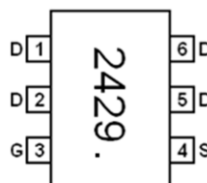
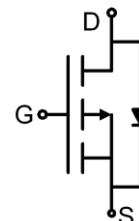


**Main Product Characteristics:**

|              |                      |
|--------------|----------------------|
| $V_{DSS}$    | -20V                 |
| $R_{DS(on)}$ | 29 m $\Omega$ (typ.) |
| $I_D$        | -5A                  |


**SOT23-6**

**Marking and Pin Assignment**

**Schematic Diagram**
**Features and Benefits:**

- Advanced trench MOSFET process technology
- Special designed for PWM, load switching and general purpose applications
- Ultra low on-resistance with low gate charge
- Fast switching and reverse body recovery
- 150°C operating temperature


**Description:**

It utilizes the latest trench processing techniques to achieve the high cell density and reduces the on-resistance with high repetitive avalanche rating. These features combine to make this design an extremely efficient and reliable device for use in power switching application and a wide variety of other applications

**Absolute Max Rating:**

| Symbol            | Parameter   | Max.        | Units |
|-------------------|---|-------------|-------|
| $I_D$ @ TC = 25°C | Continuous Drain Current, $V_{GS}$ @ 10V <sup>①</sup> | -5          | A     |
| $I_{DM}$          | Pulsed Drain Current <sup>②</sup>                     | -20         |       |
| $P_D$ @ TC = 25°C | Power Dissipation <sup>③</sup>                        | 1.4         | W     |
| $V_{DS}$          | Drain-Source Voltage                                  | -20         | V     |
| $V_{GS}$          | Gate-to-Source Voltage                                | ± 12        | V     |
| $T_J$ $T_{STG}$   | Operating Junction and Storage Temperature Range      | -55 to +150 | °C    |

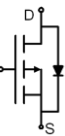
**Thermal Resistance**

| Symbol          | Characterizes                                     | Typ. | Max. | Units |
|-----------------|---|------|------|-------|
| $R_{\theta JA}$ | Junction-to-ambient ( $t \leq 10s$ ) <sup>④</sup> | —    | 90   | °C/W  |

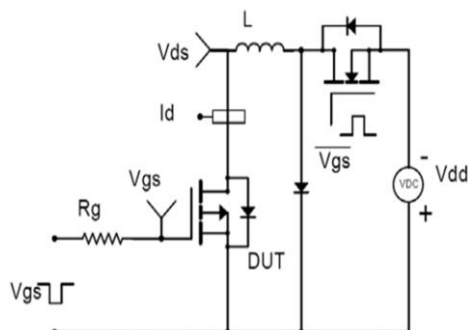
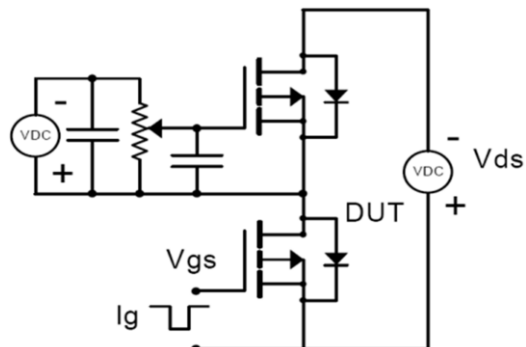
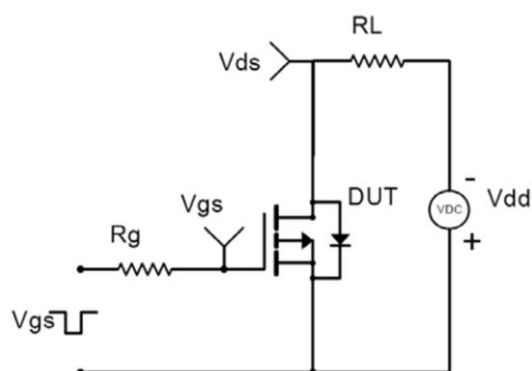
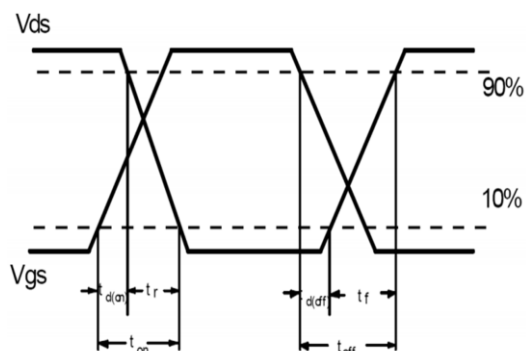
**Electrical Characterizes @ $T_A=25^{\circ}\text{C}$  unless otherwise specified**

| Symbol        | Parameter                            | Min. | Typ. | Max. | Units      | Conditions  |
|---------------|--------------------------------------|------|------|------|------------|---|
| $V_{(BR)DSS}$ | Drain-to-Source breakdown voltage    | -20  | —    | —    | V          | $V_{GS} = 0V, I_D = -250\mu A$                                  |
| $R_{DS(on)}$  | Static Drain-to-Source on-resistance | —    | 29   | 35   | m $\Omega$ | $V_{GS}=-4.5V, I_D = -5A$                                       |
|               |                                      | —    | 36   | 48   |            | $V_{GS}=-2.5V, I_D = -3A$                                       |
| $V_{GS(th)}$  | Gate threshold voltage               | -0.5 | —    | -1   | V          | $V_{DS} = V_{GS}, I_D = -250\mu A$                              |
| $I_{DSS}$     | Drain-to-Source leakage current      | —    | —    | -1   | $\mu A$    | $V_{DS} = -20V, V_{GS} = 0V$                                    |
| $I_{GSS}$     | Gate-to-Source forward leakage       | —    | —    | 100  | nA         | $V_{GS} = 12V$  |
|               |                                      | —    | —    | -100 |            | $V_{GS} = -12V$   |
| $Q_g$         | Total gate charge                    | —    | 12   | —    | nC         | $V_{DS}=-10V,$<br>$I_D=-4.5A,$<br>$V_{GS}=-5V$                  |
| $Q_{gs}$      | Gate-to-Source charge                | —    | 1.3  | —    |            |   |
| $Q_{gd}$      | Gate-to-Drain("Miller") charge       | —    | 3.5  | —    |            |   |
| $t_{d(on)}$   | Turn-on delay time                   | —    | 11   | —    | ns         | $V_{DD}=-10V, R_L=2.5\Omega$<br>$V_{GS}=-4.5V, R_{GEN}=3\Omega$ |
| $t_r$         | Rise time                            | —    | 10   | —    |            |   |
| $t_{d(off)}$  | Turn-Off delay time                  | —    | 17   | —    |            |   |
| $t_f$         | Fall time                            | —    | 22   | —    |            |   |
| $C_{iss}$     | Input capacitance                    | —    | 874  | —    | pF         | $V_{GS} = 0V$<br>$V_{DS} = -20V$<br>$f = 1.0MHz$                |
| $C_{oss}$     | Output capacitance                   | —    | 99   | —    |            |   |
| $C_{rss}$     | Reverse transfer capacitance         | —    | 86   | —    |            |   |

**Source-Drain Ratings and Characteristics**

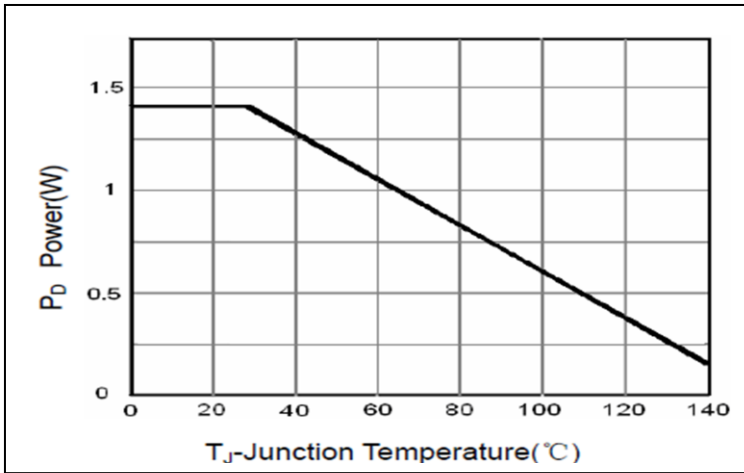
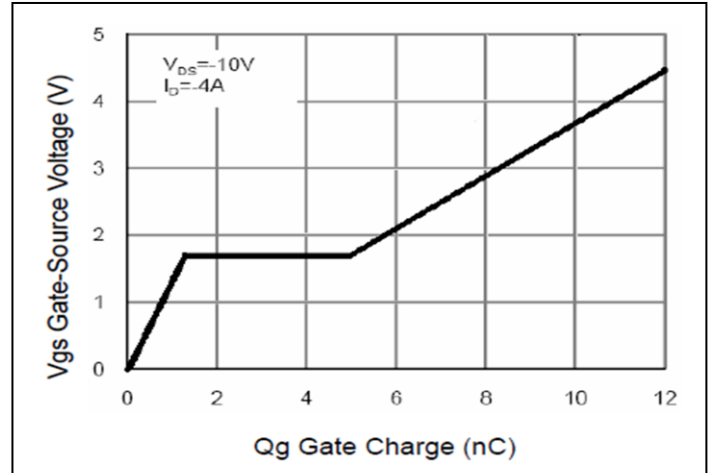
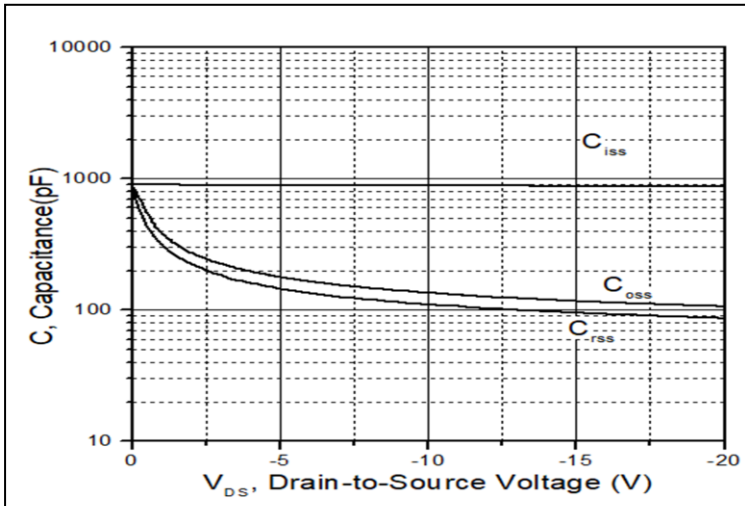
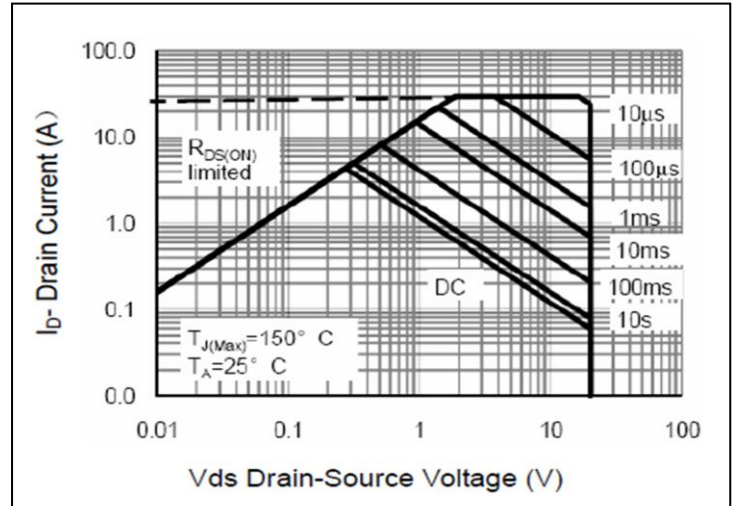
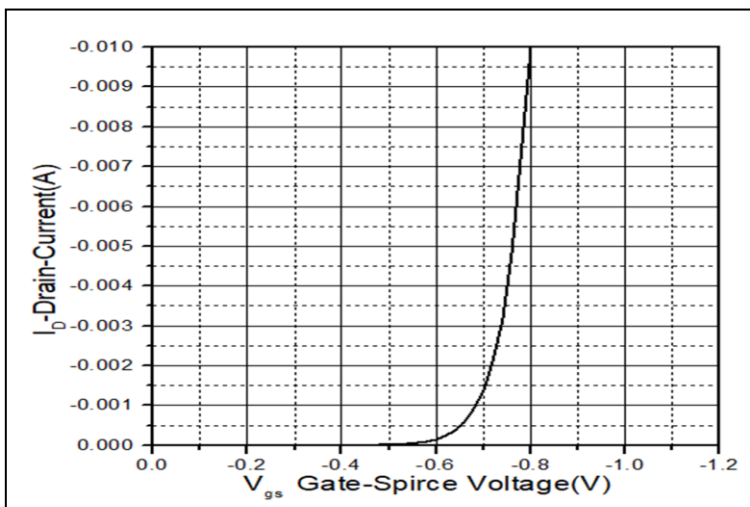
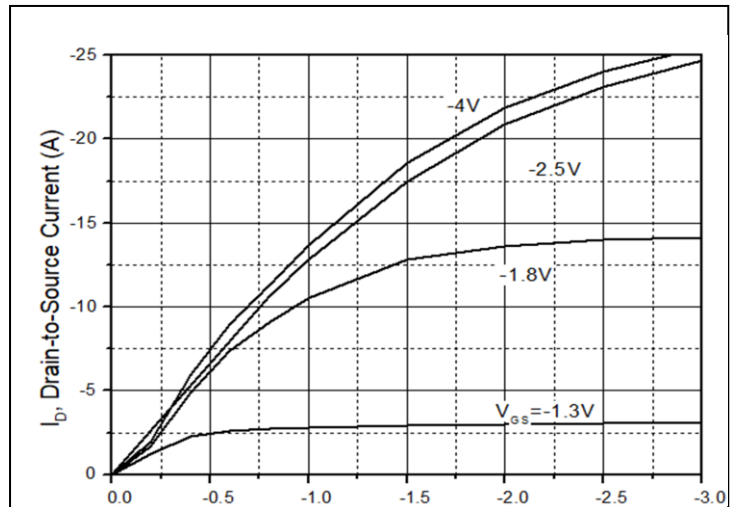
| Symbol   | Parameter                                 | Min. | Typ. | Max. | Units | Conditions   |
|----------|---|------|------|------|-------|--|
| $I_S$    | Continuous Source Current<br>(Body Diode) | —    | —    | -5   | A     | MOSFET symbol<br>showing the<br>integral reverse<br>p-n junction diode.<br> |
| $I_{SM}$ | Pulsed Source Current<br>(Body Diode)     | —    | —    | -20  | A     |  |
| $V_{SD}$ | Diode Forward Voltage                     | —    | -0.8 | -1.3 | V     | $I_S=-1.3A, V_{GS}=0V$   |

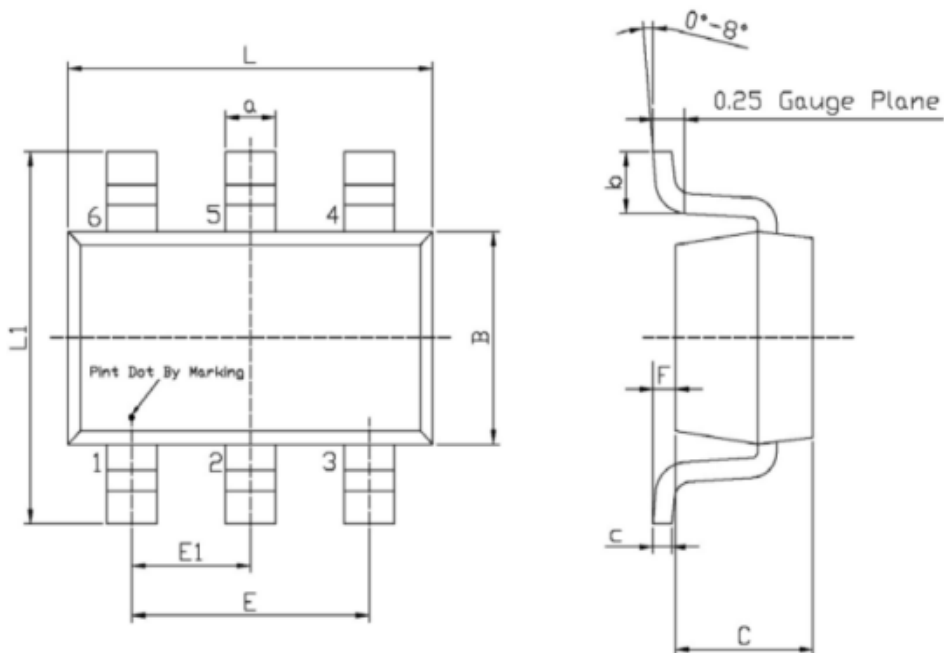
## Test Circuits and Waveforms

**EAS Test Circuit:**

**Gate Charge Test Circuit:**

**Switching Time Test Circuit:**

**Switching Waveforms:**


### Notes:

- ① The maximum current rating is limited by bond-wires.
- ② Repetitive rating; pulse width limited by max. junction temperature.
- ③ The power dissipation PD is based on max. junction temperature, using junction-to-case thermal resistance.
- ④ The value of  $R_{\theta JA}$  is measured with the device mounted on 1in 2 FR-4 board with 2oz. Copper, in a still air environment with  $T_A = 25^\circ\text{C}$

**Typical Electrical and Thermal Characteristics**

**Figure 1. Power Dissipation**

**Figure 2. Gate Charge**

**Figure 3. Capacitance Characteristics**

**Figure 4. Safe Operation Area**

**Figure 5. Transfer Characteristics**

**Figure 6. Typical Output Characteristics**

**Mechanical Data:**
**SOT-23-6L PACKAGE OUTLINE DIMENSION**


Unit: mm

| Symbol | Dimensions In Millimeters |      | Symbol | Dimensions In Millimeters |      |
|--------|---------------------------|------|--------|---------------------------|------|
|        | Min                       | Max  |        | Min                       | Max  |
| L      | 2.82                      | 3.02 | E1     | 0.85                      | 1.05 |
| B      | 1.50                      | 1.70 | a      | 0.35                      | 0.50 |
| C      | 0.90                      | 1.30 | c      | 0.10                      | 0.20 |
| L1     | 2.60                      | 3.00 | b      | 0.35                      | 0.55 |
| E      | 1.80                      | 2.00 | F      | 0                         | 0.15 |

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