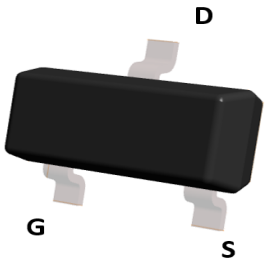
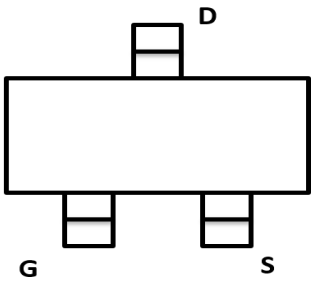
# SL05N10A

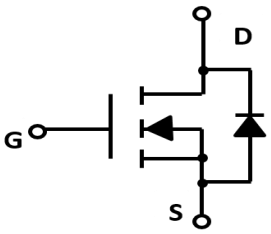
## N-Channel Enhancement Mode Field Effect Transistor




Top View

**SOT-23**




### Product Summary

- $V_{DS}$ 100V
- $I_D$ 5.0A
- $R_{DS(ON)}$( at $V_{GS}$=10V) ＜180 mohm
- $R_{DS(ON)}$( at $V_{GS}$=4.5V) ＜300 mohm

### General Description

- Low RDS(on) & FOM
- Extremely low switching loss
- Excellent stability and uniformity
- Fast switching and soft recovery

### Applications

- Consumer electronic power supply
- Motor control
- Synchronous-rectification
- Isolated DC/DC convertor
- Invertors

### ■ Absolute Maximum Ratings ($T_A$=25℃unless otherwise noted)

| Parameter | | Symbol | Maximum | Unit |
|---|---|---|---|---|
| Drain-source Voltage | | $V_{DS}$ | 100 | V |
| Gate-source Voltage | | $V_{GS}$ | ±20 | V |
| Drain Current | $T_A$=25℃ @ Steady State | $I_D$ | 5.0 | A |
| | $T_A$=70℃ @ Steady State | | 4.0 | |
| Pulsed Drain Current [A] | | $I_{DM}$ | 21 | A |
| Total Power Dissipation @ $T_A$=25℃ | | $P_D$ | 1.2 | W |
| Thermal Resistance Junction-to-Ambient @ Steady State [B] | | $R_{\theta JA}$ | 104 | ℃/ W |
| Junction and Storage Temperature Range | | $T_J$ ,$T_{STG}$ | -55～+150 | ℃ |

## ■ Electrical Characteristics ($T_J$=25℃ unless otherwise noted)

| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| **Static Parameter** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$= 0V, $I_D$=250μA | 100 | | | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=100V,$V_{GS}$=0V | | | 1 | μA |
| Gate-Body Leakage Current | $I_{GSS}$ | $V_{GS}$= ±20V, $V_{DS}$=0V | | | ±100 | nA |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$= $V_{GS}$, $I_D$=250μA | 1.0 | 1.8 | 3.0 | V |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | $V_{GS}$= 10V, $I_D$=3.0A | | 110 | 180 | mΩ |
| | | $V_{GS}$= 4.5V, $I_D$=2.0A | | 160 | 300 | |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=5.0A,$V_{GS}$=0V | | 0.8 | 1.2 | V |
| Maximum Body-Diode Continuous Current | $I_S$ | | | | 5.0 | A |
| **Dynamic Parameters** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$=100V,$V_{GS}$=0V,f=1MHZ | | 206 | | pF |
| Output Capacitance | $C_{oss}$ | | | 29 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 1.4 | | |
| **Switching Parameters** | | | | | | |
| Total Gate Charge | $Q_g$ | $V_{GS}$=10V,$V_{DS}$=50V,$I_D$=5.0A | | 4.3 | | nC |
| Gate Source Charge | $Q_{gs}$ | | | 1.5 | | |
| Gate Drain Charge | $Q_{gd}$ | | | 1.1 | | |
| Reverse Recovery Charge | $Q_{rr}$ | $I_F$=2A, di/dt=500A/us | | 39 | | |
| Reverse Recovery Time | $t_{rr}$ | | | 32 | | ns |
| Turn-on Delay Time | $t_{D(on)}$ | $V_{GS}$=10V,$V_{DD}$=30V, $I_D$=2A,$R_L$=1Ω $R_{GEN}$=3Ω | | 14.7 | | |
| Turn-on Rise Time | $t_r$ | | | 3.5 | | |
| Turn-off Delay Time | $t_{D(off)}$ | | | 20.9 | | |
| Turn-off Fall Time | $t_f$ | | | 2.7 | | |

A. Repetitive Rating: Pulse width limited by maximum junction temperature.
B. Surface Mounted on FR4 Board, t ≤ 10 sec.

## ■ Typical Performance Characteristics

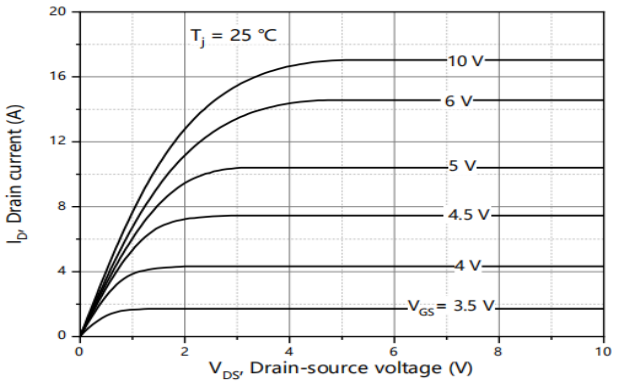



Figure1. Output Characteristics

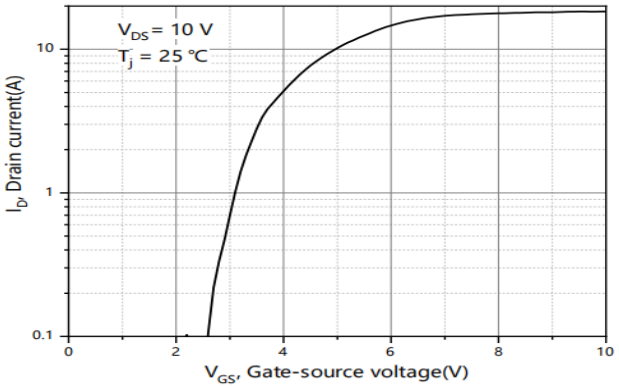



Figure2. Transfer Characteristics

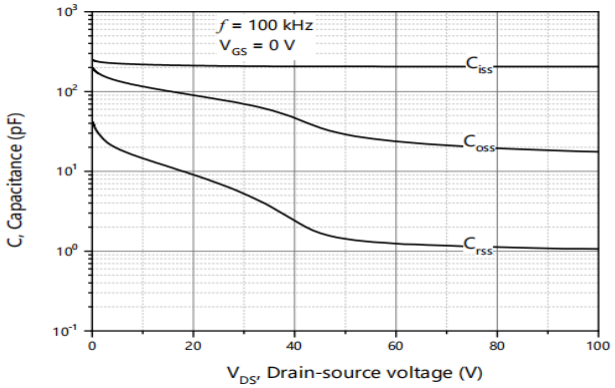



Figure3. Capacitance Characteristics

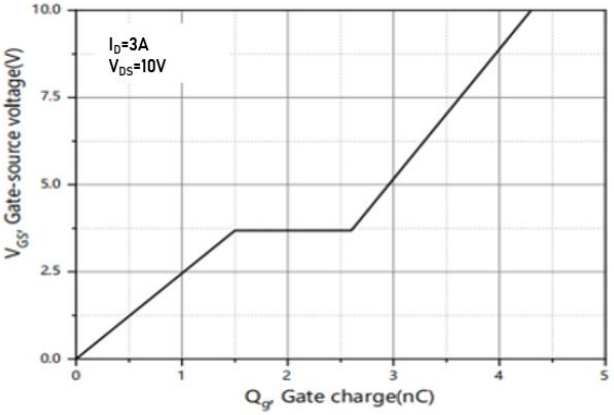



Figure4. Gate Charge

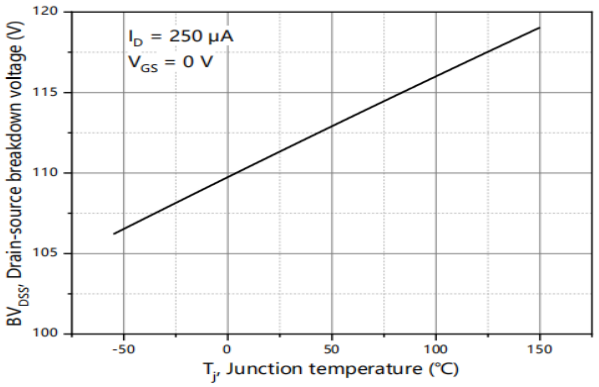



Figure5. Drain-Source breakdown voltage

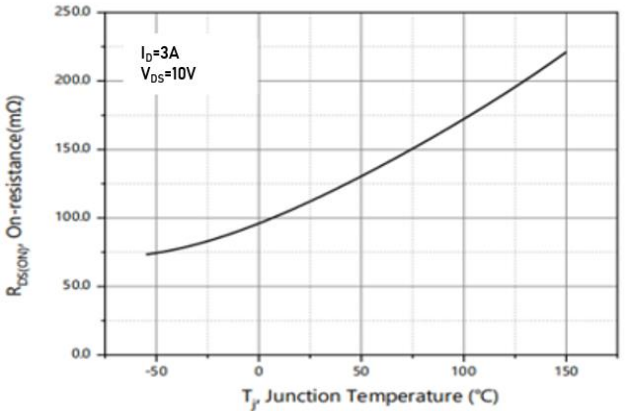



Figure6. Drain-Source on Resistance

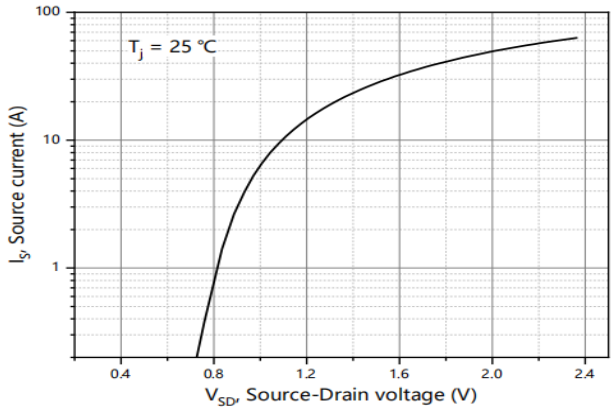



Figure7. Forward characteristic of body diode

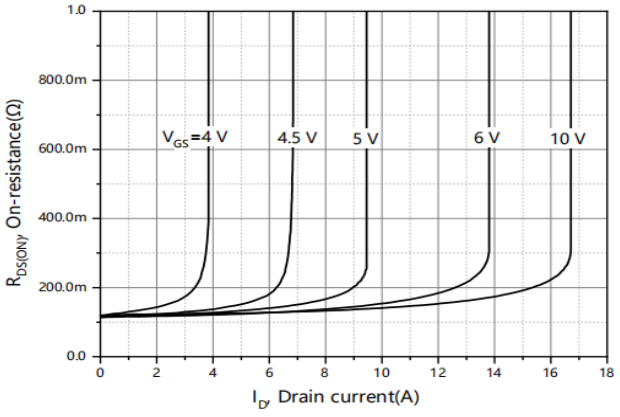



Figure8. Drain-source on-state resistance

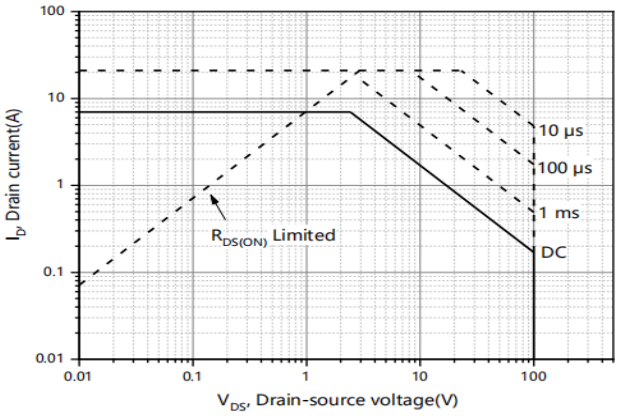



Figure9. Safe Operation Area $T_A$=25 ℃

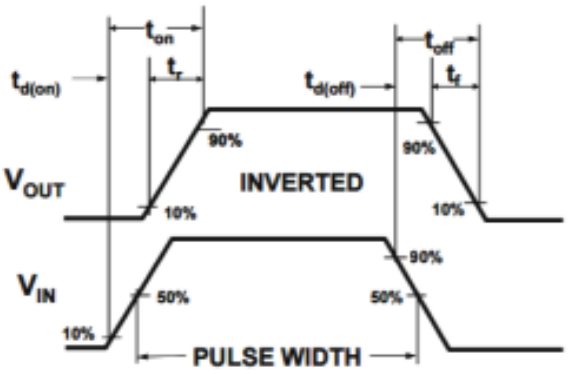
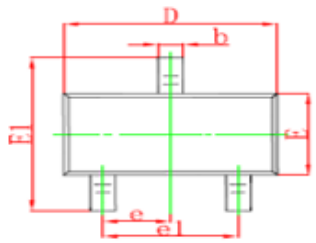
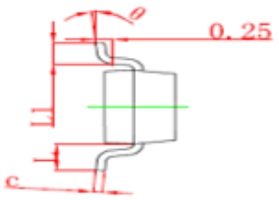
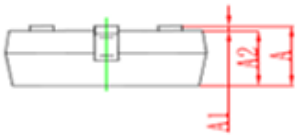



Figure10. Switching wave

## ■ SOT-23 Package information




| Symbol | Dimentions in Millimeter | | Dimentions 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 | 0.100 | 0.200 | 0.004 | 0.008 |
| 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 | 0.950Type | | 0.037Type | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.550REF | | 0.220REF | |
| L1 | 0.300 | 0.500 | 0.012 | 0.020 |
| θ | 0 ° | 8 ° | 0 ° | 8 ° |

## ■ SOT-23 Suggested Pad Layout