

## P-channel Enhancement Mode Power MOSFET

### Features

- $V_{DS} = -30V$ ,  $I_D = -5.1A$   
 $R_{DS(ON)} < 33\text{ m}\Omega$  @  $V_{GS} = -10V$   
 $R_{DS(ON)} < 48\text{ m}\Omega$  @  $V_{GS} = -4.5V$

### 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 ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

| Parameter                              |                           | Symbol         | Limit      | Unit             |
|----------------------------------------|---------------------------|----------------|------------|------------------|
| Drain-source Voltage                   |                           | $V_{DS}$       | -30        | V                |
| Gate-source Voltage                    |                           | $V_{GS}$       | $\pm 20$   | V                |
| Drain Current                          | $T_A = 25^\circ\text{C}$  | $I_D$          | -5.1       | A                |
|                                        | $T_A = 100^\circ\text{C}$ |                | -3         |                  |
| Pulsed Drain Current <sup>A</sup>      |                           | $I_{DM}$       | -40        | A                |
| Total Power Dissipation <sup>B</sup>   | $T_A = 25^\circ\text{C}$  | $P_D$          | 2          | W                |
|                                        | $T_A = 100^\circ\text{C}$ |                | 0.8        |                  |
| Junction and Storage Temperature Range |                           | $T_J, T_{STG}$ | -55 ~ +150 | $^\circ\text{C}$ |

### ■ Thermal resistance

| Parameter                                           |              | Symbol          | Typ | Max | Units              |
|-----------------------------------------------------|--------------|-----------------|-----|-----|--------------------|
| Thermal Resistance Junction-to-Ambient <sup>C</sup> | Steady-State | $R_{\theta JA}$ | 50  | 60  | $^\circ\text{C/W}$ |

# ■ Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)

| Parameter                             | Symbol              | Conditions                                                                                  | Min  | Typ | Max  | Units |
|---------------------------------------|---------------------|---------------------------------------------------------------------------------------------|------|-----|------|-------|
| Static Parameter                      |                     |                                                                                             |      |     |      |       |
| 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    |
|                                       |                     | V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V, T <sub>J</sub> =150°C                           | -    | -   | -100 |       |
| Gate-Body Leakage Current             | I <sub>GSS</sub>    | V <sub>GS</sub> = ±20V, V <sub>DS</sub> =0V                                                 | -    | -   | ±100 | nA    |
| Gate Threshold Voltage                | V <sub>GS(th)</sub> | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =-250μA                                  | -1.0 |     | -3.0 | V     |
| Static Drain-Source On-Resistance     | R <sub>DS(on)</sub> | V <sub>GS</sub> =-10V, I <sub>D</sub> =-5A                                                  | -    |     | 33   | mΩ    |
|                                       |                     | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-3.5A                                               |      |     | 48   |       |
| Diode Forward Voltage                 | V <sub>SD</sub>     | I <sub>S</sub> =-5A, V <sub>GS</sub> =0V                                                    | -    | -   | -1.2 | V     |
| Gate resistance                       | R <sub>G</sub>      | f=1MHz                                                                                      | -    | 15  | -    | Ω     |
| Maximum Body-Diode Continuous Current | I <sub>S</sub>      |                                                                                             | -    | -   | -5.1 | A     |
| Dynamic Parameters                    |                     |                                                                                             |      |     |      |       |
| Input Capacitance                     | C <sub>iss</sub>    | V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V, f=1MHz                                          | -    | 490 | -    | pF    |
| Output Capacitance                    | C <sub>oss</sub>    |                                                                                             | -    | 75  | -    |       |
| Reverse Transfer Capacitance          | C <sub>rss</sub>    |                                                                                             | -    | 60  | -    |       |
| Switching Parameters                  |                     |                                                                                             |      |     |      |       |
| Total Gate Charge                     | Q <sub>g</sub>      | V <sub>GS</sub> =-10V, V <sub>DS</sub> =-15V, I <sub>D</sub> =-5A                           | -    | 9   | -    | nC    |
| Gate-Source Charge                    | Q <sub>gs</sub>     |                                                                                             | -    | 1.5 | -    |       |
| Gate-Drain Charge                     | Q <sub>gd</sub>     |                                                                                             | -    | 2.3 | -    |       |
| Reverse Recovery Charge               | Q <sub>rr</sub>     | I <sub>F</sub> =-5A, di/dt=100A/us                                                          | -    | 12  | -    | nC    |
| Reverse Recovery Time                 | t <sub>rr</sub>     |                                                                                             | -    | 32  | -    | ns    |
| Turn-on Delay Time                    | t <sub>D(on)</sub>  | V <sub>GS</sub> =-10V, V <sub>DD</sub> =-15V, I <sub>D</sub> =-5A<br>R <sub>GEN</sub> =2.5Ω | -    | 9   | -    | ns    |
| Turn-on Rise Time                     | t <sub>r</sub>      |                                                                                             | -    | 3   | -    |       |
| Turn-off Delay Time                   | t <sub>D(off)</sub> |                                                                                             | -    | 29  | -    |       |
| Turn-off fall Time                    | t <sub>f</sub>      |                                                                                             | -    | 15  | -    |       |

A. Repetitive rating; pulse width limited by max. junction temperature.

B. P<sub>d</sub> is based on max. junction temperature, using junction-case and junction-ambient thermal resistance.

C. The value of R<sub>θJA</sub> is measured with the device mounted on 1 in<sup>2</sup> FR-4 board with 2oz. Copper, in the still air environment with T<sub>A</sub>=25°C.

The maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.

## ■ Typical Electrical and Thermal Characteristics Diagrams



Figure 1. Output Characteristics

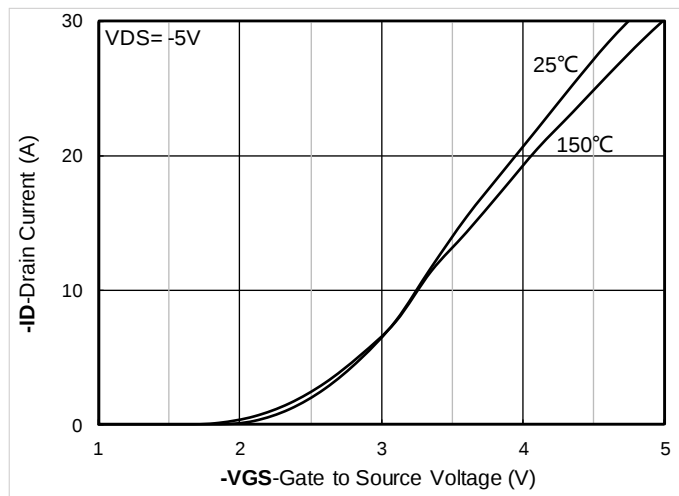


Figure 2. Transfer Characteristics



Figure 3. Capacitance Characteristics

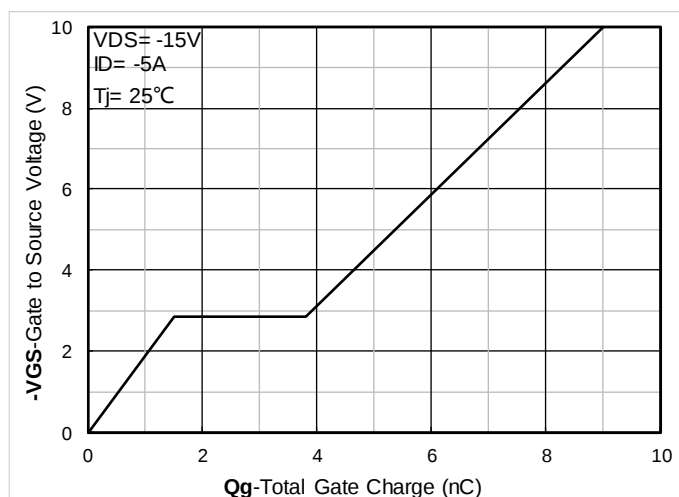


Figure 4. Gate Charge



Figure 5. On-Resistance vs Gate to Source Voltage

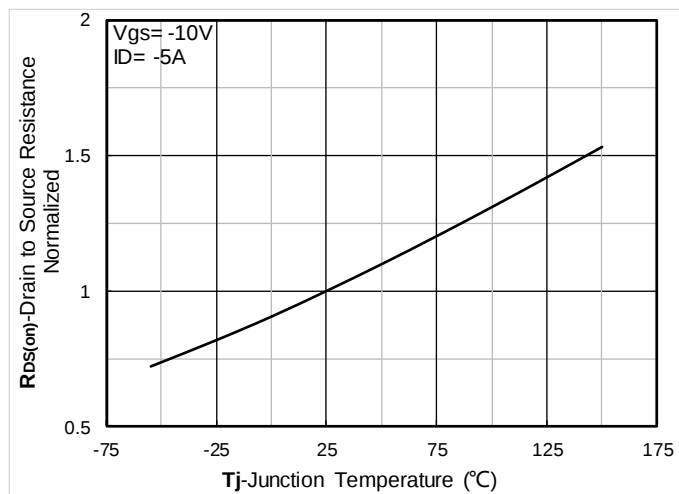


Figure 6. Normalized On-Resistance

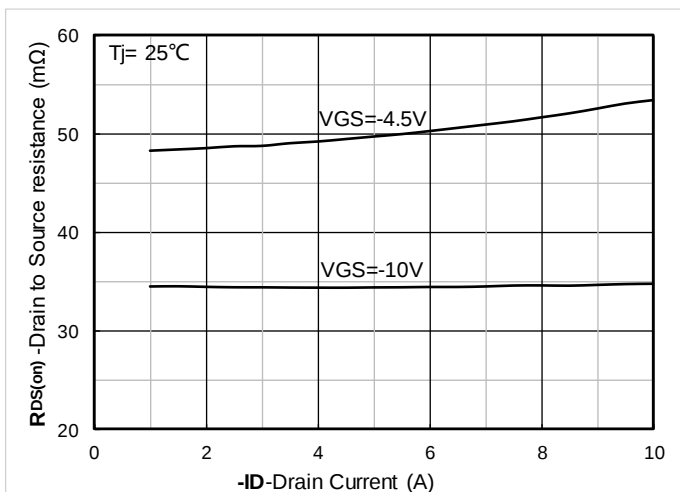


Figure 7.  $R_{DS(on)}$  VS Drain Current



Figure 8. Forward characteristics of reverse diode

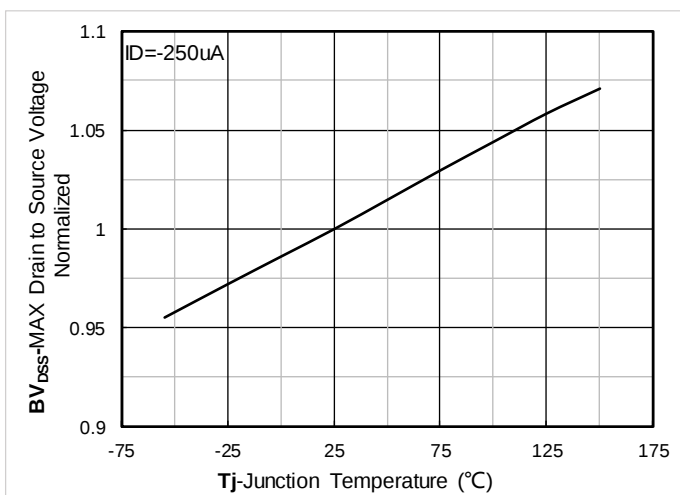


Figure 9. Normalized breakdown voltage



Figure 10. Normalized Threshold voltage

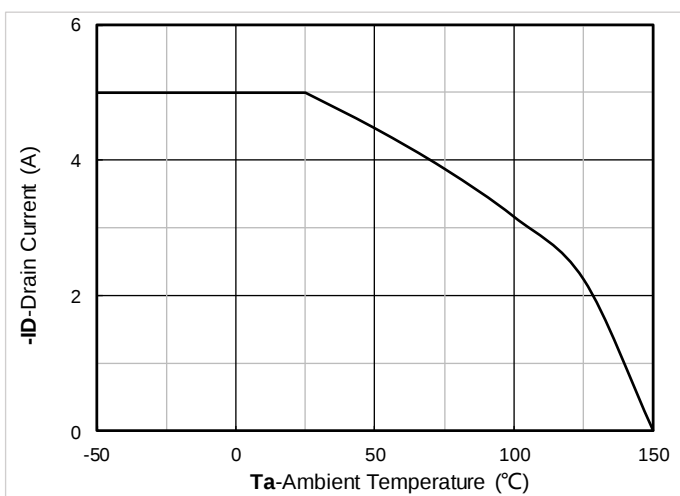


Figure 11. Current dissipation



Figure 12. Power dissipation



Figure 13. Maximum Transient Thermal Impedance

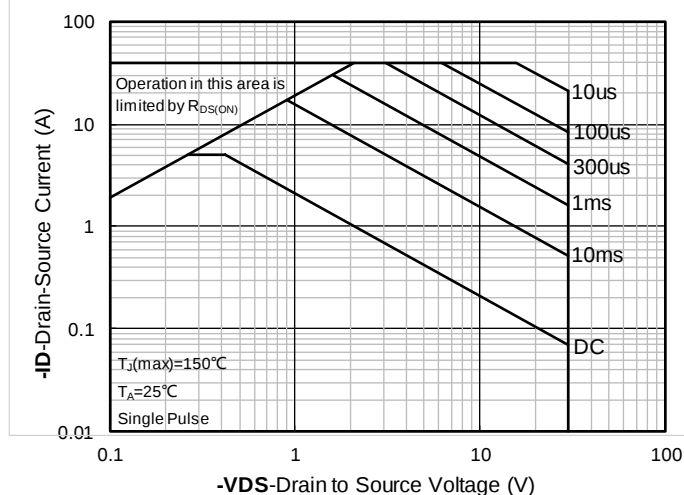


Figure 14. Safe Operation Area