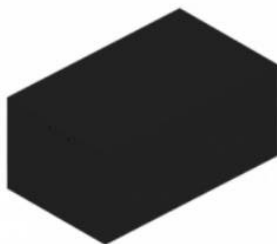


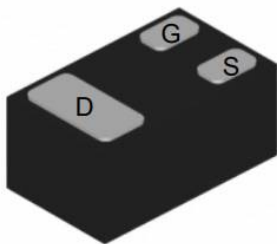
## YJA3139KA

## P-Channel Enhancement Mode Field Effect Transistor

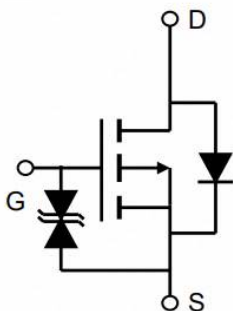
Top View



Bottom View



DFN1006-3L



## Product Summary

- $V_{DS}$  -20V
- $I_D$  -0.65A
- $R_{DS(ON)}$ ( at  $V_{GS}=-4.5V$ ) <850 mohm
- $R_{DS(ON)}$ ( at  $V_{GS}=-2.5V$ ) <1200 mohm
- $R_{DS(ON)}$ ( at  $V_{GS}=-1.8V$ ) <2000 mohm
- ESD Protected Up to 2.0KV (HBM)

## General Description

- Trench Power LV MOSFET technology
- High Density Cell Design for Low  $R_{DS(ON)}$
- High Speed switching

## Applications

- Interfacing, Logic switch
- Load switch
- Power management

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

| Parameter                                                          |                                | Symbol          | Maximum  | Unit          |
|--------------------------------------------------------------------|--------------------------------|-----------------|----------|---------------|
| Drain-source Voltage                                               |                                | $V_{DS}$        | -20      | V             |
| Gate-source Voltage                                                |                                | $V_{GS}$        | $\pm 12$ | V             |
| Drain Current                                                      | $T_A=25^{\circ}C$ Steady State | $I_D$           | -0.65    | A             |
|                                                                    | $T_A=70^{\circ}C$ Steady State |                 | -0.52    |               |
| Pulsed Drain Current <sup>A</sup>                                  |                                | $I_{DM}$        | -2.0     | A             |
| Total Power Dissipation @ $T_A=25^{\circ}C$ Steady State           |                                | $P_D$           | 0.9      | W             |
| Thermal Resistance Junction-to-Ambient @ Steady State <sup>B</sup> |                                | $R_{\theta JA}$ | 138      | $^{\circ}C/W$ |
| Junction and Storage Temperature Range                             |                                | $T_J, T_{STG}$  | -55~+150 | $^{\circ}C$   |

## ■ Ordering Information (Example)

| PREFERRED P/N | PACKING CODE | Marking | MINIMUM PACKAGE(pcs) | INNER BOX QUANTITY(pcs) | OUTER CARTON QUANTITY(pcs) | DELIVERY MODE |
|---------------|--------------|---------|----------------------|-------------------------|----------------------------|---------------|
| YJA3139KA     | F1           | 39      | 10000                | 100000                  | 400000                     | 7" reel       |

# YJA3139KA

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

| Parameter                             | Symbol              | Conditions                                                                                | Min   | Typ   | Max   | Units |
|---------------------------------------|---------------------|-------------------------------------------------------------------------------------------|-------|-------|-------|-------|
| <b>Static Parameter</b>               |                     |                                                                                           |       |       |       |       |
| 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, T <sub>C</sub> =25°C                          |       |       | -1    | μA    |
| Gate-Body Leakage Current             | I <sub>GSS</sub>    | V <sub>GS</sub> = ±10V, V <sub>DS</sub> =0V                                               |       | ±1.5  | ±10   | μA    |
|                                       |                     | V <sub>GS</sub> = ±8V, V <sub>DS</sub> =0V                                                |       | ±500  | ±2000 | nA    |
| Gate Threshold Voltage                | V <sub>GS(th)</sub> | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =-250μA                                | -0.35 | -0.62 | -1.2  | V     |
| Static Drain-Source On-Resistance     | R <sub>DS(on)</sub> | V <sub>GS</sub> = -4.5V, I <sub>D</sub> =-0.5A                                            |       | 580   | 850   | mΩ    |
|                                       |                     | V <sub>GS</sub> = -2.5V, I <sub>D</sub> =-0.3A                                            |       | 855   | 1200  |       |
|                                       |                     | V <sub>GS</sub> = -1.8V, I <sub>D</sub> =-0.2A                                            |       | 1350  | 2000  |       |
| Diode Forward Voltage                 | V <sub>SD</sub>     | I <sub>S</sub> =-0.65A, V <sub>GS</sub> =0V                                               |       | -0.8  | -1.2  | V     |
| Maximum Body-Diode Continuous Current | I <sub>S</sub>      |                                                                                           |       |       | -0.65 | A     |
| <b>Dynamic Parameters</b>             |                     |                                                                                           |       |       |       |       |
| Input Capacitance                     | C <sub>iss</sub>    | V <sub>DS</sub> =-10V, V <sub>GS</sub> =0V, f=1MHZ                                        |       | 71    |       | pF    |
| Output Capacitance                    | C <sub>oss</sub>    |                                                                                           |       | 20    |       |       |
| Reverse Transfer Capacitance          | C <sub>rss</sub>    |                                                                                           |       | 15    |       |       |
| Gate resistance                       | R <sub>g</sub>      | f=1MHz, Open Drain                                                                        |       | 85    |       | Ω     |
| <b>Switching Parameters</b>           |                     |                                                                                           |       |       |       |       |
| Total Gate Charge                     | Q <sub>g</sub>      | V <sub>GS</sub> =-4.5V, V <sub>DD</sub> =-10V, I <sub>D</sub> =-0.5A                      |       | 1.24  |       | nC    |
| Gate Source Charge                    | Q <sub>gs</sub>     |                                                                                           |       | 0.37  |       |       |
| Gate Drain Charge                     | Q <sub>gd</sub>     |                                                                                           |       | 0.27  |       |       |
| Reverse Recovery Chrage               | Q <sub>rr</sub>     | I <sub>F</sub> =-0.5A, di/dt=-20A/us                                                      |       | 0.97  |       | ns    |
| Reverse Recovery Time                 | t <sub>rr</sub>     |                                                                                           |       | 26    |       |       |
| Turn-on Delay Time                    | t <sub>D(on)</sub>  | V <sub>GS</sub> =-4.5V, V <sub>DD</sub> =-10V, R <sub>L</sub> =2.5Ω, R <sub>GEN</sub> =3Ω |       | 4     |       |       |
| Turn-on Rise Time                     | t <sub>r</sub>      |                                                                                           |       | 19    |       |       |
| Turn-off Delay Time                   | t <sub>D(off)</sub> |                                                                                           |       | 16    |       |       |
| Turn-off Fall Time                    | t <sub>f</sub>      |                                                                                           |       | 25    |       |       |

A. Pulse Test: Pulse Width≤300us, Duty cycle ≤2%.

B. The value of R<sub>θJA</sub> is measured with the device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=25°C. The Power dissipation P<sub>D</sub> is based on R<sub>θJA</sub> and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design, and the maximum temperature of 150°C may be used if the PCB allows it to.

## ■ Typical Performance Characteristics

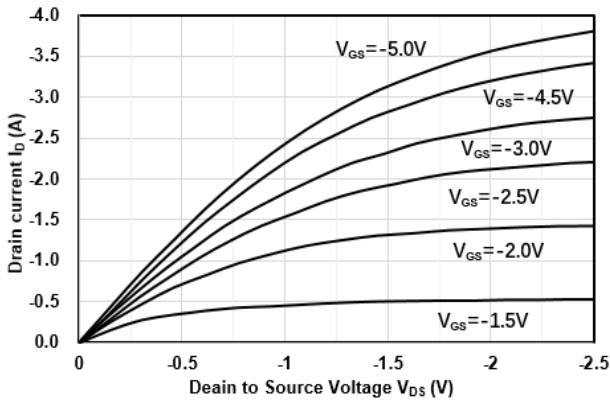


Figure1. Output Characteristics

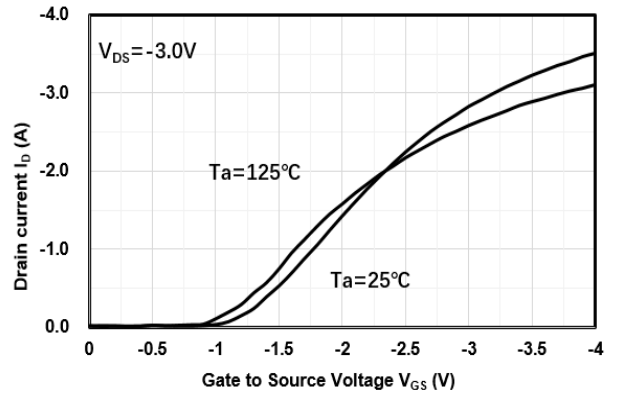


Figure2. Transfer Characteristics

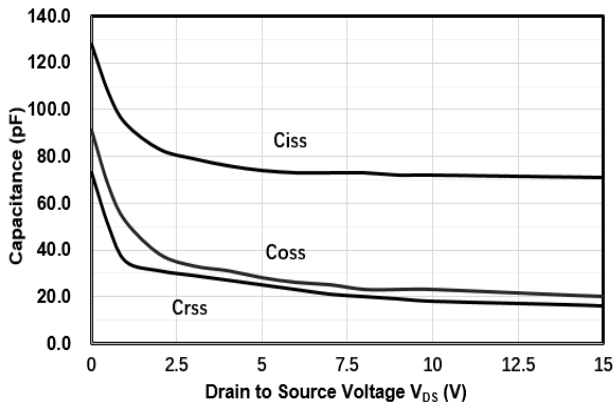


Figure3. Capacitance Characteristics

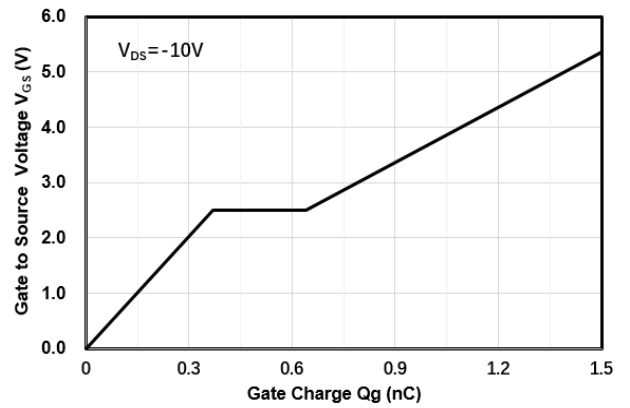


Figure4. Gate Charge

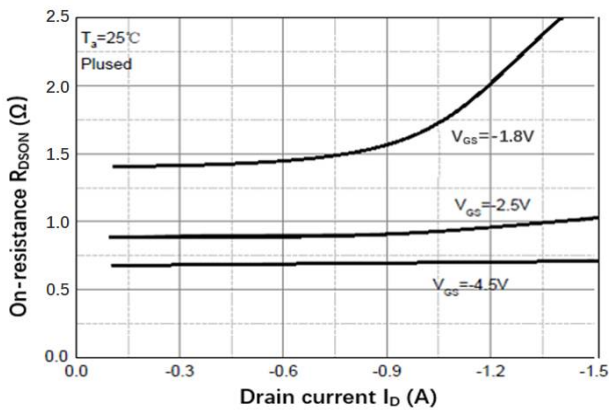


Figure5. Drain-Source on Resistance

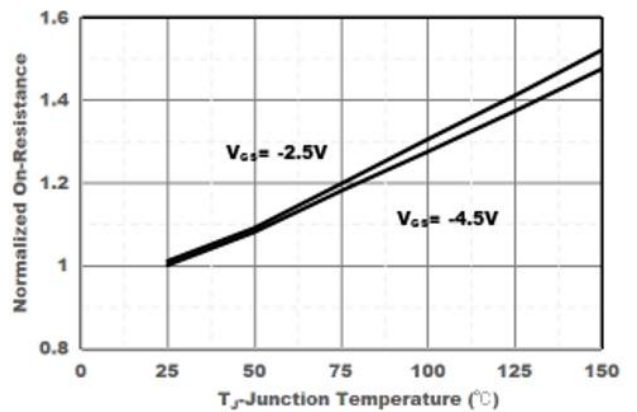


Figure6. Drain-Source on Resistance

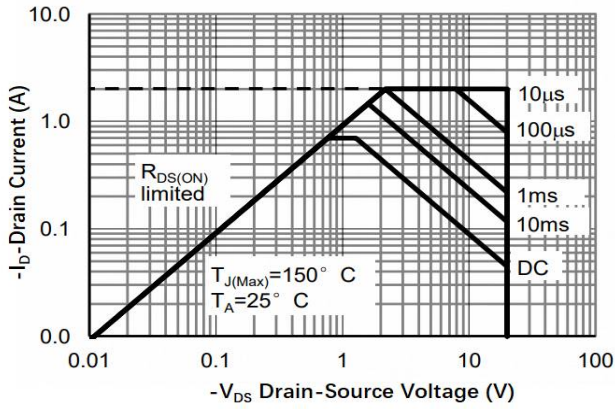


Figure7. Safe Operation Area

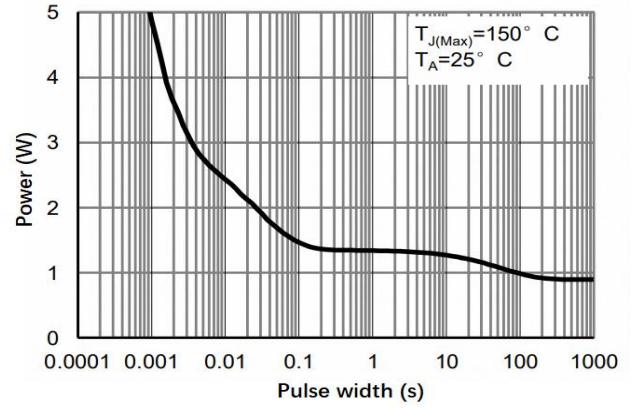


Figure8. Pulse Power Rating Junction-to Ambient

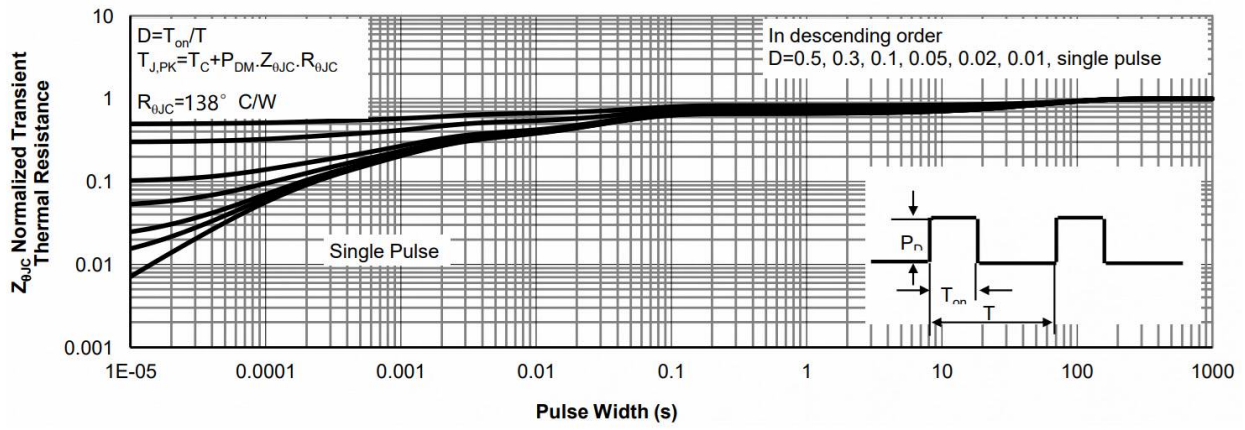
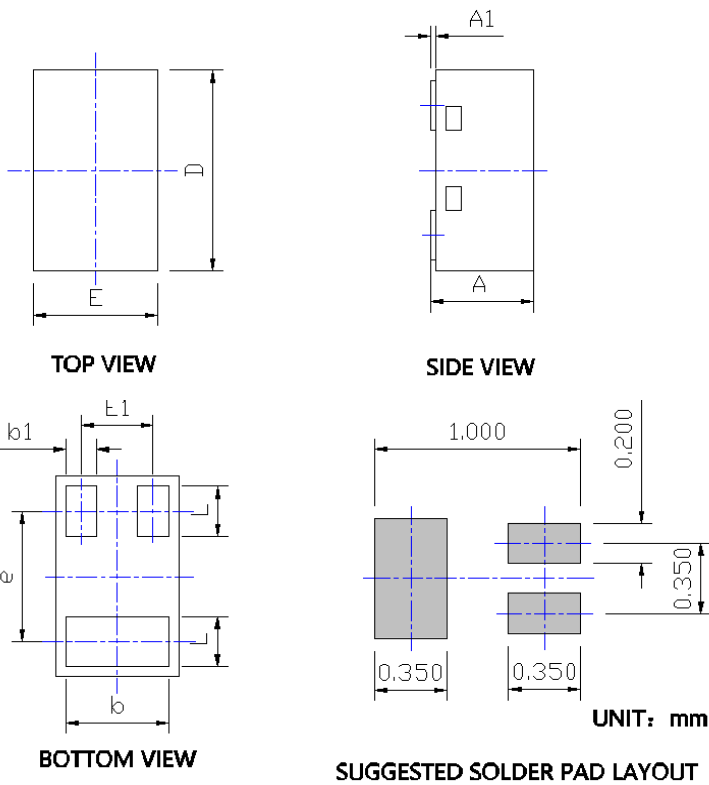


Figure9. Normalized Maximum Transient Thermal Impedance

## ■ DFN1006-3L Package information



| SYMBOL | DIMENSIONS |      |      |
|--------|------------|------|------|
|        | Millimeter |      |      |
|        | MIN.       | NOM. | MAX. |
| A      | 0.42       | ---  | 0.55 |
| A1     | 0.025REF   |      |      |
| b      | 0.45       | 0.50 | 0.55 |
| b1     | 0.10       | 0.15 | 0.20 |
| D      | 0.95       | 1.00 | 1.05 |
| E      | 0.55       | 0.60 | 0.65 |
| E1     | 0.35BSC    |      |      |
| e      | 0.65BSC    |      |      |
| L      | 0.20       | 0.25 | 0.30 |

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

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