



## Description

The AP2306GN 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.

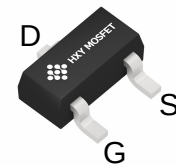
## General Features

$V_{DS} = 20V$   $I_D = 6.0A$

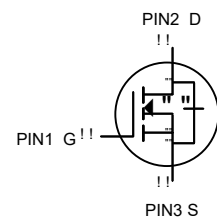
$R_{DS(ON)} < 27m\Omega @ V_{GS}=4.5V$

## Application

Battery protection  
Load switch  
Uninterruptible power supply



SOT-23



N-Channel MOSFET

## Ordering Information

| Product ID | Pack   | Marking | Qty(PCS) |
|------------|--------|---------|----------|
| AP2306GN   | SOT-23 | 2300    | 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                              | $\pm 12$   | V             |
| $I_D$           | Drain Current-Continuous                         | 6          | A             |
| $I_{DM}$        | Drain Current-Pulsed (Note 1)                    | 25         | A             |
| $P_D$           | Maximum Power Dissipation                        | 0.35       | 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        | $^{\circ}C/W$ |



$T_a=25^{\circ}\text{C}$  unless otherwise specified

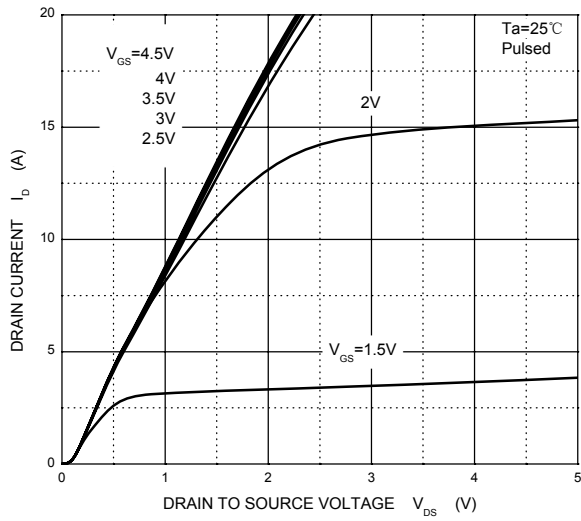
| Parameter                        | Symbol        | Test Condition                                               | Min | Typ  | Max       | Unit       |
|----------------------------------|---------------|--------------------------------------------------------------|-----|------|-----------|------------|
| <b>STATIC PARAMETERS</b>         |               |                                                              |     |      |           |            |
| Drain-source breakdown voltage   | $V_{(BR)DSS}$ | $V_{GS}=0V, I_D=250\mu A$                                    | 20  |      |           | V          |
| Gate-source leakage current      | $I_{GSS}$     | $V_{DS}=0V, V_{GS}=\pm 12V$                                  |     |      | $\pm 100$ | nA         |
| Zero gate voltage drain current  | $I_{DSS}$     | $V_{DS}=16V, V_{GS}=0V$                                      |     |      | 1.0       | $\mu A$    |
| Gate threshold voltage           | $V_{GS(th)}$  | $V_{DS}=V_{GS}, I_D=250\mu A$                                | 0.5 | 0.7  | 1.0       | V          |
| Drain-source on-state resistance | $R_{DS(on)}$  | $V_{GS}=4.5V, I_D=5.0A$                                      |     | 22   | 27        | m $\Omega$ |
|                                  |               | $V_{GS}=2.5V, I_D=4.0A$                                      |     | 35   | 42        |            |
|                                  |               | $V_{GS}=1.8V, I_D=2.0A$                                      |     |      | 73        |            |
| Diode forward voltage            | $V_{SD}$      | $V_{GS}=0V, I_S=1A$                                          |     | 0.75 | 1         | V          |
| Forward transconductance         | $g_{fs}$      | $V_{DS}=5V, I_D=3.8A$                                        | 4   |      |           | S          |
| <b>DYNAMIC PARAMETERS*</b>       |               |                                                              |     |      |           |            |
| Input capacitance                | $C_{iss}$     | $V_{DS}=10V, V_{GS}=0V, f=1MHz$                              |     | 630  |           | pF         |
| Output capacitance               | $C_{oss}$     |                                                              |     | 164  |           |            |
| Reverse transfer capacitance     | $C_{rss}$     |                                                              |     | 137  |           |            |
| Gate resistance                  | $R_g$         | $V_{DS}=0V, V_{GS}=0V, f=1MHz$                               |     | 1.5  |           | $\Omega$   |
| <b>SWITCHING PARAMETERS*</b>     |               |                                                              |     |      |           |            |
| Turn-on delay time               | $t_{d(on)}$   | $V_{GS}=5V, V_{DS}=10V,$<br>$R_L=1.7\Omega, R_{GEN}=6\Omega$ |     | 5.5  |           | ns         |
| Rise time                        | $t_r$         |                                                              |     | 14   |           |            |
| Turn-off delay time              | $t_{d(off)}$  |                                                              |     | 29   |           |            |
| Fall time                        | $t_f$         |                                                              |     | 10.2 |           |            |

\*These parameters have no way to verify.

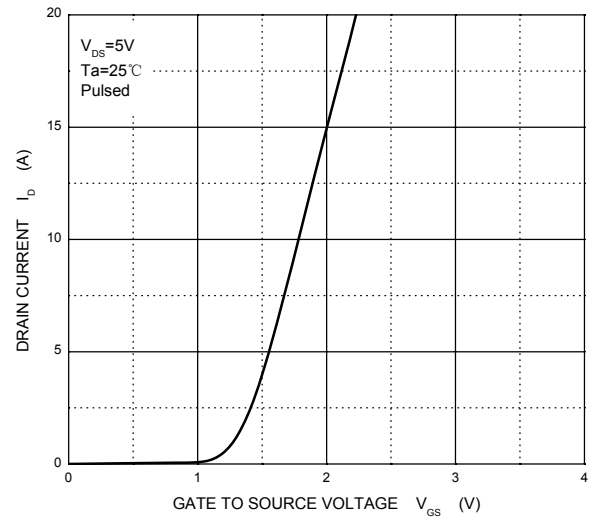


## Typical Characteristics

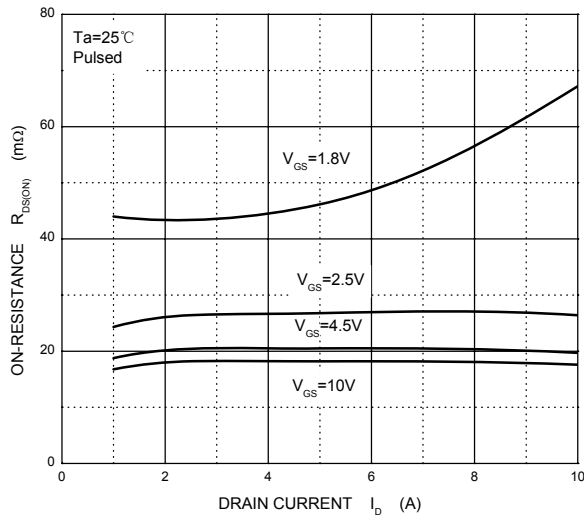
Output Characteristics



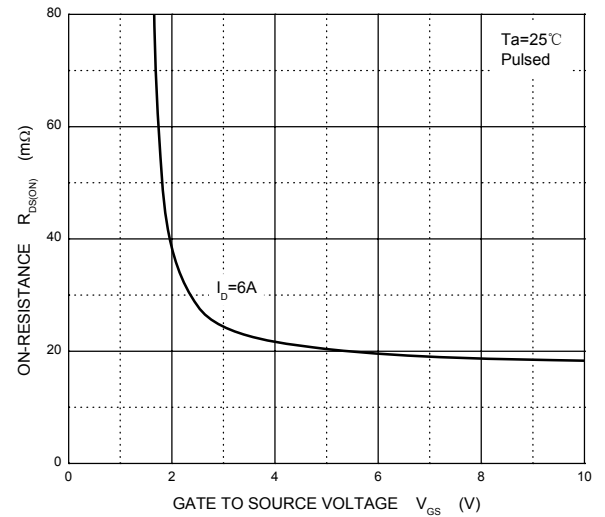
Transfer Characteristics



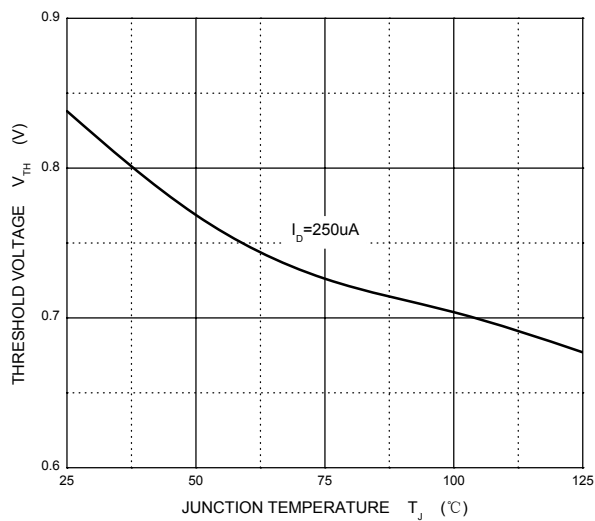
$R_{DS(ON)}$  —  $I_D$



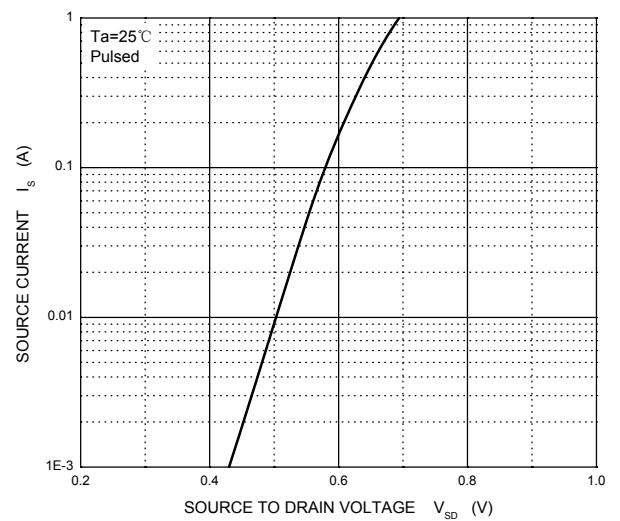
$R_{DS(ON)}$  —  $V_{GS}$



Threshold Voltage

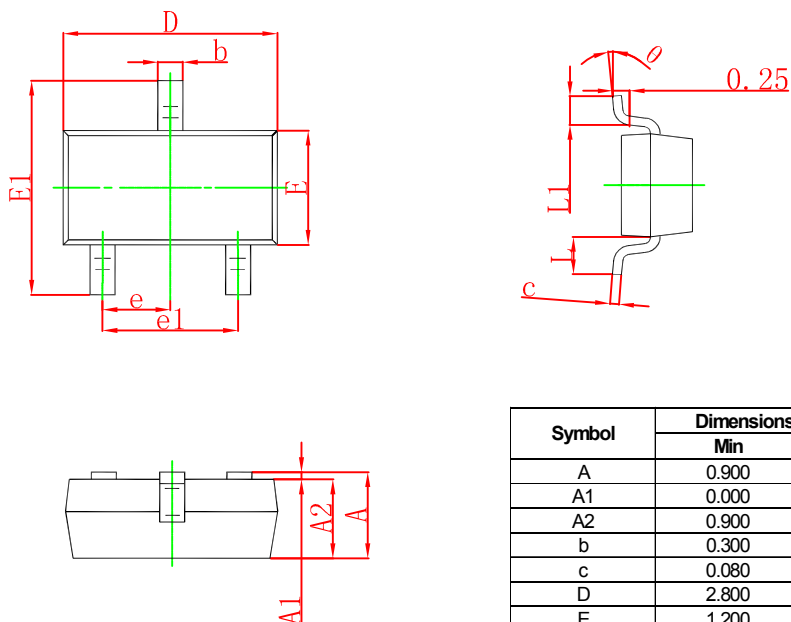


$I_S$  —  $V_{SD}$



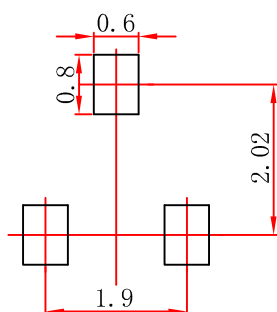


## SOT-23 Package Outline Dimensions



| 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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