

## General Description

The MY6D03C is the highest performance trench P-ch MOSFETs with extreme high ell density, which provide excellent  $R_{DS(ON)}$  and gate charge for most of the small power switching and load switch applications.

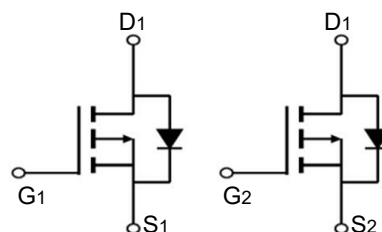
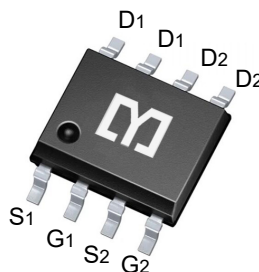


## Features

|                                  |      |            |
|----------------------------------|------|------------|
| $V_{DSS}$                        | -30  | V          |
| $I_D$                            | -6.5 | A          |
| $R_{DS(ON)}$ (at $V_{GS}=10V$ )  | <45  | m $\Omega$ |
| $R_{DS(ON)}$ (at $V_{GS}=4.5V$ ) | <65  | m $\Omega$ |

## Application

- Battery protection
- Load switch
- Uninterruptible power supply



## Package Marking and Ordering Information

| Product ID | Pack  | Marking | Qty(PCS) |
|------------|-------|---------|----------|
| MY6D03C    | SOP-8 | 6D03C   | 3000     |

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

| Parameter                                        | Symbol          | Limit      | Unit                 |
|--------------------------------------------------|-----------------|------------|----------------------|
| Drain-Source Voltage                             | $V_{DS}$        | -30        | V                    |
| Gate-Source Voltage                              | $V_{GS}$        | $\pm 20$   | V                    |
| Drain Current-Continuous                         | $I_D$           | -6.5       | A                    |
| Drain Current-Pulsed (Note 1)                    | $I_{DM}$        | -20        | A                    |
| Maximum Power Dissipation                        | $P_D$           | 2.6        | W                    |
| Operating Junction and Storage Temperature Range | $T_J, T_{STG}$  | -55 To 150 | $^{\circ}\text{C}$   |
| Thermal Resistance, Junction-to-Ambient (Note 2) | $R_{\theta JA}$ | 49         | $^{\circ}\text{C/W}$ |

Electrical Characteristics ( $T_A=25\text{ }^{\circ}\text{C}$ , unless otherwise noted)

| Parameter                                         | Symbol              | Condition                                                                                 | Min | Typ  | Max  | Unit |
|---------------------------------------------------|---------------------|-------------------------------------------------------------------------------------------|-----|------|------|------|
| Off Characteristics                               |                     |                                                                                           |     |      |      |      |
| Drain-Source Breakdown Voltage                    | BV <sub>DSS</sub>   | V <sub>GS</sub> =0V I <sub>D</sub> =-250μA                                                | -30 | -33  | -    | V    |
| Zero Gate Voltage Drain Current                   | I <sub>DSS</sub>    | V <sub>DS</sub> =-24V, V <sub>GS</sub> =0V                                                | -   | -    | -1   | μA   |
| Gate-Body Leakage Current                         | I <sub>GSS</sub>    | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V                                                | -   | -    | ±100 | nA   |
| On Characteristics <small>(Note 3)</small>        |                     |                                                                                           |     |      |      |      |
| Gate Threshold Voltage                            | V <sub>GS(th)</sub> | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA                                 | -1  | -1.6 | -3   | V    |
| Drain-Source On-State Resistance                  | R <sub>DS(ON)</sub> | V <sub>GS</sub> =-10V, I <sub>D</sub> =-6.5A                                              | -   | 37   | 45   | mΩ   |
|                                                   |                     | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-4.2A                                             | -   | 50   | 65   | mΩ   |
| Forward Transconductance                          | g <sub>FS</sub>     | V <sub>DS</sub> =-15V, I <sub>D</sub> =-4.5A                                              | 4   | 7    | -    | S    |
| Dynamic Characteristics <small>(Note4)</small>    |                     |                                                                                           |     |      |      |      |
| Input Capacitance                                 | C <sub>iss</sub>    | V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V,<br>F=1.0MHz                                   | -   | 540  | -    | PF   |
| Output Capacitance                                | C <sub>oss</sub>    |                                                                                           | -   | 150  | -    | PF   |
| Reverse Transfer Capacitance                      | C <sub>rss</sub>    |                                                                                           | -   | 75   | -    | PF   |
| Switching Characteristics <small>(Note 4)</small> |                     |                                                                                           |     |      |      |      |
| Turn-on Delay Time                                | t <sub>d(on)</sub>  | V <sub>DD</sub> =-15V, I <sub>D</sub> =-1A,<br>V <sub>GS</sub> =-10V, R <sub>GEN</sub> =6 | -   | 8    | -    | nS   |
| Turn-on Rise Time                                 | t <sub>r</sub>      |                                                                                           | -   | 14   | -    | nS   |
| Turn-Off Delay Time                               | t <sub>d(off)</sub> |                                                                                           | -   | 18   | -    | nS   |
| Turn-Off Fall Time                                | t <sub>f</sub>      |                                                                                           | -   | 10   | -    | nS   |
| Total Gate Charge                                 | Q <sub>g</sub>      | V <sub>DS</sub> =-15V, I <sub>D</sub> =-6.5A, V <sub>GS</sub> =-10V                       | -   | 12   | -    | nC   |
| Gate-Source Charge                                | Q <sub>gs</sub>     |                                                                                           | -   | 2.4  | -    | nC   |
| Gate-Drain Charge                                 | Q <sub>gd</sub>     |                                                                                           | -   | 3.2  | -    | nC   |
| Drain-Source Diode Characteristics                |                     |                                                                                           |     |      |      |      |
| Diode Forward Voltage <small>(Note 3)</small>     | V <sub>SD</sub>     | V <sub>GS</sub> =0V, I <sub>S</sub> =-6.5A                                                | -   | -    | -1.2 | V    |

**Notes:**

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production

### Typical Electrical and Thermal Characteristics

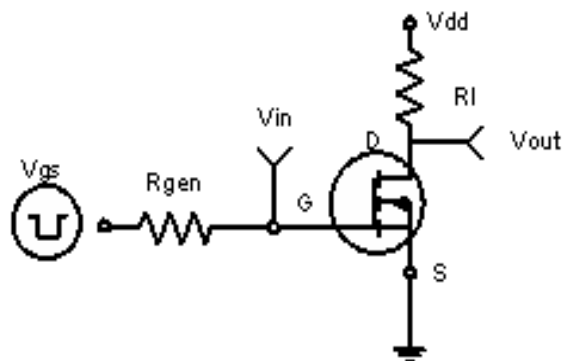


Figure 1: Switching Test Circuit

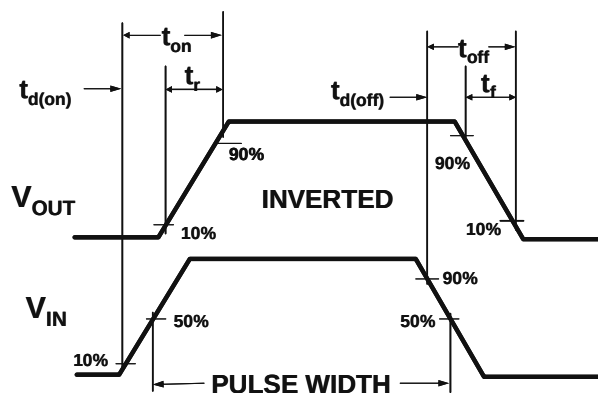


Figure 2: Switching Waveforms

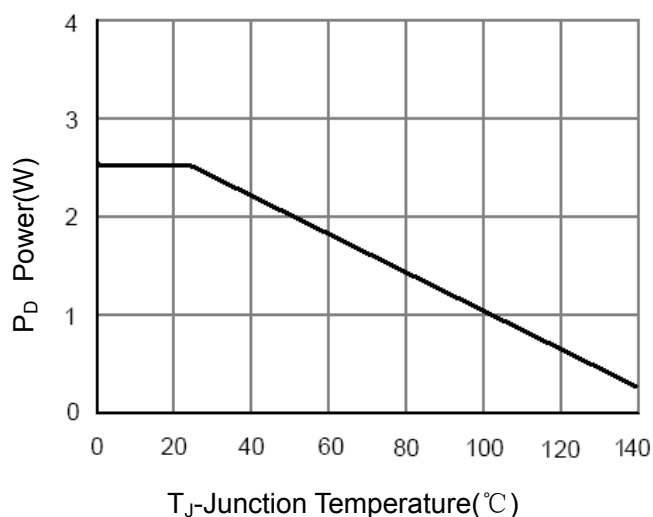


Figure 3: Power Dissipation

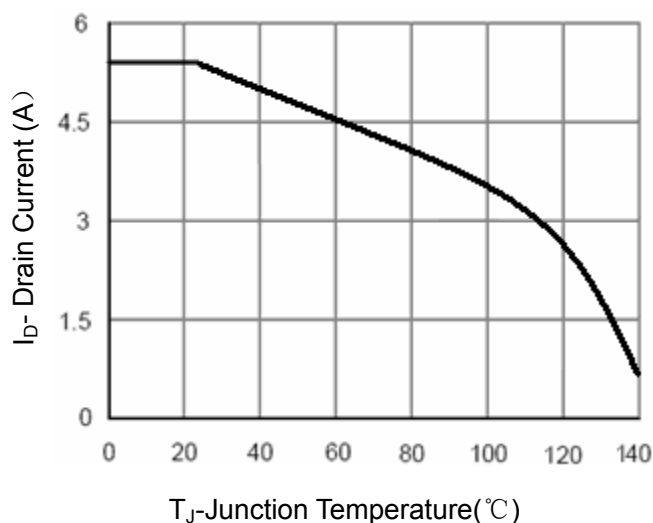


Figure 4: Drain Current

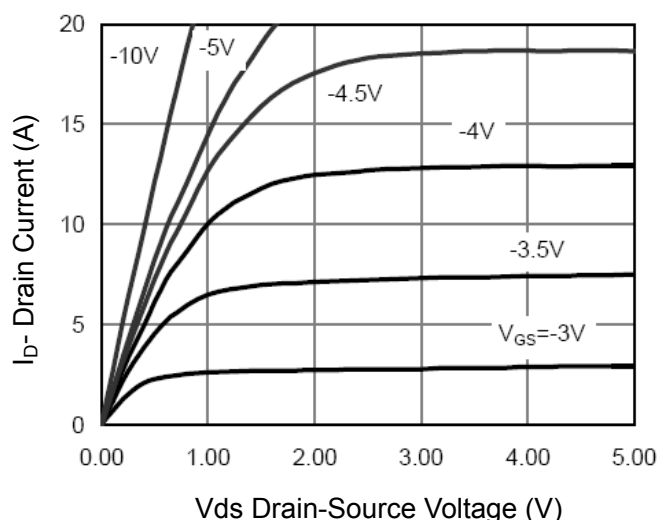


Figure 5: Output Characteristics

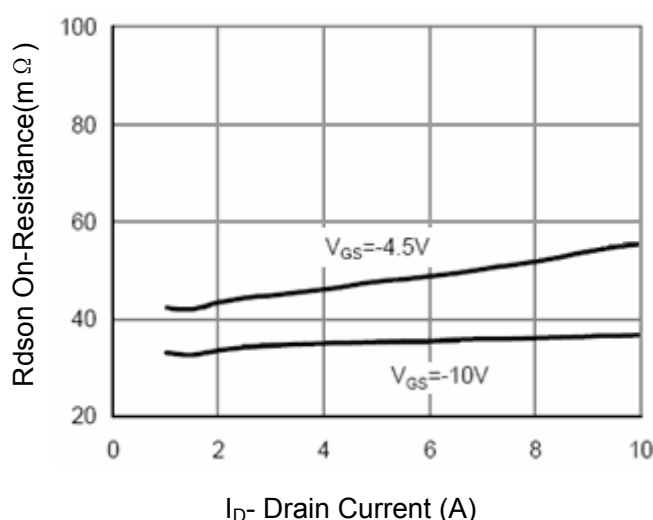
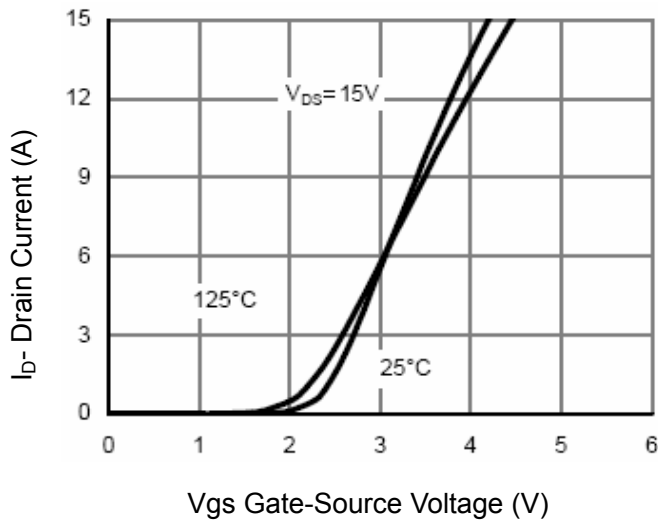
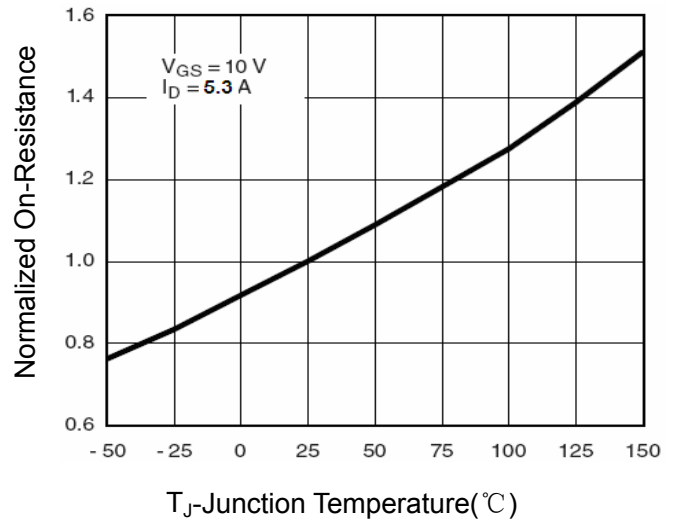


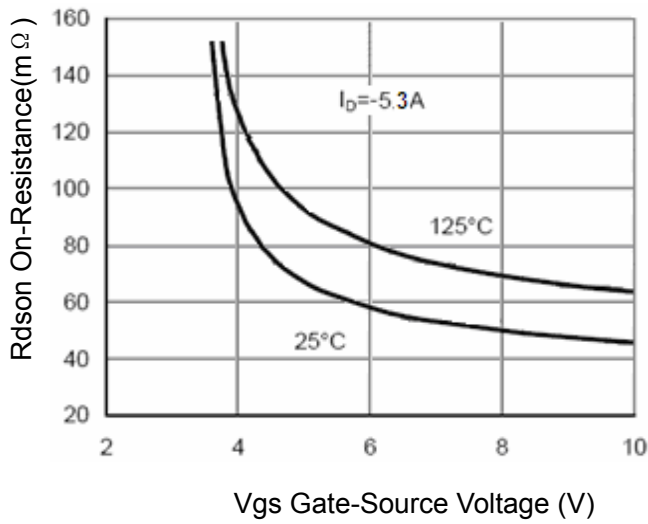
Figure 6: Drain-Source On-Resistance



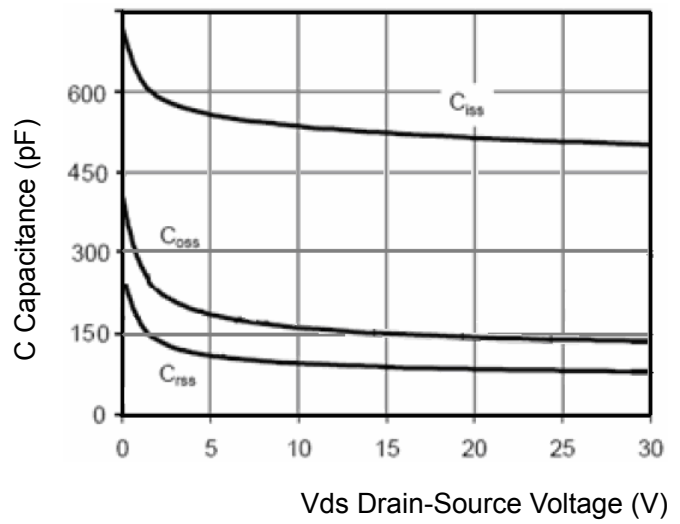
**Figure 7 Transfer Characteristics**



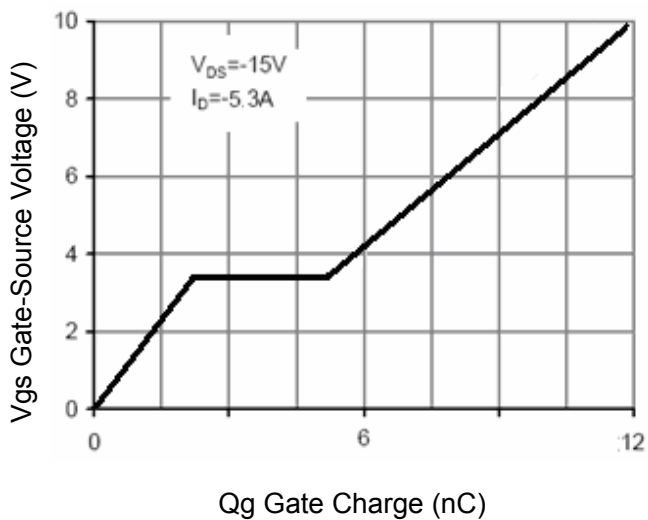
**Figure 8 Drain-Source On-Resistance**



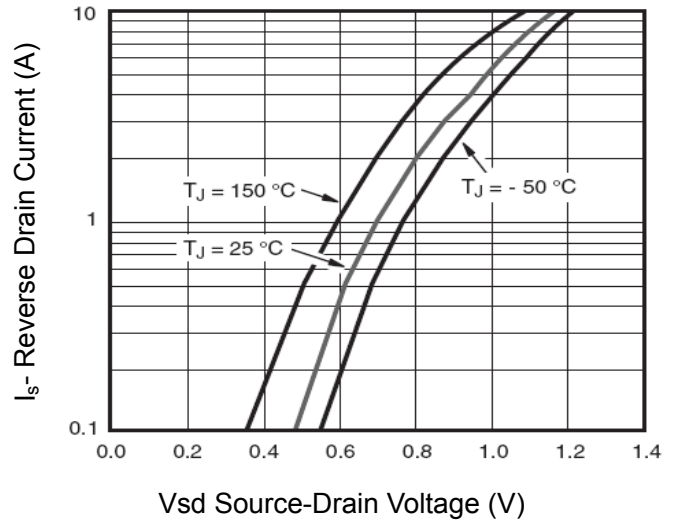
**Figure 9 Rdson vs VGS**



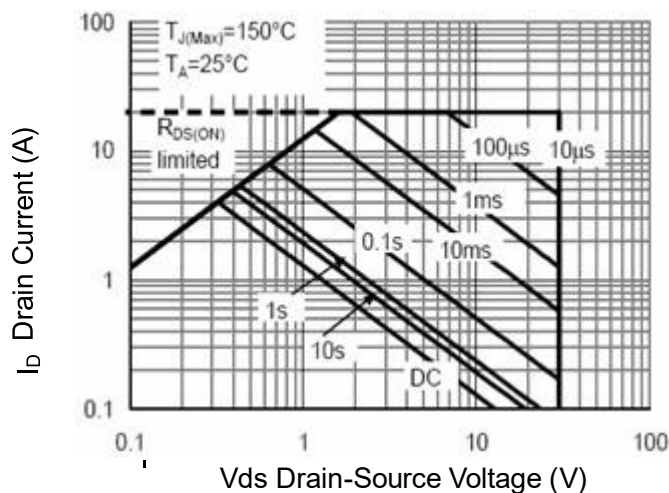
**Figure 10 Capacitance vs Vds**



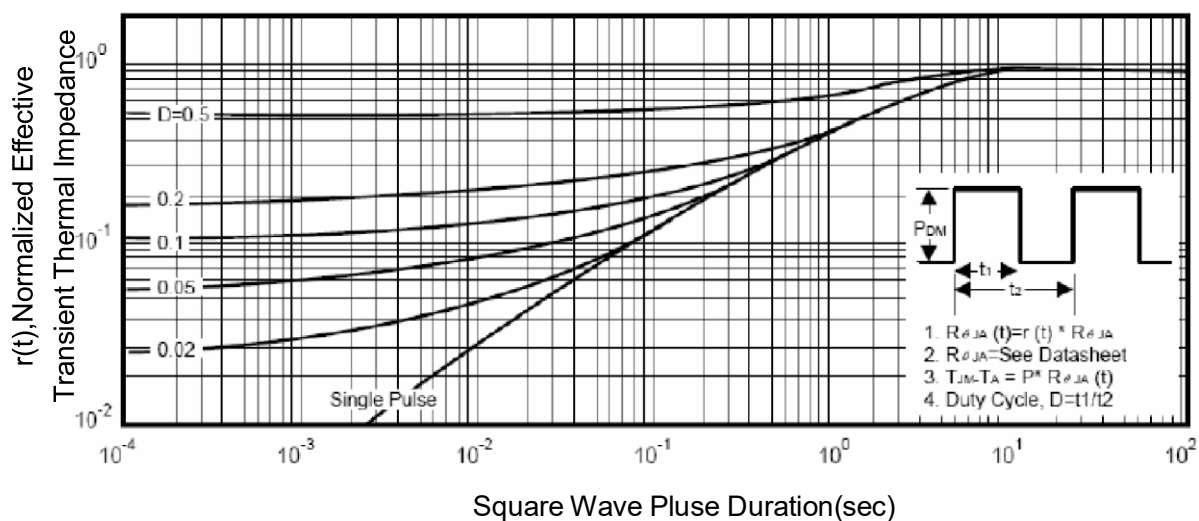
**Figure 11 Gate Charge**



**Figure 12 Source- Drain Diode Forward**

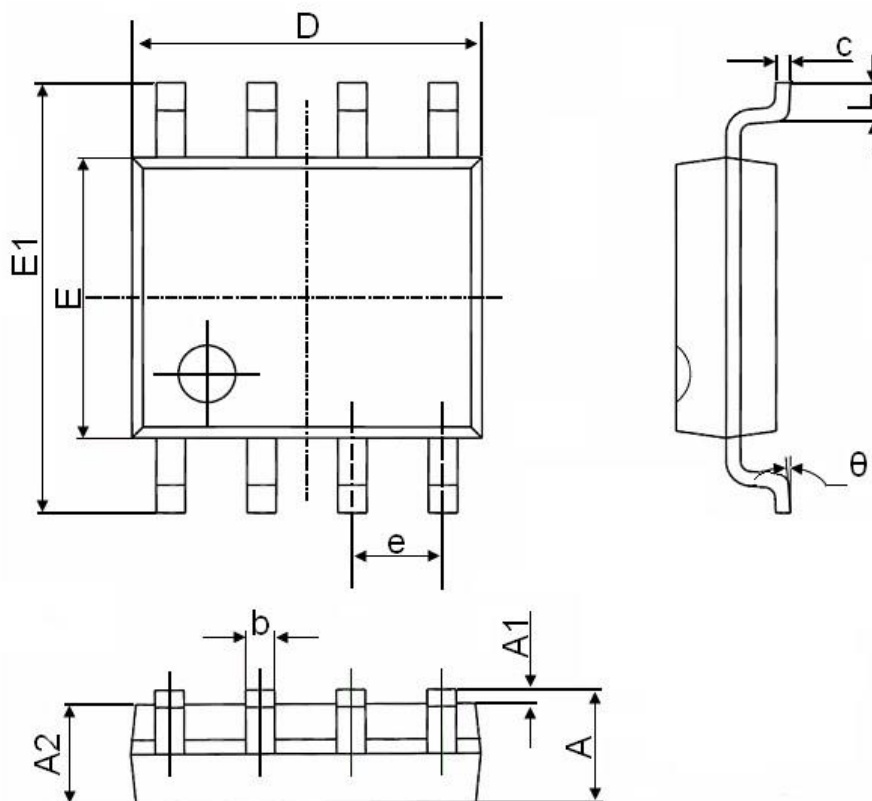


**Figure 13 Safe Operation Area**



**Figure 14 Normalized Maximum Transient Thermal Impedance**

## 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 |