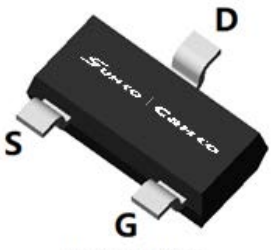
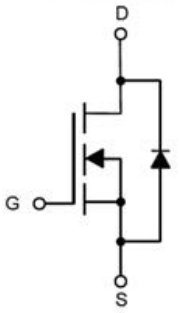
# N-Channel Enhancement Mode Field Effect Transistor

Top View



Bottom View

SOT-23




## Product Summary

- $V_{DS}$ 20V
- $I_D$ 3.0A
- $R_{DS(ON)}$( at $V_{GS}$=4.5V) ＜50 mohm
- $R_{DS(ON)}$( at $V_{GS}$=2.5V) ＜70 mohm

## General Description

- Trench Power LV MOSFET technology
- High Power and current handing capability
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

## Applications

- PWM application
- Load switch

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

| Parameter | | Symbol | Limit | Unit |
|---|---|---|---|---|
| Drain-source Voltage | | $V_{DS}$ | 20 | V |
| Gate-source Voltage | | $V_{GS}$ | ±10 | V |
| Drain Current | $T_A$=25℃ @ Steady State | $I_D$ | 3.0 | A |
| | $T_A$=70℃ @ Steady State | | 2.4 | |
| Pulsed Drain Current [A] | | $I_{DM}$ | 14 | A |
| Total Power Dissipation @ $T_A$=25℃ | | $P_D$ | 0.7 | W |
| Thermal Resistance Junction-to-Ambient @ Steady State [B] | | $R_{\theta JA}$ | 178 | ℃/W |
| Junction and Storage Temperature Range | | $T_J$ ,$T_{STG}$ | -55～+150 | ℃ |

## ■ Ordering Information (Example)

| PREFERED P/N | PACKING CODE | Marking | MINIMUM PACKAGE(pcs) | INNER BOX QUANTITY(pcs) | OUTER CARTON QUANTITY(pcs) | DELIVERY MODE |
|---|---|---|---|---|---|---|
| SCL2302B | F2 | 2302B. | 3000 | 30000 | 120000 | 7“ reel |

## ■ 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 | 20 | | | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=20V,$V_{GS}$=0V,$T_C$=25℃ | | | 1 | μA |
| Gate-Body Leakage Current | $I_{GSS}$ | $V_{GS}$= ±10V, $V_{DS}$=0V | | | ±100 | nA |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$= $V_{GS}$, $I_D$=250μA | 0.55 | 0.78 | 1.1 | V |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | $V_{GS}$= 4.5V, $I_D$=3.0A | | 38.5 | 50 | mΩ |
| | | $V_{GS}$= 2.5V, $I_D$=2.0A | | 53.5 | 70 | |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=3.0A,$V_{GS}$=0V | | | 1.2 | V |
| Maximum Body-Diode Continuous Current | $I_S$ | | | | 3.0 | A |
| **Dynamic Parameters** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$=10V,$V_{GS}$=0V,f=1MHZ | | 220 | | pF |
| Output Capacitance | $C_{oss}$ | | | 34 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 26 | | |
| **Switching Parameters** | | | | | | |
| Total Gate Charge | $Q_g$ | $V_{GS}$=4.5V,$V_{DS}$=10V,$I_D$=3.0A | | 3.61 | | nC |
| Gate Source Charge | $Q_{gs}$ | | | 0.88 | | |
| Gate Drain Charge | $Q_{gd}$ | | | 0.77 | | |
| Turn-on Delay Time | $t_{D(on)}$ | $V_{GS}$=4.5V,$V_{DD}$=10V, $R_L$=1.5Ω, $R_{GEN}$=3Ω | | 6.8 | | ns |
| Turn-on Rise Time | $t_r$ | | | 57 | | |
| Turn-off Delay Time | $t_{D(off)}$ | | | 14 | | |
| Turn-off Fall Time | $t_f$ | | | 53 | | |

A. Pulse Test: Pulse Width≤300us,Duty cycle ≤2%.
B. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch.

## ■ Typical Performance Characteristics

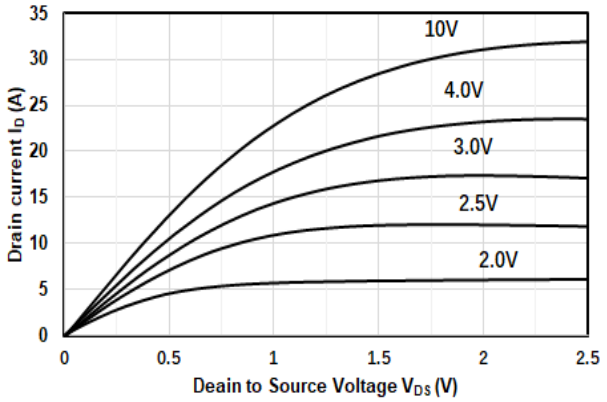



Figure1. Output Characteristics

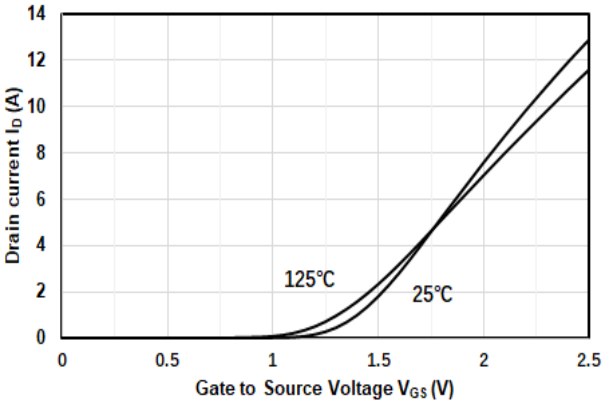



Figure2. Transfer Characteristics

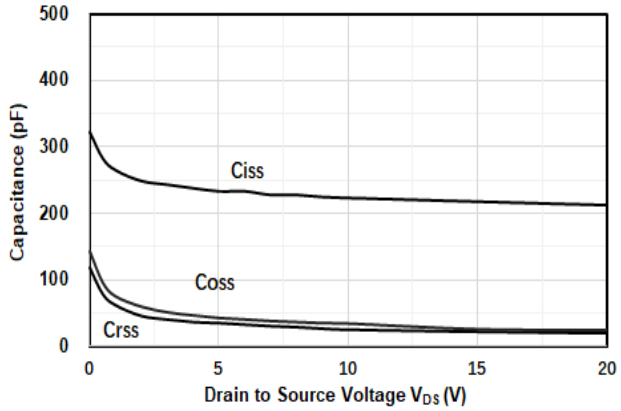



Figure3. Capacitance Characteristics

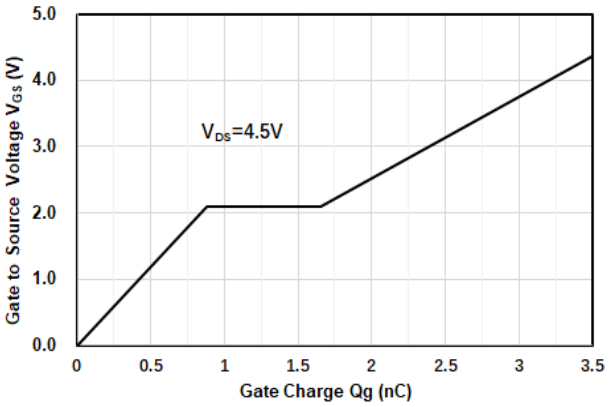



Figure4. Gate Charge

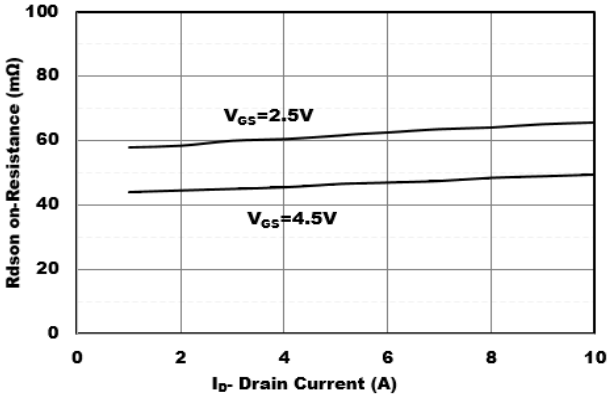



Figure5. Drain-Source on Resistance

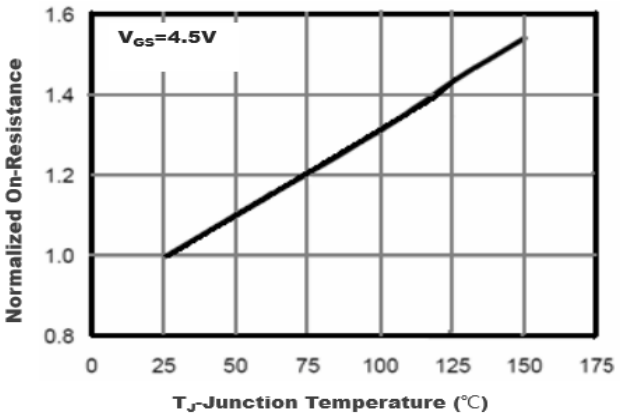



Figure6. Drain-Source on Resistance

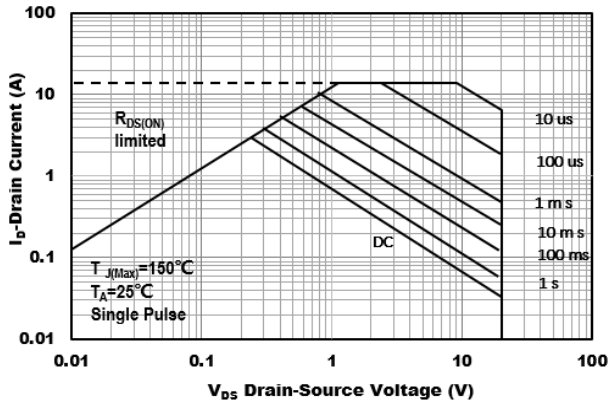



Figure7. Safe Operation Area

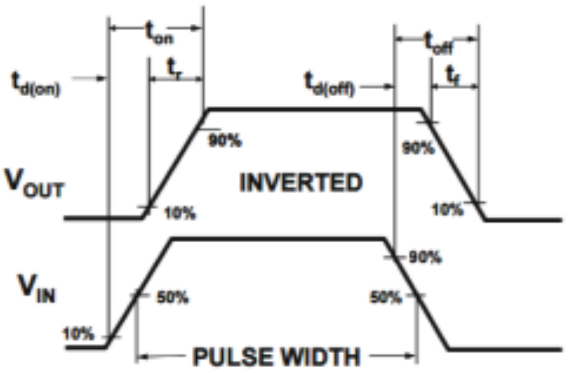



Figure8. Switching wave

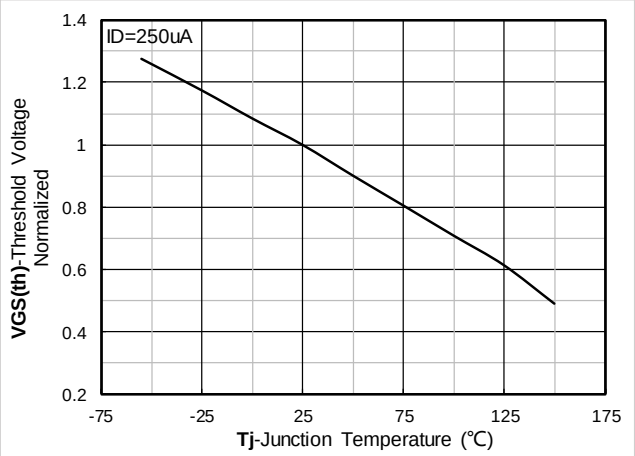



Figure 9. Normalized Threshold voltage

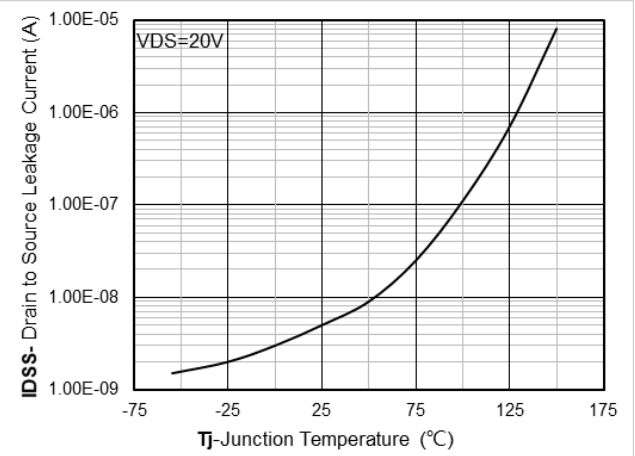
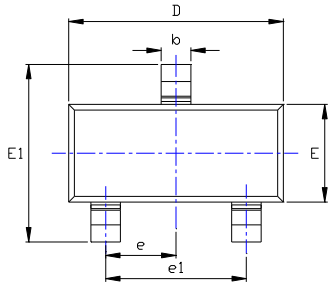
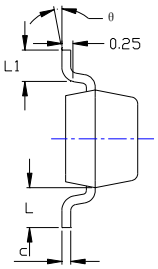



Figure 10. Drain to Source Leakage Current

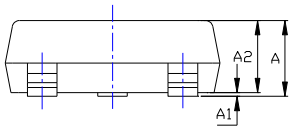
## ■SOT-23 Package information



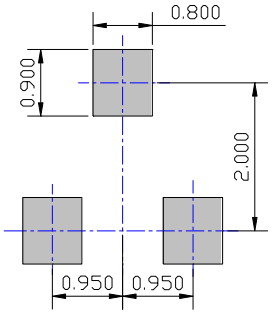

TOP VIEW




SIDE VIEW




SIDE VIEW




UNIT：mm

SUGGESTED SOLDER PAD LAYOUT

| DIMENSIONS | | | | |
|---|---|---|---|---|
| SYMBOL | INCHES | | Millimeter | |
| | MIN. | MAX. | MIN. | MAX. |
| A | 0.035 | 0.045 | 0.900 | 1.150 |
| A1 | 0.000 | 0.004 | 0.000 | 0.100 |
| A2 | 0.035 | 0.041 | 0.900 | 1.050 |
| b | 0.012 | 0.020 | 0.300 | 0.500 |
| c | 0.004 | 0.008 | 0.100 | 0.200 |
| D | 0.110 | 0.118 | 2.800 | 3.000 |
| E | 0.047 | 0.055 | 1.200 | 1.400 |
| E1 | 0.089 | 0.100 | 2.250 | 2.550 |
| e | 0.037TYP | | 0.950TYP | |
| e1 | 0.071 | 0.079 | 1.800 | 2.000 |
| L | 0.022REF | | 0.550REF | |
| L1 | 0.012 | 0.020 | 0.300 | 0.500 |
| θ | 0° | 8° | 0° | 8° |

NOTE:
1.PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
2.TOLERANCE 0.1mm UNLESS OTHERWISE SPECIFIED.
3.THE PAD LAYOUT IS FOR REFERENCE PURPOSES ONLY.

## Disclaimer

The information presented in this document is for reference only. Shanghai Sunco Electronics Co., Ltd reserves the right to make changes without notice for the specification of the products displayed herein to improve reliability, function or design or otherwise.

The product listed herein is designed to be used with ordinary electronic equipment or devices, and not designed to be used with equipment or devices which require high level of reliability and the malfunction of with would directly endanger human life (such as medical instruments, transportation equipment, aerospace machinery, nuclear-reactor controllers, fuel controllers and other safety devices), Russiansunco or anyone on its behalf, assumes no responsibility or liability for any damages resulting from such improper use of sale.

This publication supersedes & replaces all information previously supplied. For additional information, please visit our website http://www.russiansunco.com or consult your nearest Russiansunco's sales office for further assistance.