# VUSA004R300NA

# Datasheet

## General Description

| $V_{(BR)DSS}$ | $R_{DS(ON)\_max}$ | $I_D$ |
|---|---|---|
| 40V | 30mΩ@10V | 7A |
| | 38mΩ@4.5V | |

## Symbol

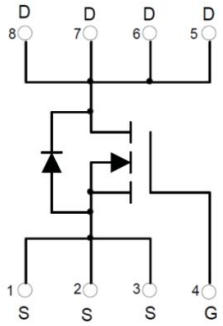



Figure 1 Symbol of VUSA004R300NA

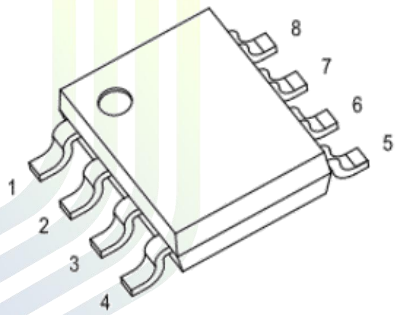
## Features

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

## Application

- Load Switch
- Power Switch Application

## Package Type




SOP8

Figure 2 Package Type of VUSA004R300NA

## Ordering Information

| Product Name | Package |
|---|---|
| VUSA004R300NA | SOP8 |

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

| Parameter | Symbol | Rating | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 40 | V |
| Gate-Source Voltage | $V_{GS}$ | ±20 | V |
| Continuous Drain Current[Note1] | $I_D$ | 7 | A |
| Pulsed Drain Current [Note2] | $I_{DM}$ | 35 | |
| Total Power Dissipation[Note4] | $P_D$ | 1.4 | 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] | $R_{\theta JA}$ | | 89 | | 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 | 40 | | | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$= 40V, $V_{GS}$=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 | 1.0 | 1.6 | 2.5 | V |
| Static Drain-Source On-Resistance[Note3] | $R_{DS(ON)}$ | $V_{GS}$=10V, $I_D$= 7A | | 22 | 30 | mΩ |
| | | $V_{GS}$=4.5V, $I_D$= 5A | | 28 | 38 | |
| Forward Transconductance[Note3] | $g_{FS}$ | $V_{DS}$=5V, $I_D$= 7A | 10 | 25 | | S |
| **Dynamic Characteristics** | | | | | | |
| Input Capacitance | $C_{ISS}$ | $V_{DS}$=20V | | 418 | | pF |
| Output Capacitance | $C_{OSS}$ | $V_{GS}$=0V | | 49 | | pF |
| Reverse Transfer Capacitance | $C_{RSS}$ | f=1MHz | | 34 | | pF |
| Total Gate Charge | $Q_g$ | $V_{DS}$=20V | | 7.3 | | nC |
| Gate-Source Charge | $Q_{gs}$ | $V_{GS}$=10V | | 2.2 | | |
| Gate-Drain Charge | $Q_{gd}$ | $I_D$=7A | | 1.3 | | |
| Gate Resistance | Rg | f = 1MHz, Open drain | | 3 | | Ω |
| **Switching Parameters** | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}$= 20V | | 6.2 | | ns |
| Turn-on Rise Time | $t_r$ | $V_{GS}$= 10V | | 3.5 | | |
| Turn-off Delay Time | $t_{d(off)}$ | $R_L$=2.8Ω | | 14 | | |
| Turn-off Fall Time | $t_f$ | $R_G$=3Ω | | 5.9 | | |
| **Diode Characteristics** | | | | | | |
| Diode Forward Voltage [Note3] | $V_{SD}$ | $V_{GS}$=0V, $I_S$= 1A | | 0.72 | 1.2 | V |
| Continuous Source Current | $I_S$ | $V_G$ = $V_D$ = 0V | | | 7 | A |
| Pulsed Source Current | $I_{SM}$ | Force Current | | | 35 | |

Notes :

1.The maximum current rating is limited by package.And device mounted on a large heatsink.

2.Pulse Test : Pulse Width ≤ 10μs, duty cycle ≤ 1%.

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

4.The power dissipation $P_D$ is limited by $T_{J(MAX)}$ = 150°C.And device mounted on a large heatsink

5.Device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with $T_A$ =25°C.

# Typical Performance Characteristics

Figure 3: Transfer Characteristics

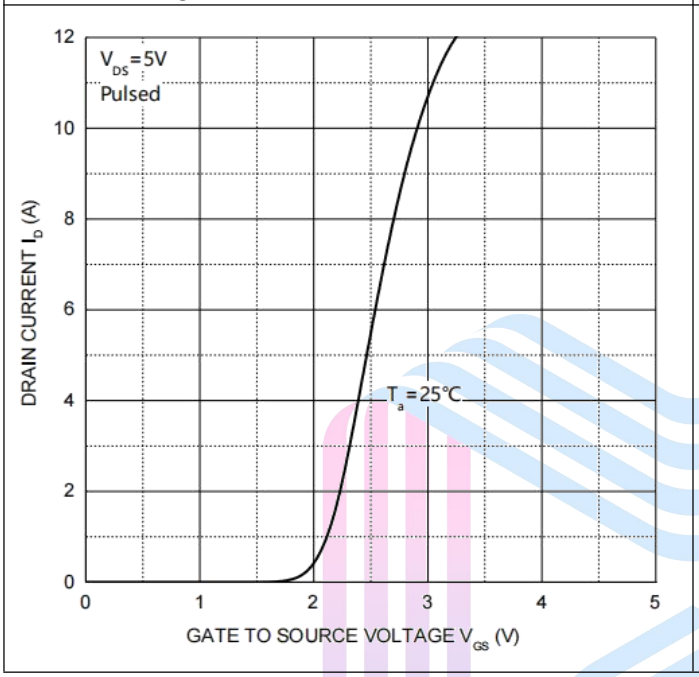



Figure 4: Output Characteristics

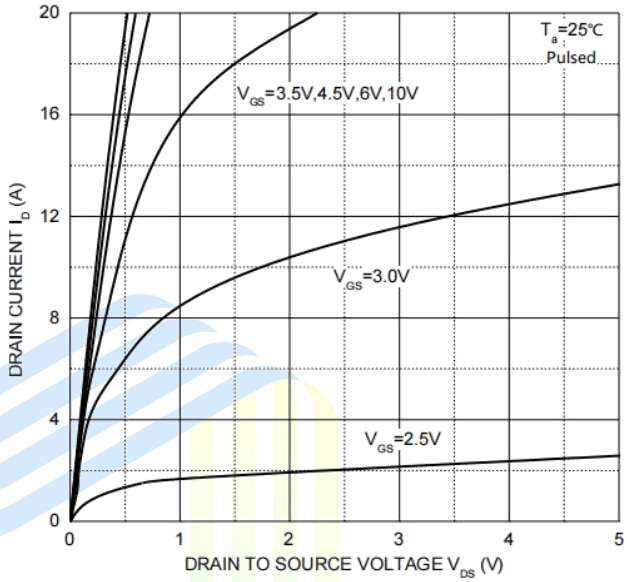



Figure 5: On-Resistance vs. Drain Current

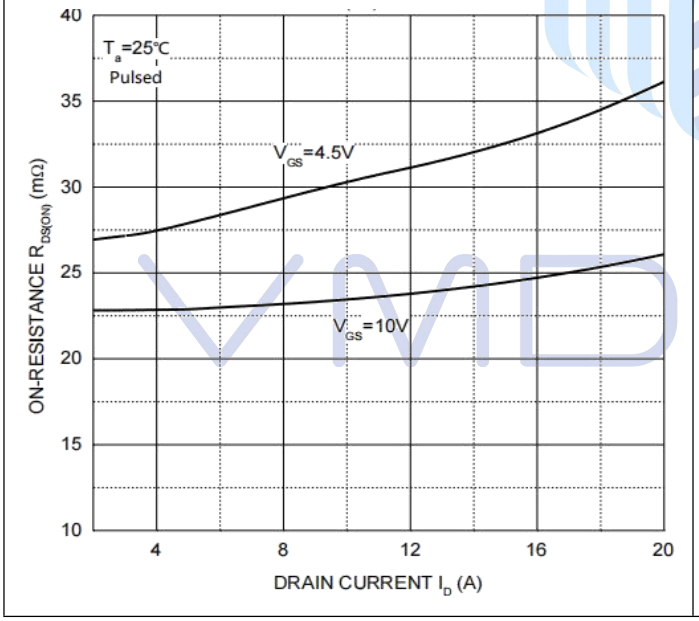



Figure 6: On-Resistance vs. Gate Voltage

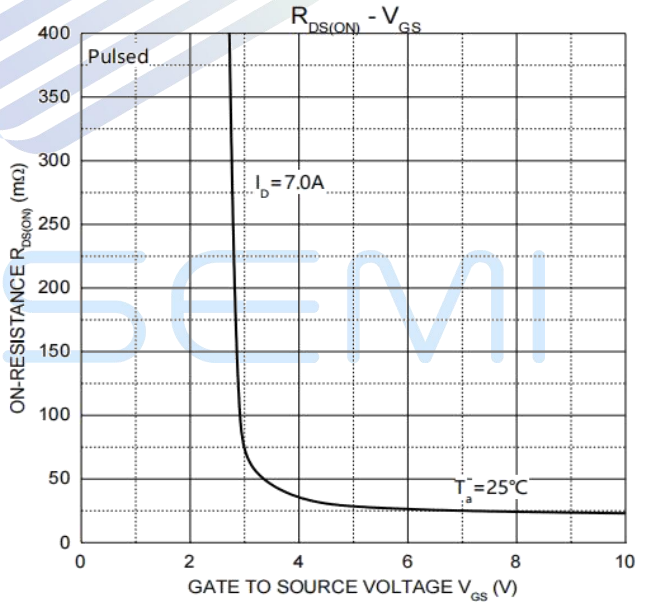


Figure 7: Body Diode Characteristics

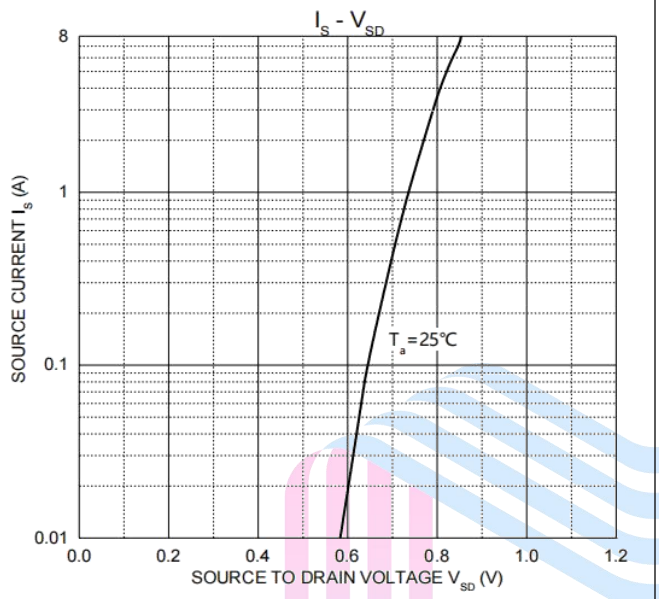
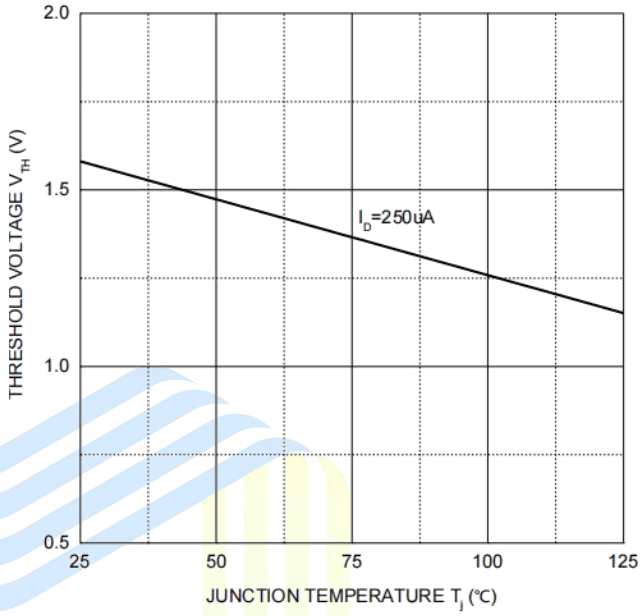
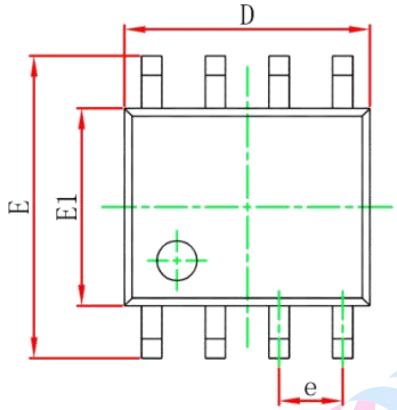


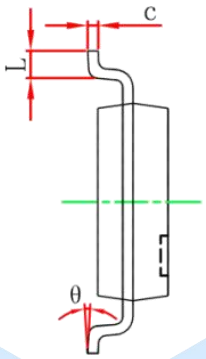

Figure 8: Threshold Voltage

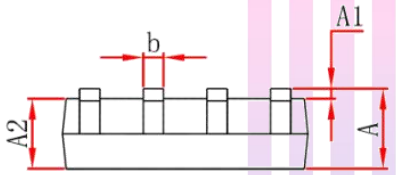


# Mechanical Dimensions:

**SOP8 Package Information**




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | **Min** | **Max** | **Min** | **Max** |
| A | 1.350 | 1.750 | 0.053 | 0.069 |
| A1 | 0.100 | 0.250 | 0.004 | 0.010 |
| A2 | 1.350 | 1.550 | 0.053 | 0.061 |
| b | 0.330 | 0.510 | 0.013 | 0.020 |
| c | 0.170 | 0.250 | 0.007 | 0.010 |
| D | 4.800 | 5.000 | 0.189 | 0.197 |
| e | 1.270 (BSC) | | 0.050 (BSC) | |
| E | 5.800 | 6.200 | 0.228 | 0.244 |
| E1 | 3.800 | 4.000 | 0.150 | 0.157 |
| L | 0.400 | 1.270 | 0.016 | 0.050 |
| θ | 0° | 8° | 0° | 8° |

# NOTICE

Hangzhou VMD Semiconductor Co., Ltd (VMD) reserves the right to make changes without notice in order to improve reliability, function or design and to discontinue any product or service without notice. Customers should obtain the latest relevant information before orders and should verify that such information is current and complete. All products are sold subject to VMD's terms and conditions supplied at the time of order acknowledgement.

VMD, its affiliates, agents, and employees, and all persons acting on its or their behalf, disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

VMD disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify VMD's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

VMD warrants performance of its hardware products to the specifications at the time of sale, testing, reliability and quality control are used to the extent VMD deems necessary to support this warrantee. Except where agreed upon by contractual agreement, testing of all parameters of each product is not necessarily performed.

VMD does not assume any liability arising from the use of any product or circuit designs described herein. Customers are responsible for their products and applications using VMD's components. To minimize risk, customers must provide adequate design and operating safeguards.

VMD does not warrant or convey any license to any intellectual property rights either expressed or implied under its patent rights, nor the rights of others. Reproduction of information in VMD's data sheets or data books is permissible only if reproduction is without modification or alteration. Reproduction of this information with any alteration is an unfair and deceptive business practice.

VMD is not responsible or liable for such altered documentation. Resale of VMD's products with statements different from or beyond the parameters stated by VMD for that product or service voids all express or implied warrantees for the associated VMD product or service and is an unfair and deceptive business practice.

# Via-Media Semiconductor Limited Company

## http://www.vmdsemi.com


**Main Sites:**

- **Headquarters**

Hangzhou Via-Media Semiconductor Co., LTD.
1305-1306, Building 71, No. 90, Wensan Road, Xihu District, Hangzhou, Zhejiang Province, P.R. China
Tel: +86-0571-8515 0563

- **Chengdu Office**

Chengdu Winhi Semiconductor Co., LTD.
Floor 15, Building 5, No. 171, Hele 2nd Street, Chengdu, Sichuan Province, P.R. China
Tel: +86-028-8505 0771

- **Shanghai**

Shanghai R&D Center.
1506~1508, Xinyin Building, 888 Yishan Road, Shanghai, P.R of China
Tel: +86- 021-54201999

- **Shenzhen**

Shenzhen Sales office
Room 4A15, Block AB, Tianxiang Building, Chegongmiao , Futian District, Shenzhen, P.R of China
Tel: +86-0755- 82570682

- **Xi'an**

Xi'an R&D Center
1703B, Building A, Greenland Center, Jinye Road, High-Tech Zone, Xi'an, Shaanxi, P.R of China