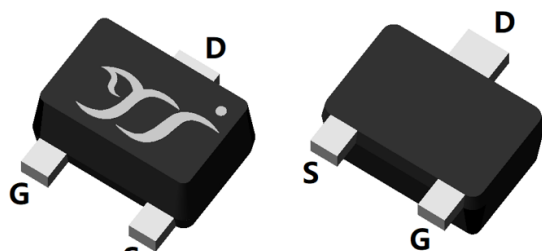


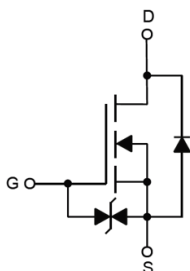
## N-Channel Enhancement Mode Field Effect Transistor



Top View

Bottom View

**SOT-723**



### Product Summary

- $V_{DS}$  20 V
- $I_D$  0.5 A
- $R_{DS(ON)}$  (at  $V_{GS}=4.5V$ ) < 300 mohm
- $R_{DS(ON)}$  (at  $V_{GS}=2.5V$ ) < 400 mohm
- $R_{DS(ON)}$  (at  $V_{GS}=1.8V$ ) < 700 mohm
- ESD Protected Up to 2.0KV (HBM)

### General Description

- Trench Power LV MOSFET technology
- High Power and current handling capability

### Applications

- PWM application
- Load switch

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

| Parameter                              |                    | Symbol         | Limit    | Unit        |
|----------------------------------------|--------------------|----------------|----------|-------------|
| Drain-source Voltage                   |                    | $V_{DS}$       | 20       | V           |
| Gate-source Voltage                    |                    | $V_{GS}$       | $\pm 12$ | V           |
| Drain Current                          | $T_A=25^{\circ}C$  | $I_D$          | 0.5      | A           |
|                                        | $T_A=100^{\circ}C$ |                | 0.3      |             |
| Pulsed Drain Current <sup>A</sup>      |                    | $I_{DM}$       | 4        | A           |
| Total Power Dissipation <sup>B</sup>   | $T_A=25^{\circ}C$  | $P_D$          | 0.25     | W           |
|                                        | $T_A=100^{\circ}C$ |                | 0.1      |             |
| Junction and Storage Temperature Range |                    | $T_J, T_{STG}$ | -55~+150 | $^{\circ}C$ |

### ■ Thermal resistance

| Parameter                                           |              | Symbol          | Typ | Max | Units         |
|-----------------------------------------------------|--------------|-----------------|-----|-----|---------------|
| Thermal Resistance Junction-to-Ambient <sup>C</sup> | Steady-State | $R_{\theta JA}$ | 420 | 500 | $^{\circ}C/W$ |

### ■ Ordering Information (Example)

| PREFERRED P/N | PACKING CODE | Marking | MINIMUM PACKAGE(pcs) | INNER BOX QUANTITY(pcs) | OUTER CARTON QUANTITY(pcs) | DELIVERY MODE |
|---------------|--------------|---------|----------------------|-------------------------|----------------------------|---------------|
| YJL3134KAT    | F1           | 4A      | 8000                 | 80000                   | 320000                     | 7" reel       |



# YJL3134KAT

## ■ Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)

| Parameter                             | Symbol              | Conditions                                                                                 | Min  | Typ  | Max | Units |
|---------------------------------------|---------------------|--------------------------------------------------------------------------------------------|------|------|-----|-------|
| Static Parameter                      |                     |                                                                                            |      |      |     |       |
| Drain-Source Breakdown Voltage        | BV <sub>DSS</sub>   | V <sub>GS</sub> = 0V, I <sub>D</sub> =250μA                                                | 20   | -    | -   | V     |
| Zero Gate Voltage Drain Current       | I <sub>DSS</sub>    | V <sub>DS</sub> =20V, V <sub>GS</sub> =0V                                                  | -    | -    | 1   | μA    |
|                                       |                     | V <sub>DS</sub> =20V, V <sub>GS</sub> =0V, T <sub>j</sub> =150°C                           | -    | -    | 100 |       |
| Gate-Body Leakage Current             | I <sub>GSS</sub>    | V <sub>GS</sub> = ±10V, V <sub>DS</sub> =0V                                                | -    | 2    | ±10 | uA    |
| Gate Threshold Voltage                | V <sub>GS(th)</sub> | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =250μA                                  | 0.35 | 0.75 | 1.1 | V     |
| Static Drain-Source On-Resistance     | R <sub>DS(ON)</sub> | V <sub>GS</sub> =4.5V, I <sub>D</sub> =0.5A                                                | -    | 200  | 300 | mΩ    |
|                                       |                     | V <sub>GS</sub> =2.5V, I <sub>D</sub> =0.4A                                                | -    | 290  | 400 |       |
|                                       |                     | V <sub>GS</sub> =1.8V, I <sub>D</sub> =0.2A                                                | -    | 480  | 700 |       |
| Diode Forward Voltage                 | V <sub>SD</sub>     | I <sub>S</sub> =0.5A, V <sub>GS</sub> =0V                                                  | -    | 0.9  | 1.2 | V     |
| Gate resistance                       | R <sub>G</sub>      | f=1MHz, Open drain                                                                         | -    | 50   | -   | Ω     |
| Maximum Body-Diode Continuous Current | I <sub>S</sub>      |                                                                                            | -    | -    | 0.5 | A     |
| Dynamic Parameters                    |                     |                                                                                            |      |      |     |       |
| Input Capacitance                     | C <sub>iss</sub>    | V <sub>DS</sub> =10V, V <sub>GS</sub> =0V, f=1MHz                                          | -    | 56   | -   | pF    |
| Output Capacitance                    | C <sub>oss</sub>    |                                                                                            | -    | 20   | -   |       |
| Reverse Transfer Capacitance          | C <sub>rss</sub>    |                                                                                            | -    | 2.5  | -   |       |
| Switching Parameters                  |                     |                                                                                            |      |      |     |       |
| Total Gate Charge                     | Q <sub>g</sub>      | V <sub>GS</sub> =4.5V, V <sub>DS</sub> =10V, I <sub>D</sub> =0.5A                          | -    | 1    | -   | nC    |
| Gate-Source Charge                    | Q <sub>gs</sub>     |                                                                                            | -    | 0.28 | -   |       |
| Gate-Drain Charge                     | Q <sub>gd</sub>     |                                                                                            | -    | 0.22 | -   |       |
| Reverse Recovery Charge               | Q <sub>rr</sub>     | I <sub>F</sub> =0.5A, di/dt=20A/us                                                         | -    | 0.4  | -   | nC    |
| Reverse Recovery Time                 | t <sub>rr</sub>     |                                                                                            | -    | 14.4 | -   | ns    |
| Turn-on Delay Time                    | t <sub>D(on)</sub>  | V <sub>GS</sub> =4.5V, V <sub>DD</sub> =10V, I <sub>D</sub> =0.5A<br>R <sub>GEN</sub> =10Ω | -    | 2    | -   | nS    |
| Turn-on Rise Time                     | t <sub>r</sub>      |                                                                                            | -    | 18.8 | -   |       |
| Turn-off Delay Time                   | t <sub>D(off)</sub> |                                                                                            | -    | 10   | -   |       |
| Turn-off fall Time                    | t <sub>f</sub>      |                                                                                            | -    | 23   | -   |       |

A. Repetitive rating; pulse width limited by max. junction temperature.

B. P<sub>d</sub> is based on max. junction temperature, using junction-case thermal resistance.

C. The value of R<sub>θJA</sub> is measured with the device mounted on the minimum recommend pad size, in the still air environment with T<sub>A</sub> =25°C. The maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.



## ■ Typical Electrical and Thermal Characteristics Diagrams

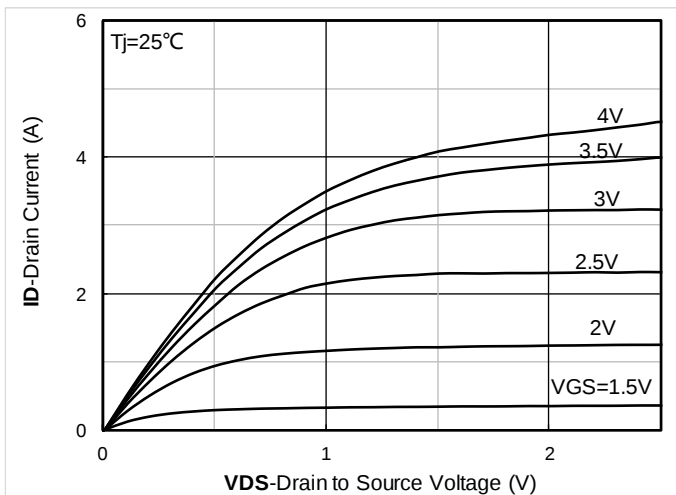


Figure1. Output Characteristics

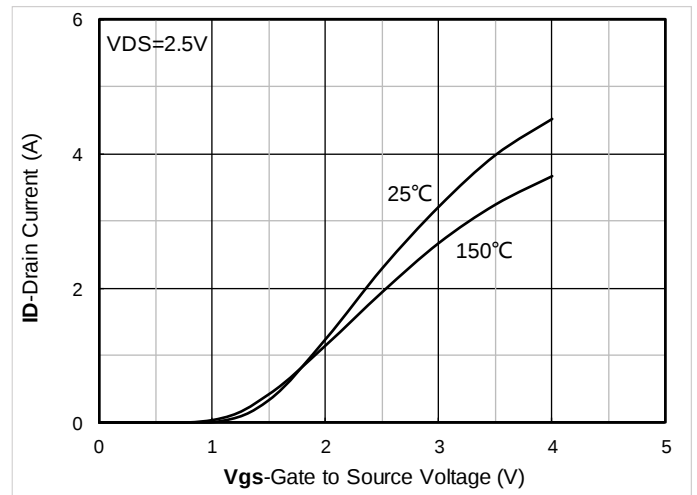


Figure2. Transfer Characteristics

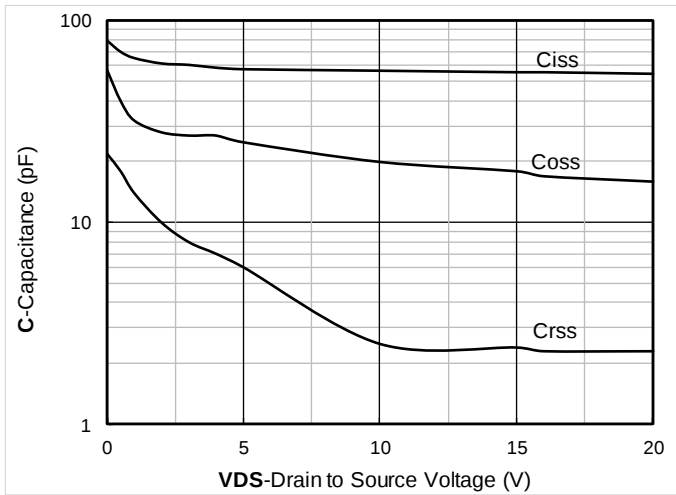


Figure3. Capacitance Characteristics

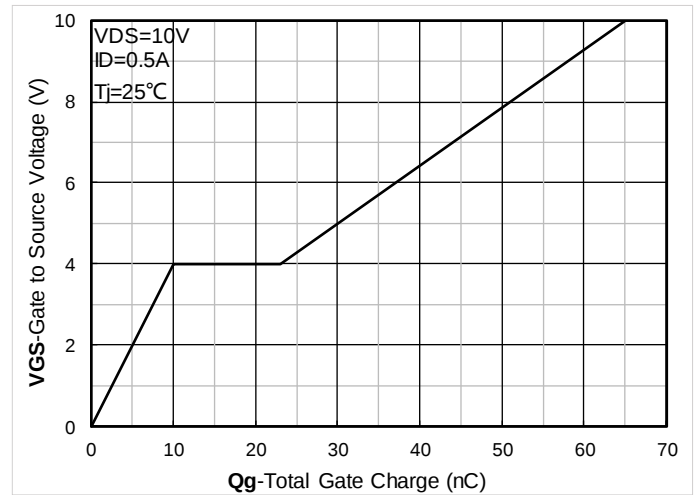


Figure4. Gate Charge

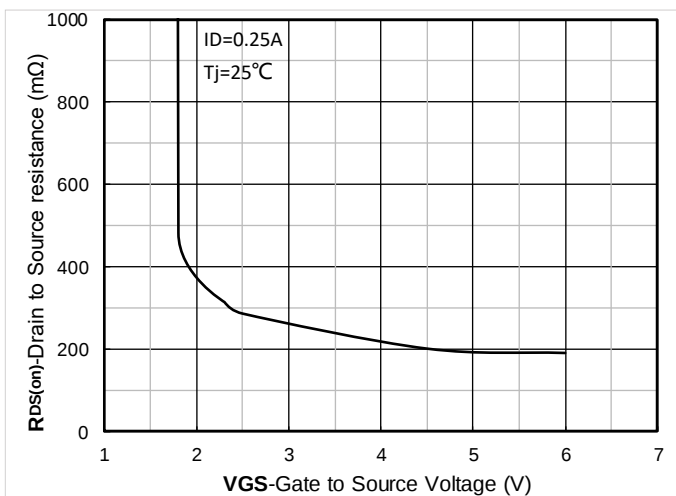


Figure5. On-Resistance vs Gate to Source Voltage

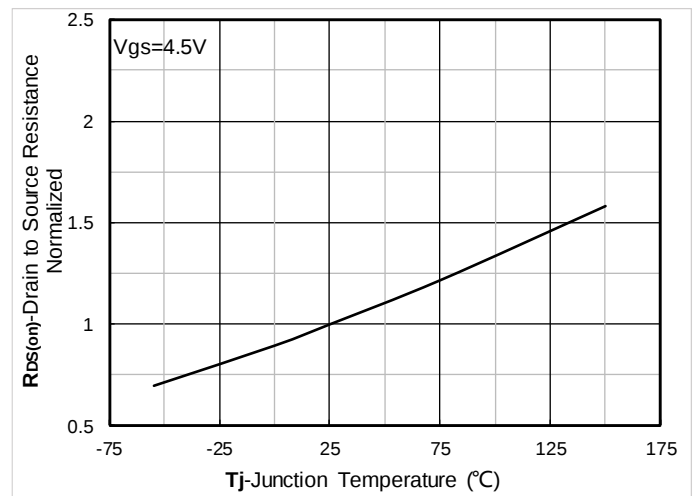


Figure6. Normalized On-Resistance

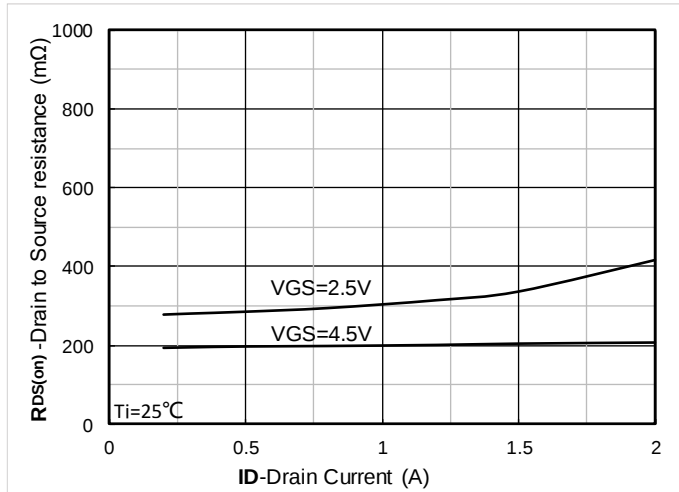


Figure7.  $R_{DS(on)}$  VS Drain Current

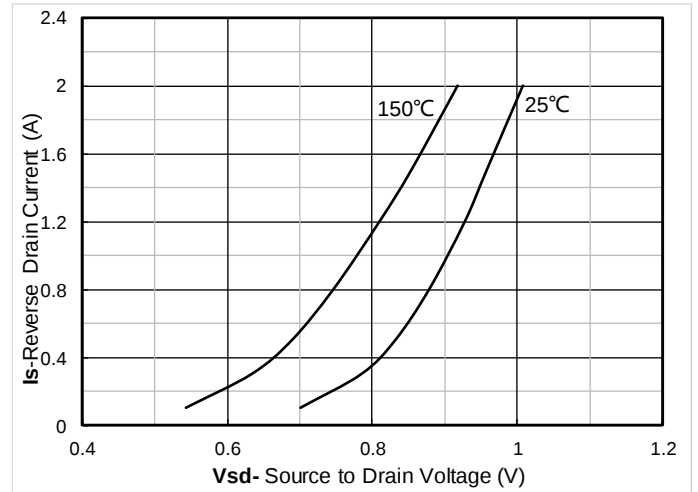


Figure8. Forward characteristics of reverse diode

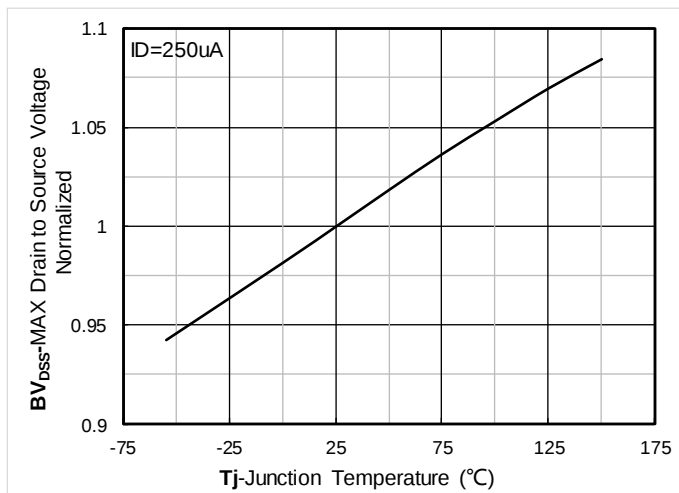


Figure9. Normalized breakdown voltage

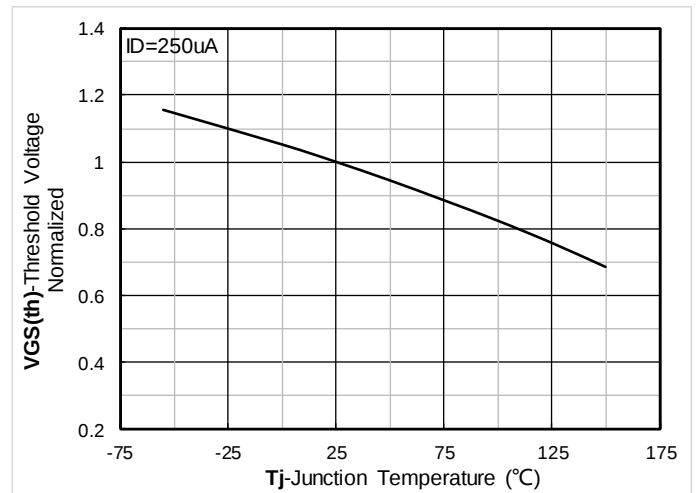


Figure10. Normalized Threshold voltage

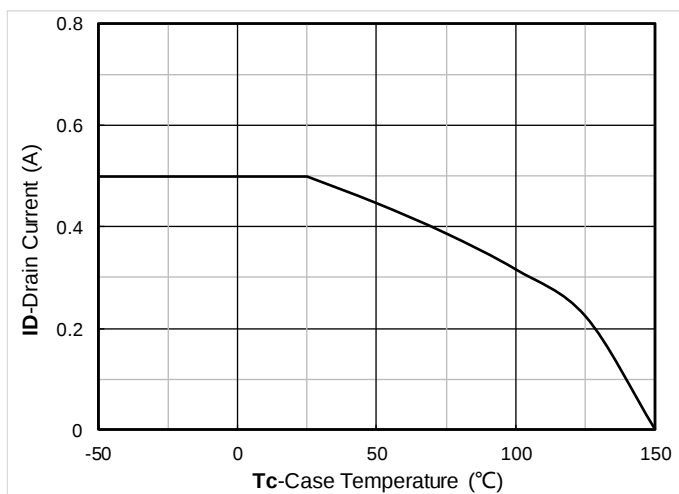


Figure11. Current dissipation

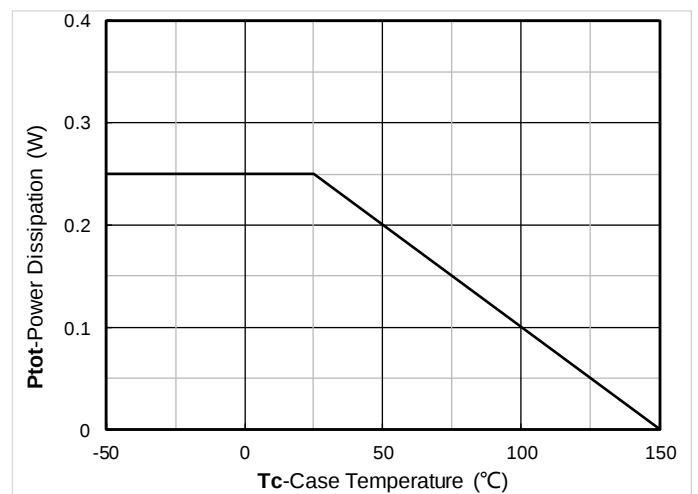


Figure12. Power dissipation

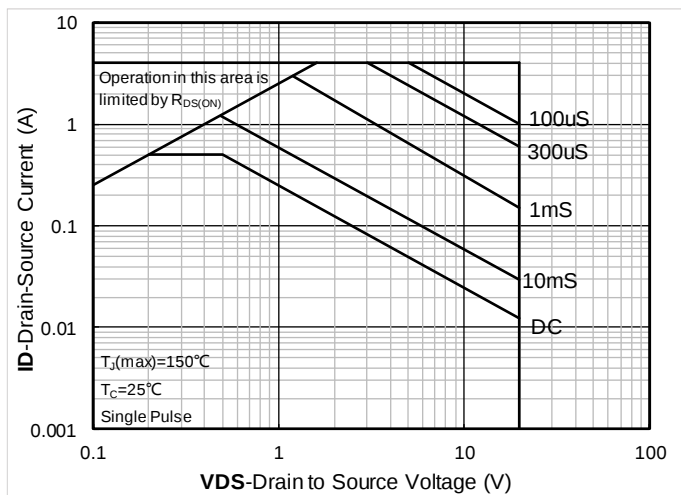
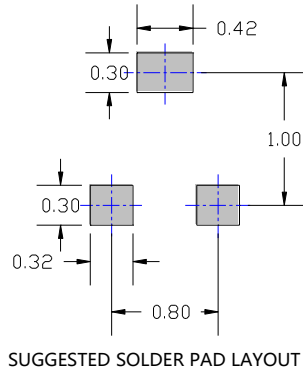
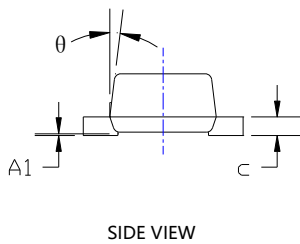
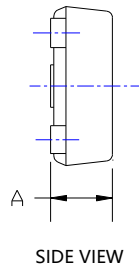
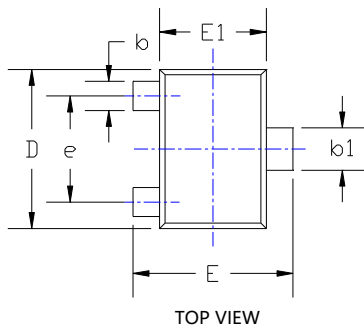


Figure13. Safe Operation Area

## ■ Package information



| SYMBOL | DIMENSIONS |       |            |       |
|--------|------------|-------|------------|-------|
|        | INCHES     |       | Millimeter |       |
|        | MIN.       | MAX.  | MIN.       | MAX.  |
| A      | 0.017      | 0.022 | 0.430      | 0.550 |
| A1     | 0.000      | 0.002 | 0.000      | 0.050 |
| b      | 0.007      | 0.011 | 0.170      | 0.270 |
| b1     | 0.011      | 0.015 | 0.270      | 0.370 |
| c      | 0.003      | 0.008 | 0.080      | 0.200 |
| D      | 0.045      | 0.049 | 1.150      | 1.250 |
| E      | 0.045      | 0.049 | 1.150      | 1.250 |
| E1     | 0.030      | 0.033 | 0.750      | 0.850 |
| e      | 0.031 TYP. |       | 0.800 TYP. |       |
| θ      | 7° REF.    |       | 7° REF.    |       |

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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