



## 30V P-Channel Trench Power MOSFET

### General Description

The SJP9435 uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as -4.5V. This device is suitable for use as a wide variety of applications.

### Features

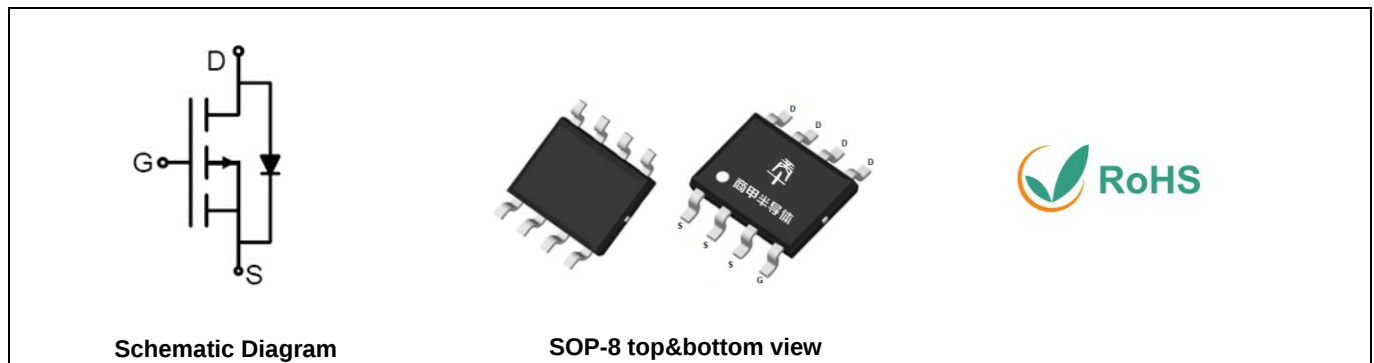
- Low Gate Charge
- High Power and current handling capability
- Lead free product is acquired

### Application

- PWM Applications
- Load Switch
- Power Management

### Key Performance Parameters

| Parameter         | Value | Unit       |
|-------------------|-------|------------|
| $V_{DS}$          | -30   | V          |
| $R_{DS(ON\_TYP)}$ | 41    | m $\Omega$ |
| $I_D$             | -4.6  | A          |
| $Q_G$             | 9     | nC         |



### Package Marking and Ordering Information

| Device/Ordering Code | Marking | Package | Packing | Reel Size | Tape width | Quantity |
|----------------------|---------|---------|---------|-----------|------------|----------|
| SJP9435              | SJP9435 | SOP-8   | Tape    | \         | \          | 4000 Pcs |

**Table 1. Absolute Maximum Ratings ( $T_A=25^{\circ}\text{C}$  unless otherwise noted)**

| Symbol           | Parameter                                              | Limit      | Unit               |
|------------------|--------------------------------------------------------|------------|--------------------|
| $V_{DS}$         | Drain-Source Voltage ( $V_{GS}=0\text{V}$ )            | -30        | V                  |
| $V_{GS}$         | Gate-Source Voltage ( $V_{DS}=0\text{V}$ )             | $\pm 20$   | V                  |
| $I_D$            | Drain Current-Continuous( $T_A=25^{\circ}\text{C}$ )   | -4.6       | A                  |
|                  | Drain Current-Continuous( $T_A=100^{\circ}\text{C}$ )  | -2.9       | A                  |
| $I_{DM}$ (pluse) | Drain Current-Continuous@ Current-Pulsed (Note 1)      | -18.4      | A                  |
| $P_D$            | Maximum Power Dissipation( $T_A=25^{\circ}\text{C}$ )  | 1.71       | W                  |
|                  | Maximum Power Dissipation( $T_A=100^{\circ}\text{C}$ ) | 0.7        | W                  |
| $E_{AS}$         | Avalanche energy (Note 2)                              | 20         | mJ                 |
| $T_J, T_{STG}$   | Operating Junction and Storage Temperature Range       | -55 To 150 | $^{\circ}\text{C}$ |

**Table 2. Thermal Characteristic**

| Symbol          | Parameter                               | Typ | Max | Unit                 |
|-----------------|-----------------------------------------|-----|-----|----------------------|
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient |     | 73  | $^{\circ}\text{C/W}$ |



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**Table 3. Electrical Characteristics ( $T_J=25^{\circ}\text{C}$  unless otherwise noted)**

| Symbol                             | Parameter                         | Conditions                                                                                  | Min | Typ | Max  | Unit |
|------------------------------------|-----------------------------------|---------------------------------------------------------------------------------------------|-----|-----|------|------|
| On/Off States                      |                                   |                                                                                             |     |     |      |      |
| BV <sub>DSS</sub>                  | Drain-Source Breakdown Voltage    | V <sub>GS</sub> =0V I <sub>D</sub> =250μA                                                   | -30 |     |      | V    |
| I <sub>DSS</sub>                   | Zero Gate Voltage Drain Current   | V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V T <sub>J</sub> =25℃                              |     |     | 1    | μA   |
|                                    |                                   | V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V T <sub>J</sub> =125℃                             |     |     | 100  | μA   |
| I <sub>GSS</sub>                   | Gate-Body Leakage Current         | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V                                                  |     |     | ±100 | μA   |
| V <sub>GS(th)</sub>                | Gate Threshold Voltage            | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                                    | -1  |     | -2.5 | V    |
| g <sub>FS</sub>                    | Forward Transconductance          | V <sub>DS</sub> =-5V, I <sub>D</sub> =-2A                                                   |     | 4   |      | S    |
| R <sub>DS(ON)</sub>                | Drain-Source On-State Resistance  | V <sub>GS</sub> =-10V, I <sub>D</sub> =-2A T <sub>J</sub> =25℃                              |     | 41  | 51.3 | mΩ   |
| R <sub>DS(ON)</sub>                | Drain-Source On-State Resistance  | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-1.5A T <sub>J</sub> =25℃                           |     | 56  | 74.5 | mΩ   |
| Dynamic Characteristics            |                                   |                                                                                             |     |     |      |      |
| C <sub>iss</sub>                   | Input Capacitance                 | V <sub>DS</sub> =-15V,V <sub>GS</sub> =0V,<br>f=1.0MHz                                      |     | 457 |      | pF   |
| C <sub>oss</sub>                   | Output Capacitance                |                                                                                             |     | 59  |      | pF   |
| C <sub>rss</sub>                   | Reverse Transfer Capacitance      |                                                                                             |     | 47  |      | pF   |
| R <sub>g</sub>                     | Gate resistance                   | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1.0MHz                                          |     | 6.4 |      | Ω    |
| Switching Parameters               |                                   |                                                                                             |     |     |      |      |
| t <sub>d(on)</sub>                 | Turn-on Delay Time                | V <sub>GS</sub> =-10V, V <sub>DS</sub> =-15V,<br>R <sub>L</sub> =7.5Ω, R <sub>GEN</sub> =3Ω |     | 3   |      | nS   |
| t <sub>r</sub>                     | Turn-on Rise Time                 |                                                                                             |     | 2   |      | nS   |
| t <sub>d(off)</sub>                | Turn-Off Delay Time               |                                                                                             |     | 25  |      | nS   |
| t <sub>f</sub>                     | Turn-Off Fall Time                |                                                                                             |     | 15  |      | nS   |
| Q <sub>g</sub>                     | Total Gate Charge                 | V <sub>GS</sub> =-10V, V <sub>DS</sub> =-15V, I <sub>D</sub> =-2A                           |     | 11  |      | nC   |
| Q <sub>gs</sub>                    | Gate-Source Charge                |                                                                                             |     | 2   |      | nC   |
| Q <sub>gd</sub>                    | Gate-Drain Charge                 |                                                                                             |     | 2   |      | nC   |
| Source-Drain Diode Characteristics |                                   |                                                                                             |     |     |      |      |
| I <sub>SD</sub>                    | Source-Drain Current (Body Diode) |                                                                                             |     |     | -4.6 | A    |
| V <sub>SD</sub>                    | Forward on Voltage (Note 3)       | V <sub>GS</sub> =0V, I <sub>S</sub> =-2A                                                    |     |     | 1.2  | V    |
| t <sub>rr</sub>                    | Reverse Recovery Time             | I <sub>F</sub> =-2A, dI/dt=100A/μs                                                          |     | 9   |      | ns   |
| Q <sub>rr</sub>                    | Reverse Recovery Charge           | I <sub>F</sub> =-2A, dI/dt=100A/μs                                                          |     | 3   |      | nC   |

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature.

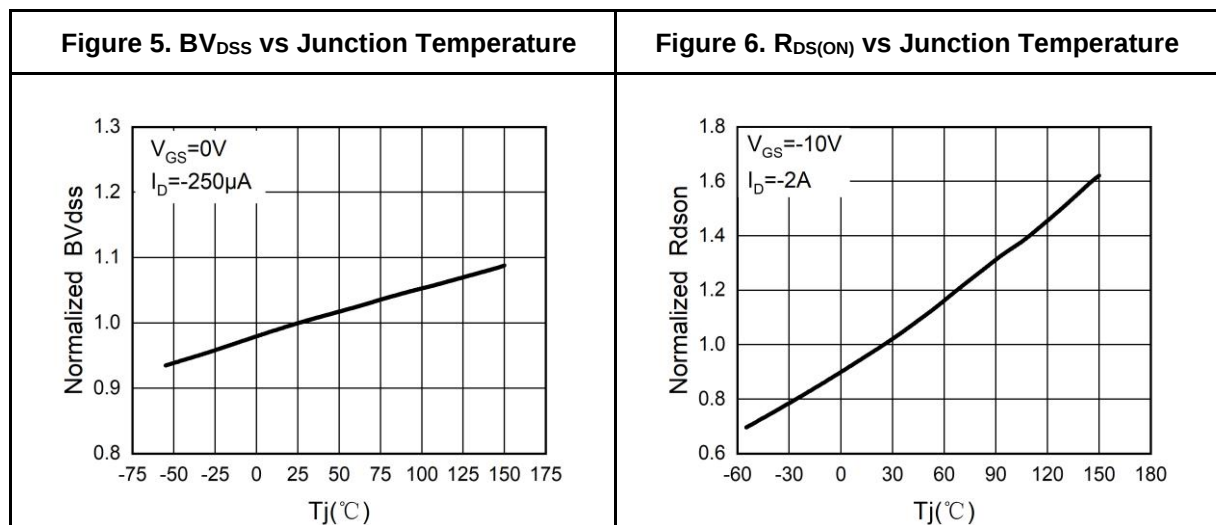
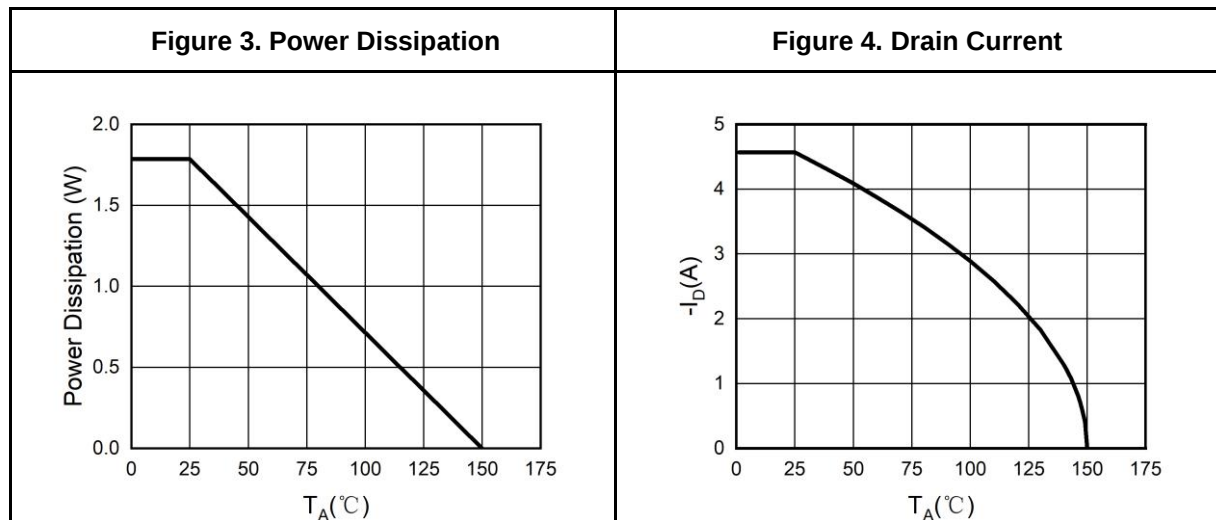
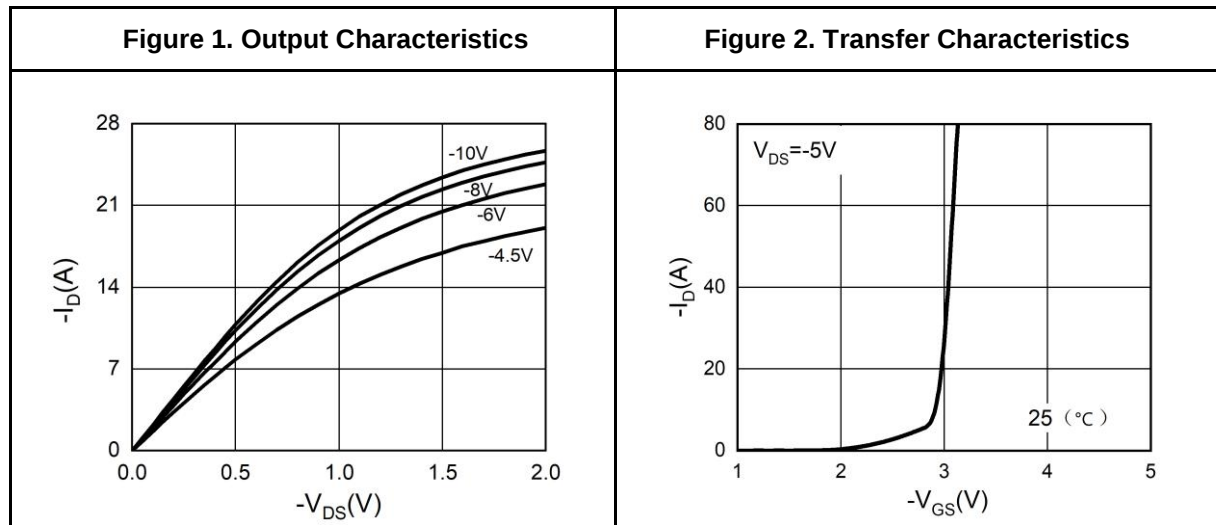
Notes 2.EAS condition:  $T_J=25^{\circ}\text{C}, V_{DD}=-25V, V_G=10V, R_g=25\Omega, L=0.5\text{mH}$ .

Notes 3.Repetitive Rating: Pulse width limited by maximum junction temperature.



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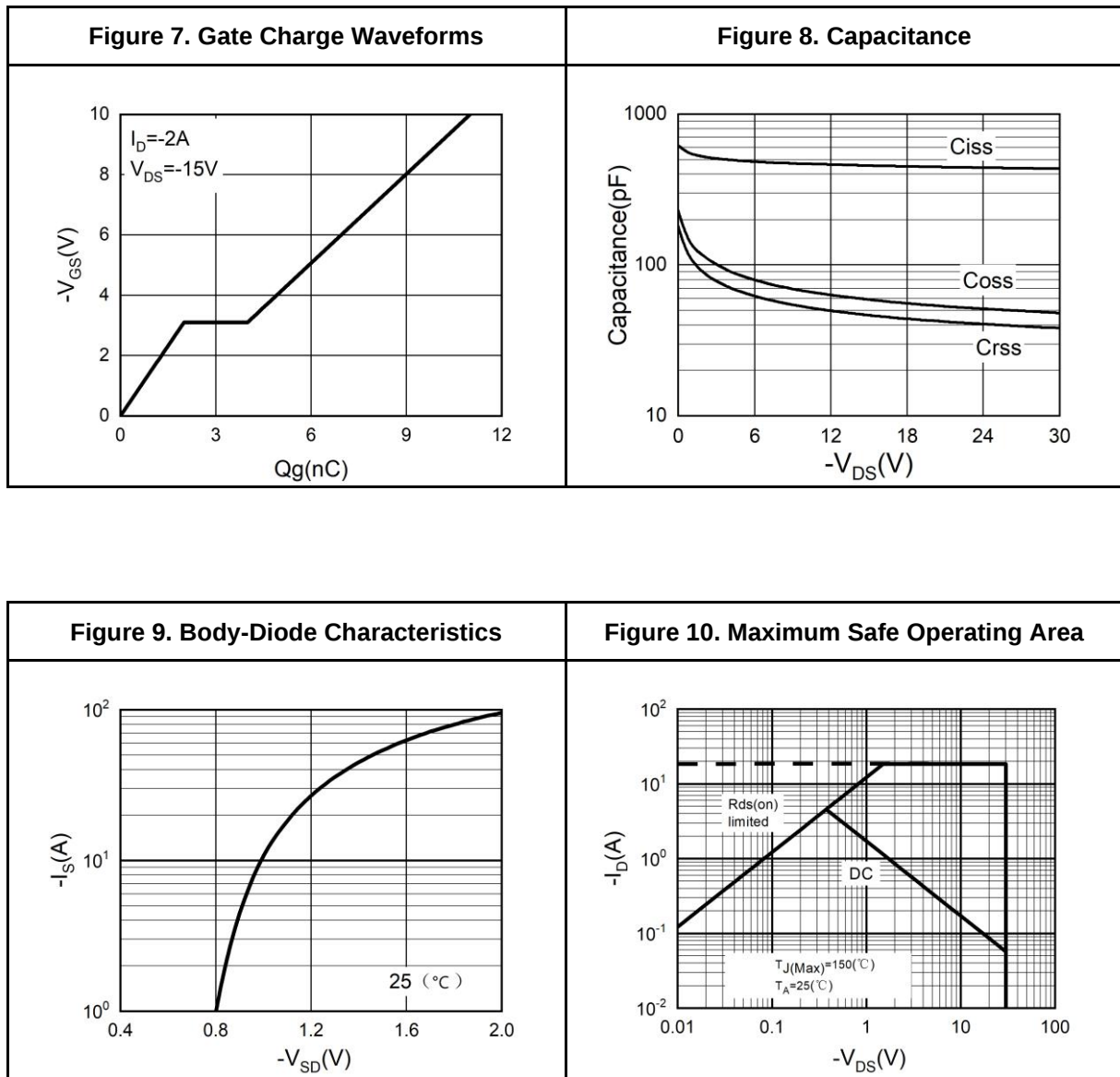
### Typical Electrical And Thermal Characteristics (Curves)





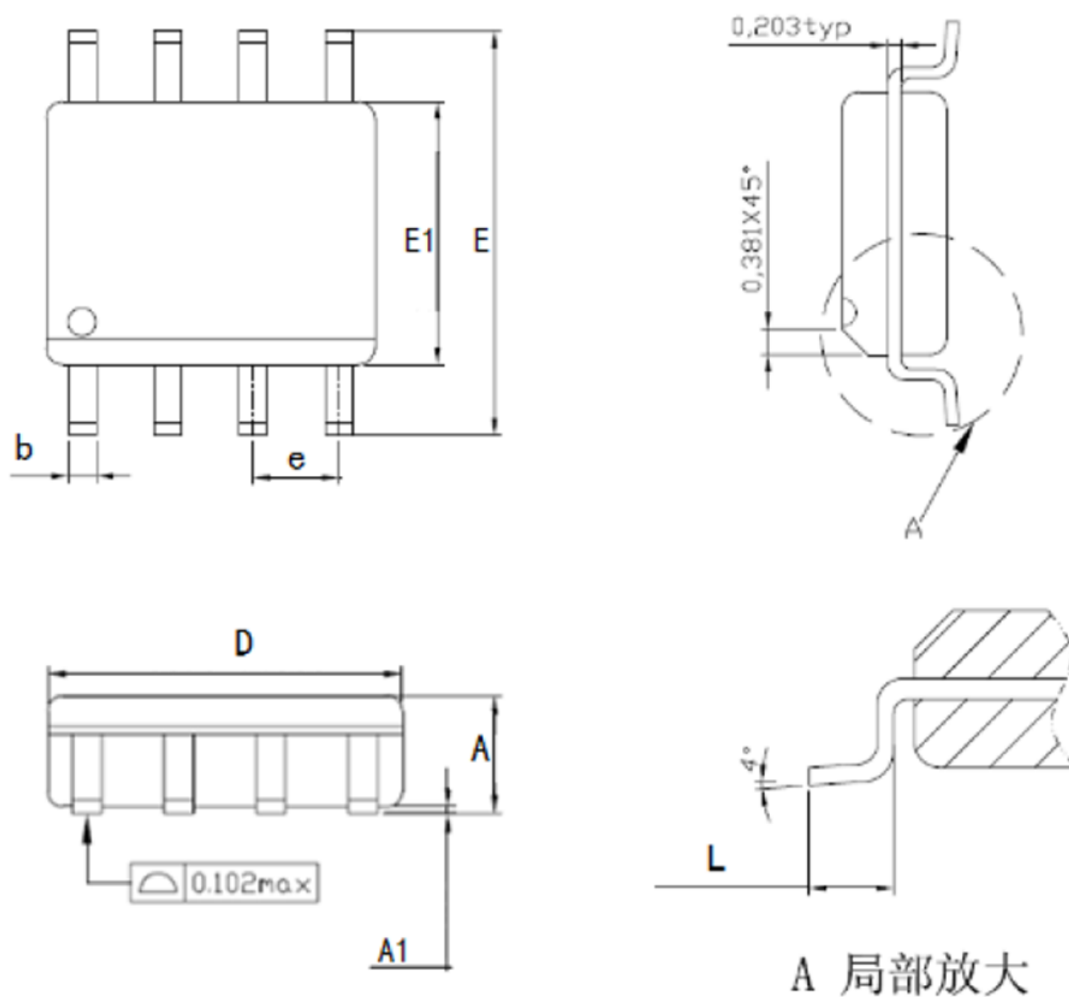
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### Typical Electrical And Thermal Characteristics (Curves)





SOP-8 Package Information



| Symbol | Dimensions In Millimeters |       |       |
|--------|---------------------------|-------|-------|
|        | Min.                      | Nom.  | Max   |
| A      | 1.35                      | 1.55  | 1.75  |
| A1     | 0.1                       | 0.15  | 0.2   |
| b      | 0.346                     | 0.406 | 0.466 |
| D      | 4.8                       | 4.89  | 4.98  |
| E      | 5.75                      | 6.00  | 6.25  |
| E1     | 3.81                      | 3.90  | 3.99  |
| e      | 1.27TYP                   |       |       |
| L      | 0.406                     | 0.838 | 1.27  |



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### Attention

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