

## Description

This -30V -4.1A P-Channel MOSFET in a SOT-23-3 Plastic Package.

## Applications

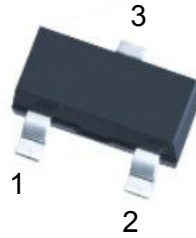
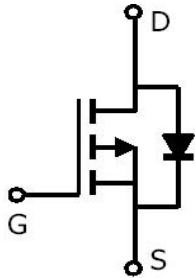
This device is suitable for use as a load switch or in PWM applications.

## Features

- $V_{DS} (V) = -30V$
- $I_D = -4.1 A$
- $R_{DS(ON)} < 60m\Omega$  ( $V_{GS} = -10V$ )
- $R_{DS(ON)} < 85m\Omega$  ( $V_{GS} = -4.5V$ )
- Halogen-Free Product.

| $V_{DSS}$ | $R_{DS(on)}$ Typ | $I_D$ |
|-----------|------------------|-------|
| -30V      | 54m $\Omega$     | -4.1A |

## Equivalent Circuit & Pinning



PIN1 : Gate

PIN 2 : Source

PIN 3 : Drain

**Absolute Maximum Ratings(Ta=25℃)**

| Parameter                                        | Symbol                        | Rating     | Unit |
|--------------------------------------------------|-------------------------------|------------|------|
| Drain-Source Voltage                             | $V_{DS}$                      | -30        | V    |
| Drain Current – Continuous                       | $I_D$                         | -4.1       | A    |
| Drain Current- Continuous                        | $I_D(T_a=70^{\circ}\text{C})$ | -3.5       | A    |
| Pulsed Drain Current                             | $I_{DM}$                      | -20        | A    |
| Gate-Source Voltage                              | $V_{GS}$                      | $\pm 20$   | V    |
| Total Power Dissipation                          | $P_D$                         | 1.4        | W    |
| Operating and Storage Junction Temperature Range | $T_J, T_{STG}$                | -55 to 150 | ℃    |
| Thermal Resistance-Junction to Ambient (t≤10s)   | $R_{\theta JA}$               | 90         | ℃/W  |
| Thermal Resistance-Junction to Lead              | $R_{\theta JL}$               | 80         |      |

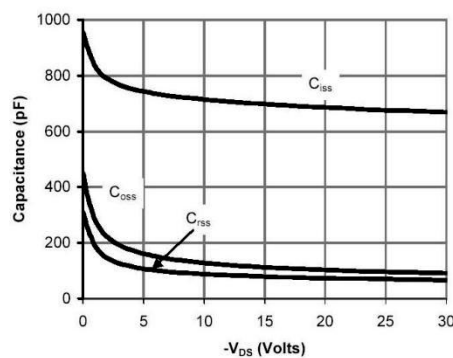
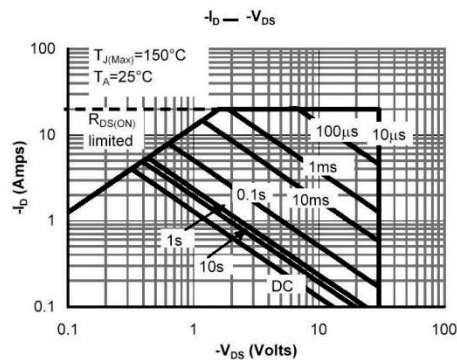
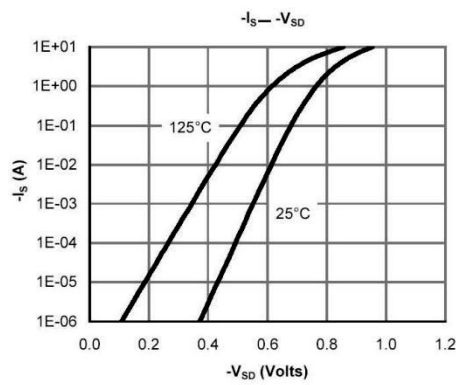
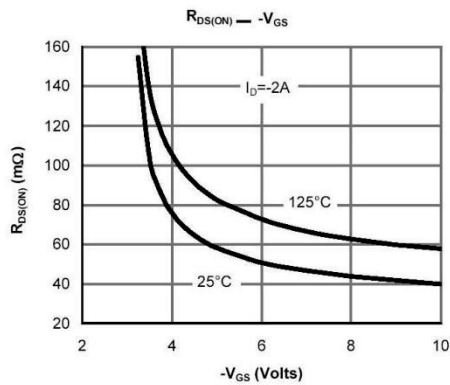
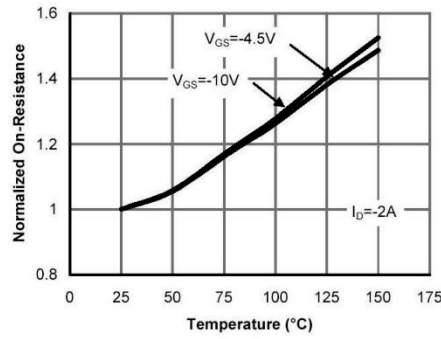
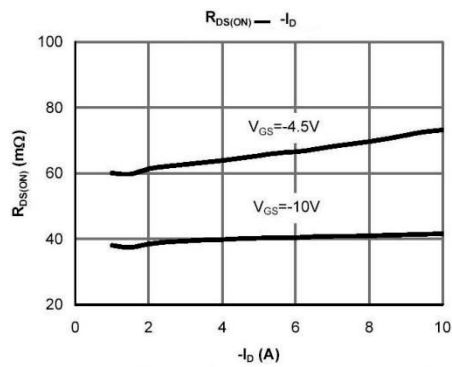
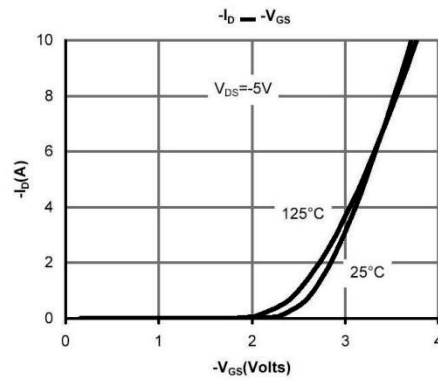
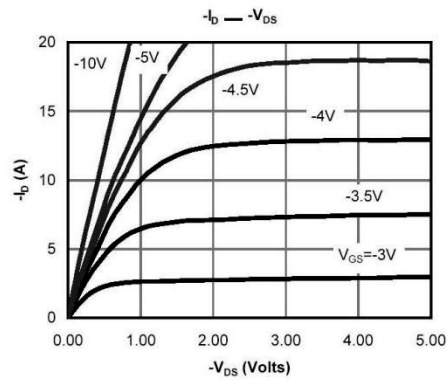
**Electrical Characteristics(Ta=25℃)**

| Parameter                          | Symbol        | Test Conditions                                        | Min | Typ   | Max       | Unit    |
|------------------------------------|---------------|--------------------------------------------------------|-----|-------|-----------|---------|
| Drain–Source Breakdown Voltage     | $BV_{DSS}$    | $V_{GS}=0V$ $I_D=-250\mu A$                            | -30 |       |           | V       |
| Zero Gate Voltage Drain Current    | $I_{DSS}$     | $V_{DS}=-24V$ $V_{GS}=0V$                              |     |       | -1        | $\mu A$ |
|                                    |               | $V_{DS}=-24V$ $V_{GS}=0V$<br>$T_J=55^{\circ}\text{C}$  |     |       | -5        | $\mu A$ |
| Gate–Body Leakage.                 | $I_{GSS}$     | $V_{GS}=\pm 20V$ $V_{DS}=0V$                           |     |       | $\pm 0.1$ | $\mu A$ |
| On–State Drain Current             | $I_{D(on)}$   | $V_{GS}=-4.5V$ $V_{DS}=-5V$                            | -10 |       |           | A       |
| Gate Threshold Voltage             | $V_{GS(th)}$  | $V_{DS}=V_{GS}$ $I_D=-250\mu A$                        | -1  | -1.4  | -3        | V       |
| Static Drain–Source On–Resistance  | $R_{DS(on)1}$ | $V_{GS}=-10V$ $I_D=-4.1A$                              |     | 54    | 60        | mΩ      |
|                                    | $R_{DS(on)2}$ | $V_{GS}=-10V$ $I_D=-4.1A$<br>$T_J=125^{\circ}\text{C}$ |     | 57    | 73        |         |
|                                    | $R_{DS(on)3}$ | $V_{GS}=-4.5V$ $I_D=-3A$                               |     | 77    | 85        |         |
| Forward Transconductance           | $g_{FS}$      | $V_{DS}=-5V$ $I_D=-4A$                                 | 5.5 | 8.2   |           | S       |
| Drain–Source Diode Forward Voltage | $V_{SD}$      | $V_{GS}=0V$ $I_S=-1A$                                  |     | -0.77 | -1        | V       |
| Input Capacitance                  | $C_{iss}$     | $V_{DS}=-15V$ $V_{GS}=0V$<br>$f=1\text{MHz}$           |     | 700   |           | pF      |
| Output Capacitance                 | $C_{oss}$     |                                                        |     | 120   |           |         |
| Reverse Transfer Capacitance       | $C_{rss}$     |                                                        |     | 75    |           |         |

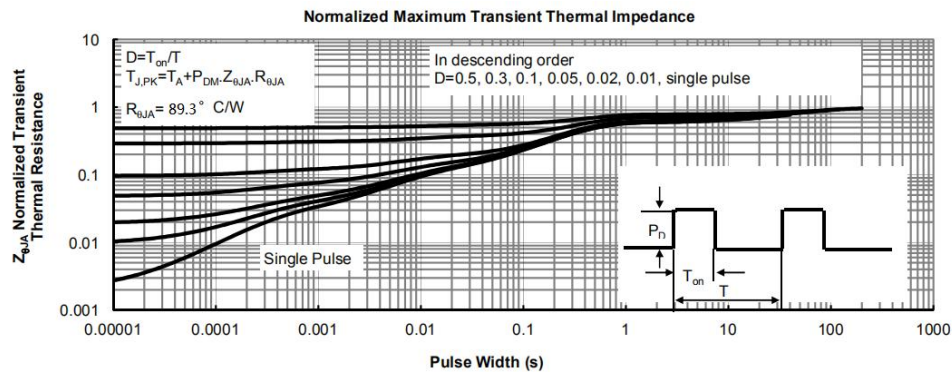
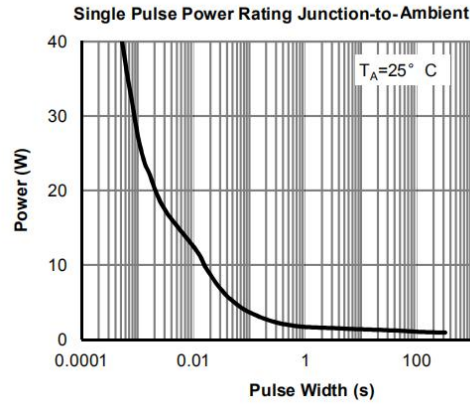
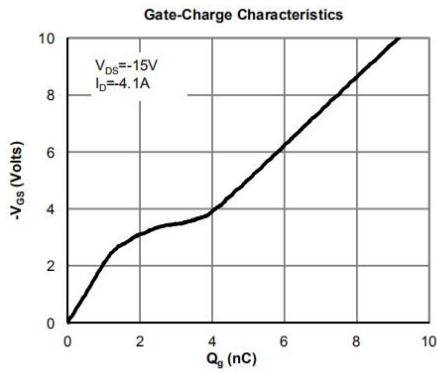
## Electrical Characteristics(Ta=25°C)

| Parameter                          | Symbol       | Test Conditions                                                         | Min | Typ  | Max | Unit |
|------------------------------------|--------------|-------------------------------------------------------------------------|-----|------|-----|------|
| Total Gate Charge                  | $Q_g(10V)$   | $V_{GS}=-10V, V_{DS}=-15V,$<br>$I_D=-4.1A$                              |     | 9    |     | nC   |
| Total Gate Charge                  | $Q_g(4.5V)$  |                                                                         |     | 4.5  |     |      |
| Gate Source Charge                 | $Q_{gs}$     |                                                                         |     | 1.5  |     |      |
| Gate Drain Charge                  | $Q_{gd}$     |                                                                         |     | 2.1  |     |      |
| Turn-On Delay Time                 | $t_{d(on)}$  | $V_{GS}=-10V \quad R_L=3.6\Omega$<br>$V_{DS}=-15V$<br>$R_{GEN}=3\Omega$ |     | 8.6  |     | ns   |
| Turn-On Rise Time                  | $t_r$        |                                                                         |     | 5    |     |      |
| Turn-Off Delay Time                | $t_{d(off)}$ |                                                                         |     | 28.2 |     |      |
| Turn-Off Fall Time                 | $t_f$        |                                                                         |     | 13.5 |     |      |
| Body Diode Reverse Recovery Time   | $t_{rr}$     | $I_F=-4.1A, di/dt=100A/\mu s$                                           |     | 13   |     | ns   |
| Body Diode Reverse Recovery Charge | $Q_{rr}$     | $I_F=-4.1A, di/dt=100A/\mu s$                                           |     | 5.5  |     | nC   |

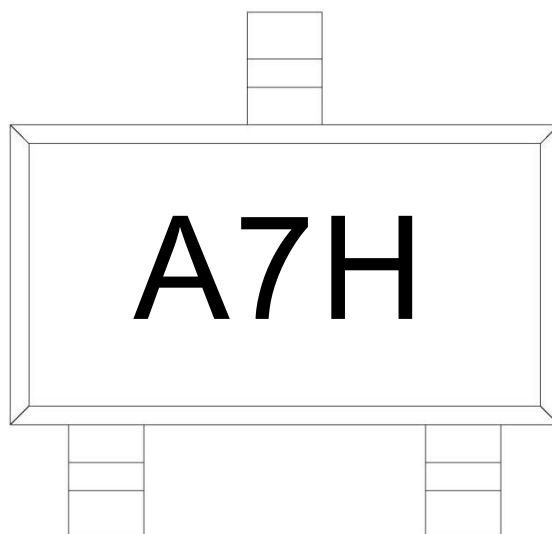
## Electrical Characteristic Curve



## Electrical Characteristic Curve



## Marking Instructions



Note:

A7: Product Type

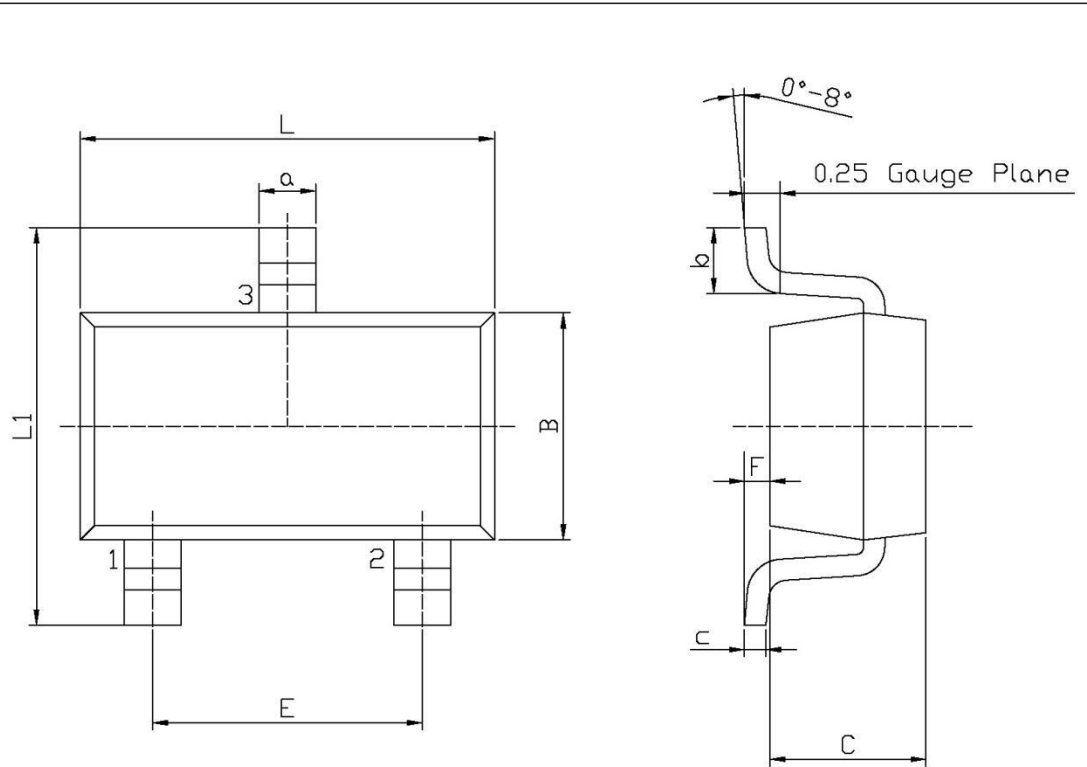
H: Company Code

## Packaging SPEC.

### REEL INFORMATION

| Package Type | Units      |                 |                 |                       |                 | Dimension (unit: mm <sup>3</sup> ) |             |             |
|--------------|------------|-----------------|-----------------|-----------------------|-----------------|------------------------------------|-------------|-------------|
|              | Units/Reel | Reels/Inner Box | Units/Inner Box | Inner Boxes/Outer Box | Units/Outer Box | Reel                               | Inner Box   | Outer Box   |
| SOT23-3      | 3,000      | 10              | 30,000          | 4                     | 120,000         | 7" x8                              | 210×205×205 | 445×230×435 |

Package Outline Dimensions



Unit: mm

| Symbol | Dimensions In Millimeters |      | Symbol | Dimensions In Millimeters |      |
|--------|---------------------------|------|--------|---------------------------|------|
|        | Min                       | Max  |        | Min                       | Max  |
| L      | 2.82                      | 3.02 | a      | 0.35                      | 0.50 |
| B      | 1.50                      | 1.70 | c      | 0.10                      | 0.20 |
| C      | 0.90                      | 1.30 | b      | 0.35                      | 0.55 |
| L1     | 2.60                      | 3.00 | F      | 0                         | 0.15 |
| E      | 1.80                      | 2.00 |        |                           |      |

SOT23-3