# SWR50P03

## 30V Single P-Channel Enhancement-Mode MOSFET

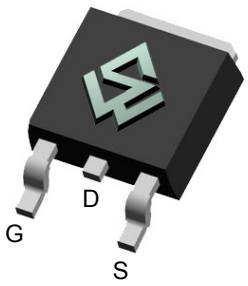
### General Description

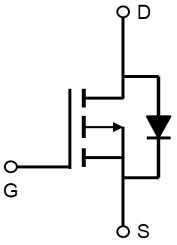
- Low gate charge.
- Uses advanced trench process technology.
- Use in PWM applications

### Product Summary

- $BV_{DSS}$ -30V
- $R_{DS(on)}$ @VGS = -10V < 15mΩ
- $R_{DS(on)}$ @VGS = -4.5V < 25mΩ

TO-252 D-PAK




### Absolute Maximum Ratings ($T_A$ = 25°C unless otherwise noted)

| Parameter | Symbol | Maximum | Units |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | -30 | V |
| Gate-Source Voltage | $V_{GS}$ | ±25 | V |
| Drain Current ($T_C$=25ºC) | $I_D$ | -50 | A |
| Drain Current ($T_C$=75ºC) | | -35 | |
| Drain Current ($T_A$=25ºC) | | -15 | |
| Drain Current ($T_A$=75ºC) | | -12 | |
| Pulsed Drain Current [a] | $I_{DM}$ | -150 | A |
| Power Dissipation [b] ($T_C$=25ºC) | $P_D$ | 25 | W |
| Power Dissipation [b] ($T_A$=25ºC) | | 2.5 | W |
| Junction and Storage Temperature Range | $T_J$, $T_{STG}$ | -55 ~ +150 | ºC |

### Thermal Characteristics

| Parameter | Symbol | Maximum | Units |
|---|---|---|---|
| Junction-to-Ambient [a] (t ≤ 10s) | $R_{\theta JA}$ | 20 | ºC/W |
| Junction-to-Ambient [a,d] (Steady-State) | | 60 | ºC/W |
| Junction-to-Lead (Steady-State) | $R_{\theta JL}$ | 5 | ºC/W |

| **Electrical Characteristics** ($T_A$ = 25°C unless otherwise noted) | | | | | | |
|---|---|---|---|---|---|---|
| **Symbol** | **Parameter** | **Conditions** | **Min** | **Typ** | **Max** | **Units** |
| **Off Characteristics** | | | | | | |
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$ = 0V , $I_D$ = -250uA | -30 | | | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$ = -30V , $V_{GS}$ = 0V | | | -1 | uA |
| $I_{GSS}$ | Gate-Body Leakage Current | $V_{GS}$ = ±25V, $V_{DS}$ = 0V | | | ±100 | nA |
| **On Characteristics** | | | | | | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$ = $V_{GS}$ , $I_D$ = -250uA | -1.0 | | -2.5 | V |
| $R_{DS(ON))}$ | Drain-Source On-State Resistance | $V_{GS}$ = -10V , $I_D$ = -10A | | 8.5 | 15 | mΩ |
| | | $V_{GS}$ = -4.5V , $I_D$ = -5A | | 18 | 25 | |
| $g_{FS}$ | Forward Transconductance | $V_{DS}$ = -5V , $I_D$ = -20A | | 44 | | S |
| **Drain-Source Diode Characteristics** | | | | | | |
| $V_{SD}$ | Diode Forward Voltage | $V_{GS}$ = 0V , $I_S$ = -1A | | | -1.3 | V |
| $I_S$ | Maximum Body-Diode Continuous Current | | | | -50 | A |
| **Dynamic Characteristics** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$ = -15V , $V_{GS}$ = 0V<br>f = 1.0MHz | | 1886 | | pF |
| $C_{oss}$ | Output Capacitance | | | 240 | | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | | | 240 | | pF |
| **Switching Characteristics** | | | | | | |
| $Q_g$ | Total Gate Charge | $V_{DS}$ = -15V , $I_D$ = -20A<br>$V_{GS}$ = -10V | | 23 | | nC |
| $Q_{gs}$ | Gate-Source Charge | | | 1.5 | | nC |
| $Q_{gd}$ | Gate-Drain Charge | | | 1.8 | | nC |
| $t_{D(ON)}$ | Turn-On Delay Time | $V_{DD}$ = -15V<br>$V_{GS}$ = -10 V<br>$R_{GEN}$ = -3 ohm | | 9 | | ns |
| $t_r$ | Turn-On Rise Time | | | 15 | | ns |
| $t_{D(OFF)}$ | Turn-Off Delay Time | | | 52 | | ns |
| $t_f$ | Turn-Off Fall Time | | | 17 | | ns |

a. Repetitive rating, Pulse width limited by junction temperature $T_{J(MAX)}$=150 ºC. Ratings are based on low frequency and duty cycles to keep initial $T_J$=25 ºC

b. The power dissipation $P_D$ is based on $T_{J(MAX)}$=150 ºC , using≤10s junction-to-ambient thermal resistance.

c. The value of $R_{\theta JA}$ is measured with the device mounted on 1in$^2$ FR-4 board with 2oz. Copper, in a still air environment with $T_A$ = 25°C. The value in any given application depends on the user's specific board design.

d. The $R_{\theta JA}$ is the sum of the thermal impedence from junction to lead $R_{\theta JL}$ and lead to ambient.

## Typical Characteristics

**Figure1:** Output Characteristics

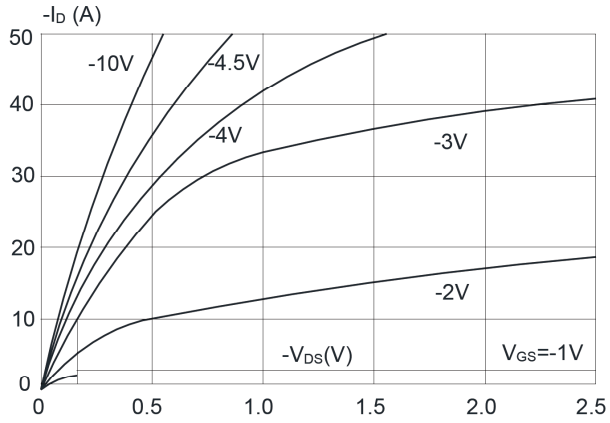



**Figure 2:** Typical Transfer Characteristics

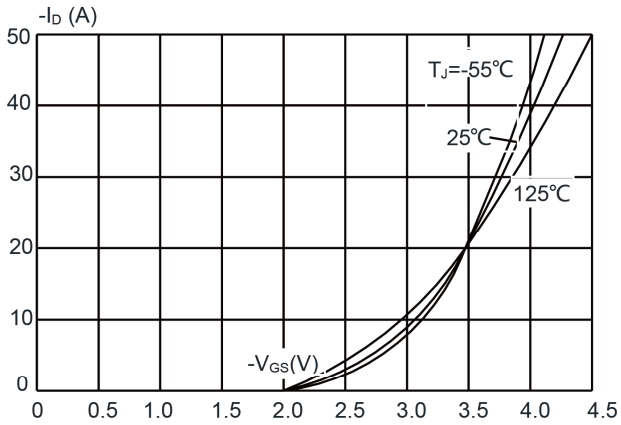



**Figure 3:**On-resistance vs. Drain Current

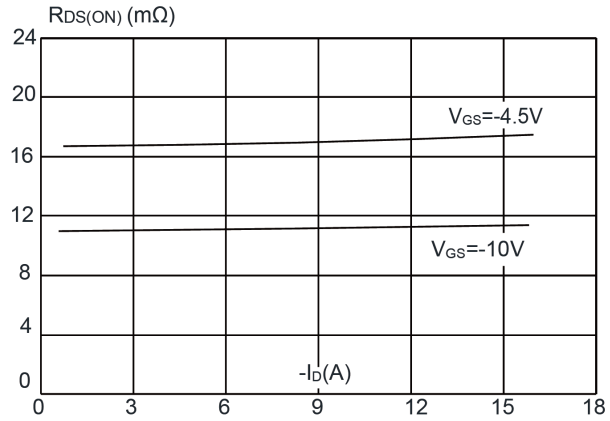



**Figure 4**: Body Diode Characteristics

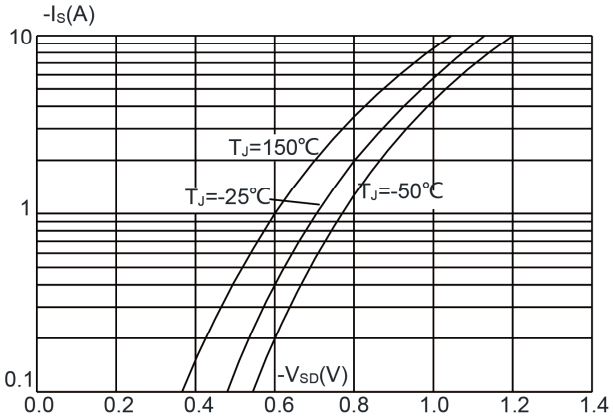



**Figure 5:** Gate Charge Characteristics

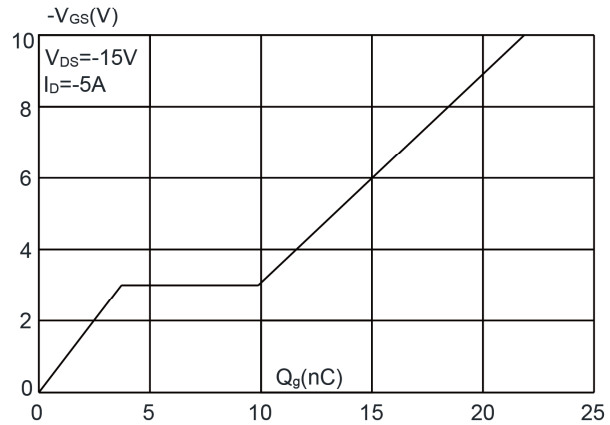
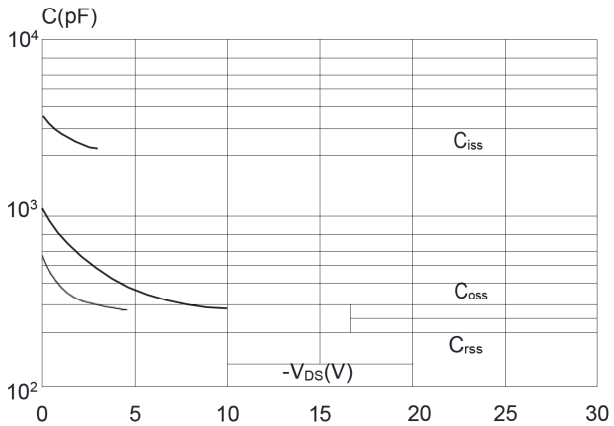



**Figure 6:** Capacitance Characteristics



## Typical Characteristics

**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature

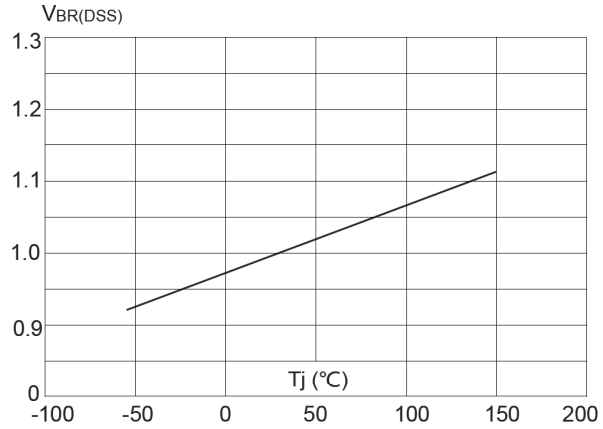



**Figure 8:** Normalized on Resistance vs. Junction Temperature

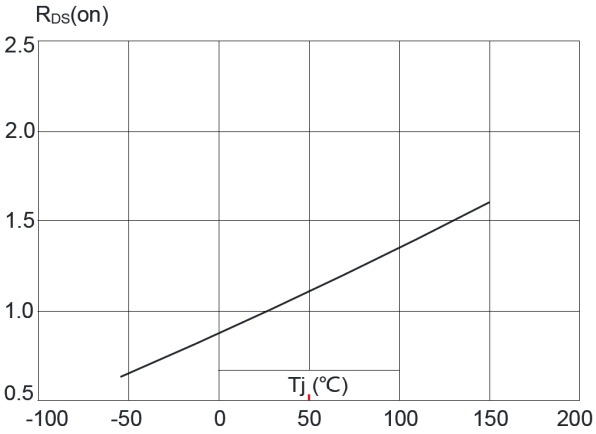



**Figure 9:** Maximum Safe Operating Area

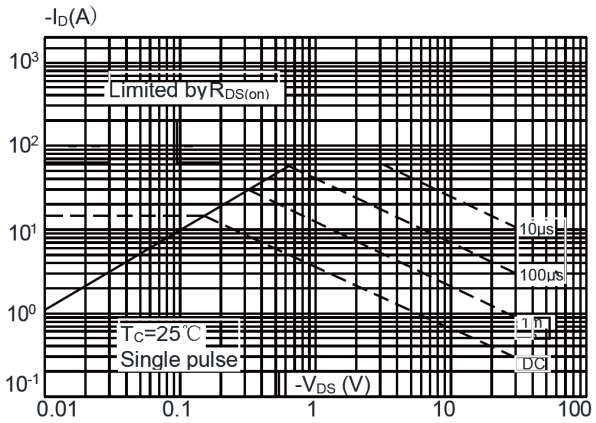



**Figure 10:** Maximum Continuous Drain Current vs. Ambient Temperature

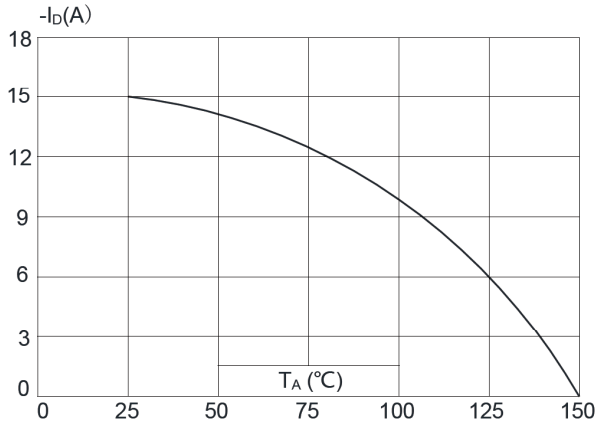
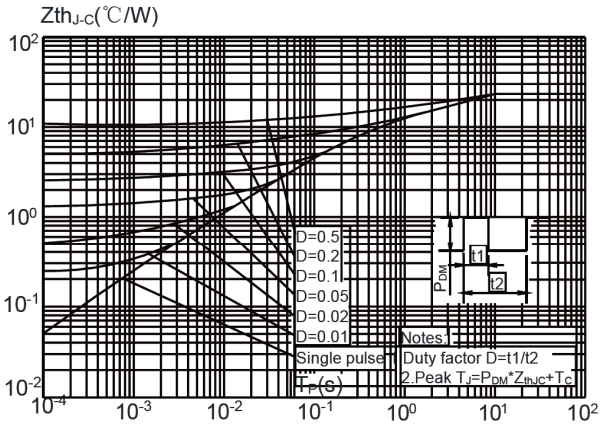
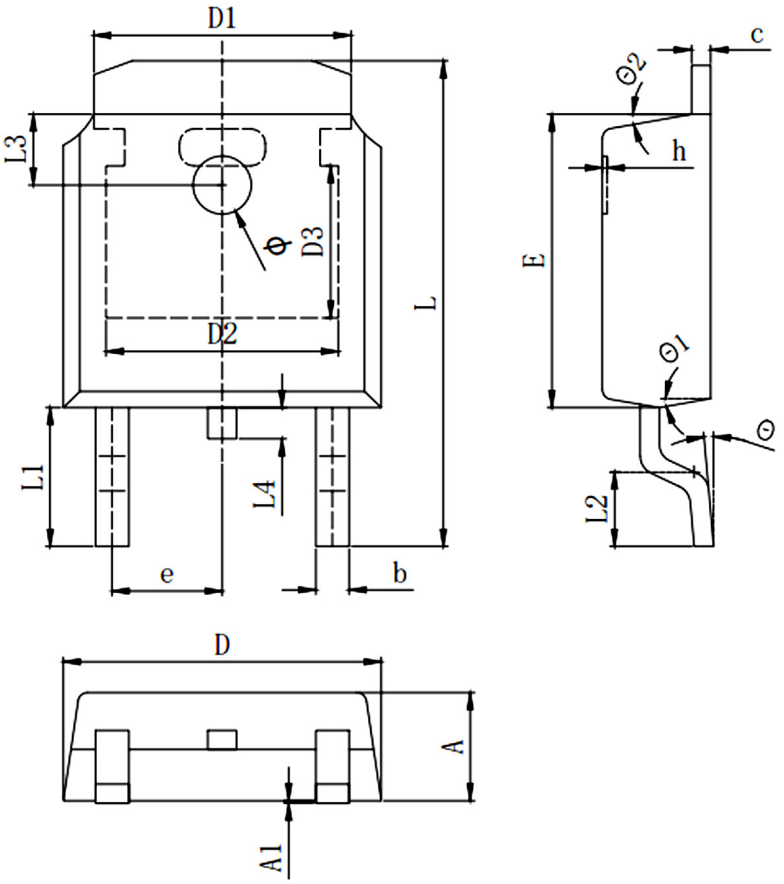



**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Case



## TO-252 D-PAK Package




| Symbols | Millimeters | | |
|---|---|---|---|
| | MIN. | Mom. | MAX. |
| A | 2.200 | 2.300 | 2.400 |
| A1 | 0.000 | | 0.127 |
| b | 0.640 | 0.690 | 0.740 |
| c(电镀后) | 0.460 | 0.520 | 0.580 |
| D | 6.500 | 6.600 | 6.700 |
| D1 | 5.334 REF | | |
| D2 | 4.826 REF | | |
| D3 | 3.166REF | | |
| E | 6.000 | 6.100 | 6.200 |
| e | 2.286 TYP | | |
| h | 0.000 | 0.100 | 0.200 |
| L | 9.900 | 10.100 | 10.300 |
| L1 | 2.888 REF | | |
| L2 | 1.400 | 1.550 | 1.700 |
| L3 | 1.600 REF | | |
| L4 | 0.600 | 0.800 | 1.000 |
| Φ | 1.100 | 1.200 | 1.300 |
| θ | 0° | | 8° |
| θ1 | 9° TYP | | |
| θ2 | 9° TYP | | |

单击下面可查看定价，库存，交付和生命周期等信息

>>SiliconWisdom(矽睿半导体)