VUTL004R100PA

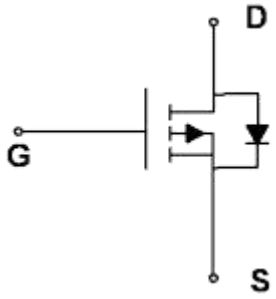
Datasheet

10mΩ, -40V, P-Channel Power MOSFET VUTL004R100PA

General Description

$V_{(BR)DSS}$	$R_{DS(ON)\_max}$	I_D
-40V	10mΩ@-10V	-81A
	14mΩ@-4.5V	

Symbol



Symbol of VUTL004R100PA

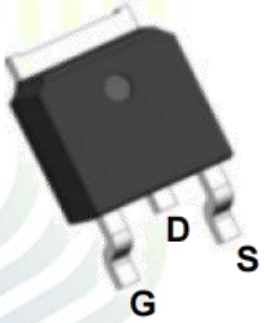
Features

- Excellent package for good heat dissipation
- Advanced Trench technology
- Power Management Switches

Application

- Power switch
- Load switch in high current applications
- DC-DC converter

Package Type



TO-252

Package Type of VUTL004R100PA

Ordering Information

Product Name	Package
VUTL004R100PA	TO-252

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 Note 1	T_C=25ºC	I_D	-81	A
Pulsed Drain Current Note 2	T_C=25ºC	I_{DM}	-240	A
Max Power Dissipation Note 3	T_C=25ºC	P_D	87	W
Avalanche Energy, Single Pulse Note 4		E_{AS}	378	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	$R_{\theta JC}$	-	1.43	-	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}= -20V,V_{GS}= -10 V, L=1 mH, R_G=25Ω,starting T_J=25 ºC.

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	-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	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250uA	-1.0	-1.7	-2.5	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-20A	-	8.1	10	mΩ
		V_{GS}=-4.5V, I_D=-10A	-	10.1	14	
Forward Transconductance	gfs	V_{DS}=-10V, I_D=-20A	-	33	-	S
Dynamic Characteristics						
Input Capacitance	C_{ISS}	V_{GS}=0V	-	4272	-	pF
Output Capacitance	C_{OSS}	V_{DS}=-20V	-	328	-	pF
Reverse Transfer Capacitance	C_{RSS}	f=1MHz	-	242	-	pF
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-20V	-	9	-	ns
Rise Time	t_r	V_{GS}=-10V	-	3.7	-	
Turn-off Delay Time	$t_{d(off)}$	R_L=2Ω	-	52.4	-	
Fall Time	t_f	R_G=1Ω	-	38.9	-	
Gate Charge Characteristics						
Total Gate Charge	Q_g	V_{GS}=-10V	-	85	-	nC
Gate to Source Charge	Q_{gs}	V_{DS}=-20V	-	14	-	
Gate to Drain Charge	Q_{gd}	I_D=-20A	-	17	-	
Reverse Diode Characteristics						
Drain-Source Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=-20A	-	-0.84	-1.2	V

Typical Performance Characteristics

Figure 1: Typ. Output Characteristics

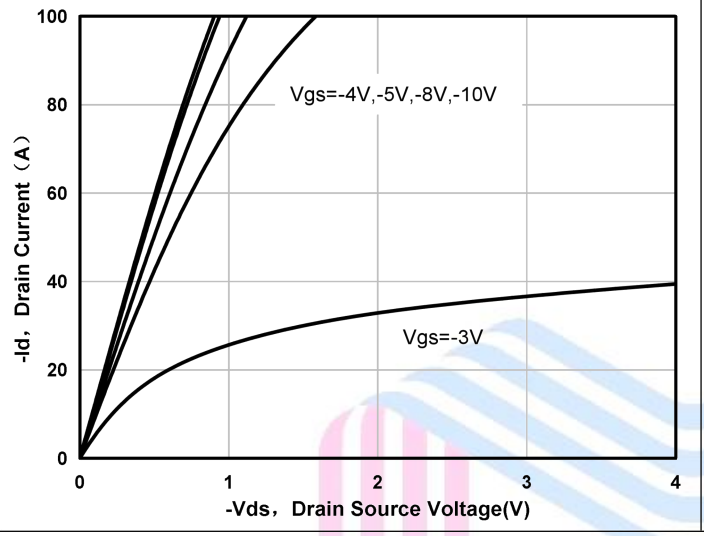


Figure 2: Typ. Transfer Characteristics

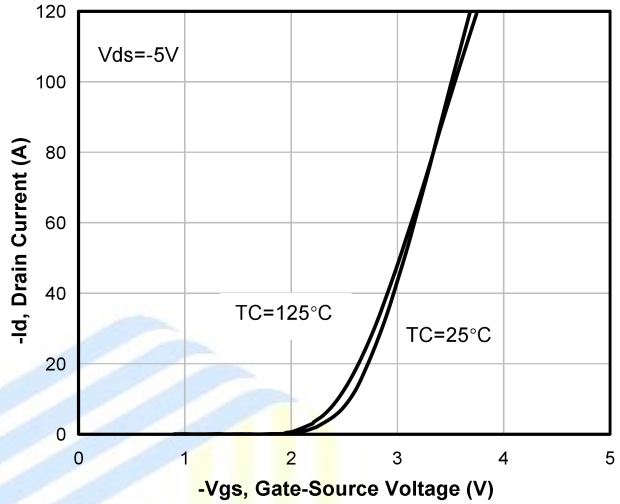


Figure 3: Typ. On-Resistance vs. Drain Current

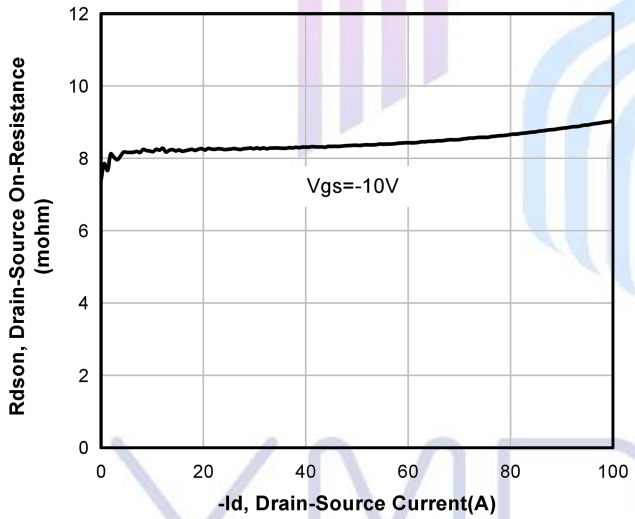


Figure 4: On-Resistance vs. Temperature

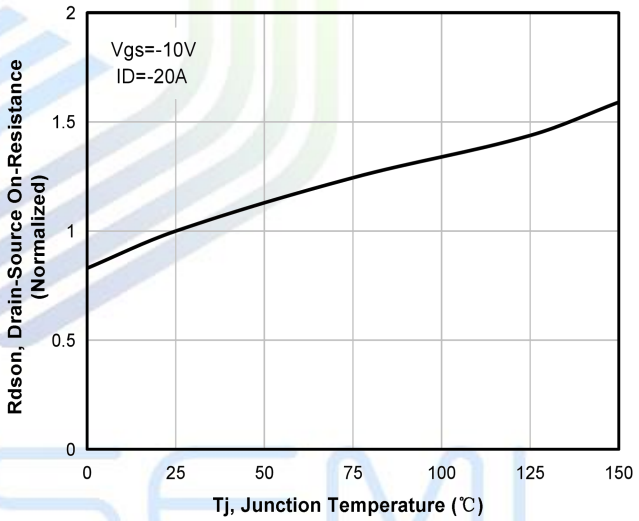


Figure 5: Forward Characteristics of Body Diode

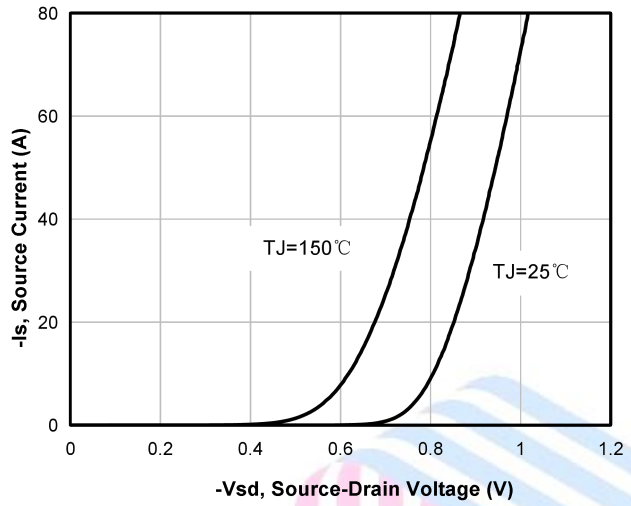


Figure 6: Gate Charge Characteristics

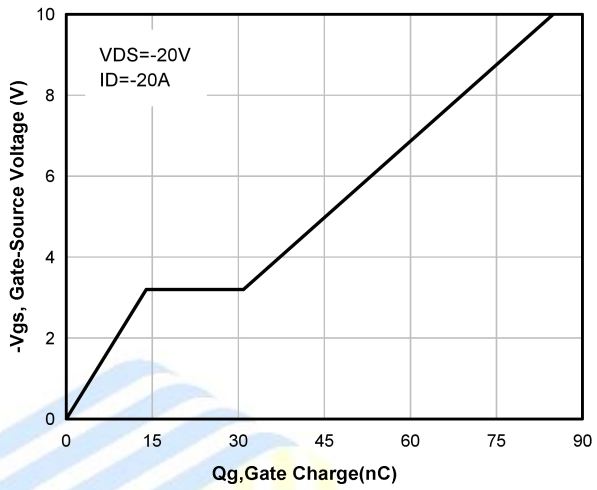


Figure 7: Typ. Capacitances

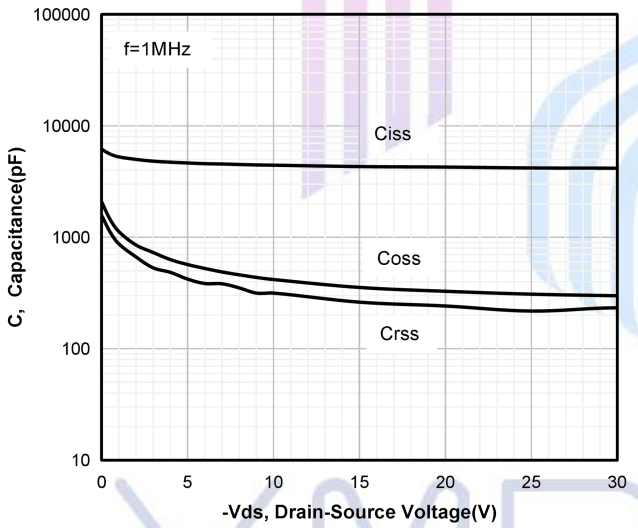


Figure 8: BV_{DSS} vs. Temperature

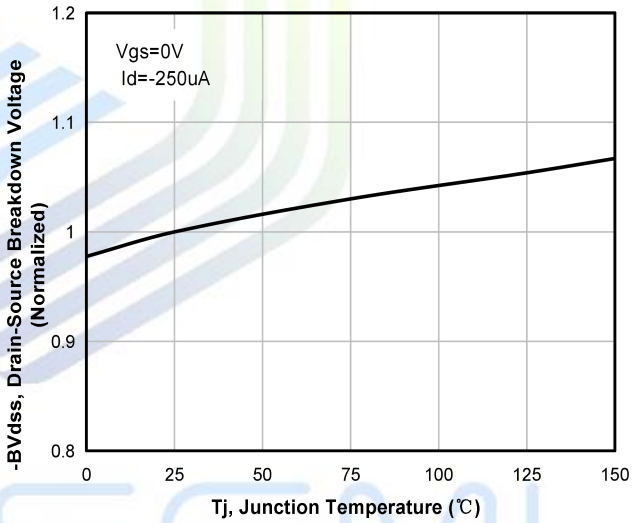


Figure 9: Power Dissipation

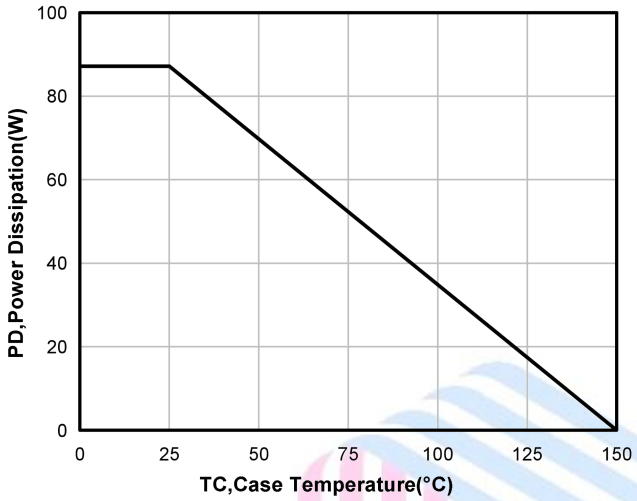


Figure 10: ID Current Derating

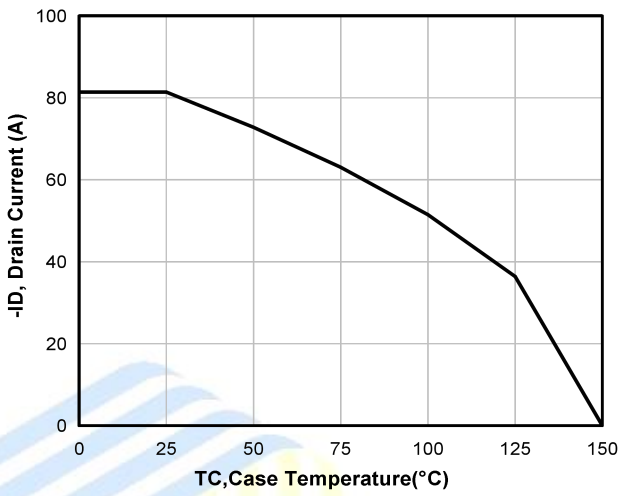


Figure 11: Safe Operating Area

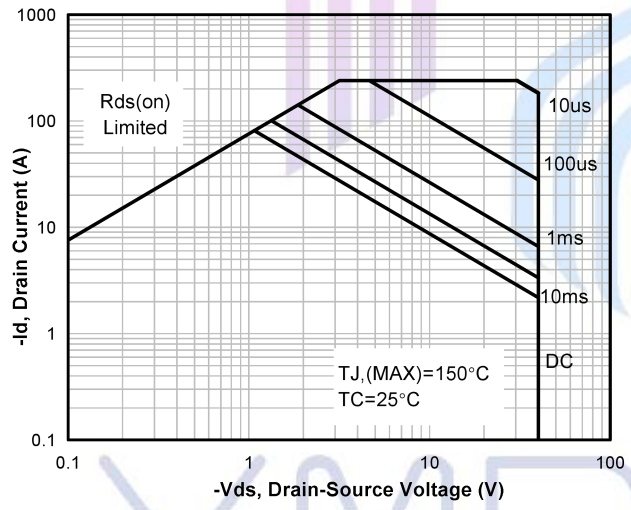
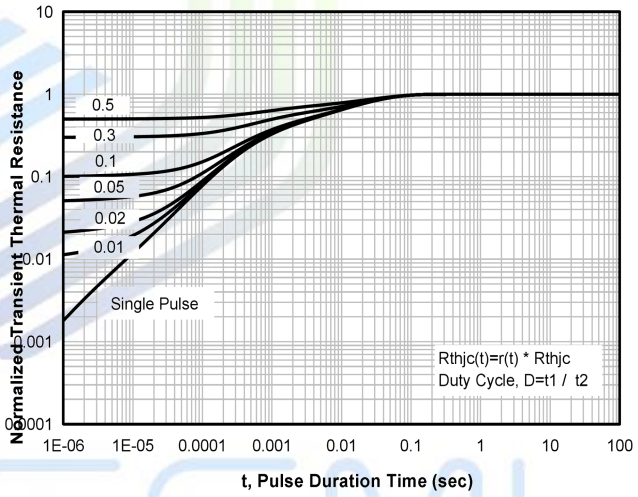
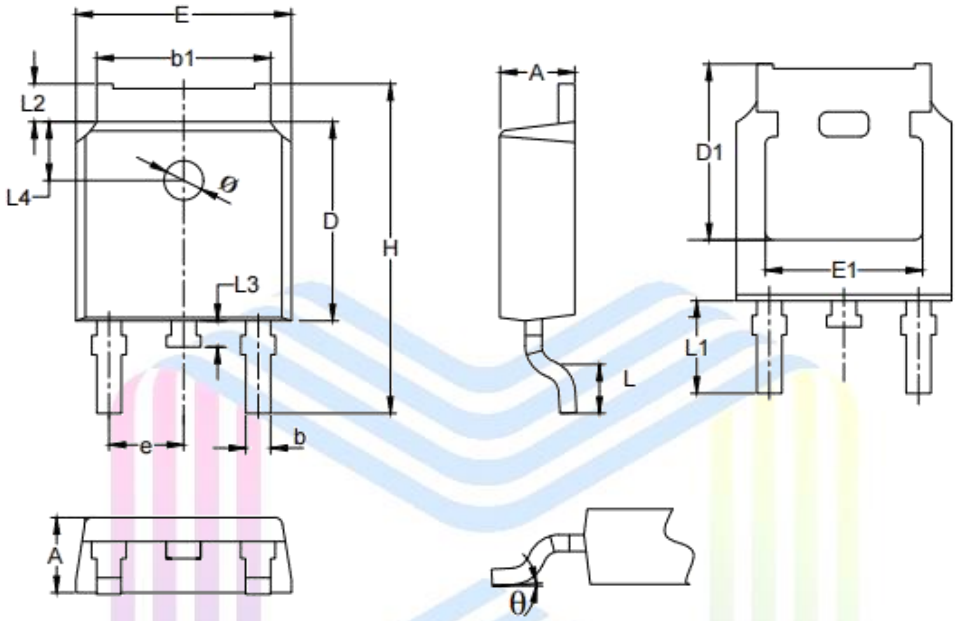


Figure 12: Normalized Max Transient Thermal Impedance



Mechanical Dimensions

TO-252 Package Information



SYMBOL	MILLIMETERS	
	MIN	MAX
A	2.2	2.4
A1	0	0.127
A2	-	-
b	0.66	0.9
b1	5.1	5.5
c	0.43	0.61
D	5.95	6.22
D1	5.3REF	
E	6.4	6.75
E1	4.8REF	
e	2.286BSC	
H	9.4	10.5
L	1.38	2
L1	2.9REF	
L2	0.88	1.28
L3	0.5	1
L4	1.8REF	
θ	0°	8°

NOTICE

Hangzhou VMD Semiconductor Co., Ltd (VMD) reserves the right to make changes without notice in order to improve reliability, function or design and to discontinue any product or service without notice. Customers should obtain the latest relevant information before orders and should verify that such information is current and complete. All products are sold subject to VMD's terms and conditions supplied at the time of order acknowledgement.

VMD, its affiliates, agents, and employees, and all persons acting on its or their behalf, disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

VMD disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify VMD's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

VMD warrants performance of its hardware products to the specifications at the time of sale, testing, reliability and quality control are used to the extent VMD deems necessary to support this warrantee. Except where agreed upon by contractual agreement, testing of all parameters of each product is not necessarily performed.

VMD does not assume any liability arising from the use of any product or circuit designs described herein. Customers are responsible for their products and applications using VMD's components. To minimize risk, customers must provide adequate design and operating safeguards.

VMD does not warrant or convey any license to any intellectual property rights either expressed or implied under its patent rights, nor the rights of others. Reproduction of information in VMD's data sheets or data books is permissible only if reproduction is without modification or alteration. Reproduction of this information with any alteration is an unfair and deceptive business practice.

VMD is not responsible or liable for such altered documentation. Resale of VMD's products with statements different from or beyond the parameters stated by VMD for that product or service voids all express or implied warrantees for the associated VMD product or service and is an unfair and deceptive business practice.

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