# TC736 (文件编号：S&CIC1809) N-Channel Trench Power MOSFET

## Description

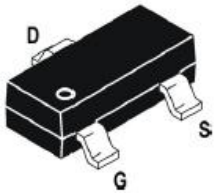
### Features

- 20V/6A,
  $R_{DS(ON)}$ =12mΩ(Typ.)@VGS=4.5V
  $R_{DS(ON)}$ =14mΩ(Typ.)@VGS=2.5V
- Low $R_{DS(ON)}$
- Super High Dense Cell Design
- Reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)

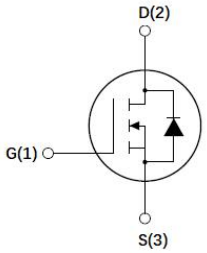
### Application

- Power Management
- Load Switch

### Package




SOT23-3




N-Channel MOSFET

## Absolute Maximum Ratings ($T_C$=25℃unless otherwise specified)

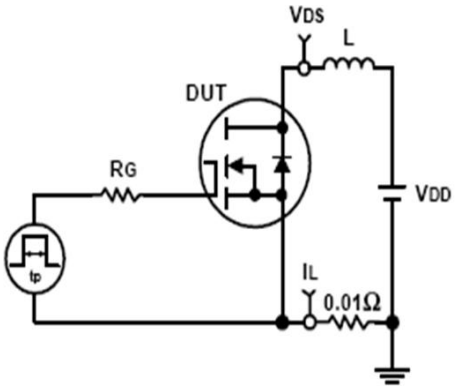
| Symbol | Parameter | | Rating | Unit |
|---|---|---|---|---|
| **Common Ratings** ($T_A$=25°C Unless Otherwise Noted) | | | | |
| $V_{DSS}$ | Drain-Source Voltage | | 20 | V |
| $V_{GSS}$ | Gate-Source Voltage | | ±12 | |
| $T_J$ | Maximum Junction Temperature | | 150 | °C |
| $T_{STG}$ | Storage Temperature Range | | -55 to 150 | °C |
| $I_S$ | Diode Continuous Forward Current | $T_A$=25°C | 1.6 | A |
| **Mounted on Large Heat Sink** | | | | |
| $I_{DP}$ ① | 200μs Pulse Drain Current Tested | $T_A$=25°C | 23 | A |
| $I_D$ ② | Continuous Drain Current($V_{GS}$=4.5V) | $T_A$=25°C | 6 | A |
| | | $T_A$=70°C | 4.5 | |
| $P_D$ | Maximum Power Dissipation | $T_A$=25°C | 1.27 | W |
| | | $T_A$=70°C | 0.78 | |
| $R_{JC}$ | Thermal Resistance-Junction to Case | | - | °C/W |
| $R_{JA}$ ③ | Thermal Resistance-Junction to Ambient | | 100 | °C/W |
| **Drain-Source Avalanche Ratings** | | | | |
| $E_{AS}$ ④ | Avalanche Energy, Single Pulsed | | - | mJ |

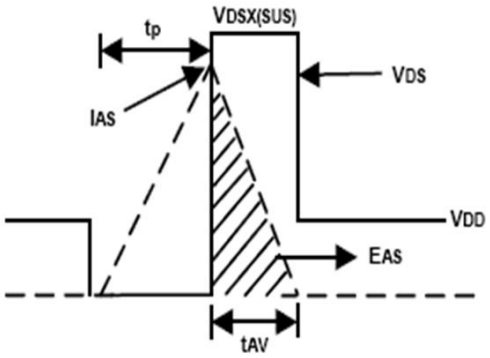
## Electrical Characteristics ($T_C$=25℃unless otherwise specified)

| Symbol | Parameter | Test Condition | TC736 | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| **Static Characteristics** | | | | | | |
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V, $I_{DS}$=250μA | 20 | | | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$=20V, $V_{GS}$=0V | | | 1 | μA |
| | | $T_J$=125°C | | | 30 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$, $I_{DS}$=250μA | 0.5 | 0.8 | 1.2 | V |
| $I_{GSS}$ | Gate Leakage Current | $V_{GS}$=±10V, $V_{DS}$=0V | | | ±100 | nA |
| $R_{DS(ON)}$ ⑤ | Drain-Source On-state Resistance | $V_{GS}$=4.5V, $I_{DS}$=6A | | 11 | 14 | mΩ |
| | | $V_{GS}$=2.5V, $I_{DS}$=5A | | 14 | 18 | mΩ |
| **Diode Characteristics** | | | | | | |
| $V_{SD}$ ⑤ | Diode Forward Voltage | $I_{SD}$=1A, $V_{GS}$=0V | | | 1 | V |
| $t_{rr}$ | Reverse Recovery Time | $I_{SD}$=1A, $dI_{SD}/dt$=100A/μs | | 16 | | ns |
| $Q_{rr}$ | Reverse Recovery Charge | | | 9 | | nC |
| **Dynamic Characteristics** ⑥ | | | | | | |
| $R_G$ | Gate Resistance | $V_{GS}$=0V,$V_{DS}$=0V,F=1MHz | | 1.62 | | Ω |
| $C_{iss}$ | Input Capacitance | $V_{GS}$=0V, $V_{DS}$=10V, Frequency=1.0MHz | | 610 | | pF |
| $C_{oss}$ | Output Capacitance | | | 127 | | |
| $C_{rss}$ | Reverse Transfer Capacitance | | | 93 | | |
| $t_{d(ON)}$ | Turn-on Delay Time | $V_{DD}$=10V, $I_{DS}$=6A, $V_{GEN}$=4.5V,$R_G$=6Ω | | 9 | | ns |
| $t_r$ | Turn-on Rise Time | | | 17 | | |
| $t_{d(OFF)}$ | Turn-off Delay Time | | | 35 | | |
| $t_f$ | Turn-off Fall Time | | | 14 | | |
| **Gate Charge Characteristics** ⑥ | | | | | | |
| $Q_g$ | Total Gate Charge | $V_{DS}$=16V, $V_{GS}$=4.5V, $I_{DS}$=6A | | 12 | | nC |
| $Q_{gs}$ | Gate-Source Charge | | | 1.8 | | |
| $Q_{gd}$ | Gate-Drain Charge | | | 3.6 | | |

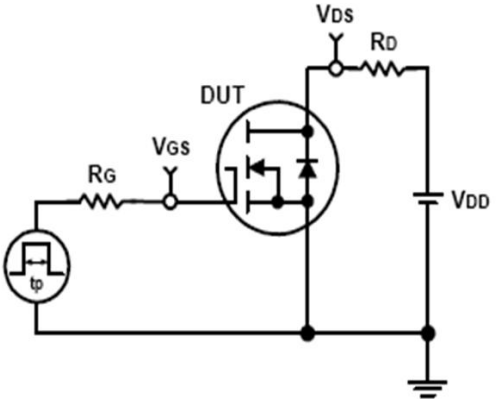
Notes: ①Pulse width limited by safe operating area.
②Calculated continuous current based on maximum allowable junction temperature.
③When mounted on 1 inch square copper board, t≤5sec. The value in any given application depends on the user's specific board design.
④Limited by $T_{Jmax.}$ Starting $T_J$ = 25°C.
⑤Pulse test;Pulse width≤200μs, duty cycle≤2%.
⑥Guaranteed by design, not subject to production testing.

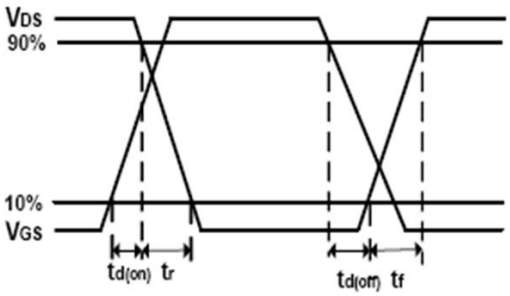
## Avalanche Test Circuit and Waveforms



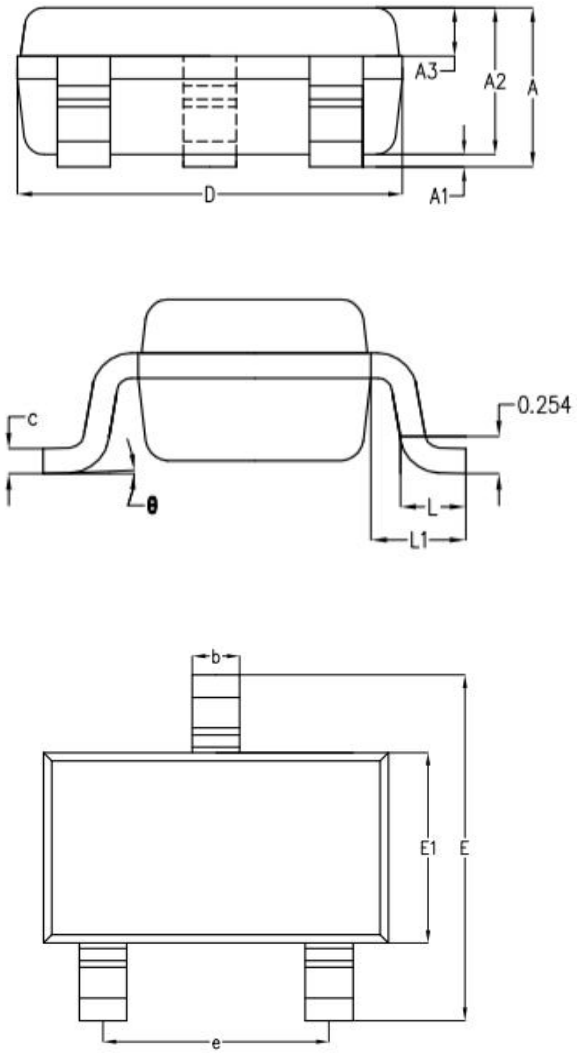

## Switching Time Test Circuit and Waveforms



## Package Information

- SOT23-3(大)




| SYMBOL | MILLIMETER | | |
|---|---|---|---|
| | MIN | NOM | MAX |
| A | - | 1.19 | 1.24 |
| A1 | - | 0.05 | 0.09 |
| A2 | 1.05 | 1.10 | 1.15 |
| A3 | 0.31 | 0.36 | 0.41 |
| b | 0.35 | 0.40 | 0.45 |
| c | 0.12 | 0.17 | 0.22 |
| D | 2.85 | 2.90 | 2.95 |
| E | 2.80 | 2.90 | 3.00 |
| E1 | 1.55 | 1.60 | 1.65 |
| e | 1.90BSC | | |
| L | 0.37 | 0.45 | 0.53 |
| L1 | 0.65BSC | | |
| θ | 0° | 2° | 8° |