# PRODUCT DATA SHEET

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Datasheet Resources Samples

Please note: Please check the JINGAO Semiconductor website to verify the updated device numbers. The most current and up-to-date ordering information can be found at www.jg-semi.cn. Please email any questions regarding the system integration to JINGAO_questions@jgsemi.com.

## General Description

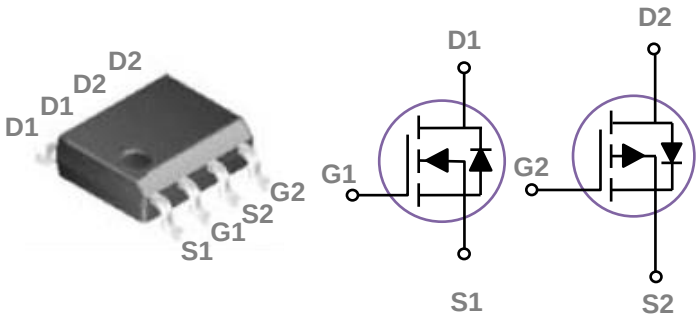
*These N+P dual Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.*

| BVDSS | RDSON | ID |
|---|---|---|
| 30V | 16mΩ | 7A |
| -30V | 25mΩ | -6.5A |

## Features

- *Fast switching*
- *Green Device Available*
- *Suit for 4.5V Gate Drive Applications*

## SOP8 Pin Configuration




## Applications

- *DC Fan*
- *Motor Drive Applications*
- *Networking*
- *Half / Full Bridge Topology*

## Absolute Maximum Ratings Tc=25℃ unless otherwise noted

| Symbol | Parameter | Rating | | Units |
|---|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | 30 | -30 | V |
| $V_{GS}$ | Gate-Source Voltage | ±20 | ±20 | V |
| $I_D$ | Drain Current – Continuous ($T_C$=25℃) | 7 | -6.5 | A |
| | Drain Current – Continuous ($T_C$=100℃) | 5 | -4.5 | A |
| $I_{DM}$ | Drain Current – Pulsed[1] | 32 | -22 | A |
| $P_D$ | Power Dissipation ($T_C$=25℃) | 2.5 | | W |
| | Power Dissipation – Derate above 25℃ | 0.02 | | W/℃ |
| $T_{STG}$ | Storage Temperature Range | -55 to 150 | | ℃ |
| $T_J$ | Operating Junction Temperature Range | -55 to 125 | | ℃ |

## Thermal Characteristics

| Symbol | Parameter | Typ. | Max. | Unit |
|---|---|---|---|---|
| $R_{\theta JA}$ | Thermal Resistance Junction to ambient | --- | 62.5 | ℃/W |
| $R_{\theta JC}$ | Thermal Resistance Junction to Case | --- | 50 | ℃/W |

## N-CH Electrical Characteristics ($T_J$=25 ℃, unless otherwise noted)

### Off Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V , $I_D$=250uA | 30 | --- | --- | V |
| $I_{DSS}$ | Drain-Source Leakage Current | $V_{DS}$=30V , $V_{GS}$=0V , $T_J$=25℃ | --- | --- | 1 | uA |
| | | $V_{DS}$=24V , $V_{GS}$=0V , $T_J$=125℃ | --- | --- | 10 | uA |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{GS}$=±20V , $V_{DS}$=0V | --- | --- | ±100 | nA |

### On Characteristics

| | | | | | | |
|---|---|---|---|---|---|---|
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance | $V_{GS}$=10V , $I_D$=7A | --- | 16 | 25 | mΩ |
| | | $V_{GS}$=4.5V , $I_D$=5A | --- | 23 | 35 | mΩ |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}$=$V_{DS}$ , $I_D$ =250uA | 1.0 | 1.5 | 2.5 | V |
| △$V_{GS(th)}$ | $V_{GS(th)}$ Temperature Coefficient | | --- | -4 | --- | mV/℃ |
| gfs | Forward Transconductance | $V_{DS}$=10V , $I_D$=3A | --- | 3 | --- | S |

### Dynamic and switching Characteristics

| | | | | | | |
|---|---|---|---|---|---|---|
| $Q_g$ | Total Gate Charge[3,4] | $V_{DS}$=15V , $V_{GS}$=4.5V , $I_D$=8A | --- | 4.1 | 6 | nC |
| $Q_{gs}$ | Gate-Source Charge[3,4] | | --- | 1 | 1.4 | |
| $Q_{gd}$ | Gate-Drain Charge[3,4] | | --- | 2.1 | 4 | |
| $T_{d(on)}$ | Turn-On Delay Time[3,4] | $V_{DD}$=15V , $V_{GS}$=10V , $R_G$=6Ω $I_D$=1A | --- | 2.8 | 5 | ns |
| $T_r$ | Rise Time[3,4] | | --- | 7.2 | 14 | |
| $T_{d(off)}$ | Turn-Off Delay Time[3,4] | | --- | 15.8 | 30 | |
| $T_f$ | Fall Time[3,4] | | --- | 4.6 | 9 | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=25V , $V_{GS}$=0V , F=1MHz | --- | 345 | 500 | pF |
| $C_{oss}$ | Output Capacitance | | --- | 55 | 80 | |
| $C_{rss}$ | Reverse Transfer Capacitance | | --- | 32 | 55 | |
| Rg | Gate resistance | $V_{GS}$=0V, $V_{DS}$=0V, F=1MHz | --- | 3.2 | 6.4 | Ω |

### Drain-Source Diode Characteristics and Maximum Ratings

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_S$ | Continuous Source Current | $V_G$=$V_D$=0V , Force Current | --- | --- | 7 | A |
| $I_{SM}$ | Pulsed Source Current | | --- | --- | 14 | A |
| $V_{SD}$ | Diode Forward Voltage | $V_{GS}$=0V , $I_S$=1A , $T_J$=25℃ | --- | --- | 1.3 | V |

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. $V_{DD}$=25V,$V_{GS}$=10V,L=0.1mH,$I_{AS}$=17A.,$R_G$=25Ω, Starting $T_J$=25℃.
3. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
4. Essentially independent of operating temperature.

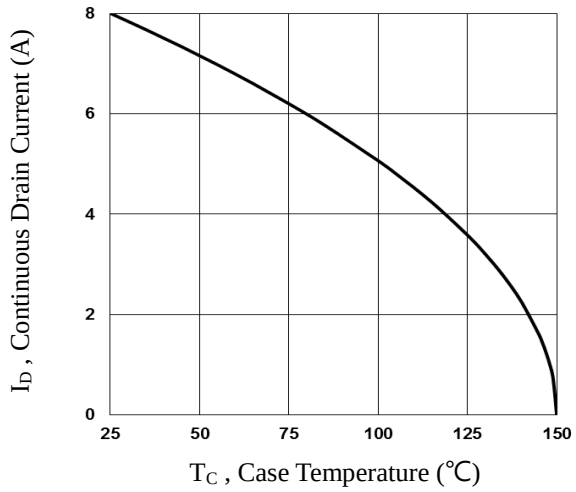



**Fig.1 Continuous Drain Current vs. $T_C$**

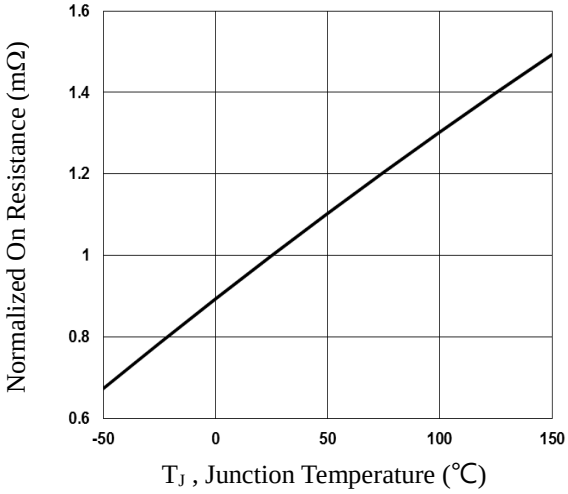



**Fig.2 Normalized RDSON vs. $T_J$**

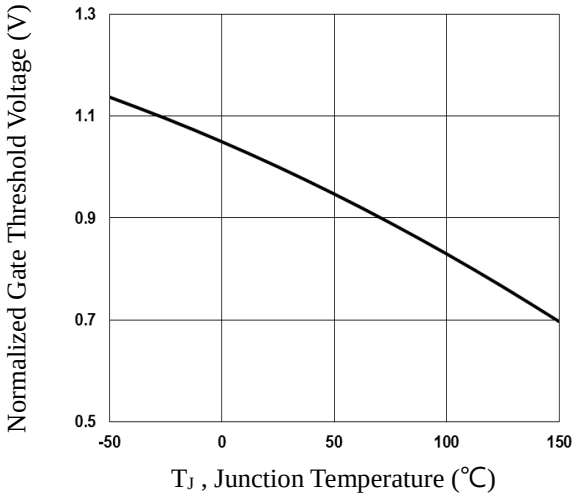



**Fig.3 Normalized $V_{th}$ vs. $T_J$**

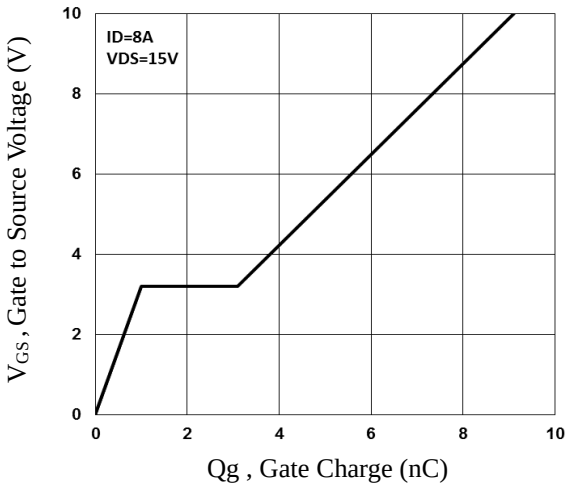



**Fig.4 Gate Charge Waveform**

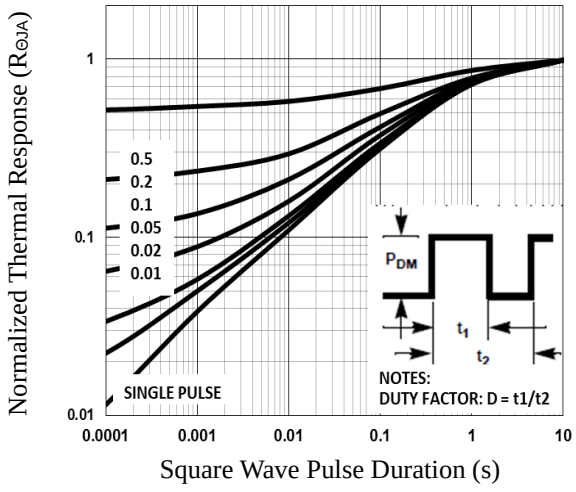



**Fig.5 Normalized Transient Response**

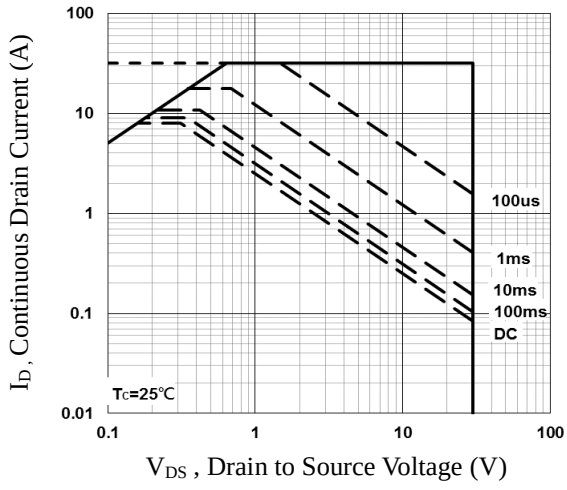



**Fig.6 Maximum Safe Operation Area**

## P-CH Electrical Characteristics ($T_J$=25 ℃, unless otherwise noted)

### Off Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V , $I_D$=-250uA | -30 | --- | --- | V |
| △$BV_{DSS}$/△$T_J$ | $BV_{DSS}$ Temperature Coefficient | Reference to 25℃ , $I_D$=-1mA | --- | -0.03 | --- | V/℃ |
| $I_{DSS}$ | Drain-Source Leakage Current | $V_{DS}$=-30V , $V_{GS}$=0V , $T_J$=25℃ | --- | --- | -1 | uA |
| | | $V_{DS}$=-24V , $V_{GS}$=0V , $T_J$=125℃ | --- | --- | -10 | uA |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{GS}$=±20V , $V_{DS}$=0V | --- | --- | ±100 | nA |

### On Characteristics

| | | | | | | |
|---|---|---|---|---|---|---|
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance | $V_{GS}$=-10V , $I_D$=-6A | --- | 25 | 35 | mΩ |
| | | $V_{GS}$=-4.5V , $I_D$=-3A | --- | 35 | 55 | mΩ |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}$=$V_{DS}$ , $I_D$ =-250uA | -1.0 | -1.6 | -2.5 | V |
| △$V_{GS(th)}$ | $V_{GS(th)}$ Temperature Coefficient | | --- | 4 | --- | mV/℃ |
| gfs | Forward Transconductance | $V_{DS}$=-10V , $I_D$=-3A | --- | 3.5 | --- | S |

### Dynamic and switching Characteristics

| | | | | | | |
|---|---|---|---|---|---|---|
| $Q_g$ | Total Gate Charge[7,8] | $V_{DS}$=-15V , $V_{GS}$=-4.5V , $I_D$=-3A | --- | 5.1 | 7 | nC |
| $Q_{gs}$ | Gate-Source Charge[7,8] | | --- | 2 | 3 | |
| $Q_{gd}$ | Gate-Drain Charge[7,8] | | --- | 2.2 | 4 | |
| $T_{d(on)}$ | Turn-On Delay Time[7,8] | $V_{DD}$=-15V , $V_{GS}$=-10V , $R_G$=6Ω $I_D$=-1A | --- | 3.4 | 6 | ns |
| $T_r$ | Rise Time[7,8] | | --- | 10.8 | 21 | |
| $T_{d(off)}$ | Turn-Off Delay Time[7,8] | | --- | 26.9 | 51 | |
| $T_f$ | Fall Time[7,8] | | --- | 6.9 | 13 | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=-15V , $V_{GS}$=0V , F=1MHz | --- | 560 | 810 | pF |
| $C_{oss}$ | Output Capacitance | | --- | 55 | 80 | |
| $C_{rss}$ | Reverse Transfer Capacitance | | --- | 40 | 60 | |

### Drain-Source Diode Characteristics and Maximum Ratings

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_S$ | Continuous Source Current | $V_G$=$V_D$=0V , Force Current | --- | --- | -6.5 | A |
| $I_{SM}$ | Pulsed Source Current | | --- | --- | -13 | A |
| $V_{SD}$ | Diode Forward Voltage | $V_{GS}$=0V , $I_S$=-1A , $T_J$=25℃ | --- | --- | -1.3 | V |

Note :

5. Repetitive Rating : Pulsed width limited by maximum junction temperature.
6. $V_{DD}$=-25V,$V_{GS}$=-10V,L=0.1mH,$I_{AS}$=-10A.,$R_G$=25Ω, Starting $T_J$=25℃
7. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
8. Essentially independent of operating temperature.

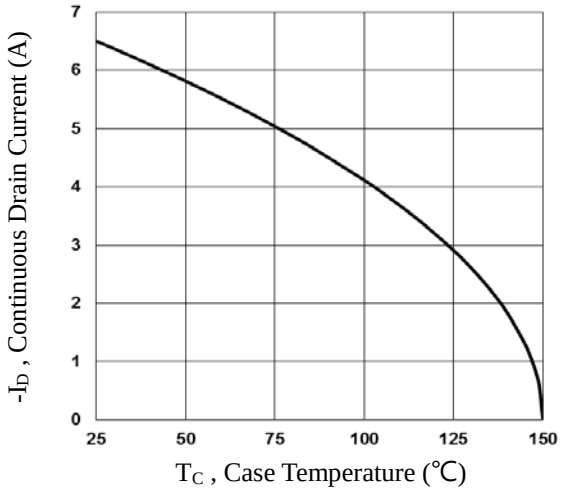



**Fig.1 Continuous Drain Current vs. $T_C$**

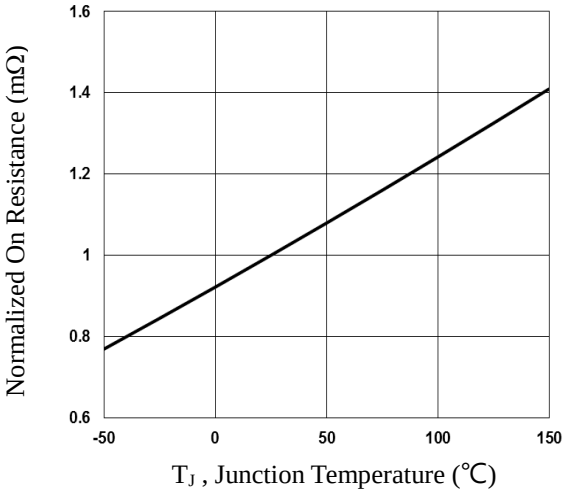



**Fig.2 Normalized RDSON vs. $T_J$**

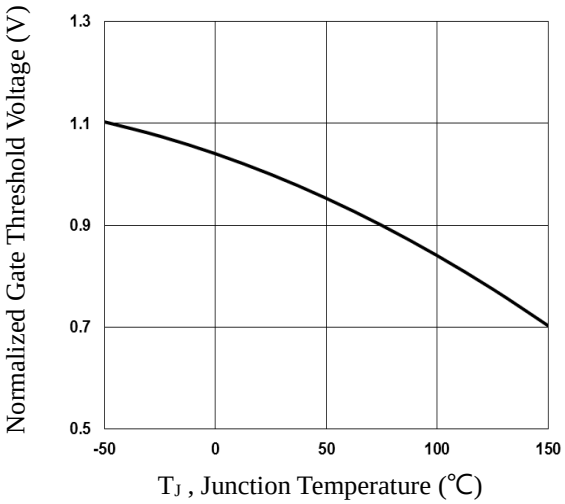



**Fig.3 Normalized $V_{th}$ vs. $T_J$**

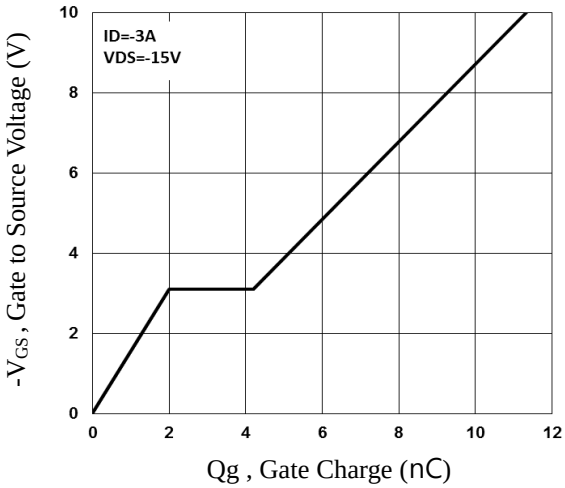



**Fig.4 Gate Charge Waveform**

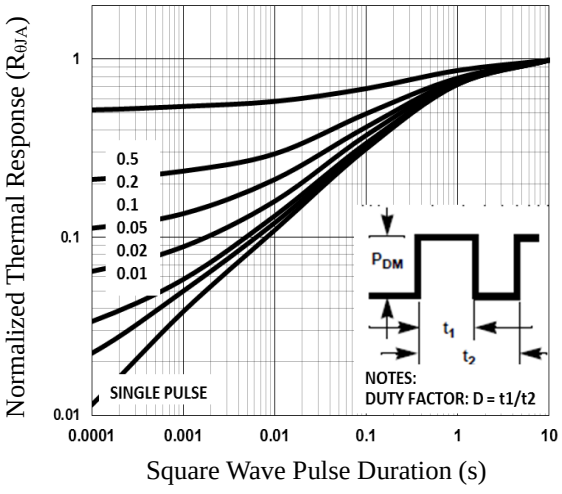



**Fig.5 Normalized Transient Impedance**

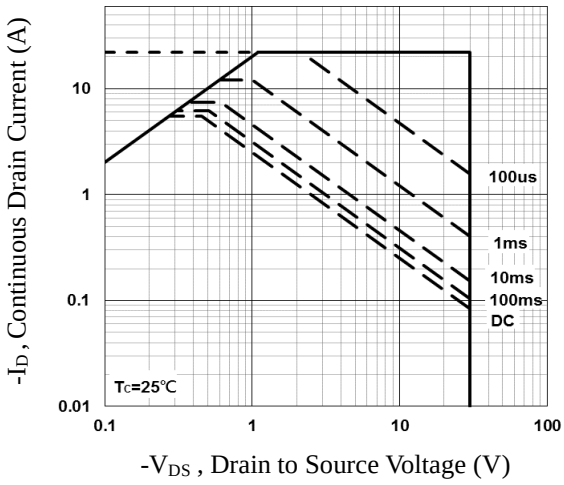
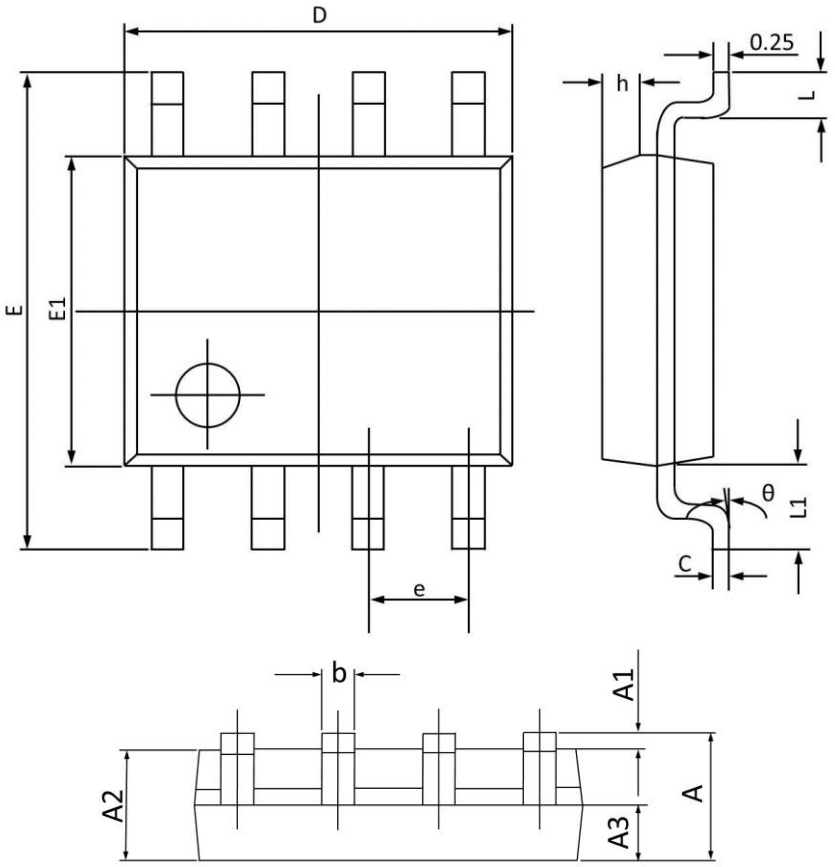



**Fig.6 Maximum Safe Operation Area**

# SOP8 PACKAGE INFORMATION




| 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 | 1.250 | 1.650 | 0.049 | 0.065 |
| A3 | 0.500 | 0.700 | 0.020 | 0.028 |
| b | 0.380 | 0.510 | 0.015 | 0.020 |
| c | 0.170 | 0.260 | 0.007 | 0.010 |
| D | 4.700 | 5.100 | 0.185 | 0.201 |
| E | 5.800 | 6.200 | 0.228 | 0.244 |
| E1 | 3.700 | 4.100 | 0.146 | 0.161 |
| e | 1.270(BSC) | | 0.050(BSC) | |
| h | 0.250 | 0.500 | 0.010 | 0.020 |
| L | 0.400 | 0.800 | 0.016 | 0.031 |
| L1 | 1.050(BSC) | | 0.041(BSC) | |
| $\theta$ | 0° | 8° | 0° | 8° |

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