# VUSC010R900NA

# Datasheet

## General Description

| $V_{(BR)DSS}$ | $R_{DS(ON)\_max}$ | $I_D$ |
|---|---|---|
| 100V | 90mΩ@10V | 5A |
| | 135mΩ@4.5V | |

## Symbol

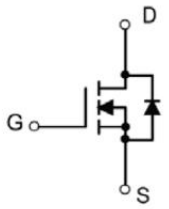
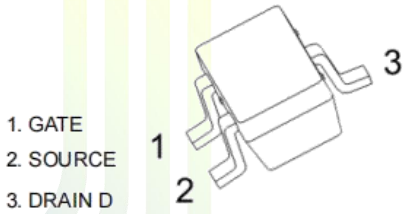



Figure 1 Symbol of VUSC010R900NA

## Features

- Trench Technology Power MOSFET
- Low $R_{DS(ON)}$
- Low Gate Charge

## Package Type




**SOT-23-3L**

Figure 2 Package Type of VUSC010R900NA

## Application

- Load Switching
- Low Current Inverters
- Low Current DC/DC Converters

## Ordering Information

| Product Name | Package |
|---|---|
| VUSC010R900NA | SOT-23-3L |

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

| Parameter | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DSS}$ | 100 | V |
| Gate-Source Voltage | | $V_{GSS}$ | ±20 | V |
| Continuous Drain Current[Note1] | $T_A$= 25 ºC | $I_D$ | 5 | A |
| Pulsed Drain Current [Note2] | | $I_{DM}$ | 20 | |
| Total Power Dissipation[Note4] | $T_A$= 25 ºC | $P_D$ | 1.25 | 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 [Note5] | $R_{\theta JA}$ | | 100 | | ºC/W |

## Electrical Characteristics ($T_J$= 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 | 100 | | | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$= 80V, $V_{GS}$=0V | | | 1 | uA |
| Gate-Body Leakage Current | $I_{GSS}$ | $V_{GS}$ = ±20V, $V_{DS}$= 0V | | | ±100 | nA |
| Gate Threshold Voltage[Note3] | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$, $I_D$=250uA | 1 | 2 | 3 | V |
| Static Drain-Source On-Resistance[Note3] | $R_{DS(ON)}$ | $V_{GS}$=10V, $I_D$= 1A | | 70 | 90 | mΩ |
| | | $V_{GS}$=4.5V, $I_D$= 1A | | 88 | 135 | |
| Forward tranconductance[Note3] | $g_{FS}$ | $V_{DS}$= 5V, $I_D$=3A | | 5 | | S |
| **Dynamic Characteristics** | | | | | | |
| Input Capacitance | $C_{ISS}$ | $V_{DS}$=45V | | 849 | | pF |
| Output Capacitance | $C_{OSS}$ | $V_{GS}$=0V | | 34 | | pF |
| Reverse Transfer Capacitance | $C_{RSS}$ | f=1MHz | | 31 | | pF |
| Total Gate Charge | $Q_g$ | $V_{DS}$=50V | | 21.5 | | nC |
| Gate-Source Charge | $Q_{gs}$ | $V_{GS}$=10V | | 5.9 | | |
| Gate-Drain Charge | $Q_{gd}$ | $I_D$=1A | | 2.4 | | |
| **Switching Parameters** | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}$= 50V | | 6 | | ns |
| Turn-on Rise Time | $t_r$ | $V_{GS}$= 10V | | 4 | | |
| Turn-off Delay Time | $t_{d(off)}$ | $R_L$=19Ω | | 20 | | |
| Turn-off Fall Time | $t_f$ | $R_G$=3Ω | | 4 | | |
| **Diode Characteristics** | | | | | | |
| Diode Forward Voltage [Note4] | $V_{SD}$ | $V_{GS}$=0V, $I_S$= 1A | | | 1.2 | V |

Notes :

1.The maximum current rating is limited by package.

2.Repetitive rating:pulse width limited by $T_{J(MAX)}$ = 150°C.

3.Pulse Test : Pulse Width ≤ 300μs, duty cycle ≤ 2%.

4.The power dissipation $P_D$ is limited by $T_{J(MAX)}$ = 150°C.

5.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

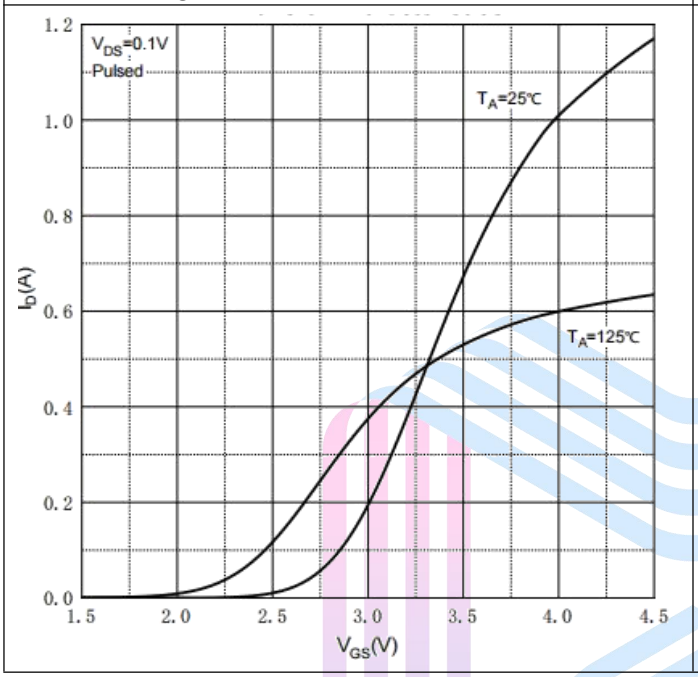



Figure 4: Output Characteristics

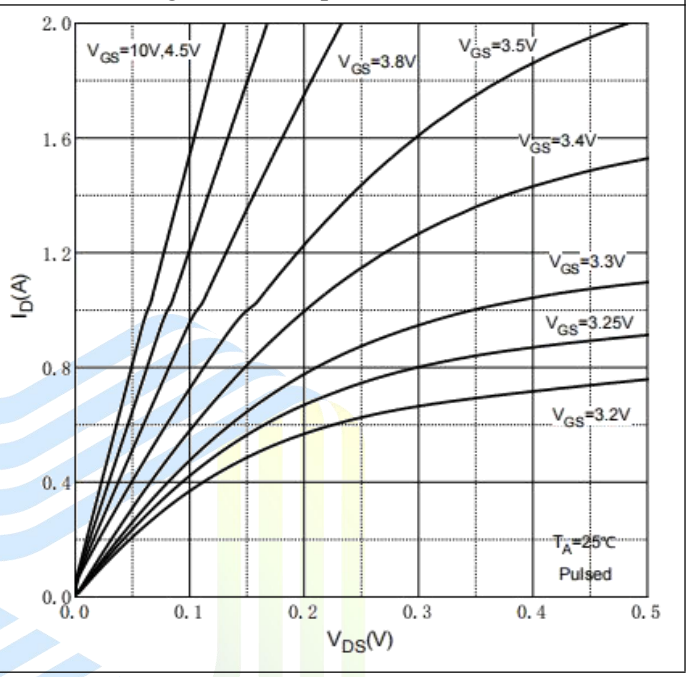



Figure 5: On-Resistance vs. Drain Current

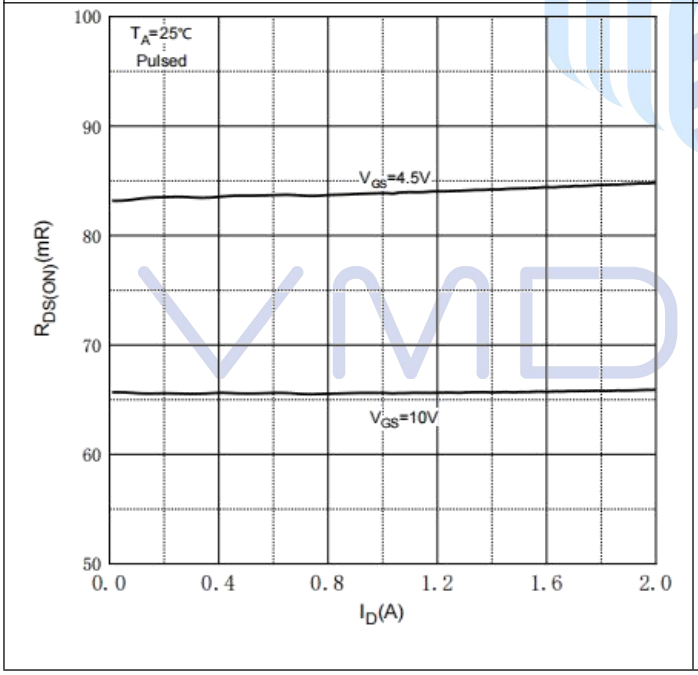



Figure 6: On-Resistance vs. Gate Voltage

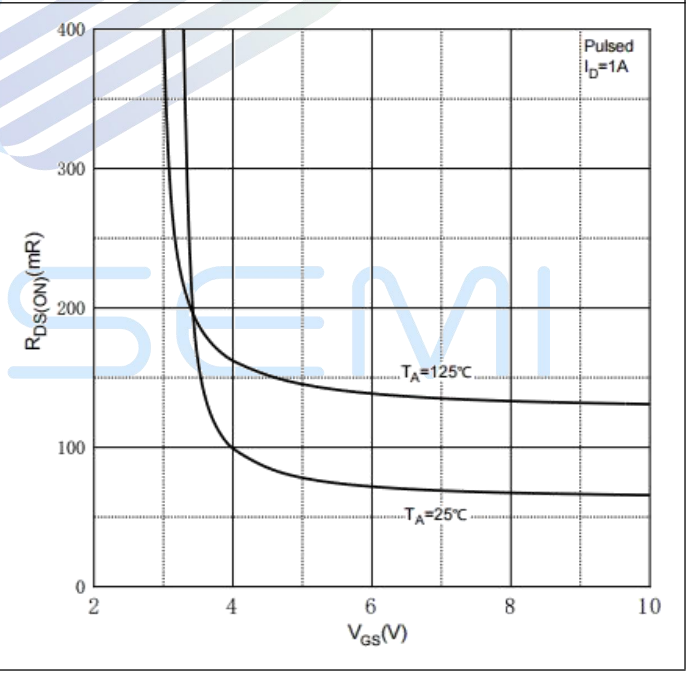


Figure 7: Body Diode Characteristics

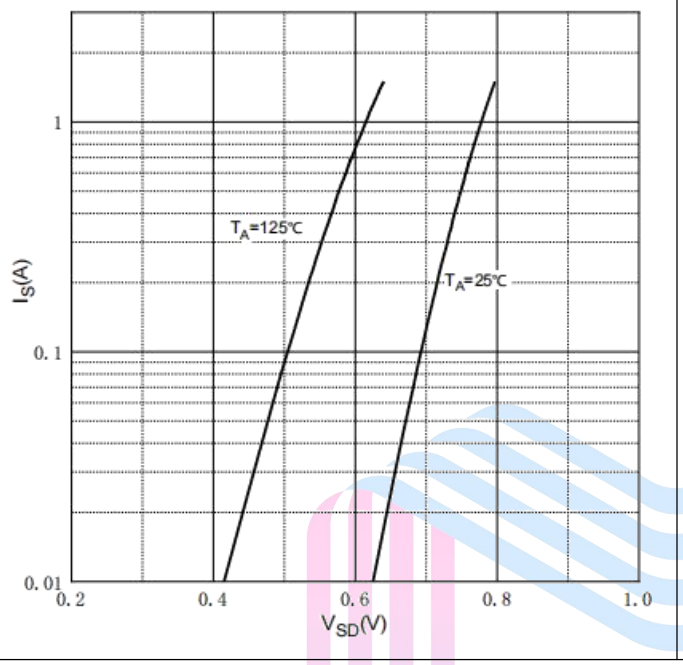
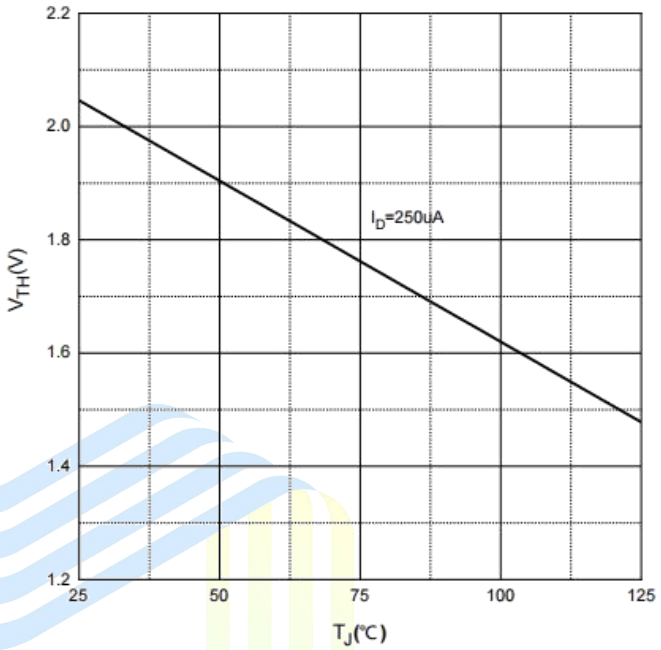
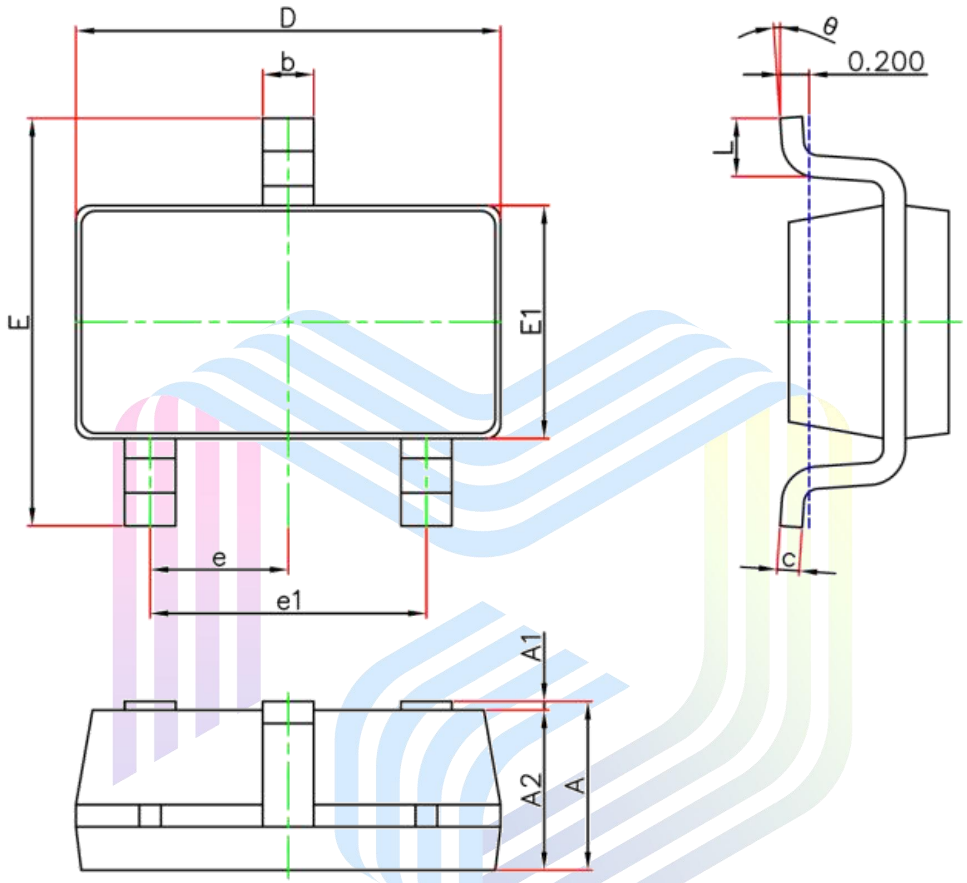



Figure 8: Threshold Voltage



# Mechanical Dimensions:

**SOT-23-3L Package Information**




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | 1.050 | 1.250 | 0.041 | 0.049 |
| A1 | 0 | 0.150 | 0.000 | 0.006 |
| A2 | 1.050 | 1.250 | 0.041 | 0.049 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.100 | 0.200 | 0.004 | 0.008 |
| D | 2.820 | 3.020 | 0.111 | 0.119 |
| E | 2.650 | 2.950 | 0.104 | 0.116 |
| E1 | 1.500 | 1.700 | 0.059 | 0.067 |
| e | 0.950TYP | | 0.037TYP | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.300 | 0.600 | 0.012 | 0.024 |
| θ | 0° | 8° | 0° | 8° |

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