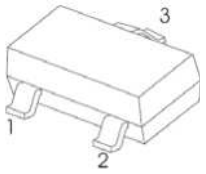
# 60V N-Channel MOSFET

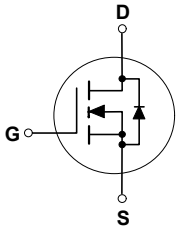
## ■ Features

- $V_{DS\,(V)}$ =60V
- $I_D$ =3A
- $R_{DS(ON)}$ < 80mΩ ($V_{GS}$ = 10V)
- $R_{DS(ON)}$ < 95mΩ ($V_{GS}$ = 4.5V)

**SOT－23**




1. GATE
2. SOURCE
3. DRAIN



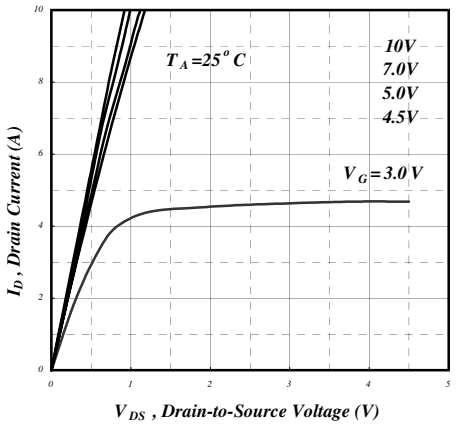

## ■ Absolute Maximum Ratings Ta = 25℃

| Parameter | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 60 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | V |
| Continuous Drain Current | $T_A$=25℃ | $I_D$ | 3 | A |
| | $T_A$=70℃ | | 2.3 | |
| Pulsed Drain Current * | | $I_{DM}$ | 10 | |
| Power Dissipation | $T_A$=25℃ | $P_D$ | 1.38 | W |
| Linear Derating Factor | | | 0.01 | W/℃ |
| Thermal Resistance.Junction-to-ambient | | $R_{thJa}$ | 90 | ℃/W |
| Junction and Storage Temperature Range | | $T_J$, $T_{STG}$ | -55 to 150 | ℃ |

* 2.Pulse width ≤300us , duty cycle≤ 2%.

■ Electrical Characteristics Ta = 25℃

| Parameter | Symbol | Testconditons | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $V_{DSS}$ | $I_D$=250μA, $V_{GS}$=0V | 60 | | | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=60V, $V_{GS}$=0V | | | 10 | μA |
| | | $V_{DS}$=48, $V_{GS}$=0V ,$T_J$=70℃ | | | 25 | |
| Gate-Body leakage current | $I_{GSS}$ | $V_{DS}$=0V, $V_{GS}$=±20V | | | ±100 | nA |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$ $I_D$=-250μA | 1 | | 3 | V |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | $V_{GS}$=10V, $I_D$=3A | | | 80 | mΩ |
| | | $V_{GS}$=4.5V, $I_D$=2A | | | 95 | |
| Forward Transconductance | $g_{FS}$ | $V_{DS}$=5V, $I_D$=3A | | 5 | | S |
| Input Capacitance | $C_{iss}$ | $V_{GS}$=0V, $V_{DS}$=25V, f=1MHz | | 490 | 780 | pF |
| Output Capacitance | $C_{oss}$ | | | 55 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 40 | | |
| Total Gate Charge | $Q_g$ | VDS=48V, ID=3A ,VGS=4.5V | | 6 | 10 | nC |
| Gate Source Charge | $Q_{gs}$ | | | 1.6 | | |
| Gate Drain Charge | $Q_{gd}$ | | | 3 | | |
| Turn-On DelayTime | $t_{D(on)}$ | $V_{GS}$=10V, $V_{DS}$=30V,ID=1A RD=30Ω,$R_{GEN}$=3.3Ω | | 6 | | ns |
| Turn-On Rise Time | $t_r$ | | | 5 | | |
| Turn-Off DelayTime | $t_{D(off)}$ | | | 16 | | |
| Turn-Off Fall Time | $t_f$ | | | 3 | | |
| Body Diode Reverse Recovery Time | $t_{rr}$ | $I_S$=3A,dI/dt=100A/μs | | 25 | | |
| Body Diode Reverse Recovery Charge | $Q_{rr}$ | $I_S$=3A, $d_I/d_t$=100A/μs | | 26 | | nC |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=1.2A,$V_{GS}$=0V | | | 1.2 | V |



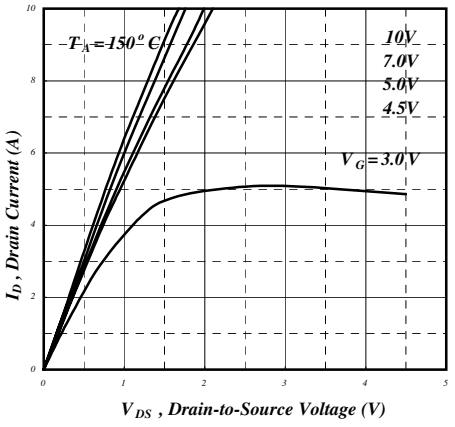




**Fig 2. Typical Output Characteristics**

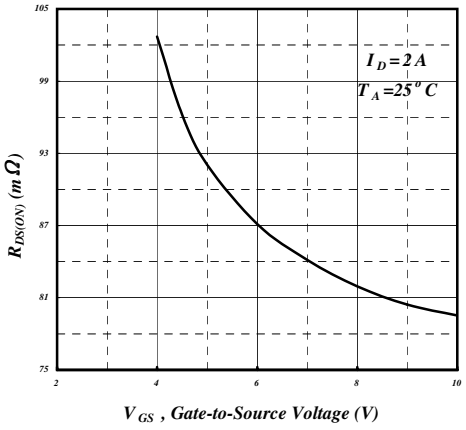



**Fig 3. On-Resistance v.s. Gate Voltage**

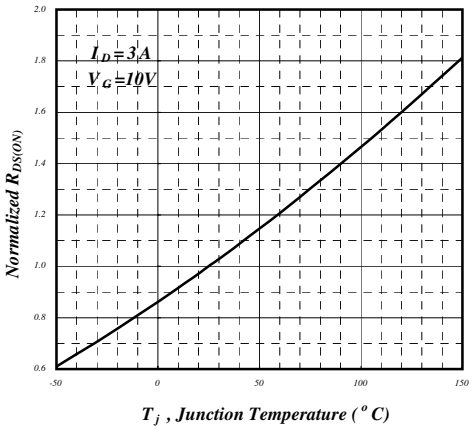



**Fig 4. Normalized On-Resistance v.s. Junction Temperature**

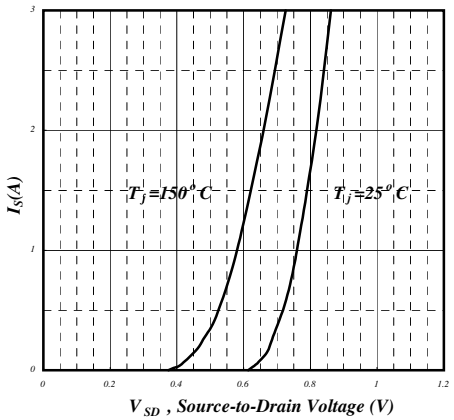



**Fig 5. Forward Characteristic of Reverse Diode**

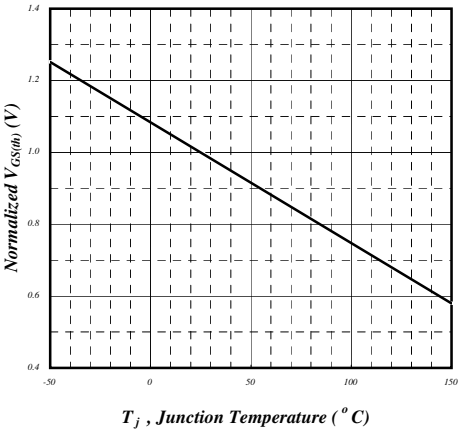
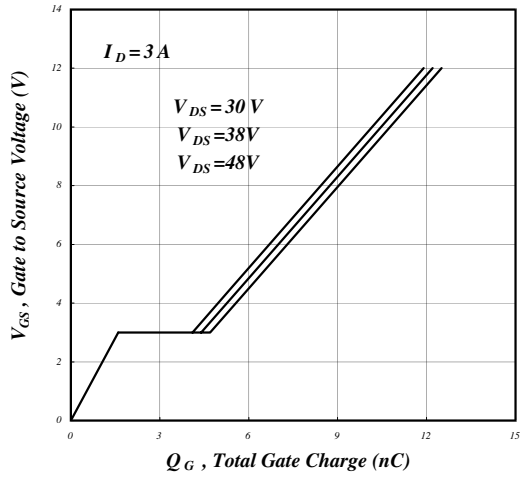



**Fig 6. Gate Threshold Voltage v.s. Junction Temperature**



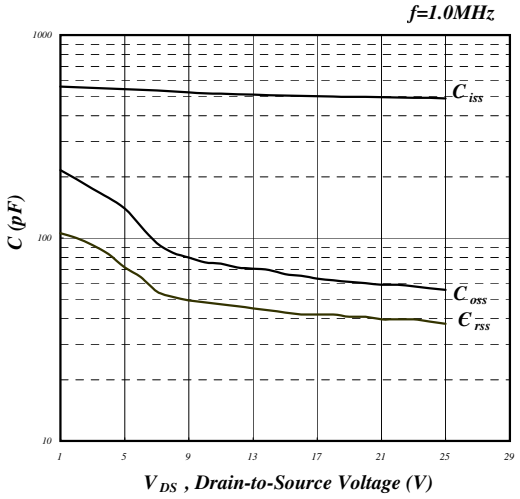
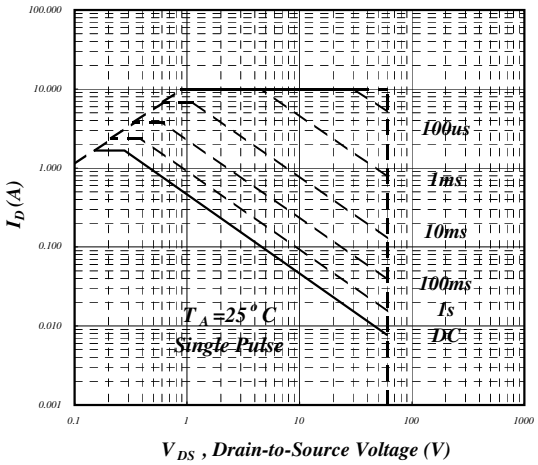




**Fig 8. Typical Capacitance Characteristics**



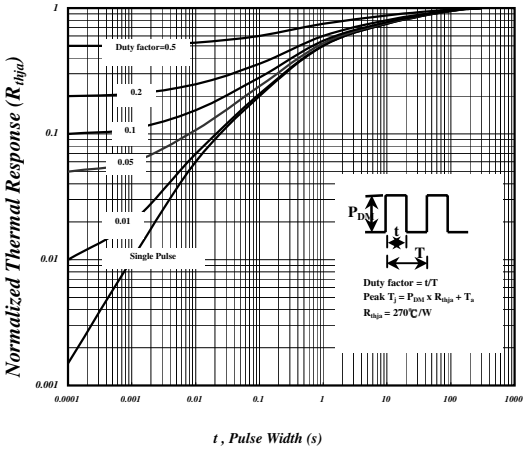
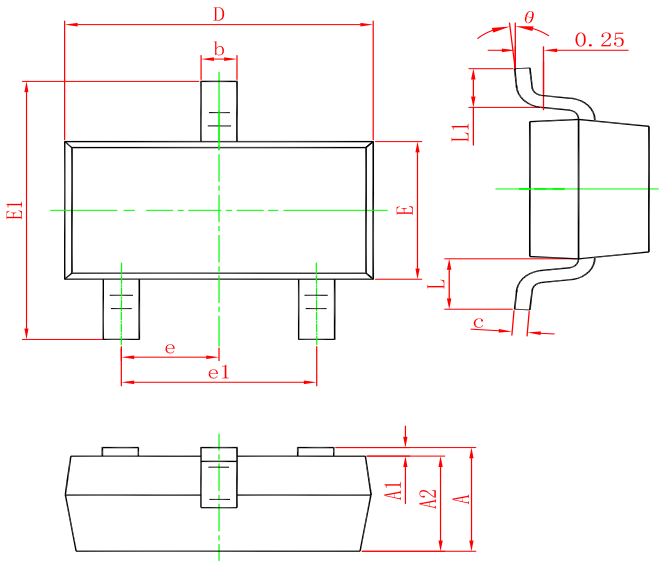




**Fig 9. Maximum Safe Operating Area**

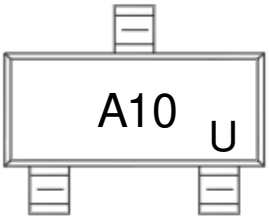
**Fig 10. Effective Transient Thermal Impedance**

## SOT-23 PACKAGE OUTLINE DIMENSIONS




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | 0.900 | 1.150 | 0.035 | 0.045 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 0.900 | 1.050 | 0.035 | 0.041 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.080 | 0.150 | 0.003 | 0.006 |
| D | 2.800 | 3.000 | 0.110 | 0.118 |
| E | 1.200 | 1.400 | 0.047 | 0.055 |
| E1 | 2.250 | 2.550 | 0.089 | 0.100 |
| e | 0.950 TYP. | | 0.037 TYP. | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.550 REF. | | 0.022 REF. | |
| L1 | 0.300 | 0.500 | 0.012 | 0.020 |
| θ | 0° | 8° | 0° | 8° |

## Marking




## Ordering information

| Order code | Package | Baseqty | Deliverymode |
|---|---|---|---|
| UMW SI2310A | SOT-23 | 3000 | Tape and reel |