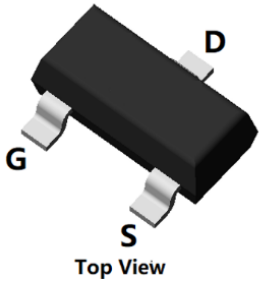
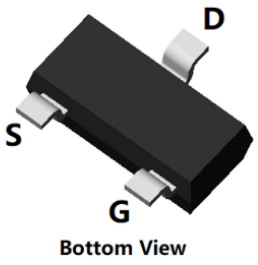
# P-Channel Enhancement Mode Field Effect Transistor

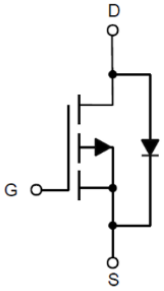



Top View




Bottom View

**SOT-23**




## Product Summary

- $V_{DS}$ -20V
- $I_D$ -2A
- $R_{DS(ON)}$( at $V_{GS}$=-4.5V) ＜94 mohm
- $R_{DS(ON)}$( at $V_{GS}$=-2.5V) ＜127 mohm
- $R_{DS(ON)}$( at $V_{GS}$=-1.8V) ＜215 mohm

## General Description

- Trench Power LV MOSFET technology
- Low $R_{DS(ON)}$
- Low Gate Charge
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

## Applications

- Video monitor
- Power management

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

| Parameter | | Symbol | Maximum | Unit |
|---|---|---|---|---|
| Drain-source Voltage | | $V_{DS}$ | -20 | V |
| Gate-source Voltage | | $V_{GS}$ | ±10 | V |
| Drain Current | $T_A$=25℃ @ Steady State | $I_D$ | -2 | A |
| | $T_A$=70℃ @ Steady State | | -1.6 | |
| Pulsed Drain Current [A] | | $I_{DM}$ | -8 | A |
| Total Power Dissipation @ $T_A$=25℃ | | $P_D$ | 0.7 | W |
| Thermal Resistance Junction-to-Ambient [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 |
|---|---|---|---|---|---|---|
| L2301F | F2 | $2301_F$. | 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 | -0.4 | -0.62 | -1.0 | V |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | $V_{GS}$= -4.5V, $I_D$=-1.5A | | 81 | 94 | mΩ |
| | | $V_{GS}$= -2.5V, $I_D$=-1.5A | | 109 | 127 | |
| | | $V_{GS}$= -1.8V, $I_D$=-1.5A | | 183 | 215 | |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=-2A,$V_{GS}$=0V | | -0.8 | -1.2 | V |
| Maximum Body-Diode Continuous Current | $I_S$ | | | | -2 | A |
| **Dynamic Parameters** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$=-10V,$V_{GS}$=0V,f=1MHz | | 327 | | pF |
| Output Capacitance | $C_{oss}$ | | | 62 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 55 | | |
| **Switching Parameters** | | | | | | |
| Total Gate Charge | $Q_g$ | $V_{GS}$=-4.5V,$V_{DS}$=-10V,$I_D$=-2A | | 4.5 | | nC |
| Gate Source Charge | $Q_{gs}$ | | | 0.85 | | |
| Gate Drain Charge | $Q_{gd}$ | | | 1.4 | | |
| Reverse Recovery Charge | $Q_{rr}$ | $I_F$=-2A, di/dt=100A/us | | 2.3 | | |
| Reverse Recovery Time | $t_{rr}$ | | | 27 | | ns |
| Turn-on Delay Time | $t_{D(on)}$ | $V_{GS}$=-4.5V,$V_{DD}$=-10V, $I_D$=-1A, $R_{GEN}$=2.5Ω | | 6 | | |
| Turn-on Rise Time | $t_r$ | | | 30 | | |
| Turn-off Delay Time | $t_{D(off)}$ | | | 45 | | |
| Turn-off Fall Time | $t_f$ | | | 46 | | |

A. 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

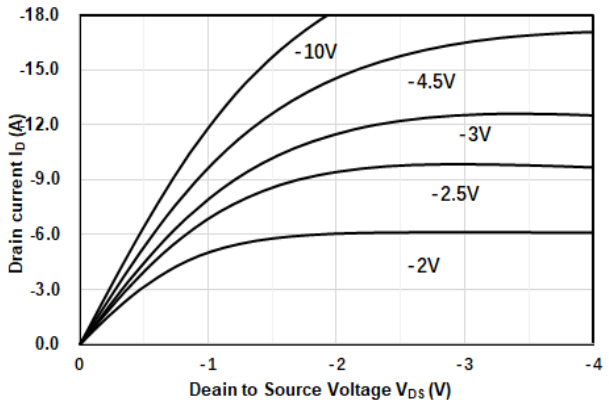



Figure1. Output Characteristics

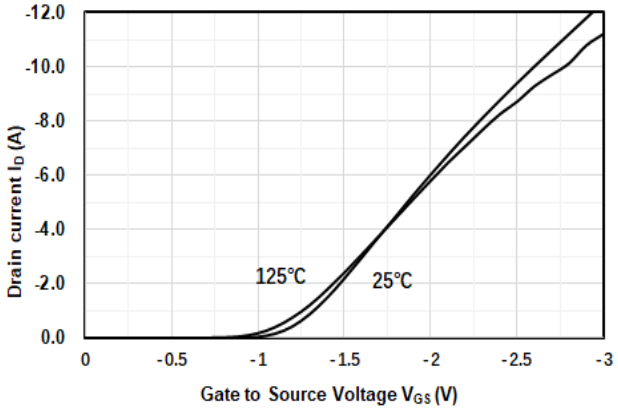



Figure2. Transfer Characteristics

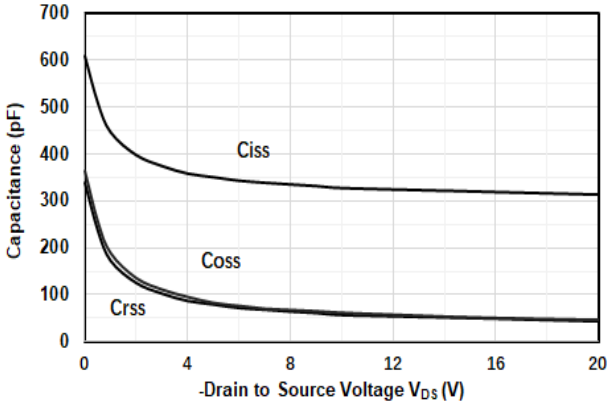



Figure3. Capacitance Characteristics

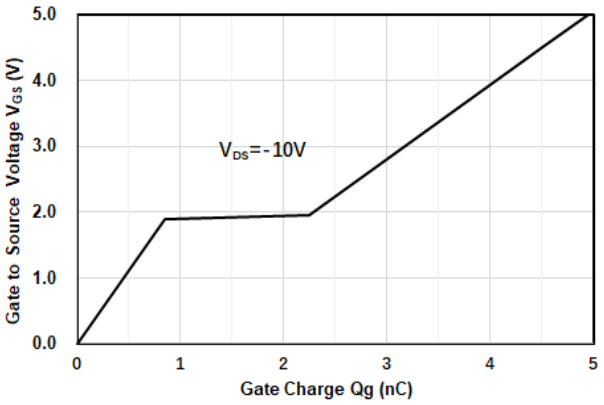



Figure4. Gate Charge

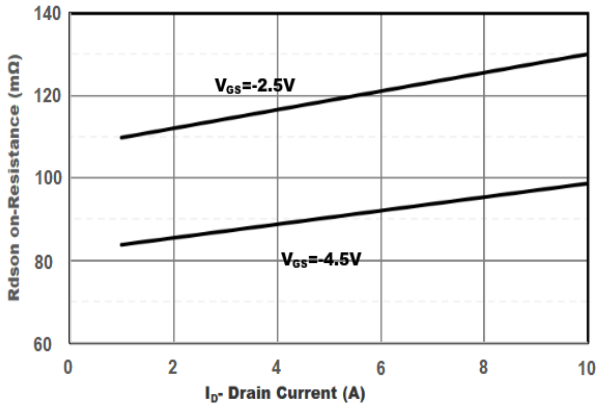



Figure5. Drain-Source on Resistance

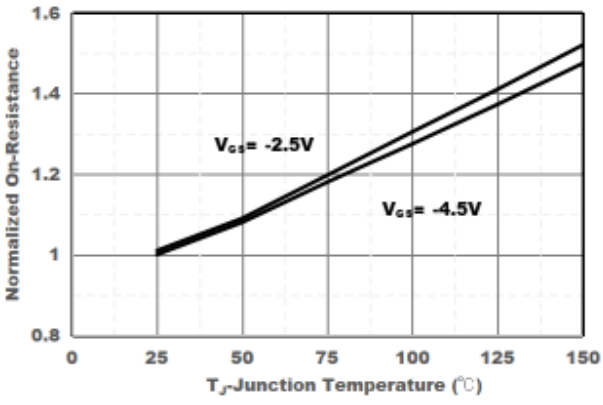



Figure6. Drain-Source on Resistance

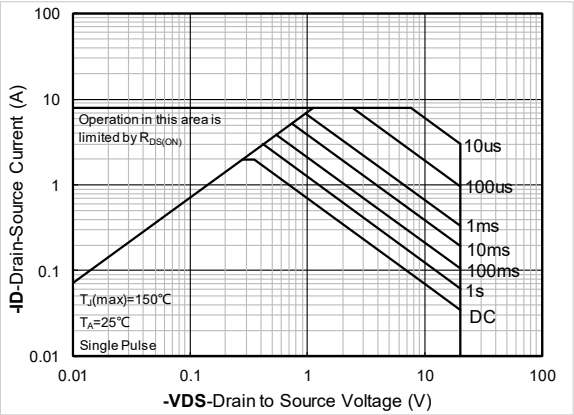



Figure7. Safe Operation Area

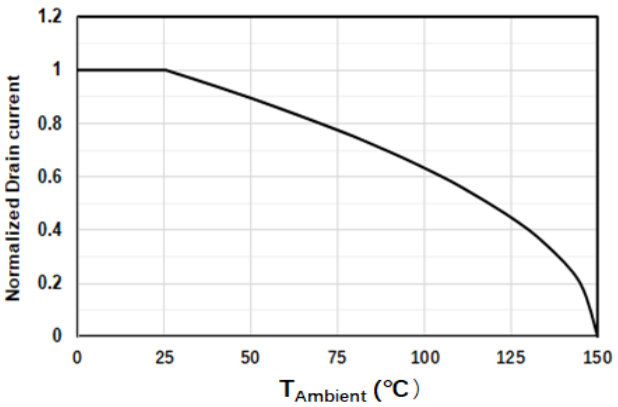



Figure8. Drain Current vs Ambient temperature

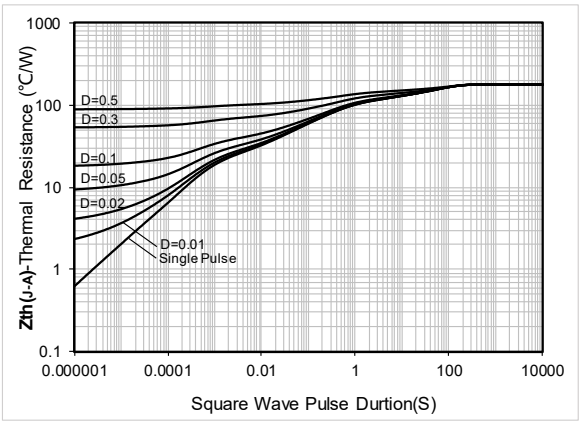
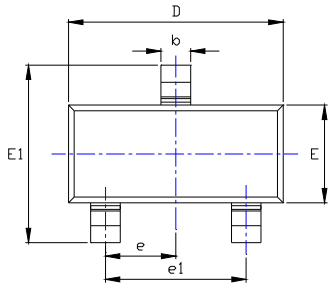
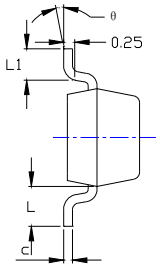



Figure9. Maximum Transient Thermal Impedance

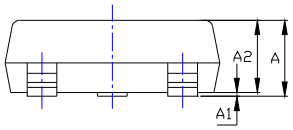
## ■ SOT-23 Package information



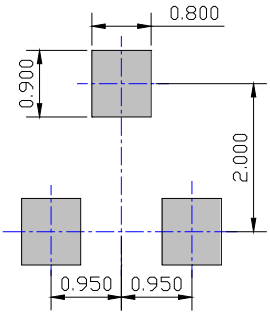

TOP VIEW




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.

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