VUTL003R031NA

Datasheet

General Description

$V_{(BR)DSS}$	$R_{DS(ON)\_max}$	I_D
30V	3.1mΩ@10V	140A
	3.8mΩ@4.5V	

Symbol

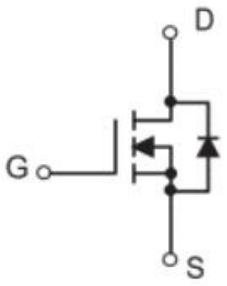
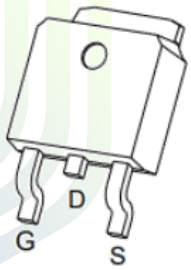


Figure 1 Symbol of VUTL003R031NA

Features

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

Package Type



TO-252-2L

Figure 2 Package Type of VUTL003R031NA

Application

- Power Switch Application
- DC/DC Converter

Ordering Information

Product Name	Package
VUTL003R031NA	TO-252-2L

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 Note1	T_C= 25 ºC	I_D	140	A
Continuous Drain Current Note1	T_C= 100 ºC		90	
Pulsed Drain Current Note2		I_{DM}	560	
Avalanche Current Note3		I_{AS}	53	A
Single Pulsed Avalanche Energy Note3		E_{AS}	702	mJ
Total Power Dissipation Note5	T_C= 25 ºC	P_D	125	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 Note6	$R_{\theta JA}$		50		ºC/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$		1.0		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	30			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}= 24V, 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	1.5	3.0	V
Static Drain-Source On-Resistance[Note4]	$R_{DS(ON)}$	V_{GS}=10V, I_D=20A		2.5	3.1	mΩ
		V_{GS}=4.5V, I_D= 10A		2.9	3.8	
Forward Transconductance[Note4]	g_{FS}	V_{DS}=10V, I_D= 10A	10			S
Dynamic Characteristics						
Input Capacitance	C_{ISS}	V_{DS}=15V		5144		pF
Output Capacitance	C_{OSS}	V_{GS}=0V		721		pF
Reverse Transfer Capacitance	C_{RSS}	f=1MHz		688		pF
Total Gate Charge	Q_g	V_{DS}=15V		120		nC
Gate-Source Charge	Q_{gs}	V_{GS}=10V		16		
Gate-Drain Charge	Q_{gd}	I_D= 20A		37		
Gate Resistance	Rg	f = 1MHz, Open drain		1.0		Ω
Switching Parameters						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}= 15V		18		ns
Turn-on Rise Time	t_r	V_{GS}= 10V		22		
Turn-off Delay Time	$t_{d(off)}$	R_L=0.75Ω		52		
Turn-off Fall Time	t_f	R_G=3Ω		20		
Diode Characteristics						
Diode Forward Voltage [Note4]	V_{SD}	V_{GS}=0V, I_S= 10A			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 ≤ 10μs, duty cycle ≤ 1%.

3.E_{AS} condition: V_{DD} = 25V,V_{GS} = 10V, L = 0.5mH, R_G = 25Ω Starting T_J = 25°C.

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

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

Typical Performance Characteristics

Figure 3: Transfer Characteristics

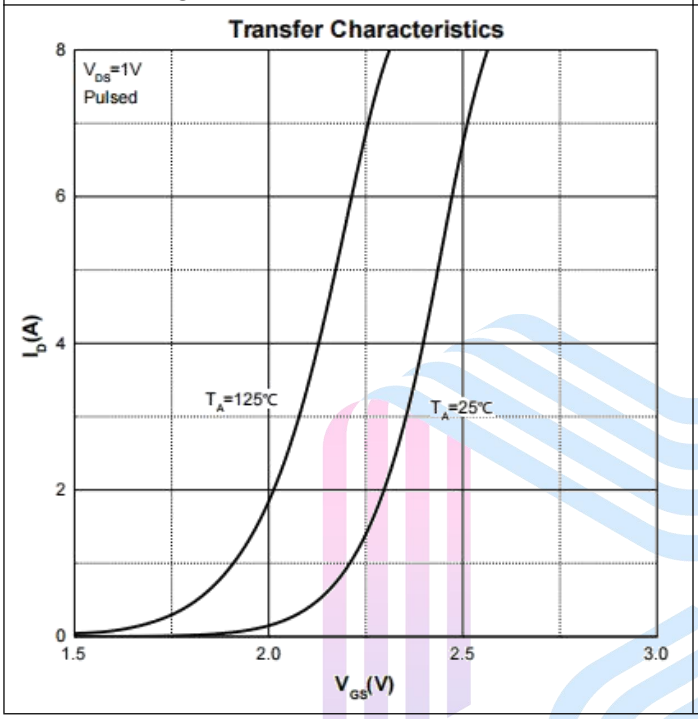


Figure 4: Output Characteristics

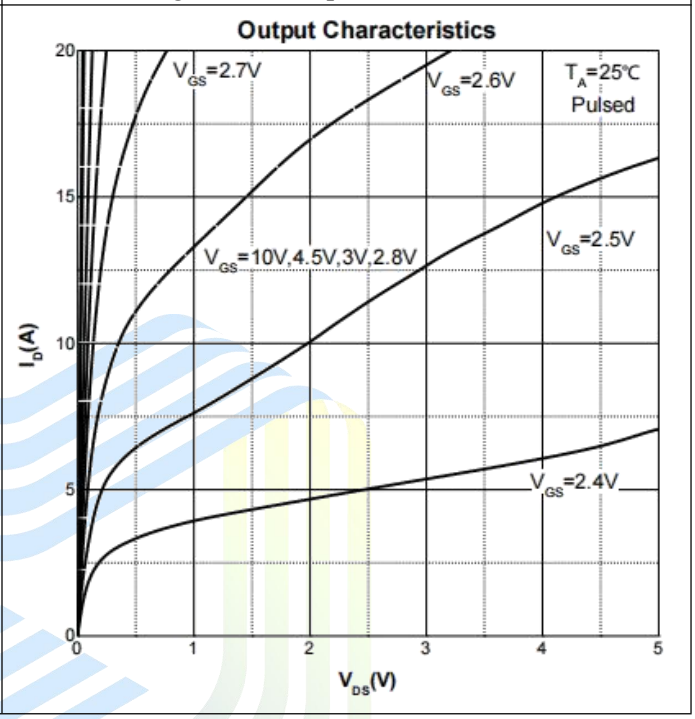


Figure 5: On-Resistance vs. Drain Current

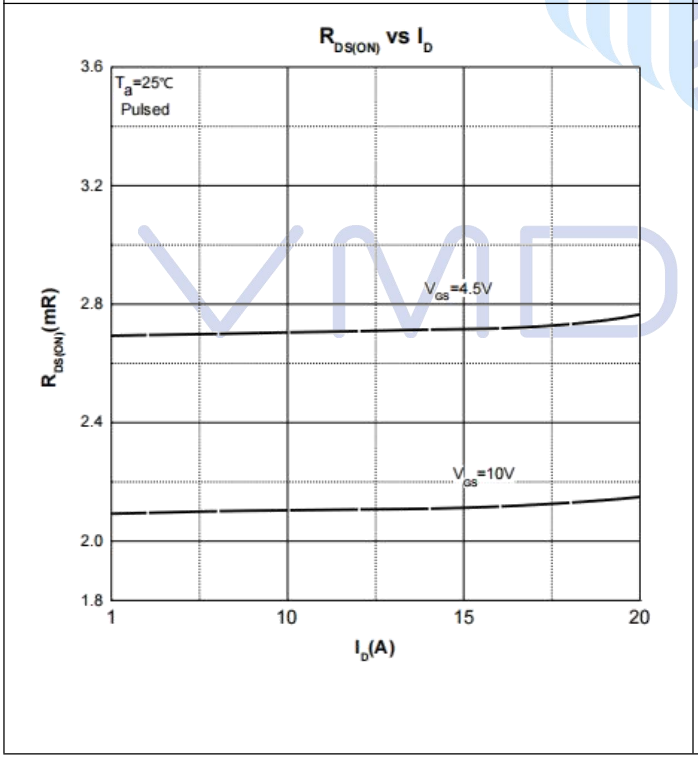


Figure 6: On-Resistance vs. Gate Voltage

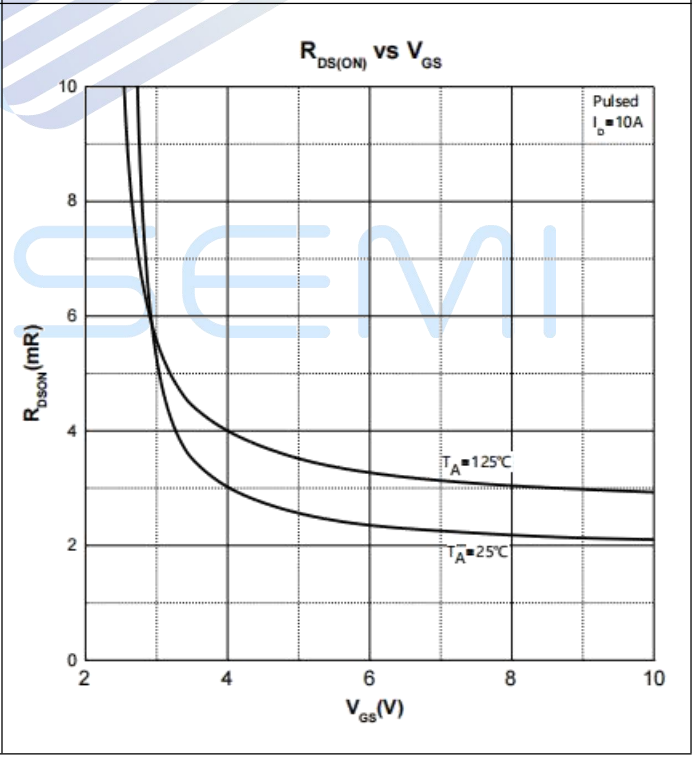


Figure 7: Body Diode Characteristics

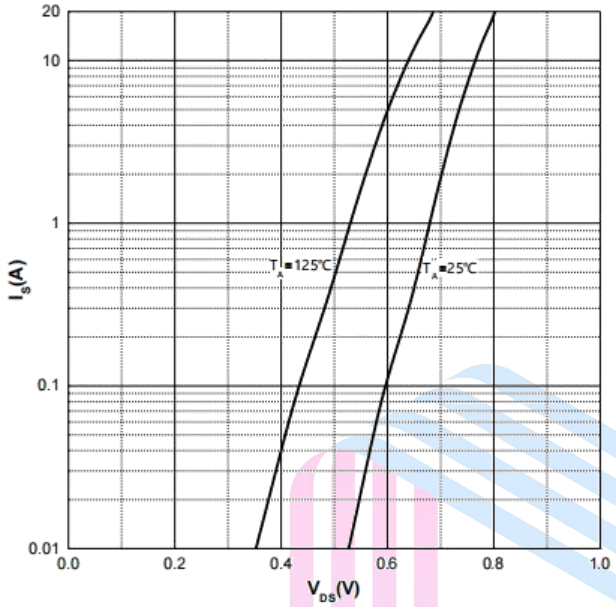


Figure 8: Threshold Voltage

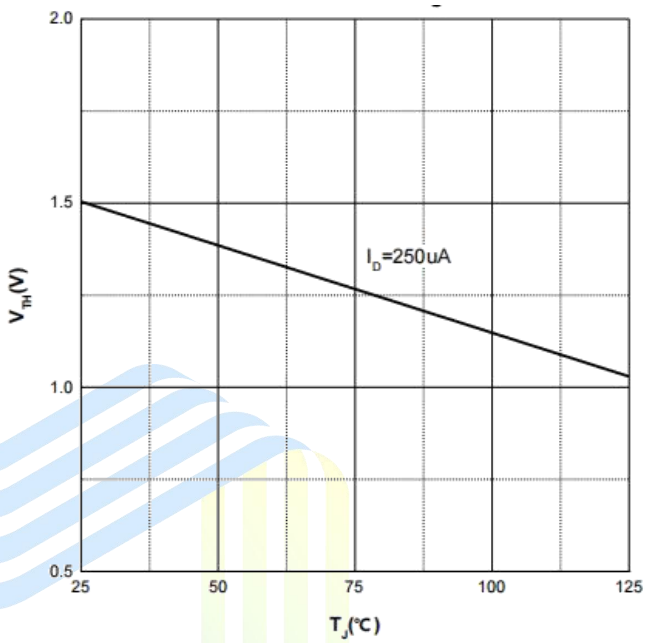


Figure 9: Typical Capacitance

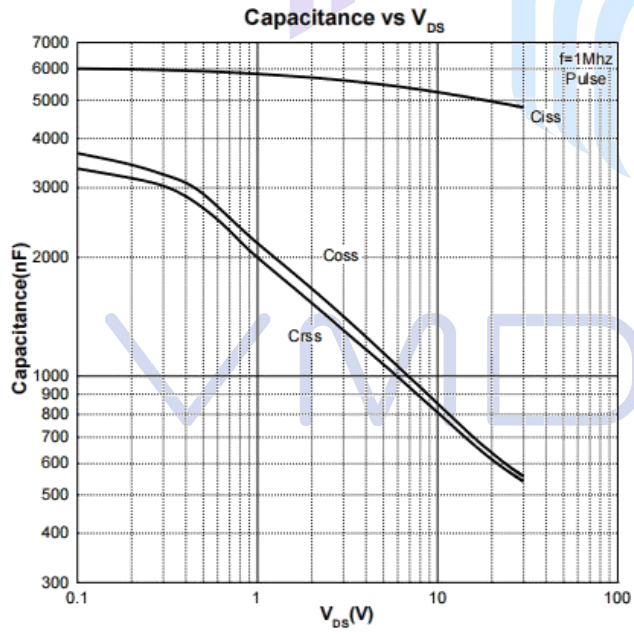


Figure 10: Safe Operating Area

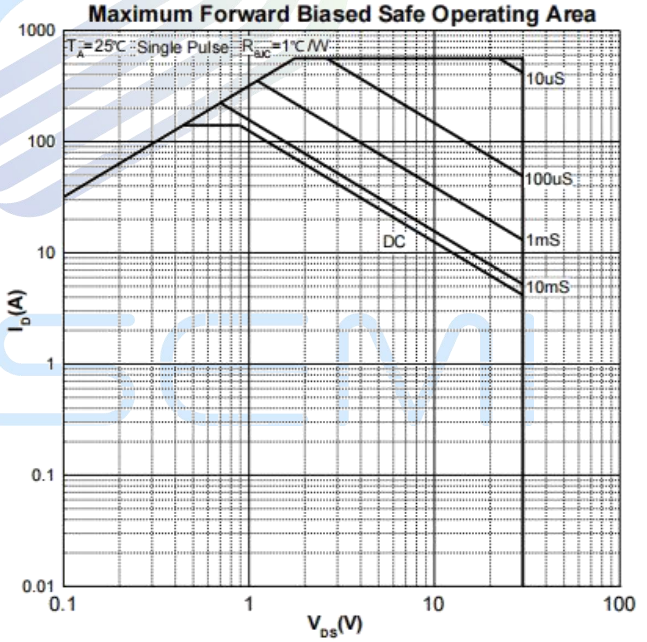
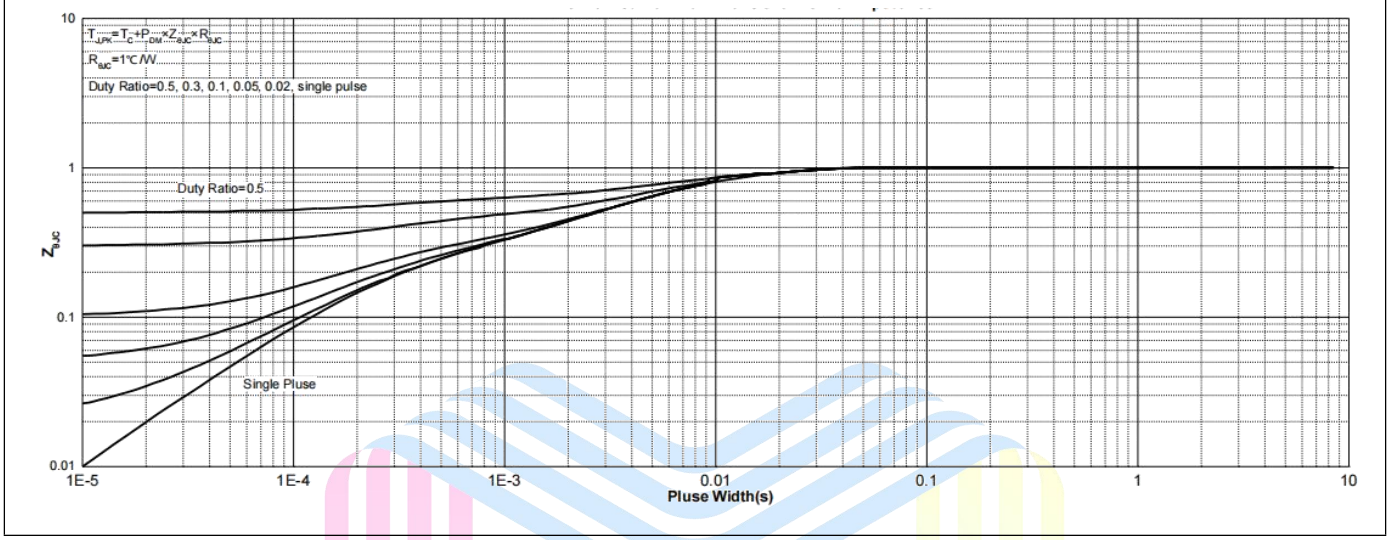
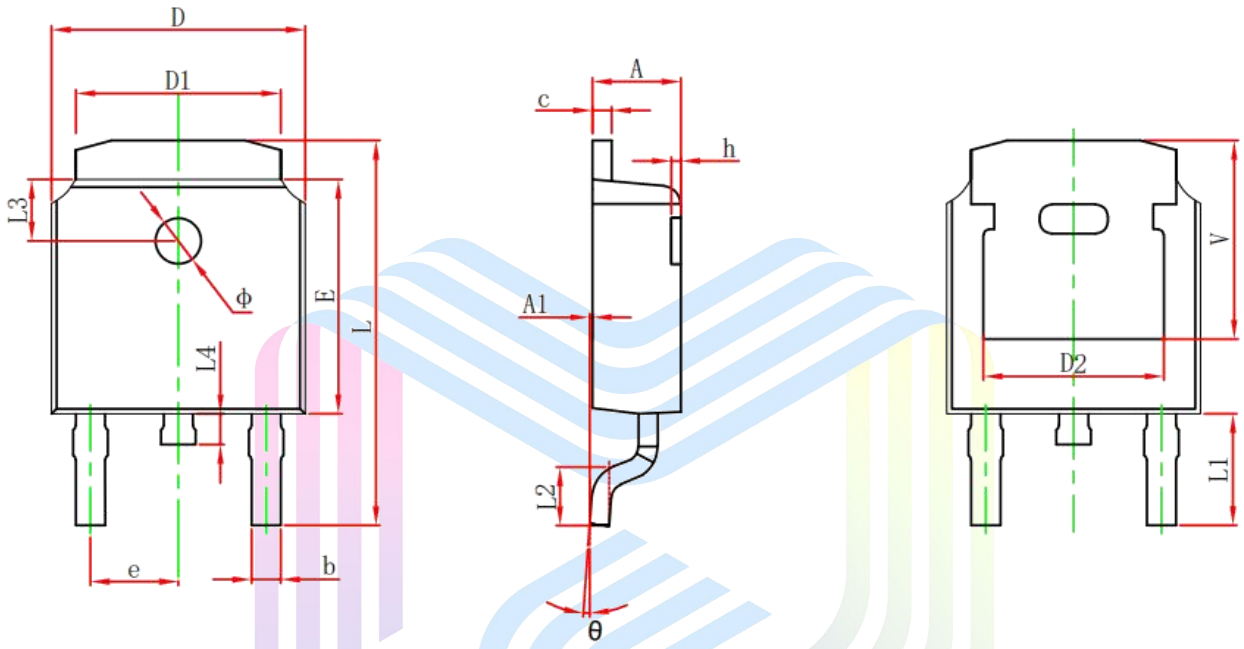


Figure 11: Normalized Maximum Transient Thermal Impedance



Mechanical Dimensions:

TO-252-2L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.635	0.770	0.025	0.030
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.712	10.312	0.382	0.406
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.250 REF.		0.207 REF.	

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