VUPA004R082NA

Datasheet

VMDSEMI

8.2mΩ, 40V, N-Channel Power MOSFET VUPA004R082NA

General Description

$V_{(BR)DSS}$	$R_{DS(ON)_max}$	I_D
40V	8.2mΩ@10V	60A
	11.8mΩ@4.5V	

Symbol

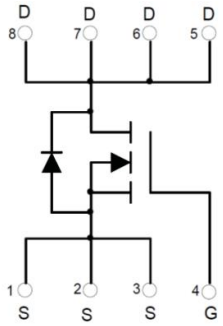
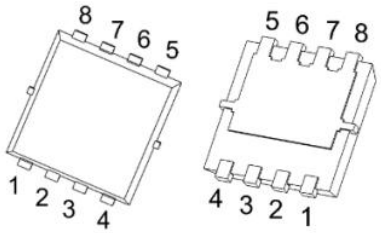


Figure 1 Symbol of VUPA004R082NA

Features

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

Package Type



PDFN3.3X3.3-8L

Figure 2 Package Type of VUPA004R082NA

Application

- Battery protection applications
- Power Switch Application

Ordering Information

Product Name	Package
VUPA004R082NA	PDFN3.3X3.3-8L

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

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DSS}	40	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current[Note1]	T_C= 25 ºC	I_D	60	A
Continuous Drain Current[Note6]	T_A= 25 ºC		25	
Pulsed Drain Current [Note2]		I_{DM}	180	
Single Pulsed Avalanche Energy[Note3]		E_{AS}	80	mJ
Avalanche Current[Note3]		I_{AS}	40	A
Total Power Dissipation[Note5]	T_C= 25 ºC	P_D	70	W
Total Power Dissipation[Note6]	T_A= 25 ºC		2.5	
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]	$R_{\theta JA}$		55		ºC/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$		3		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}= 32V, 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	1.2	1.6	2.5	V
Static Drain-Source On-Resistance[Note4]	$R_{DS(ON)}$	V_{GS}=10V, I_D= 10A		6.3	8.2	mΩ
		V_{GS}=4.5V, I_D= 10A		7.9	11.8	
Forward Transconductance[Note4]	g_{FS}	V_{DS}=10V, I_D= 10A		12		S
Dynamic Characteristics						
Input Capacitance	C_{ISS}	V_{DS}=20V		3163		pF
Output Capacitance	C_{OSS}	V_{GS}=0V		240		pF
Reverse Transfer Capacitance	C_{RSS}	f=1MHz		214		pF
Total Gate Charge	Q_g	V_{DS}=25V		20		nC
Gate-Source Charge	Q_{gs}	V_{GS}=10V		9		
Gate-Drain Charge	Q_{gd}	I_D= 8A		11		
Gate Resistance	Rg	f = 1MHz, Open drain		1.59		Ω
Switching Parameters						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}= 15V		15		ns
Turn-on Rise Time	t_r	V_{GS}= 10V		5		
Turn-off Delay Time	$t_{d(off)}$	R_L=3Ω		50		
Turn-off Fall Time	t_f	R_G=3Ω		6		
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 = 0.1mH, 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

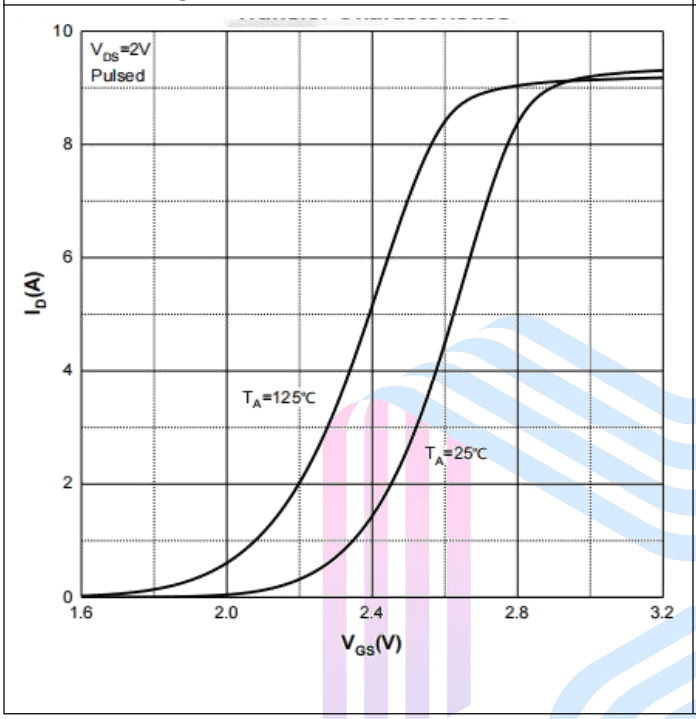


Figure 4: Output Characteristics

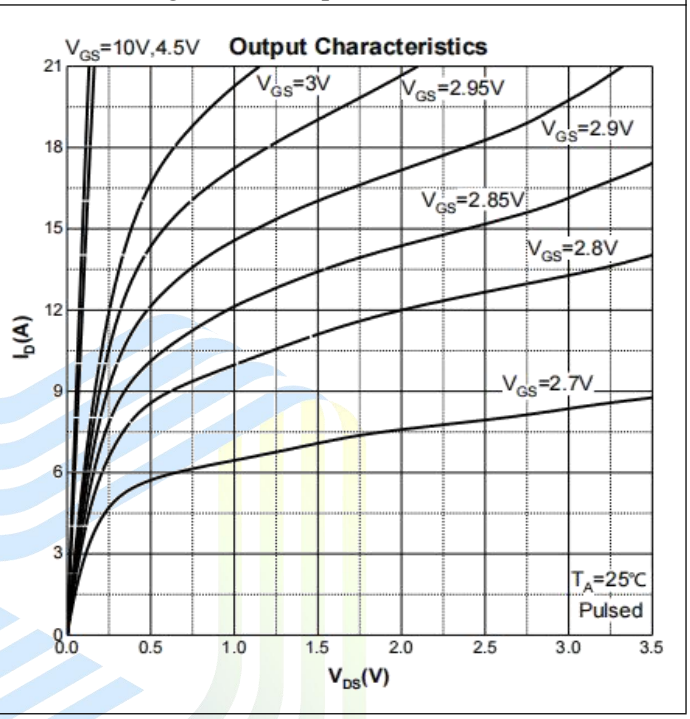


Figure 5: Threshold Voltage

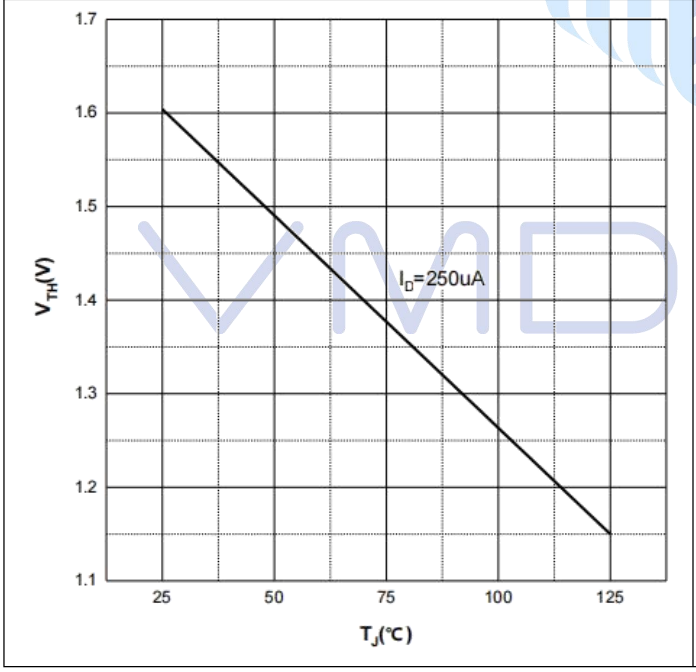


Figure 6: On-Resistance vs. Gate Voltage

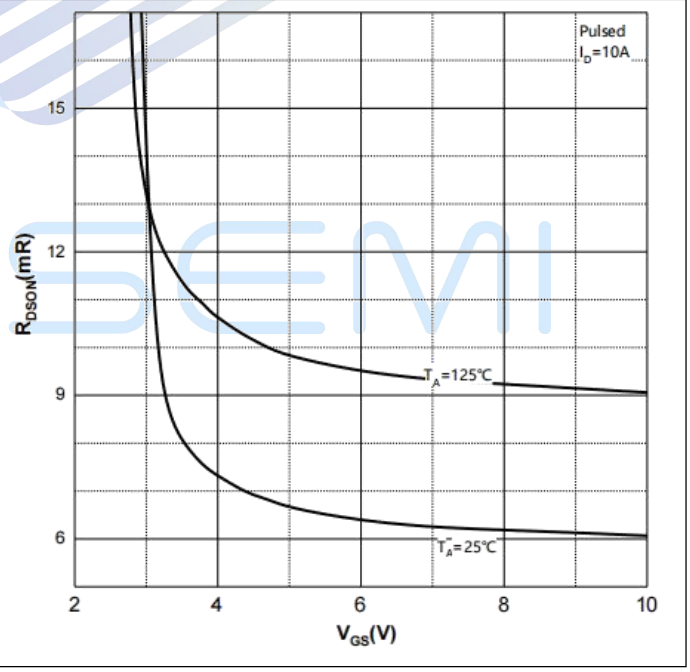


Figure 7: Body Diode Characteristics

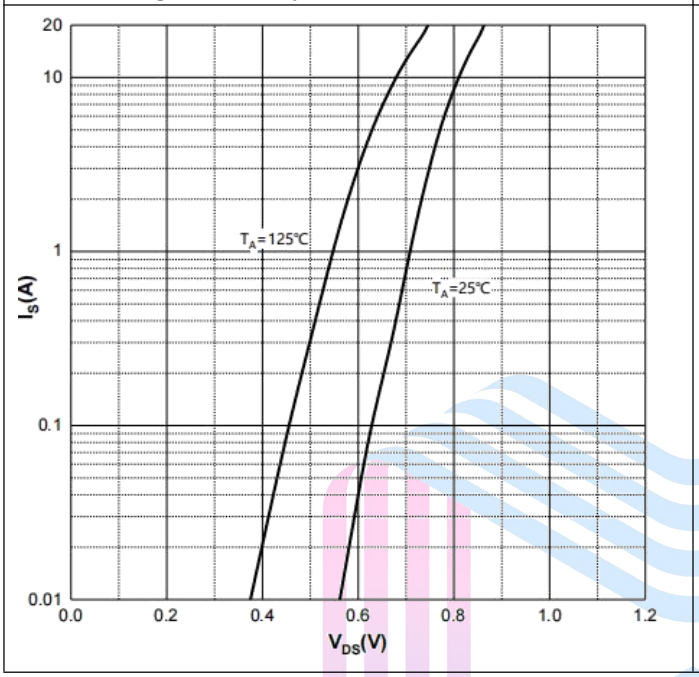


Figure 8: Safe Operation Area

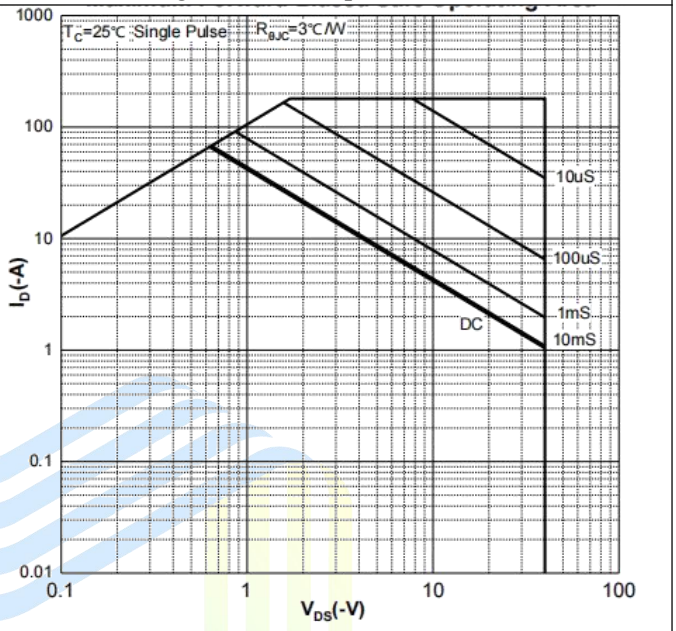


Figure 9: Typical Capacitance

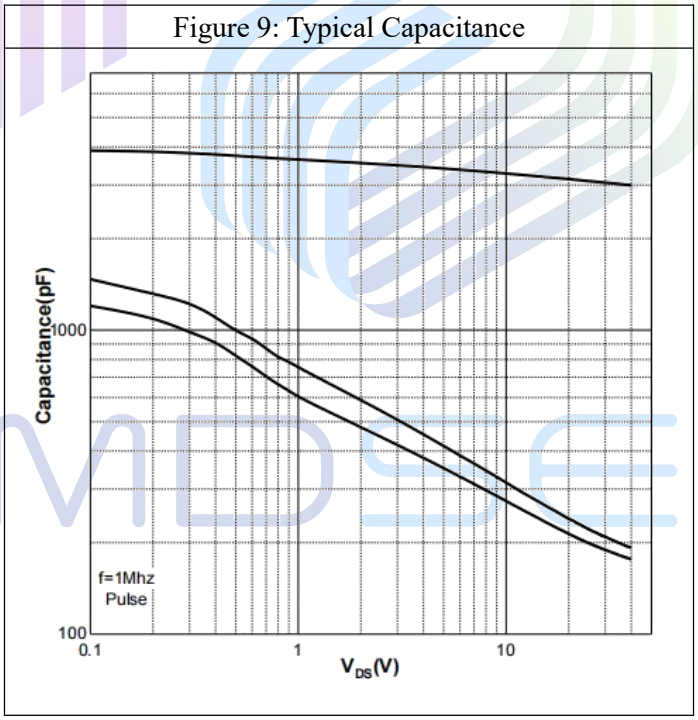
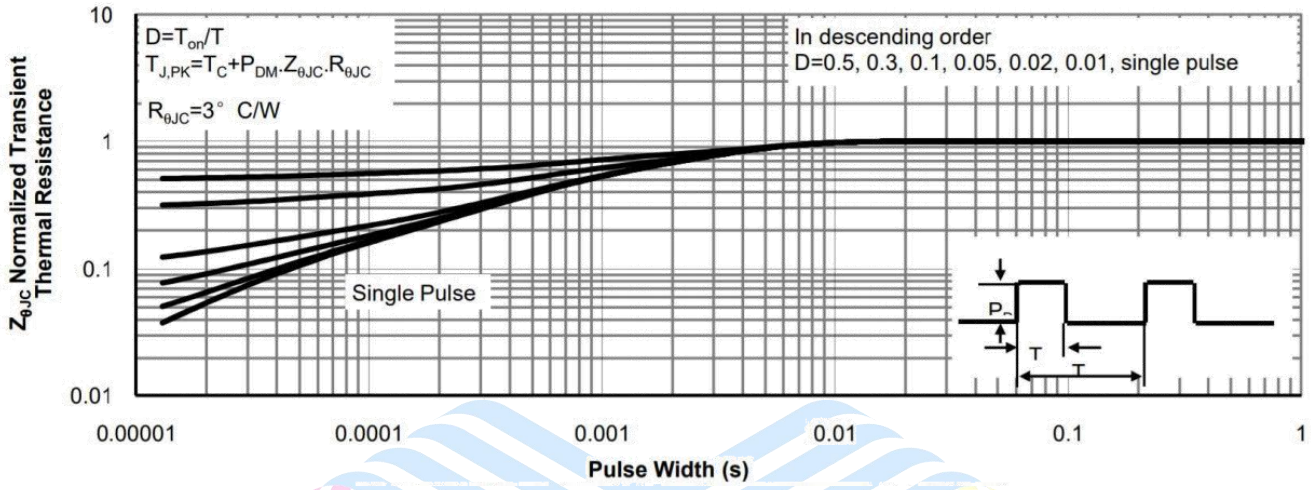
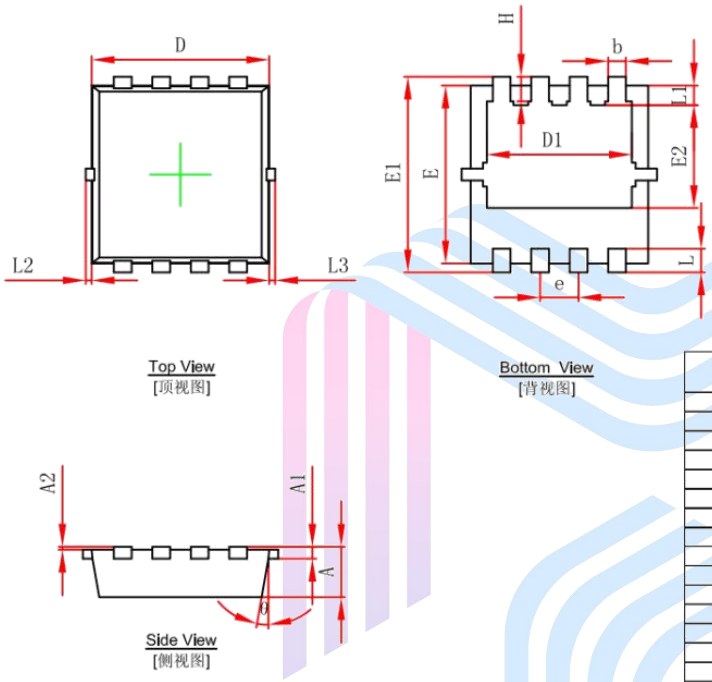


Figure 10: Normalized Maximum Transient Thermal Impedance



Mechanical Dimensions:

PDFNWB3.3X3.3-8L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.650	0.850	0.026	0.033
A1	0.152 REF.		0.006 REF.	
A2	0~0.05		0~0.002	
D	2.900	3.100	0.114	0.122
D1	2.300	2.600	0.091	0.102
E	2.900	3.100	0.114	0.122
E1	3.150	3.450	0.124	0.136
E2	1.535	1.935	0.060	0.076
b	0.200	0.400	0.008	0.016
e	0.550	0.750	0.022	0.030
L	0.300	0.500	0.012	0.020
L1	0.180	0.480	0.007	0.019
L2	0~0.100		0~0.004	
L3	0~0.100		0~0.004	
H	0.315	0.515	0.012	0.020
θ	9°	13°	9°	13°

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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 2nd 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