

## TO-252 N Channel Enhancement 沟道增强型 MOS Field Effect Transistor 场效应管

### ■Features 特点

Low on-resistance 低导通电阻

$R_{DS(ON)}=4.8m\Omega(\text{Type})@V_{GS}=4.5V$

$R_{DS(ON)}=6.8m\Omega(\text{Type})@V_{GS}=2.5V$

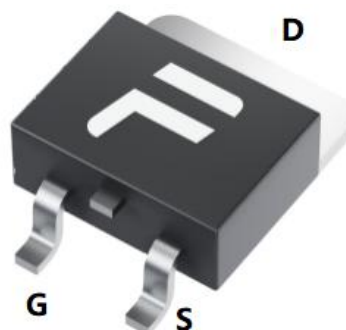
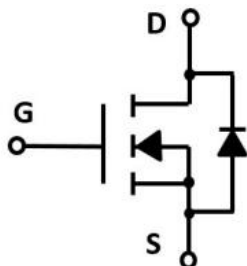
### ■Applications 应用

Load switch 负载开关

PWM Application 脉宽调制

Power Management 电源管理

### ■Internal Schematic Diagram 内部结构



### ■Absolute Maximum Ratings 最大额定值

| Characteristic 特性参数                    | Symbol 符号                                    | Rat 额定值  | Unit 单位            |
|----------------------------------------|----------------------------------------------|----------|--------------------|
| Drain-Source Voltage 漏极-源极电压           | $BV_{DSS}$                                   | 20       | V                  |
| Gate- Source Voltage 栅极-源极电压           | $V_{GS}$                                     | $\pm 12$ | V                  |
| Drain Current (continuous)漏极电流-连续      | $I_D$ (at $T_C = 25^\circ\text{C}$ )         | 60       | A                  |
| Drain Current (pulsed)漏极电流-脉冲          | $I_{DM}$                                     | 240      | A                  |
| Total Device Dissipation 总耗散功率         | $P_{TOT}(\text{at } T_C = 25^\circ\text{C})$ | 37       | W                  |
| Thermal Resistance Junction-Case 热阻    | $R_{\theta JC}$                              | 3.4      | $^\circ\text{C/W}$ |
| Thermal Resistance Junction-Ambient 热阻 | $R_{\theta JA}$                              | 32       | $^\circ\text{C/W}$ |
| Avalanche Energy Single Pulse 雪崩能量     | $E_{AS}$                                     | 65       | mJ                 |
| Junction/Storage Temperature 结温/储存温度   | $T_J, T_{stg}$                               | -55~150  | $^\circ\text{C}$   |

**Electrical Characteristics 电特性**

 (T<sub>A</sub>=25°C unless otherwise noted 如无特殊说明, 温度为 25°C)

| Characteristic<br>特性参数                                                                                                                         | Symbol<br>符号        | Min<br>最小值 | Typ<br>典型值 | Max<br>最大值 | Unit<br>单位 |
|------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|------------|------------|------------|------------|
| Drain-Source Breakdown Voltage<br>漏极-源极击穿电压(I <sub>D</sub> =250uA, V <sub>GS</sub> =0V)                                                        | BV <sub>DSS</sub>   | 20         | —          | —          | V          |
| Gate Threshold Voltage<br>栅极开启电压(I <sub>D</sub> =250uA, V <sub>GS</sub> =V <sub>DS</sub> )                                                     | V <sub>GS(th)</sub> | 0.5        | 0.8        | 1.1        | V          |
| Zero Gate Voltage Drain Current<br>零栅压漏极电流(V <sub>GS</sub> =0V, V <sub>DS</sub> =20V)                                                          | I <sub>DSS</sub>    | —          | —          | 1          | uA         |
| Gate Body Leakage<br>栅极漏电流(V <sub>GS</sub> =±12V, V <sub>DS</sub> =0V)                                                                         | I <sub>GSS</sub>    | —          | —          | ±100       | nA         |
| Static Drain-Source On-State Resistance<br>静态漏源导通电阻(I <sub>D</sub> =30A, V <sub>GS</sub> =10V)<br>(I <sub>D</sub> =20A, V <sub>GS</sub> =4.5V) | R <sub>DS(ON)</sub> | —          | 4.8<br>6.8 | 6.3<br>9.5 | mΩ         |
| Diode Forward Voltage Drop<br>内附二极管正向压降(I <sub>SD</sub> =30A, V <sub>GS</sub> =0V)                                                             | V <sub>SD</sub>     | —          | —          | 1.2        | V          |
| Input Capacitance 输入电容<br>(V <sub>GS</sub> =0V, V <sub>DS</sub> =10V, f=1MHz)                                                                  | C <sub>ISS</sub>    | —          | 2006       | —          | pF         |
| Common Source Output Capacitance<br>共源输出电容(V <sub>GS</sub> =0V, V <sub>DS</sub> =10V, f=1MHz)                                                  | C <sub>OSS</sub>    | —          | 278        | —          | pF         |
| Reverse Transfer Capacitance 反馈电容<br>(V <sub>GS</sub> =0V, V <sub>DS</sub> =10V, f=1MHz)                                                       | C <sub>RSS</sub>    | —          | 252        | —          | pF         |
| Total Gate Charge 栅极电荷密度<br>(V <sub>DS</sub> =10V, I <sub>D</sub> =20A, V <sub>GS</sub> =4.5V)                                                 | Q <sub>g</sub>      | —          | 23         | —          | nC         |
| Gate Source Charge 栅源电荷密度<br>(V <sub>DS</sub> =10V, I <sub>D</sub> =20A, V <sub>GS</sub> =4.5V)                                                | Q <sub>gs</sub>     | —          | 4          | —          | nC         |
| Gate Drain Charge 栅漏电荷密度<br>(V <sub>DS</sub> =10V, I <sub>D</sub> =20A, V <sub>GS</sub> =4.5V)                                                 | Q <sub>gd</sub>     | —          | 7          | —          | nC         |
| Turn-ON Delay Time 开启延迟时间<br>(V <sub>DS</sub> =10V I <sub>D</sub> =20A, R <sub>GEN</sub> =3Ω, V <sub>GS</sub> =4.5V)                           | t <sub>d(on)</sub>  | —          | 12         | —          | ns         |
| Turn-ON Rise Time 开启上升时间<br>(V <sub>DS</sub> =10V I <sub>D</sub> =20A, R <sub>GEN</sub> =3Ω, V <sub>GS</sub> =4.5V)                            | t <sub>r</sub>      | —          | 33         | —          | ns         |
| Turn-OFF Delay Time 关断延迟时间<br>(V <sub>DS</sub> =10V I <sub>D</sub> =20A, R <sub>GEN</sub> =3Ω, V <sub>GS</sub> =4.5V)                          | t <sub>d(off)</sub> | —          | 48         | —          | ns         |
| Turn-OFF Fall Time 关断下降时间<br>(V <sub>DS</sub> =10V I <sub>D</sub> =20A, R <sub>GEN</sub> =3Ω, V <sub>GS</sub> =4.5V)                           | t <sub>f</sub>      | —          | 95         | —          | ns         |

■ Typical Characteristic Curve 典型特性曲线

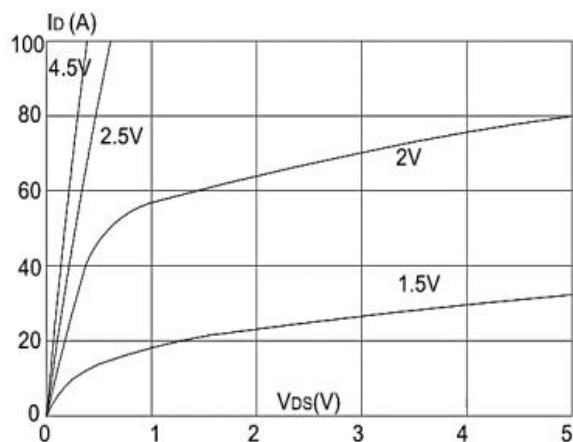


Figure 1: Output Characteristics

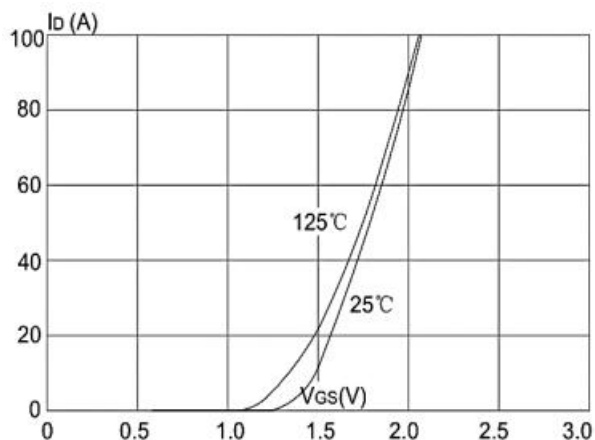


Figure 2: Transfer Characteristics

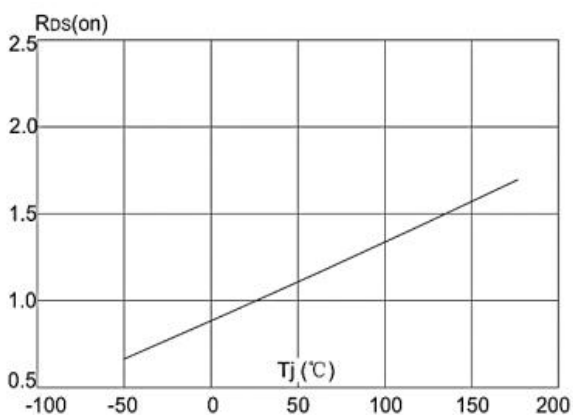


Figure 3: On-Resistance vs.  $T_J$

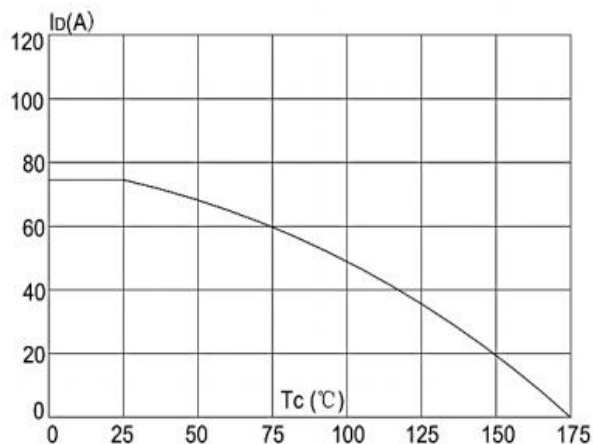


Figure 4: Drain Current vs.  $T_C$

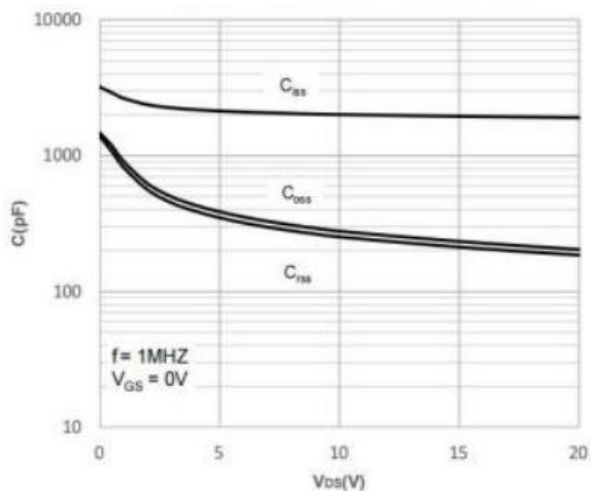


Figure 5: Capacitance Characteristics

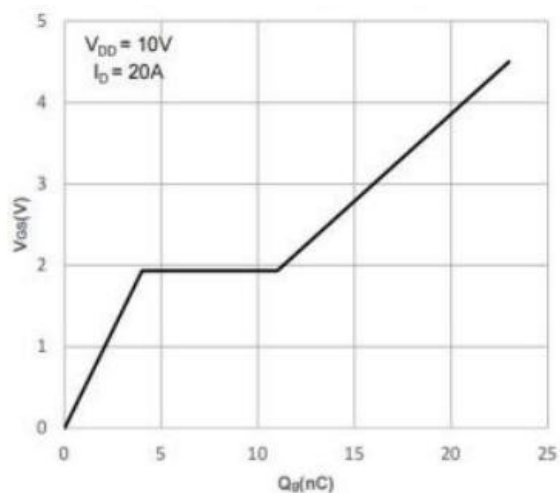


Figure 6: Gate-Charge Characteristics

■ Typical Characteristic Curve 典型特性曲线

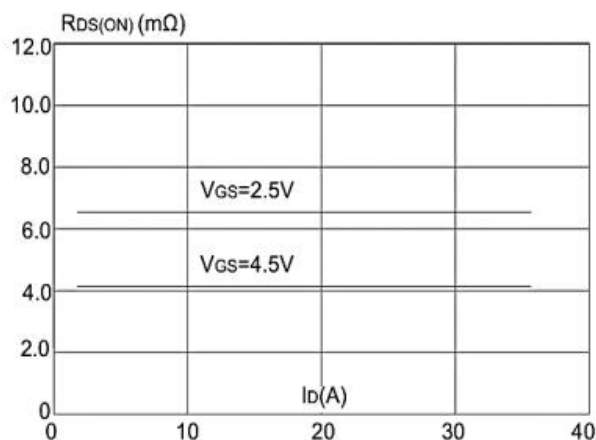


Figure 7: On-Resistance vs. Drain Current

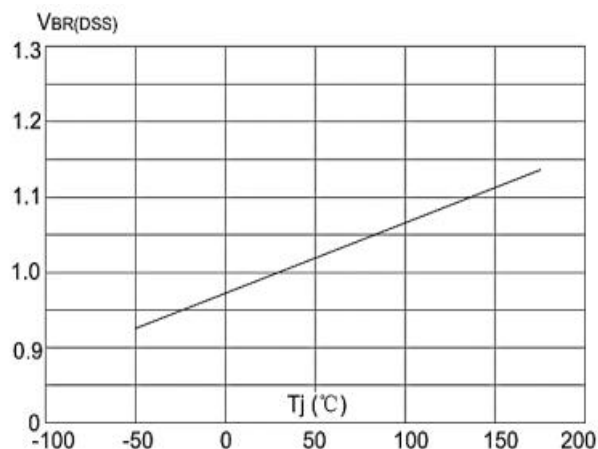


Figure 8: Breakdown Voltage vs.  $T_j$

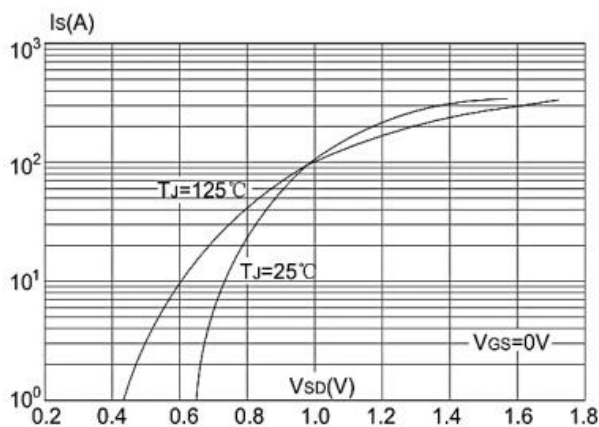


Figure 9: Diode Characteristics

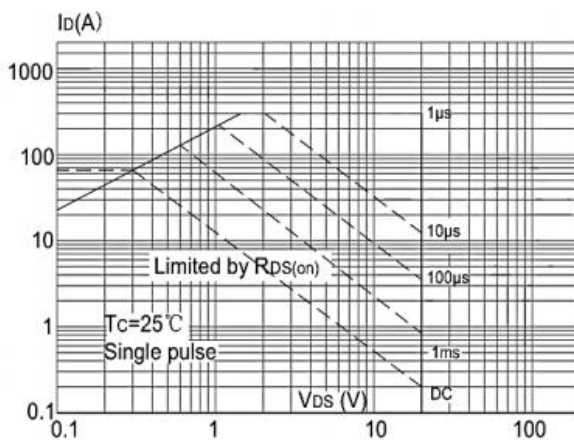


Figure 10: Safe Operating Area

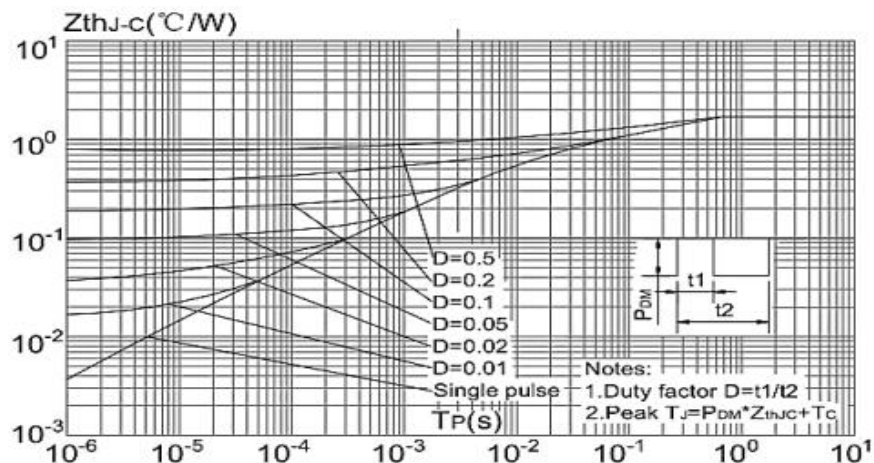
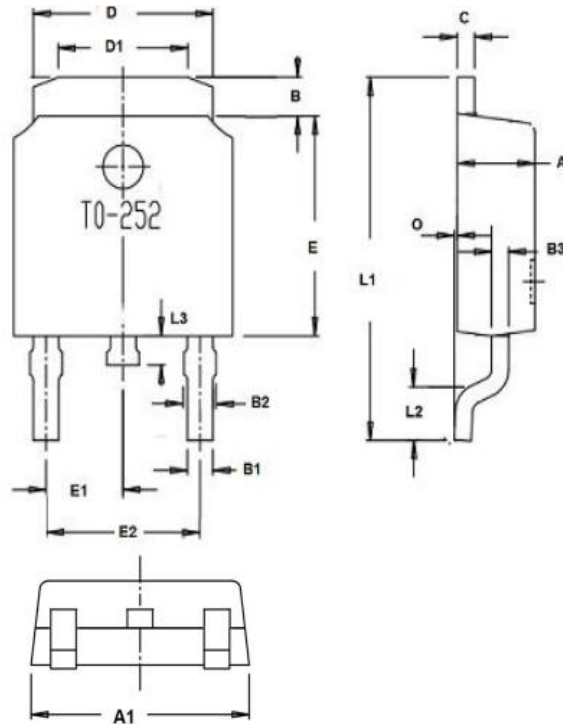


Figure 11: Transient Thermal Response Curve

■ **Package Dimension 外形封装尺寸**



| Dim.                         | Min.   | Max. |
|------------------------------|--------|------|
| A                            | 2.1    | 2.5  |
| A1                           | 6.3    | 6.9  |
| B                            | 0.95   | 1.55 |
| B1                           | 0.6    | 0.8  |
| B2                           | 0.75   | 0.95 |
| B3                           |        |      |
| C                            | Typ0.5 |      |
| D                            | 5.3    | 5.5  |
| D1                           | 3.65   | 4.05 |
| E                            | 5.8    | 6.4  |
| E1                           | Typ2.3 |      |
| E2                           | Typ4.6 |      |
| O                            | 0      | 0.15 |
| L1                           | 9      | 11   |
| L2                           | Typ1.5 |      |
| L3                           | 0.7    | 1    |
| All Dimensions in millimeter |        |      |