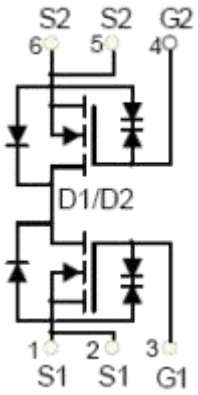
VUDG002R090MA

Datasheet

General Description

$V_{(BR)DSS}$	$R_{DS(ON)\_max}$	I_D
20V	9mΩ@4.5V	13A
	12mΩ@2.5V	

Symbol

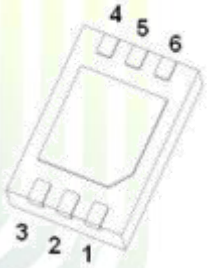


Symbol of VUDG002R090MA

Features

- Low $R_{DS(ON)}$
- Trench Technology Power MOSFET
- Low Gate Charge
- ESD Protected

Package Type



DFN2*3-6L

Package Type of VUDG002R090MA

Application

- Uni-directional or bi-directional Load Switch
- Battery Protected
- Power PC

Ordering Information

Product Name	Package
VUDG002R090MA	DFN2*3-6L

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]	I_D	13	A
Pulsed Drain Current[Note 2]	I_{DM}	52	A
Max Power Dissipation [Note 3]	P_D	1.8	W
Avalanche Energy, Single Pulse [Note 4]	E_{AS}	56	mJ
Operation Junction temperature	T_J,T_{SGT}	-55 to 150	ºC

Thermal Resistance

Parameter	Symbol	Min	Typ	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	-	7.9	-	ºC/W
Thermal Resistance, Junction-to-Ambient[Note 5]	$R_{\theta JA}$	-	69.2	-	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}= 15V,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 inch 2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25 °C.

Electrical Characteristics(T_A= 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}=20V, 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=3A	-	6.8	9	mΩ
		V_{GS}=2.5V, I_D=3A	-	7.9	12	
Forward Transconductance	gfs	V_{DS}=5V, I_D=7A	-	12	-	S
Dynamic Characteristics						
Input Capacitance	C_{ISS}	V_{GS}=0V	-	1331	-	pF
Output Capacitance	C_{OSS}	V_{DS}=10V	-	168	-	pF
Reverse Transfer Capacitance	C_{RSS}	f=1MHz	-	147	-	pF
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=10V	-	15.2	-	ns
Rise Time	t_r	V_{GS}=4.5V	-	8.8	-	
Turn-off Delay Time	$t_{d(off)}$	I_D=7A	-	30.3	-	
Fall Time	t_f	R_G=3Ω	-	21.2	-	
Switching Characteristics						
Total Gate Charge	Q_g	V_{GS}=4.5V	-	12	-	nC
Gate to Source Charge	Q_{gs}	V_{DS}=10V	-	1.9	-	
Gate to Drain Charge	Q_{gd}	I_D=6A	-	3.4	-	
Reverse Diode Characteristics						
Drain-Source Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=3A	-	0.75	1.2	V

Typical Performance Characteristics

Figure 1: Typ. Output Characteristics

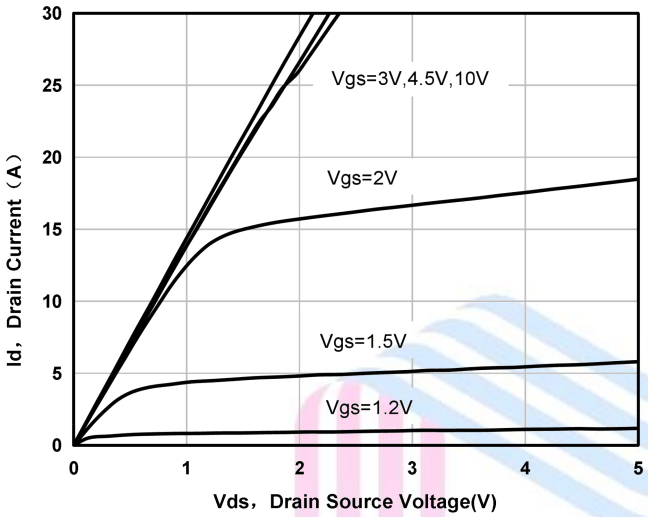


Figure 2: Typ. Transfer Characteristics

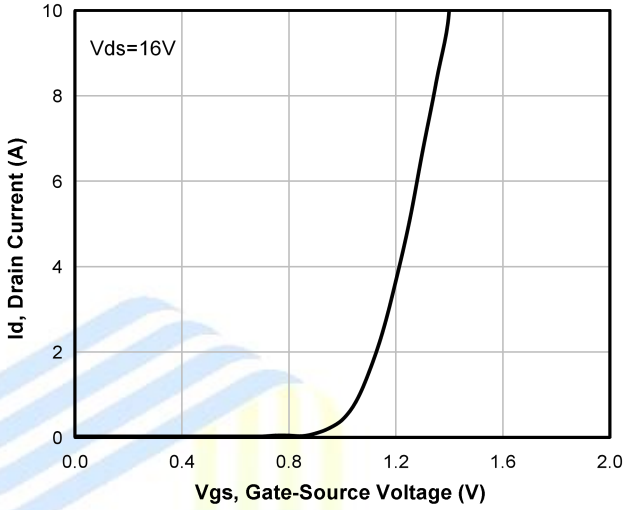


Figure 3: Typ. On-Resistance vs. Drain Current

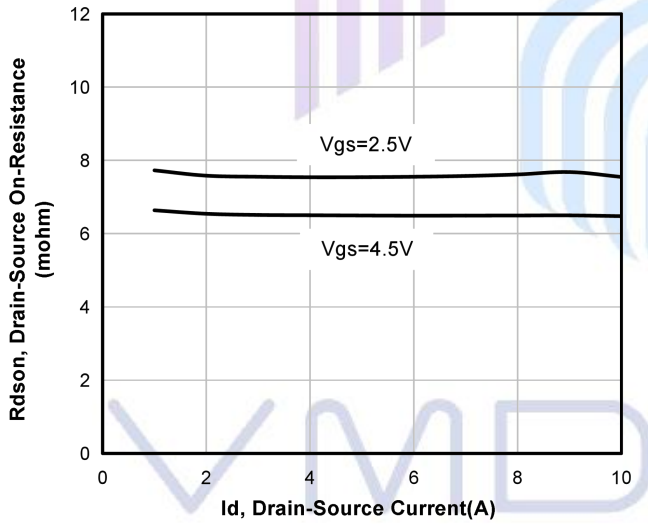


Figure 4: On-Resistance vs. Temperature

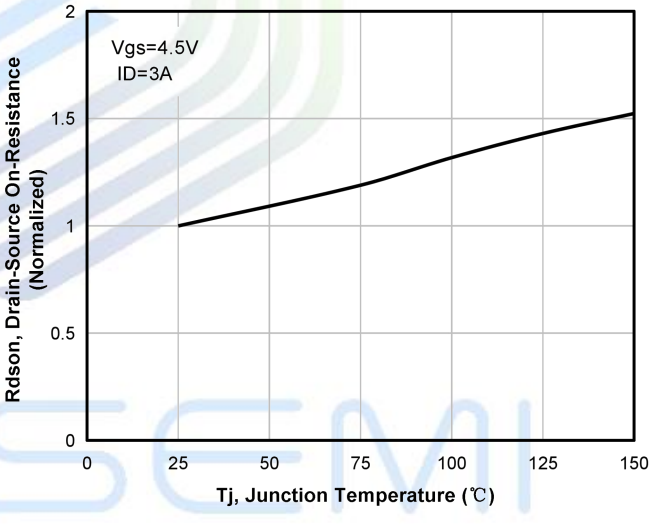


Figure 5: On-Resistance vs.Gate-Source Voltage

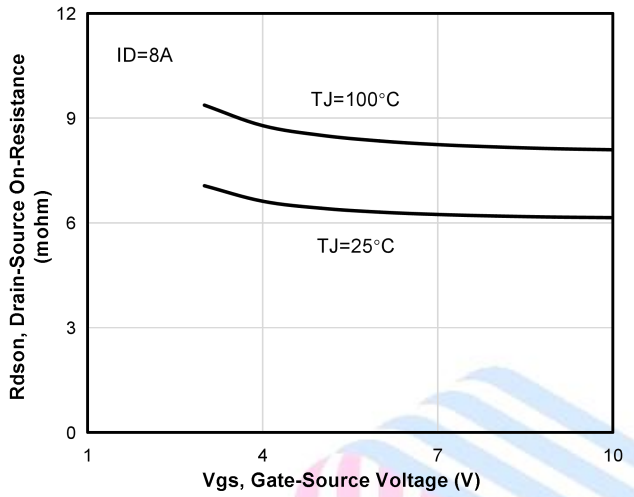


Figure 6: Forward Characteristics of Body Diode

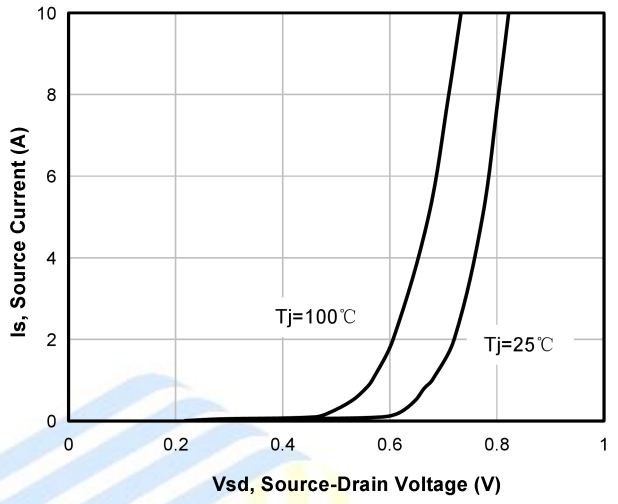


Figure 7: Gate Charge Characteristics

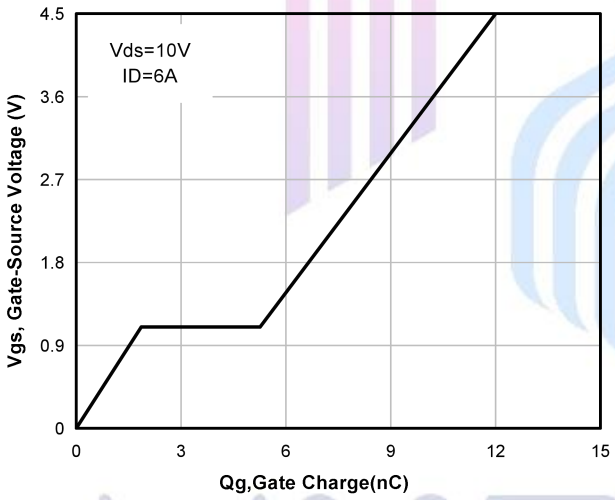


Figure 8: Typ. Capacitances

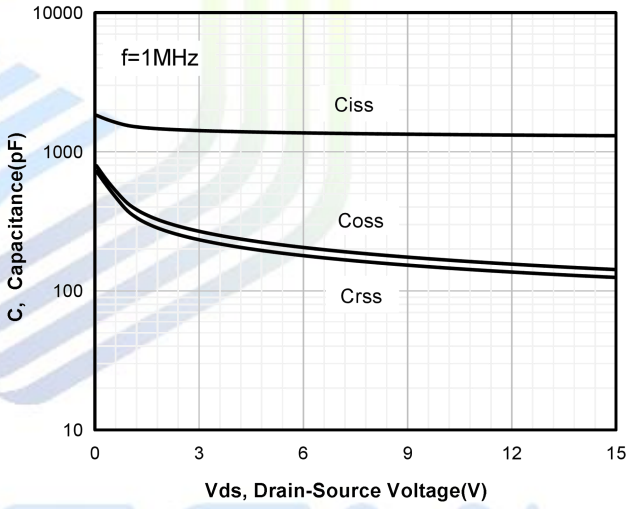


Figure 9: Power Dissipation

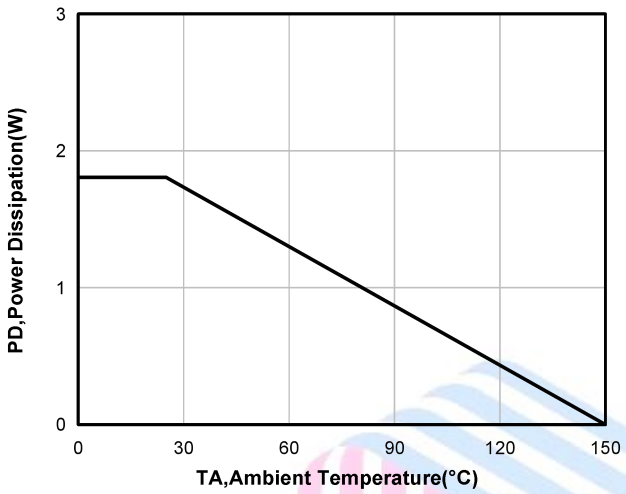


Figure 10: Safe Operating Area

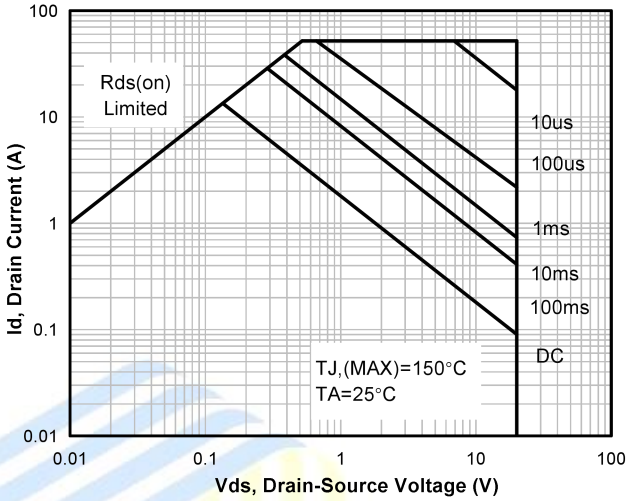
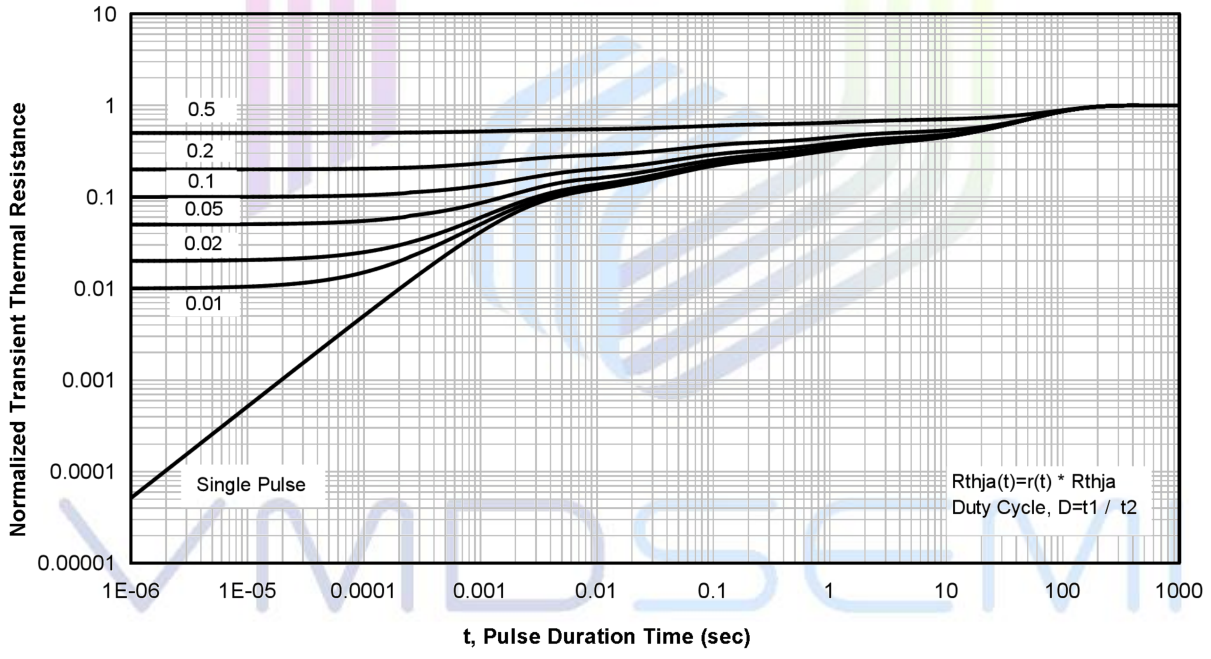
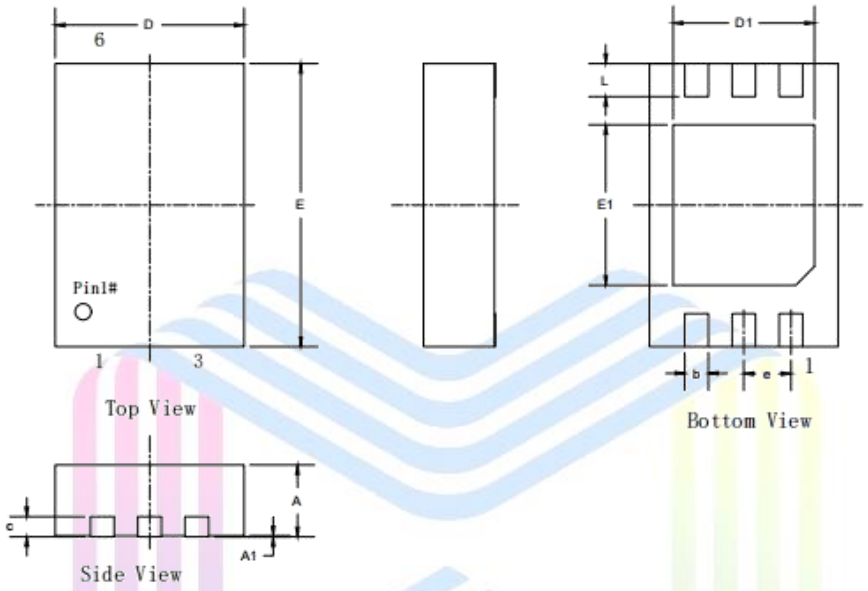


Figure 11: Normalized Max Transient Thermal Impedance



Mechanical Dimensions

DFN2*3-6L Package Information



SYMBOL	MILLIMETERS	
	MIN	MAX
A	0.70	0.80
A1	0.00	0.05
b	0.20	0.30
c	0.20	0.25
D	1.90	2.10
D1	1.40	1.60
e	0.5BSC	
E	2.90	3.10
E1	1.60	1.80
L	0.30	0.45

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