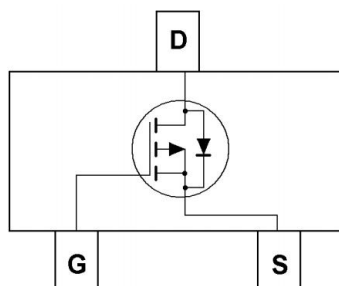


## P-Channel MOSFET

### Features

- High power and current handing capability
- Lead free product is acquired
- Surface Mount Package



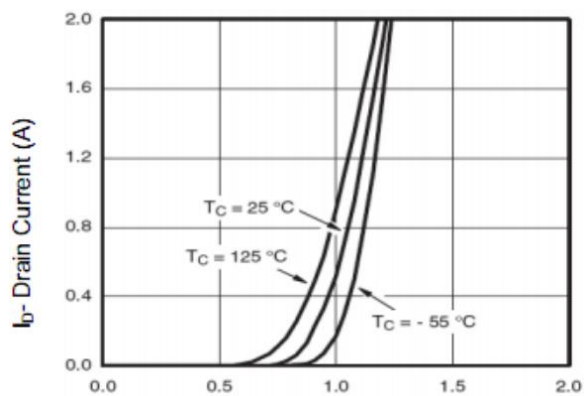
### Absolute Maximum Ratings( $T_A=25^{\circ}\text{C}$ , unless otherwise noted.)

| Parameter                | Symbol    | Limit    | Unit               |
|--------------------------|-----------|----------|--------------------|
| Drain-source Voltage     | $V_{DS}$  | -20      | V                  |
| Gate-source Voltage      | $V_{GS}$  | $\pm 8$  | V                  |
| Drain Current-Continuous | $I_D$     | -4.1     | A                  |
| Power Dissipation        | $P_D$     | 1.7      | W                  |
| Junction Temperature     | $T_J$     | 150      | $^{\circ}\text{C}$ |
| Storage Temperature      | $T_{STG}$ | -55~+150 | $^{\circ}\text{C}$ |

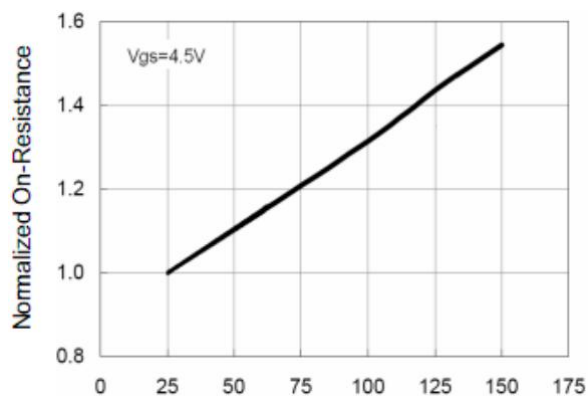
### Electrical Characteristics( $T_A=25^{\circ}\text{C}$ , unless otherwise noted.)

| Parameter                          | Symbol              | Condition                                                                                    | Min   | Typ  | Max  | Unit |
|------------------------------------|---------------------|----------------------------------------------------------------------------------------------|-------|------|------|------|
| Drain-source breakdown voltage     | BV <sub>DSS</sub>   | V <sub>GS</sub> =0V,I <sub>D</sub> =-250μA                                                   | -20   |      |      | V    |
| Gate Threshold voltage             | V <sub>GS(th)</sub> | V <sub>DS</sub> =V <sub>GS</sub> ,I <sub>D</sub> =-250μA                                     | -0.45 | -0.6 | -1   | V    |
| Gate-source leakage current        | I <sub>GSS</sub>    | V <sub>DS</sub> =0V,V <sub>GS</sub> =±8V                                                     |       |      | ±100 | nA   |
| Drain-source leakage current       | I <sub>DSS</sub>    | V <sub>DS</sub> =-20V,V <sub>GS</sub> =0V                                                    |       |      | -1   | μA   |
| Drain-source on resistance         | R <sub>DS(on)</sub> | V <sub>GS</sub> =-4.5V,I <sub>D</sub> =-2.8A                                                 |       | 57   | 72   | mΩ   |
|                                    |                     | V <sub>GS</sub> =-2.5V,I <sub>D</sub> =-2.4A                                                 |       | 69   | 91   | mΩ   |
| Forward Trans conductance          | g <sub>fs</sub>     | V <sub>DS</sub> =-5V,I <sub>D</sub> =-3.5A                                                   |       | 8.5  |      | s    |
| Dynamic Characteristics            |                     |                                                                                              |       |      |      |      |
| Input Capacitance                  | C <sub>iss</sub>    | V <sub>DS</sub> =-4V,V <sub>GS</sub> =0V<br>f=1MHz                                           |       | 740  |      | pF   |
| Output Capacitance                 | C <sub>oss</sub>    |                                                                                              |       | 290  |      |      |
| Reverse Transfer Capacitance       | C <sub>rss</sub>    |                                                                                              |       | 190  |      |      |
| Switching Capacitance              |                     |                                                                                              |       |      |      |      |
| Turn-on Delay Time                 | t <sub>d(on)</sub>  | V <sub>DD</sub> =-4V,I <sub>D</sub> =-3.3A<br>V <sub>GS</sub> =-4.5V<br>R <sub>GEN</sub> =1Ω |       | 12   |      | nS   |
| Turn-on Rise Time                  | t <sub>r</sub>      |                                                                                              |       | 35   |      |      |
| Turn-off Delay Time                | t <sub>d(off)</sub> |                                                                                              |       | 30   |      |      |
| Turn-off Fall Time                 | t <sub>f</sub>      |                                                                                              |       | 10   |      |      |
| Total Gate Charge                  | Q <sub>g</sub>      | V <sub>DS</sub> =-4V,I <sub>D</sub> =-4.1A<br>V <sub>GS</sub> =-4.5V                         |       | 7.8  |      | nC   |
| Gate-Source Charge                 | Q <sub>gs</sub>     |                                                                                              |       | 1.2  |      |      |
| Gate-Drain Charge                  | Q <sub>gd</sub>     |                                                                                              |       | 1.6  |      |      |
| Drain-Source Diode Characteristics |                     |                                                                                              |       |      |      |      |
| Diode Forward Voltage              | V <sub>SD</sub>     | V <sub>GS</sub> =0V,I <sub>D</sub> =-1.3A                                                    |       |      | -1.2 | V    |
| Diode Forward Current              | I <sub>s</sub>      |                                                                                              |       |      | -1.3 | A    |

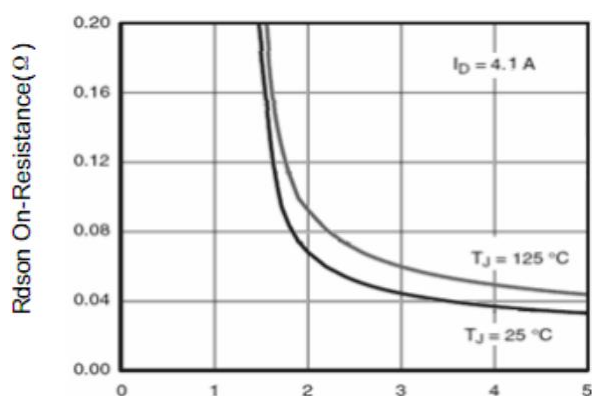
## Typical Characteristics



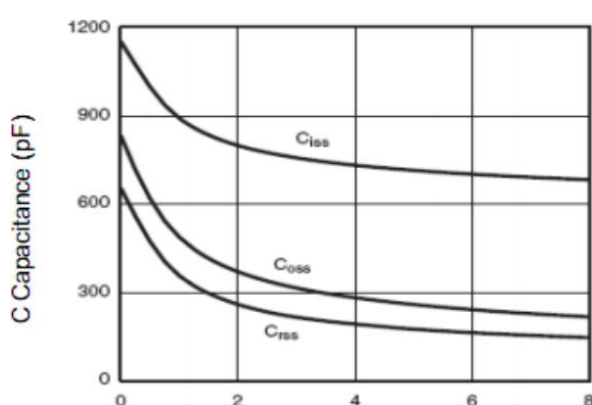
$V_{GS}$  Gate-Source Voltage(V)  
**Figure 1 Transfer Characteristics**



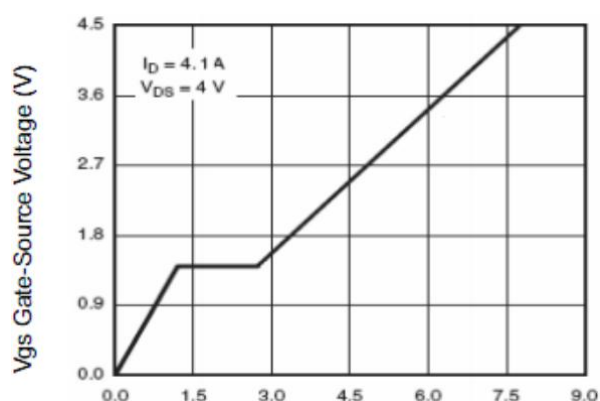
$T_J$  Junction Temperature( $^\circ\text{C}$ )  
**Figure 2 Drain-Source On-Resistance**



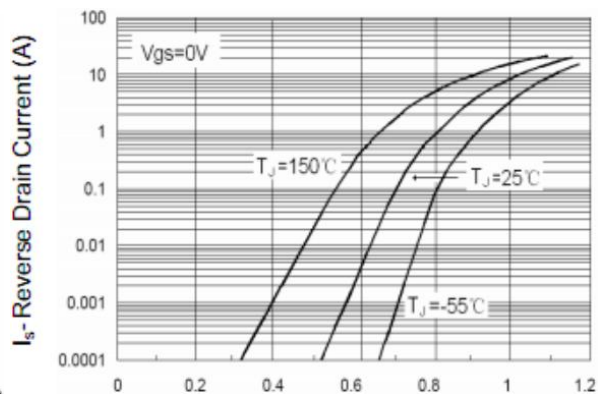
$V_{GS}$  Gate-Source Voltage(V)  
**Figure 3 Rdson vs  $V_{GS}$**



$V_{DS}$  Drain-Source Voltage(V)  
**Figure 4 Capacitance vs  $V_{DS}$**



$Q_g$  Gate Charge(nC)  
**Figure 5 Gate Charge**

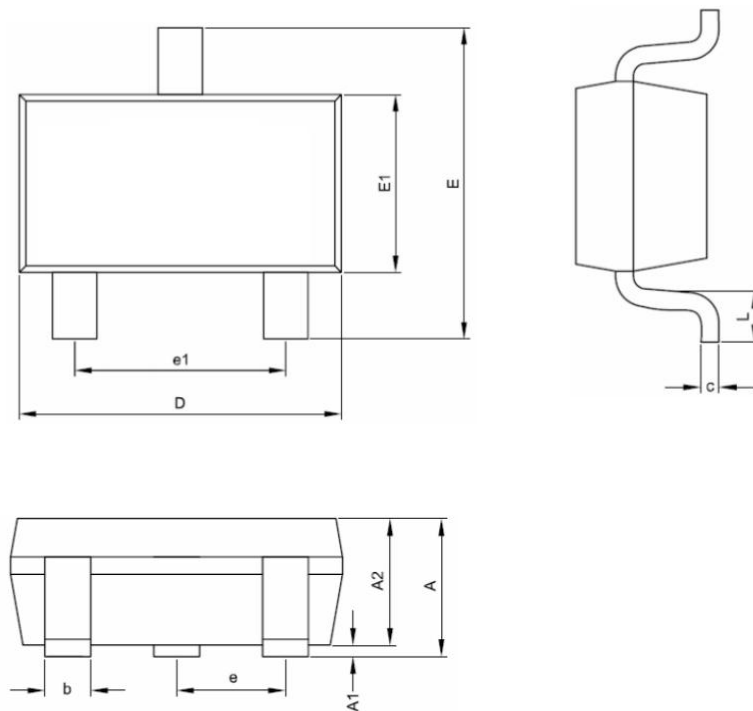


$V_{SD}$  Source-Drain Voltage(V)  
**Figure 6 Source-Drain Diode Forward**

## Package Information

### SOT-23

#### Dimensions in mm



| Symbol | Dimensions In Millimeters |      |
|--------|---------------------------|------|
|        | MIN                       | MAX  |
| A      |                           | 1.12 |
| A1     | 0.00                      | 0.10 |
| A2     | 0.60                      | 1.02 |
| D      | 2.90 BSC                  |      |
| E      | 2.40 BSC                  |      |
| E1     | 1.20                      | 1.40 |
| c      | 0.08                      | 0.25 |
| b      | 0.30                      | 0.50 |
| e      | 0.95 BSC                  |      |
| e1     | 1.90 BSC                  |      |
| L      | 0.20                      | 0.60 |