



Product Summary

- $V_{DS} = -20V, I_D = -4A$
- $R_{DS(ON)} < 36m\Omega @ V_{GS} = -4.5V$
- $R_{DS(ON)} < 49m\Omega @ V_{GS} = -2.5V$
- ESD Rating: 2500V HBM

Application

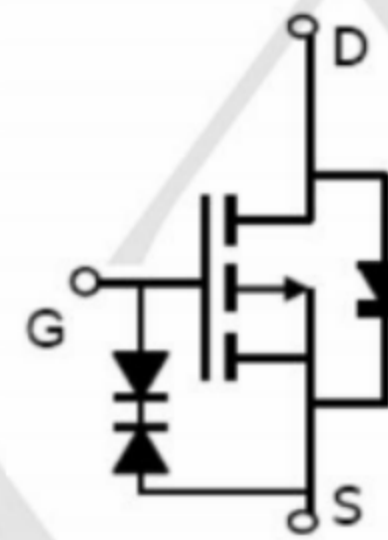
- Load/Power Switching
- Interfacing Switching
- Logic Level Shift

Package and Pin Configuration
SOT-23



Marking: 3415

Circuit diagram



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

| Parameter | Symbol | Limit | Unit |
|--|----------------|------------|------------|
| Drain-Source Voltage | V_{DS} | -20 | V |
| Gate-Source Voltage | V_{GS} | ± 10 | V |
| Drain Current-Continuous | I_D | -4 | A |
| Drain Current-Pulsed (Note 1) | I_{DM} | -30 | A |
| Maximum Power Dissipation | P_D | 1.4 | W |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | -55 To 150 | $^\circ C$ |

Thermal Characteristic

| | | | |
|--|-----------------|------|--------------|
| Thermal Resistance, Junction-to-Ambient (Note 2) | $R_{\theta JA}$ | 89.3 | $^\circ C/W$ |
|--|-----------------|------|--------------|

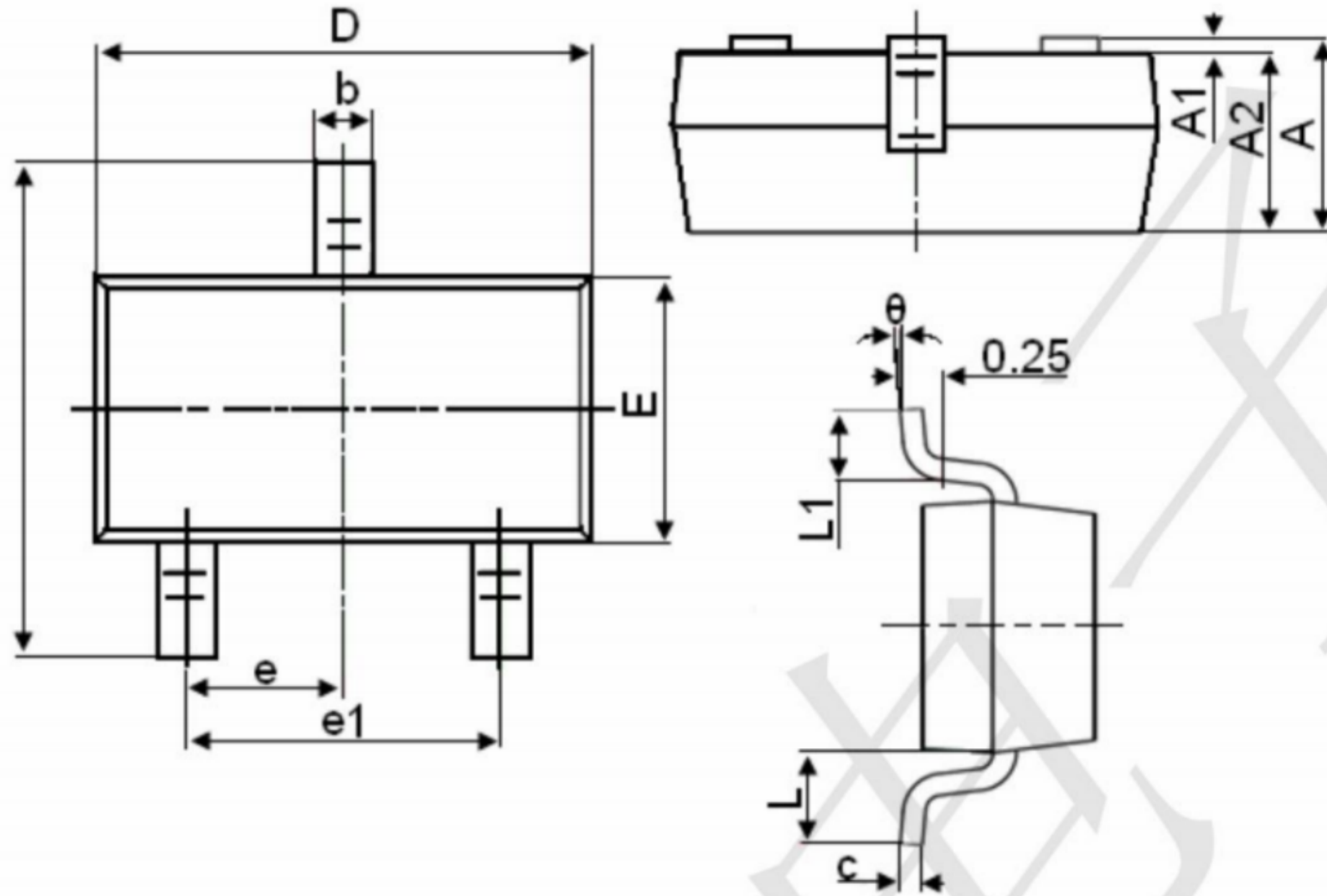


Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|--------------|---|-------|--------|----------|------------|
| Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0V, I_D=-250\mu A$ | -20 | | - | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=-20V, V_{GS}=0V$ | - | - | 1 | μA |
| Gate-Body Leakage Current | I_{GSS} | $V_{GS}=\pm 10V, V_{DS}=0V$ | - | - | ± 10 | μA |
| On Characteristics (Note 3) | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=-250\mu A$ | -0.35 | -0.65 | -0.9 | V |
| Drain-Source On-State Resistance | $R_{DS(on)}$ | $V_{GS}=-4.5V, I_D=-4A$ | - | 29 | 36 | m Ω |
| | | $V_{GS}=-2.5V, I_D=-4A$ | - | 37 | 49 | m Ω |
| Forward Transconductance | g_{FS} | $V_{DS}=-5V, I_D=-4A$ | 8 | - | - | S |
| Dynamic Characteristics (Note4) | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS}=-10V, V_{GS}=0V,$ $F=1.0MHz$ | - | 1181.1 | - | PF |
| Output Capacitance | C_{oss} | | - | 121.3 | - | PF |
| Reverse Transfer Capacitance | C_{rss} | | - | 114.8 | - | PF |
| Switching Characteristics (Note 4) | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}=-10V, R_L=2.5\Omega$ $V_{GS}=-4.5V, R_{GEN}=3\Omega$ | - | 12 | | nS |
| Turn-on Rise Time | t_r | | - | 10 | | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 19 | | nS |
| Turn-Off Fall Time | t_f | | - | 25 | | nS |
| Total Gate Charge | Q_g | $V_{DS}=-10V, I_D=-4A,$ $V_{GS}=-4.5V$ | - | 10.2 | | nC |
| Gate-Source Charge | Q_{gs} | | - | 1.3 | - | nC |
| Gate-Drain Charge | Q_{gd} | | - | 2.4 | - | nC |
| Drain-Source Diode Characteristics | | | | | | |
| Diode Forward Voltage (Note 3) | V_{SD} | $V_{GS}=0V, I_S=-4A$ | - | - | -1.2 | V |
| Diode Forward Current (Note 2) | I_S | | - | - | -4 | A |



SOT-23 Package Information



| Symbol | Dimensions in Millimeters | |
|----------|---------------------------|-------|
| | MIN. | MAX. |
| A | 0.900 | 1.150 |
| A1 | 0.000 | 0.100 |
| A2 | 0.900 | 1.050 |
| b | 0.300 | 0.500 |
| c | 0.080 | 0.150 |
| D | 2.800 | 3.000 |
| E | 1.200 | 1.400 |
| E1 | 2.250 | 2.550 |
| e | 0.950TYP | |
| e1 | 1.800 | 2.000 |
| L | 0.550REF | |
| L1 | 0.300 | 0.500 |
| θ | 0° | 8° |