



## 30V P-Channel Trench Power MOSFET

### General Description

The SJS3407C 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

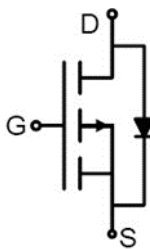
- Low Gate Charge
- High Power and current handling capability
- Lead free product is acquired

### Application

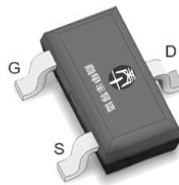
- PWM Applications
- Load Switch
- Power Management

### Key Performance Parameters

| Parameter         | Value | Unit       |
|-------------------|-------|------------|
| $V_{DS}$          | -30   | V          |
| $R_{DS(ON\_TYP)}$ | 43.4  | m $\Omega$ |
| $I_D$             | -3.7  | A          |
| $Q_G$             | 11    | nC         |



Schematic Diagram



SOT-23 top view



### Package Marking and Ordering Information

| Device/Ordering Code | Marking | Package | Packing | Reel Size | Tape width | Quantity |
|----------------------|---------|---------|---------|-----------|------------|----------|
| SJS3407C             | 3407C   | SOT-23  | Tape    | \         | \          | 3000 Pcs |

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

| Symbol           | Parameter                                            | Limit      | Unit             |
|------------------|------------------------------------------------------|------------|------------------|
| $V_{DS}$         | Drain-Source Voltage ( $V_{GS}=0V$ )                 | -30        | V                |
| $V_{GS}$         | Gate-Source Voltage ( $V_{DS}=0V$ )                  | $\pm 20$   | V                |
| $I_D$            | Drain Current-Continuous( $T_A=25^\circ\text{C}$ )   | -3.7       | A                |
|                  | Drain Current-Continuous( $T_A=100^\circ\text{C}$ )  | -2.4       | A                |
| $I_{DM}$ (pluse) | Drain Current-Continuous@ Current-Pulsed (Note 1)    | -14.8      | A                |
| $P_D$            | Maximum Power Dissipation( $T_A=25^\circ\text{C}$ )  | 1.2        | W                |
|                  | Maximum Power Dissipation( $T_A=100^\circ\text{C}$ ) | 0.5        | 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 |     | 103 | $^\circ\text{C/W}$ |



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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°C                             |     |      | 1    | μA   |
|                                    |                                            | V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V T <sub>J</sub> =125°C                            |     |      | 100  | μA   |
| I <sub>GSS</sub>                   | Gate-Body Leakage Current                  | V <sub>GS</sub> =±10V, V <sub>DS</sub> =0V                                                  |     |      | ±10  | 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°C                             |     | 43.4 | 54.3 | 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°C                          |     | 58.8 | 78.2 | 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)          |                                                                                             |     |      | -3.7 | A    |
| V <sub>SD</sub>                    | Forward on Voltage <small>(Note 3)</small> | 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.

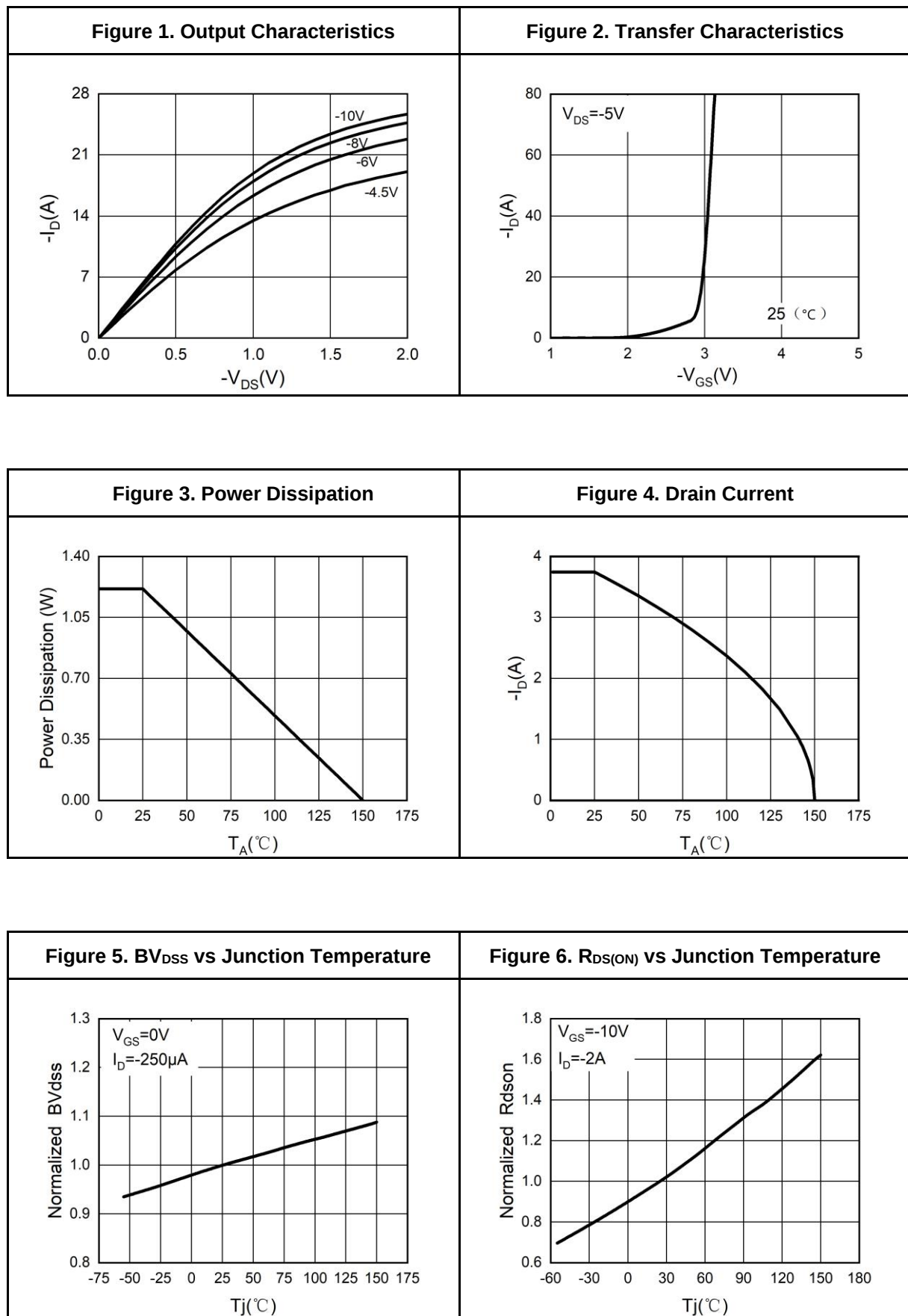
Notes 2.EAS condition:  $T_J=25^{\circ}\text{C}, V_{DD}=-30V, V_G=10V, R_g=25\Omega, L=0.5\text{mH}$ .

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



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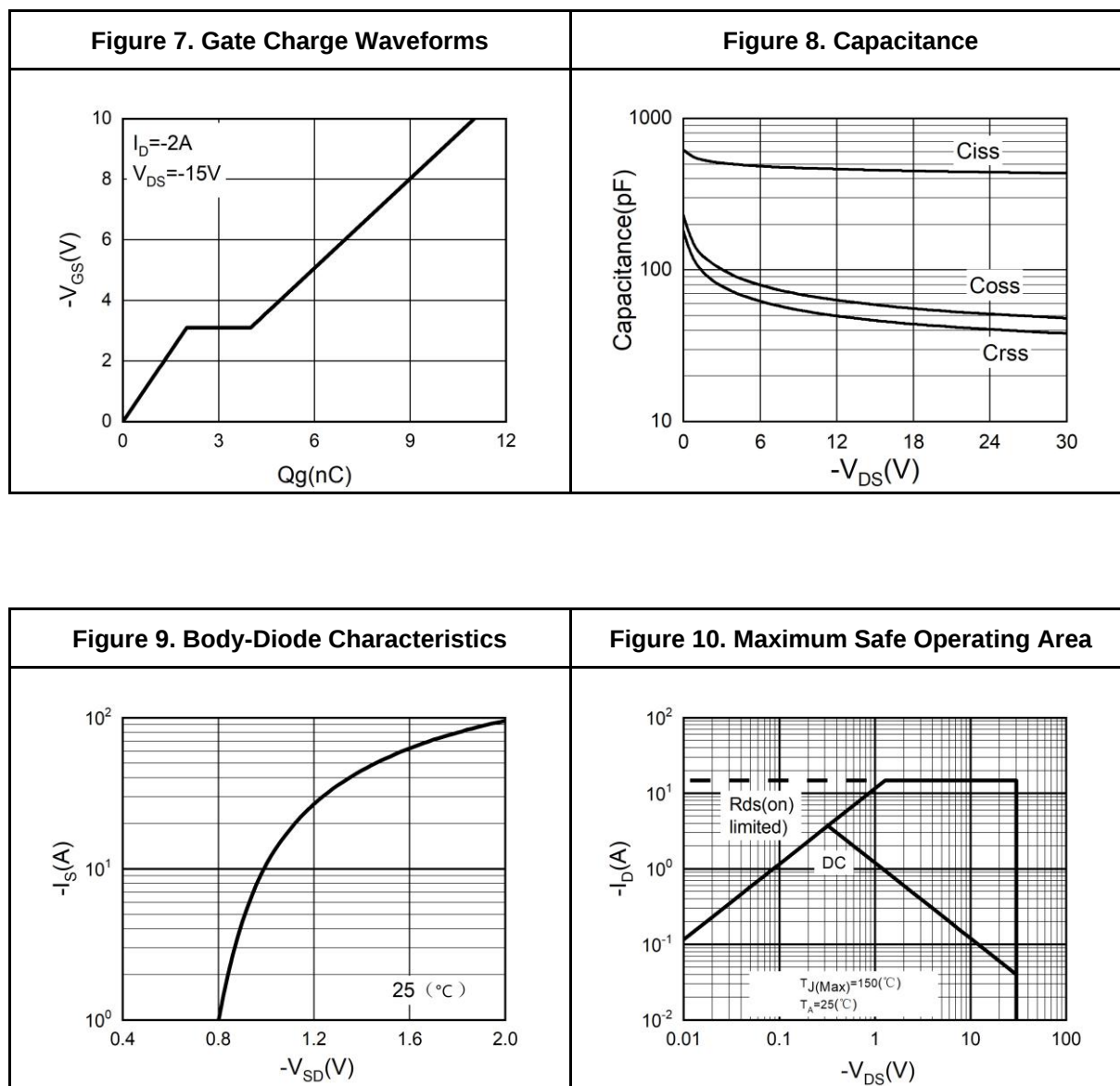
### Typical Electrical And Thermal Characteristics (Curves)





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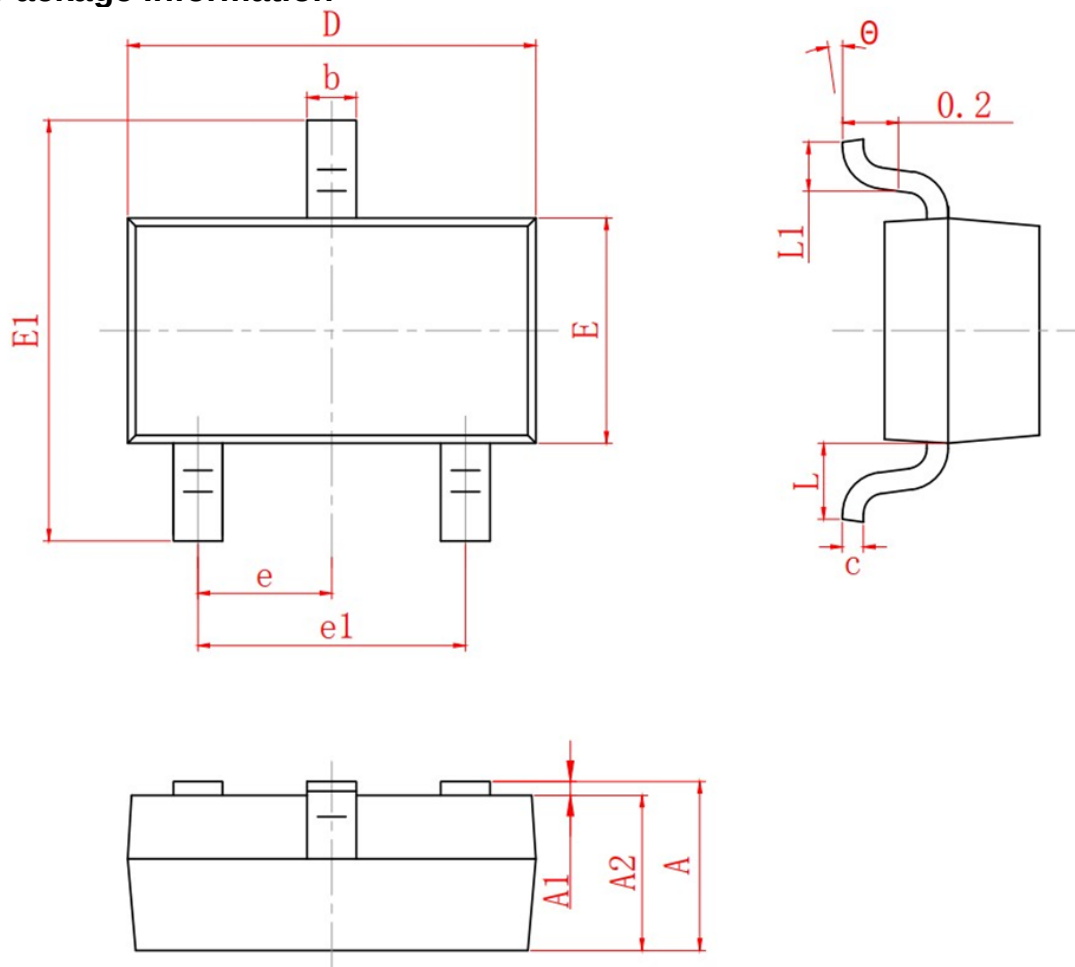
### Typical Electrical And Thermal Characteristics (Curves)





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### SOT-23 Package Information



| SYMBOL   | MIN      | NOM  | MAX  |
|----------|----------|------|------|
| A        | 0.90     | 1.05 | 1.20 |
| A1       | 0.00     | 0.05 | 0.10 |
| A2       | 0.90     | 1.00 | 1.10 |
| b        | 0.30     | 0.40 | 0.50 |
| c        | 0.08     | 0.10 | 0.15 |
| D        | 2.80     | 2.90 | 3.00 |
| E        | 1.20     | 1.30 | 1.40 |
| E1       | 2.30     | 2.40 | 2.50 |
| L        | 0.30     | 0.40 | 0.50 |
| $\theta$ | 0°       | 5°   | 10°  |
| L1       | 0.55 REF |      |      |
| e        | 0.95 BSC |      |      |
| e1       | 1.90 REF |      |      |



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