

## Description

The SX8P06S 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 Battery protection or in other Switching application.

## General Features

$V_{DS} = -60V$   $I_D = -8A$

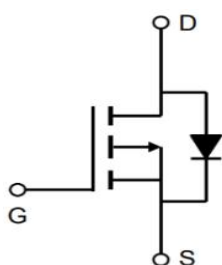
$R_{DS(ON)} < 70m\Omega$  @  $V_{GS}=10V$

## Application

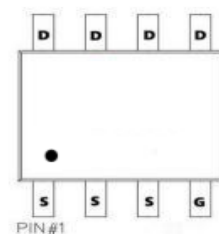
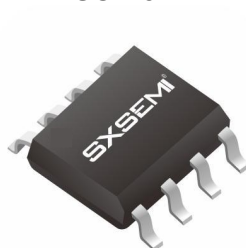
Brushless motor

Load switch

Uninterruptible power supply



**SOP-8**



## Absolute Maximum Ratings ( $T_c=25^\circ C$ unless otherwise noted)

| Symbol                 | Parameter                                              | Rating     | Units        |
|------------------------|--------------------------------------------------------|------------|--------------|
| $V_{DS}$               | Drain-Source Voltage                                   | -60        | V            |
| $V_{GS}$               | Gate-Source Voltage                                    | $\pm 20$   | V            |
| $I_D @ T_A=25^\circ C$ | Continuous Drain Current, $V_{GS}$ @ -10V <sup>1</sup> | -8.0       | A            |
| $I_D @ T_A=70^\circ C$ | Continuous Drain Current, $V_{GS}$ @ -10V <sup>1</sup> | -3         | A            |
| $I_{DM}$               | Pulsed Drain Current <sup>2</sup>                      | -7.5       | A            |
| EAS                    | Single Pulse Avalanche Energy <sup>3</sup>             | 35.3       | mJ           |
| $I_{AS}$               | Avalanche Current                                      | -26.6      | A            |
| $P_D @ T_A=25^\circ C$ | Total Power Dissipation <sup>4</sup>                   | 1.5        | W            |
| $T_{STG}$              | Storage Temperature Range                              | -55 to 150 | $^\circ C$   |
| $T_J$                  | Operating Junction Temperature Range                   | -55 to 150 | $^\circ C$   |
| $R_{\theta JA}$        | Thermal Resistance Junction-Ambient <sup>1</sup>       | 85         | $^\circ C/W$ |
| $R_{\theta JC}$        | Thermal Resistance Junction-Case <sup>1</sup>          | 36         | $^\circ C/W$ |

**Electrical Characteristics (T<sub>A</sub>=25°C unless otherwise noted)**

| Symbol                   | Parameter                                   | Conditions                                                                                       | Min. | Typ.  | Max. | Unit  |
|--------------------------|---------------------------------------------|--------------------------------------------------------------------------------------------------|------|-------|------|-------|
| BVDSS                    | Drain-Source Breakdown Voltage              | V <sub>GS</sub> =0V , I <sub>D</sub> =-250uA                                                     | -60  | ---   | ---  | V     |
| ΔBVDSS / ΔT <sub>J</sub> | BV <sub>DSS</sub> Temperature Coefficient   | Reference to 25°C , I <sub>D</sub> =-1mA                                                         | ---  | -0.03 | ---  | V/°C  |
| RDS(ON)                  | Static Drain-Source On-Resistance           | V <sub>GS</sub> =-10V , I <sub>D</sub> =-12A                                                     | ---  | 55    | 70   | mΩ    |
|                          |                                             | V <sub>GS</sub> =-4.5V , I <sub>D</sub> =-8A                                                     | ---  | 64    | 105  |       |
| VGS(th)                  | Gate Threshold Voltage                      | V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =-250uA                                        | -1.2 | -1.5  | -2.5 | V     |
| ΔVGS(th)                 | V <sub>GS(th)</sub> Temperature Coefficient |                                                                                                  | ---  | 4.56  | ---  | mV/°C |
| IDSS                     | Drain-Source Leakage Current                | V <sub>DS</sub> =-48V , V <sub>GS</sub> =0V , T <sub>J</sub> =25°C                               | ---  | ---   | 1    | uA    |
|                          |                                             | V <sub>DS</sub> =-48V , V <sub>GS</sub> =0V , T <sub>J</sub> =55°C                               | ---  | ---   | 5    |       |
| IGSS                     | Gate-Source Leakage Current                 | V <sub>GS</sub> =±20V , V <sub>DS</sub> =0V                                                      | ---  | ---   | ±100 | nA    |
| gfs                      | Forward Transconductance                    | V <sub>DS</sub> =-5V , I <sub>D</sub> =-12A                                                      | ---  | 15.4  | ---  | S     |
| R <sub>g</sub>           | Gate Resistance                             | V <sub>DS</sub> =0V , V <sub>GS</sub> =0V , f=1MHz                                               | ---  | 13.5  | ---  | Ω     |
| Q <sub>g</sub>           | Total Gate Charge (-4.5V)                   | V <sub>DS</sub> =-48V , V <sub>GS</sub> =-4.5V , I <sub>D</sub> =-10A                            | ---  | 9.86  | ---  | nC    |
| Q <sub>gs</sub>          | Gate-Source Charge                          |                                                                                                  | ---  | 3.08  | ---  |       |
| Q <sub>gd</sub>          | Gate-Drain Charge                           |                                                                                                  | ---  | 2.95  | ---  |       |
| Td(on)                   | Turn-On Delay Time                          | V <sub>DD</sub> =-15V , V <sub>GS</sub> =-10V ,<br>R <sub>G</sub> =3.3Ω ,<br>I <sub>D</sub> =-1A | ---  | 28.8  | ---  | ns    |
| T <sub>r</sub>           | Rise Time                                   |                                                                                                  | ---  | 19.8  | ---  |       |
| Td(off)                  | Turn-Off Delay Time                         |                                                                                                  | ---  | 60.8  | ---  |       |
| T <sub>f</sub>           | Fall Time                                   |                                                                                                  | ---  | 7.2   | ---  |       |
| C <sub>iss</sub>         | Input Capacitance                           | V <sub>DS</sub> =-15V , V <sub>GS</sub> =0V , f=1MHz                                             | ---  | 1447  | ---  | pF    |
| C <sub>oss</sub>         | Output Capacitance                          |                                                                                                  | ---  | 97.3  | ---  |       |
| C <sub>rss</sub>         | Reverse Transfer Capacitance                |                                                                                                  | ---  | 70    | ---  |       |
| I <sub>S</sub>           | Continuous Source Current <sup>1,5</sup>    | V <sub>G</sub> =V <sub>D</sub> =0V , Force Current                                               | ---  | ---   | -18  | A     |
| ISM                      | Pulsed Source Current <sup>2,5</sup>        |                                                                                                  | ---  | ---   | -36  | A     |
| VSD                      | Diode Forward Voltage <sup>2</sup>          | V <sub>GS</sub> =0V , I <sub>S</sub> =-1A , T <sub>J</sub> =25°C                                 | ---  | ---   | -1.2 | V     |

**Note :**

- 1、The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- 2、The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%
- 3、The EAS data shows Max. rating . The test condition is V<sub>DD</sub>=-25V,V<sub>GS</sub>=-10V,L=0.1mH,I<sub>AS</sub>=-26.6A
- 4、The power dissipation is limited by 150°C junction temperature
- 5、The data is theoretically the same as I<sub>D</sub> and I<sub>DM</sub> , in real applications , should be limited by total power dissipation.

## Typical Characteristics

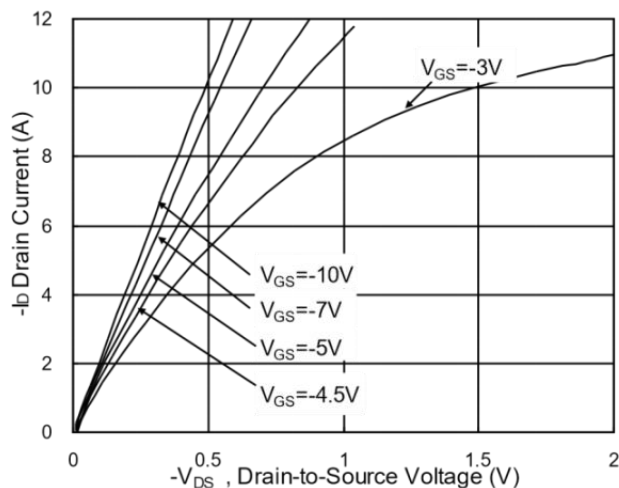


Fig.1 Typical Output Characteristics

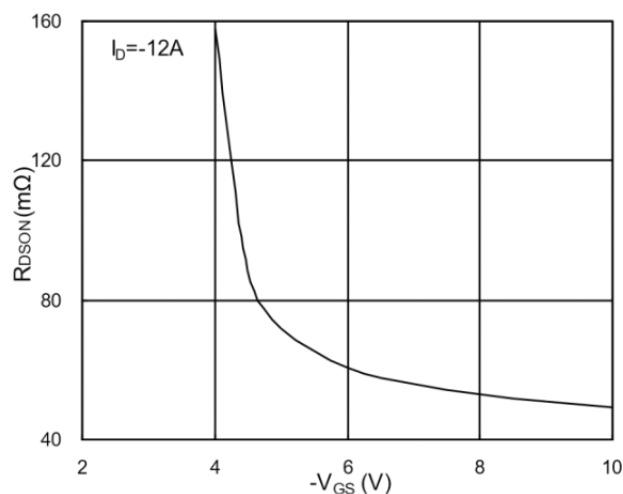


Fig.2 On-Resistance v.s Gate-Source

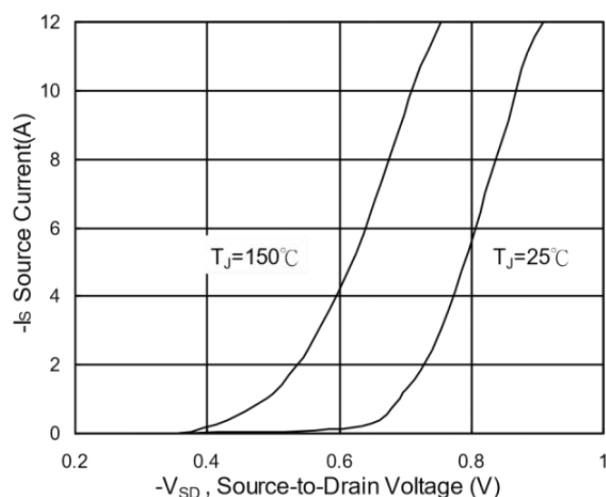


Fig.3 Forward Characteristics of Reverse

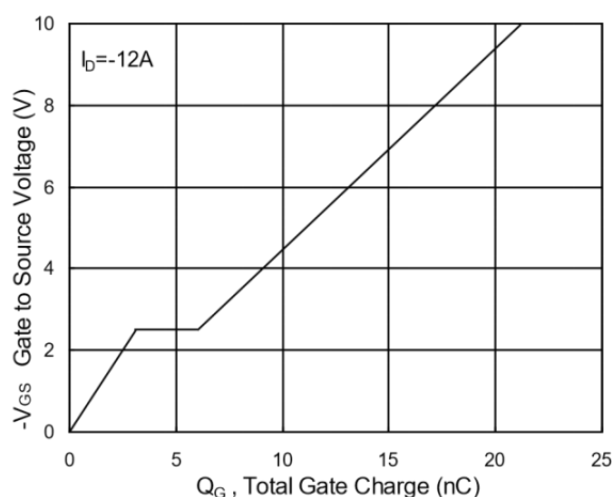


Fig.4 Gate-Charge Characteristics

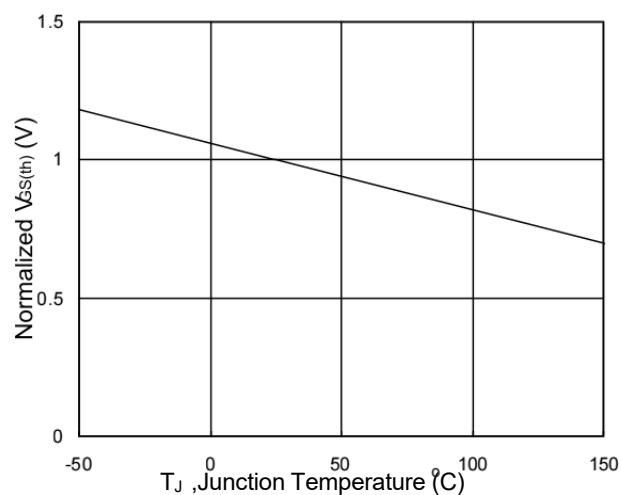


Fig.5 Normalized  $V_{GS(th)}$  v.s  $T_J$

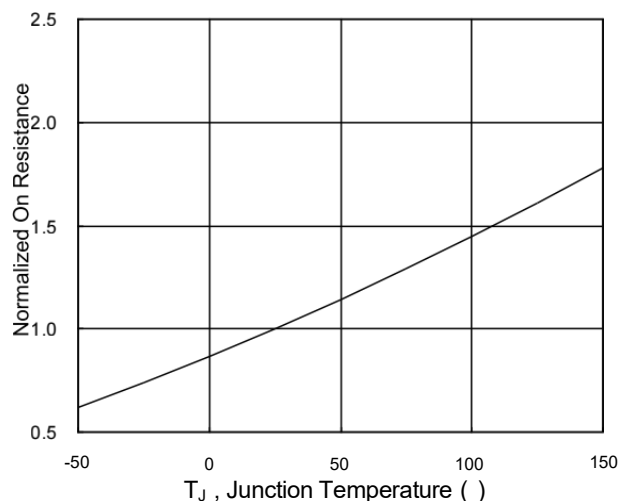
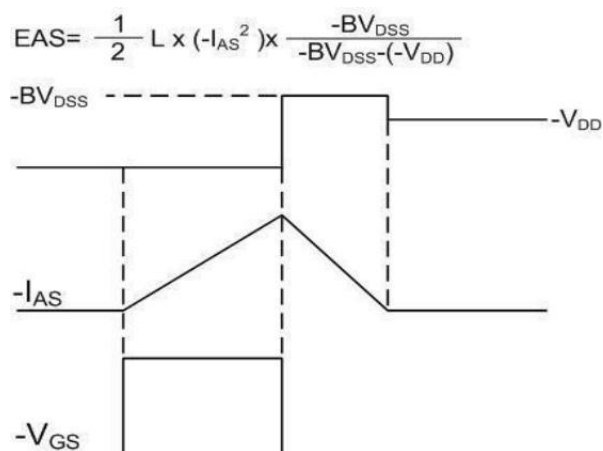
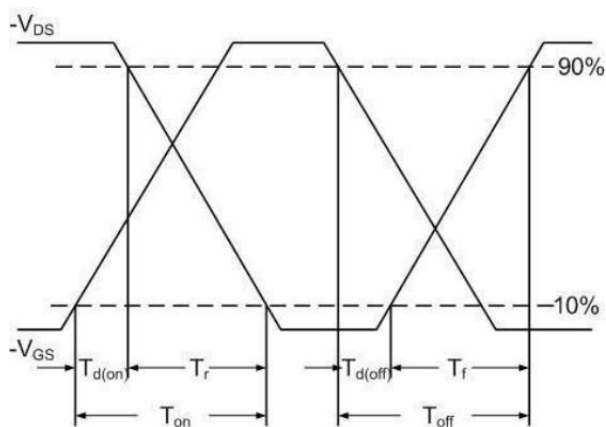
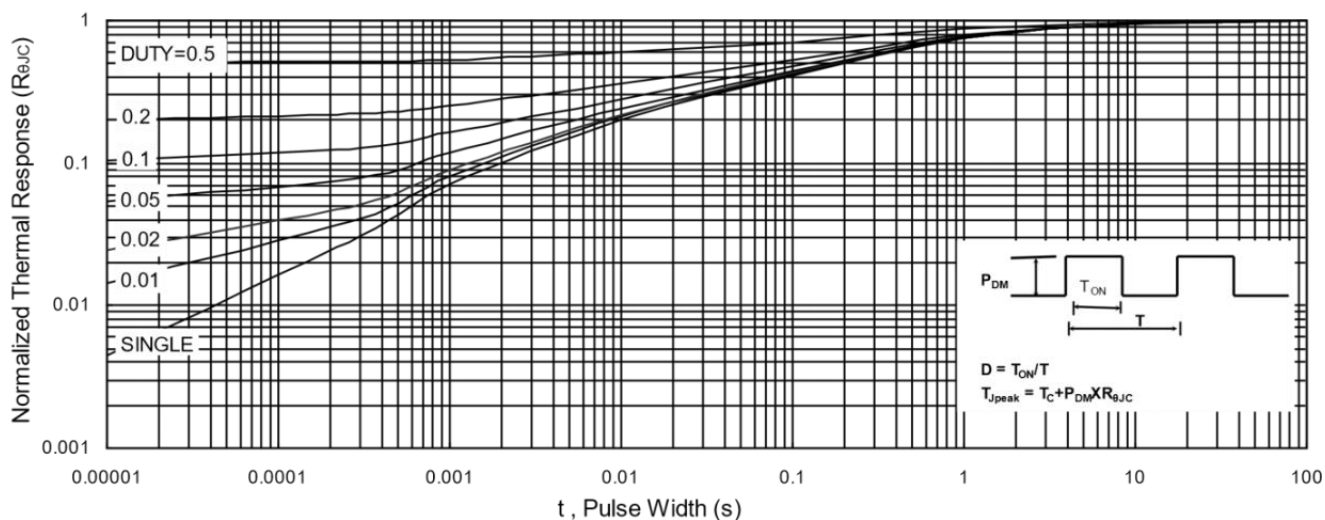
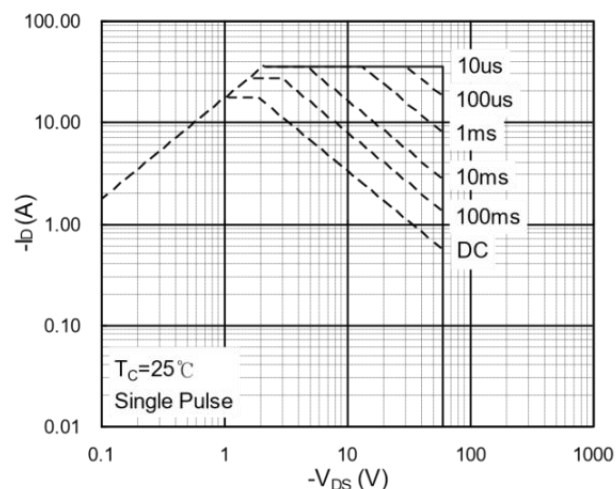
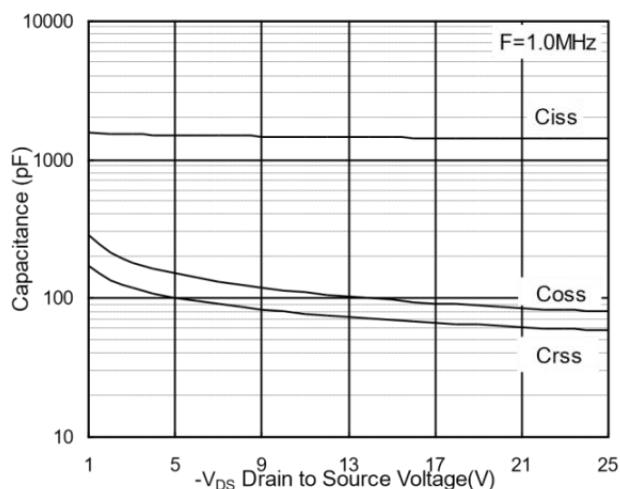
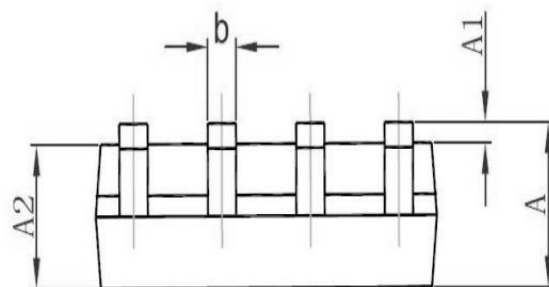
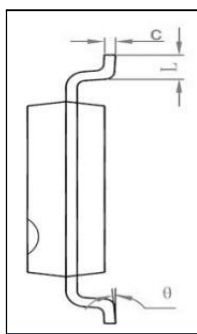
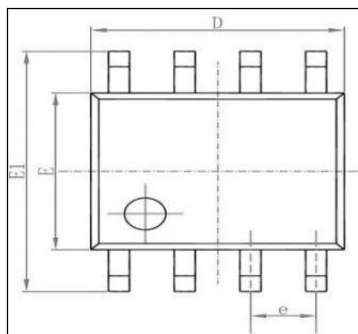


Fig.6 Normalized  $R_{DS(on)}$  v.s  $T_J$

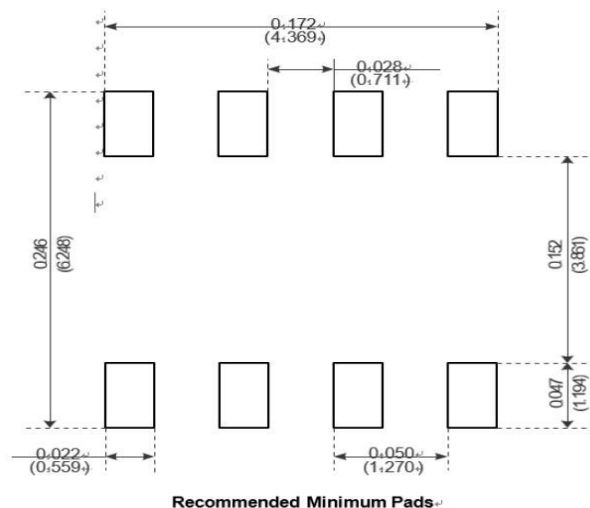
## Typical Characteristics



## Package Mechanical Data-SOP-8



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min                       | Max   | Min                  | Max   |
| A      | 1.350                     | 1.750 | 0.053                | 0.069 |
| A1     | 0.100                     | 0.250 | 0.004                | 0.010 |
| A2     | 1.350                     | 1.550 | 0.053                | 0.061 |
| b      | 0.330                     | 0.510 | 0.013                | 0.020 |
| c      | 0.170                     | 0.250 | 0.006                | 0.010 |
| D      | 4.700                     | 5.100 | 0.185                | 0.200 |
| E      | 3.800                     | 4.000 | 0.150                | 0.157 |
| E1     | 5.800                     | 6.200 | 0.228                | 0.244 |
| e      | 1.270 (BSC)               |       | 0.050 (BSC)          |       |
| L      | 0.400                     | 1.270 | 0.016                | 0.050 |
| θ      | 0°                        | 8°    | 0°                   | 8°    |



## Package Marking and Ordering Information

| Product ID | Pack  | Marking | Qty(PCS) |
|------------|-------|---------|----------|
| TAPING     | SOP-8 |         | 3000     |