



# SPP1023

## Dual P-Channel Enhancement Mode MOSFET

### DESCRIPTION

The SPP1023 is the Dual P-Channel enhancement mode power field effect transistors are produced using high cell density , DMOS trench technology. This high density process is especially tailored to minimize on-state resistance and provide superior switching performance. These devices are particularly suited for low voltage applications such as notebook computer power management and other battery powered circuits where high-side switching , low in-line power loss, and resistance to transients are needed.

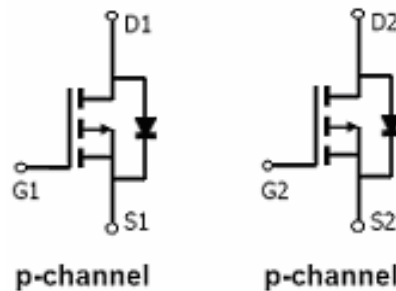
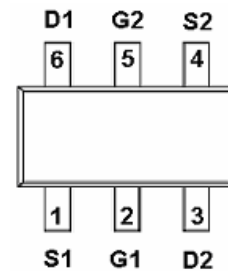
### APPLICATIONS

- Power Management in Note book
- Portable Equipment
- Battery Powered System
- DC/DC Converter
- Load Switch
- DSC
- LCD Display inverter

### FEATURES

- ◆ P-Channel
  - 20V/0.45A,  $R_{DS(ON)} = 0.52\Omega @ V_{GS} = -4.5V$
  - 20V/0.35A,  $R_{DS(ON)} = 0.70\Omega @ V_{GS} = -2.5V$
  - 20V/0.25A,  $R_{DS(ON)} = 0.95\Omega @ V_{GS} = -1.8V$
- ◆ Super high density cell design for extremely low  $R_{DS(ON)}$
- ◆ Exceptional on-resistance and maximum DC current capability
- ◆ SOT-563 (SC-89-6L) package design

### PIN CONFIGURATION( SOT-563 / SC-89-6L)



### PART MARKING





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### PIN DESCRIPTION

| Pin | Symbol | Description |
|-----|--------|-------------|
| 1   | S1     | Source 1    |
| 2   | G1     | Gate 1      |
| 3   | D2     | Drain 2     |
| 4   | S2     | Source 2    |
| 5   | G2     | Gate 2      |
| 6   | D1     | Drain1      |

### ORDERING INFORMATION

| Part Number  | Package | Part Marking |
|--------------|---------|--------------|
| SPP1023S56RG | SOT-563 | A            |

※ Week Code : A ~ Z ( 1 ~ 26 ) ; a ~ z ( 27 ~ 52 )

※ SPP1023S56RG : Tape Reel ; Pb – Free

### ABSOLUTE MAXIMUM RATINGS

( $T_A=25^{\circ}\text{C}$  Unless otherwise noted)

| Parameter   | Symbol    | Typical                  | Unit               |   |
|---|-----------|--------------------------|--------------------|---|
| Drain-Source Voltage                                  | $V_{DSS}$ | -20                      | V                  |   |
| Gate –Source Voltage                                  | $V_{GSS}$ | $\pm 12$                 | V                  |   |
| Continuous Drain Current( $T_J=150^{\circ}\text{C}$ ) | $I_D$     | $T_A=25^{\circ}\text{C}$ | -0.45              | A |
|   |           | $T_A=80^{\circ}\text{C}$ | -0.35              |   |
| Pulsed Drain Current                                  | $I_{DM}$  | -1.0                     | A                  |   |
| Continuous Source Current(Diode Conduction)           | $I_S$     | -0.3                     | A                  |   |
| Power Dissipation                                     | $P_D$     | $T_A=25^{\circ}\text{C}$ | 0.35               | W |
|   |           | $T_A=70^{\circ}\text{C}$ | 0.19               |   |
| Operating Junction Temperature                        | $T_J$     | -55/150                  | $^{\circ}\text{C}$ |   |
| Storage Temperature Range                             | $T_{STG}$ | -55/150                  | $^{\circ}\text{C}$ |   |



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### ELECTRICAL CHARACTERISTICS

(TA=25°C Unless otherwise noted)

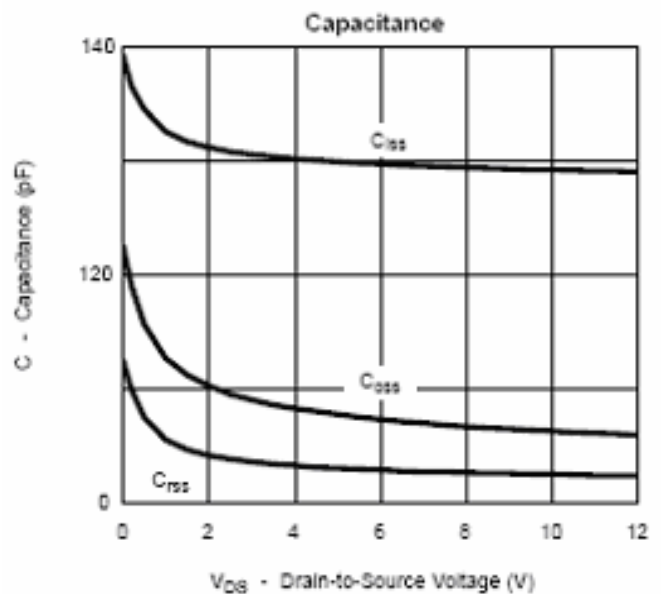
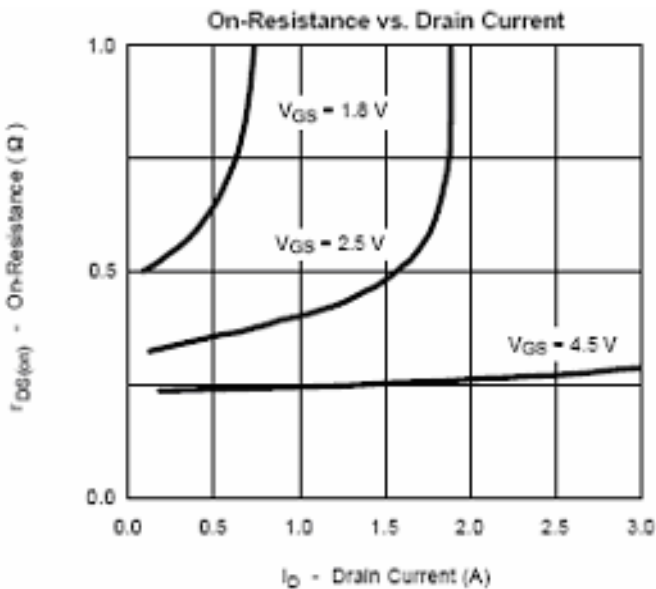
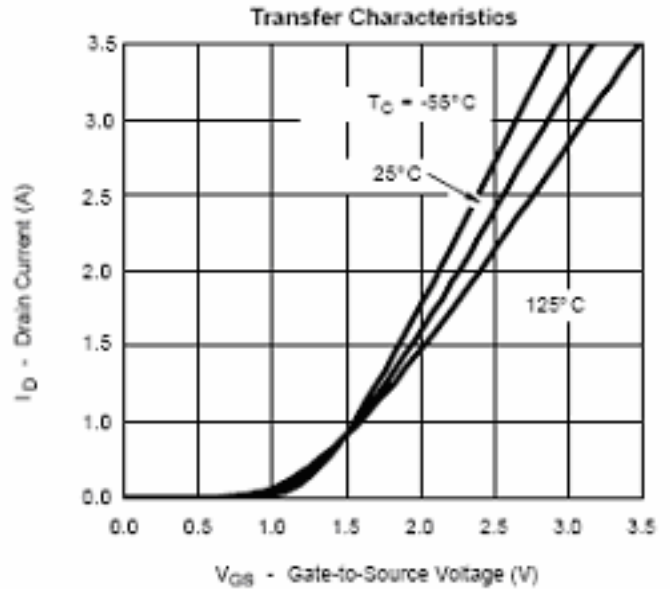
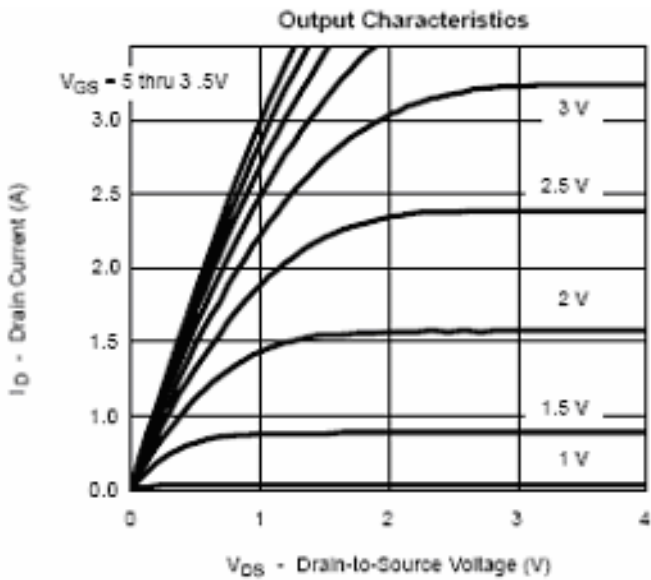
| Parameter                       | Symbol        | Conditions  | Min.  | Typ  | Max.      | Unit     |
|---------------------------------|---------------|---|-------|------|-----------|----------|
| <b>Static</b>                   |               |   |       |      |           |          |
| Drain-Source Breakdown Voltage  | $V_{(BR)DSS}$ | $V_{GS}=0V, I_D=-250\mu A$  | -20   |      |           | V        |
| Gate Threshold Voltage          | $V_{GS(th)}$  | $V_{DS}=V_{GS}, I_D=-250\mu A$  | -0.35 |      | -0.8      |          |
| Gate Leakage Current            | $I_{GSS}$     | $V_{DS}=0V, V_{GS}=\pm 12V$   |       |      | $\pm 100$ | nA       |
| Zero Gate Voltage Drain Current | $I_{DSS}$     | $V_{DS}=-20V, V_{GS}=0V$  |       |      | -1        | uA       |
|                                 |               | $V_{DS}=-20V, V_{GS}=0V$<br>$T_J=55^\circ C$                                      |       |      | -5        |          |
| On-State Drain Current          | $I_{D(on)}$   | $V_{DS}\leq -4.5V, V_{GS}=-5V$  | -0.7  |      |           | A        |
| Drain-Source On-Resistance      | $R_{DS(on)}$  | $V_{GS}=-4.5V, I_D=-0.45A$  |       | 0.42 | 0.52      | $\Omega$ |
|                                 |               | $V_{GS}=-2.5V, I_D=-0.35A$  |       | 0.58 | 0.70      |          |
|                                 |               | $V_{GS}=-1.8V, I_D=-0.25A$  |       | 0.75 | 0.95      |          |
| Forward Transconductance        | $g_{fs}$      | $V_{DS}=-10V, I_D=-0.25A$   |       | 0.4  |           | S        |
| Diode Forward Voltage           | $V_{SD}$      | $I_S=-0.15A, V_{GS}=0V$   |       | -0.8 | -1.2      | V        |
| <b>Dynamic</b>                  |               |   |       |      |           |          |
| Total Gate Charge               | $Q_g$         | $V_{DS}=-10V, V_{GS}=-4.5V, I_D$<br>$\equiv -0.6A$                                |       | 1.5  | 2.0       | nC       |
| Gate-Source Charge              | $Q_{gs}$      |   |       | 0.3  |           |          |
| Gate-Drain Charge               | $Q_{gd}$      |   |       | 0.35 |           |          |
| Turn-On Time                    | $t_{d(on)}$   | $V_{DD}=-10V, R_L=10\Omega,$<br>$I_D\equiv -0.4A$<br>$V_{GEN}=-4.5V, R_G=6\Omega$ |       | 5    | 10        | ns       |
|                                 | $t_r$         |   |       | 15   | 25        |          |
| Turn-Off Time                   | $t_{d(off)}$  |   |       | 8    | 15        |          |
|                                 | $t_f$         |   |       | 1.4  | 1.8       |          |



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### TYPICAL CHARACTERISTICS

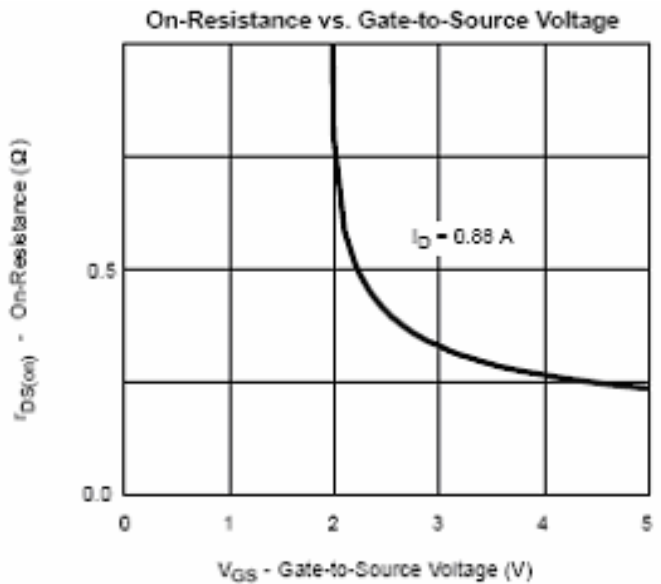
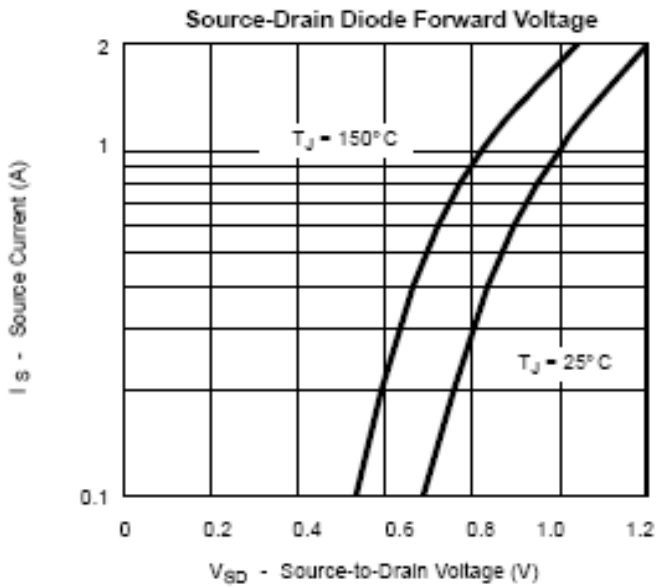
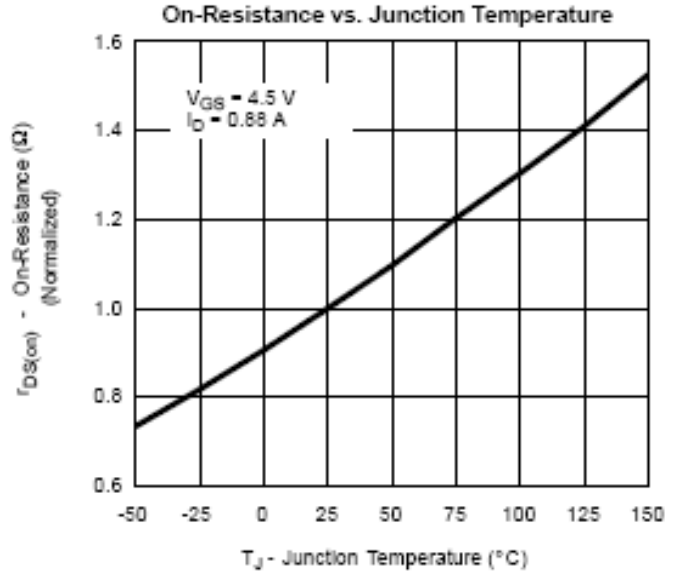
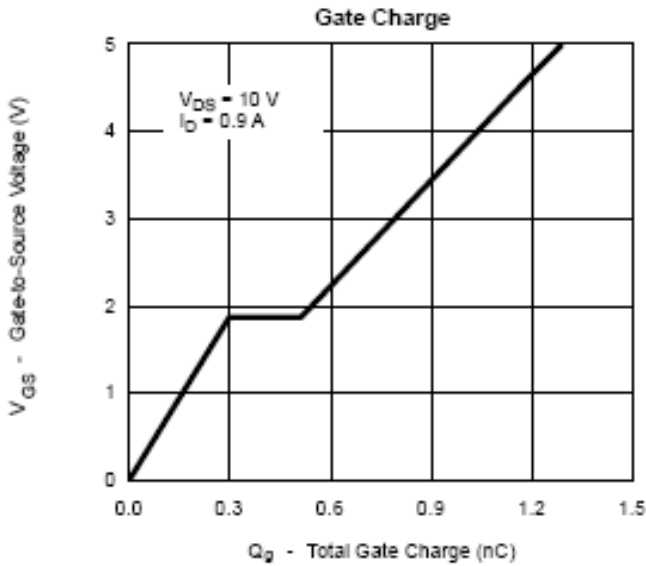




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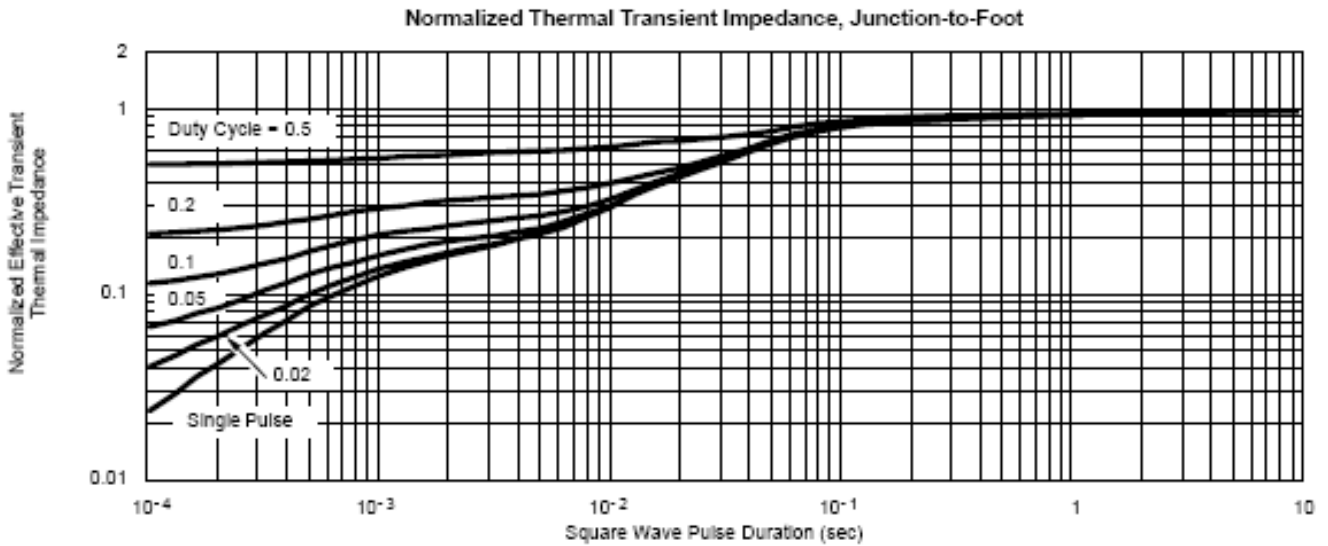
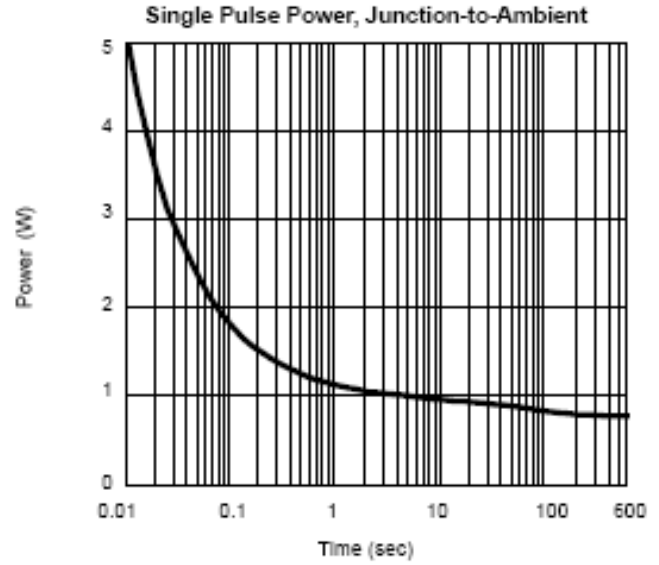
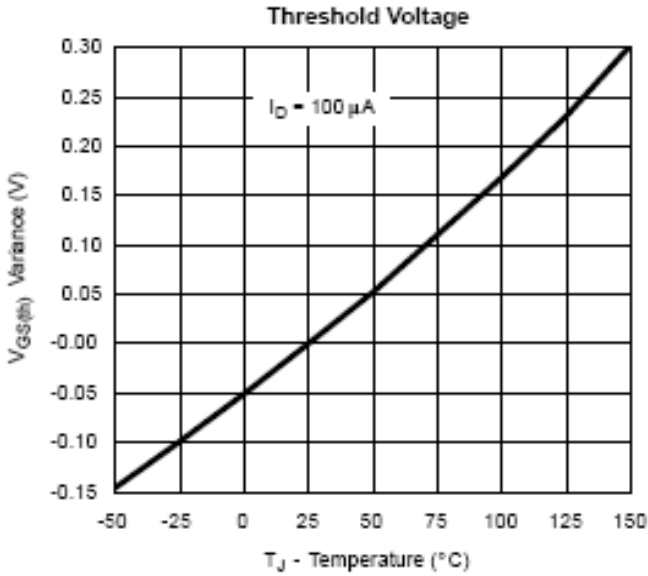




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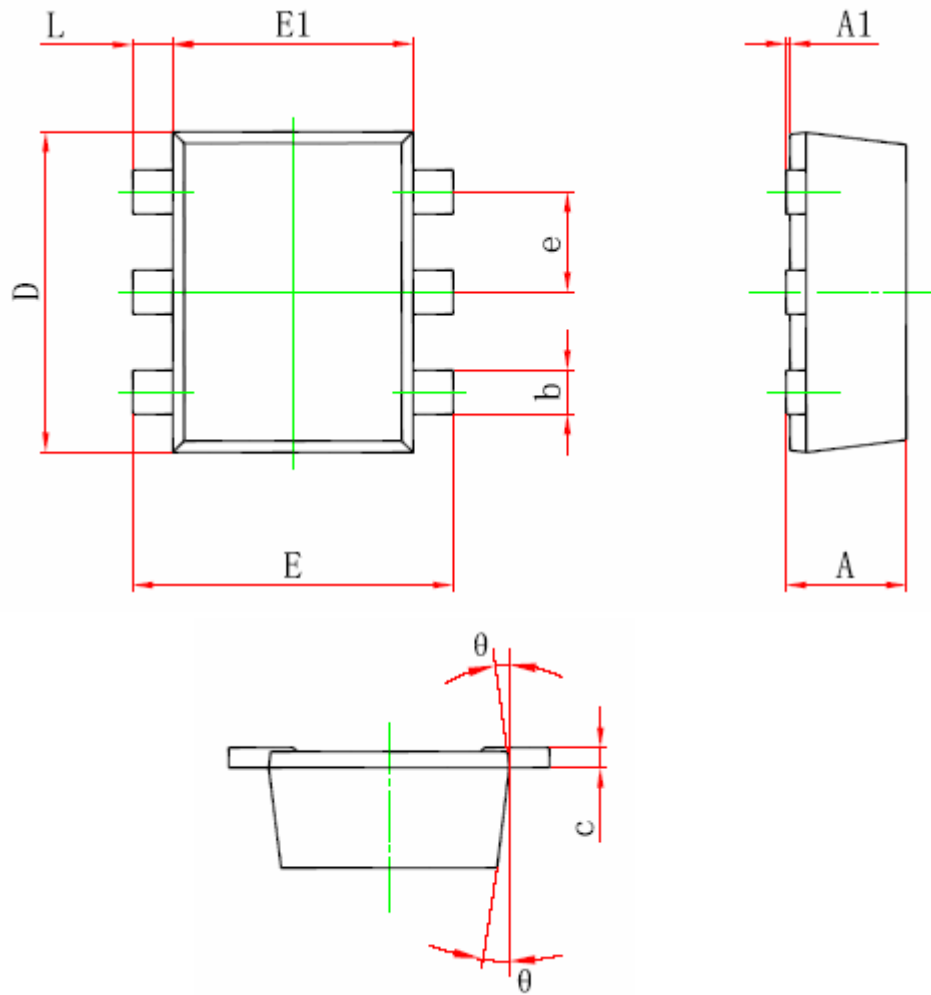




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### SOT-563 PACKAGE OUTLINE



| Symbol   | Dimensions in Millimeters |       | Dimensions in Inches |       |
|----------|---------------------------|-------|----------------------|-------|
|          | Min.                      | Max.  | Min.                 | Max.  |
| A        | 0.525                     | 0.600 | 0.021                | 0.024 |
| A1       | 0.000                     | 0.050 | 0.000                | 0.002 |
| e        | 0.450                     | 0.550 | 0.018                | 0.022 |
| c        | 0.090                     | 0.160 | 0.004                | 0.006 |
| D        | 1.500                     | 1.700 | 0.059                | 0.067 |
| b        | 0.170                     | 0.270 | 0.007                | 0.011 |
| E1       | 1.100                     | 1.300 | 0.043                | 0.051 |
| E        | 1.500                     | 1.700 | 0.059                | 0.067 |
| L        | 0.100                     | 0.300 | 0.004                | 0.012 |
| $\theta$ | 7° REF.                   |       | 7° REF.              |       |



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