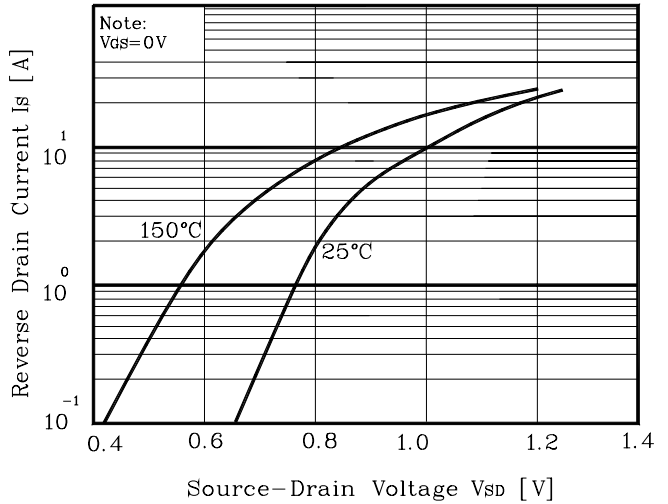
**Fig. 2  $I_D - V_{GS}$**



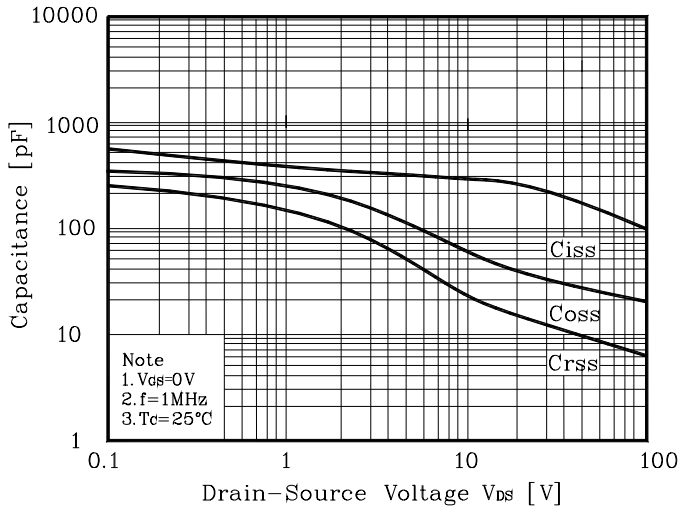
**Fig. 3  $R_{DS(on)} - I_D$**



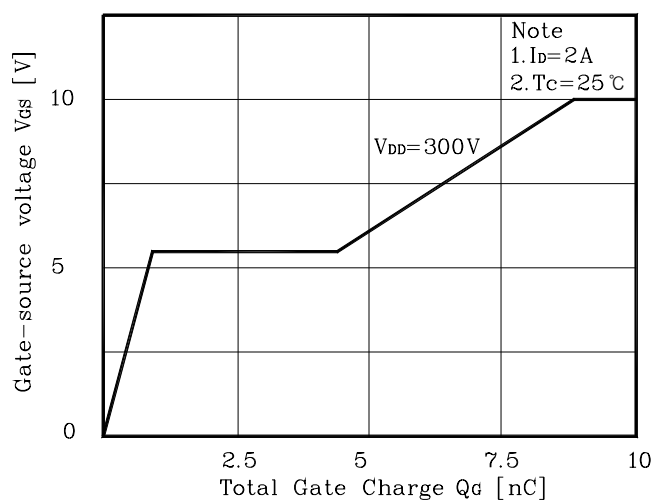
**Fig. 4  $I_S - V_{SD}$**



**Fig. 5 Capacitance -  $V_{DS}$**

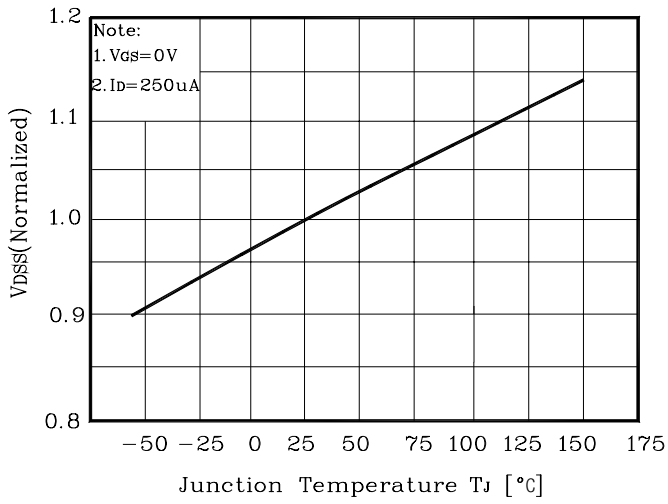


**Fig. 6  $V_{GS} - Q_G$**

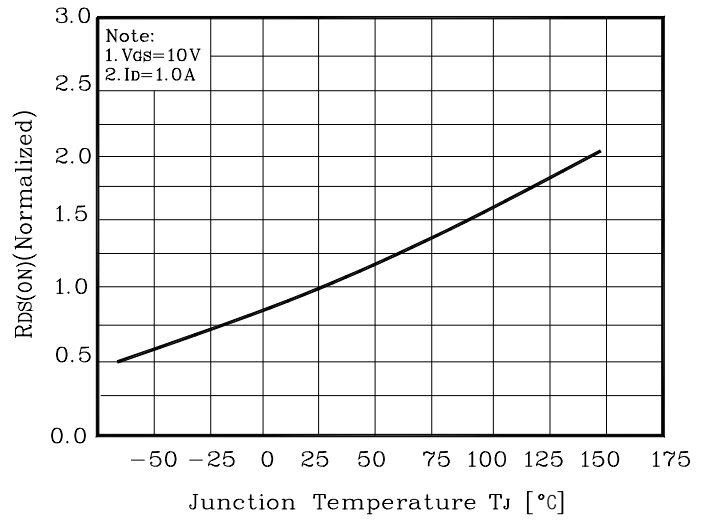


# STK0260F

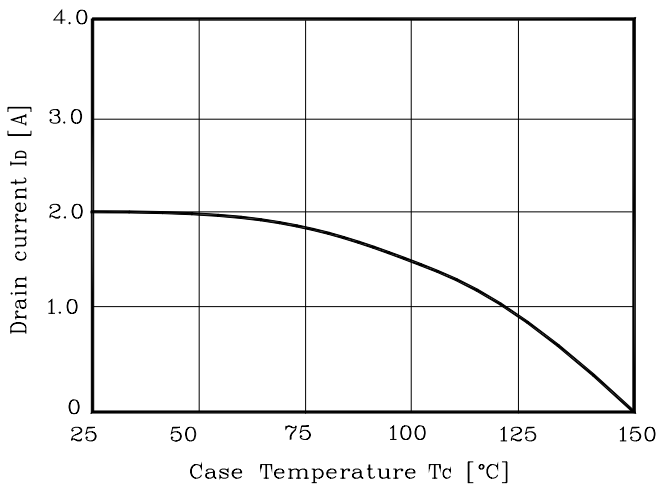
**Fig. 7  $V_{DSS} - T_J$**



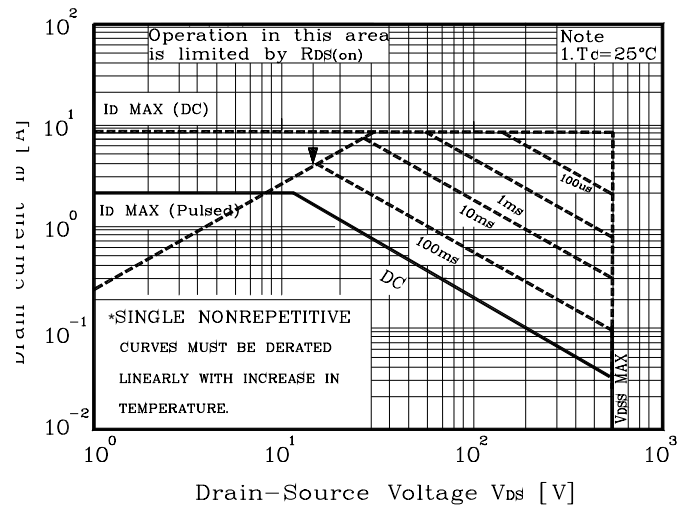
**Fig. 8  $R_{DS(on)} - T_J$**



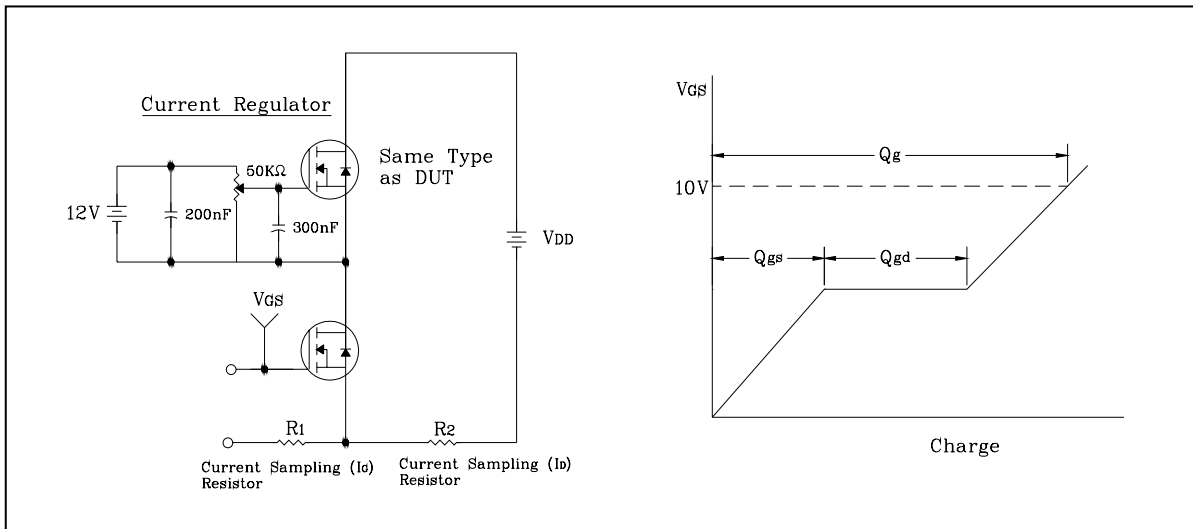
**Fig. 9  $I_D - T_C$**



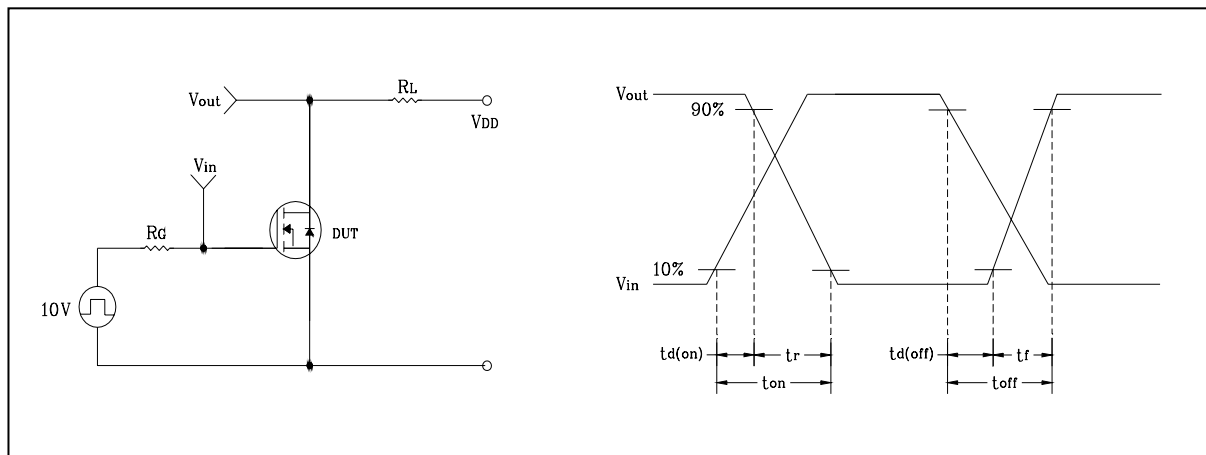
**Fig. 10 Safe Operating Area**



**Fig. 11 Gate Charge Test Circuit & Waveform**



**Fig. 12 Resistive Switching Test Circuit & Waveform**



**Fig. 13 E<sub>AS</sub> Test Circuit & Waveform**

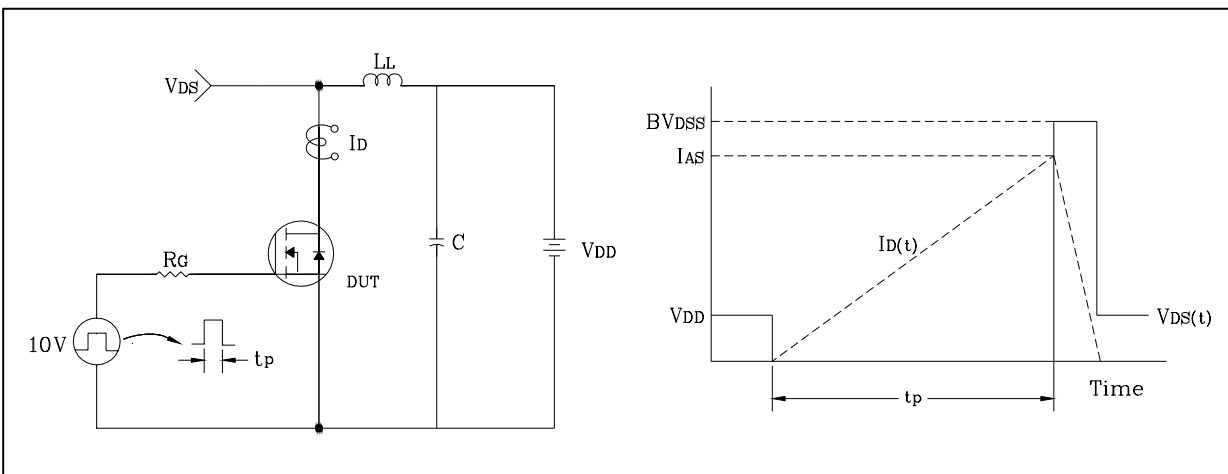
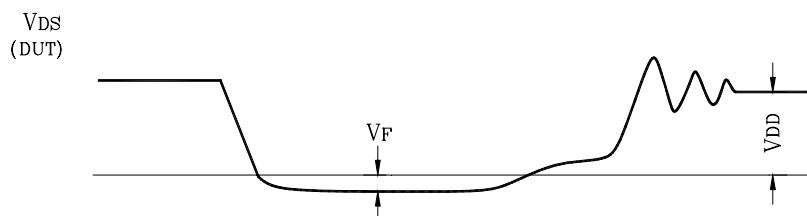
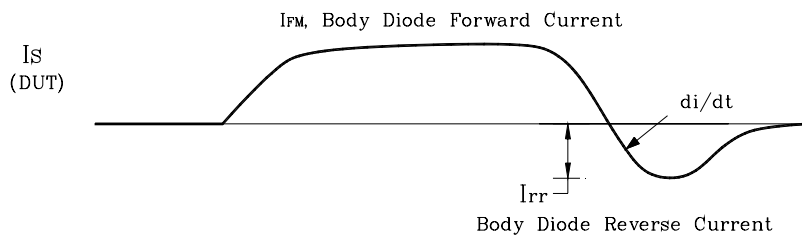
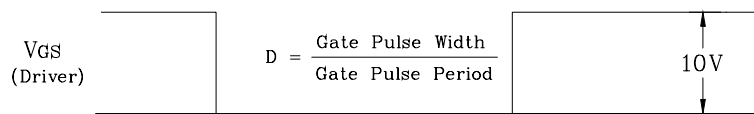
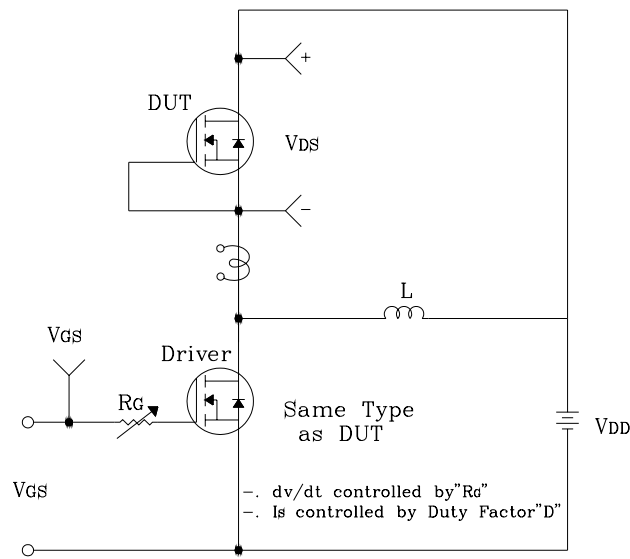


Fig. 14 Diode Reverse Recovery Time Test Circuit & Waveform



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