VUTP004R031NA

Datasheet

General Description

$V_{(BR)DSS}$	$R_{DS(ON)\_max}$	I_D
40V	3.1mΩ@10V	130A
	4.0mΩ@4.5V	

Symbol

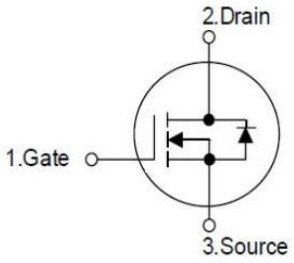


Figure 1 Symbol of VUTP004R031NA

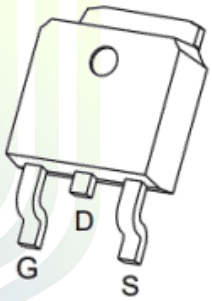
Features

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

Application

- Battery protection applications
- Power Switch Application

Package Type



TO-263-2L

Figure 2 Package Type of VUTP004R031NA

Ordering Information

Product Name	Package
VUTP004R031NA	TO-263-2L

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]	T_C= 25 ºC	I_D	130	A
Continuous Drain Current[Note1]	T_C= 100 ºC		68	
Pulsed Drain Current [Note2]		I_{DM}	520	
Avalanche Current[Note3]		I_{AS}	52	A
Single Pulsed Avalanche Energy[Note3]		E_{AS}	676	mJ
Total Power Dissipation[Note5]	T_C= 25 ºC	P_D	156	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]	$R_{\theta JA}$		60		ºC/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$		0.8		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[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= 20A		2.9	4.0	
Forward Transconductance[Note4]	g_{FS}	V_{DS}=10V, I_D=10A	10	26		S
Dynamic Characteristics						
Input Capacitance	C_{ISS}	V_{DS}=20V		13003		pF
Output Capacitance	C_{OSS}	V_{GS}=0V		806		pF
Reverse Transfer Capacitance	C_{RSS}	f=1MHz		886		pF
Total Gate Charge	Q_g	V_{DS}=20V		230		nC
Gate-Source Charge	Q_{gs}	V_{GS}=10V		29		
Gate-Drain Charge	Q_{gd}	I_D= 20A		37		
Gate Resistance	Rg	f = 1MHz, Open drain		1.3		Ω
Switching Parameters						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}= 20V		13		ns
Turn-on Rise Time	t_r	V_{GS}= 10V		9		
Turn-off Delay Time	$t_{d(off)}$	R_L=0.75Ω		57		
Turn-off Fall Time	t_f	R_G=3Ω		35		
Diode Characteristics						
Diode Forward Voltage [Note4]	V_{SD}	V_{GS}=0V, I_S= 20A			1.2	V
Diode Reverse Recovery Time	t_{rr}	I_F = 20A, dI/dt = 500A/ms		20		ns
Diode Reverse Recovery Charge	Qrr	I_F = 20A, dI/dt = 500A/ms		60		nC

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} = 40V, 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 1in2 FR-4 board with 2oz. Copper, in a still air environment with T_A =25°C.

Typical Performance Characteristics

Figure 3: Transfer Characteristics

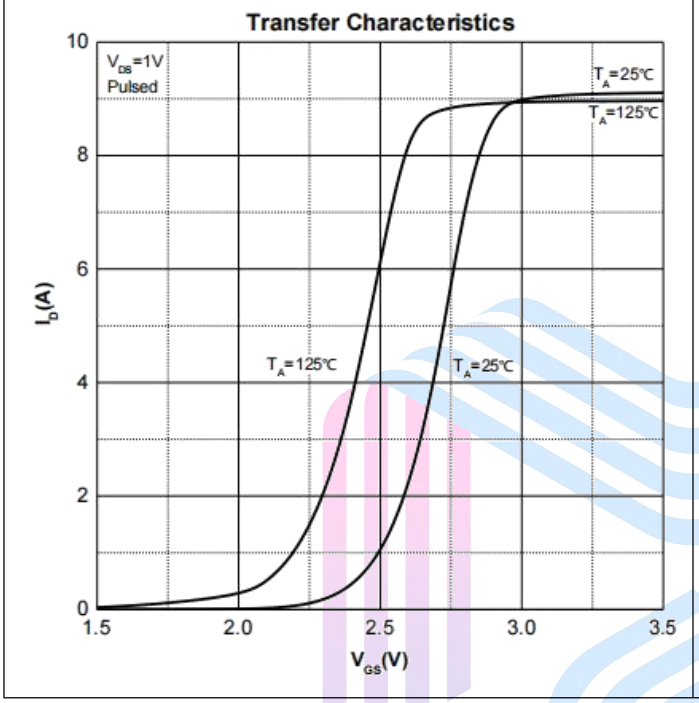


Figure 4: Output Characteristics

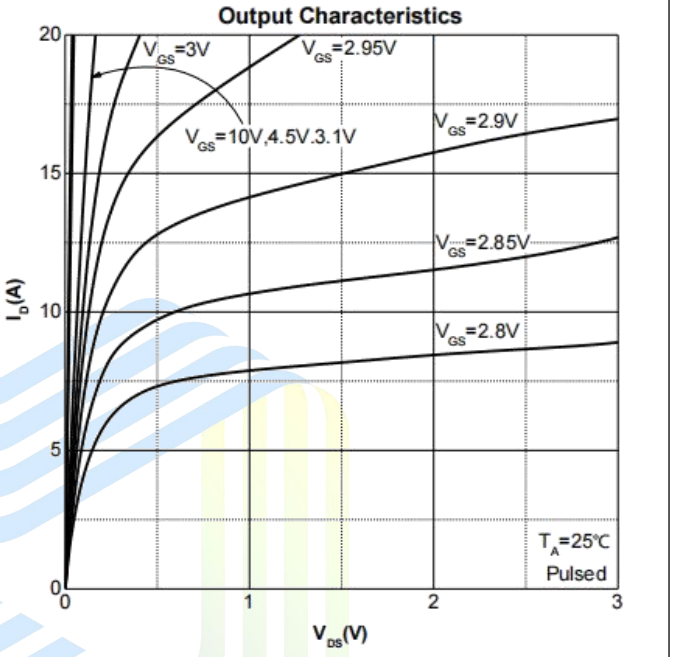


Figure 5: On-Resistance vs. Drain Current

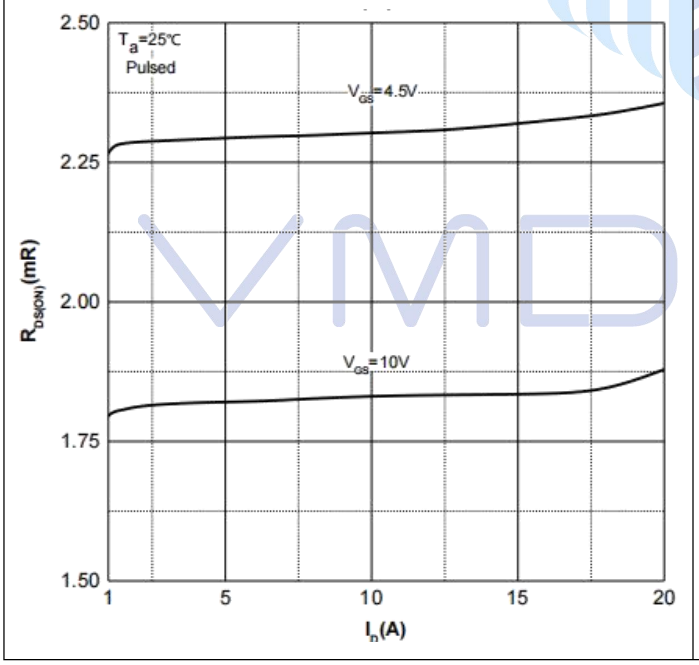


Figure 6: On-Resistance vs. Gate Voltage

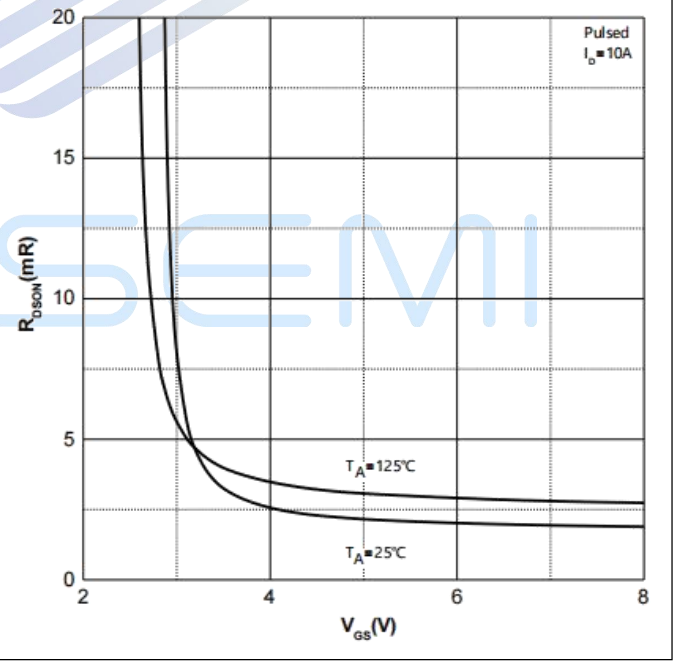


Figure 7: Body Diode Characteristics

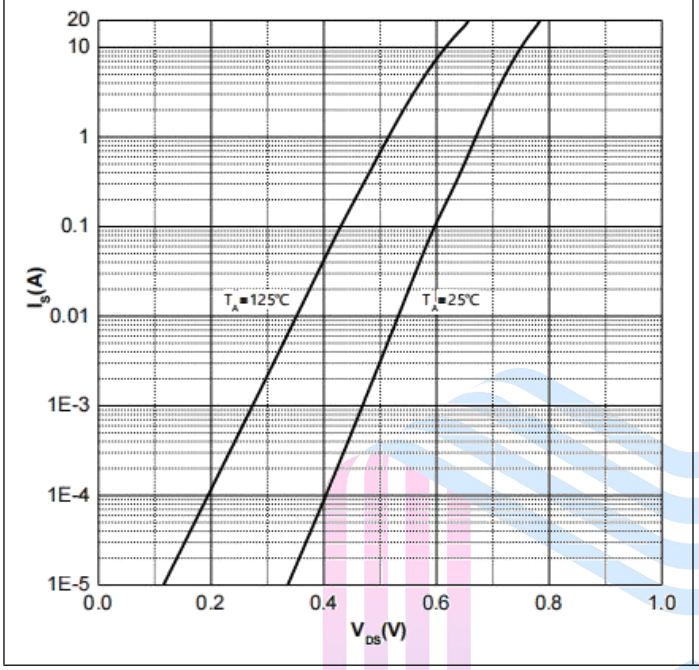


Figure 8: Threshold Voltage

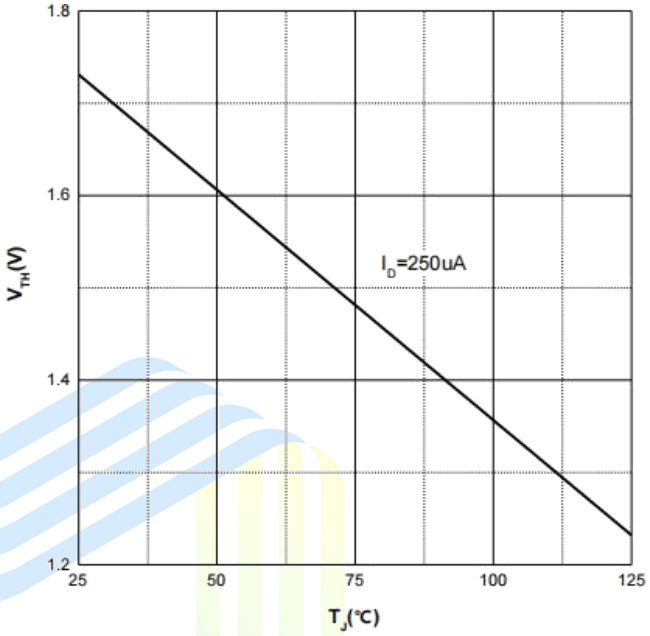


Figure 9: Typical Capacitance

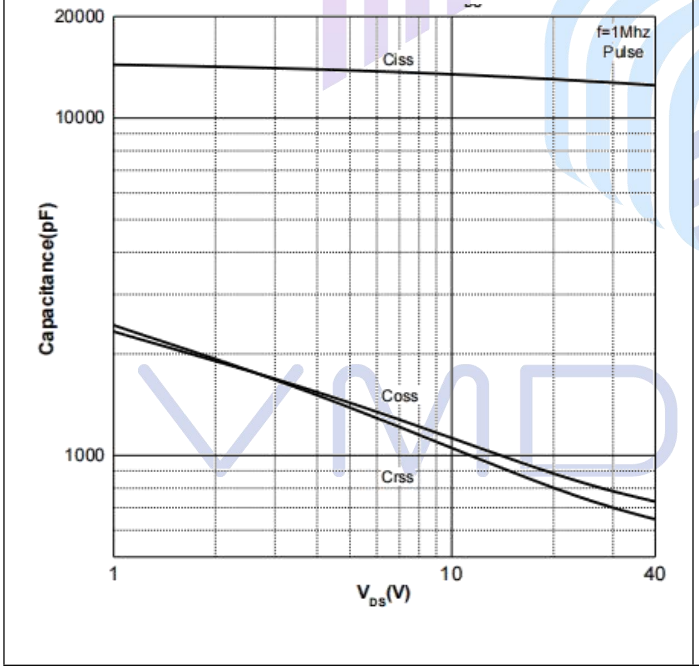


Figure 10: Safe Operation Area

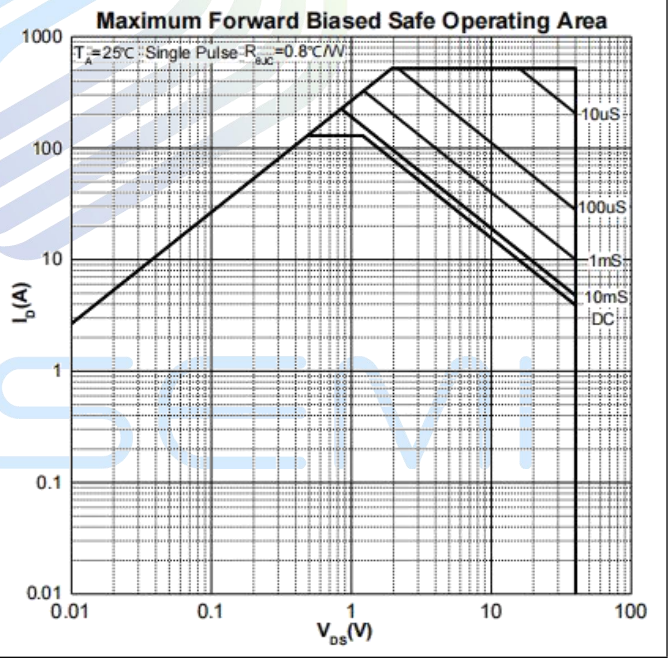
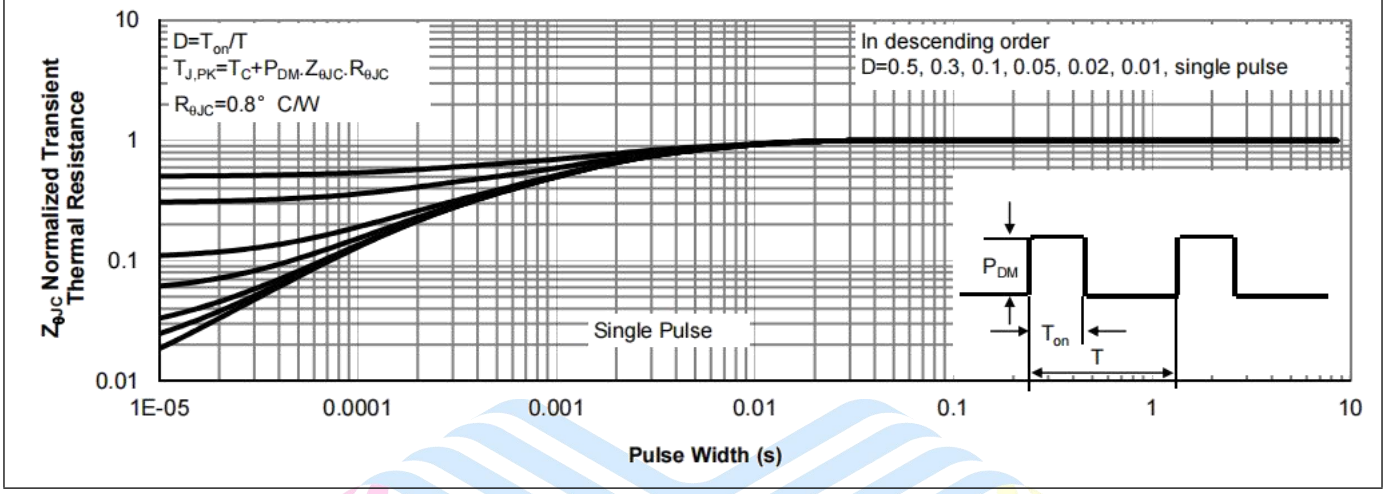
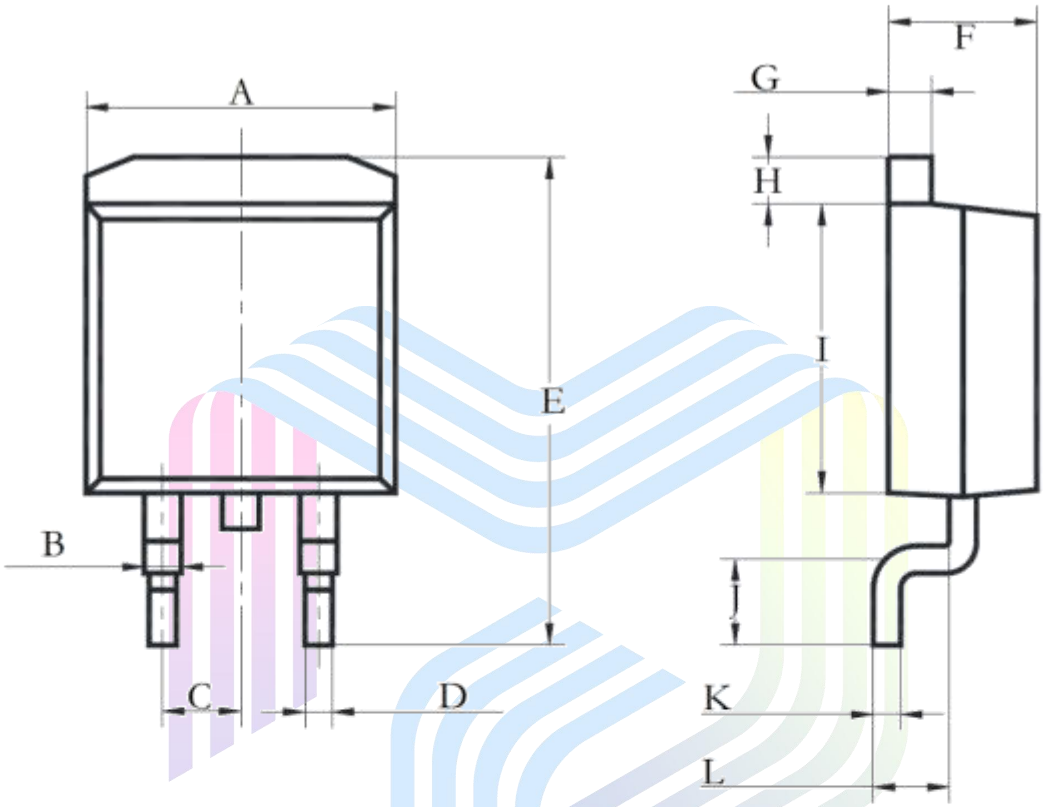


Figure 11: Normalized Maximum Transient Thermal Impedance



Mechanical Dimensions:

TO-263-2L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	9.600	10.500	0.378	0.413
B	1.000	1.400	0.039	0.055
C	2.540REF		0.100REF	
D	0.680	0.940	0.027	0.037
E	14.600	15.880	0.575	0.625
F	4.400	4.800	0.173	0.189
G	1.140	1.400	0.045	0.055
H	1.140	1.400	0.045	0.055
I	8.250	9.650	0.325	0.380
J	2.290	2.790	0.090	0.110
K	0.360	0.650	0.014	0.026
L	2.030	2.790	0.080	0.110

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