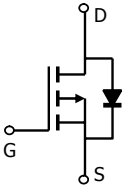
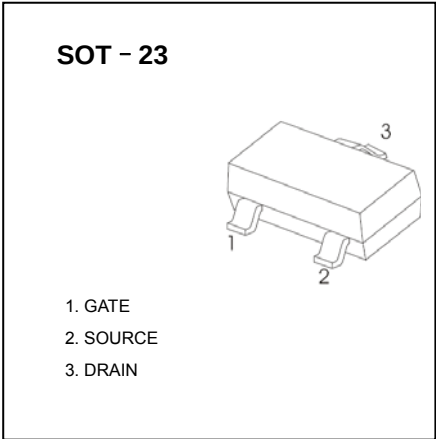


■ Features

- $V_{DS} (V) = -30V$
- $I_D = -2.6 A (V_{GS} = -10V)$
- $R_{DS(ON)} < 130m\Omega (V_{GS} = -10V)$
- $R_{DS(ON)} < 200m\Omega (V_{GS} = -4.5V)$
- Pb-Free Package May be Available. The G-Suffix Denotes a Pb-Free Lead Finish



■ Absolute Maximum Ratings  $T_a = 25^{\circ}C$

| Parameter                                                          | Symbol         | Rating     | Unit          |
|--------------------------------------------------------------------|----------------|------------|---------------|
| Drain-Source Voltage                                               | $V_{DS}$       | -30        | V             |
| Gate-Source Voltage                                                | $V_{GS}$       | $\pm 20$   | V             |
| Continuous Drain Current<br>$T_A=25^{\circ}C$<br>$T_A=70^{\circ}C$ | $I_D$          | -2.6       | A             |
|                                                                    |                | -2.2       |               |
| Pulsed Drain Current                                               | $I_{DM}$       | -20        |               |
| Power Dissipation<br>$T_A=25^{\circ}C$<br>$T_A=70^{\circ}C$        | $P_D$          | 1.4        | W             |
|                                                                    |                | 1          |               |
| Thermal Resistance. Junction-to-Ambient                            | $R_{thJA}$     | 125        | $^{\circ}C/W$ |
| Thermal Resistance. Junction-to-Case                               | $R_{thJC}$     | 80         | $^{\circ}C/W$ |
| Junction and Storage Temperature Range                             | $T_J, T_{STG}$ | -55 to 150 | $^{\circ}C$   |

## ■ Electrical Characteristics Ta = 25°C

| Parameter                             | Symbol              | Testconditions                                                                             | Min | Typ   | Max  | Unit |
|---------------------------------------|---------------------|--------------------------------------------------------------------------------------------|-----|-------|------|------|
| Drain-Source Breakdown Voltage        | V <sub>DSS</sub>    | I <sub>D</sub> =250 μ A, V <sub>GS</sub> =0V                                               | -30 |       |      | V    |
| Zero Gate Voltage Drain Current       | I <sub>DSS</sub>    | V <sub>DS</sub> =-24V, V <sub>GS</sub> =0V                                                 |     |       | -1   | μ A  |
|                                       |                     | V <sub>DS</sub> =-24V, V <sub>GS</sub> =0V, T <sub>J</sub> =55°C                           |     |       | -5   |      |
| Gate-Body leakage current             | I <sub>GSS</sub>    | V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V                                                 |     |       | ±100 | nA   |
| Gate Threshold Voltage                | V <sub>GS(th)</sub> | V <sub>DS</sub> =V <sub>GS</sub> I <sub>D</sub> =-250 μ A                                  | -1  | -1.9  | -3   | V    |
| Static Drain-Source On-Resistance     | r <sub>DS(ON)</sub> | V <sub>GS</sub> =-10V, I <sub>D</sub> =-2.6A                                               |     | 97    | 130  | m Ω  |
|                                       |                     | V <sub>GS</sub> =-10V, I <sub>D</sub> =-2.6A T <sub>J</sub> =125°C                         |     | 135   | 150  |      |
|                                       |                     | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-2A                                                |     | 166   | 200  | m Ω  |
| On state drain current                | I <sub>D(ON)</sub>  | V <sub>GS</sub> =-4.5V, V <sub>DS</sub> =-5V                                               | -5  |       |      | A    |
| Forward Transconductance              | g <sub>fs</sub>     | V <sub>DS</sub> =-5V, I <sub>D</sub> =-5A                                                  | 3   | 3.8   |      | S    |
| Input Capacitance                     | C <sub>iss</sub>    | V <sub>GS</sub> =0V, V <sub>DS</sub> =-15V, f=1MHz                                         |     | 302   | 370  | pF   |
| Output Capacitance                    | C <sub>oss</sub>    |                                                                                            |     | 50.3  |      | pF   |
| Reverse Transfer Capacitance          | C <sub>rss</sub>    |                                                                                            |     | 37.8  |      | pF   |
| Gate resistance                       | R <sub>g</sub>      | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz                                           |     | 12    | 18   | Ω    |
| Total Gate Charge (10V)               | Q <sub>g</sub>      | V <sub>GS</sub> =-4.5V, V <sub>DS</sub> =-15V, I <sub>D</sub> =-2.6A                       |     | 6.8   | 9    | nC   |
| Total Gate Charge (4.5V)              |                     |                                                                                            |     | 2.4   |      | nC   |
| Gate Source Charge                    | Q <sub>gs</sub>     |                                                                                            |     | 1.6   |      | nC   |
| Gate Drain Charge                     | Q <sub>gd</sub>     |                                                                                            |     | 0.95  |      | nC   |
| Turn-On DelayTime                     | t <sub>D(on)</sub>  |                                                                                            |     | 7.5   |      | ns   |
| Turn-On Rise Time                     | t <sub>r</sub>      | V <sub>GS</sub> =-10V, V <sub>DS</sub> =-15V, R <sub>L</sub> =5.8 Ω, R <sub>GEN</sub> =3 Ω |     | 3.2   |      | ns   |
| Turn-Off DelayTime                    | t <sub>D(off)</sub> |                                                                                            |     | 17    |      | ns   |
| Turn-Off Fall Time                    | t <sub>f</sub>      |                                                                                            |     | 6.8   |      | ns   |
| Body Diode Reverse Recovery Time      | t <sub>rr</sub>     | I <sub>F</sub> =-2.6A, dI/dt=100A/ μ s                                                     |     | 16.8  | 22   | ns   |
| Body Diode Reverse Recovery Charge    | Q <sub>rr</sub>     | I <sub>F</sub> =-2.6A, dI/dt=100A/ μ s                                                     |     | 10    |      | nC   |
| Maximum Body-Diode Continuous Current | I <sub>s</sub>      |                                                                                            |     |       | -2   | A    |
| Diode Forward Voltage                 | V <sub>SD</sub>     | I <sub>s</sub> =-1A, V <sub>GS</sub> =0V                                                   |     | -0.82 | -1   | V    |

\* Repetitive rating, pulse width limited by junction temperature.

## ■ Typical Characteristics

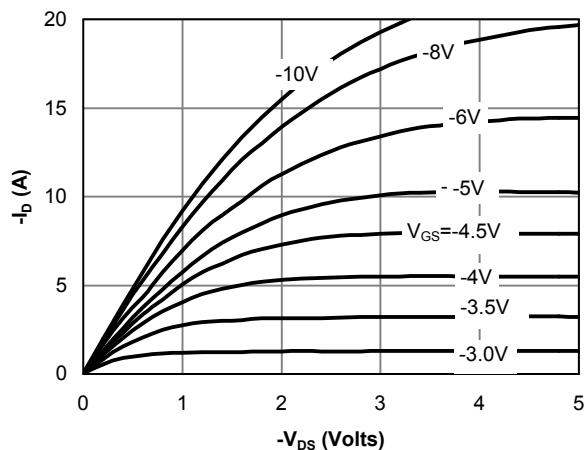


Fig 1: On-Region Characteristics

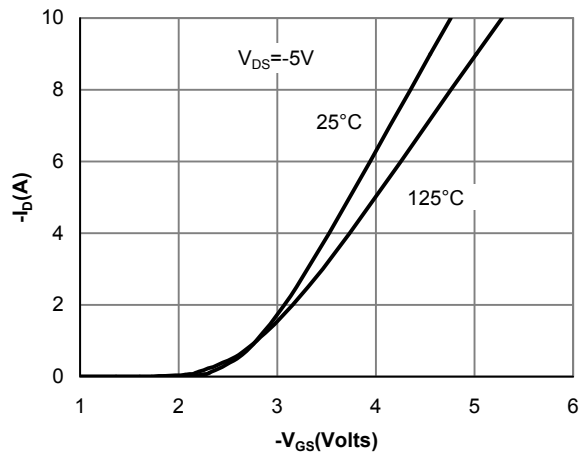


Figure 2: Transfer Characteristics

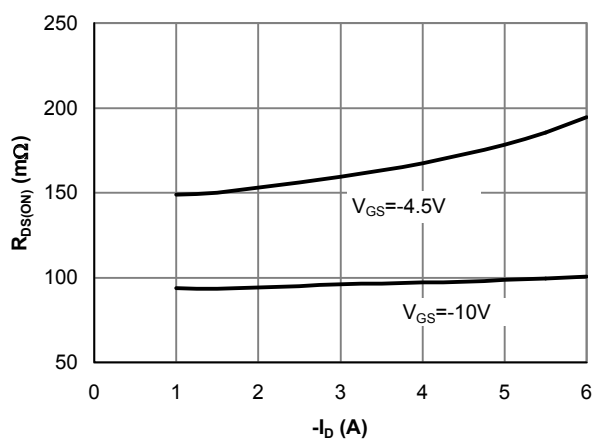


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

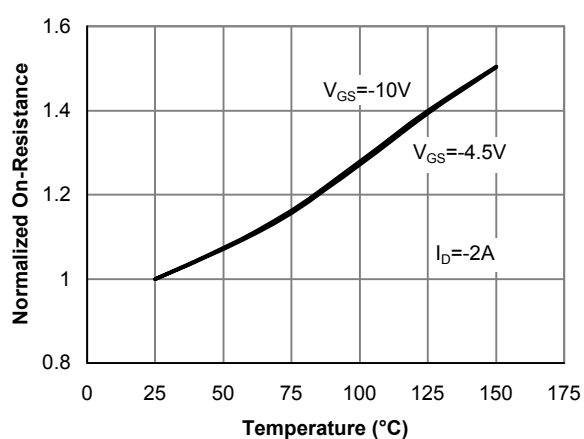


Figure 4: On-Resistance vs. Junction Temperature

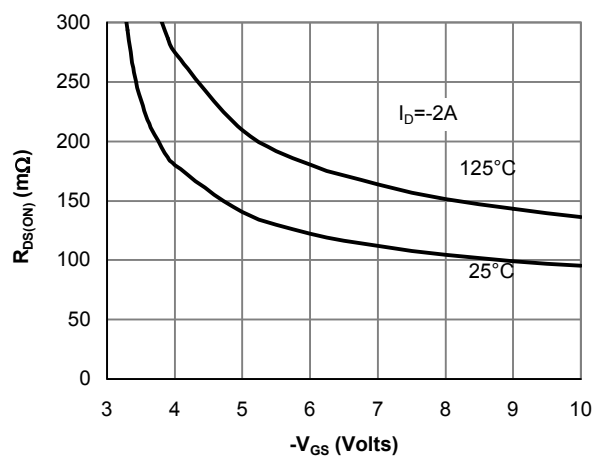


Figure 5: On-Resistance vs. Gate-Source Voltage

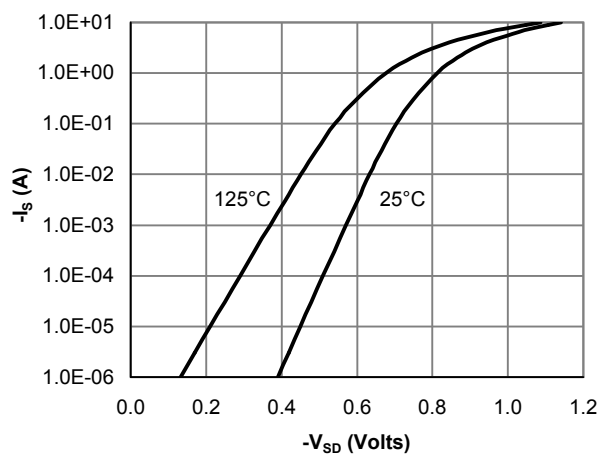


Figure 6: Body-Diode Characteristics

### ■ Typical Characteristics

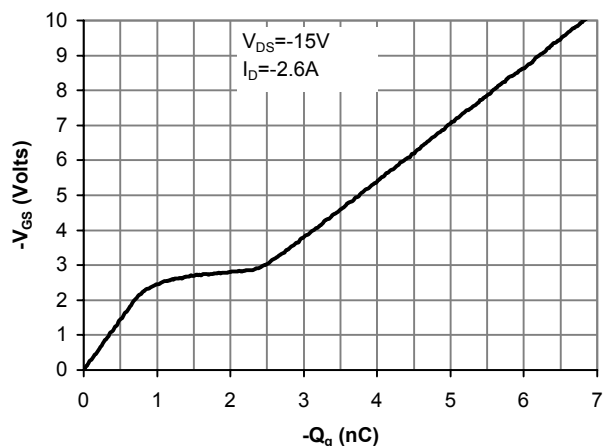


Figure 7: Gate-Charge Characteristics

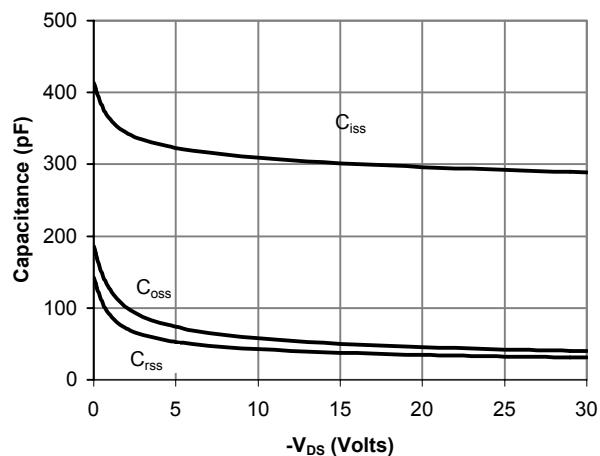


Figure 8: Capacitance Characteristics

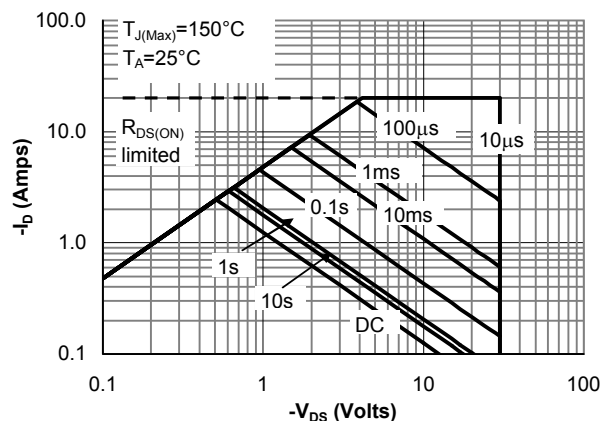


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

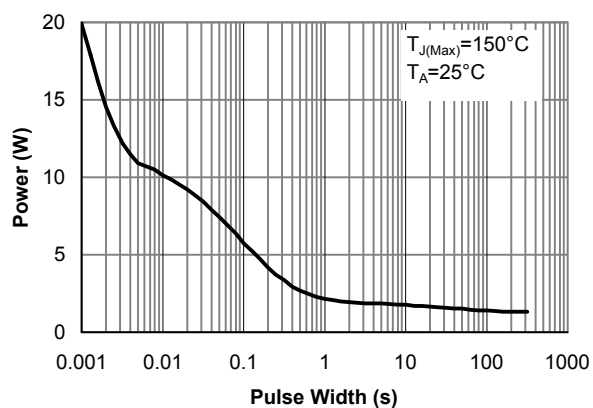


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

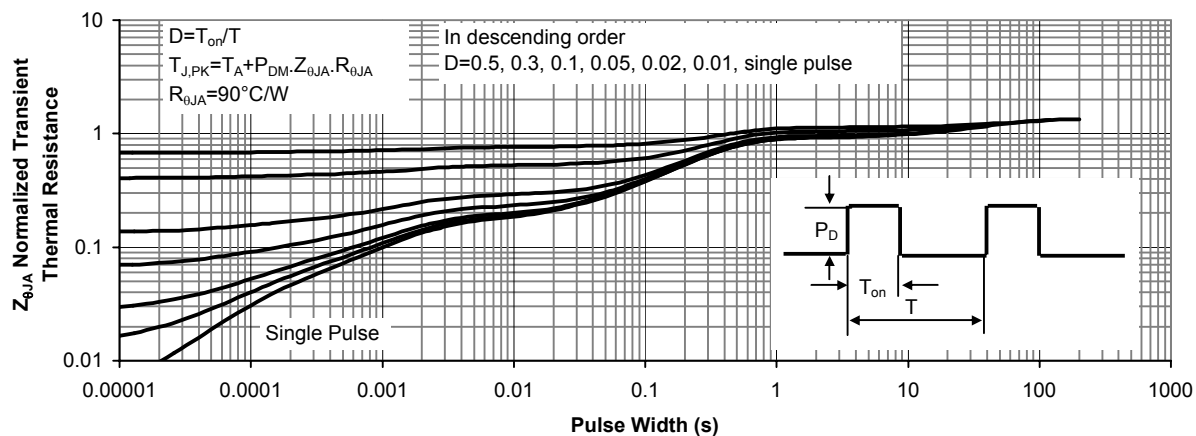
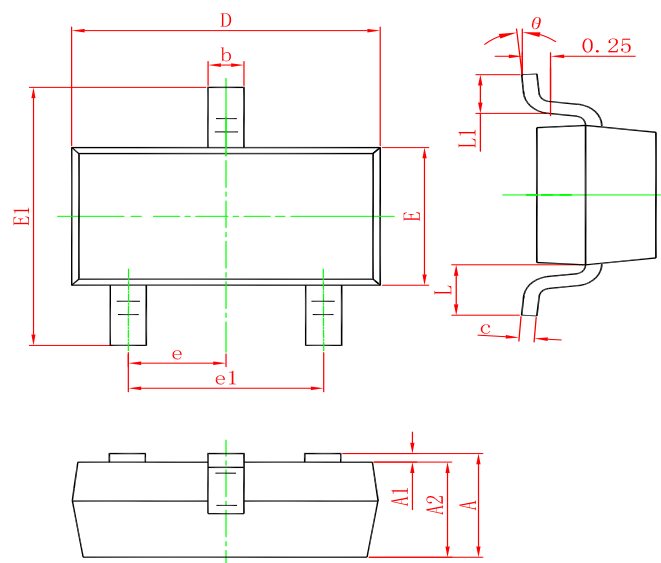


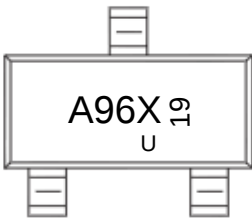
Figure 11: Normalized Maximum Transient Thermal Impedance

SOT-23 PACKAGE OUTLINE DIMENSIONS



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 0.900                     | 1.150 | 0.035                | 0.045 |
| A1     | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2     | 0.900                     | 1.050 | 0.035                | 0.041 |
| b      | 0.300                     | 0.500 | 0.012                | 0.020 |
| c      | 0.080                     | 0.150 | 0.003                | 0.006 |
| D      | 2.800                     | 3.000 | 0.110                | 0.118 |
| E      | 1.200                     | 1.400 | 0.047                | 0.055 |
| E1     | 2.250                     | 2.550 | 0.089                | 0.100 |
| e      | 0.950 TYP.                |       | 0.037 TYP.           |       |
| e1     | 1.800                     | 2.000 | 0.071                | 0.079 |
| L      | 0.550 REF.                |       | 0.022 REF.           |       |
| L1     | 0.300                     | 0.500 | 0.012                | 0.020 |
| θ      | 0°                        | 8°    | 0°                   | 8°    |

Marking



Ordering information

| Order code | Package | Baseqty | Deliverymode  |
|------------|---------|---------|---------------|
| AO3409A    | SOT-23  | 3000    | Tape and reel |