VUPB003R021NA

Datasheet

2.1mΩ, 30V, N-Channel Power MOSFET VUPB003R021NA

General Description

$V_{(BR)DSS}$	$R_{DS(ON)\_max}$	I_D
30V	2.1mΩ@10V	150A
	2.8mΩ@4.5V	

Symbol

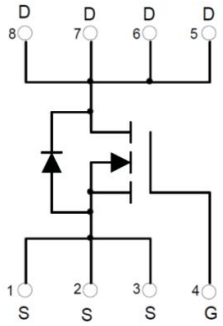
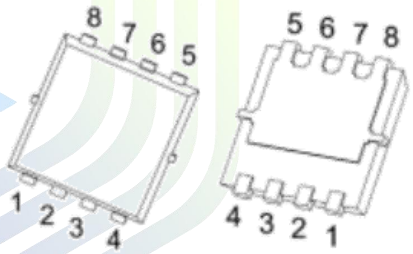


Figure 1 Symbol of VUPB003R021NA

Features

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

Package Type



PDFN5X6-8L

Figure 2 Package Type of VUPB003R021NA

Application

- Power Switch Application
- DC/DC Converters

Ordering Information

Product Name	Package
VUPB003R021NA	PDFN5X6-8L

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 Note1	T_C= 25 ºC	I_D	150	A
Pulsed Drain Current Note2		I_{DM}	600	
Single Pulsed Avalanche Energy Note3		E_{AS}	689	mJ
Avalanche Current Note3		I_{AS}	52.5	A
Total Power Dissipation Note5	T_C= 25 ºC	P_D	56.8	W
Total Power Dissipation Note5	T_A= 25 ºC	P_D	2.5	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	$R_{\theta JC}$		2.2		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}= 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	1.5	3.0	V
Static Drain-Source On-Resistance[Note4]	$R_{DS(ON)}$	V_{GS}=10V, I_D= 20A		1.5	2.1	mΩ
		V_{GS}=4.5V, I_D= 10A		2.1	2.8	
Forward Transconductance[Note4]	g_{FS}	V_{DS}=5V, I_D= 20A		100		S
Dynamic Characteristics						
Input Capacitance	C_{ISS}	V_{DS}=15V		5186		pF
Output Capacitance	C_{OSS}	V_{GS}=0V		660		pF
Reverse Transfer Capacitance	C_{RSS}	f=1MHz		555		pF
Total Gate Charge	Q_g	V_{DS}=15V		105		nC
Gate-Source Charge	Q_{gs}	V_{GS}=10V		12.1		
Gate-Drain Charge	Q_{gd}	I_D= 20A		25.6		
Gate Resistance	Rg	f = 1MHz, Open drain		1.5		Ω
Switching Parameters						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}= 15V		12.5		ns
Turn-on Rise Time	t_r	V_{GS}= 10V		6		
Turn-off Delay Time	$t_{d(off)}$	R_L=0.75Ω		47		
Turn-off Fall Time	t_f	R_G=3Ω		10.5		
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} = 15V,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

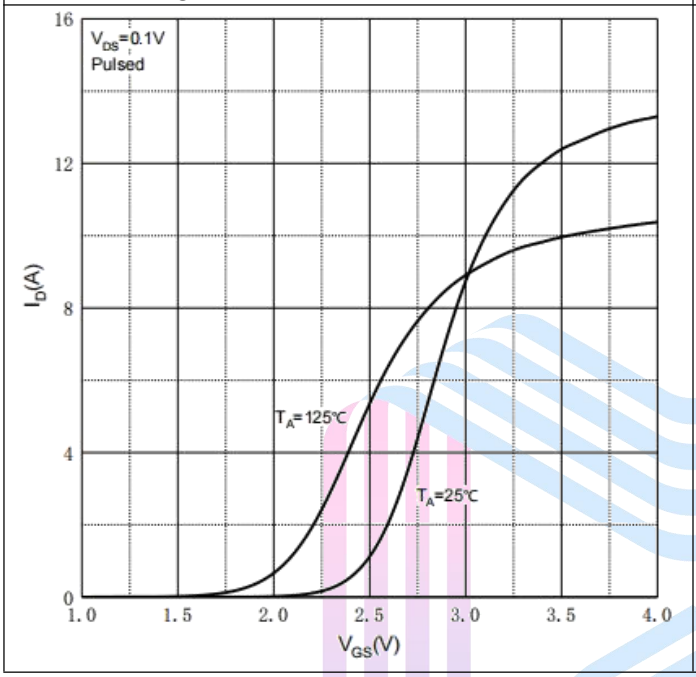


Figure 4: Output Characteristics

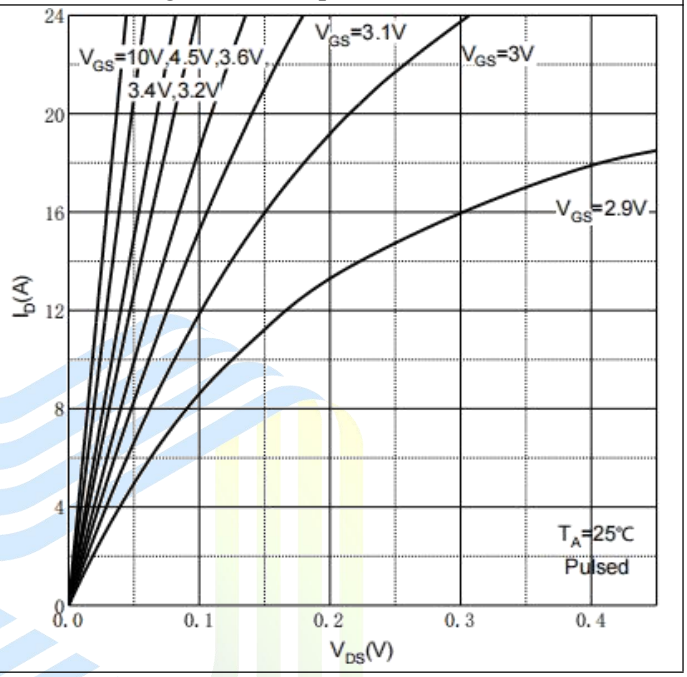


Figure 5: On-Resistance vs. Drain Current

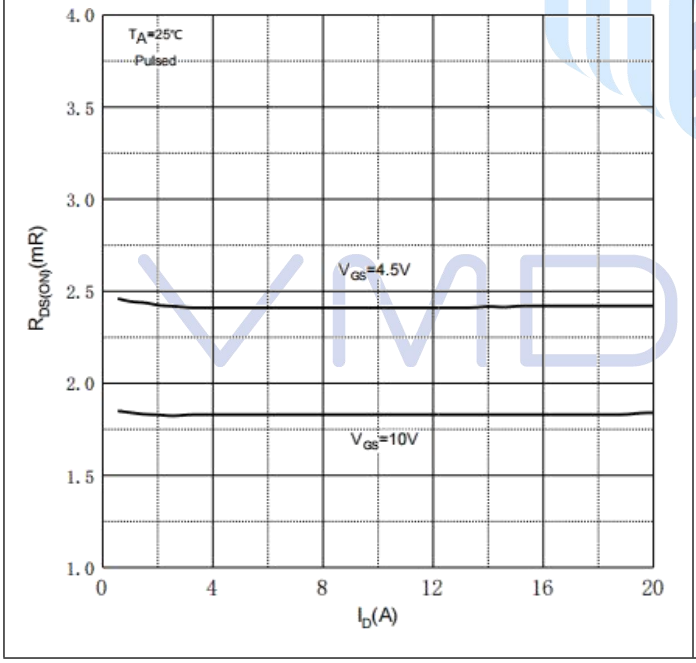


Figure 6: On-Resistance vs. Gate Voltage

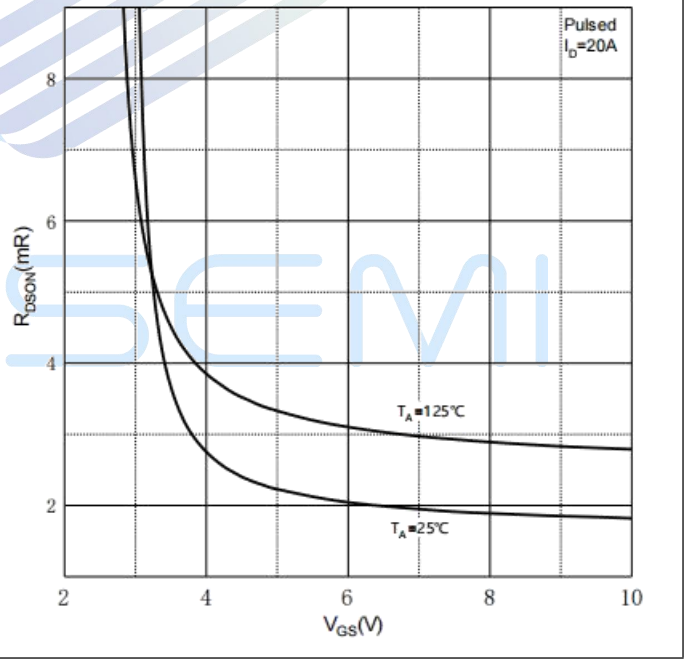


Figure 7: Body Diode Characteristics

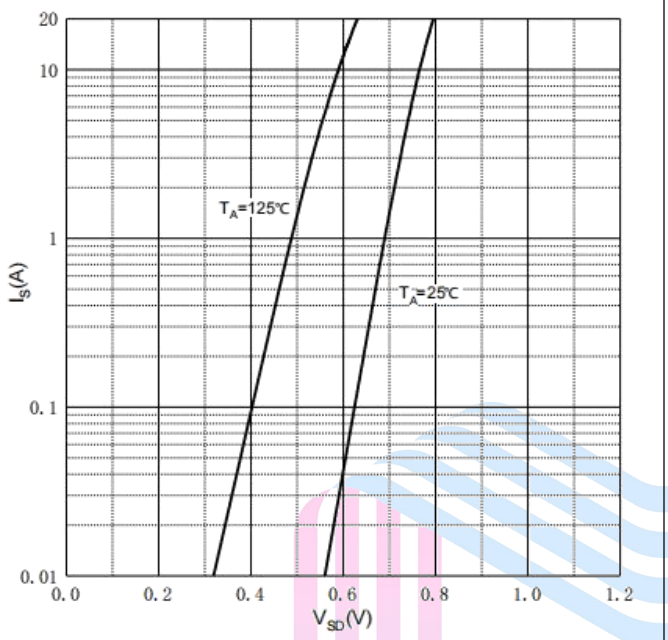


Figure 8: Threshold Voltage

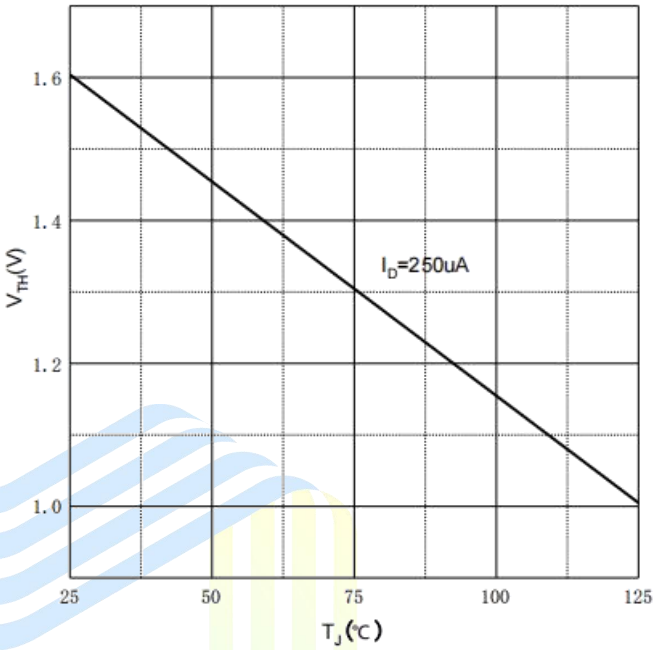


Figure 9: Typical Capacitance

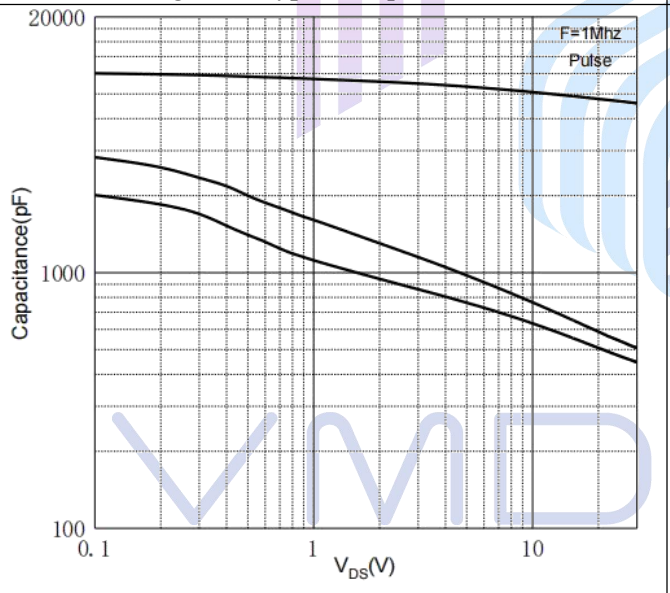


Figure 10: Safe Operation Area

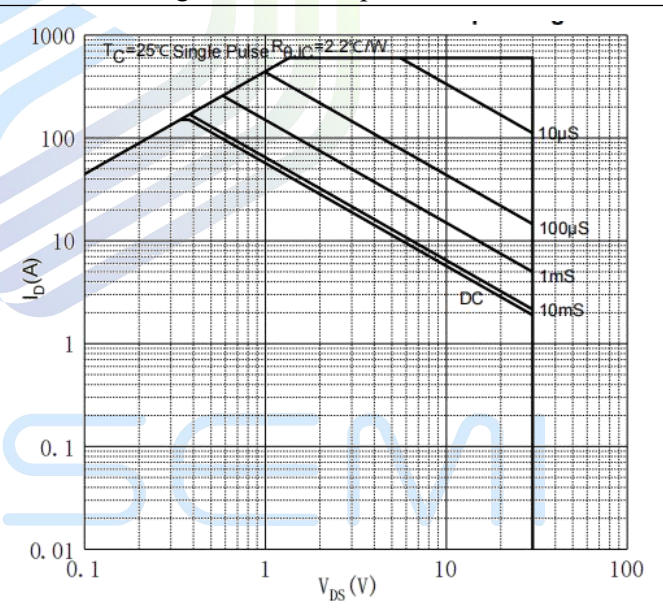
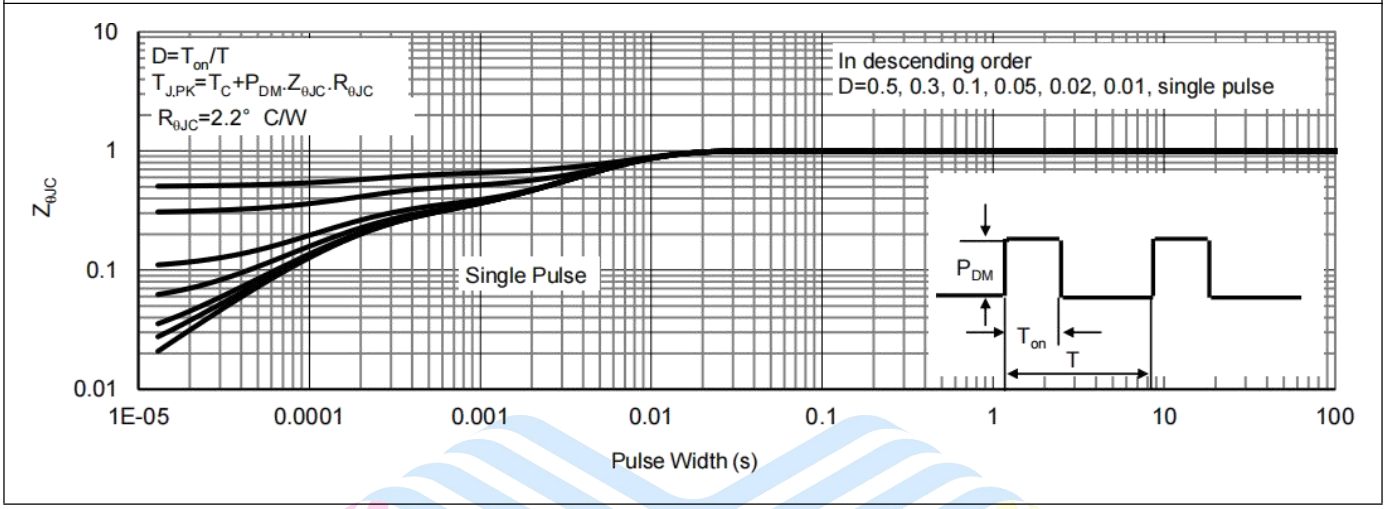
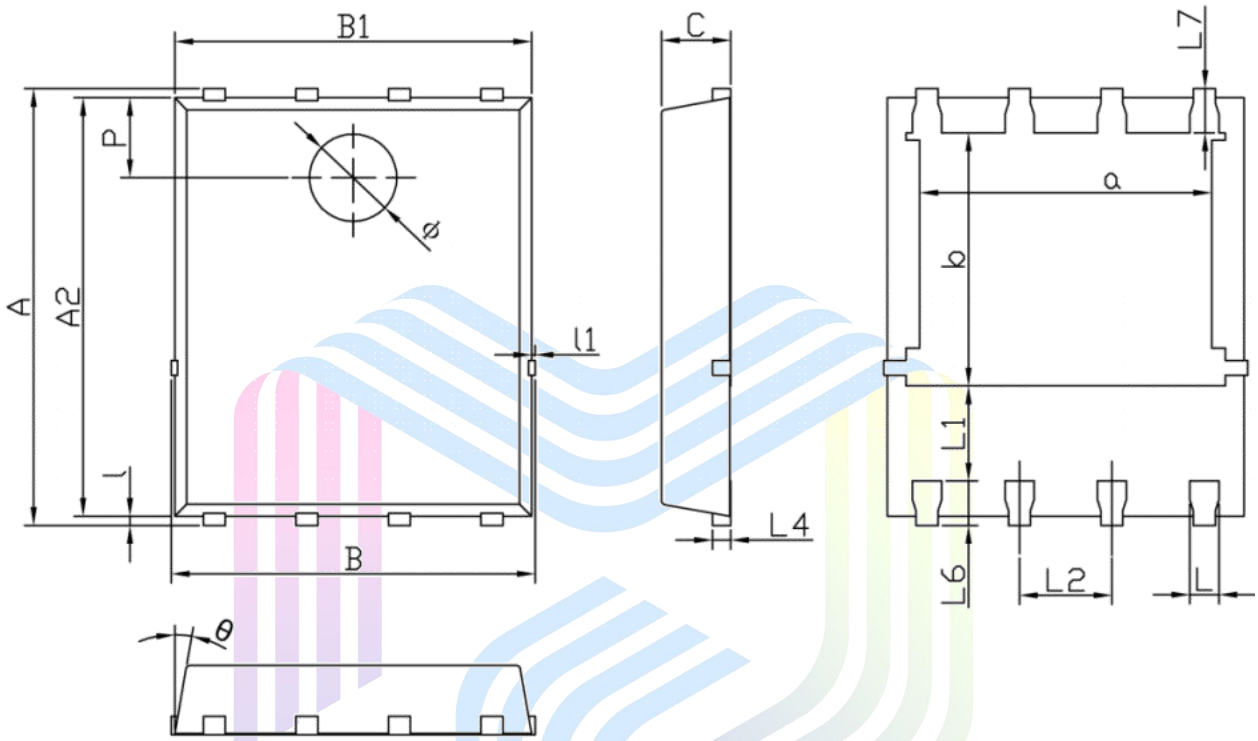


Figure 11: Normalized Maximum Transient Thermal Impedance



Mechanical Dimensions:

PDFN5X6-8L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	5.900	6.100	0.232	0.240
a	3.910	4.110	0.154	0.162
A2	5.700	5.800	0.224	0.228
B	4.900	5.100	0.193	0.201
b	3.370	3.570	0.133	0.141
B1	4.800	5.000	0.189	0.197
C	0.900	1.000	0.035	0.039
L	0.350	0.450	0.014	0.018
l	0.060	0.200	0.002	0.008
L1	1.100	-	0.043	-
l1	-	0.100	-	0.004
L2	1.170	1.370	0.046	0.054
L4	0.210	0.340	0.008	0.013
L6	0.510	0.710	0.020	0.028
L7	0.510	0.710	0.020	0.028
P	1.000	1.200	0.039	0.047
Φ	1.100	1.300	0.043	0.051
θ	8°	12°	8°	12°

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