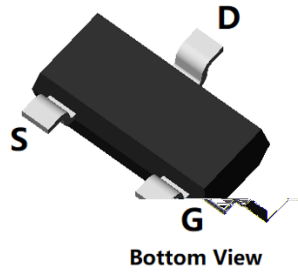
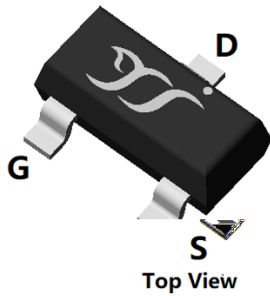
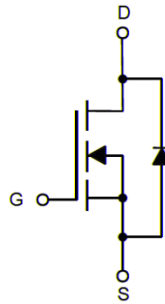


## N-Channel Enhancement Mode Field Effect Transistor



**SOT-23**



### Product Summary

|                                     |         |
|-------------------------------------|---------|
| • $V_{DS}$                          | 30V     |
| • $I_D$                             | 5.6A    |
| • $R_{DS(ON)}$ ( at $V_{GS}=10V$ )  | <24mohm |
| • $R_{DS(ON)}$ ( at $V_{GS}=4.5V$ ) | <38mohm |

### General Description

- Trench Power LV MOSFET technology
- High density cell design for low  $R_{DS(ON)}$
- High Speed switching
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

### Applications

- Battery protection
- Load switch
- Power management

### ■ Absolute Maximum Ratings ( $T_A=25^\circ\text{C}$ unless otherwise noted)

| Parameter   |                        | Symbol          | Limit    | Unit                      |
|---|------------------------|-----------------|----------|---------------------------|
| Drain-source Voltage                                |                        | $V_{DS}$        | 30       | V                         |
| Gate-source Voltage                                 |                        | $V_{GS}$        | $\pm 20$ | V                         |
| Drain Current                                       | $T_A=25^\circ\text{C}$ | $I_D$           | 5.6      | A                         |
|   | $T_A=70^\circ\text{C}$ |                 | 4.5      |                           |
| Pulsed Drain Current <sup>A</sup>                   |                        | $I_{DM}$        | 30       | A                         |
| Total Power Dissipation                             | $T_A=25^\circ\text{C}$ | $P_D$           | 1.2      | W                         |
|   | $T_A=70^\circ\text{C}$ |                 | 0.8      |                           |
| Thermal Resistance Junction-to-Ambient <sup>B</sup> |                        | $R_{\theta JA}$ | 104      | $^\circ\text{C}/\text{W}$ |
| Junction and Storage Temperature Range              |                        | $T_J, T_{STG}$  | -55~+150 | $^\circ\text{C}$          |

### ■ Ordering Information (Example)

| PREFERRED P/N | PACKING CODE | Marking | MINIMUM PACKAGE(pcs) | INNER BOX QUANTITY(pcs) | OUTER CARTON QUANTITY(pcs) | DELIVERY MODE |
|---------------|--------------|---------|----------------------|-------------------------|----------------------------|---------------|
| YJL3404A      | F2           | R4.     | 3000                 | 30000                   | 120000                     | 7" reel       |



# YJL3404A

## ■ Electrical Characteristics ( $T_J=25^{\circ}\text{C}$ unless otherwise noted)

| Parameter                         | Symbol       | Conditions  | Min | Typ   | Max       | Units      |
|-----------------------------------|--------------|---|-----|-------|-----------|------------|
| <b>Static Parameter</b>           |              |   |     |       |           |            |
| Drain-Source Breakdown Voltage    | $BV_{DSS}$   | $V_{GS}=0V, I_D=250\mu A$                               | 30  |       |           | V          |
| Zero Gate Voltage Drain Current   | $I_{DSS}$    | $V_{DS}=30V, V_{GS}=0V$                                 |     |       | 1         | $\mu A$    |
| Gate-Body Leakage Current         | $I_{GSS1}$   | $V_{GS}=\pm 20V, V_{DS}=0V$                             |     |       | $\pm 100$ | nA         |
| Gate Threshold Voltage            | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$                           | 1   | 1.5   | 2.2       | V          |
| Static Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS}=10V, I_D=5.6A$                                  |     | 17    | 24        | m $\Omega$ |
|                                   |              | $V_{GS}=4.5V, I_D=5A$                                   |     | 26    | 38        |            |
| Diode Forward Voltage             | $V_{SD}$     | $I_S=5.6A, V_{GS}=0V$                                   |     |       | 1.2       | V          |
| <b>Dynamic Parameters</b>         |              |   |     |       |           |            |
| Input Capacitance                 | $C_{iss}$    | $V_{DS}=15V, V_{GS}=0V, f=1\text{MHZ}$                  |     | 526   |           | pF         |
| Output Capacitance                | $C_{oss}$    |   |     | 78    |           |            |
| Reverse Transfer Capacitance      | $C_{rss}$    |   |     | 69    |           |            |
| <b>Switching Parameters</b>       |              |   |     |       |           |            |
| Total Gate Charge                 | $Q_g$        | $V_{GS}=10V, V_{DS}=15V, I_D=5.6A$                      |     | 12.22 |           | nC         |
| Gate-Source Charge                | $Q_{gs}$     |   |     | 2.37  |           |            |
| Gate-Drain Charge                 | $Q_{gd}$     |   |     | 2.31  |           |            |
| Reverse Recovery Charge           | $Q_{rr}$     | $I_F=5.6A, di/dt=100A/\mu s$                            |     | 1.28  |           | ns         |
| Reverse Recovery Time             | $t_{rr}$     |   |     | 16.5  |           |            |
| Turn-on Delay Time                | $t_{D(on)}$  | $V_{GS}=10V, V_{DS}=15V, I_D=5.6A$<br>$R_{GEN}=3\Omega$ |     | 5     |           | ns         |
| Turn-on Rise Time                 | $t_r$        |   |     | 28.2  |           |            |
| Turn-off Delay Time               | $t_{D(off)}$ |   |     | 12.8  |           |            |
| Turn-off fall Time                | $t_f$        |   |     | 21.6  |           |            |

A. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty cycle  $\leq 2\%$ .

B.  $R_{\theta JA}$  is the sum of the junction-to-case and case-to-ambient thermal resistance, where the case thermal reference is defined as the solder mounting surface of the drain pins.  $R_{\theta JC}$  is guaranteed by design, while  $R_{\theta JA}$  is determined by the board design. The maximum rating presented here is based on mounting on a 1 in 2 pad of 2oz copper.



### Typical Performance Characteristics

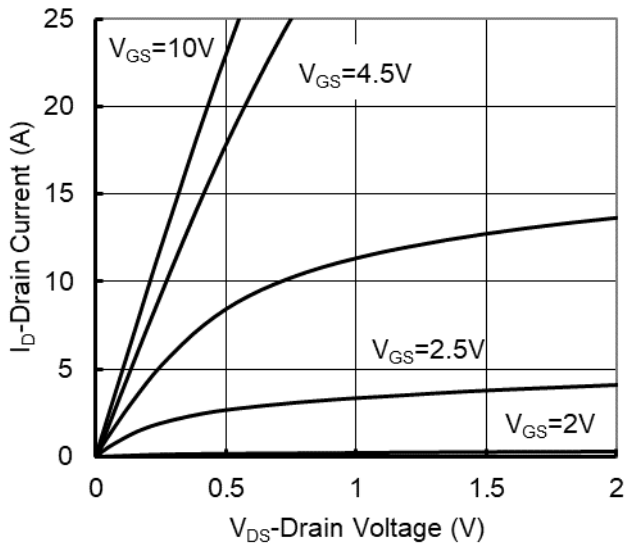


Figure1. Output Characteristics

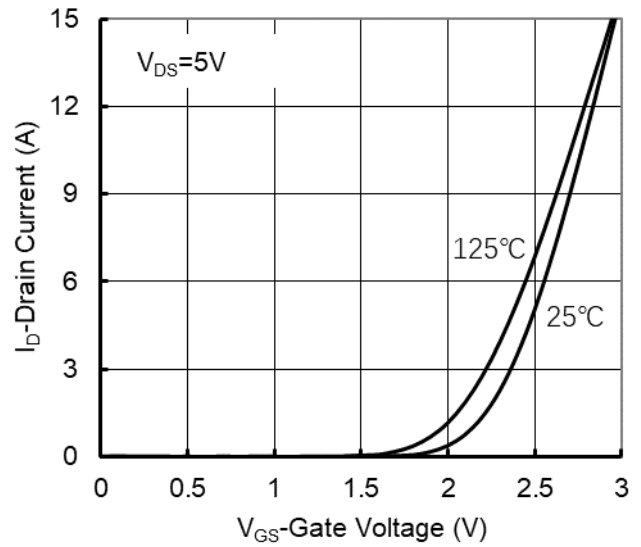


Figure2. Transfer Characteristics

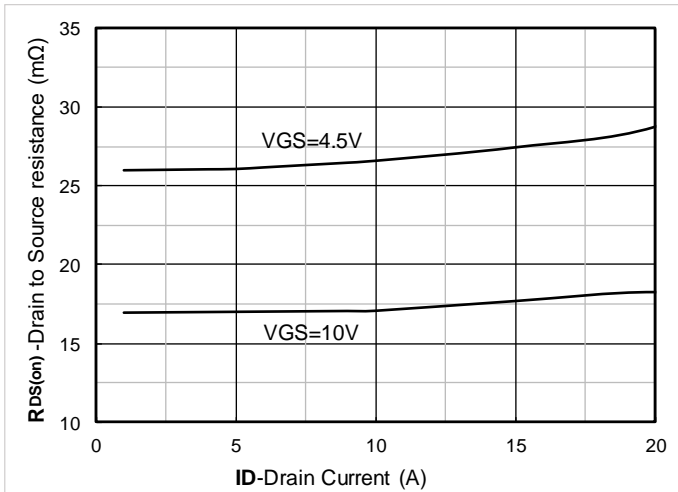


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

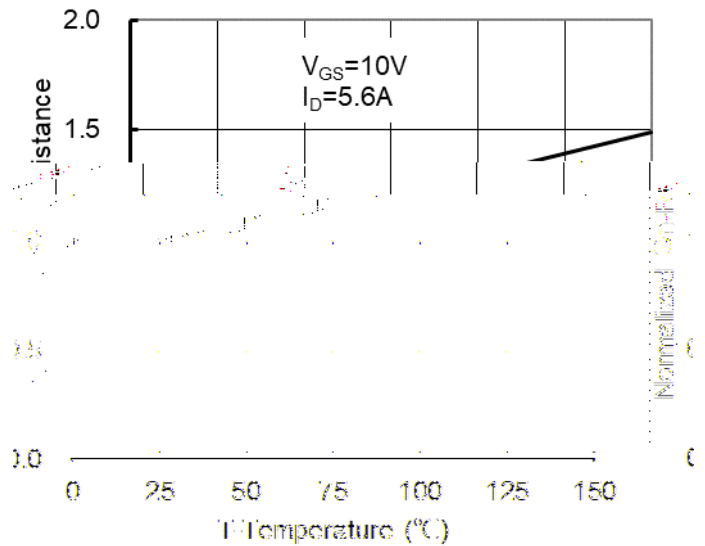


Figure 4: On-Resistance vs. Junction Temperature

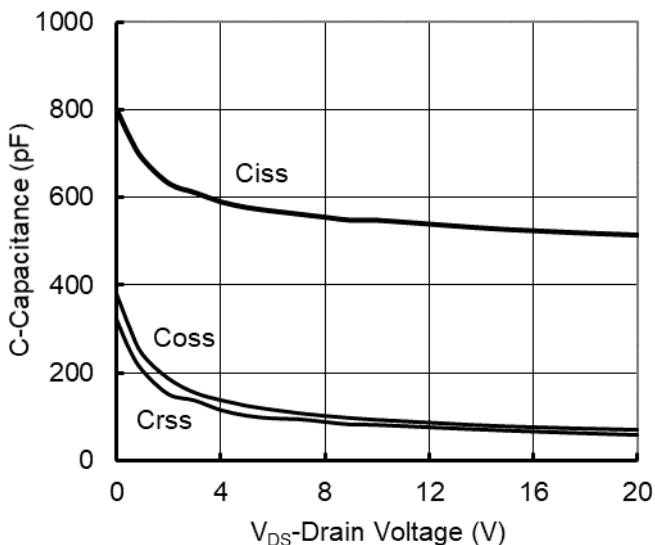


Figure5. Capacitance Characteristics

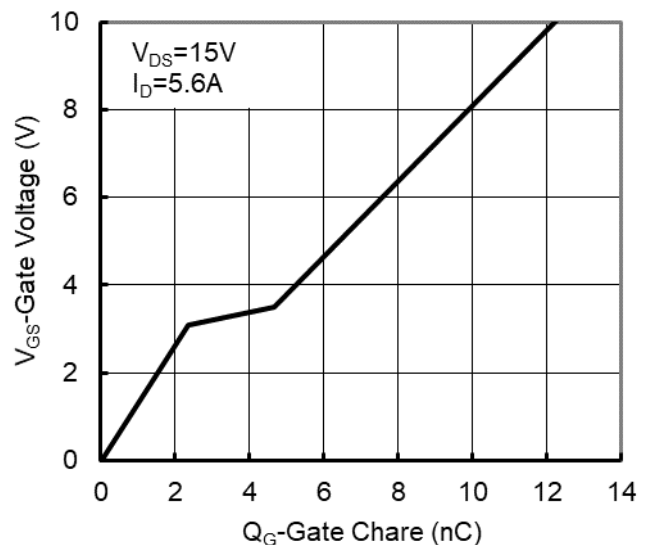


Figure6. Gate Charge

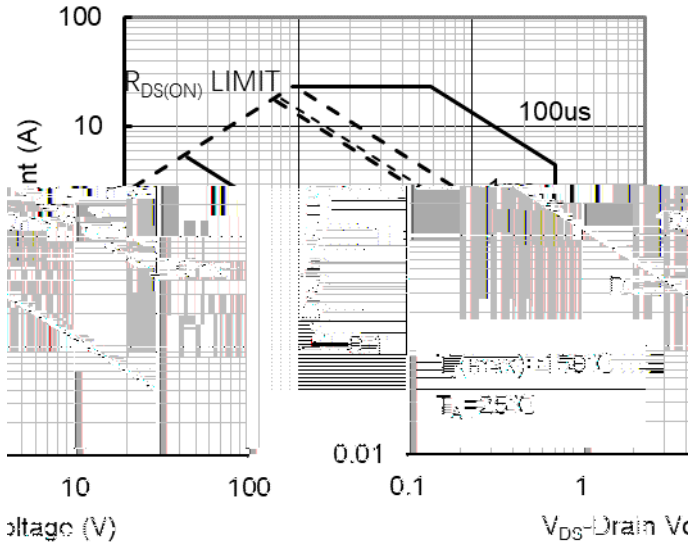


Figure7. Safe Operation Area

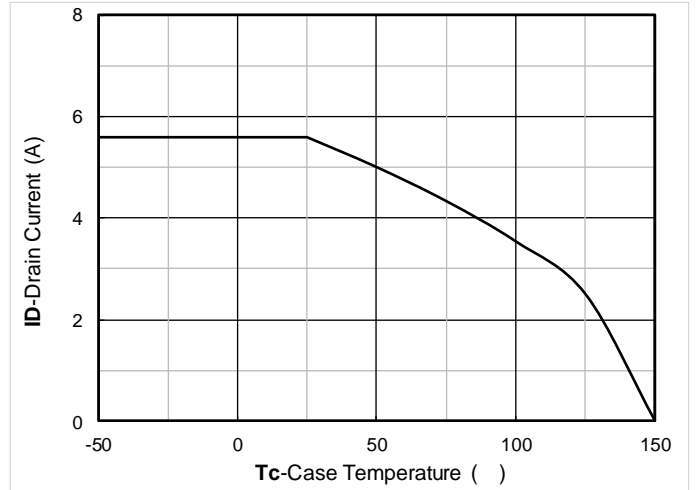


Figure8. Maximum Continuous Drain Current vs Ambient Temperature

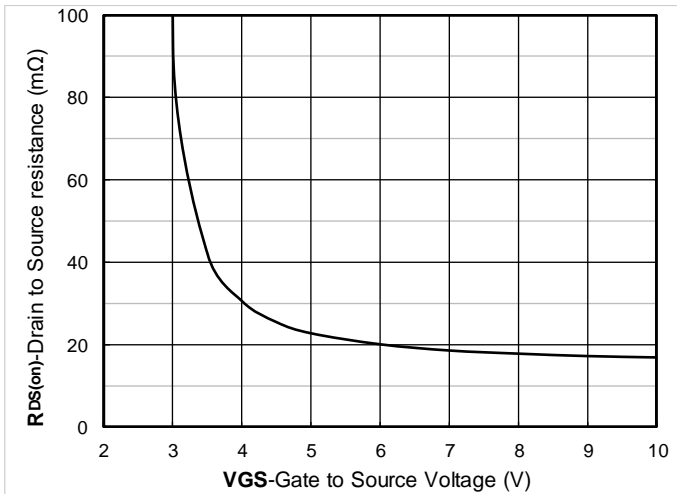


Figure 9. On-Resistance vs Gate to Source Voltage

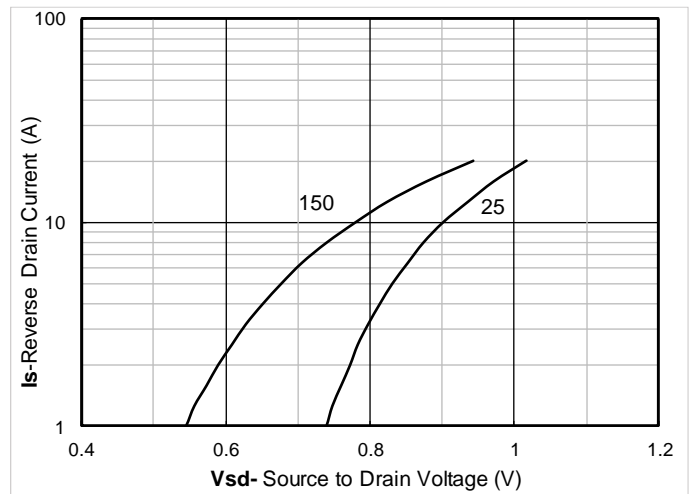


Figure 10. Forward characteristics of reverse diode

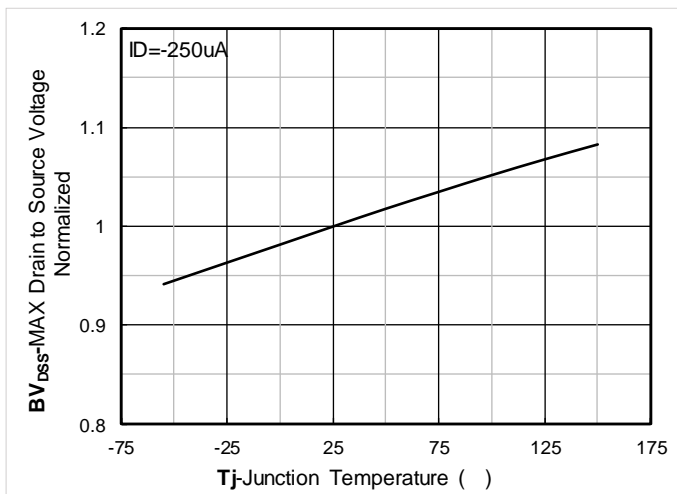


Figure 11. Normalized breakdown voltage

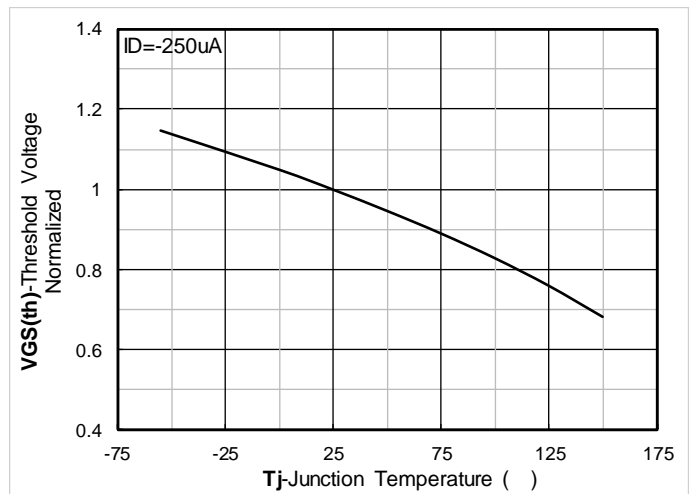


Figure 12. Normalized Threshold voltage



# YJL3404A

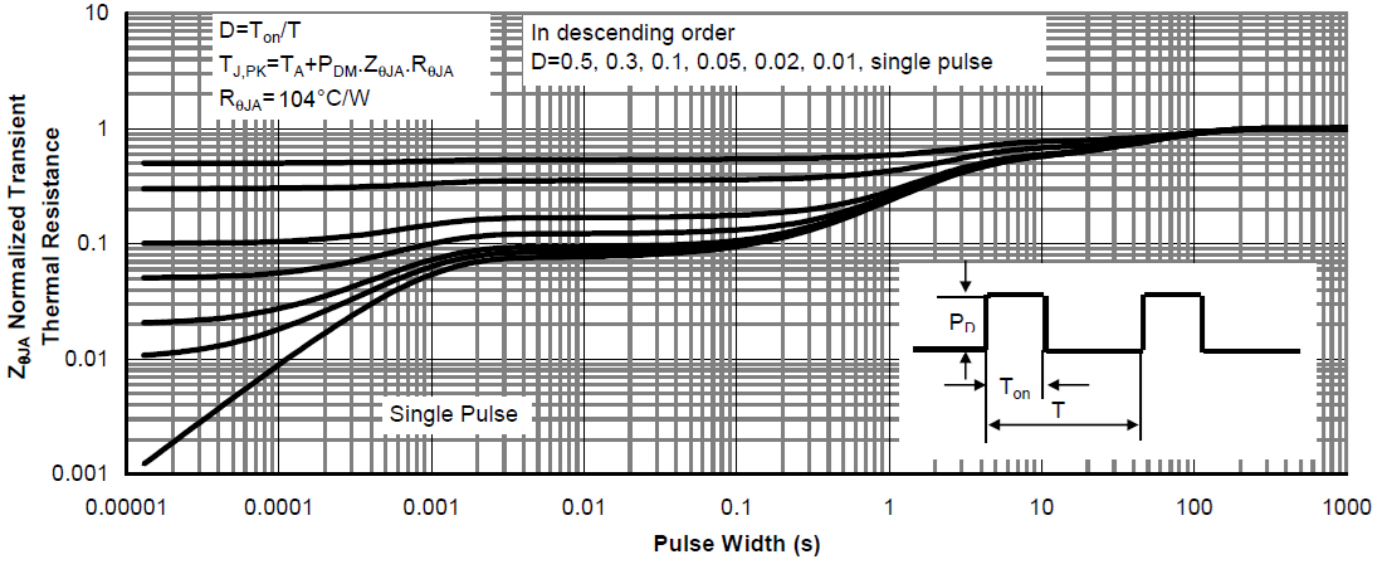
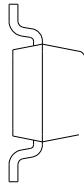


Figure13. Normalized Maximum Transient Thermal Impedance





■ SOT-23 Package information



UNIT: mm



## YJL3404A

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