

**Product Summary**

● **N-Channel**

- $V_{DS} = 30V, I_D = 4A$   
 $R_{DS(ON)} 30m\Omega @ V_{GS}=10V (Typ)$   
 $R_{DS(ON)} 50m\Omega @ V_{GS}=-4.5V (Typ)$

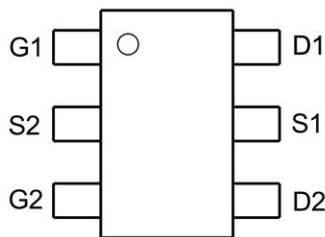
● **P-Channel**

- $V_{DS} = -30V, I_D = -3.0A$   
 $R_{DS(ON)} 45m\Omega @ V_{GS}=-10V (Typ)$   
 $R_{DS(ON)} 70m\Omega @ V_{GS}=-4.5V (Typ)$

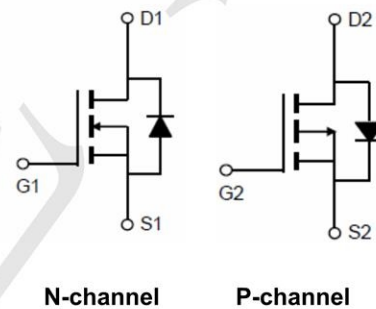
**Application**

- DC-DC Converters.
- Load Switch.
- Power Management.

**Package and Pin Configuration**



**Circuit diagram**



Marking:



**Absolute Maximum Ratings ( $T_A=25^\circ C$  unless otherwise noted)**

| Parameter  | Symbol         | N-Channel        | P-Channel  | Unit       |   |
|--|----------------|------------------|------------|------------|---|
| Drain-Source Voltage                             | $V_{DS}$       | 30               | -30        | V          |   |
| Gate-Source Voltage                              | $V_{GS}$       | $\pm 20$         | $\pm 20$   | V          |   |
| Continuous Drain Current                         | $I_D$          | $T_A=25^\circ C$ | 4.0        | -3.0       | A |
|  |                | $T_A=70^\circ C$ | 3          | -2.1       |   |
| Pulsed Drain Current (Note 1)                    | $I_{DM}$       | 20               | -15        | A          |   |
| Maximum Power Dissipation                        | $P_D$          | 1.2              |            | W          |   |
| Operating Junction and Storage Temperature Range | $T_J, T_{STG}$ | -55 To 150       | -55 To 150 | $^\circ C$ |   |

**Thermal Characteristic**

|   |                 |      |     |              |
|---|-----------------|------|-----|--------------|
| Thermal Resistance, Junction-to-Ambient (Note2) | $R_{\theta JA}$ | N-Ch | 104 | $^\circ C/W$ |
| Thermal Resistance, Junction-to-Ambient (Note2) | $R_{\theta JA}$ | P-Ch | 104 | $^\circ C/W$ |

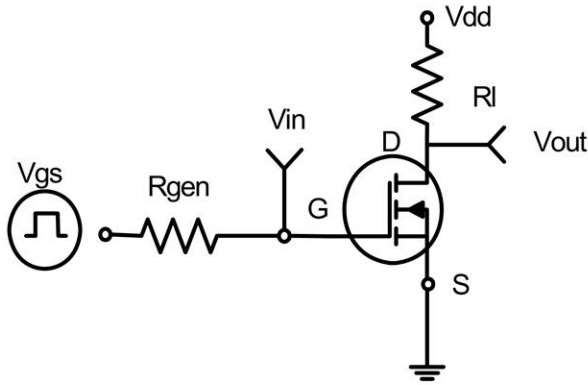
**N-CH Electrical Characteristics (T<sub>A</sub>=25°C unless otherwise noted)**

| Parameter                                 | Symbol              | Condition  | Min | Typ  | Max  | Unit |
|---|---------------------|--|-----|------|------|------|
| <b>Off Characteristics</b>                |                     |  |     |      |      |      |
| Drain-Source Breakdown Voltage            | BV <sub>DSS</sub>   | V <sub>GS</sub> =0V, I <sub>D</sub> =250μA   | 30  |      | -    | V    |
| Zero Gate Voltage Drain Current           | I <sub>DSS</sub>    | V <sub>DS</sub> =30V, V <sub>GS</sub> =0V  | -   | -    | 1    | μA   |
| Gate-Body Leakage Current                 | I <sub>GSS</sub>    | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V   | -   | -    | ±100 | nA   |
| <b>On Characteristics</b> (Note 3)        |                     |  |     |      |      |      |
| Gate Threshold Voltage                    | V <sub>GS(th)</sub> | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                               | 1.2 | 1.5  | 2.2  | V    |
| Drain-Source On-State Resistance          | R <sub>DS(ON)</sub> | V <sub>GS</sub> =10V, I <sub>D</sub> =4A   |     | 30   | 48   | mΩ   |
|   |                     | V <sub>GS</sub> =4.5V, I <sub>D</sub> =2A  |     | 50   | 90   | mΩ   |
| Forward Transconductance                  | g <sub>FS</sub>     | V <sub>DS</sub> =5V, I <sub>D</sub> =3.1A  | -   | 4    | -    | S    |
| <b>Dynamic Characteristics</b> (Note 4)   |                     |  |     |      |      |      |
| Input Capacitance                         | C <sub>iss</sub>    | V <sub>DS</sub> =15V, V <sub>GS</sub> =0V,<br>F=1.0MHz                                 | -   | 210  | -    | PF   |
| Output Capacitance                        | C <sub>oss</sub>    |  | -   | 35   | -    | PF   |
| Reverse Transfer Capacitance              | C <sub>rss</sub>    |  | -   | 23   | -    | PF   |
| <b>Switching Characteristics</b> (Note 4) |                     |  |     |      |      |      |
| Turn-on Delay Time                        | t <sub>d(on)</sub>  | V <sub>DD</sub> =15V, R <sub>L</sub> =3Ω<br>V <sub>GS</sub> =10V, R <sub>GEN</sub> =6Ω | -   | 4.5  | -    | nS   |
| Turn-on Rise Time                         | t <sub>r</sub>      |  | -   | 1.5  | -    | nS   |
| Turn-Off Delay Time                       | t <sub>d(off)</sub> |  | -   | 18.5 | -    | nS   |
| Turn-Off Fall Time                        | t <sub>f</sub>      |  | -   | 15.5 | -    | nS   |
| Total Gate Charge                         | Q <sub>g</sub>      | V <sub>DS</sub> =15V, I <sub>D</sub> =3.5A,<br>V <sub>GS</sub> =10V                    | -   | 5    | -    | nC   |
| Gate-Source Charge                        | Q <sub>gs</sub>     |  | -   | 0.55 | -    | nC   |
| Gate-Drain Charge                         | Q <sub>gd</sub>     |  | -   | 1    | -    | nC   |
| <b>Drain-Source Diode Characteristics</b> |                     |  |     |      |      |      |
| Diode Forward Voltage (Note 3)            | V <sub>SD</sub>     | V <sub>GS</sub> =0V, I <sub>S</sub> =3.5A  | -   | 0.8  | 1.2  | V    |
| Diode Forward Current (Note 2)            | I <sub>S</sub>      |  | -   | -    | 4    | A    |

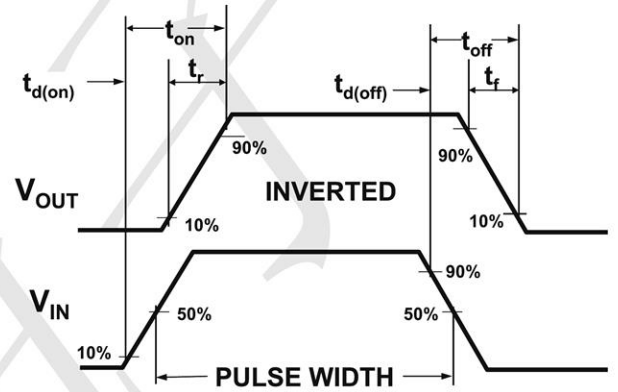
**P-CH Electrical Characteristics (T<sub>A</sub>=25°C unless otherwise noted)**

| Parameter                                 | Symbol              | Condition   | Min | Typ  | Max  | Unit |
|---|---------------------|---|-----|------|------|------|
| <b>Off Characteristics</b>                |                     |   |     |      |      |      |
| Drain-Source Breakdown Voltage            | BV <sub>DSS</sub>   | V <sub>GS</sub> =0V, I <sub>D</sub> =-250μA   | -30 | -33  | -    | V    |
| Zero Gate Voltage Drain Current           | I <sub>DSS</sub>    | V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V  | -   | -    | -1   | μA   |
| Gate-Body Leakage Current                 | I <sub>GSS</sub>    | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V  | -   | -    | ±100 | nA   |
| <b>On Characteristics</b> (Note 3)        |                     |   |     |      |      |      |
| Gate Threshold Voltage                    | V <sub>GS(th)</sub> | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA                                 | -1  | -1.6 | -2.5 | V    |
| Drain-Source On-State Resistance          | R <sub>DS(on)</sub> | V <sub>GS</sub> =-10V, I <sub>D</sub> =-2.7A  | -   | 45   | 65   | mΩ   |
|   |                     | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-2A   | -   | 85   | 100  | mΩ   |
| Forward Transconductance                  | g <sub>FS</sub>     | V <sub>DS</sub> =-10V, I <sub>D</sub> =-2.7A  |     | 2    | -    | S    |
| <b>Dynamic Characteristics</b> (Note 4)   |                     |   |     |      |      |      |
| Input Capacitance                         | C <sub>iss</sub>    | V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V,<br>F=1.0MHz                                   | -   | 199  | -    | PF   |
| Output Capacitance                        | C <sub>oss</sub>    |   | -   | 47   | -    | PF   |
| Reverse Transfer Capacitance              | C <sub>rss</sub>    |   | -   | 28   | -    | PF   |
| <b>Switching Characteristics</b> (Note 4) |                     |   |     |      |      |      |
| Turn-on Delay Time                        | t <sub>d(on)</sub>  | V <sub>DD</sub> =-15V, R <sub>L</sub> =15Ω<br>V <sub>GS</sub> =-10V, R <sub>GEN</sub> =6Ω | -   | 8    | -    | nS   |
| Turn-on Rise Time                         | t <sub>r</sub>      |   | -   | 5    | -    | nS   |
| Turn-Off Delay Time                       | t <sub>d(off)</sub> |   | -   | 12   | -    | nS   |
| Turn-Off Fall Time                        | t <sub>f</sub>      |   | -   | 4    | -    | nS   |
| Total Gate Charge                         | Q <sub>g</sub>      | V <sub>DS</sub> =-15V, I <sub>D</sub> =-2.7A, V <sub>GS</sub> =-10V                       | -   | 5    | -    | nC   |
| Gate-Source Charge                        | Q <sub>gs</sub>     |   | -   | 0.7  | -    | nC   |
| Gate-Drain Charge                         | Q <sub>gd</sub>     |   | -   | 1.1  | -    | nC   |
| <b>Drain-Source Diode Characteristics</b> |                     |   |     |      |      |      |
| Diode Forward Voltage (Note 3)            | V <sub>SD</sub>     | V <sub>GS</sub> =0V, I <sub>S</sub> =-2.7A  | -   | -    | -1.2 | V    |

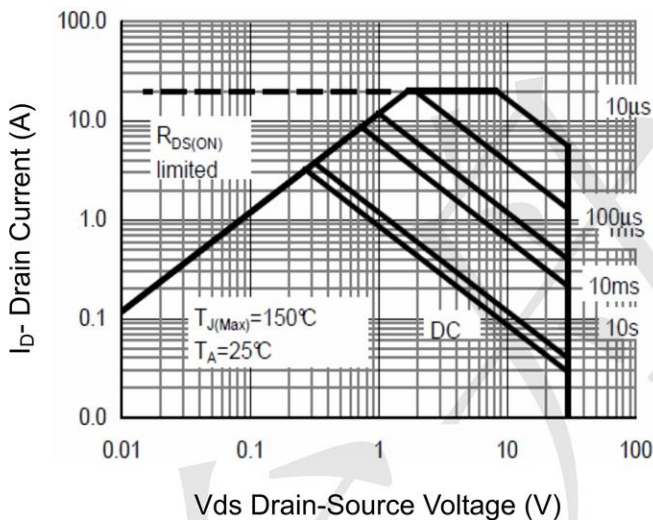
**N- Channel Typical Electrical and Thermal Characteristics**



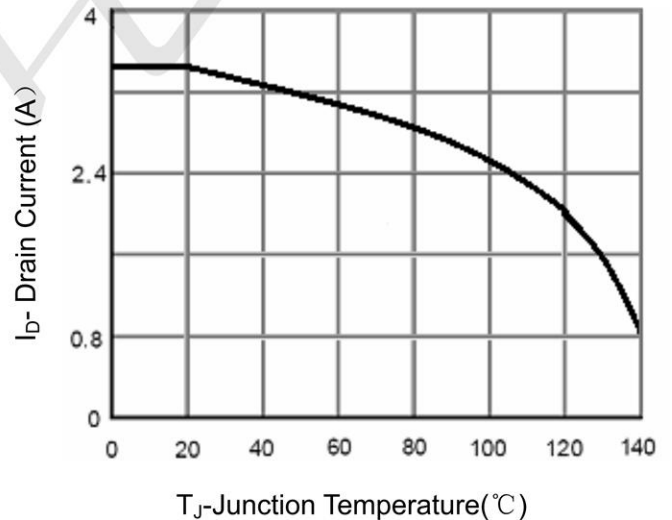
**Figure 1: Switching Test Circuit**



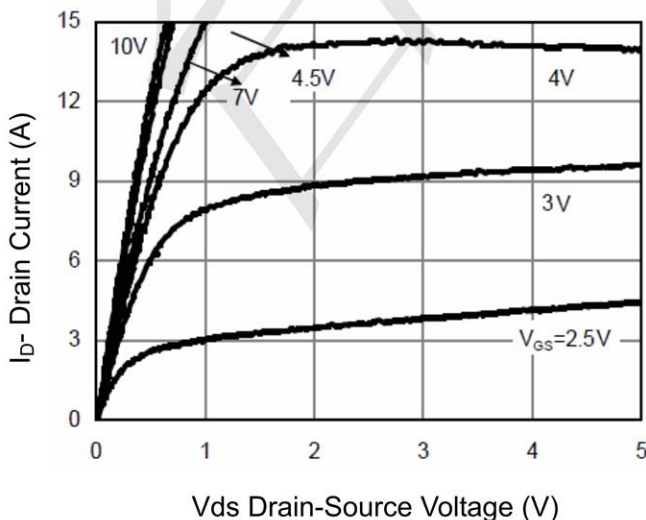
**Figure 2: Switching Waveforms**



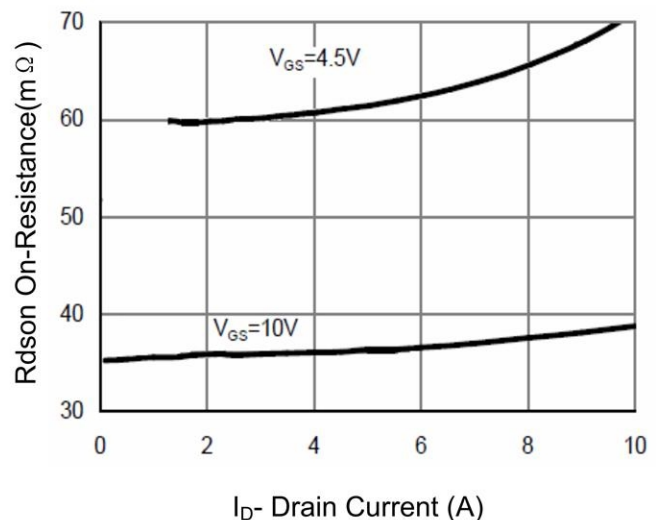
**Figure 3 Safe Operation Area**



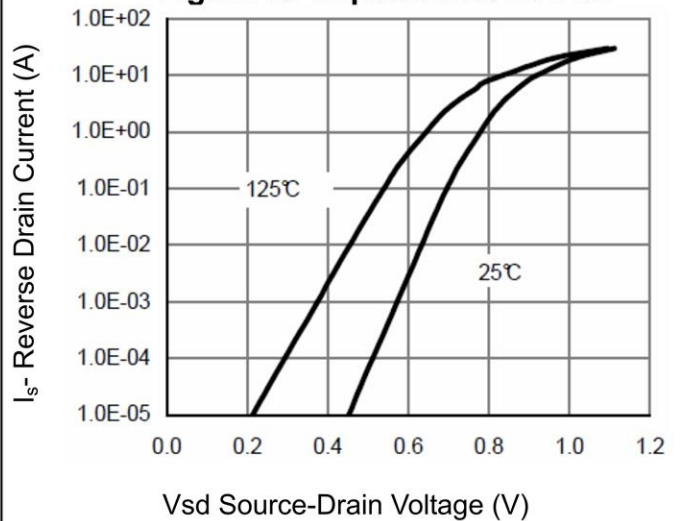
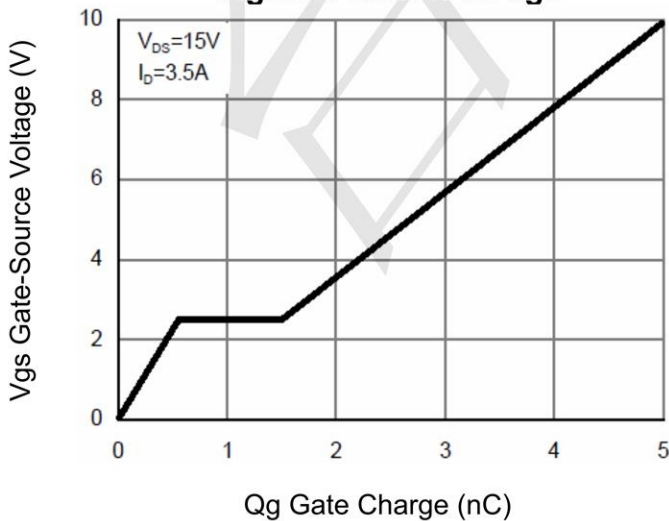
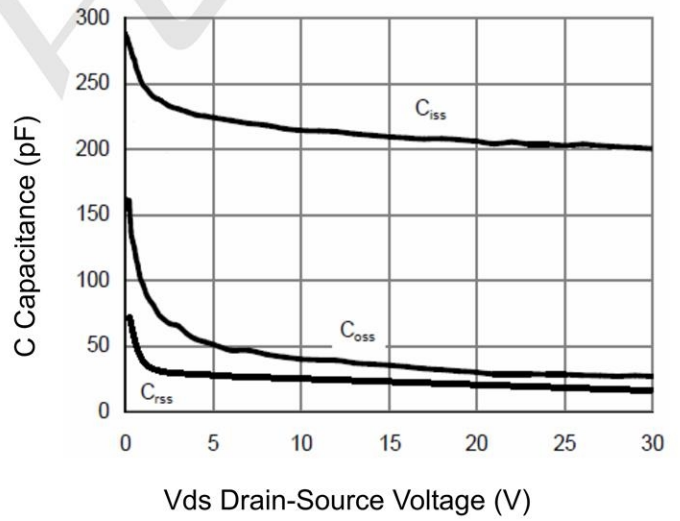
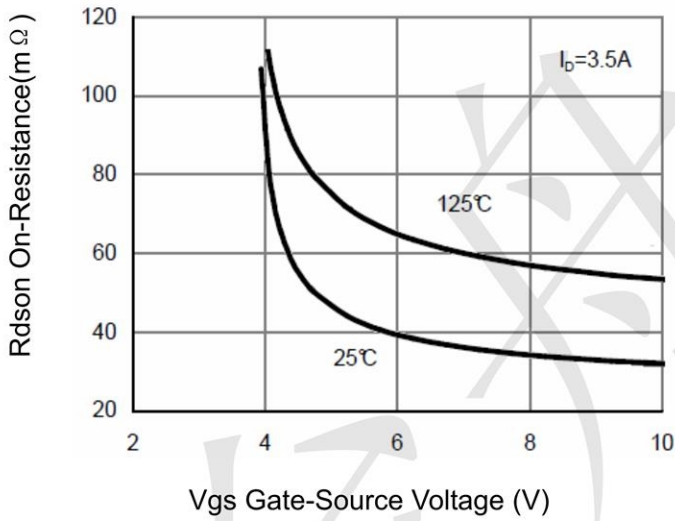
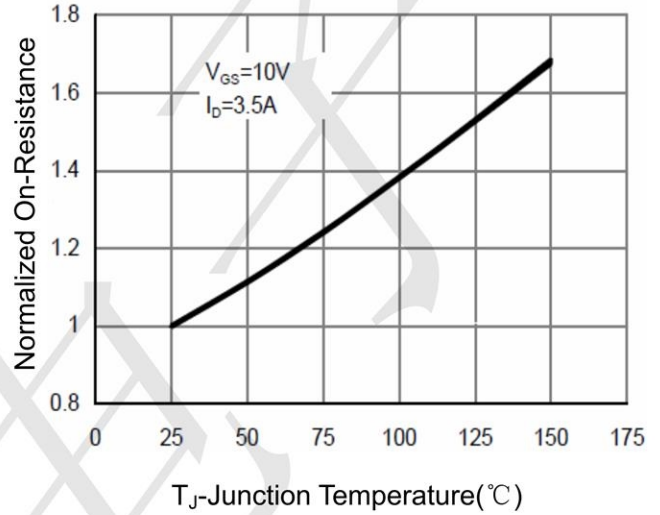
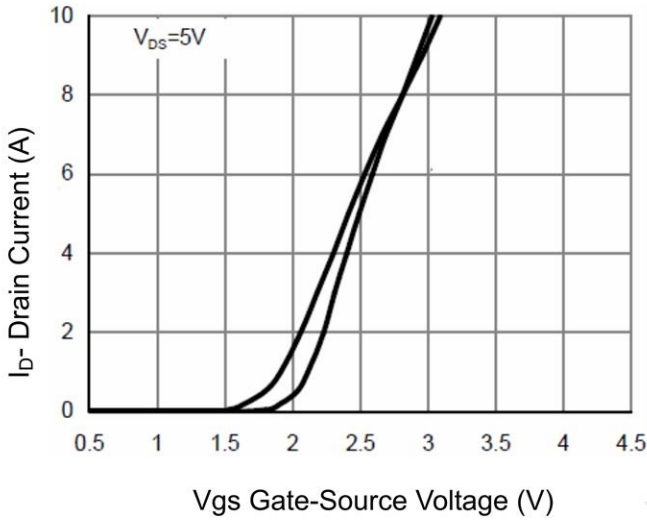
**Figure 4 Drain Current**

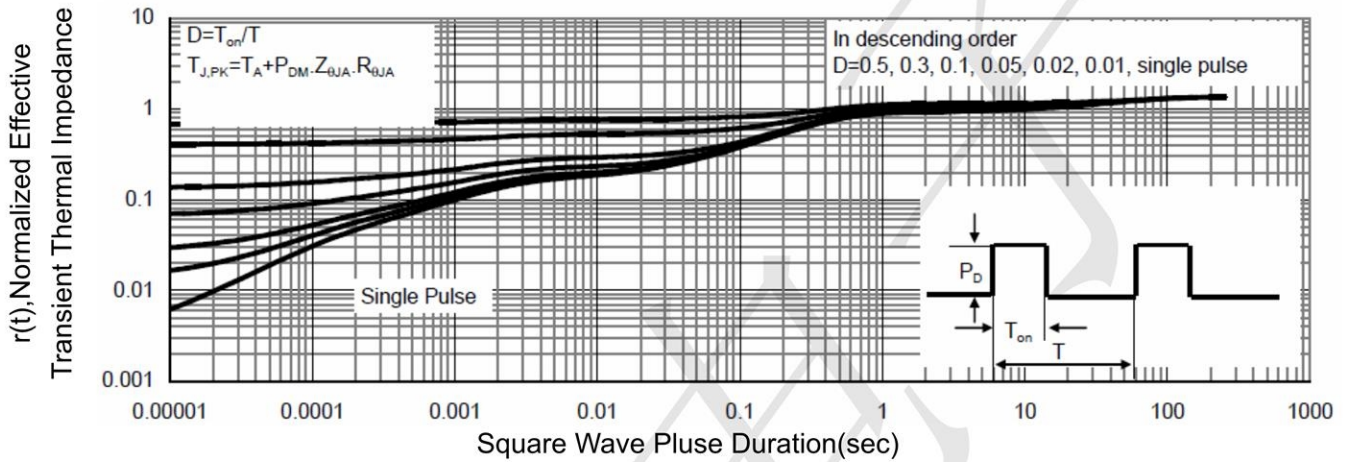


**Figure 5 Output Characteristics**



**Figure 6 Drain-Source On-Resistance**





**Figure 13 Normalized Maximum Transient Thermal Impedance**

P- Channel Typical Electrical and Thermal Characteristics

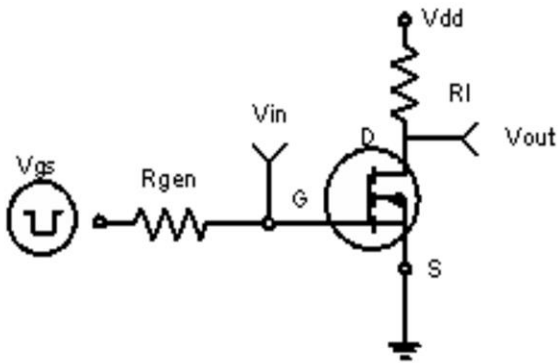


Figure 1: Switching Test Circuit

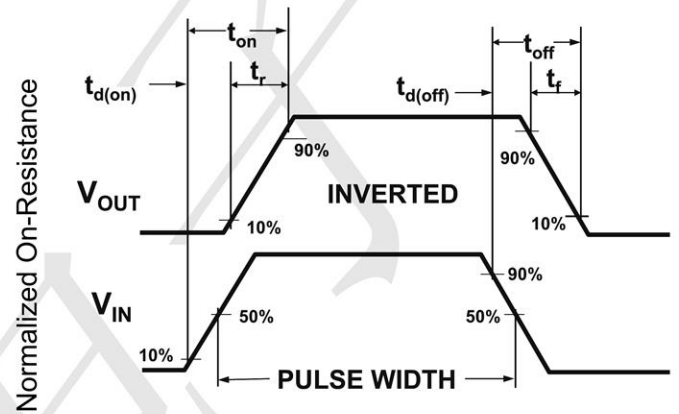


Figure 2: Switching Waveforms

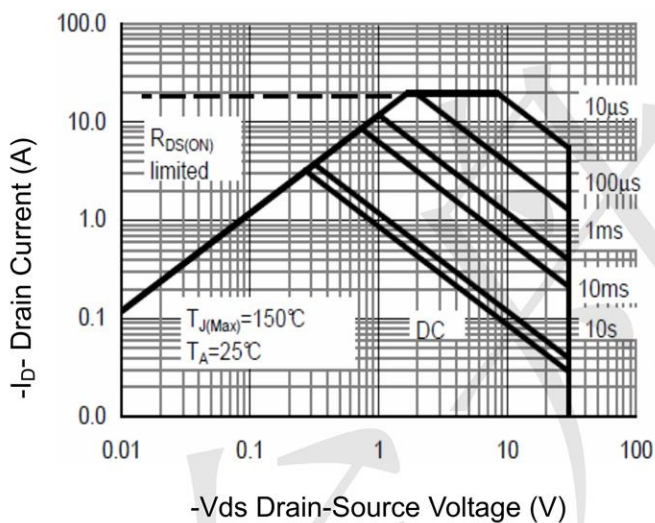


Figure 3 Safe Operation Area

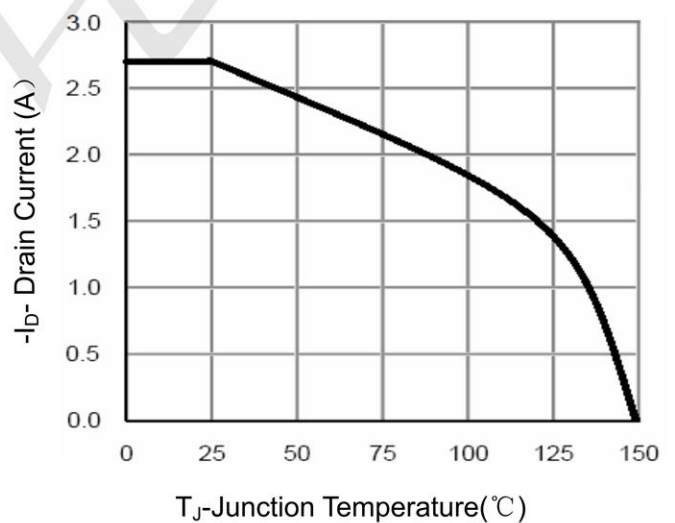


Figure 4 Drain Current

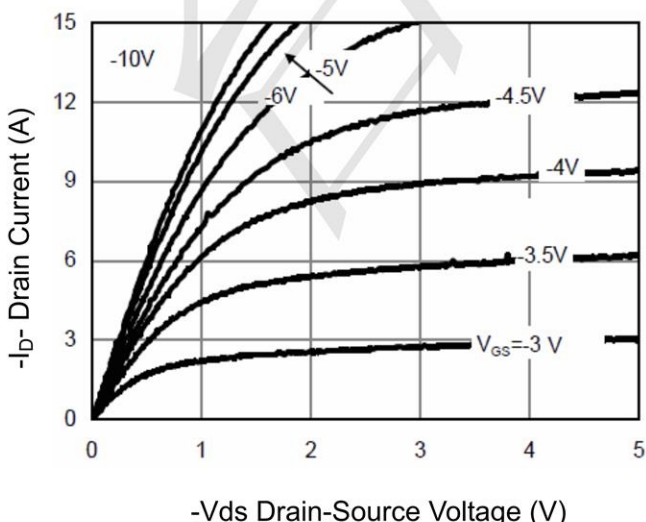


Figure 5 Output Characteristics

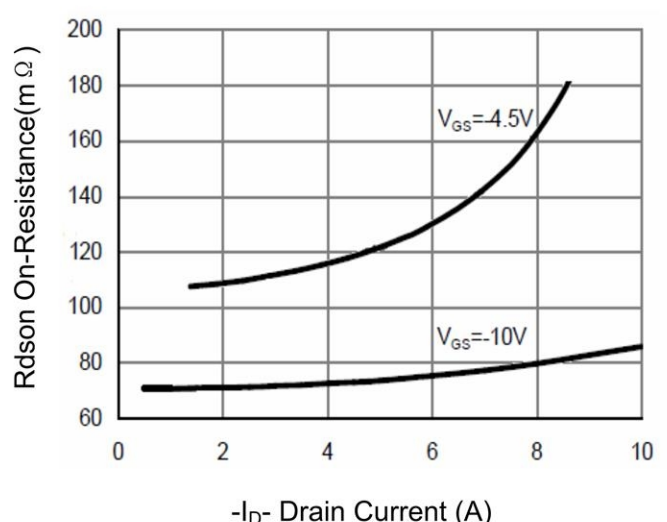


Figure 6 Drain-Source On-Resistance

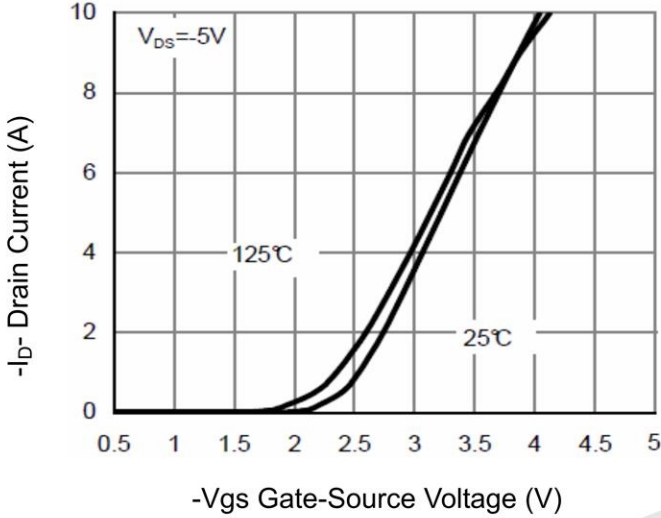


Figure 7 Transfer Characteristics

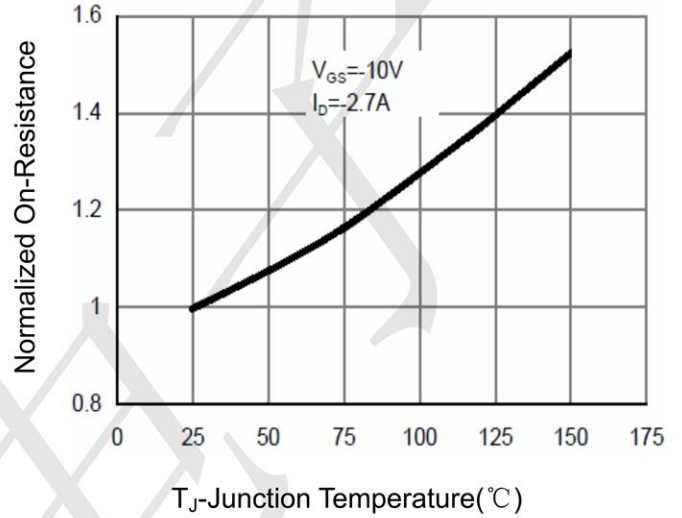


Figure 8 Drain-Source On-Resistance

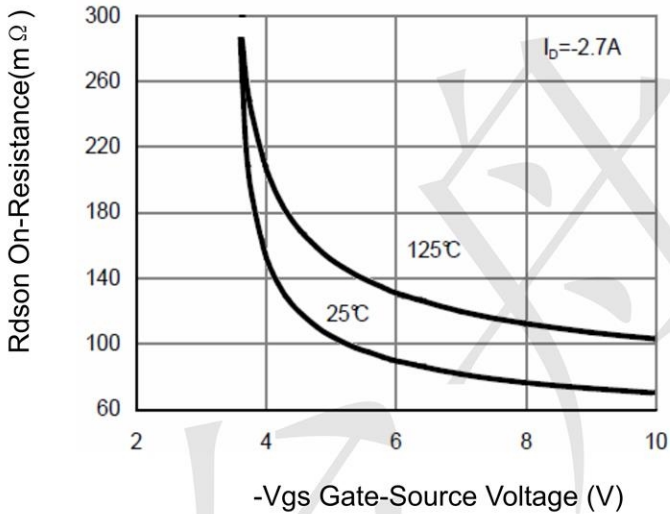


Figure 9 Rdson vs Vgs

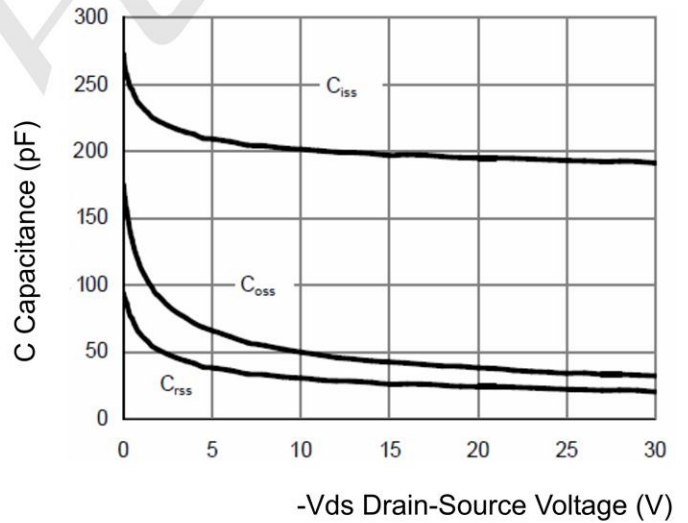


Figure 10 Capacitance vs Vds

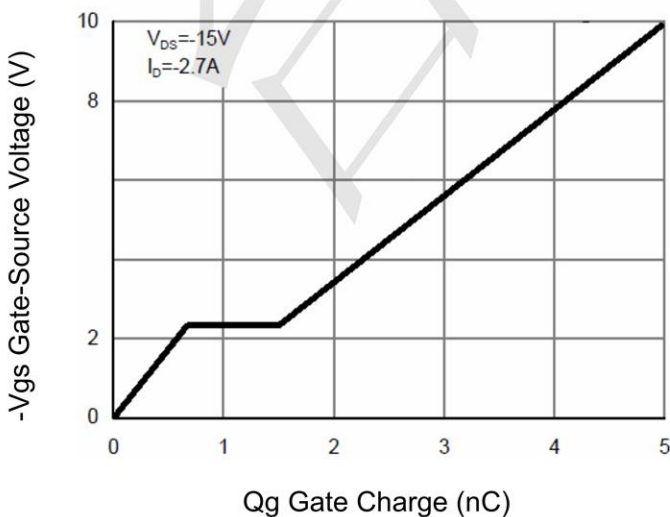


Figure 11 Gate Charge

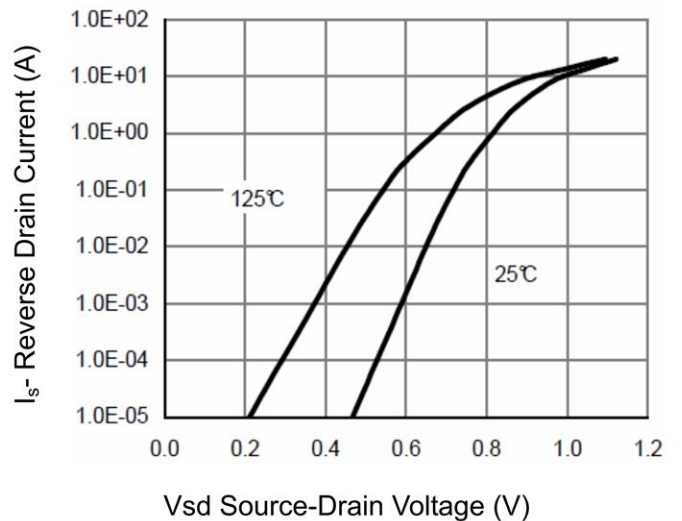
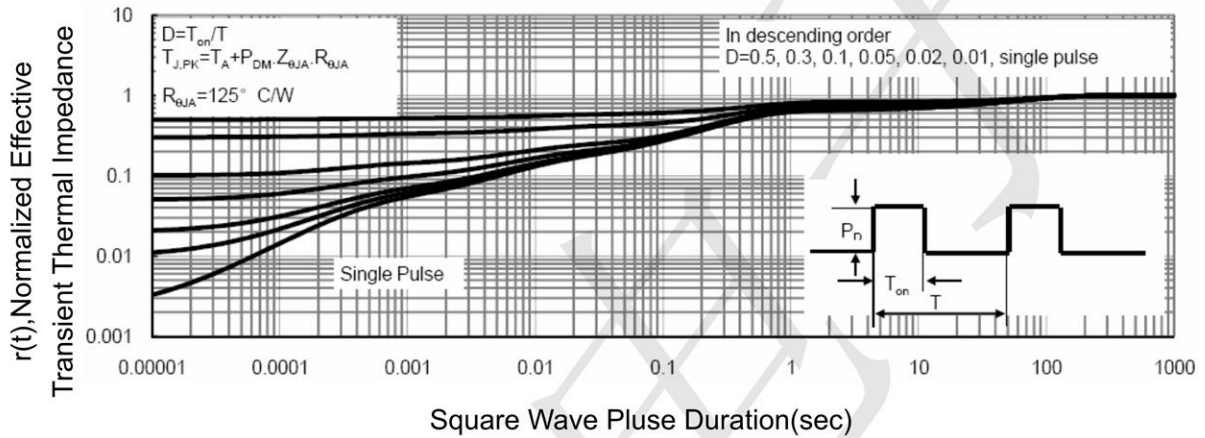


Figure 12 Source- Drain Diode Forward





**Figure 13 Normalized Maximum Transient Thermal Impedance**



**TECH PUBLIC**

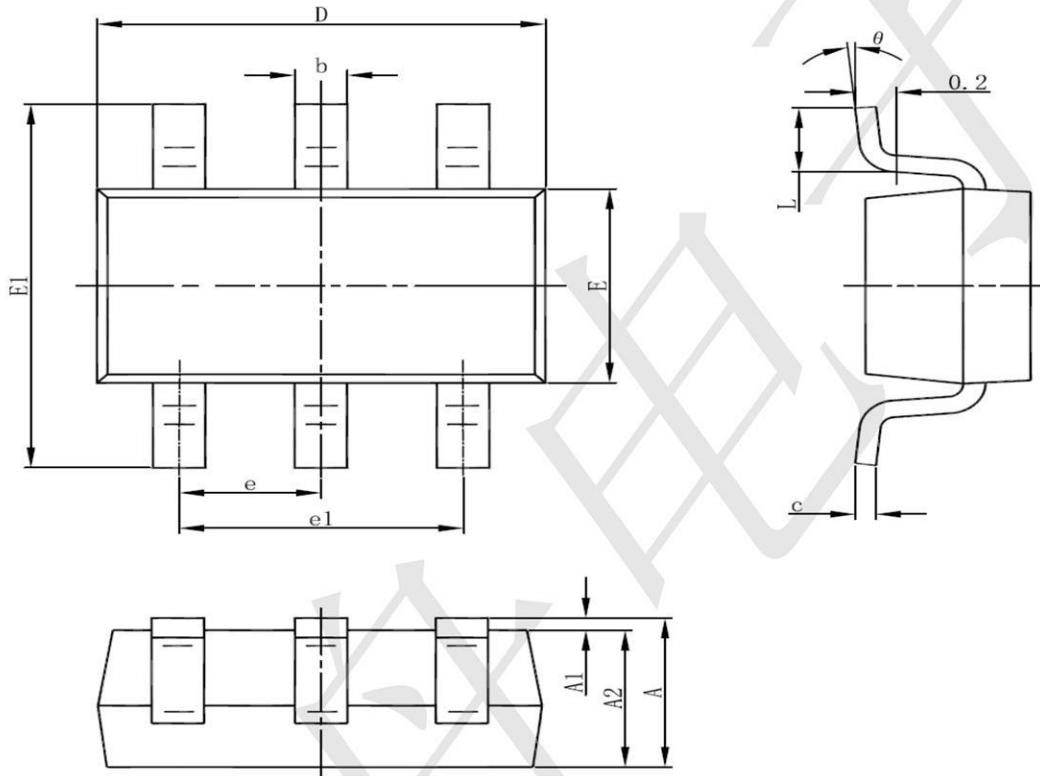
—台丹电子—

TPSI3552DV

N and P-Channel Enhancement Mode Power MOSFET

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**SOT23-6 Package Information**



| Symbol   | Dimensions In Millimeters |       | Dimensions In Inches |       |
|----------|---------------------------|-------|----------------------|-------|
|          | Min                       | Max   | Min                  | Max   |
| A        | 1.050                     | 1.250 | 0.041                | 0.049 |
| A1       | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2       | 1.050                     | 1.150 | 0.041                | 0.045 |
| b        | 0.300                     | 0.500 | 0.012                | 0.020 |
| c        | 0.100                     | 0.200 | 0.004                | 0.008 |
| D        | 2.820                     | 3.020 | 0.111                | 0.119 |
| E        | 1.500                     | 1.700 | 0.059                | 0.067 |
| E1       | 2.650                     | 2.950 | 0.104                | 0.116 |
| e        | 0.950(BSC)                |       | 0.037(BSC)           |       |
| e1       | 1.800                     | 2.000 | 0.071                | 0.079 |
| L        | 0.300                     | 0.600 | 0.012                | 0.024 |
| $\theta$ | 0°                        | 8°    | 0°                   | 8°    |