

## P-channel Enhancement Mode Power MOSFET

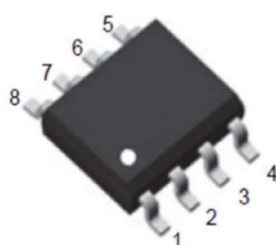
### Features

- $V_{DS} = -30V$ ,  $I_D = -9A$   
 $R_{DS(ON)} < 16\ m\Omega$  @  $V_{GS} = -10V$   
 $R_{DS(ON)} < 23\ m\Omega$  @  $V_{GS} = -4.5V$

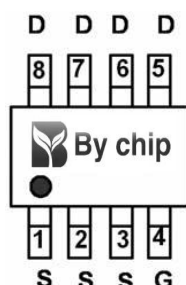
### General Features

- Advanced Trench Technology
- Provide Excellent  $R_{DS(ON)}$  and Low Gate Charge
- Lead Free and Green Available

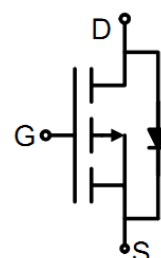
100% UIS TESTED!  
100%  $\Delta V_{ds}$  TESTED!



SOP-8



pin assignment



Schematic diagram

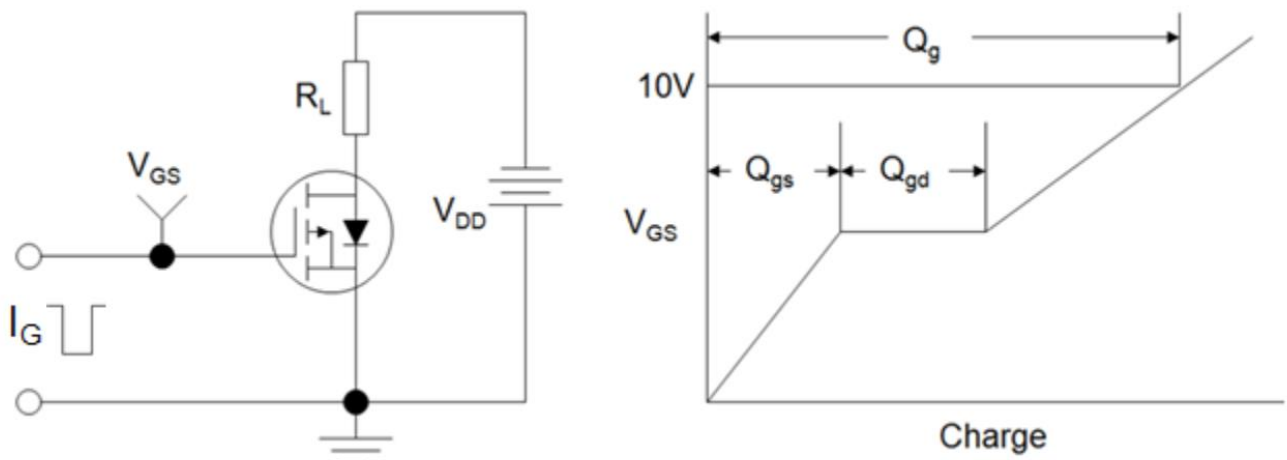
| Absolute Maximum Ratings $T_C = 25^\circ C$ , unless otherwise noted |                |            |              |
|----------------------------------------------------------------------|----------------|------------|--------------|
| Parameter                                                            | Symbol         | Value      | Unit         |
| Drain-Source Voltage                                                 | $V_{DS}$       | -30        | V            |
| Continuous Drain Current                                             | $I_D$          | -9         | A            |
| Pulsed Drain Current (note1)                                         | $I_{DM}$       | -36        | A            |
| Gate-Source Voltage                                                  | $V_{GS}$       | $\pm 20$   | V            |
| Power Dissipation                                                    | $P_D$          | 2.7        | W            |
| Single Pulse Avalanche Energy (note3)                                | EAS            | 231        | mJ           |
| Operating Junction and Storage Temperature Range                     | $T_J, T_{stg}$ | -55 To 150 | $^\circ C$   |
| Thermal Resistance                                                   |                |            |              |
| Parameter                                                            | Symbol         | Value      | Unit         |
| Thermal Resistance, Junction-to-Ambient                              | $R_{thJA}$     | 47         | $^\circ C/W$ |

| Specifications T <sub>J</sub> = 25°C, unless otherwise noted |                      |                                                                            |       |      |      |      |
|--------------------------------------------------------------|----------------------|----------------------------------------------------------------------------|-------|------|------|------|
| Parameter                                                    | Symbol               | Test Conditions                                                            | Value |      |      | Unit |
|                                                              |                      |                                                                            | Min.  | Typ. | Max. |      |
| Static Parameters                                            |                      |                                                                            |       |      |      |      |
| Drain-Source Breakdown Voltage                               | V <sub>(BR)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   | uA   |
| Gate-Source Leakage                                          | I <sub>GSS</sub>     | V <sub>GS</sub> = ±20V                                                     | --    | --   | ±100 | nA   |
| Gate-Source Threshold Voltage                                | V <sub>GS(th)</sub>  | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA                | -1    |      | -3   | V    |
| Drain-Source On-Resistance                                   | R <sub>DS(on)</sub>  | V <sub>GS</sub> = -10V, I <sub>D</sub> = -3A                               | --    |      | 16   | mΩ   |
|                                                              |                      | V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -2A                              | --    |      | 23   |      |
| Dynamic Parameters                                           |                      |                                                                            |       |      |      |      |
| Input Capacitance                                            | C <sub>iss</sub>     | V <sub>GS</sub> = 0V,<br>V <sub>DS</sub> = -15V,<br>f = 1.0MHz             | --    | 1253 | --   | pF   |
| Output Capacitance                                           | C <sub>oss</sub>     |                                                                            | --    | 181  | --   |      |
| Reverse Transfer Capacitance                                 | C <sub>rss</sub>     |                                                                            | --    | 158  | --   |      |
| Total Gate Charge                                            | Q <sub>g</sub>       | V <sub>DD</sub> = -15V,<br>I <sub>D</sub> = -3A,<br>V <sub>GS</sub> = -10V | --    | 24.5 | --   | nC   |
| Gate-Source Charge                                           | Q <sub>gs</sub>      |                                                                            | --    | 3    | --   |      |
| Gate-Drain Charge                                            | Q <sub>gd</sub>      |                                                                            | --    | 6    | --   |      |
| Turn-on Delay Time                                           | t <sub>d(on)</sub>   | V <sub>DD</sub> = -15V,<br>I <sub>D</sub> = -3A,<br>R <sub>G</sub> = 1Ω    | --    | 8    | --   | ns   |
| Turn-on Rise Time                                            | t <sub>r</sub>       |                                                                            | --    | 9    | --   |      |
| Turn-off Delay Time                                          | t <sub>d(off)</sub>  |                                                                            | --    | 26   | --   |      |
| Turn-off Fall Time                                           | t <sub>f</sub>       |                                                                            | --    | 8    | --   |      |
| Drain-Source Body Diode Characteristics                      |                      |                                                                            |       |      |      |      |
| Continuous Body Diode Current                                | I <sub>S</sub>       | T <sub>C</sub> = 25°C                                                      | --    | --   | -9   | A    |
| Body Diode Voltage                                           | V <sub>SD</sub>      | T <sub>J</sub> = 25°C, I <sub>SD</sub> = -3A, V <sub>GS</sub> = 0V         | --    | --   | -1.2 | V    |

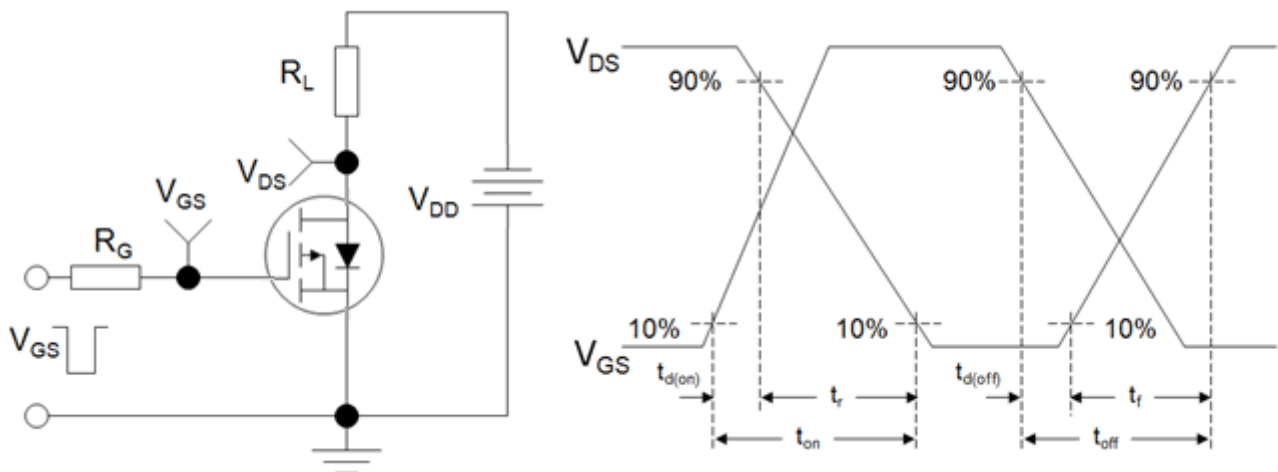
#### Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. Identical low side and high side switch with identical  $R_G$
3.  $V_{DD} = -30V, R_G = 25\Omega, L = 0.5\text{ mH}$ , Starting  $T_J = 25^{\circ}\text{C}$  .

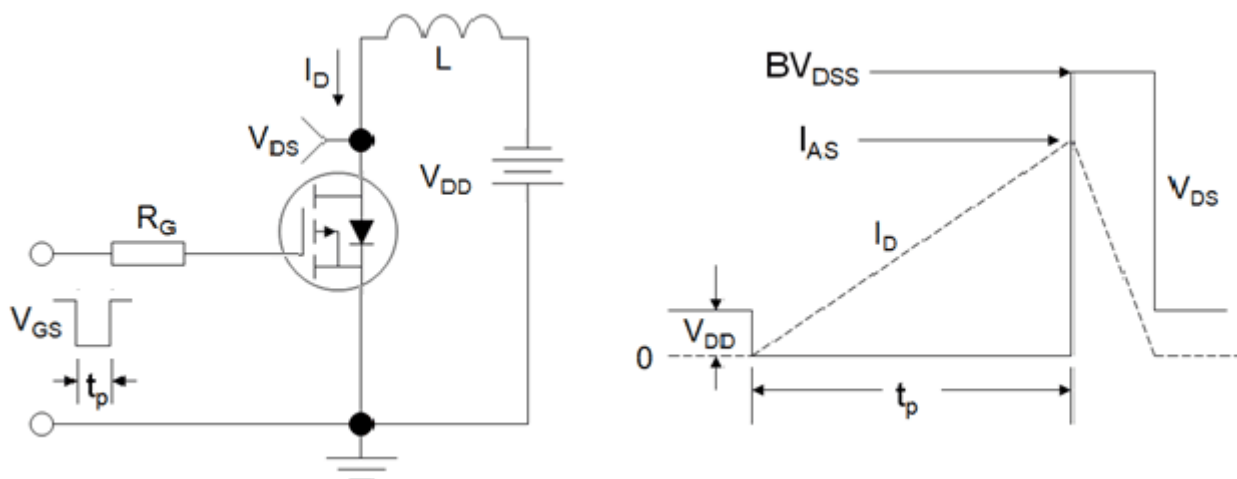
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



Typical Characteristics  $T_J = 25^\circ\text{C}$ , unless otherwise noted

Figure 1. Output Characteristics

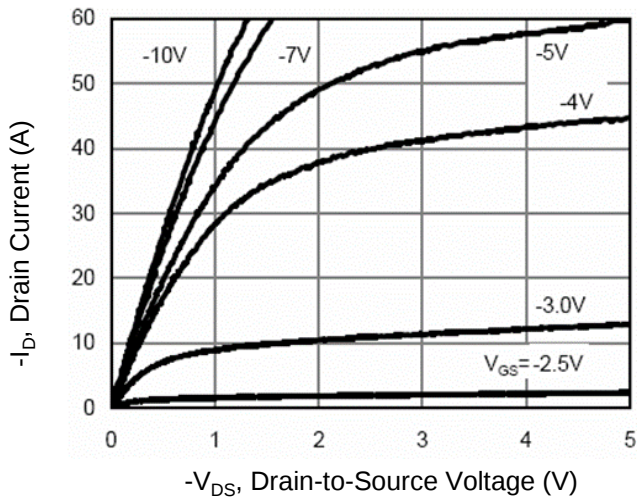


Figure 2. Transfer Characteristics

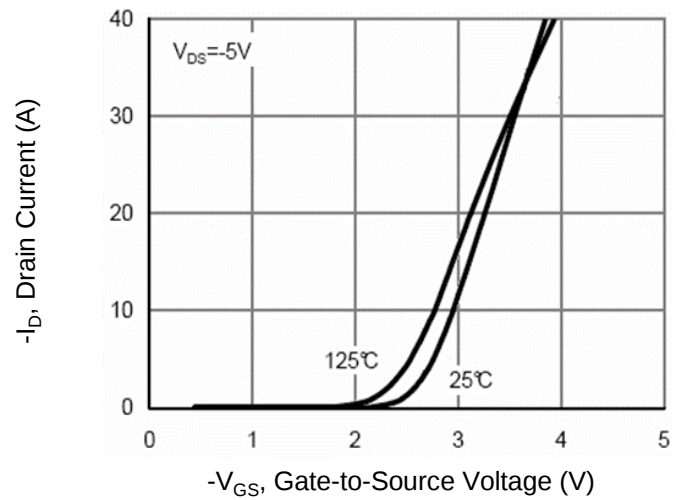


Figure 3.  $R_{DS(on)}$  vs  $V_{GS}$

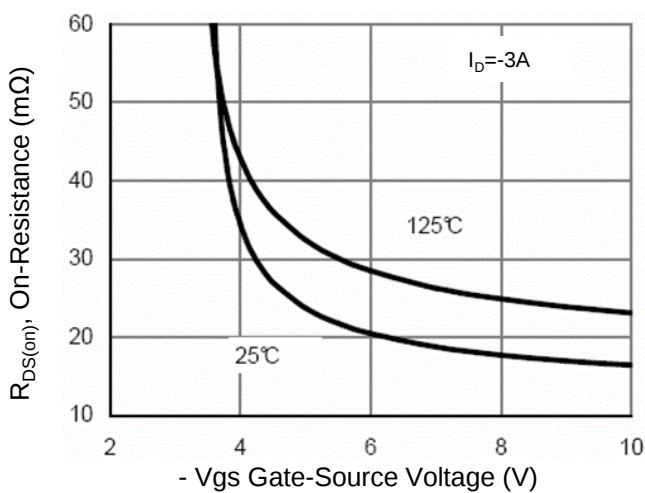


Figure 4. Gate Charge

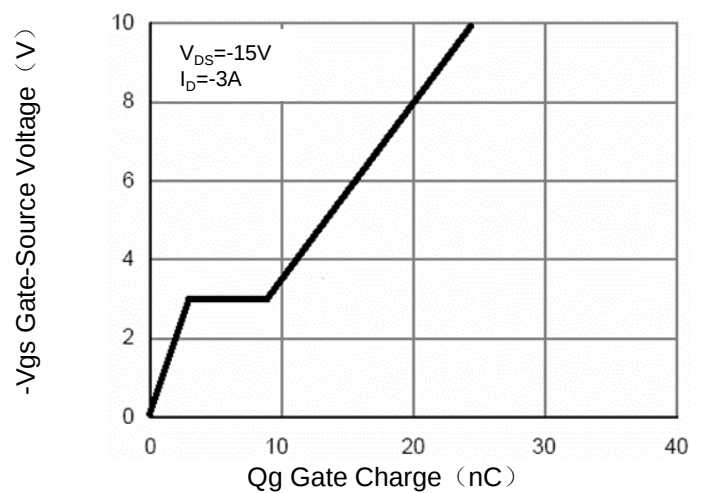


Figure 5. Capacitance vs  $V_{ds}$

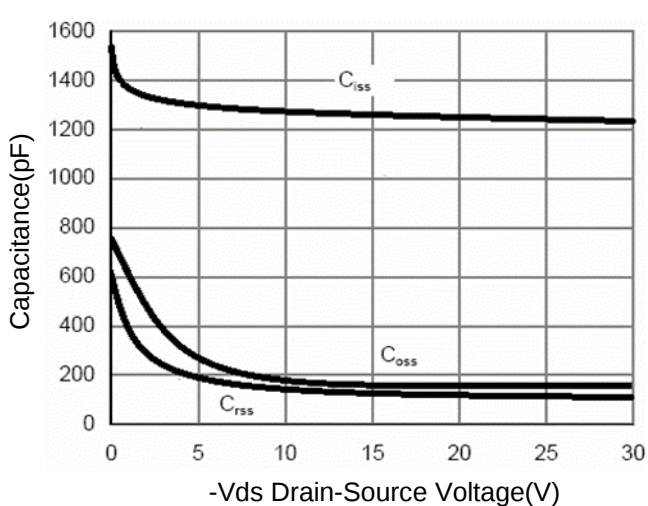
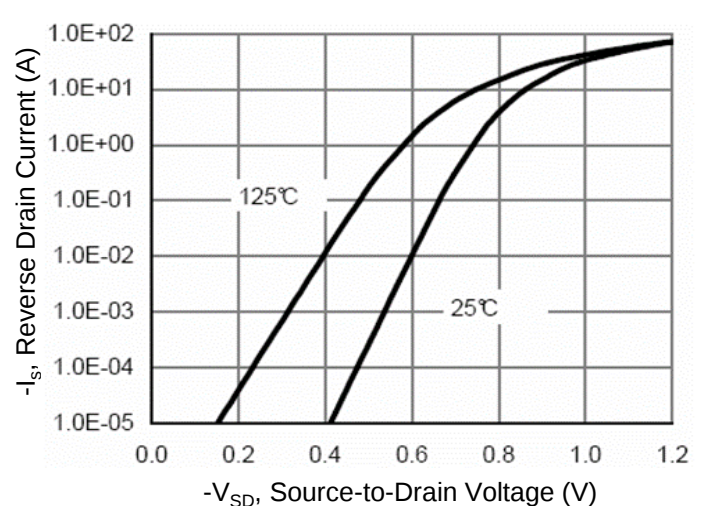
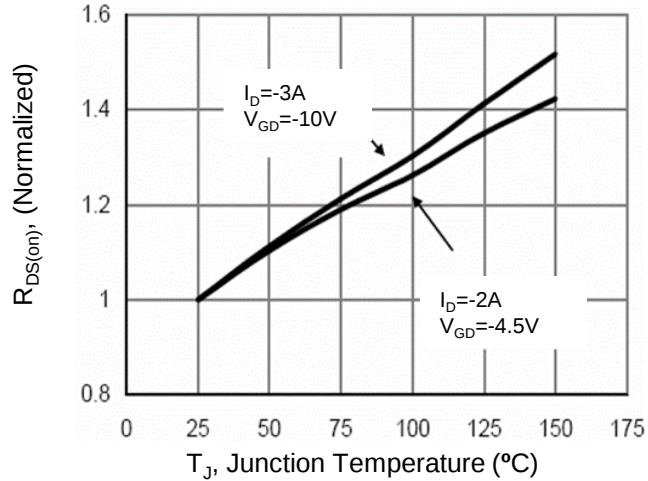


Figure 6. Source-Drain Diode Forward

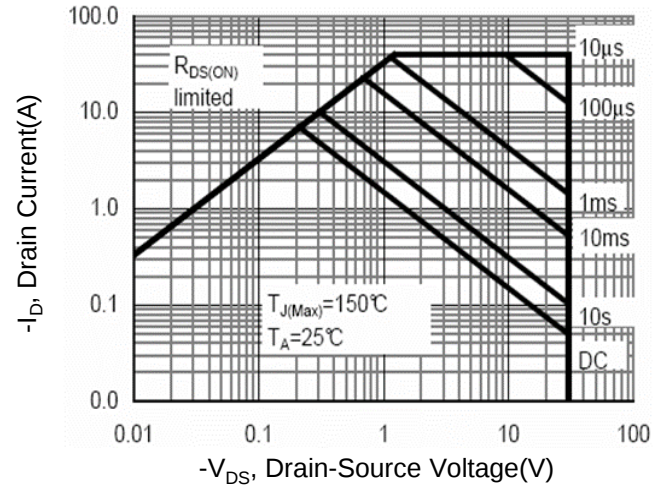


**Typical Characteristics**  $T_J = 25^\circ\text{C}$ , unless otherwise noted

**Figure 7. Drain-Source On-Resistance**



**Figure 10. Safe Operation Area**



**Figure 9. Normalized Maximum Transient Thermal Impedance**

