



## DESCRIPTION

The AM2333 is available in SOT-23 package.

## ORDERING INFORMATION

| Package Type                   | Part Number                               |            |
|--------------------------------|---|------------|
| SOT-23<br>SPQ: 3,000pcs/Reel   | E3  | AM2333E3R  |
|                                |   | AM2333E3VR |
| Note                           | V: Halogen free Package<br>R: Tape & Reel |            |
| AiT provides all RoHS products |   |            |

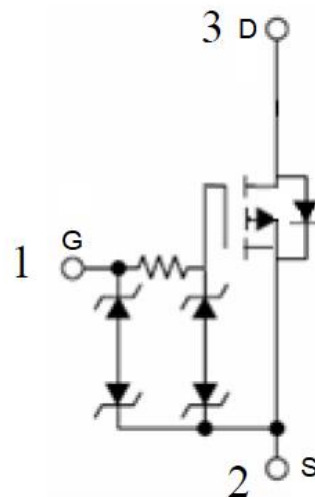
## FEATURES

- Ultra Low  $R_{DS(ON)}$
- ESD Diode. Protected Gate
- Available in SOT-23 package

## APPLICATIONS

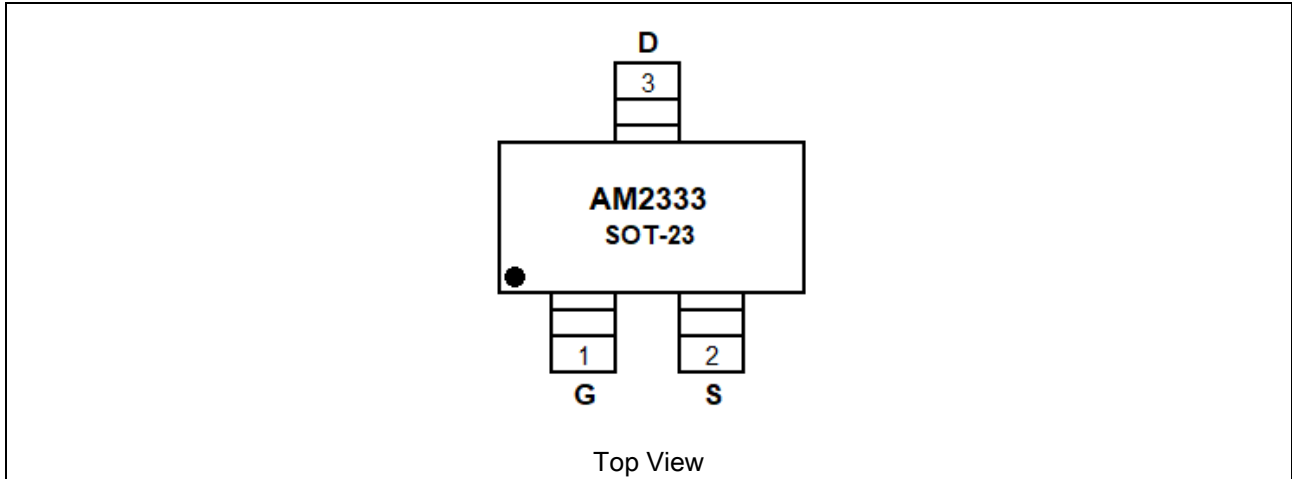
- Battery Switch
- High Side Load Switch

## TYPICAL APPLICATION





## PIN DESCRIPTION



| Pin # | Symbol | Function |
|-------|--------|----------|
| 1     | G      | Gate     |
| 2     | S      | Source   |
| 3     | D      | Drain    |



## ABSOLUTE MAXIMUM RATINGS

T<sub>A</sub>=25°C, unless otherwise noted

|  |                |
|--|----------------|
| V <sub>DSS</sub> , Drain-to-Source Voltage   | -12V           |
| V <sub>GS</sub> , Gate-to-Source Voltage   | ±8V            |
| I <sub>D</sub> , Drain Current <sup>NOTE1</sup> Steady State                         | -6A            |
| I <sub>DM</sub> , Pulsed Drain Current (tp = 10μs)                                   | -21A           |
| P <sub>D</sub> , Power Dissipation <sup>NOTE1</sup>                                  |                |
| Steady State   | 1.1W           |
| t < 7s   | 1.8W           |
| R <sub>θJA</sub> , Thermal Resistance, Junction-to-Ambient                           | 140°C/W        |
| T <sub>J</sub> , T <sub>STG</sub> , Operating Junction and Storage Temperature Range | -55°C ~ +150°C |

Stress beyond above listed "Absolute Maximum Ratings" may lead permanent damage to the device. These are stress ratings only and operations of the device at these or any other conditions beyond those indicated in the operational sections of the specifications are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

NOTE1: Surface-mounted on FR4 board using 1 in sq pad size (Cu area = 1.127 in sq [1 oz] including traces)



## ELECTRICAL CHARACTERISTICS

| Parameter                                   | Symbol        | Conditions  | Min | Typ  | Max      | Units      |
|---|---------------|---|-----|------|----------|------------|
| Drain-Source Breakdown Voltage              | $V_{(BR)DSS}$ | $V_{GS}=0V, I_D=-250\mu A$                        | -12 | -    | -        | V          |
| Zero Gate Voltage Drain Current             | $I_{DSS}$     | $V_{GS}=0V, V_{DS}=-12V, T_J = 25^\circ C$        | -   | -    | -1       | $\mu A$    |
| Gate-to-Source Leakage Current              | $I_{GSS}$     | $V_{DS}=0V, V_{GS}=\pm 8V$                        | -   | -    | $\pm 10$ | $\mu A$    |
| Gate Threshold Voltage <sup>NOTE2</sup>     | $V_{GS(th)}$  | $V_{DS}=V_{GS}, I_D=-250\mu A$                    | -   | -    | -1       | V          |
| Drain-Source On-Resistance <sup>NOTE2</sup> | $R_{DS(on)}$  | $V_{GS}=-4.5V, I_D=-1A$                           | -   | 27   | 32       | m $\Omega$ |
|   |               | $V_{GS}=-2.5V, I_D=-1A$                           | -   | 32   | 40       |            |
|   |               | $V_{GS}=-1.8V, I_D=-1A$                           | -   | 45   | 71       |            |
| Forward Transconductance <sup>NOTE2</sup>   | $g_{fs}$      | $V_{DS}=-5V, I_D=-3A$                             | -   | 11   | -        | S          |
| Input Capacitance                           | $C_{iss}$     | $V_{DS}=-15V, V_{GS}=0V, f=1.0MHz$                | -   | 1571 | -        | pF         |
| Output Capacitance                          | $C_{oss}$     |   | -   | 214  | -        |            |
| Reverse Transfer Capacitance                | $C_{rss}$     |   | -   | 230  | -        |            |
| Threshold Gate Charge                       | $Q_{g(th)}$   | $V_{DS}=-15V, V_{GS}=-0.7V, I_D=-4.0A$            | -   | 1.2  | -        | nC         |
| Total Gate Charge                           | $Q_{g(TOT)}$  | $V_{GS}=-4.5V, V_{DS}=-15V, I_D=-4A$              | -   | 19.2 | -        |            |
| Gate-Source Charge                          | $Q_{gs}$      |   | -   | 2.5  | -        |            |
| Gate-Drain Charge                           | $Q_{gd}$      |   | -   | 7.1  | -        |            |
| Turn-On Delay Time                          | $t_{d(on)}$   | $V_{GS}=-4.5V, V_{DD}=-15V, I_D=-4A, R_G=1\Omega$ | -   | 8.6  | -        | ns         |
| Rise Time                                   | $t_r$         |   | -   | 15   | -        |            |
| Turn-Off Delay Time                         | $t_{d(off)}$  |   | -   | 150  | -        |            |
| Fall Time                                   | $t_f$         |   | -   | 88   | -        |            |
| Diode Forward Voltage                       | $V_{SD}$      | $I_S=-1A, V_{GS}=0V, T_J=25^\circ C$              | -   | -    | -1.5     | V          |

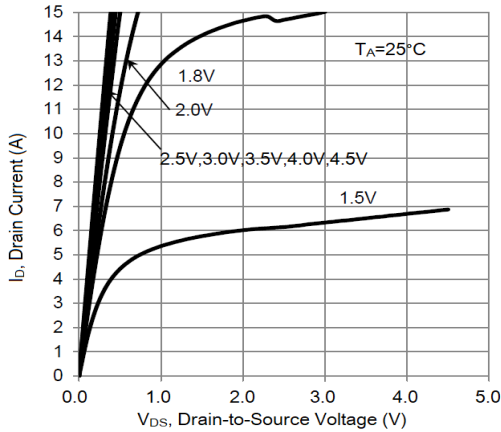
NOTE2: pulse test: pulse width $\leq 300\mu s$ , duty cycle $\leq 2\%$

NOTE3: Switching characteristics are independent of operating junction temperatures

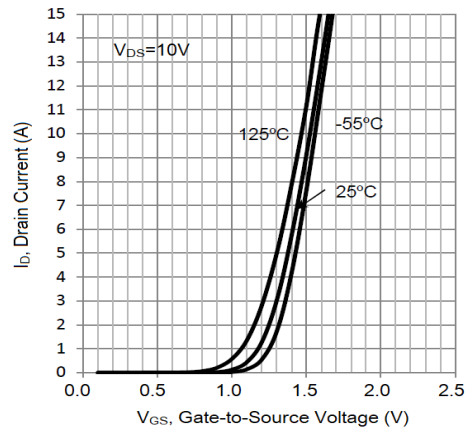


## TYPICAL ELECTRICAL CHARACTERISTICS

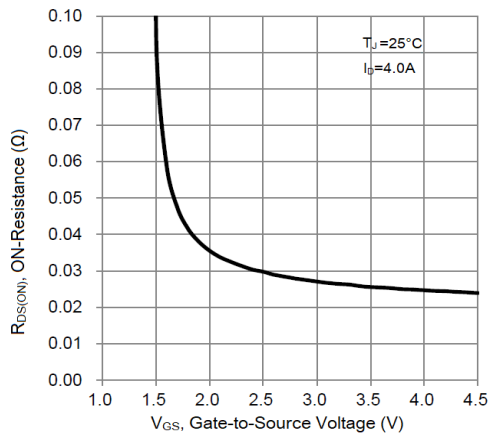
### 1. On-Region Characteristics



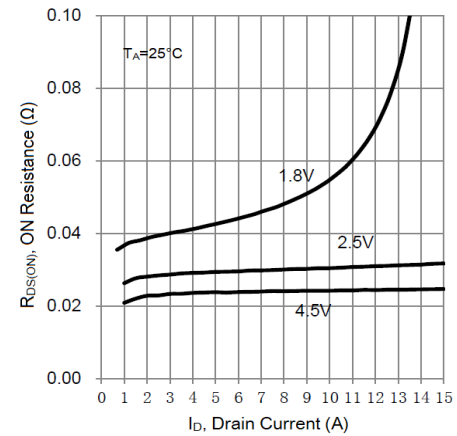
### 2. Transfer Characteristics



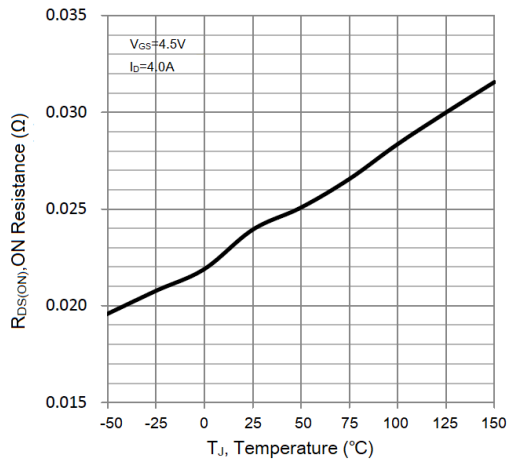
### 3. On-Resistance vs. Gate-to-Source Voltage



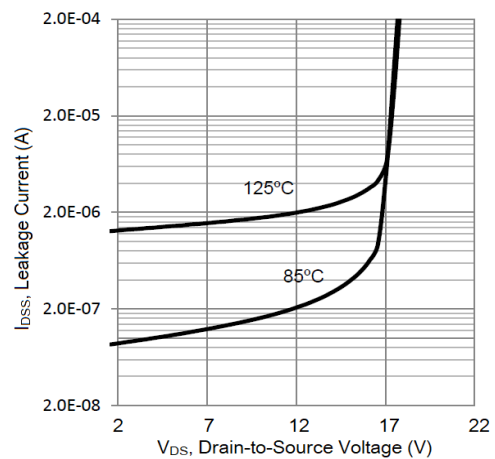
### 4. On-Resistance vs. Drain Current and Gate Voltage



### 5. On-Resistance Variation with Temperature

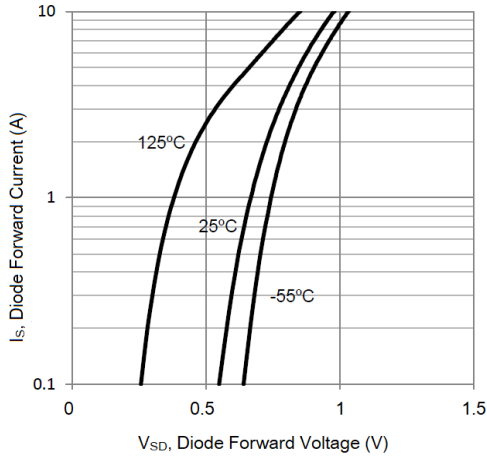


### 6. Drain-to-Source Leakage Current vs. Voltage

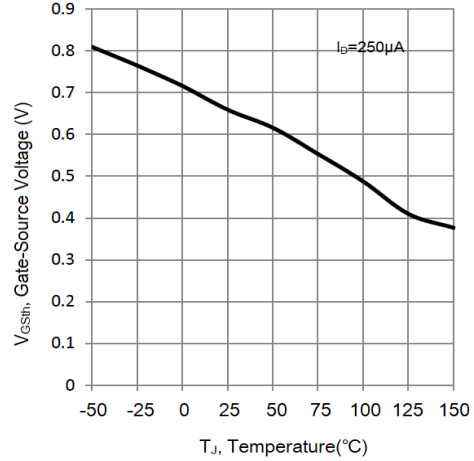




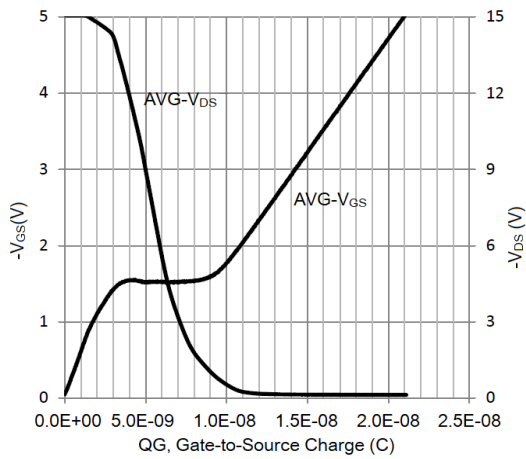
7. Diode Forward Voltage vs. Current



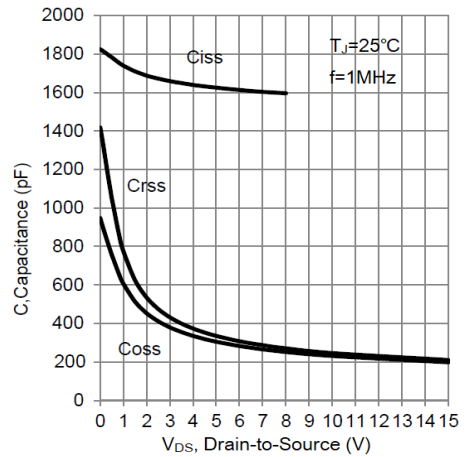
8. Threshold Voltage



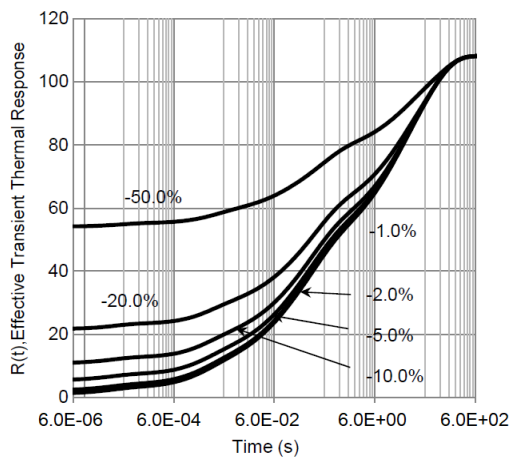
9. Gate-to-Source and Drain-to-Source Voltage vs. Total Charge



10. Capacitance variation



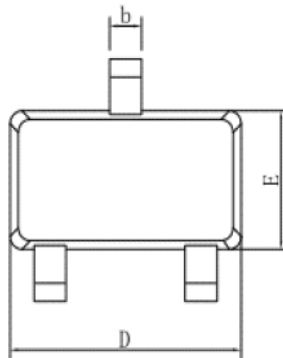
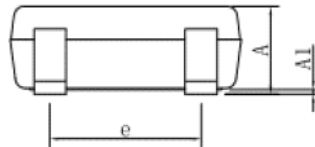
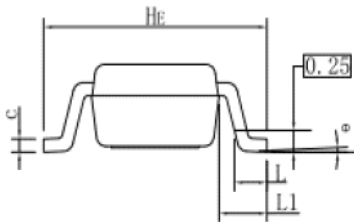
11. FET Thermal Response



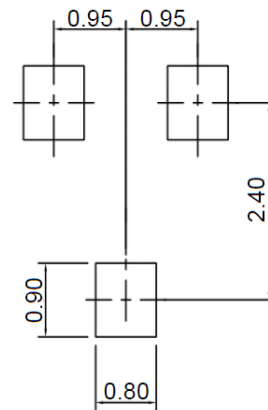


## PACKAGE INFORMATION

Dimension in SOT-23 Package (Unit: mm)



### SOLDERING FOOTPRINT



| Symbol   | Min.    | Max. |
|----------|---------|------|
| A        | 0.90    | 1.10 |
| A1       | 0.01    | 0.10 |
| b        | 0.30    | 0.50 |
| c        | 0.10    | 0.20 |
| D        | 2.80    | 3.00 |
| E        | 1.50    | 1.70 |
| e        | 1.80    | 2.00 |
| L        | 0.20    | 0.60 |
| L1       | 0.60REF |      |
| He       | 2.60    | 3.00 |
| $\theta$ | 0°      | 10°  |



## IMPORTANT NOTICE

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