# VUSK003R50ANA

# Datasheet

VMDSEMI

## General Description

| $V_{(BR)DSS}$ | $R_{DS(ON)_max}$ | $I_D$ |
|---|---|---|
| 30V | 500mΩ@4.5V | 0.6A |
| | 600mΩ@2.5V | |

## Symbol

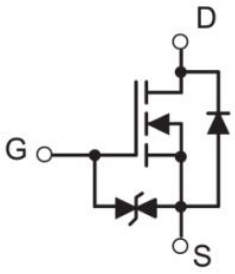
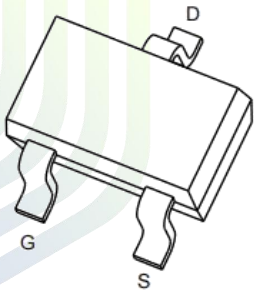



Figure 1 Symbol of VUSK003R50ANA

## Features

- Surface Mount Package
- N-Channel Switch with Low $R_{DS(on)}$
- Operated at Low Logic Level Gate Drive

## Package Type




**SOT-523**

Figure 2 Package Type of VUSK003R50ANA

## Application

- Load /Power Switch
- Interfacing Switching
- Battery Management for Ultra Small Portable Electronics
- Logic Level Shift

## Ordering Information

| Product Name | Package |
|---|---|
| VUSK003R50ANA | SOT-523 |

## Absolute Maximum Ratings ($T_A$= 25 ºC, unless otherwise specified)

| Parameter | Symbol | Rating | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DSS}$ | 30 | V |
| Gate-Source Voltage | $V_{GSS}$ | ±12 | V |
| Continuous Drain Current Note1 | $I_D$ | 0.6 | A |
| Pulsed Drain Current | $I_{DM}$ | 1.8 | A |
| Total Power Dissipation Note2 | $P_D$ | 0.35 | W |
| Junction Temperature | $T_J$ | 150 | ºC |
| Storage Temperature | $T_{STG}$ | -55 to 150 | ºC |

## Thermal Resistance

| Parameter | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| Thermal Resistance, Junction-to-Ambient Note4 | $R_{\theta JA}$ | | 357 | | ºC/W |

## Electrical Characteristics ($T_A$= 25 ºC, unless otherwise specified)

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Statistic Characteristics** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$=0V, $I_D$= 250uA | 30 | | | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$= 30V, $V_{GS}$=0V | | | 1 | uA |
| Gate-Body Leakage Current | $I_{GSS}$ | $V_{GS}$ = ±10V, $V_{DS}$= 0V | | | ±3 | uA |
| Gate Threshold Voltage[Note3] | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$, $I_D$=250uA | 0.5 | 1.0 | 1.5 | V |
| Static Drain-Source On-Resistance[Note3] | $R_{DS(ON)}$ | $V_{GS}$= 4.5V, $I_D$= 0.6A | | 290 | 500 | mΩ |
| | | $V_{GS}$= 2.5V, $I_D$= 0.3A | | 380 | 600 | |
| Forward tranconductance[Note3] | $g_{FS}$ | $V_{DS}$= 5V, $I_D$= 0.5A | 0.1 | | | S |
| **Dynamic Characteristics** | | | | | | |
| Input Capacitance | $C_{ISS}$ | $V_{DS}$=10V | | 44 | | pF |
| Output Capacitance | $C_{OSS}$ | $V_{GS}$=0V | | 15 | | |
| Reverse Transfer Capacitance | $C_{RSS}$ | f=1MHz | | 8 | | |
| Total gate charge | $Q_g$ | $V_{DS}$=15V | | 1.2 | | nC |
| Gate-source charge | $Q_{gs}$ | $V_{GS}$=4.5V | | 0.28 | | |
| Gate-drain charge | $Q_{gd}$ | $I_D$= 0.8A | | 0.3 | | |
| **Switching Parameters** | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}$= 15V | | 5.0 | | ns |
| Turn-on Rise Time | $t_r$ | $V_{GS}$= 4.5V | | 8.2 | | |
| Turn-off Delay Time | $t_{d(off)}$ | $I_D$= 0.7A | | 23 | | |
| Turn-off Fall Time | $t_f$ | $R_G$=51Ω | | 41 | | |
| **Source-Drain Diode characteristics** | | | | | | |
| Diode Forward voltage | $V_{DS}$ | $I_S$= 0.6A,$V_{GS}$=0V | | | 1.2 | V |

Notes :

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. This test is performed with no heat sink at Ta=25°C .
3. Pulse Test : Pulse Width≤380μs, Duty Cycle≤0.5%.
4. Device mounted on 1in$^2$ FR-4 board with 2oz. Copper, in a still air environment with $T_A$=25°C.

# Typical Performance Characteristics

Figure 3: Transfer Characteristics

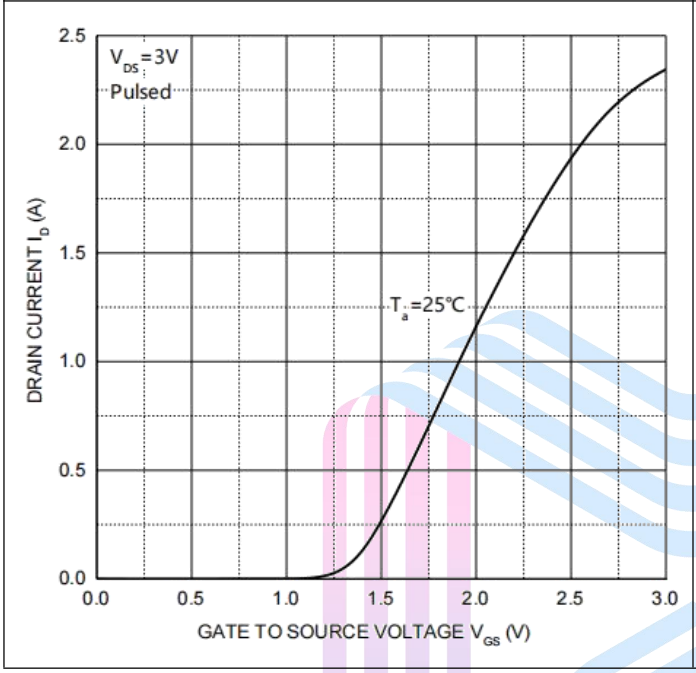



Figure 4: Output Characteristics

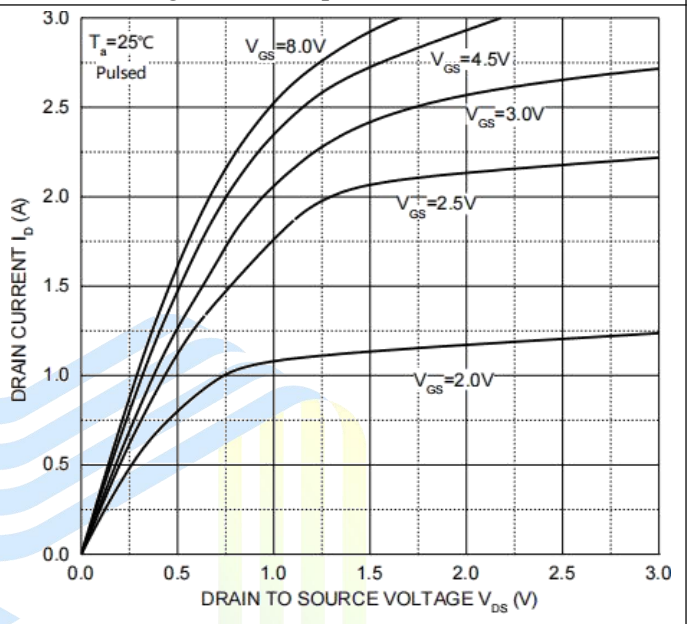



Figure 5: On-Resistance vs. Drain Current

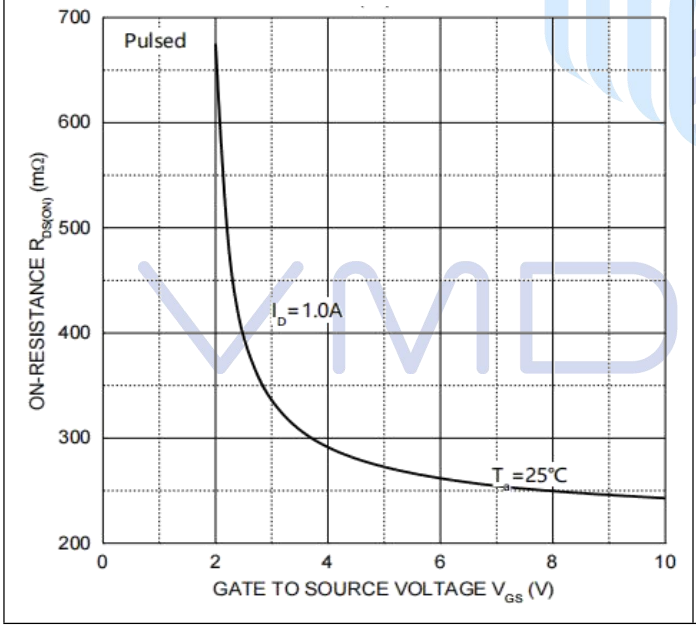



Figure 6: On-Resistance vs. Gate Voltage

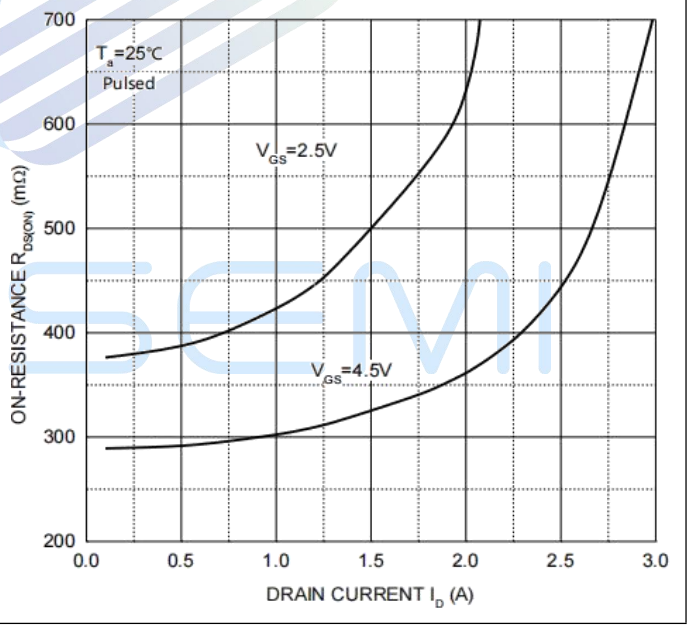


Figure 7: Body Diode Characteristics

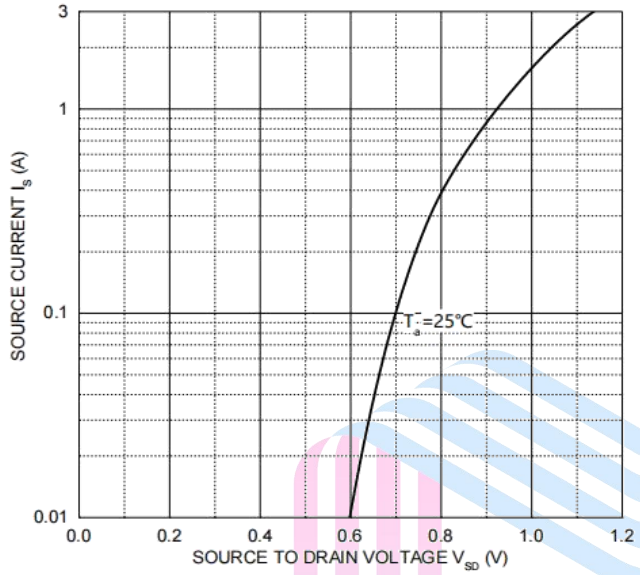
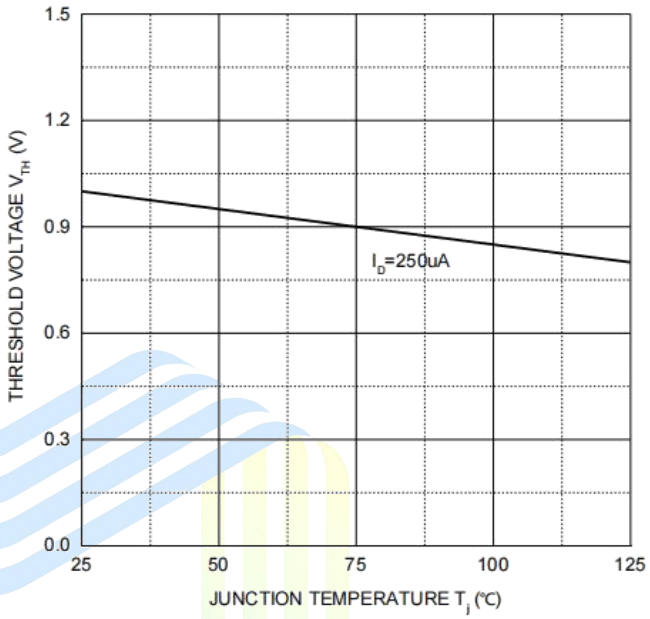
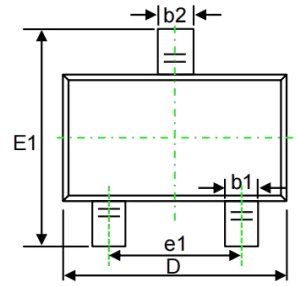



Figure 8: Threshold Voltage

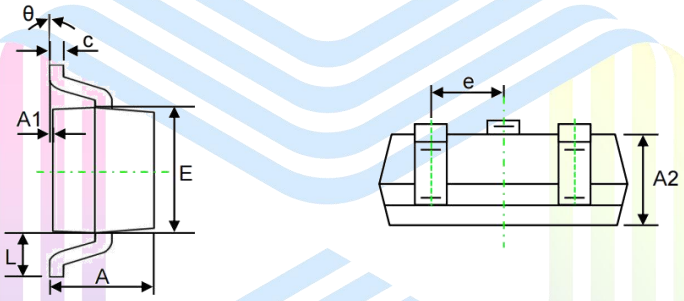


# Mechanical Dimensions:

**SOT-523 Package Information**




**TOP VIEW**
［顶视图］




**SIDE VIEW**
［侧视图］

| Symbol | Dimensions In Millimeters (mm) | | |
|---|---|---|---|
| | Min. | Typ. | Max. |
| A | 0.70 | 0.80 | 0.90 |
| A1 | 0.00 | 0.05 | 0.10 |
| A2 | 0.70 | 0.75 | 0.80 |
| b1 | 0.15 | 0.20 | 0.25 |
| b2 | 0.25 | 0.30 | 0.35 |
| c | 0.10 | 0.15 | 0.20 |
| D | 1.50 | 1.60 | 1.70 |
| E | 0.70 | 0.80 | 0.90 |
| E1 | 1.45 | 1.60 | 1.75 |
| e | - | 0.50 | - |
| e1 | 0.90 | 1.00 | 1.10 |
| L | 0.55 REF. | | |
| θ | 0° | – | 8° |

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