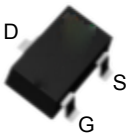
- 30V/4A
- $R_{DS(ON)}$=40mΩ (typ) @VGS=10V
  $R_{DS(ON)}$=45mΩ (typ) @VGS=4.5V
  $R_{DS(ON)}$=60mΩ (typ) @VGS=2.5V
- 100% UIS & RG Tested
- Reliableand Rugged
- Lead Freeand Green Devices Available
  (RoHS Compliant)

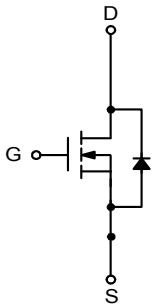
## Applications

- Power Management for Industrial DC/DC Converters

## Pin Description




Top View of SOT-23




N-Channel MOSFET

## Absolute Maximum Ratings ($T_A$= 25°C unless otherwise noted)

| Symbol | Parameter | | Rating | Unit |
|---|---|---|---|---|
| **Common Ratings** | | | | |
| $V_{DSS}$ | Drain-Source Voltage | | 30 | V |
| $V_{GSS}$ | Gate-Source Voltage | | ±12 | |
| $I_D$ | Continuous Drain Current(TJ=150°C） | $V_{GS}$=4.5V | 4 | A |
| $I_{DM}$ | Pulsed Drain Current | | 15 | |
| $I_S$ | Diode Continuous Forward Current | | 1.5 | A |
| $T_{STG}$, $T_j$ | Storage Temperature Range | | -55 to 150 | °C |
| PD | Power Dissipation | $T_A$=25°C | 1.4 | W |
| | | $T_A$=70°C | 0.9 | |
| $R_{\theta JA}$ | Thermal Resistance-Junction to Ambient | | 90 | °C/W |

**Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress rating only and functional device operation is not implied**

## Electrical Characteristics ($T_A$ = 25°C Unless otherwise noted)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **Static Characteristics** | | | | | | |
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V, $I_{DS}$=250μA | 30 | - | - | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$ =30V, $V_{GS}$=0V | - | - | 1 | μA |
| | | $T_j$=55°C | - | - | 5 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$ =$V_{GS}$, $I_{DS}$=250μA | 0.5 | - | 1.5 | V |
| $I_{GSS}$ | Gate Leakage Current | $V_{GS}$=±12V, $V_{DS}$=0V | - | - | ±100 | nA |
| $R_{DS(ON)}$ | Drain-Source On-state Resistance | $V_{GS}$=10V, $I_{DS}$=4A | - | 40 | 50 | mΩ |
| | | $V_{GS}$=4.5V, $I_{DS}$=3A | - | 45 | 65 | |
| | | $V_{GS}$=2.5V,$I_{DS}$=2A | - | 60 | 85 | |
| **Body Diode Characteristics** | | | | | | |
| $V_{SD}$ | Diode Forward Voltage | $I_{SD}$=1A, $V_{GS}$=0V | - | 0.7 | 1.0 | V |
| **Dynamic Characteristics** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{GS}$=0V, $V_{DS}$ =15V, Frequency=1.0MHz | - | 260 | - | pF |
| $C_{oss}$ | Output Capacitance | | - | 38 | - | |
| $C_{rss}$ | Reverse transfer capacitance | | - | 22 | - | |
| $t_{d(ON)}$ | Turn-on delay Time | $V_{GS}$=10V ,$V_{DS}$=15V $R_G$=3Ω,$R_L$=3.75Ω, | - | 4 | - | nS |
| $t_r$ | Turn-on rise Time | | - | 2 | - | |
| $t_{d(OFF)}$ | Turn-off delay Time | | - | 20 | - | |
| $t_f$ | Turn-off rise Time | | - | 3 | - | |
| **Gate Charge Characteristics** | | | | | | |
| $Q_g$ | Total Gate Charge | $V_{DS}$ =15V, $V_{GS}$=10V, $I_{DS}$=4A | - | 10 | 19 | nC |
| $Q_{gs}$ | Gate-Source Charge | | - | 1.1 | - | |
| $Q_{gd}$ | Gate-Drain Charge | | - | 1.8 | - | |

**Note: 1. Pulse test: pulse width<=300uS, duty cycle<=2%**

**2.Static parameters are based on package level with recommended wire bonding**

## *TYPICAL CHARACTERISTICS (25℃ Unless Note)*

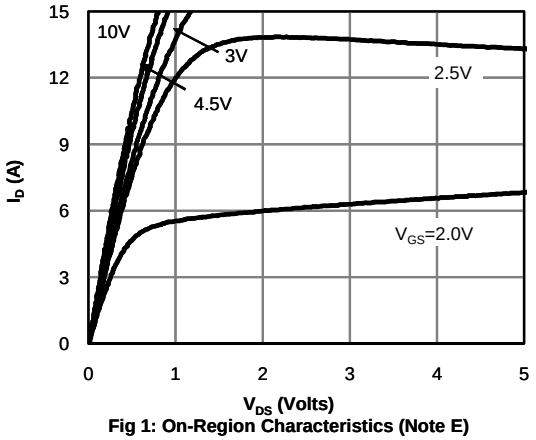



Fig 1: On-Region Characteristics (Note E)

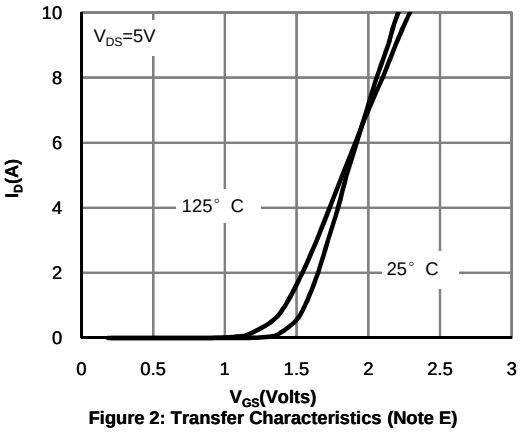



Figure 2: Transfer Characteristics (Note E)

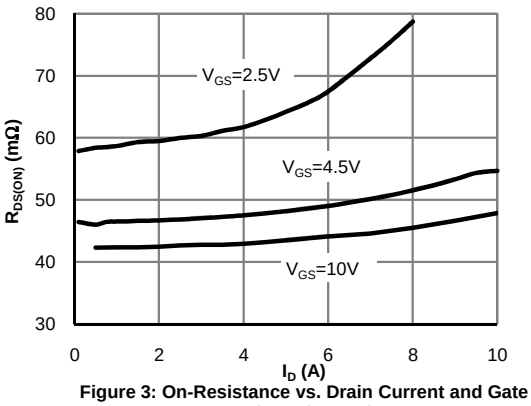



Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

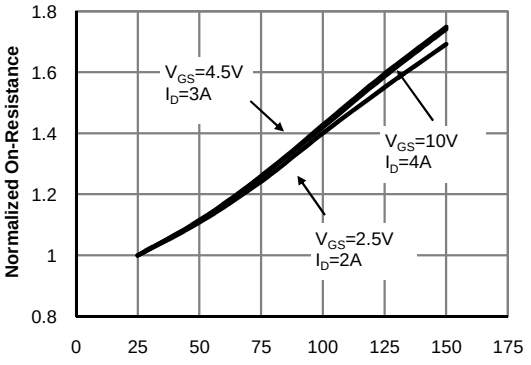



Figure 4: On-Resistance vs. Junction Temperature (Note E)

## *TYPICAL CHARACTERISTICS (continuous)*

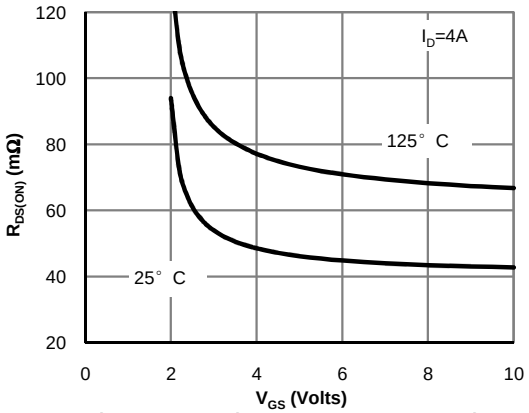



**Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)**

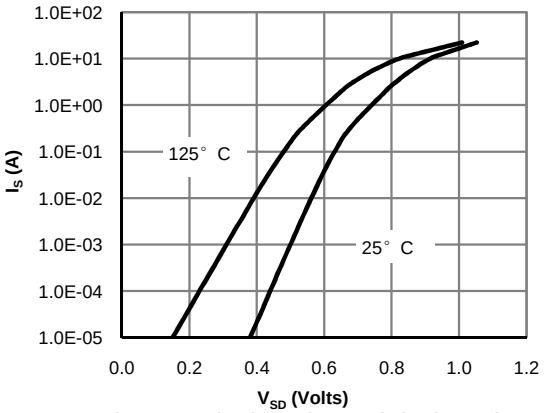



**Figure 6: Body-Diode Characteristics (Note E)**

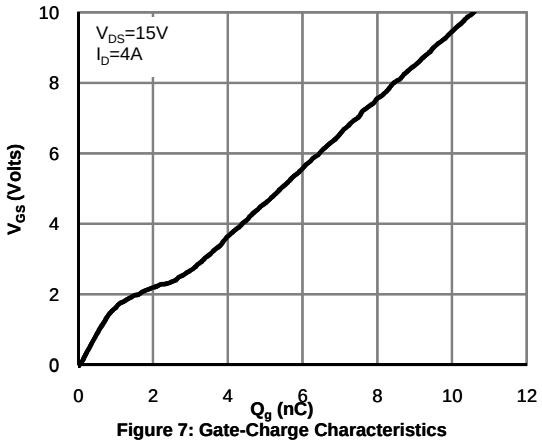



**Figure 7: Gate-Charge Characteristics**

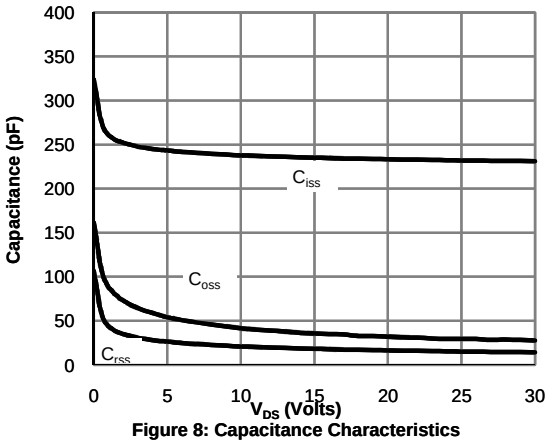



**Figure 8: Capacitance Characteristics**

## *TYPICAL CHARACTERISTICS (continuous)*

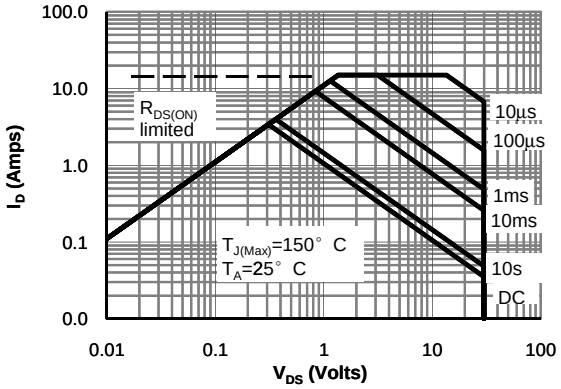



**Figure 9: Maximum Forward Biased Safe Operating Area (Note F)**

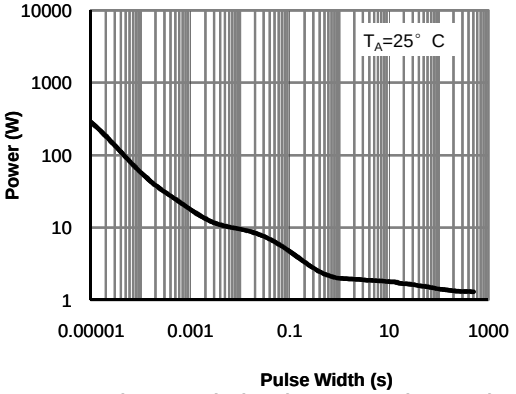



**Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)**

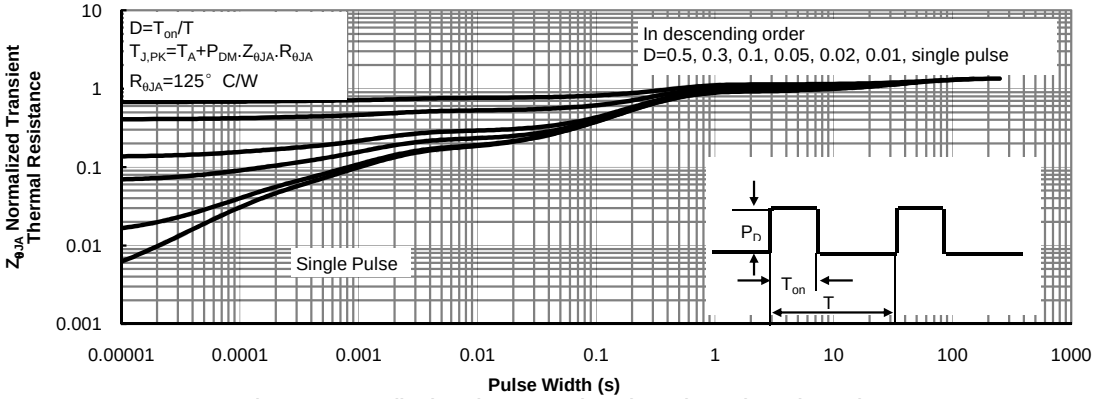
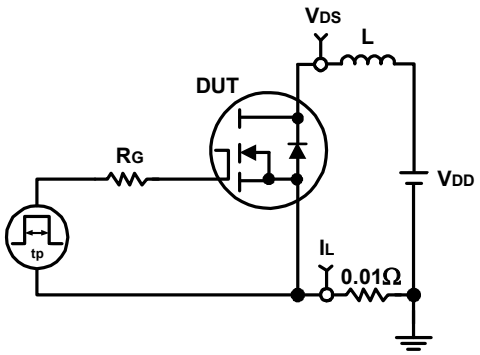
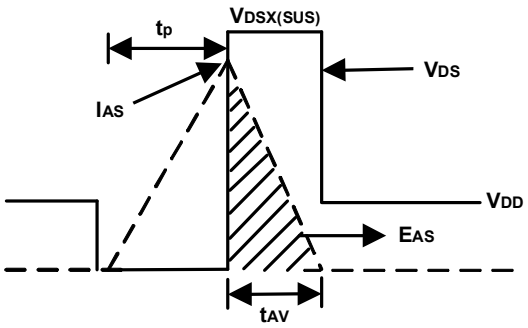


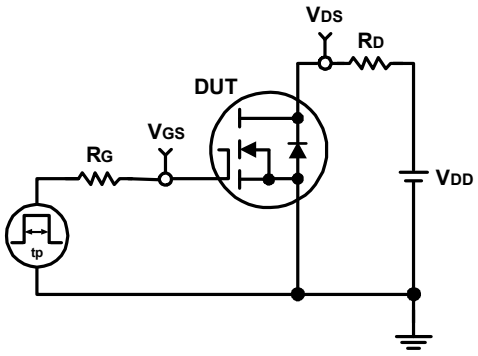

**Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)**

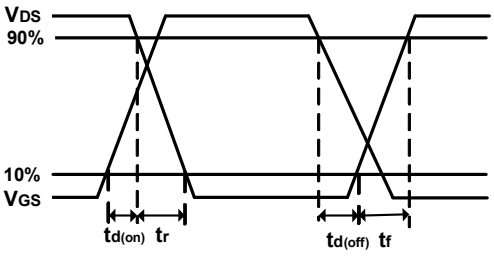
## Avalanche Test Circuit and Waveforms



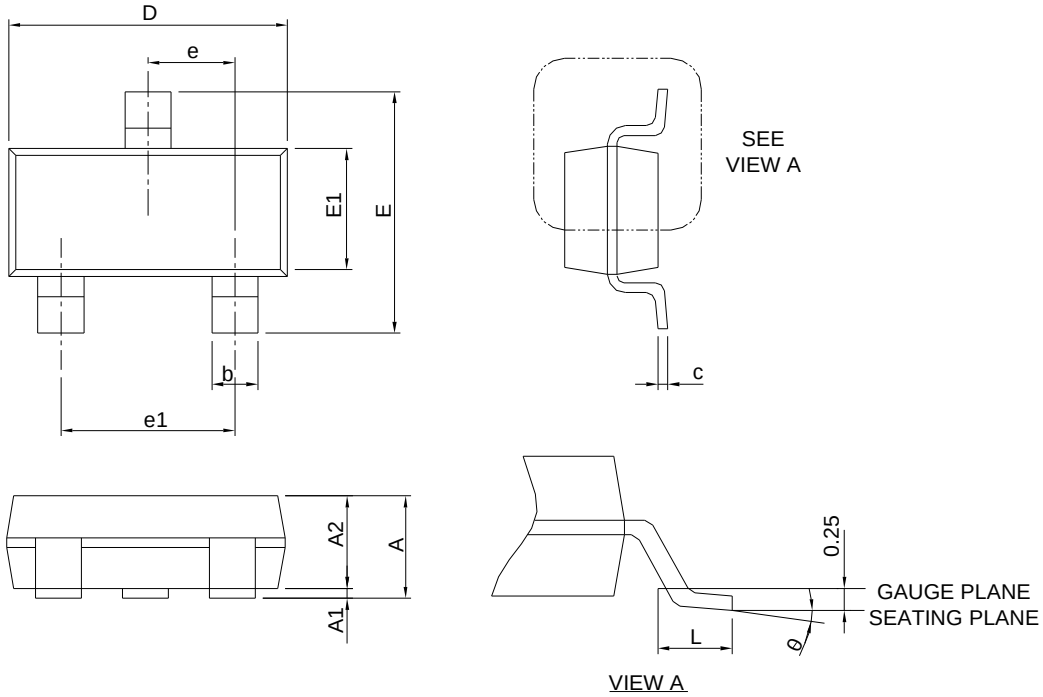

## Switching Time Test Circuit and Waveforms



## Package Information

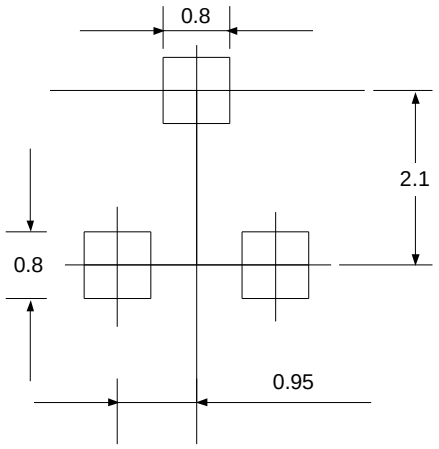
**SOT-23**




| SYMBOL | SOT-23 | | | |
|---|---|---|---|---|
| | MILLIMETERS | | INCHES | |
| | MIN. | MAX. | MIN. | MAX. |
| A | - | 1.20 | - | 0.047 |
| A1 | 0.00 | 0.10 | 0.000 | 0.004 |
| A2 | 0.90 | 1.10 | 0.035 | 0.043 |
| b | 0.30 | 0.50 | 0.012 | 0.020 |
| c | 0.08 | 0.22 | 0.003 | 0.009 |
| D | 2.70 | 3.10 | 0.106 | 0.122 |
| E | 2.20 | 2.60 | 0.086 | 0.102 |
| E1 | 1.20 | 1.40 | 0.047 | 0.055 |
| e | 0.95 BSC | | 0.037 BSC | |
| e1 | 1.90 BSC | | 0.075 BSC | |
| L | 0.30 | 0.60 | 0.012 | 0.024 |
| θ | 0 ° | 8 ° | 0 ° | 8 ° |

Note : Dimension D and E1 do not include mold flash, protrusions or gate burrs. Mold flash, protrusion or gate burrs shall not exceed 10 mil per side.

**RECOMMENDED LAND PATTERN**




UNIT: mm