



VMDSEMI

**VUTL003R120NA**

**Datasheet**



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**General Description**
**Symbol**

$V_{(BR)DSS}$	$R_{DS(ON)_{max}}$	$I_D$
30V	12mΩ@10V	44A
	19mΩ@4.5V	

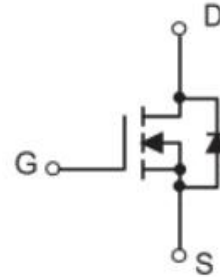
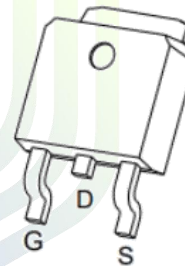


Figure 1 Symbol of VUTL003R120NA

**Features**

- Trench Technology Power MOSFET
- Low Gate Charge
- Low Gate Resistance
- Low  $R_{DS(ON)}$
- 100% UIS Tested

**Package Type**

**TO-252-2L**
**Application**

- Power Switch Application
- DC/DC Converter

Figure 2 Package Type of VUTL003R120NA

**Ordering Information**

Product Name	Package
VUTL003R120NA	TO-252-2L

**Absolute Maximum Ratings** ( $T_A=25\text{ }^\circ\text{C}$ , unless otherwise specified)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current <sup>Note1</sup> $T_C=25\text{ }^\circ\text{C}$	$I_D$	44	A
Continuous Drain Current <sup>Note1</sup> $T_A=25\text{ }^\circ\text{C}$		17	
Pulsed Drain Current <sup>Note2</sup>	$I_{DM}$	130	
Avalanche Current <sup>Note3</sup>	$I_{AS}$	17	A
Single Pulsed Avalanche Energy <sup>Note3</sup>	$E_{AS}$	72	mJ
Total Power Dissipation <sup>Note5</sup> $T_C=25\text{ }^\circ\text{C}$	$P_D$	31	W
Total Power Dissipation <sup>Note5</sup> $T_A=25\text{ }^\circ\text{C}$		2.5	
Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-55 to 150	$^\circ\text{C}$

**Thermal Resistance**

Parameter	Symbol	Min	Typ	Max	Unit
Thermal Resistance, Junction-to-Ambient <sup>Note6</sup>	$R_{\theta JA}$		50		$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$		4		$^\circ\text{C}/\text{W}$



**Electrical Characteristics** ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Statistic Characteristics</b>						
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	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS} = \pm 20V, V_{DS}=0V$			$\pm 100$	nA
Gate Threshold Voltage <sup>Note4</sup>	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.5	3	V
Static Drain-Source On-Resistance <sup>Note4</sup>	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$		8	12	m $\Omega$
		$V_{GS}=4.5V, I_D=10A$		13	19	
Forward Transconductance <sup>Note4</sup>	$g_{FS}$	$V_{DS}=5V, I_D=11A$	20			S
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{ISS}$	$V_{DS}=15V$		937		pF
Output Capacitance	$C_{OSS}$	$V_{GS}=0V$		147		pF
Reverse Transfer Capacitance	$C_{RSS}$	$f=1MHz$		137		pF
Total Gate Charge	$Q_g$	$V_{DS}=15V$		18.5		nC
Gate-Source Charge	$Q_{gs}$	$V_{GS}=10V$		3.4		
Gate-Drain Charge	$Q_{gd}$	$I_D=11A$		4.6		
Gate Resistance	$R_g$	$f=1MHz, \text{Open drain}$		2.0		$\Omega$
<b>Switching Parameters</b>						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=15V$		9.4		ns
Turn-on Rise Time	$t_r$	$V_{GS}=10V$		25		
Turn-off Delay Time	$t_{d(off)}$	$R_L=1.3\Omega$		37		
Turn-off Fall Time	$t_f$	$R_G=6\Omega$		22		
<b>Diode Characteristics</b>						
Diode Forward Voltage <sup>Note4</sup>	$V_{SD}$	$V_{GS}=0V, I_S=12A$			1.2	V

Notes :

- 1.The maximum current rating is limited by package.And device mounted on a large heatsink
- 2.Pulse Test : Pulse Width  $\leq 10\mu s$ , duty cycle  $\leq 1\%$ .
- 3.EAS condition:  $V_{DD}=15V, V_{GS}=10V, L=0.5mH, R_G=25\Omega$  Starting  $T_J=25^\circ C$ .
- 4.Pulse Test : Pulse Width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
- 5.The power dissipation  $P_D$  is limited by  $T_{J(MAX)}=150^\circ C$ .And device mounted on a large heatsink
- 6.Device mounted on  $1in^2$  FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^\circ C$ .

**Typical Performance Characteristics**

Figure 3: Transfer Characteristics

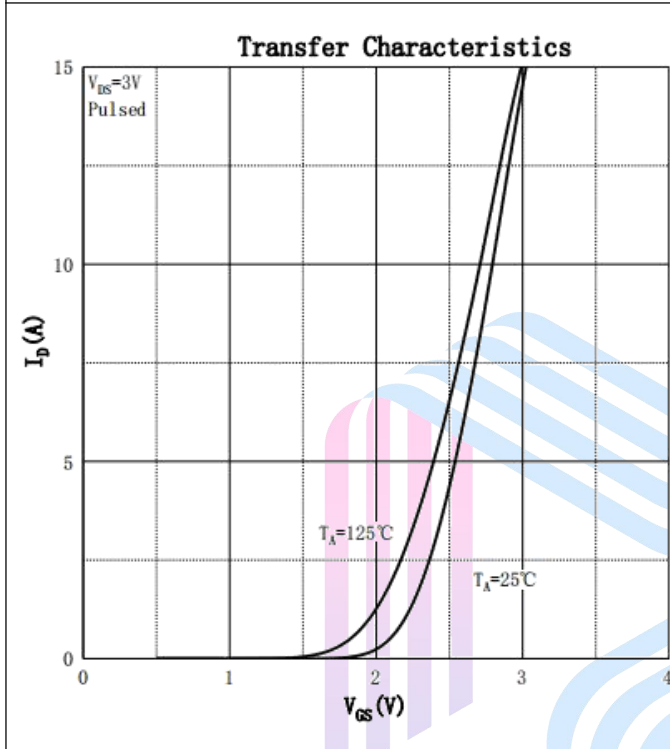


Figure 4: Output Characteristics

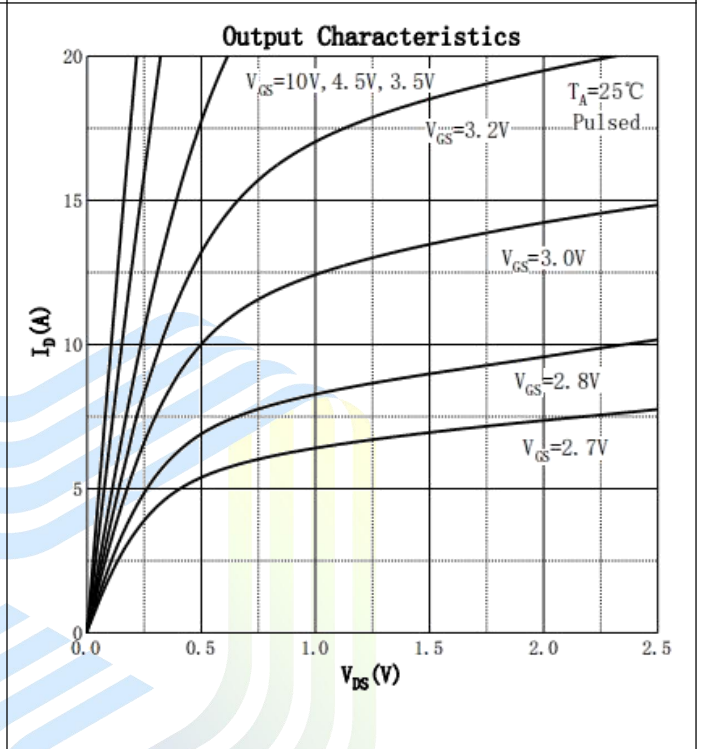


Figure 5: On-Resistance vs. Drain Current

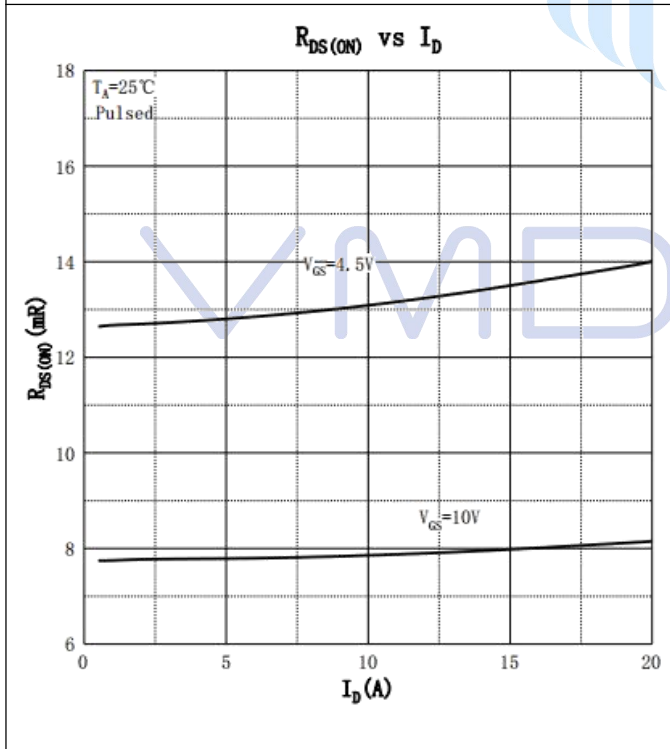
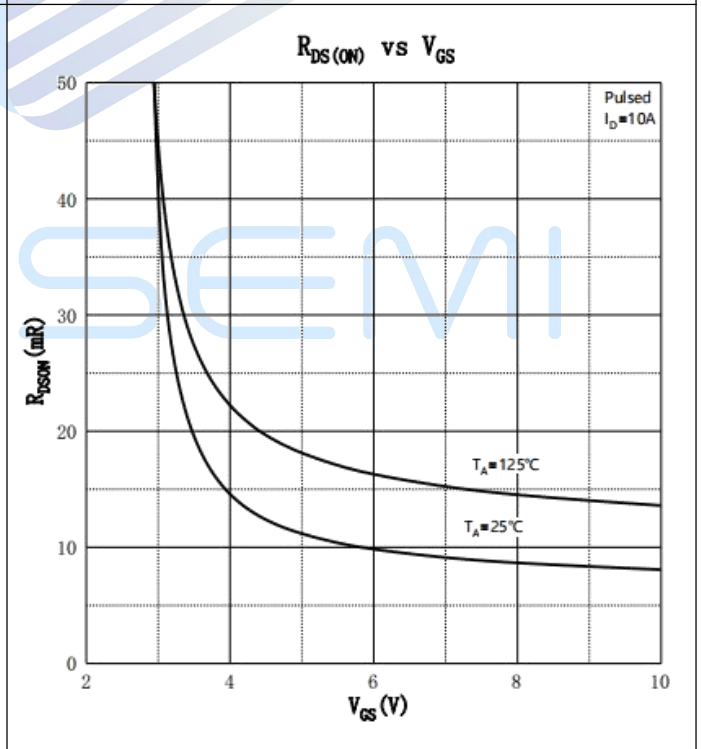
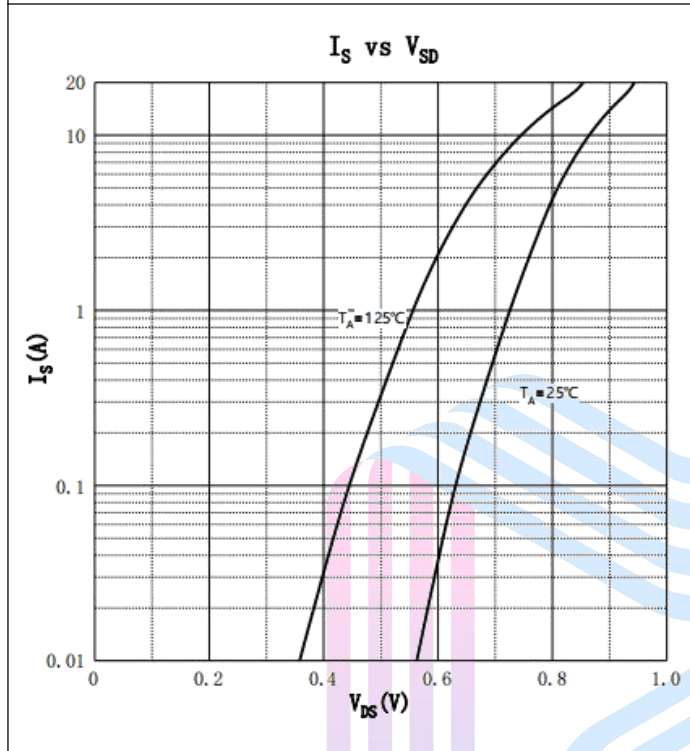
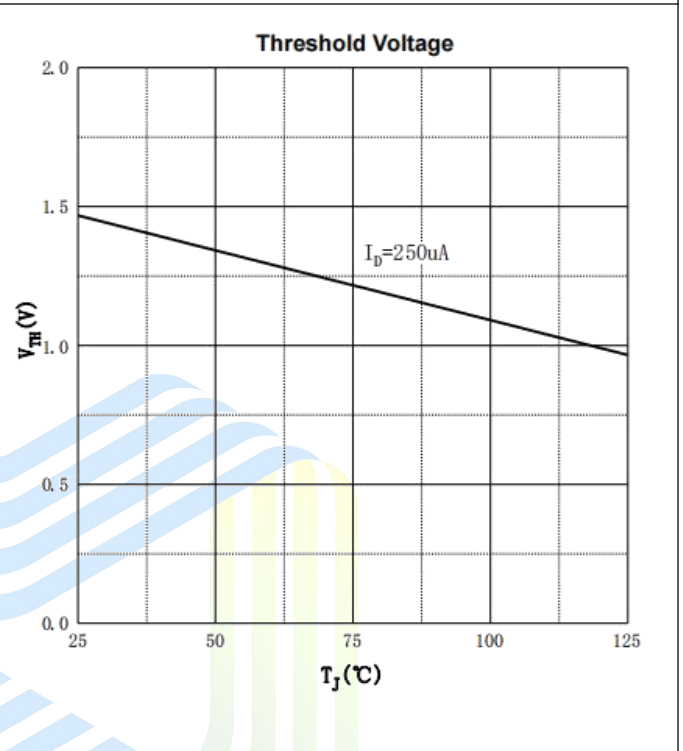
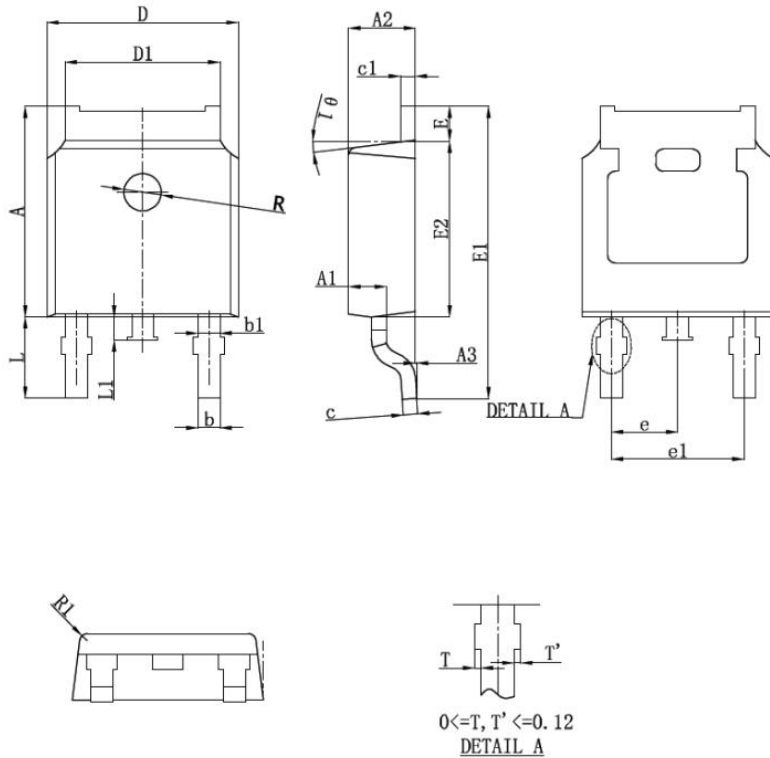


Figure 6: On-Resistance vs. Gate Voltage



**Figure 7: Body Diode Characteristics**

**Figure 8: Threshold Voltage**


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**Mechanical Dimensions:**
**TO-252-2L Package Information**


SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	7.050	7.100	7.150
A1	0.960	1.010	1.060
A2	2.250	2.300	2.350
A3	0.000	0.050	0.100
b	0.760REF.		
b1	1.000REF.		
c	0.508REF.		
c1	0.508REF.		
D	6.550	6.600	6.650
D1	5.220	5.320	5.420
E	0.950	1.000	1.050
E1	9.700	9.900	10.100
E2	6.050	6.100	6.150
e	2.286BSC		
e1	4.572REF.		
L	2.650	2.800	2.950
L1	0.700	0.800	0.900
$\theta$	7° REF.		
R	0.250REF.		

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## 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 2<sup>nd</sup> 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