VUPA002R070NA

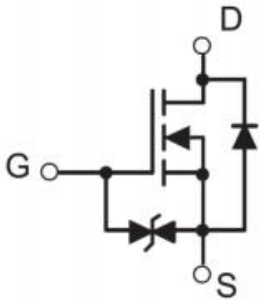
Datasheet

7.0mΩ, 20V, N-Channel Power MOSFET VUPA002R070NA

General Description

$V_{(BR)DSS}$	$R_{DS(ON)\_max}$	I_D
20V	7.0mΩ@4.5V	10A
	9.0mΩ@2.5V	

Symbol



Symbol of VUPA002R070NA

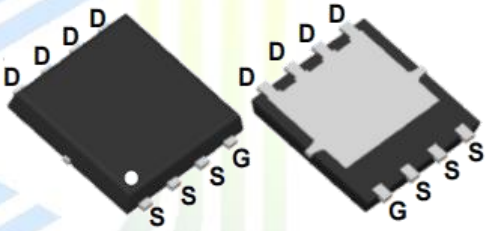
Features

- Low $R_{DS(ON)}$
- Advanced Trench technology
- ESD Protected
- Low gate charge

Application

- BMS
- Switched mode power supply
- DC-DC converter
- Lithium battery protection

Package Type



PDFN3.3*3.3-8L

Package Type of VUPA002R070NA

Ordering Information

Product Name	Package
VUPA002R070NA	PDFN3.3*3.3-8L

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

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	±12	V
Continuous Drain Current Note 1	T_C=25ºC	I_D	20	A
Pulsed Drain Current Note 2	T_C=25ºC	I_{DM}	60	A
Max Power Dissipation Note 3	T_C=25ºC	P_D	3	W
Avalanche Energy, Single Pulse Note 4		E_{AS}	53	mJ
Operation Junction temperature		T_J	-55 to 150	ºC

Thermal Resistance

Parameter	Symbol	Min	Typ	Max	Unit
Thermal Resistance, Junction-to-Ambient Note 5	$R_{\theta JA}$	-	42	-	ºC/W

Notes:

1) Calculated continuous current based on maximum allowable junction temperature.
2) Repetitive rating; pulse width limited by max. junction temperature.
3) P_D is based on max. junction temperature, using junction-case thermal resistance.
4) V_{DS}=10V,V_{GS}=10 V, L=0.5 mH, starting T_J=25 °C.
5) The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25 °C.

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	20	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=60V, V_{GS}=0V	-	-	1	uA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±12V, V_{DS}=0V	-	-	±5	uA
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250uA	0.4	0.7	1.0	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=10A	-	5.2	7	mΩ
		V_{GS}=2.5V, I_D=10A	-	6.3	9	
Gate Resistance	R_G	f=1MHz,Open Drain	-	4.7	-	Ω
Dynamic Characteristics						
Input Capacitance	C_{ISS}	V_{GS}=0V	-	1472	-	pF
Output Capacitance	C_{OSS}	V_{DS}=10V	-	192	-	pF
Reverse Transfer Capacitance	C_{RSS}	f=1MHz	-	183	-	pF
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=10V	-	10.3	-	ns
Rise Time	t_r	V_{GS}=10V	-	7.1	-	
Turn-off Delay Time	$t_{d(off)}$	R_L=1.2Ω	-	25.6	-	
Fall Time	t_f	R_G=3Ω	-	22.8	-	
Switching Characteristics						
Total Gate Charge	Q_g	V_{GS}=4.5V	-	13.8	-	nC
Gate to Source Charge	Q_{gs}	V_{DS}=10V	-	2.2	-	
Gate to Drain Charge	Q_{gd}	I_D=8A	-	3.7	-	
Reverse Diode Characteristics						
Drain-Source Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_{SD}=10A	-	0.7	1.2	V

Typical Performance Characteristics

Figure 1: Typ. Output Characteristics

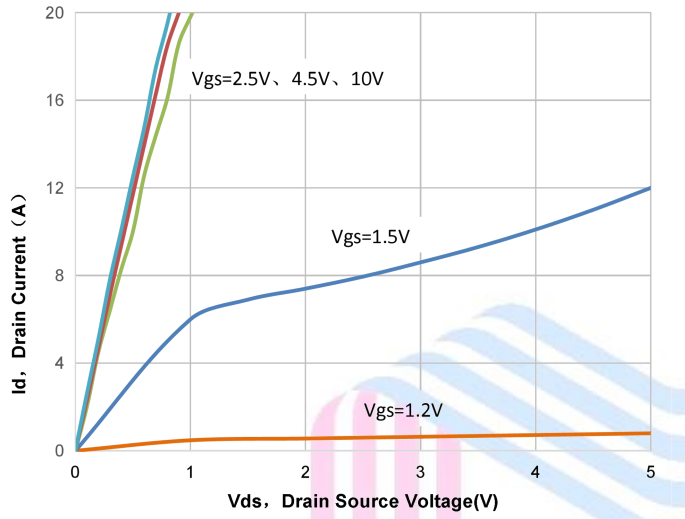


Figure 2: Typ. Transfer Characteristics

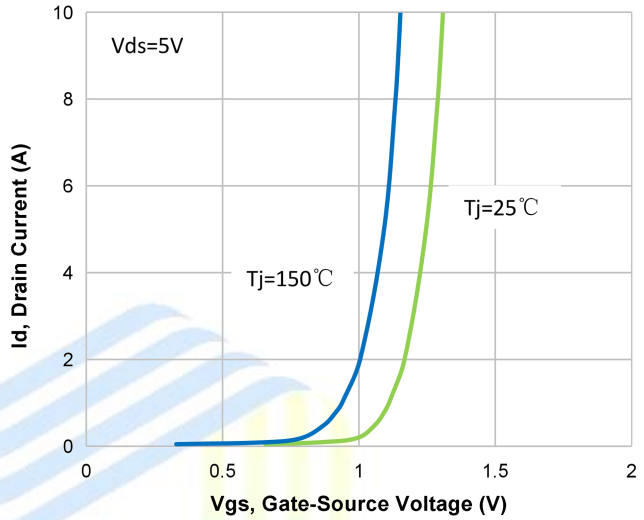


Figure 3: Typical On-Resistance vs. Drain Current

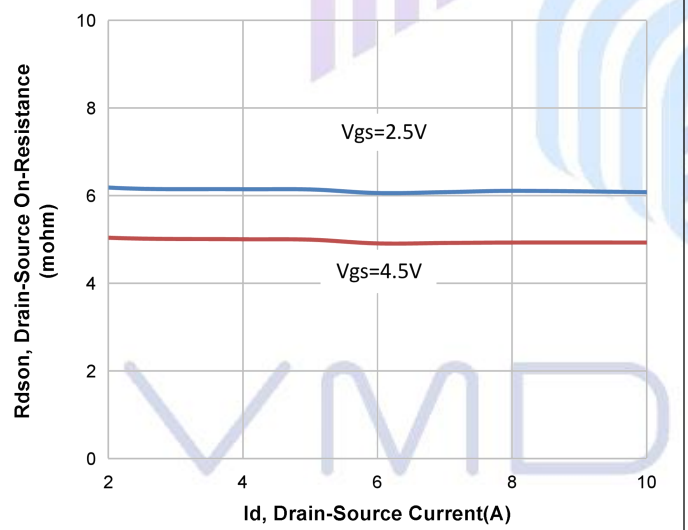


Figure 4: On-Resistance vs. Temperature

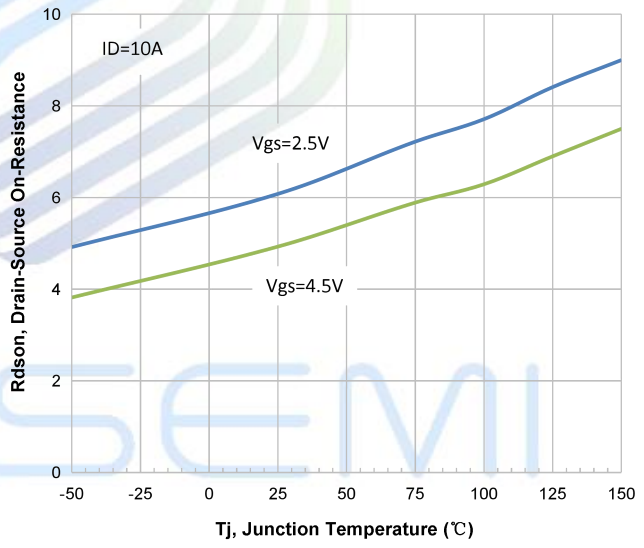


Figure 5: On-Resistance vs.Gate-source voltage

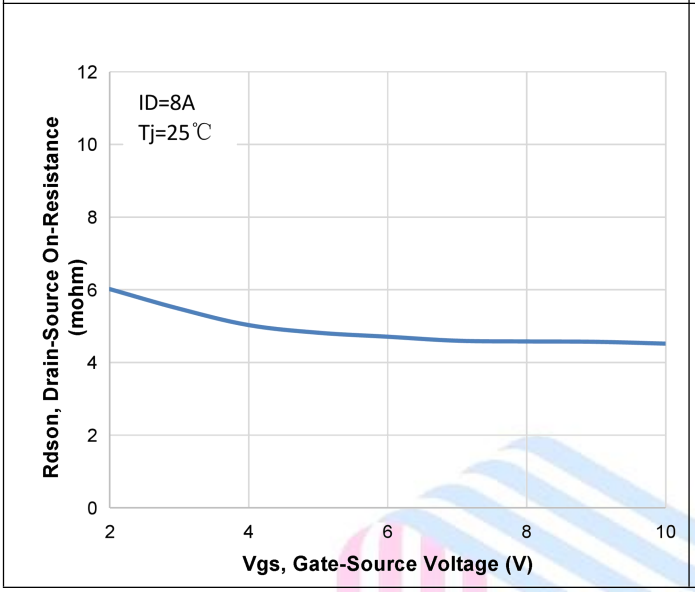


Figure 6: Forward Characteristics of Body Diode

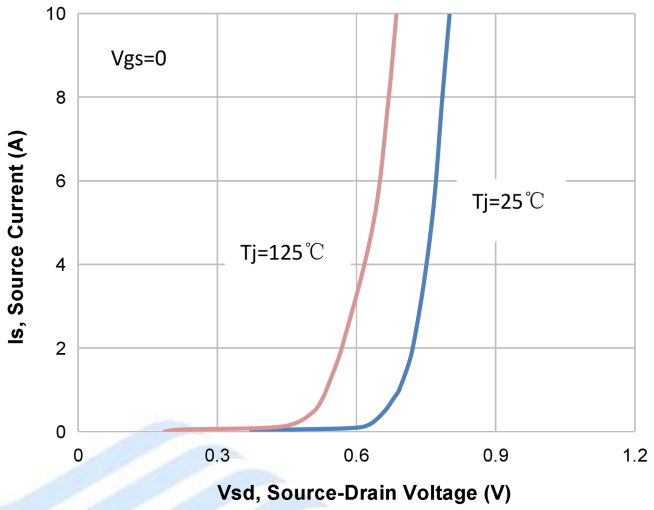


Figure 7: Gate Charge Characteristics

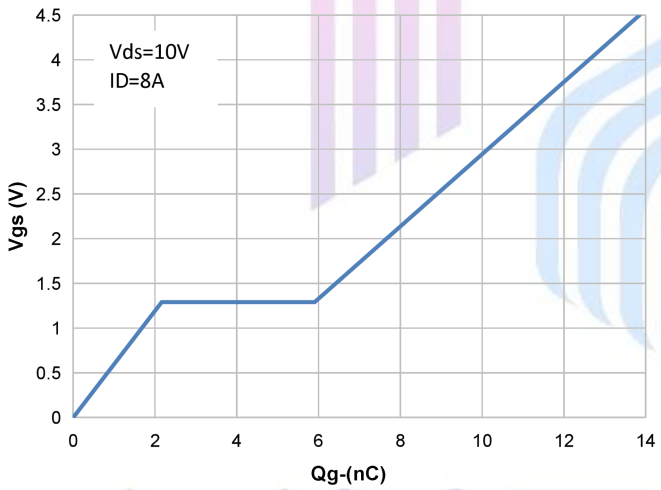


Figure 8: Typ. Capacitances

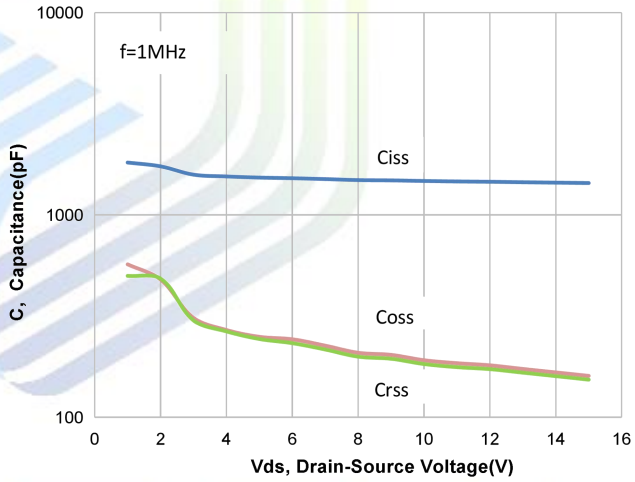
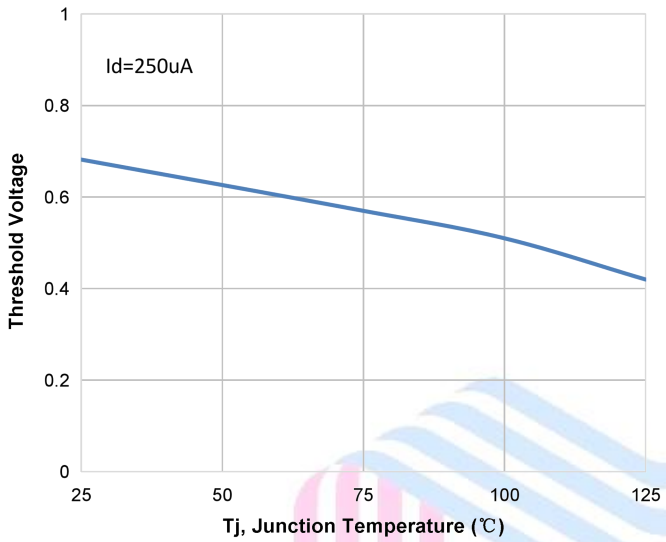
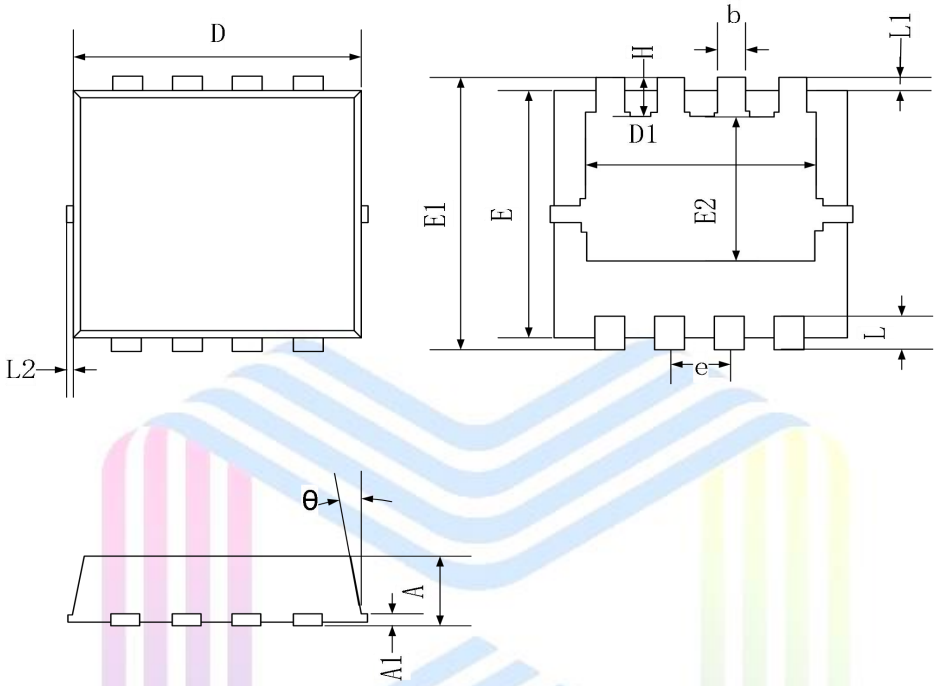


Figure 9: Threshold Voltage



Mechanical Dimensions

PDFN3.3*3.3-8L Package Information



SYMBOL	MILLIMETERS	
	MIN	MAX
A	0.70	0.90
A1	0.10	0.25
D	2.90	3.25
D1	2.25	2.69
E	2.90	3.20
E1	3.00	3.60
E2	1.35	2.20
b	0.20	0.40
e	0.65BSC	
L	0.30	0.50
L1	0.13BSC	
L2	0.00	0.20
H	0.15	0.65
θ	0°	14°

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