# VUDE003R120NA

# Datasheet

## General Description

| $V_{(BR)DSS}$ | $R_{DS(ON)\_max}$ | $I_D$ |
|---|---|---|
| 30V | 12mΩ@10V | 35A |
| | 18mΩ@4.5V | |

## Symbol

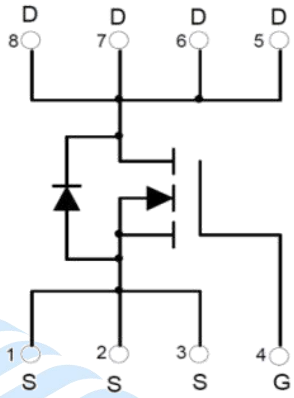
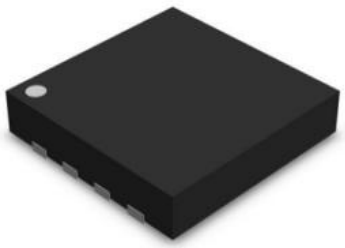



Figure 1 Symbol of VUDE003R120NA

## Features

- Low Gate Charge
- Low Gate Resistance
- Advanced high cell density Trench technology

## Package Type



**DFN3030-8L**

Figure 2 Package Type of VUDE003R120NA

## Application

- Load / Power Switch
- Battery protection applications

## Ordering Information

| Product Name | Package |
|---|---|
| VUDE003R120NA | DFN3030-8L |

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

| Parameter | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DSS}$ | 30 | V |
| Gate-Source Voltage | | $V_{GSS}$ | ±20 | V |
| Continuous Drain Current | $T_A$= 25 ºC | $I_D$ | 15 | A |
| Continuous Drain Current | $T_C$= 25 ºC | $I_D$ | 35 | |
| Pulsed Drain Current Note2 | | $I_{DM}$ | 60 | A |
| Total Power Dissipation Note3 | | $P_D$ | 3 | 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 Note1 | $R_{\theta JA}$ | | 42 | | 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 | $I_{GSS}$ | $V_{GS}$ = ±20V, $V_{DS}$= 0V | | | ±100 | nA |
| Gate Threshold Voltage[Note4] | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$, $I_D$=250uA | 1.0 | 1.7 | 3.0 | V |
| Static Drain-Source On-Resistance[Note4] | $R_{DS(ON)}$ | $V_{GS}$=10V, $I_D$= 10A | | 8 | 12 | mΩ |
| | | $V_{GS}$=4.5V, $I_D$= 10A | | 12 | 18 | |
| Forward tranconductance[Note4] | $g_{FS}$ | $V_{DS}$ =5V, $I_D$= 10A | 5 | 12 | | S |
| **Dynamic Characteristics** | | | | | | |
| Input Capacitance | $C_{ISS}$ | $V_{DS}$=15V | | 1570 | | pF |
| Output Capacitance | $C_{OSS}$ | $V_{GS}$=0V | | 320 | | pF |
| Reverse Transfer Capacitance | $C_{RSS}$ | f=1MHz | | 190 | | pF |
| Total Gate Charge | $Q_g$ | $V_{DS}$=15V | | 13.5 | | nC |
| Gate-Source Charge | $Q_{gs}$ | $V_{GS}$=5V | | 5.6 | | |
| Gate-Drain Charge | $Q_{gd}$ | $I_D$= 10A | | 3.7 | | |
| **Switching Parameters** | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}$= 25V | | 31 | | ns |
| Turn-on Rise Time | $t_r$ | $V_{GS}$= 10V | | 22 | | |
| Turn-off Delay Time | $t_{d(off)}$ | $R_L$=6.7Ω | | 105 | | |
| Turn-off Fall Time | $t_f$ | $R_{GEN}$=63Ω, $I_D$= 1A | | 82 | | |
| **Diode Characteristics** | | | | | | |
| Diode Forward Voltage [Note4] | $V_{SD}$ | $V_{GS}$=0V, $I_S$= 10A<br>$T_J$= 25 ºC | | 0.85 | 1.2 | V |
| Continuous Source Current | $I_S$ | $V_G$=$V_D$=0V | | | 15 | A |
| Pulsed Source Current | $I_{SM}$ | Force Current | | | 45 | |

Notes :

1.The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper

2.Pulse Test:Pulse Width < 10us, Duty Cycle < 0.5%.

3.The power dissipation is limited by 150℃ junction temperature

4.Pulse Test : Pulse width≤300μs, duty cycle≤0.5%.

# Typical Performance Characteristics

Figure 3: Transfer Characteristics

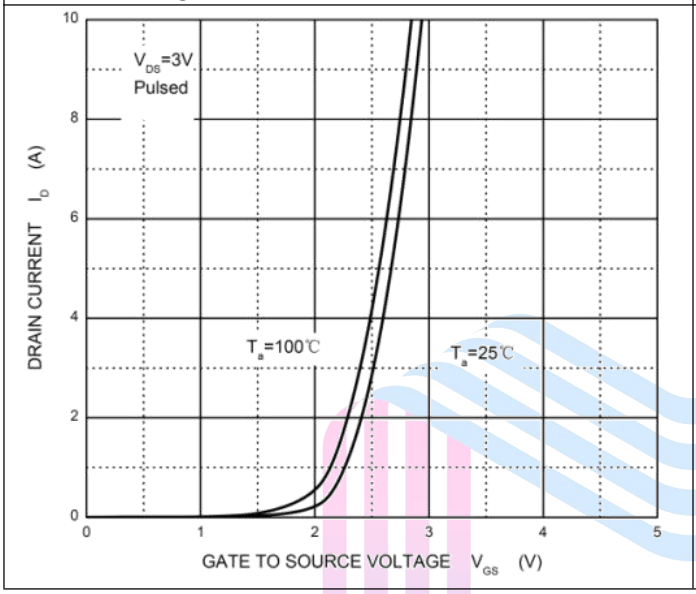



Figure 4: Output Characteristics

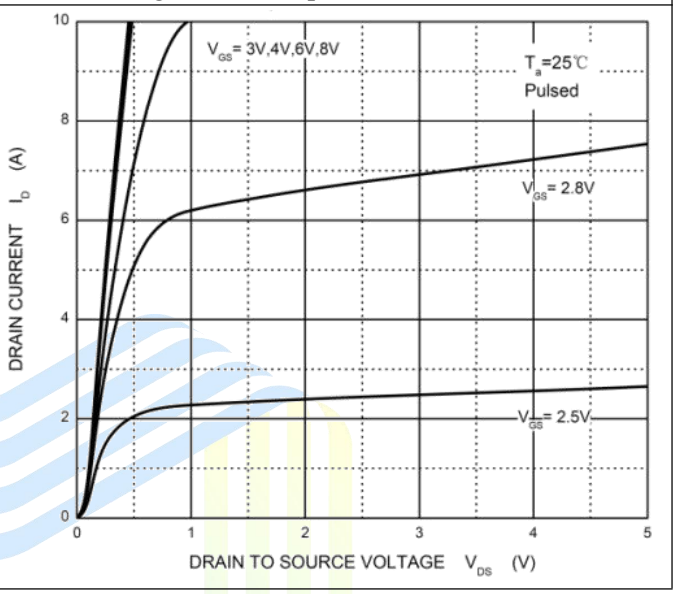



Figure 5: On-Resistance vs. Drain Current

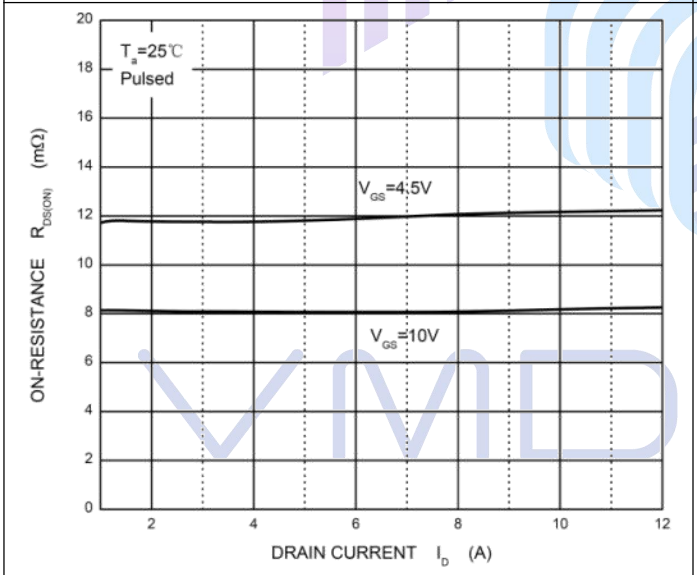



Figure 6: On-Resistance vs. Gate Voltage

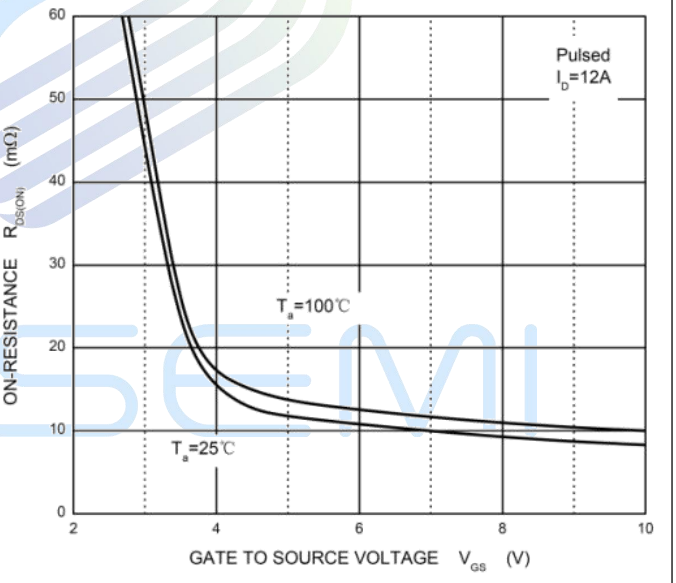


Figure 7: Body Diode Characteristics

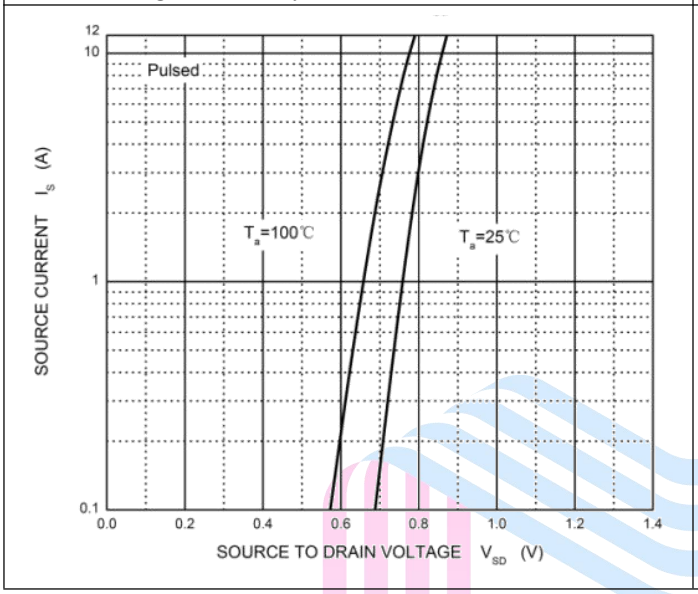
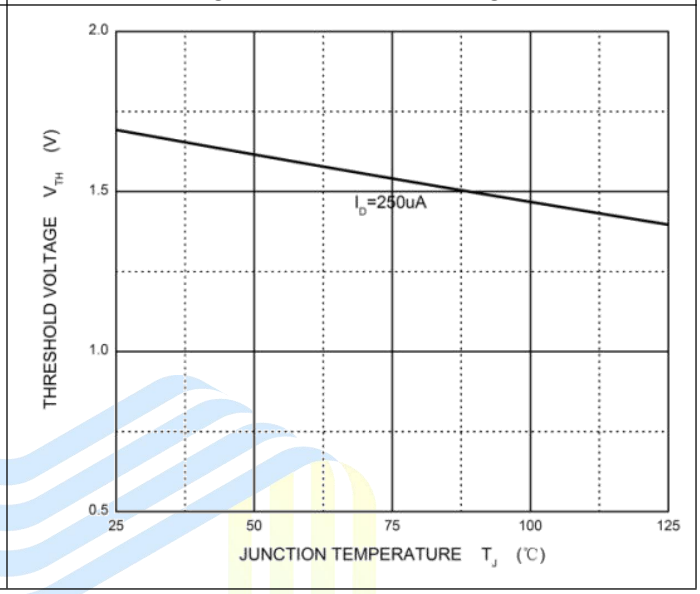
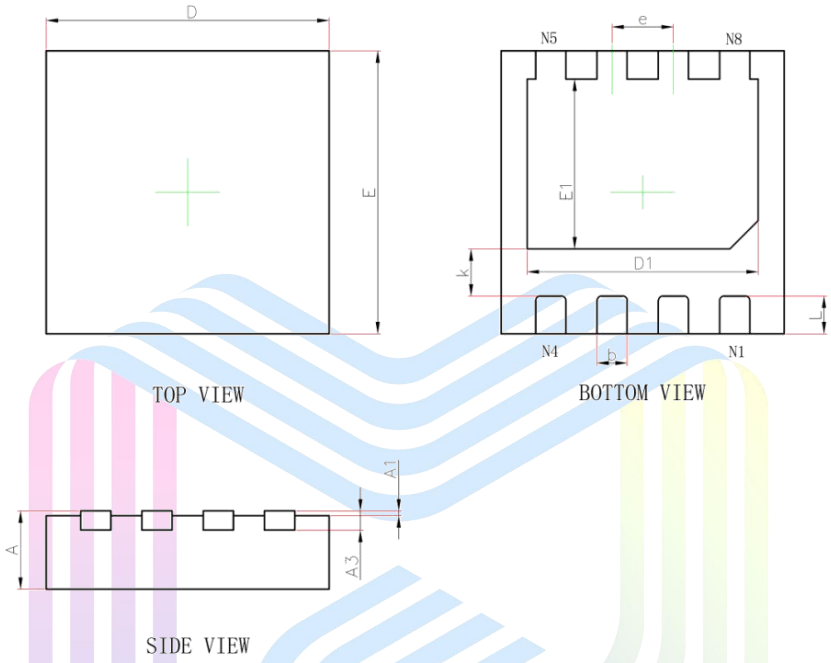



Figure 8: Threshold Voltage



# Mechanical Dimensions:

**DFN3030-8L Package Information**




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | 0.700/0.800 | 0.800/0.900 | 0.028/0.031 | 0.031/0.035 |
| A1 | 0.000 | 0.050 | 0.000 | 0.002 |
| A3 | 0.203REF. | | 0.008REF. | |
| D | 2.924 | 3.076 | 0.115 | 0.121 |
| E | 2.924 | 3.076 | 0.115 | 0.121 |
| D1 | 2.350 | 2.550 | 0.093 | 0.100 |
| E1 | 1.700 | 1.900 | 0.067 | 0.075 |
| k | 0.450 | 0.550 | 0.018 | 0.022 |
| b | 0.270 | 0.370 | 0.011 | 0.015 |
| e | 0.650TYP. | | 0.026TYP. | |
| L | 0.324 | 0.476 | 0.013 | 0.019 |

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