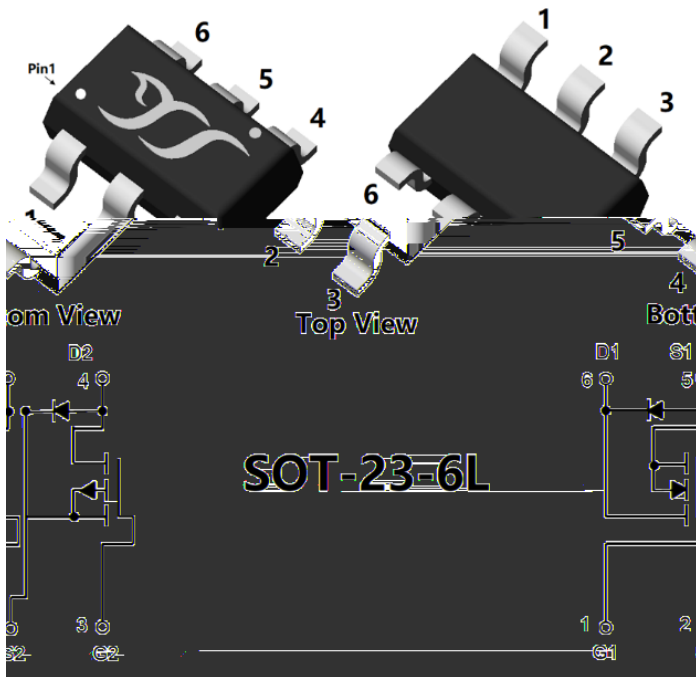


## N-Channel and P-Channel Complementary Power MOSFET



### Product Summary

#### NMOS(Die1)

|                                   |          |
|-----------------------------------|----------|
| $V_{DS}$                          | 20V      |
| $I_D$                             | 2.0A     |
| $R_{DS(ON)}$ ( at $V_{GS}=4.5V$ ) | <55 mohm |
| $R_{DS(ON)}$ ( at $V_{GS}=2.5V$ ) | <75 mohm |

#### PMOS(Die2)

|                                    |           |
|------------------------------------|-----------|
| $V_{DS}$                           | -20V      |
| $I_D$                              | -1.5A     |
| $R_{DS(ON)}$ ( at $V_{GS}=-4.5V$ ) | <120 mohm |
| $R_{DS(ON)}$ ( at $V_{GS}=-2.5V$ ) | <170 mohm |

### General Description

- Trench Power LV MOSFET technology
- High Density Cell Design for Low  $R_{DS(ON)}$
- High Speed switching
- Part no. with suffix "Q" means AEC-Q101 qualified

### Applications

- Interfacing, Logic switch
- Load switch
- Power management

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

| Parameter                                                       |                         | Symbol         | N-Channel | P-Channel | Unit                      |
|-----------------------------------------------------------------|-------------------------|----------------|-----------|-----------|---------------------------|
| Drain-source Voltage                                            |                         | $V_{DS}$       | 20        | -20       | V                         |
| Gate-source Voltage                                             |                         | $V_{GS}$       | $\pm 10$  | $\pm 10$  | V                         |
| Drain Current                                                   | $T_A=25^\circ\text{C}$  | $I_D$          | 2.0       | -1.5      | A                         |
|                                                                 | $T_A=100^\circ\text{C}$ |                | 1.3       | -1.0      |                           |
| Pulsed Drain Current <sup>A</sup>                               |                         | $I_{DM}$       | 12        | -12       | A                         |
| Total Power Dissipation <sup>B</sup>                            | $T_A=25^\circ\text{C}$  | $P_D$          | 595       | 568       | mW                        |
|                                                                 | $T_A=100^\circ\text{C}$ |                | 238       | 227       | mW                        |
| Thermal Resistance Junction-to-Case @ Steady State <sup>C</sup> |                         | $R_{JA}$       | 210       | 220       | $^\circ\text{C}/\text{W}$ |
| Junction and Storage Temperature Range                          |                         | $T_J, T_{STG}$ | -55~+150  | -55~+150  | $^\circ\text{C}$          |

### Ordering Information (Example)

| PREFERED P/N | PACKING CODE | Marking | MINIMUM PACKAGE(pcs) | INNER BOX QUANTITY(pcs) | OUTER CARTON QUANTITY(pcs) | DELIVERY MODE |
|--------------|--------------|---------|----------------------|-------------------------|----------------------------|---------------|
| YJJ2429AQ    | F2           | 2429    | 3000                 | 30000                   | 120000                     | 7" reel       |



# YJJ2429AQ

## N-MOS 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           | $BV_{DSS}$   | $V_{GS}=0V, I_D=250\mu A$              | 20  |      |           | V       |  |
| Zero Gate Voltage Drain Current          | $I_{DSS}$    | $V_{DS}=20V, V_{GS}=0V$                |     |      | 1         | $\mu A$ |  |
| Gate-Body Leakage Current                | $I_{GSS}$    | $V_{GS}=\pm 10V, V_{DS}=0V$            |     |      | $\pm 100$ | nA      |  |
| Gate Threshold Voltage                   | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$          | 0.5 | 0.75 | 1.1       | V       |  |
| Static Drain-Source On-Resistance        | $R_{DS(on)}$ | $V_{GS}=4.5V, I_D=1A$                  |     | 38   | 55        | m       |  |
|                                          |              | $V_{GS}=2.5V, I_D=0.6A$                |     | 50   | 75        |         |  |
| Diode Forward Voltage <sup>C</sup>       | $V_{SD}$     | $I_S=1A, V_{GS}=0V$                    |     | 0.85 | 1.2       | V       |  |
| Gate resistance                          | $R_G$        | $f=1\text{MHz}$                        | -   | 2.5  |           |         |  |
| <b>Dynamic Parameters <sup>B</sup></b>   |              |                                        |     |      |           |         |  |
| Input Capacitance                        | $C_{iss}$    | $V_{DS}=10V, V_{GS}=0V, f=1\text{MHz}$ |     | 186  |           | pF      |  |
| Output Capacitance                       | $C_{oss}$    |                                        |     |      | 33        |         |  |
| Reverse Transfer Capacitance             | $C_{rss}$    |                                        |     |      | 27        |         |  |
| <b>Switching Parameters <sup>B</sup></b> |              |                                        |     |      |           |         |  |

Total Gate Charge

$Q_g$

$V_{GS}$



# YJJ2429AQ

## P-MOS 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                                             |      |       | ±100 | nA    |
| Gate Threshold Voltage            | V <sub>GS(th)</sub> | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =-250μA                              | -0.3 | -0.65 | -1.0 | V     |
| Static Drain-Source On-Resistance | R <sub>DS(on)</sub> | V <sub>GS</sub> = -4.5V, I <sub>D</sub> =-1A                                            |      | 86    | 120  | m     |
|                                   |                     | V <sub>GS</sub> = -2.5V, I <sub>D</sub> =-0.6A                                          |      | 115   | 170  |       |
| Diode Forward Voltage             | V <sub>SD</sub>     | I <sub>S</sub> =-0.5A, V <sub>GS</sub> =0V                                              |      |       | -1.2 | V     |
| Gate resistance                   | R <sub>G</sub>      | f=1MHz                                                                                  | -    | 15    | -    |       |
| <b>Dynamic Parameters</b>         |                     |                                                                                         |      |       |      |       |
| Input Capacitance                 | C <sub>iss</sub>    | V <sub>DS</sub> =-10V, V <sub>GS</sub> =0V, f=1MHz                                      |      | 70    |      | pF    |
| Output Capacitance                | C <sub>oss</sub>    |                                                                                         |      | 19    |      |       |
| Reverse Transfer Capacitance      | C <sub>rss</sub>    |                                                                                         |      | 14    |      |       |
| <b>Switching Parameters</b>       |                     |                                                                                         |      |       |      |       |
| Total Gate Charge                 | Q <sub>g</sub>      | V <sub>GS</sub> =-4.5V, V <sub>DS</sub> =-10V, I <sub>D</sub> =-1.2A                    |      | 2.9   |      | nC    |
| Gate Source Charge                | Q <sub>gs</sub>     |                                                                                         |      | 0.65  |      |       |
| Gate Drain Charge                 | Q <sub>gd</sub>     |                                                                                         |      | 0.7   |      |       |
| Reverse Recovery Charge           | Q <sub>rr</sub>     | I <sub>SD</sub> =-1.2A, di/dt=60A/us                                                    |      | 0.9   |      |       |
| Reverse Recovery Time             | t <sub>rr</sub>     |                                                                                         |      | 5.4   |      |       |
| Turn-on Delay Time                | t <sub>D(on)</sub>  | V <sub>GS</sub> =-4.5V, V <sub>DS</sub> =-10V, I <sub>D</sub> =-1.2A, R <sub>g</sub> =3 |      | 4.8   |      | ns    |
| Turn-on Rise Time                 | t <sub>r</sub>      |                                                                                         |      | 22    |      |       |
| Turn-off Delay Time               | t <sub>D(off)</sub> |                                                                                         |      | 21    |      |       |
| Turn-off Fall Time                | t <sub>f</sub>      |                                                                                         |      | 28    |      |       |



## ■ N-MOS Typical Performance Characteristics

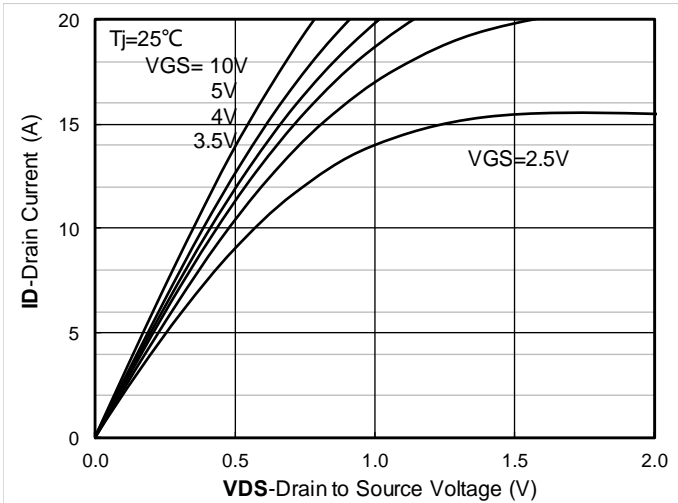


Figure1. Output Characteristics

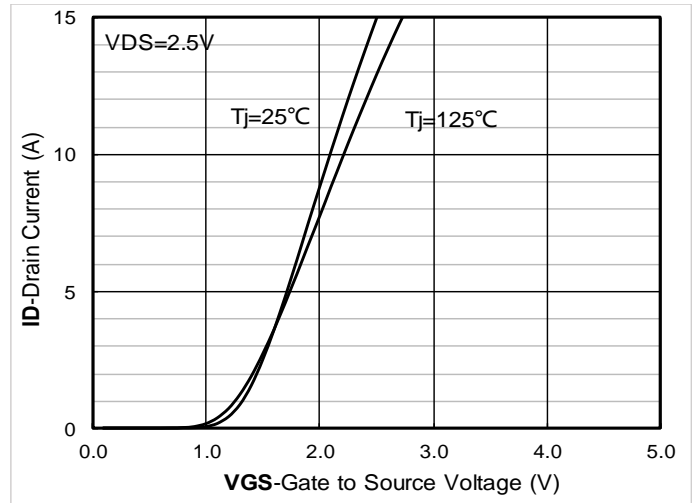


Figure2. Transfer Characteristics

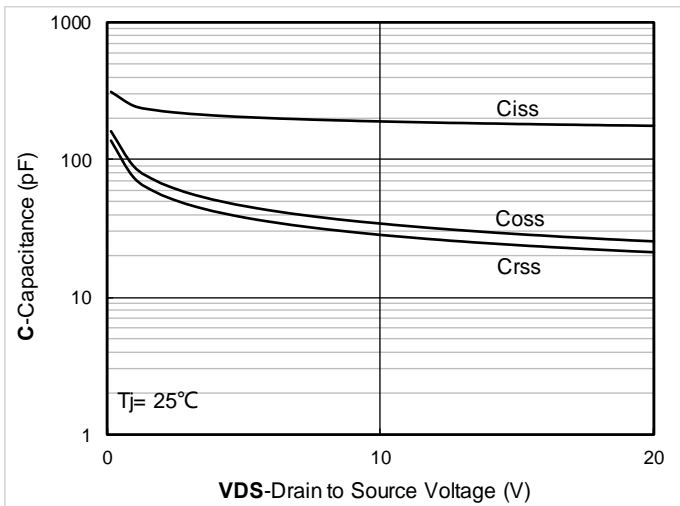


Figure3. Capacitance Characteristics

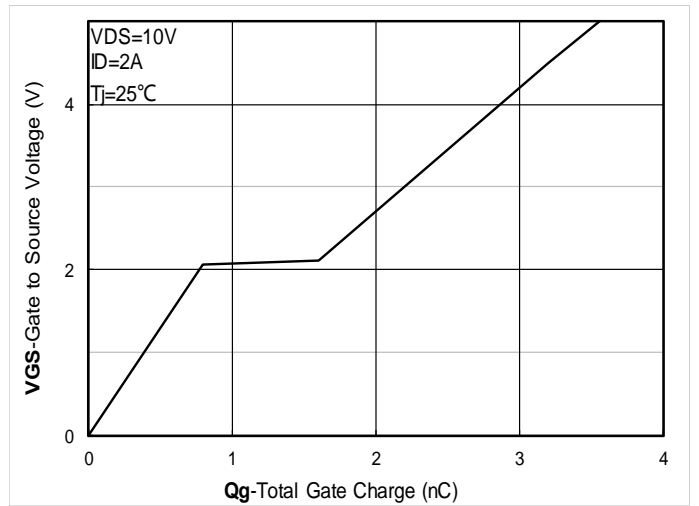


Figure4. Gate Charge

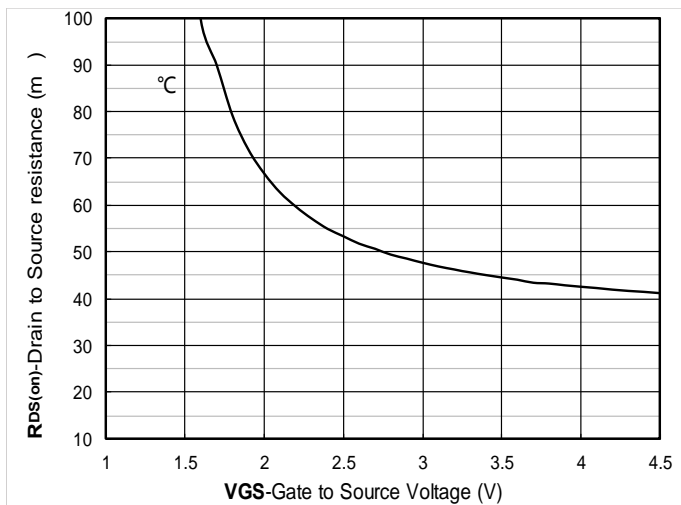


Figure5. On-Resistance vs Gate to Source Voltage

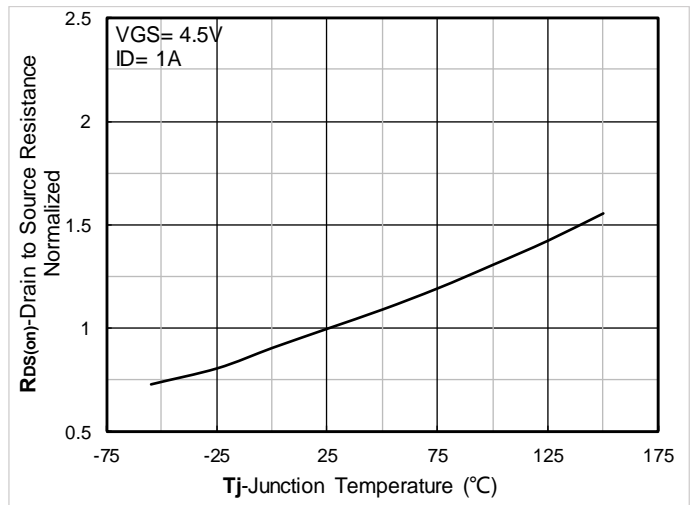


Figure6. Normalized On-Resistance

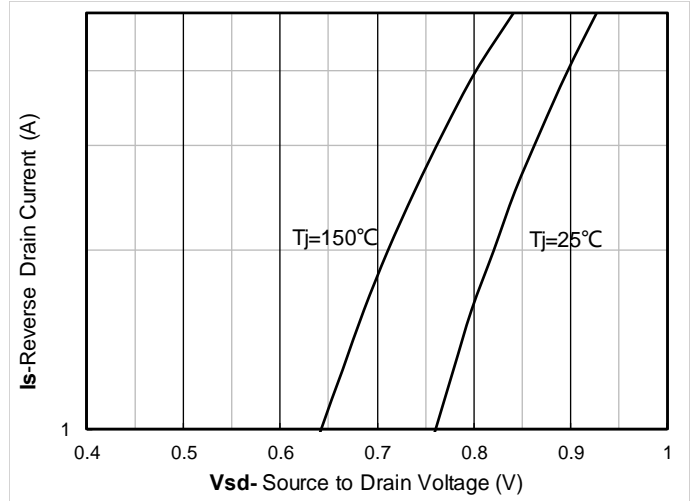
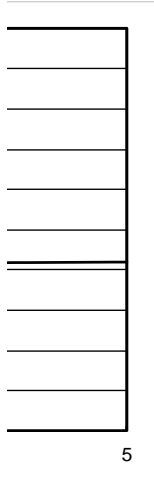


Figure 8. Forward characteristics of reverse diode

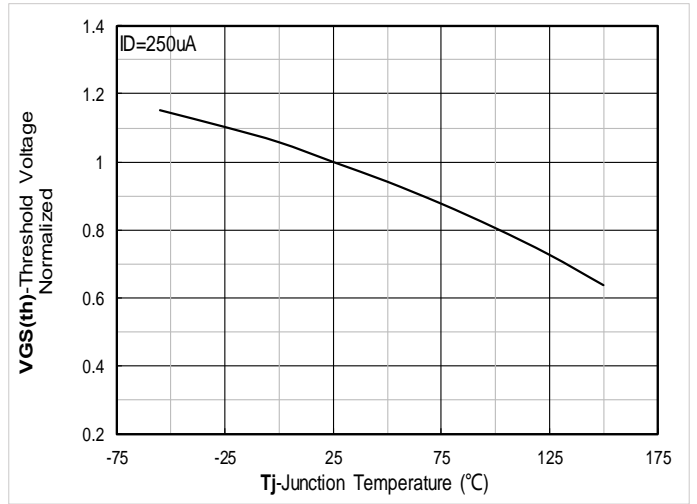
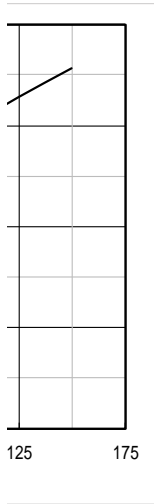


Figure 10. Normalized Threshold voltage

voltage



Impedance

Figure 12. Safe Operation Area



■ P-MOS Typical Performance Characteristics

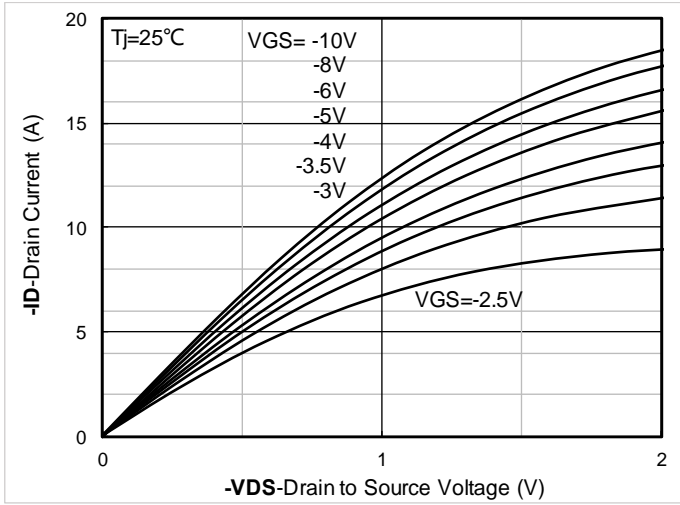


Figure1. Output Characteristics

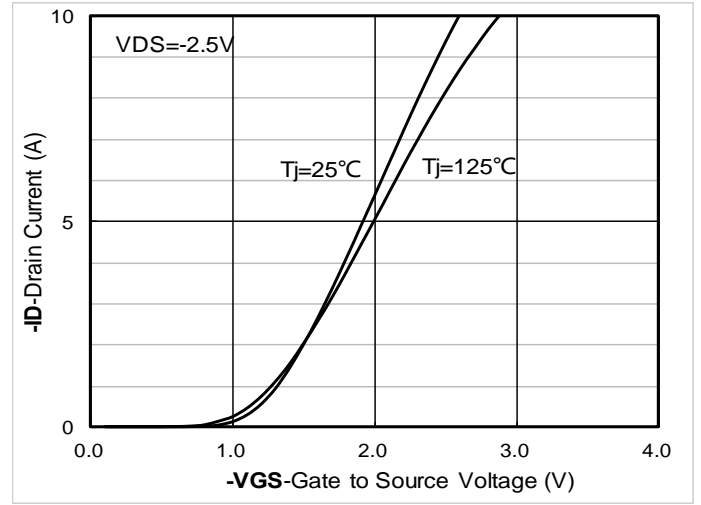


Figure2. Transfer Characteristics

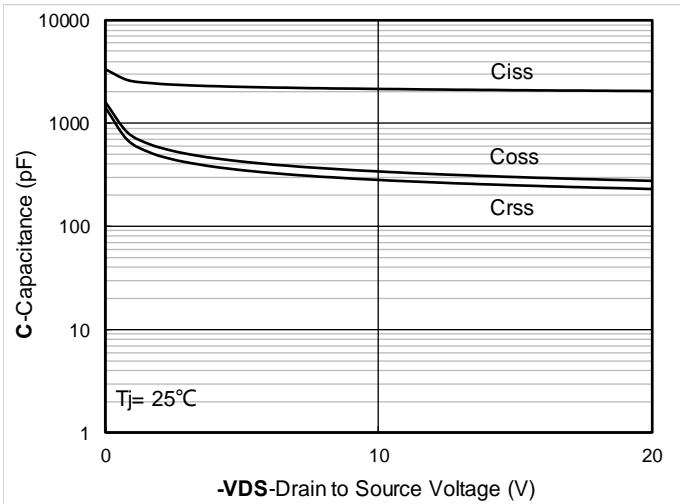


Figure3. Capacitance Characteristics

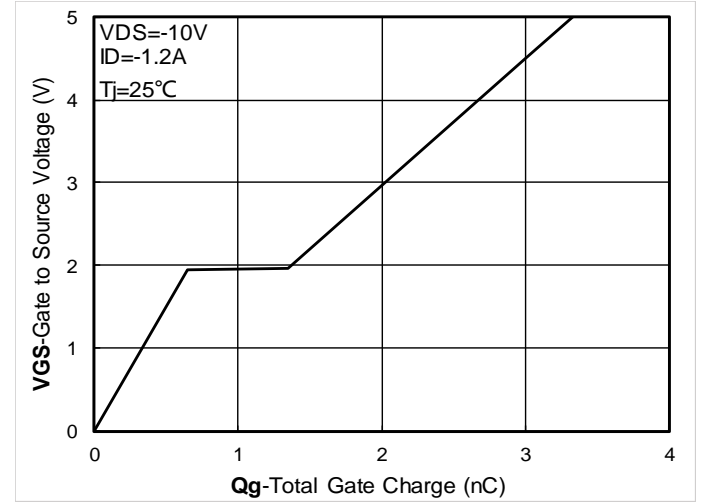


Figure4. Gate Charge

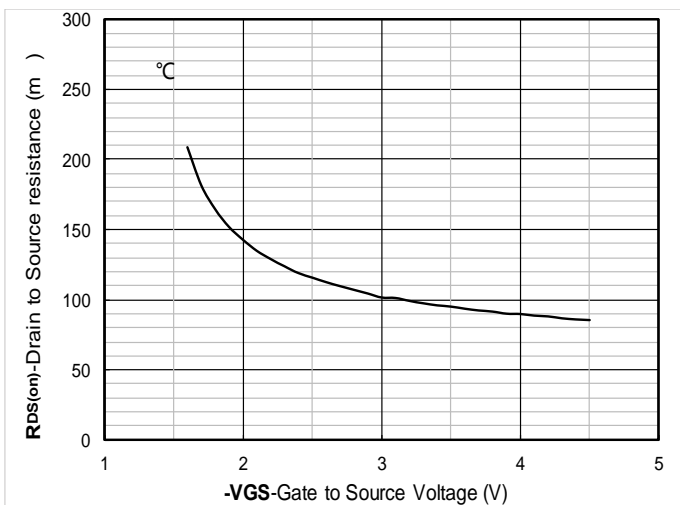


Figure5. On-Resistance vs Gate to Source Voltage

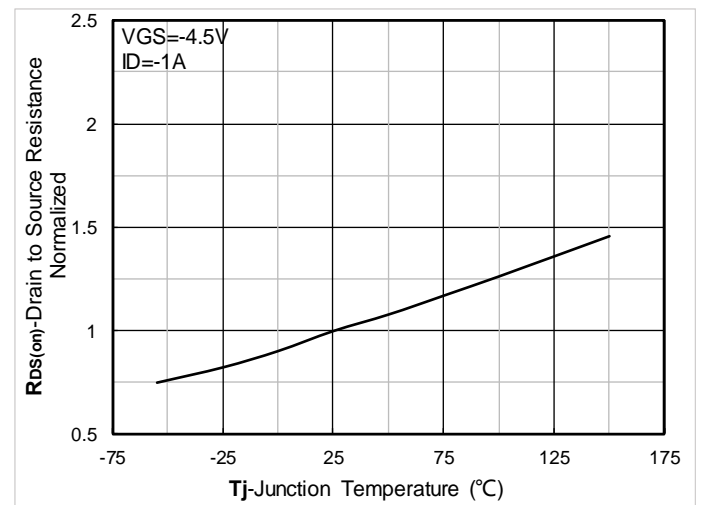


Figure6. Normalized On-Resistance



# YJJ2429AQ

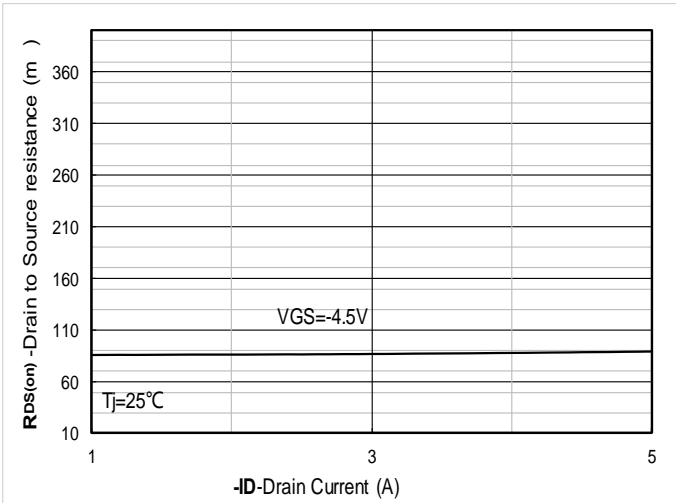


Figure 7. RDS(on) VS Drain Current

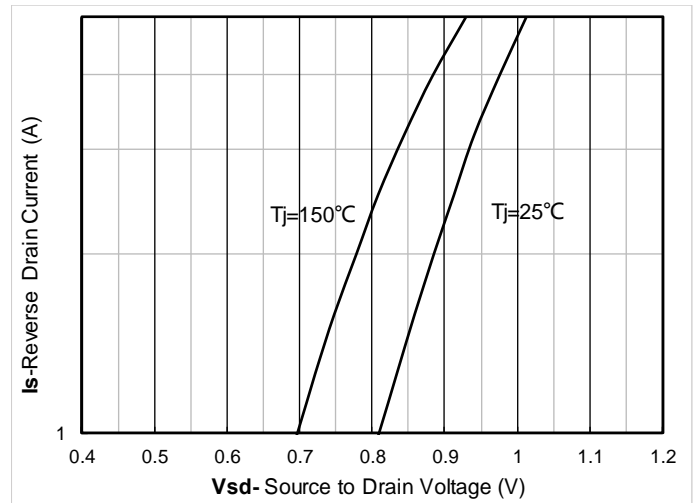


Figure 8. Forward characteristics of reverse diode

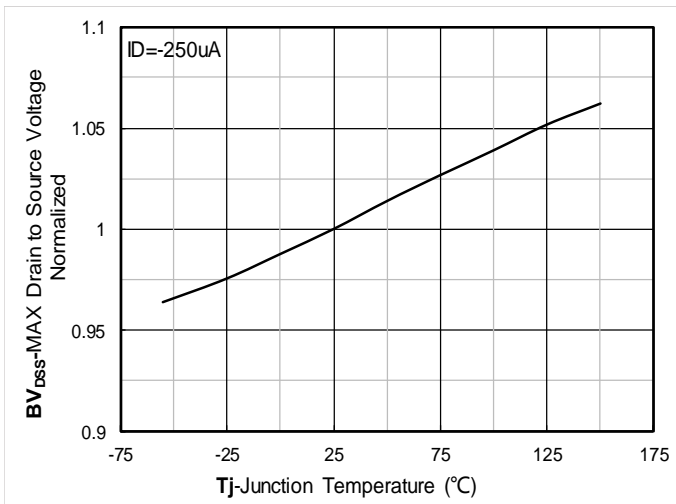


Figure 9. Normalized breakdown voltage

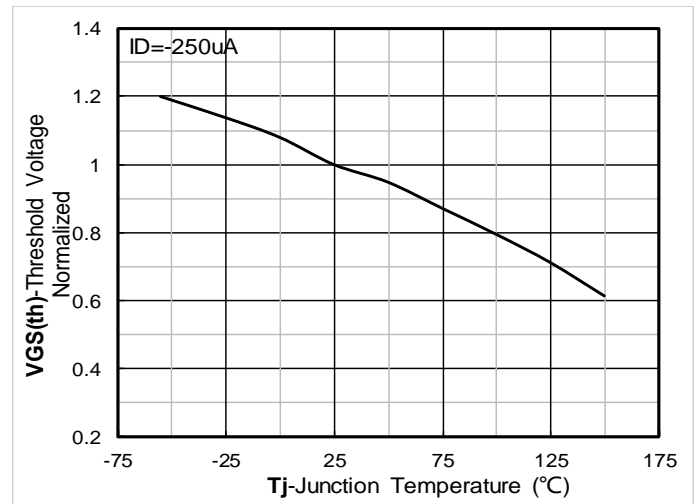


Figure 10. Normalized Threshold voltage

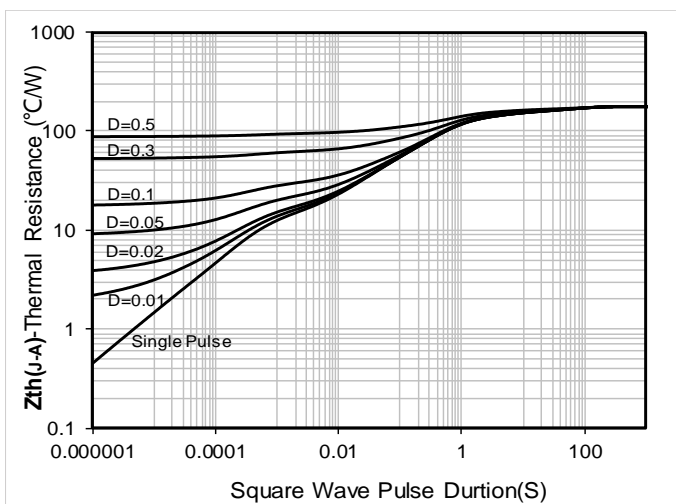


Figure 11. Maximum Transient Thermal Impedance

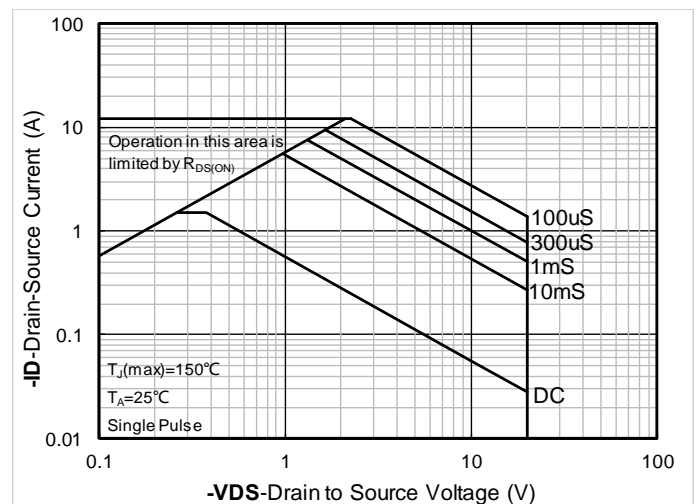
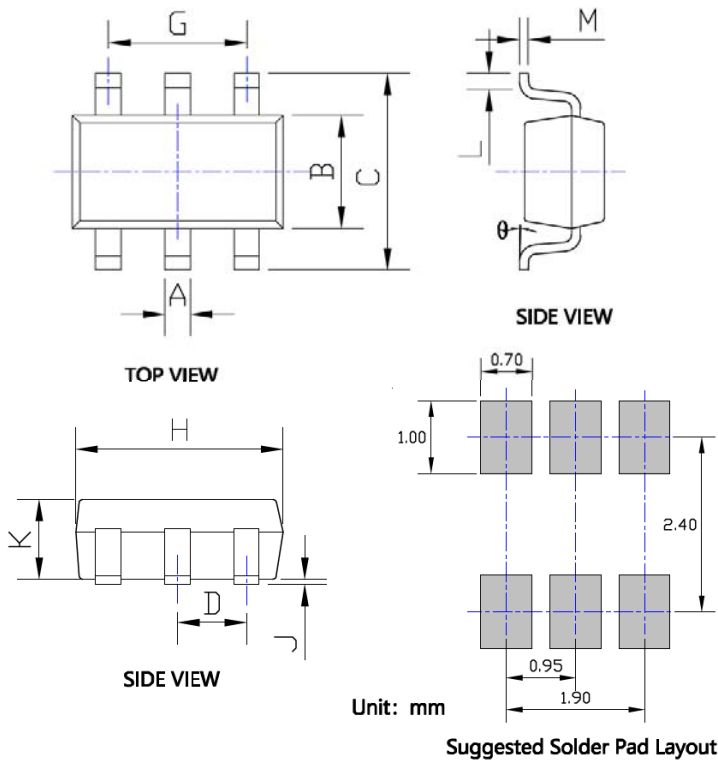


Figure 12. Safe Operation Area



# YJJ2429AQ

## SOT-23-6L Package Information



| SYMBOL   | DIMENSIONS |       |            |       |
|----------|------------|-------|------------|-------|
|          | INCHES     |       | Millimeter |       |
|          | MIN.       | MAX.  | MIN.       | MAX.  |
| A        | 0.012      | 0.020 | 0.300      | 0.500 |
| B        | 0.059      | 0.067 | 1.500      | 1.700 |
| C        | 0.104      | 0.116 | 2.650      | 2.950 |
| D        | 0.037BSC   |       | 0.950BSC   |       |
| G        | 0.075BSC   |       | 1.900BSC   |       |
| H        | 0.111      | 0.119 | 2.820      | 3.020 |
| J        | 0.000      | 0.004 | 0.000      | 0.100 |
| K        | 0.041      | 0.045 | 1.050      | 1.150 |
| L        | 0.012      | 0.024 | 0.300      | 0.600 |
| M        | 0.004      | 0.008 | 0.100      | 0.200 |
| $\theta$ | 0°         | 8°    | 0°         | 8°    |

- Note:**
1. Controlling dimension: in millimeters.
  2. General tolerance:  $\pm 0.05\text{mm}$ .
  3. The pad layout is for reference purposes only.





## YJJ2429AQ

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