



Description

The HAOSS32136C uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

$V_{DS} = 20V$ $I_D = 6A$

$R_{DS(ON)} < 27m\Omega @ V_{GS}=4.5V$

Application

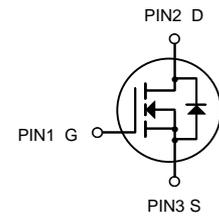
Battery protection

Load switch

Uninterruptible power supply



SOT23



N-Channel MOSFET

Package Marking and Ordering Information

| Product ID | Pack | Marking | Qty(PCS) |
|-------------|-------|---------|----------|
| HAOSS32136C | SOT23 | AE9T | 3000 |

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

| Symbol | Parameter | Limit | Unit | |
|-----------------|--|--------------------|--------------|---|
| V_{DS} | Drain-Source Voltage | 20 | V | |
| V_{GS} | Gate-Source Voltage | ± 12 | V | |
| I_D | Continuous Drain Current | $T_A = 25^\circ C$ | 6 | A |
| | | $T_A = 70^\circ C$ | 3.6 | |
| I_{DM} | Drain Current-Pulsed (Note 1) | 15 | A | |
| P_D | Maximum Power Dissipation | 1.25 | W | |
| T_J, T_{STG} | Operating Junction and Storage Temperature Range | -55 To 150 | $^\circ C$ | |
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient (Note 2) | 100 | $^\circ C/W$ | |



Electrical Characteristics (T_A=25°C unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|---------------------|---|-----|------|------|------|
| Drain-Source Breakdown Voltage | BV _{DSS} | V _{GS} =0V I _D =250μA | 20 | 22.5 | - | V |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =20V, V _{GS} =0V | - | - | 1 | μA |
| Gate-Body Leakage Current | I _{GSS} | V _{GS} =±12V, V _{DS} =0V | - | - | ±100 | nA |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} =V _{GS} , I _D =250μA | 0.5 | 0.65 | 1.0 | V |
| Drain-Source On-State Resistance | R _{DS(on)} | V _{GS} =4.5V, I _D =4.0 A | - | 22 | 27 | mΩ |
| | | V _{GS} =2.5V, I _D =4.5A | - | 28 | 40 | mΩ |
| Forward Transconductance | g _{FS} | V _{DS} =10V, I _D =4A | - | 10 | - | S |
| Input Capacitance | C _{iss} | V _{DS} =8V, V _{GS} =0V, F=1.0MHz | - | 500 | - | PF |
| Output Capacitance | C _{oss} | | - | 295 | - | PF |
| Reverse Transfer Capacitance | C _{rss} | | - | 96 | - | PF |
| Turn-on Delay Time | t _{d(on)} | V _{DD} =10V, I _D =1A V _{GS} =4.5V, R _{GEN} =6Ω | - | 11 | - | nS |
| Turn-on Rise Time | t _r | | - | 30 | - | nS |
| Turn-Off Delay Time | t _{d(off)} | | - | 35 | - | nS |
| Turn-Off Fall Time | t _f | | - | 10 | - | nS |
| Total Gate Charge | Q _g | V _{DS} =10V, I _D =3A, V _{GS} =4.5V | - | 10 | 15 | nC |
| Gate-Source Charge | Q _{gs} | | - | 2.3 | - | nC |
| Gate-Drain Charge | Q _{gd} | | - | 2.9 | - | nC |
| Diode Forward Voltage ^(Note 3) | V _{SD} | V _{GS} =0V, I _S =1A | - | - | 1.2 | V |
| Diode Forward Current ^(Note 2) | I _S | | - | - | 4.5 | A |

Notes:

1. Repetitive rating: pulse width limited by maximum junction temperature.
2. Surface mounted on FR4 Board, t ≤ 10 sec.
3. Pulse test: pulse width ≤ 300μs, duty cycle ≤ 2%.
4. Guaranteed by design, not subject to production



Typical Electrical and Thermal Characteristics

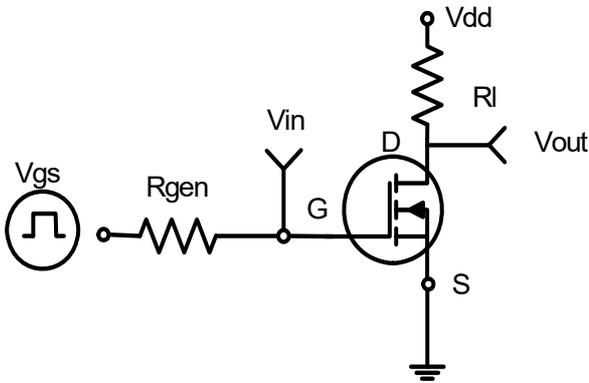


Figure 1: Switching Test Circuit

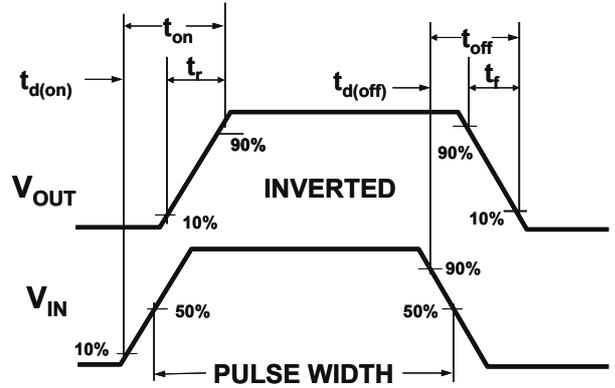


Figure 2: Switching Waveforms

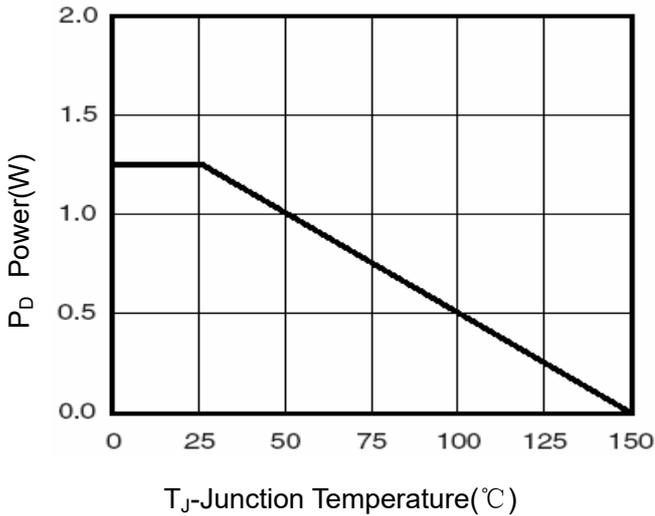


Figure 3 Power Dissipation

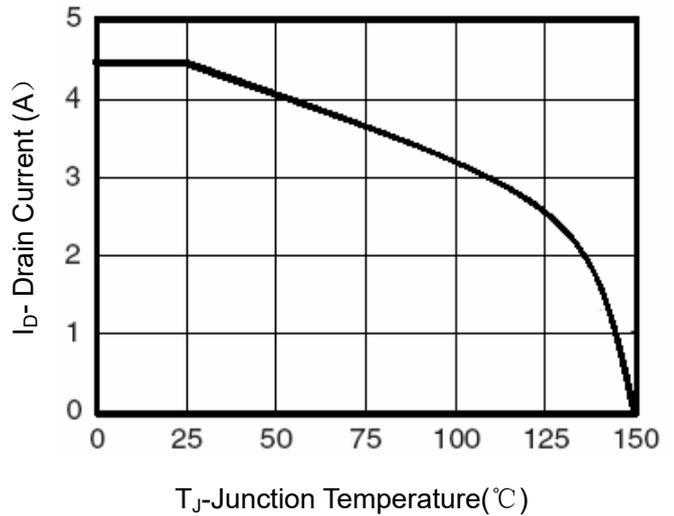


Figure 4 Drain Current

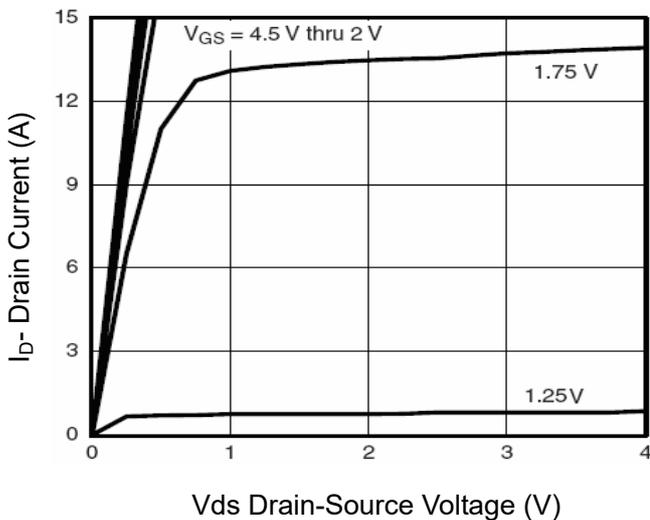


Figure 5 Output Characteristics

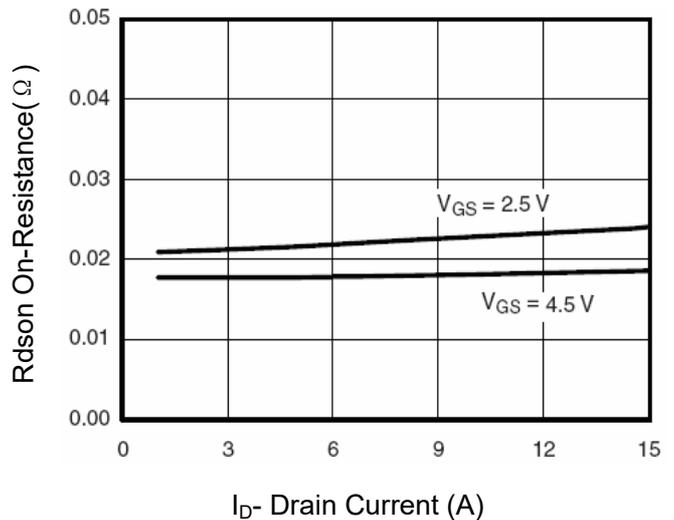


Figure 6 Drain-Source On-Resistance

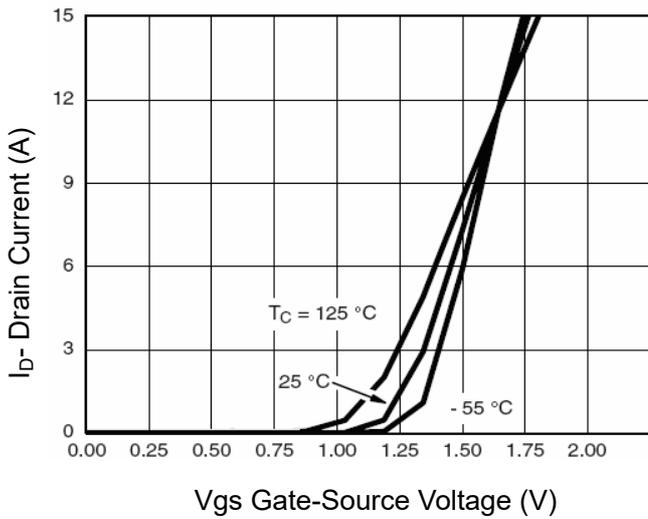


Figure 7 Transfer Characteristics

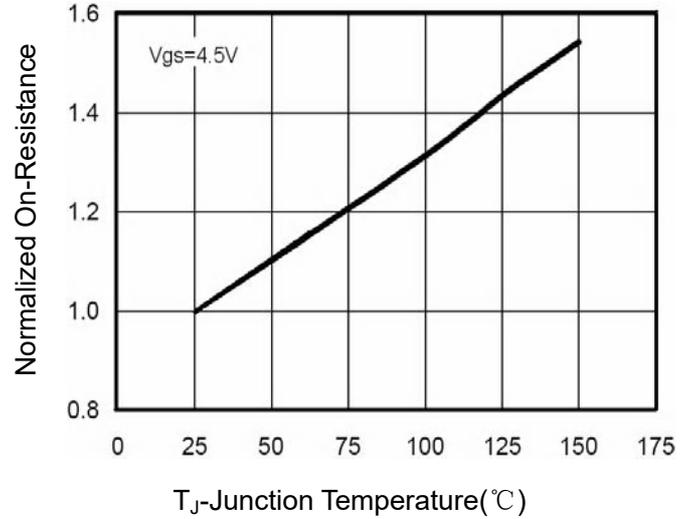


Figure 8 Drain-Source On-Resistance

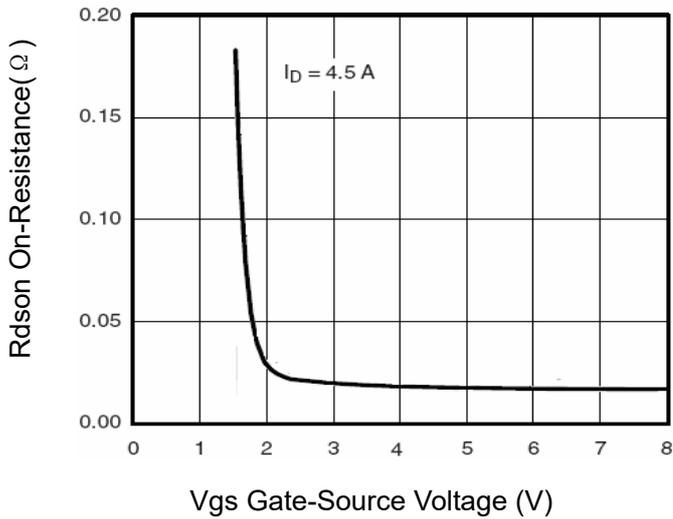


Figure 9 R_{dson} vs. V_{gs}

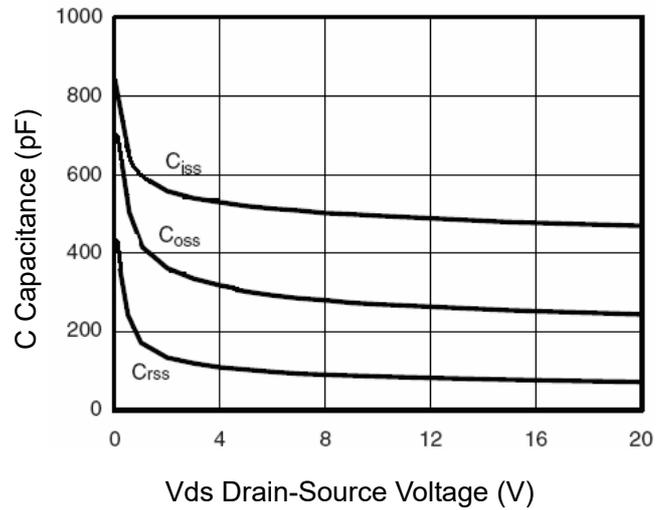


Figure 10 Capacitance vs V_{ds}

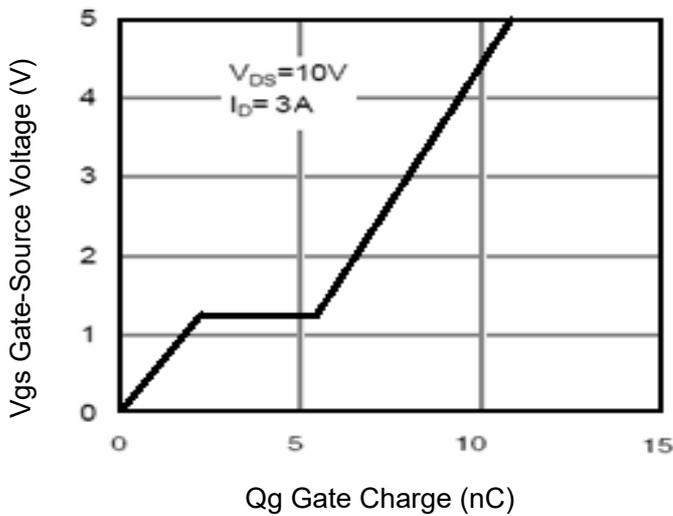


Figure 11 Gate Charge

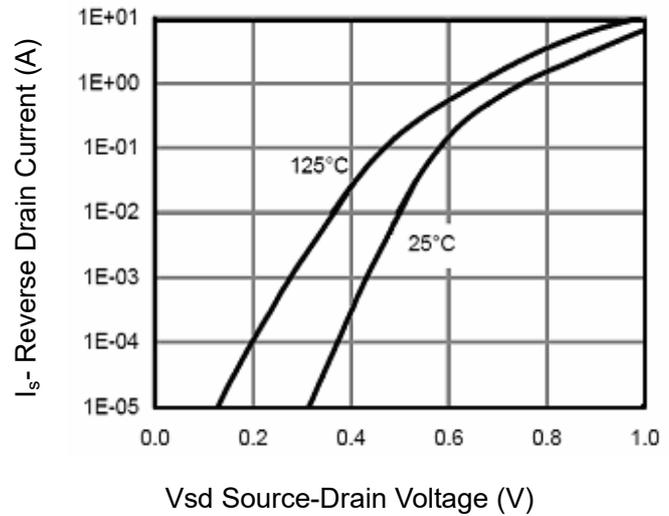


Figure 12 Source- Drain Diode Forward

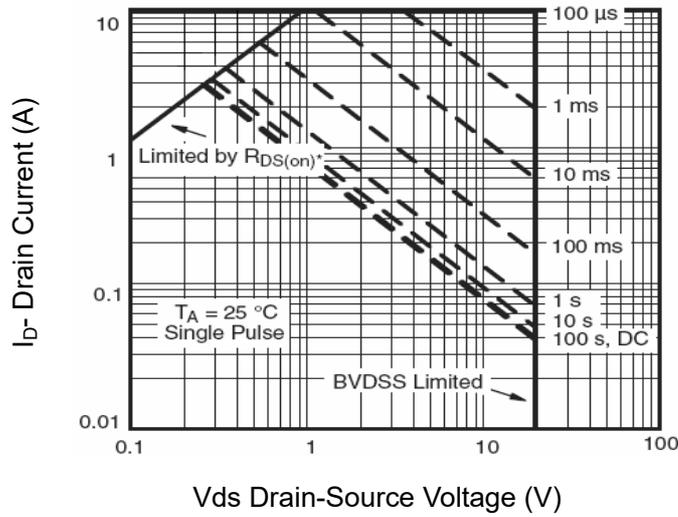


Figure 13 Safe Operation Area

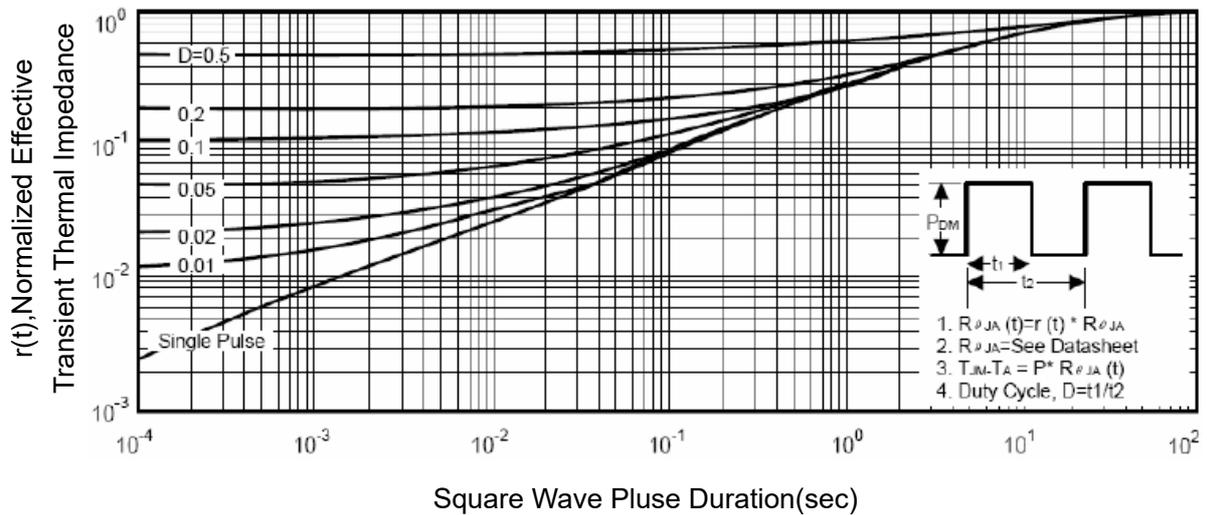
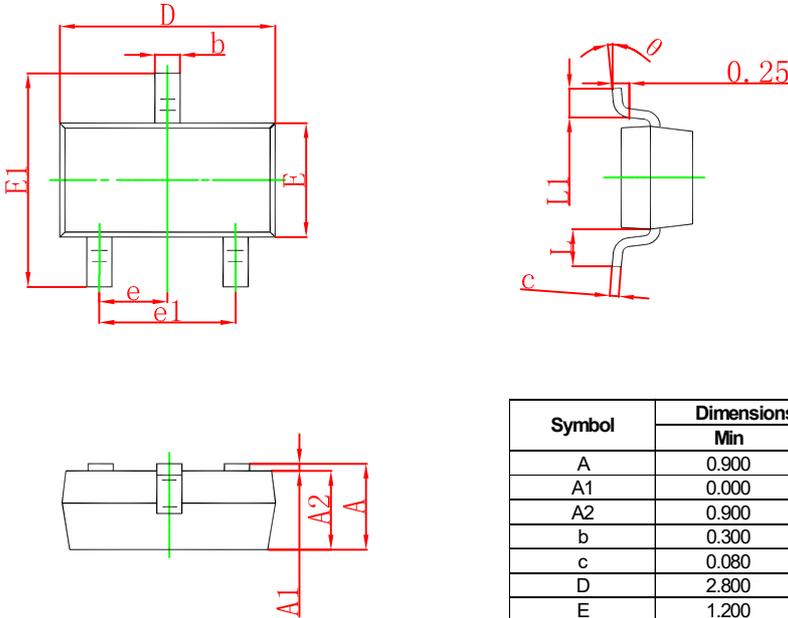


Figure 14 Normalized Maximum Transient Thermal Impedance

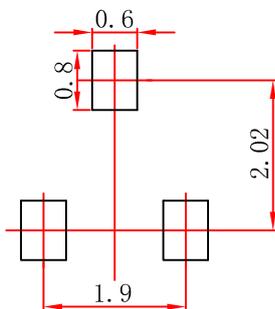


SOT-23 Package Outline Dimensions



| 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° |

SOT-23 Suggested Pad Layout



Note:

1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.



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