

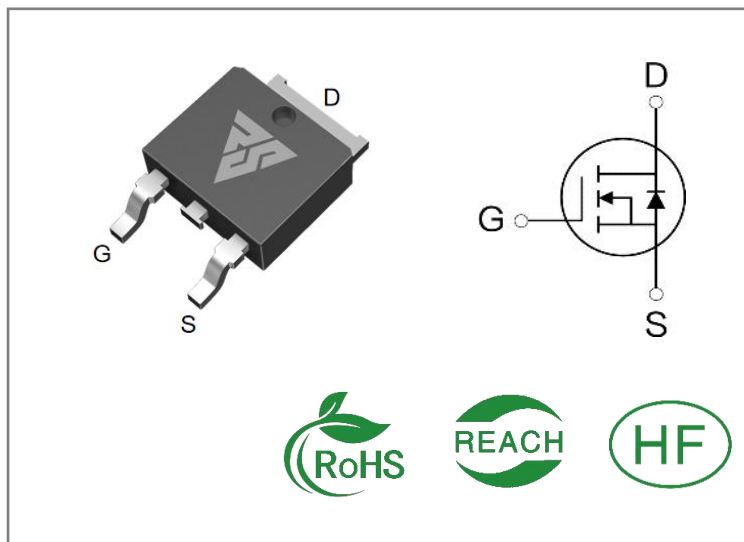
| ID    | $R_{DS(ON)}$ (Typ) | VDSS |
|-------|--------------------|------|
| 10.6A | 340mΩ              | 650V |

**Applications:**

- Switch Mode Power Supply(SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)
- AC-DC Switching Power Supply

**Features:**

- Fast switching speed
- 100% avalanche tested
- Improved dv/dt capability


**Ordering Information**

| Part Number | Package | Marking   | Packing   | Qty.     |
|-------------|---------|-----------|-----------|----------|
| RS65R380D   | T0-252  | RS65R380D | Tape&reel | 2500 PCS |

**Absolute Maximum Ratings**  $T_c = 25^\circ\text{C}$  unless otherwise specified

| Symbol      | Parameter                                                                                                         | RS65R380D  | Units            |
|-------------|-------------------------------------------------------------------------------------------------------------------|------------|------------------|
| VDSS        | Drain-to-Source Voltage                                                                                           | 650        | V                |
| ID          | Continuous Drain Current $T_C = 25^\circ\text{C}$                                                                 | 10.6       | A                |
| ID          | Continuous Drain Current $T_C = 100^\circ\text{C}$                                                                | 6.1        |                  |
| IDM         | Pulsed Drain Current (Note*1)                                                                                     | 31.8       |                  |
| PD          | Power Dissipation                                                                                                 | 60         | W                |
| VGS         | Gate- to- Source Voltage                                                                                          | $\pm 30$   | V                |
| EAS         | Single Pulse Avalanche Energy<br>$L = 10\text{mH}, V_{DS} = 50\text{V}, R_G = 25\ \Omega, T_C = 25^\circ\text{C}$ | 220        | mJ               |
| dv/dt       | MOSFET dv/ dt ruggedness $V_{DS} = 0 \dots 400\text{V}$                                                           | 50         | V/ns             |
| dv/dt       | Reverse diode dv/dt $V_{DS} = 0 \dots 400\text{V}, T_j = 25^\circ\text{C}, I_{SD} \leq I_D$                       | 15         | V/ns             |
| TL TPKG     | Maximum Temperature for Soldering                                                                                 | 300        | $^\circ\text{C}$ |
|             | Leads at 0.063in(1.6mm)from Case for 10 seconds<br>Package Body for 10 seconds                                    | 260        |                  |
| TJ and TSTG | Operating Junction and Storage Temperature Range                                                                  | -55 to 150 |                  |

\* Drain Current Limited by Maximum Junction Temperature

Caution: Stresses greater than those listed in the " Absolute Maximum Ratings" Table may cause permanent damage to the device.

**Thermal Resistance**

| Symbol        | Parameter            | RS65R380D | Units  | Test Conditions                                                                                         |
|---------------|----------------------|-----------|--------|---------------------------------------------------------------------------------------------------------|
| R $\theta$ JC | Junction-to-Case     | 1.4       | °C / W | Drain lead soldered to water cooled heatsink, PD adjusted for a peak junction temperature of + 1 5 0 °C |
| R $\theta$ JA | Junction-to- Ambient | 62.5      |        | 1 cubic foot chamber, free air.                                                                         |

**OFF Characteristics** T<sub>J</sub>= 25°C unless otherwise specified

| Symbol | Parameter                           | Min. | Typ. | Max. | Units | Test Conditions                              |
|--------|-------------------------------------|------|------|------|-------|----------------------------------------------|
| BVDSS  | Drain- to- source Breakdown Voltage | 650  | --   | --   | V     | V <sub>GS</sub> =0V<br>I <sub>D</sub> =250μA |
| IDSS   | Drain- to- Source Leakage Current   | --   | --   | 1    | μA    | V <sub>D</sub> S=650V<br>V <sub>GS</sub> =0V |
| IGSS   | Gate- to- Source Forward Leakage    | --   | --   | 100  | nA    | V <sub>GS</sub> =30V<br>V <sub>D</sub> S=0V  |
|        | Gate- to- Source Reverse Leakage    | --   | --   | -100 |       | V <sub>GS</sub> =-30V<br>V <sub>D</sub> S=0V |

**ON Characteristics** T<sub>J</sub>=25°C unless otherwise specified

| Symbol              | Parameter                                      | Min. | Typ. | Max. | Units | Test Conditions                                            |
|---------------------|------------------------------------------------|------|------|------|-------|------------------------------------------------------------|
| R <sub>DS(on)</sub> | Static Drain- to- Source On-Resistance(Note*2) | --   | 340  | 380  | mΩ    | V <sub>GS</sub> =10V<br>I <sub>D</sub> =3.2A               |
| V <sub>GS(TH)</sub> | Gate Threshold Voltage                         | 2    | --   | 4    | V     | V <sub>GS</sub> =V <sub>D</sub> S<br>I <sub>D</sub> =250μA |

**Resistive Switching Characteristics** Essentially independent of operating temperature

| Symbol              | Parameter            | Min. | Typ. | Max. | Units | Test Conditions                                                       |
|---------------------|----------------------|------|------|------|-------|-----------------------------------------------------------------------|
| t <sub>d(ON)</sub>  | Turn- on Delay Time  | --   | 18   | --   | nS    | V <sub>D</sub> S=325V<br>I <sub>D</sub> =10.6A<br>R <sub>G</sub> =25Ω |
| t <sub>rise</sub>   | Rise Time            | --   | 31   | --   |       |                                                                       |
| t <sub>d(OFF)</sub> | Turn- OFF Delay Time | --   | 65   | --   |       |                                                                       |
| t <sub>fall</sub>   | Fall Time            | --   | 28   | --   |       |                                                                       |

**Dynamic Characteristics** Essentially independent of operating temperature

| Symbol | Parameter                       | Min. | Typ. | Max. | Units | Test Conditions                 |
|--------|---------------------------------|------|------|------|-------|---------------------------------|
| Ciss   | Input Capacitance               | --   | 747  | --   | pF    | VGS=0V<br>VDS=50V<br>f=400KHz   |
| Coss   | Output Capacitance              | --   | 55   | --   |       |                                 |
| Crss   | Reverse Transfer Capacitance    | --   | 3.3  | --   |       |                                 |
| Qg     | Total Gate Charge               | --   | 20   | --   | nC    | VDS=520V<br>ID=10.6A<br>VGS=10V |
| Qgs    | Gate- to- Source Charge         | --   | 3.7  | --   |       |                                 |
| Qgd    | Gate-to-Drain(" Miller") Charge | --   | 9    | --   |       |                                 |

**Source- Drain Diode Characteristics**

| Symbol | Parameter                 | Min. | Typ. | Max. | Units | Test Conditions                      |
|--------|---------------------------|------|------|------|-------|--------------------------------------|
| IS     | Continuous Source Current | --   | --   | 10.6 | A     | Integral pn- diode<br>in MOSFET      |
| ISM    | Maximum Pulsed Current    | --   | --   | 31.8 | A     |                                      |
| VSD    | Diode Forward Voltage     | --   | --   | 1.4  | V     | IS=10.6A<br>VGS=0V                   |
| trr    | Reverse Recovery Time     | --   | 267  | --   | nS    | VR=100V<br>IS=10.6A<br>di/dt=100A/μs |
| Qrr    | Reverse Recovery Charge   | --   | 2.8  | --   | μC    |                                      |

**Notes:**

- \* 1. Repetitive rating, pulse width limited by maximum junction temperature.
- \* 2. Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 2%

Typical Feature Curve

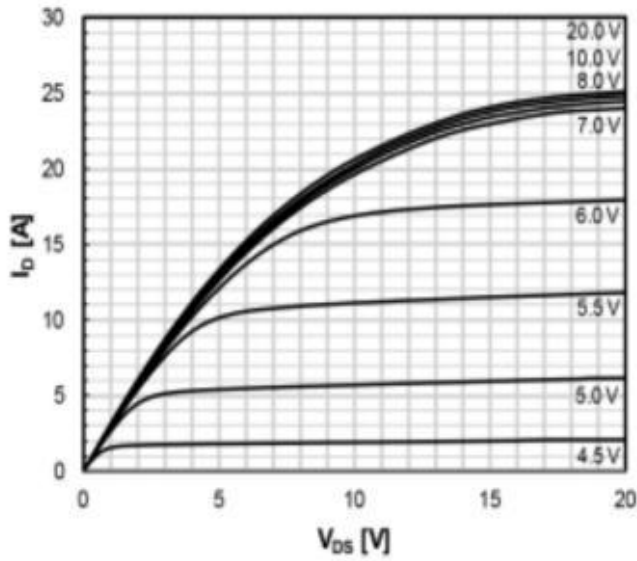


Fig. 1 Output characteristics

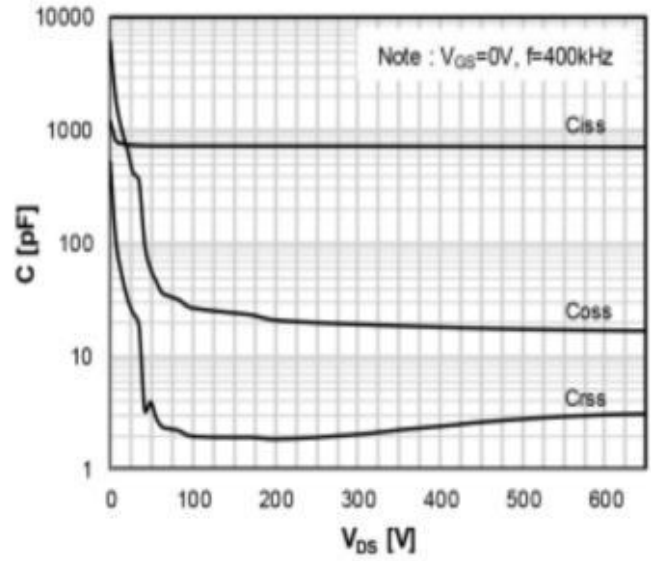


Fig. 2 Capacitances

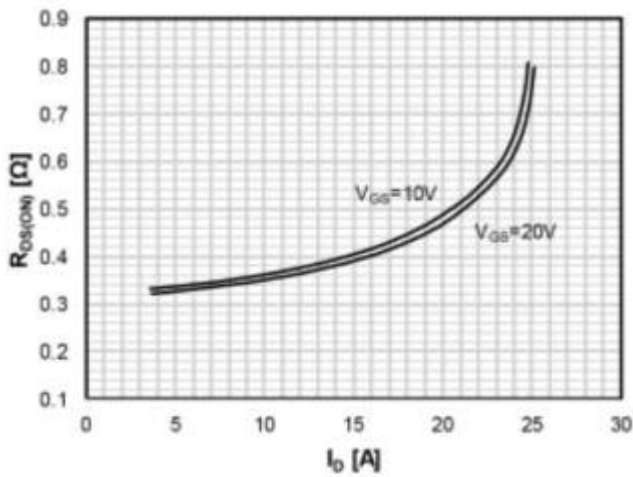


Fig. 3 On-state resistance

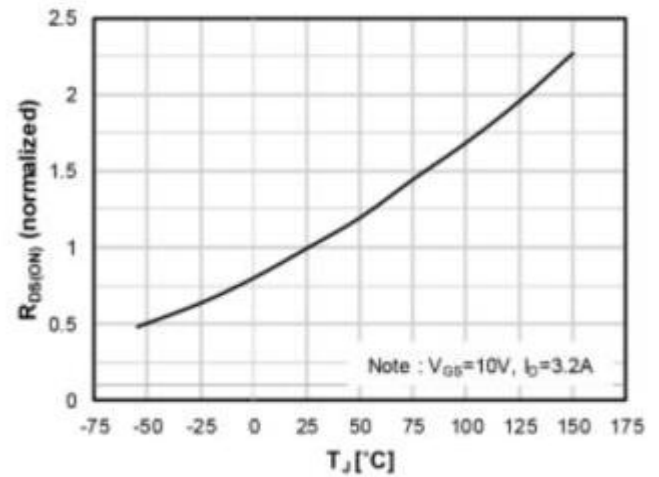


Fig. 4 On-state resistance with temperature

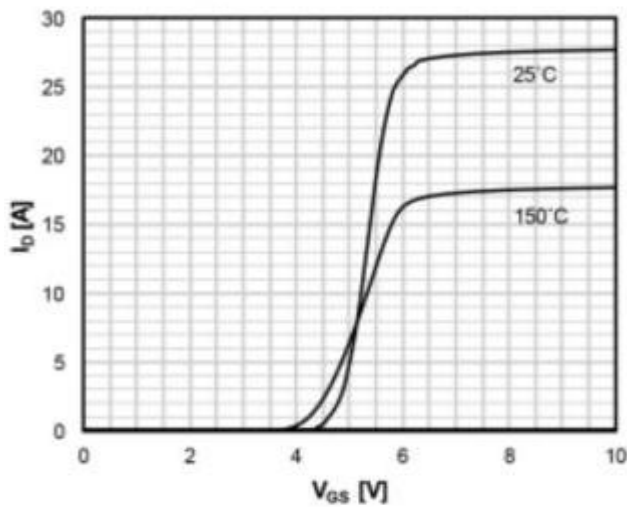


Fig. 5. Transfer characteristics

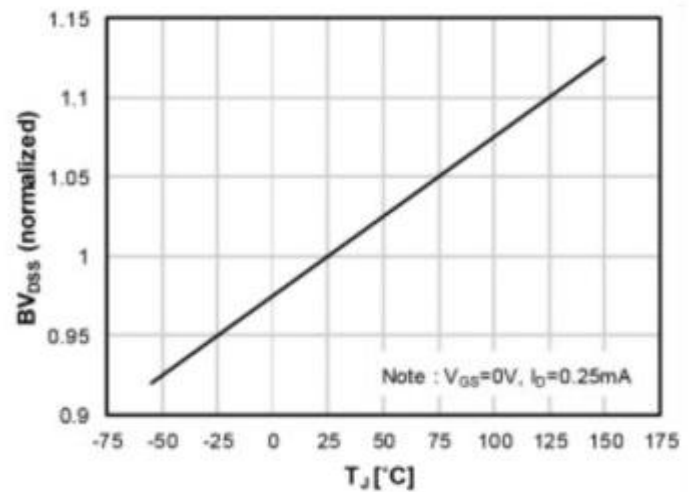
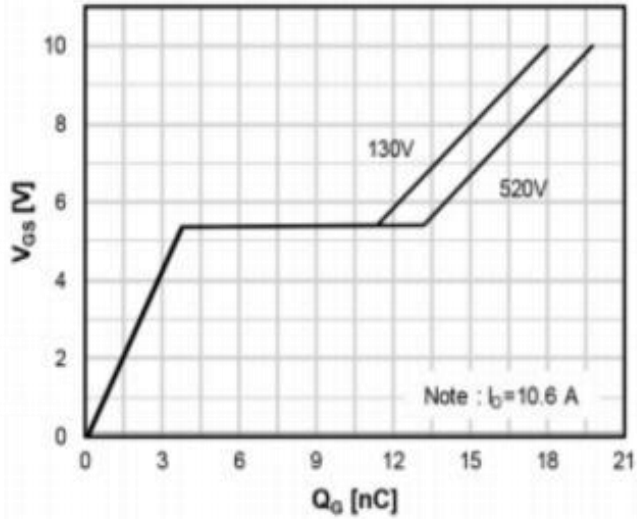
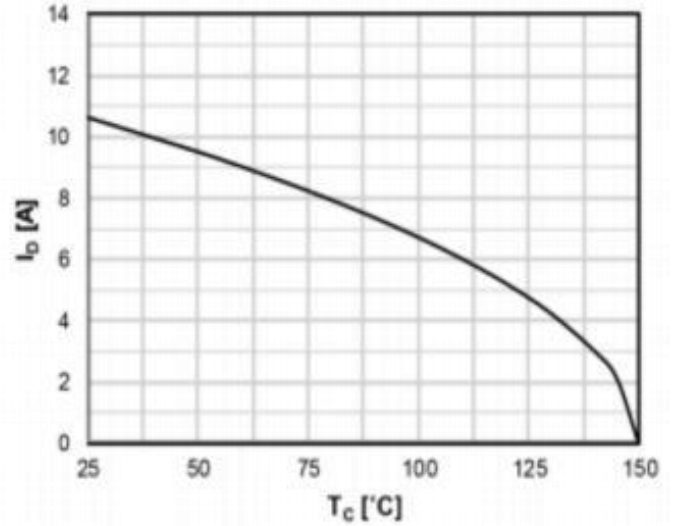


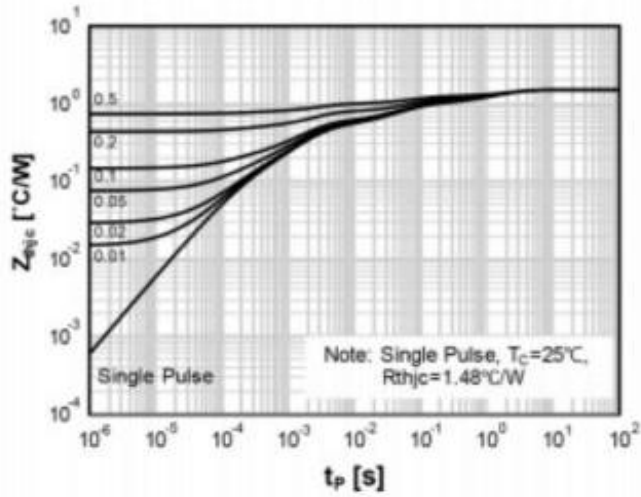
Fig. 6. Breakdown voltage with temperature



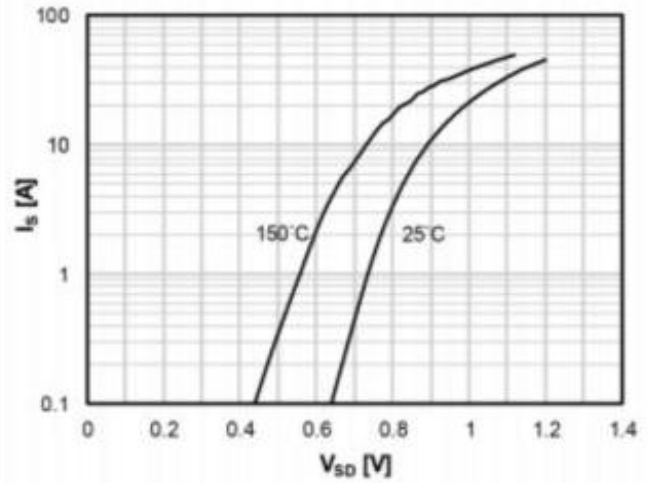
**Fig 7. Gate charge**



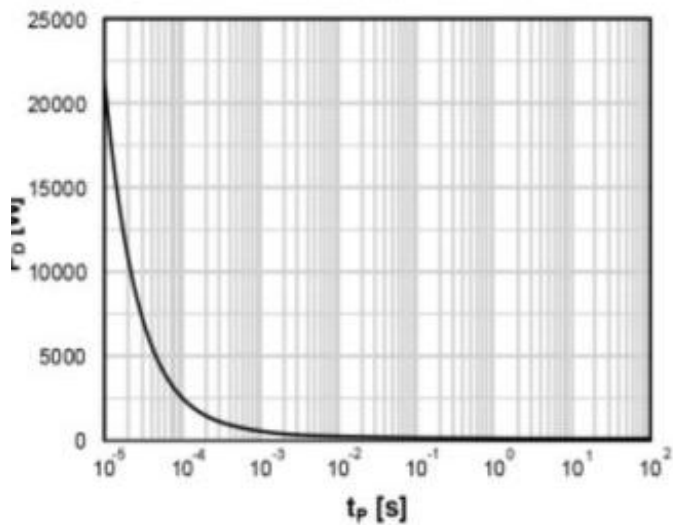
**Fig 8. Maximum drain current**



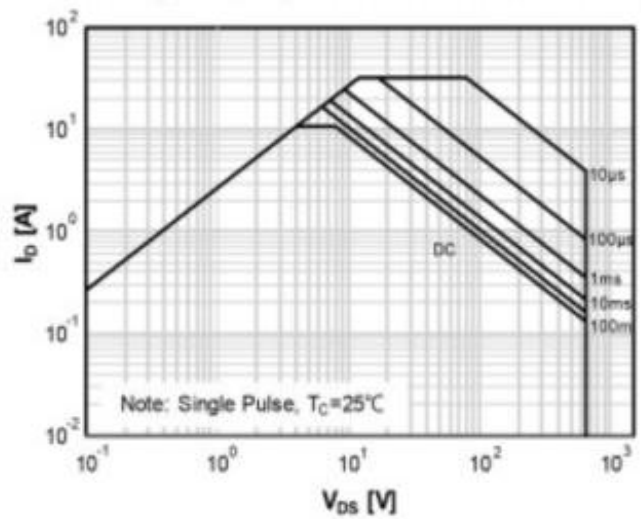
**Fig 9. Maximum thermal characteristics**



**Fig 10. Body diode characteristics**



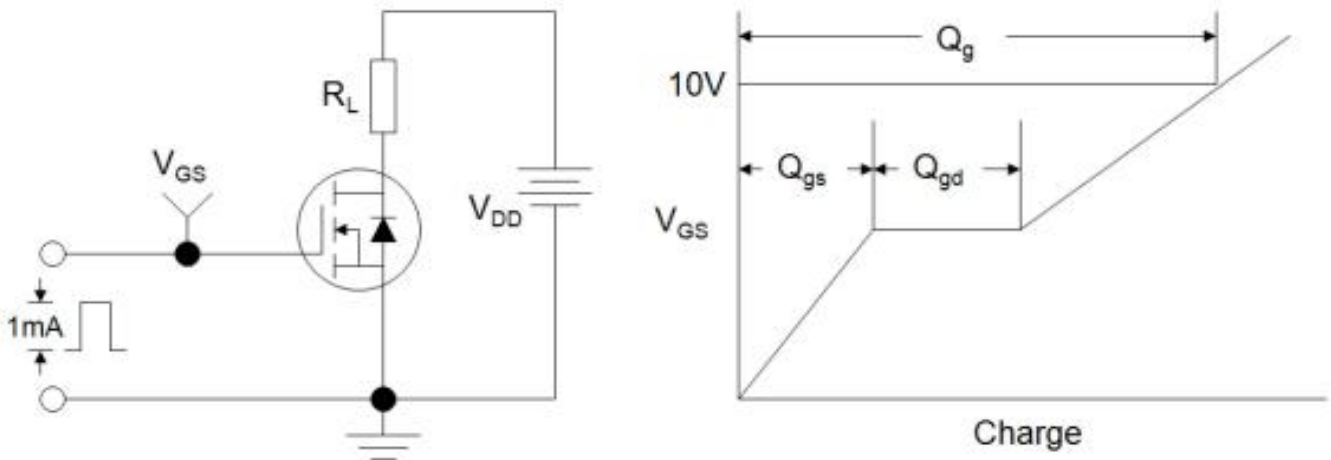
**Fig 11. Power dissipation**



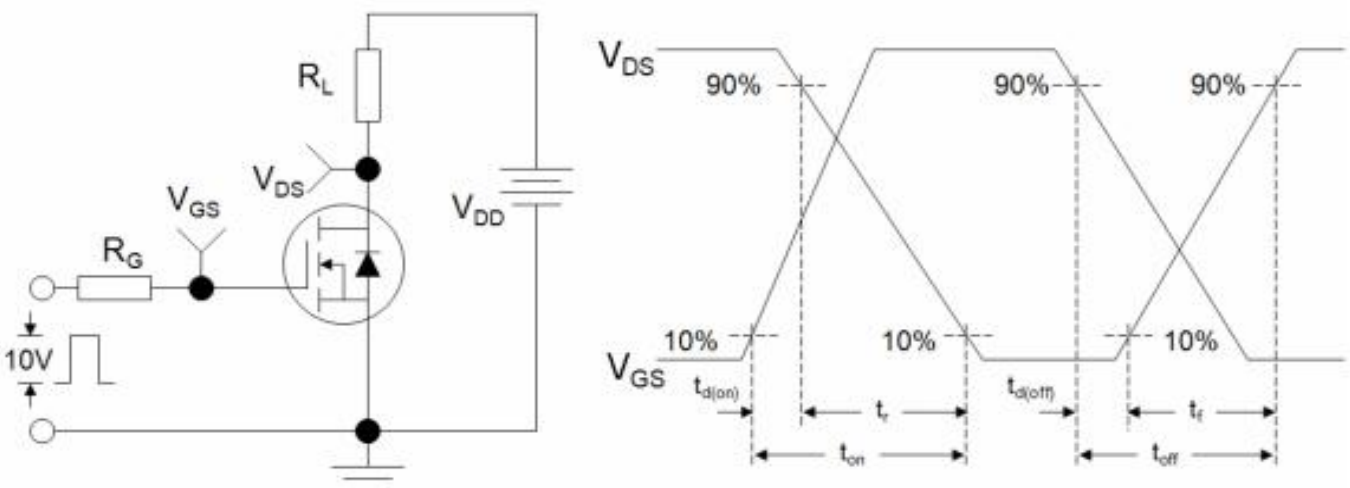
**Fig 12. Safe operating area**

**Test Circuits and Waveforms**

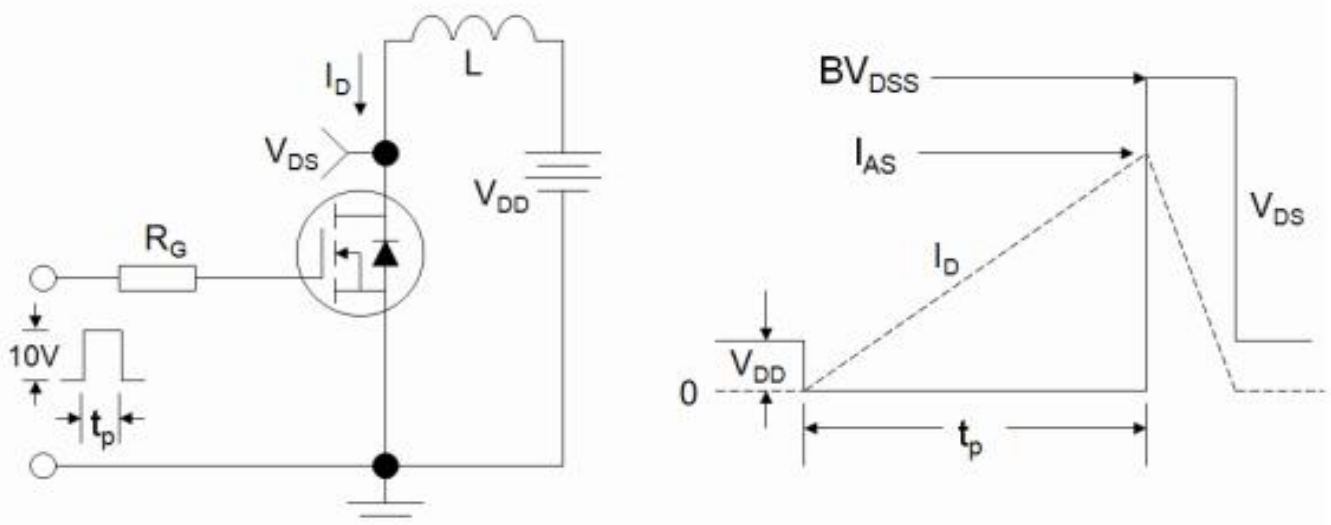
**Figure A: Gate Charge Test Circuit and Waveform**



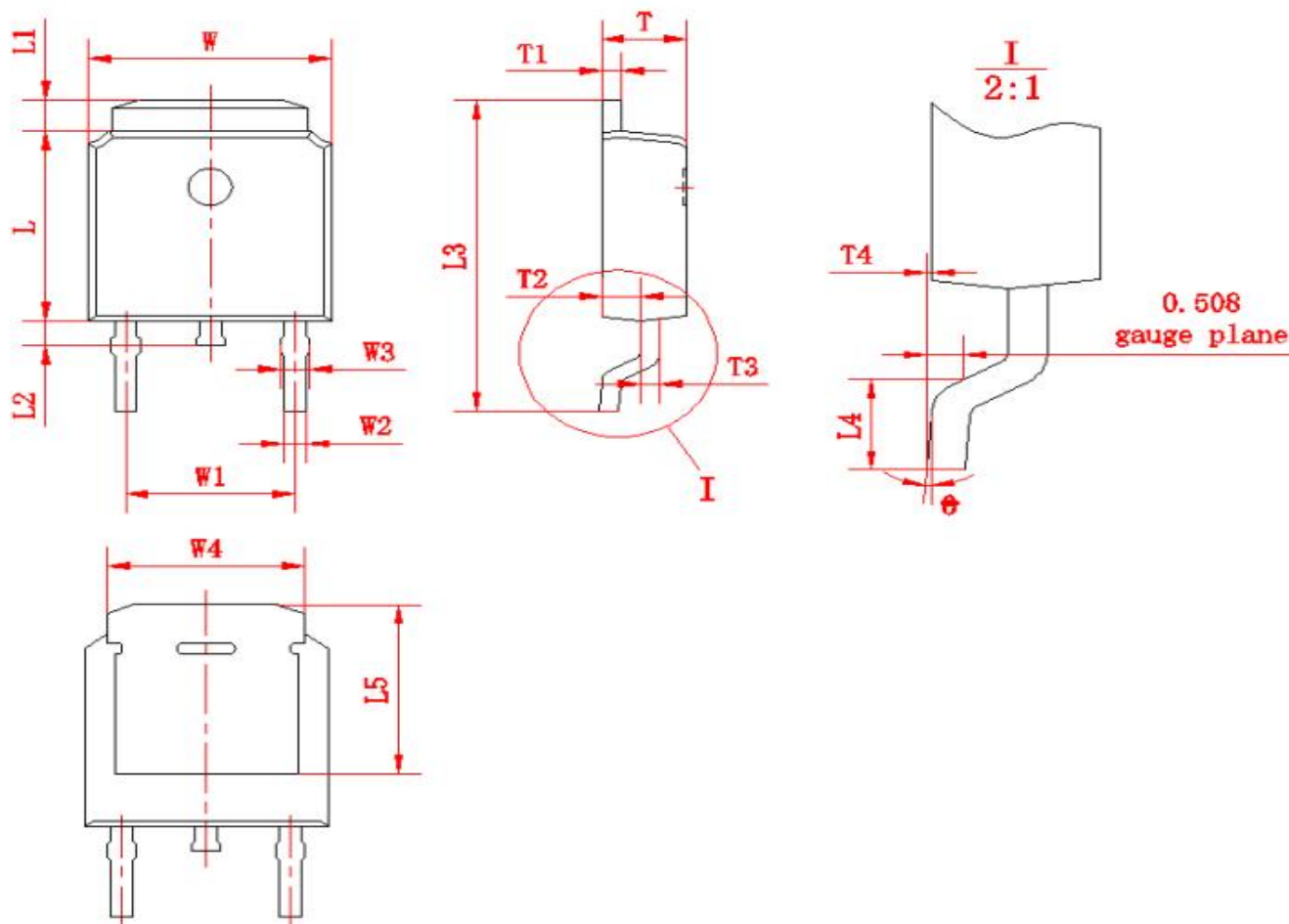
**Figure B: Resistive Switching Test Circuit and Waveform**



**Figure C: Unclamped Inductive Switching Test Circuit and Waveform**



Package outline drawing (TO-252 Unit: mm)



| 符号 | 尺寸      |      | 符号 | 尺寸     |       | 符号 | 尺寸   |      |
|----|---------|------|----|--------|-------|----|------|------|
|    | Min     | Max  |    | Min    | Max   |    | Min  | Max  |
| W  | 6.50    | 6.70 | L1 | 0.80   | 1.20  | T1 | 0.48 | 0.58 |
| W1 | (4.572) |      | L2 | 0.60   | 1.00  | T2 | 0.95 | 1.15 |
| W2 | 0.6     | 0.8  | L3 | 9.70   | 10.30 | T3 | 0.48 | 0.58 |
| W3 | 0.68    | 0.88 | L4 | 1.30   | 1.70  | T4 | 0.00 | 0.12 |
| W4 | (5.3)   |      | L5 | (5.20) |       | 0  | 0    | 8    |
| L  | 6.00    | 6.20 | T  | 2.20   | 2.40  |    |      |      |

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