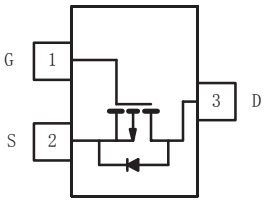
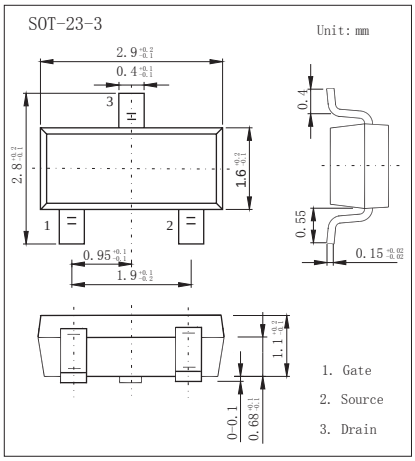
# SI2301

## P-Channel Enhancement MOSFET

- Features
- $V_{DS\ (V)}$ =-20V
- $R_{DS(ON)}$ < 100mΩ ($V_{GS}$ =-4.5V)
- $R_{DS(ON)}$ < 150mΩ ($V_{GS}$ =-2.5V)




Absolute Maximum Ratings Ta = 25℃

| Parameter | Symbol | 5 sec | Steady State | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | -20 | | V |
| Gate-Source Voltage | $V_{GS}$ | ±8 | | |
| Continuous Drain Current Ta=25℃ ($T_J$=150℃)*1 | $I_D$ | -3.2 | -2.9 | A |
| Ta=70℃ | | -2.5 | -2.3 | |
| Pulsed Drain Current *2 | $I_{DM}$ | -10 | | |
| Power Dissipation *1 Ta=25℃ | $P_D$ | 0.9 | 0.7 | W |
| Ta=70℃ | | 0.57 | 0.45 | |
| Thermal Resistance.Junction- to-Ambient *1 | $R_{thJA}$ | 120 | 145 | ℃/W |
| *3 | | 140 | 175 | |
| Junction Temperature | $T_J$ | 150 | | ℃ |
| Storage Temperature Range | $T_{stg}$ | -55 to 150 | | |

*1 Surface Mounted on FR4 Board, t ≤ 5 sec.

*2 Pulse width limited by maximum junction temperature.

*3 Surface Mounted on FR4 Board.

## Electrical Characteristics Ta = 25℃

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $V_{DSS}$ | $I_D$=-250μA, $V_{GS}$=0V | -20 | | | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=-20V, $V_{GS}$=0V | | | -1 | μA |
| | | $V_{DS}$=-20V, $V_{GS}$=0V, $T_J$=55℃ | | | -10 | |
| Gate-Body leakage current | $I_{GSS}$ | $V_{DS}$=0V, $V_{GS}$=±8V | | | ±100 | nA |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$ $I_D$=-250μA | -0.45 | | -0.95 | V |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | $V_{GS}$=-4.5V, $I_D$=-2.8A | | 80 | 100 | mΩ |
| | | $V_{GS}$=-2.5V, $I_D$=-2.0A | | 110 | 150 | |
| On state drain current *1 | $I_{D(ON)}$ | $V_{GS}$=-4.5V, $V_{DS}$ ≤ -5V | -6 | | | A |
| | | $V_{GS}$=-2.5V, $V_{DS}$ ≤ -5V | -3 | | | |
| Forward Transconductance *1 | $g_{FS}$ | $V_{DS}$=-5V, $I_D$=-2.8A | | 6.5 | | S |
| Input Capacitance *2 | $C_{iss}$ | $V_{GS}$=0V, $V_{DS}$=-6V, f=1MHz | | 375 | | pF |
| Output Capacitance *2 | $C_{oss}$ | | | 95 | | |
| Reverse Transfer Capacitance *2 | $C_{rss}$ | | | 65 | | |
| Total Gate Charge *2 | $Q_g$ | $V_{GS}$=-4.5V, $V_{DS}$=-6V, $I_D$=-2.8A | | 4.5 | 10 | nC |
| Gate Source Charge *2 | $Q_{gs}$ | | | 0.7 | | |
| Gate Drain Charge *2 | $Q_{gd}$ | | | 1.1 | | |
| Turn-On DelayTime *3 | $t_{d(on)}$ | $V_{GS}$=-4.5V, $V_{DS}$=-6V, $R_L$=6Ω, $R_{GEN}$=6Ω $I_D$=-1.0A | | 20 | 30 | ns |
| Turn-On Rise Time *3 | $t_r$ | | | 40 | 60 | |
| Turn-Off DelayTime *3 | $t_{d(off)}$ | | | 30 | 45 | |
| Turn-Off Fall Time *3 | $t_f$ | | | 20 | 30 | |
| Maximum Body-Diode Continuous Current | $I_S$ | 5 sec | | | -0.72 | A |
| | | Steady State | | | -0.6 | |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=-0.75A,$V_{GS}$=0V | | -0.8 | -1.2 | V |

*1 Pulse test: PW ≤ 300us duty cycle ≤ 2%.

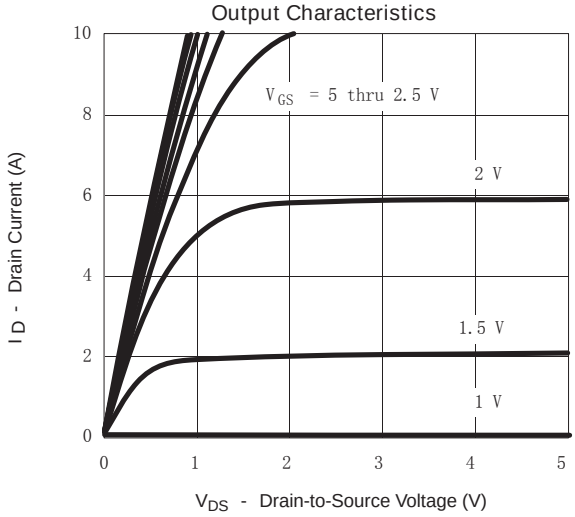
*2 For DESIGN AID ONLY, not subject to production testing.

*3 Switching time is essentially independent of operating temperature.

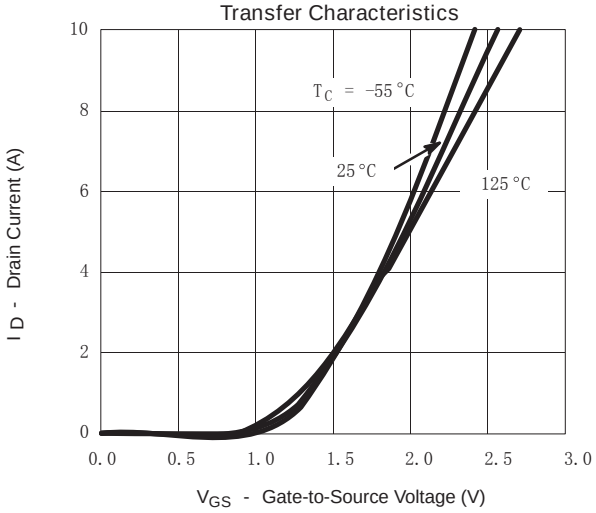
## Marking

| Marking | A1* |
|---|---|

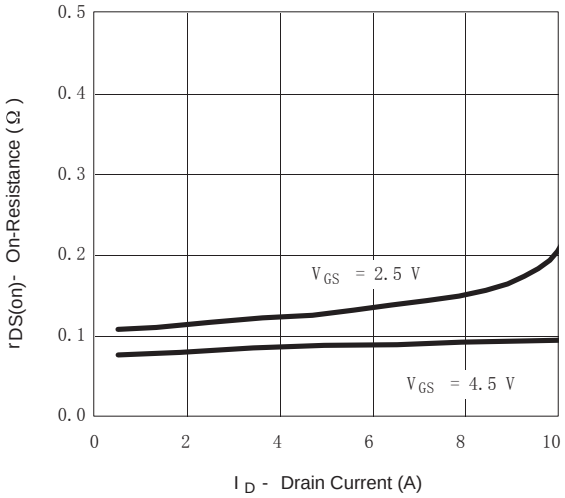
Output Characteristics



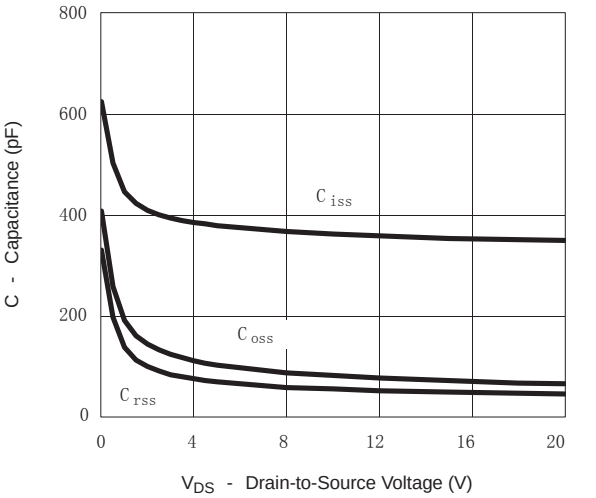

Transfer Characteristics



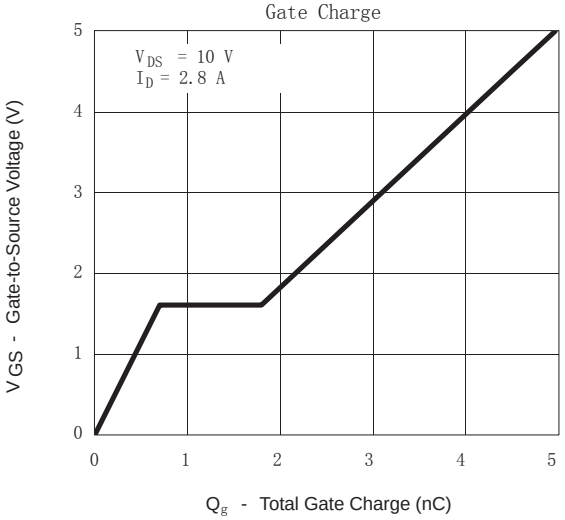

On-Resistance vs. Drain Current



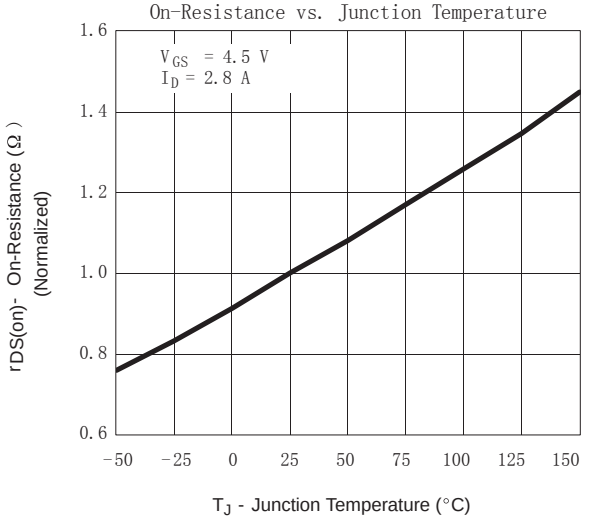

Capacitance



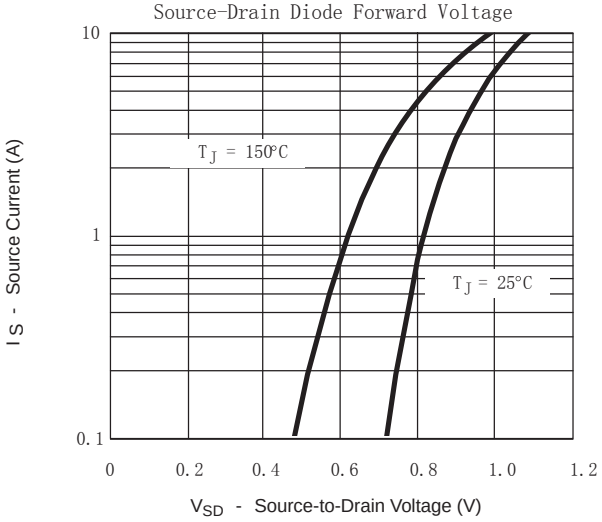

Gate Charge



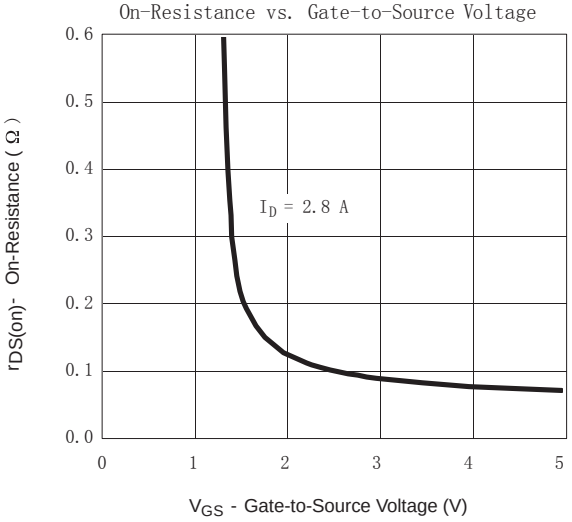

On-Resistance vs. Junction Temperature



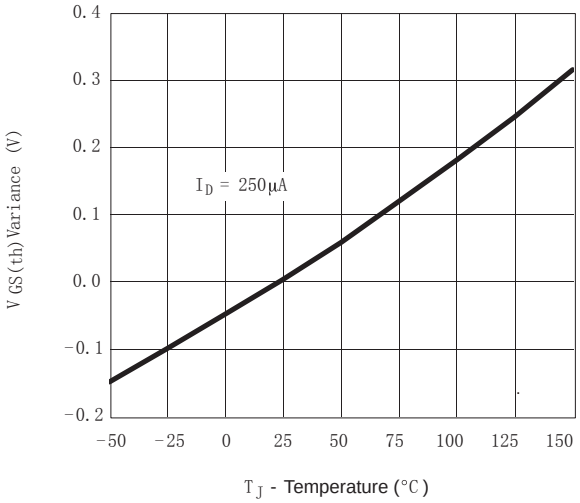
Source-Drain Diode Forward Voltage



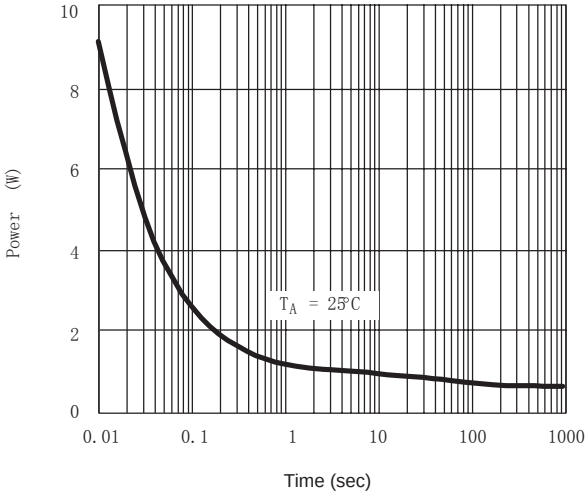

On-Resistance vs. Gate-to-Source Voltage



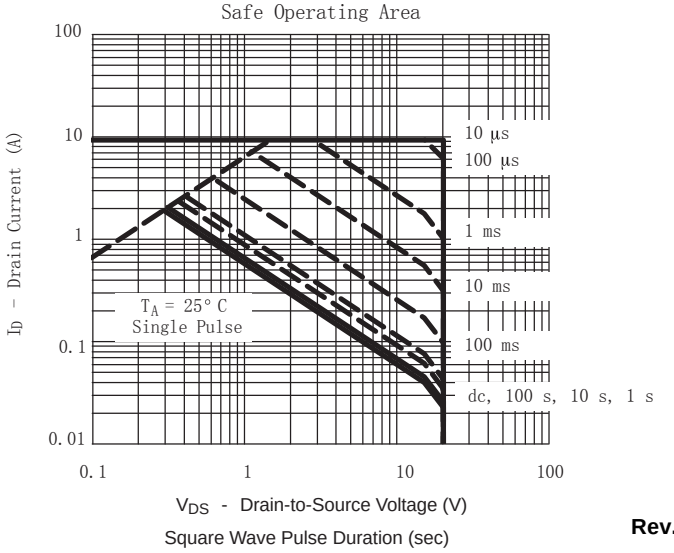

Threshold Voltage

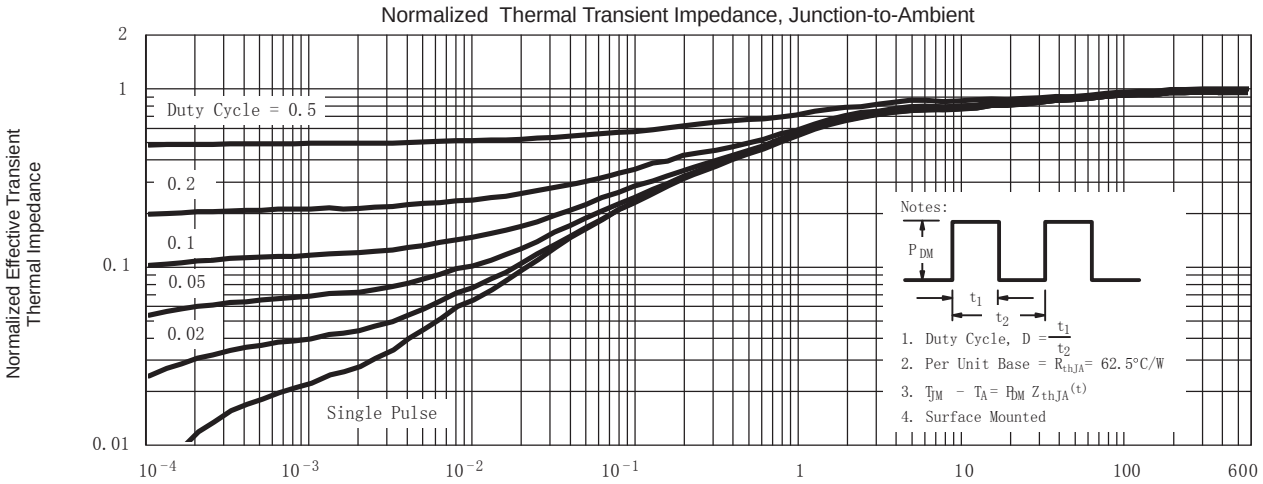



Single Pulse Power




Safe Operating Area




Normalized Thermal Transient Impedance, Junction-to-Ambient
Normalized Effective Transient Thermal Impedance
2
1
0.1
0.01
Duty Cycle = 0.5
0.2
0.1
0.05
0.02
Single Pulse
Notes:
P DM
t1
t2
1. Duty Cycle, D = t1/t2
2. Per Unit Base = RthJA= 62.5°C/W
3. TJM - TA= PDM ZthJA(t)
4. Surface Mounted
10-4
10-3
10-2
10-1
1
10
100
600

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