VUSC1P2R280PA

Datasheet

28mΩ, -12V, P-Channel Power MOSFET VUSC1P2R280PA

General Description

$V_{(BR)DSS}$	$R_{DS(ON)\_max}$	I_D
-12V	28mΩ@-4.5V	-6A
	32mΩ@-3.7V	
	40mΩ@-2.5V	
	63mΩ@-1.8V	
	150mΩ@-1.5V	

Symbol

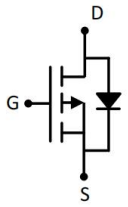


Figure 1 Symbol of VUSC1P2R280PA

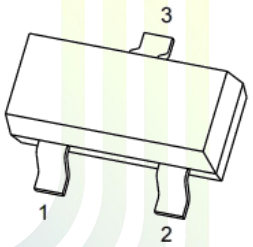
Features

- Trench FET Power MOSFET
- Excellent $R_{DS(on)}$ and Low Gate Charge

Application

- DC/DC Converter
- Load Switch for Portable Devices
- Battery Switch

Package Type



1. GATE
2. SOURCE
3. DRAIN

SOT-23-3L

Figure 2 Package Type of VUSC1P2R280PA

Ordering Information

Product Name	Package
VUSC1P2R280PA	SOT-23-3L

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

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DSS}	-12	V
Gate-Source Voltage	V_{GSS}	±8	V
Continuous Drain Current[Note1]	I_D	-6	A
Pulsed Drain Current [Note2]	I_{DM}	-20	
Total Power Dissipation[Note4]	P_D	0.4	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[Note5]	$R_{\theta JA}$		312.5		ºC/W

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	-12			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}= -12V, V_{GS}=0V			-1	uA
Gate-Body Leakage Current	I_{GSS}	V_{GS} = ±8V, V_{DS}= 0V			±0.1	uA
Gate Threshold Voltage[Note3]	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250uA	-0.4	-0.65	-1	V
Static Drain-Source On-Resistance[Note3]	$R_{DS(ON)}$	V_{GS}=-4.5V, I_D= -5A		19	28	mΩ
		V_{GS}=-3.7V, I_D= -4.6A		21	32	
		V_{GS}=-2.5V, I_D= -4.3A		27	40	
		V_{GS}=-1.8V, I_D= -1A		35	63	
		V_{GS}=-1.5V, I_D= -0.5A		50	150	
Forward Transconductance[Note3]	g_{FS}	V_{DS}=-5V, I_D= -5A	10	14		S
Dynamic Characteristics						
Input Capacitance	C_{ISS}	V_{DS}=-6V		1275		pF
Output Capacitance	C_{OSS}	V_{GS}=0V		255		pF
Reverse Transfer Capacitance	C_{RSS}	f=1MHz		236		pF
Total Gate Charge	Q_g	V_{DS}=-6V		14		nC
Gate-Source Charge	Q_{gs}	V_{GS}=-4.5V		2.3		
Gate-Drain Charge	Q_{gd}	I_D= -5A		3.6		
Gate Resistance	Rg	f = 1MHz, Open drain	1.9		19	Ω
Switching Parameters						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}= -6V		26		ns
Turn-on Rise Time	t_r	V_{GS}= -4.5V		24		
Turn-off Delay Time	$t_{d(off)}$	R_L=6Ω		45		
Turn-off Fall Time	t_f	R_G=1Ω, I_D= -4A		20		
Diode Characteristics						
Diode Forward Voltage [Note3]	V_{DS}	V_{GS}=0V, I_S= -4A			-1.2	V
Continuous Source Current	I_S	T_C=25 ºC			-6	A
Pulsed Source Current	I_{SM}				-20	
Diode Reverse Recovery Time	t_{rr}	I_F = -4A		24	48	ns
Diode Reverse Recovery Charge	Q_{rr}	dI/dt = 100A/us		8	16	nC

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.Pulse Test : Pulse Width ≤ 380μs, duty cycle ≤ 2%.

4.The power dissipation P_D is limited by $T_{J(MAX)}$ = 150°C.And device mounted on a large heatsink

5.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

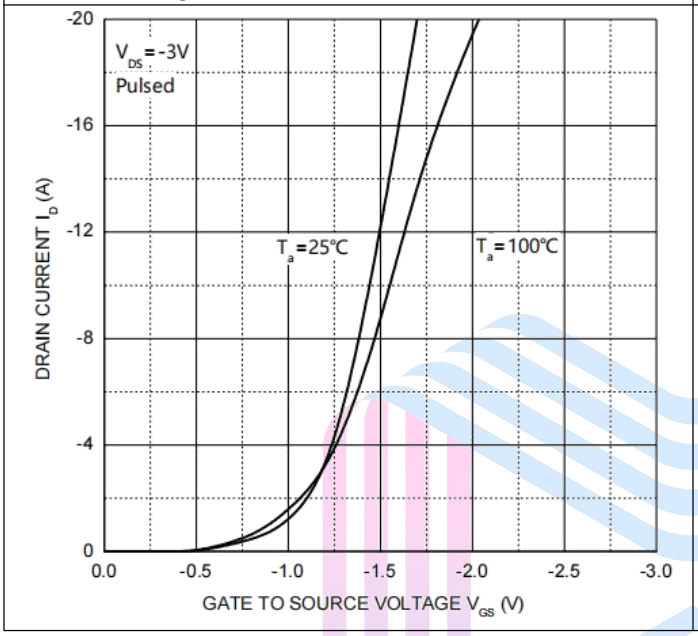


Figure 4: Output Characteristics

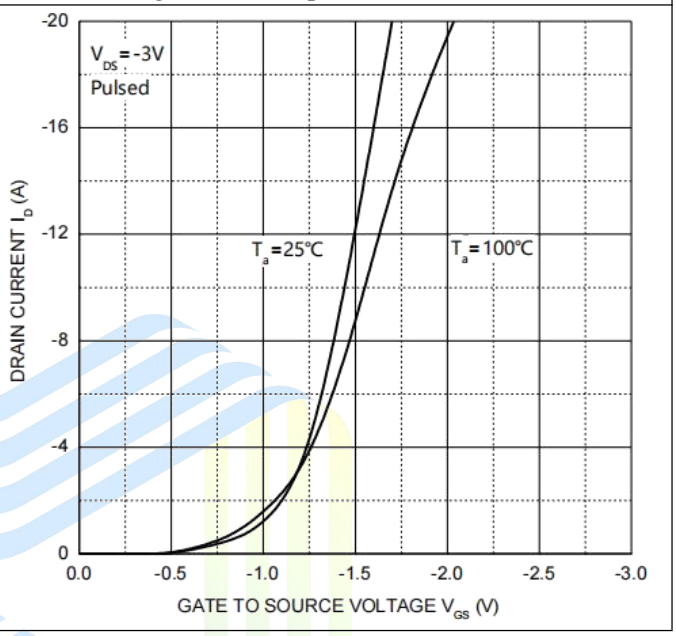


Figure 5: On-Resistance vs. Drain Current

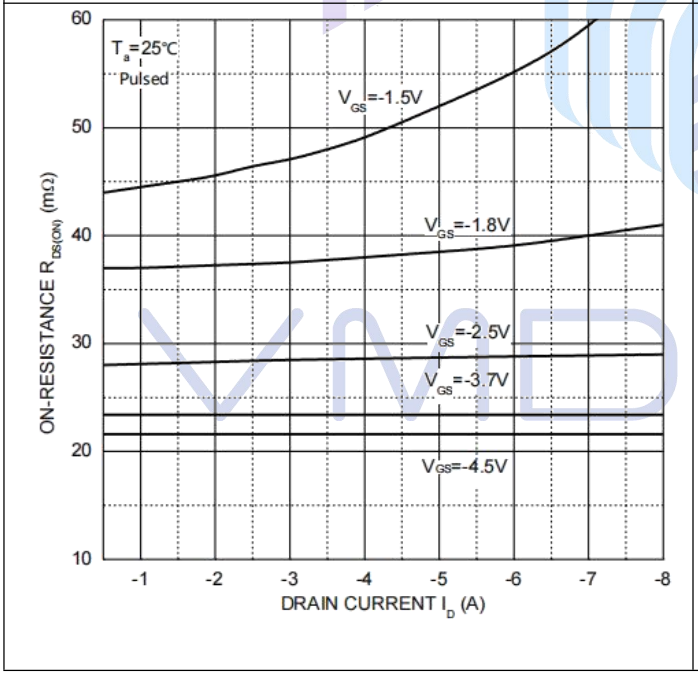


Figure 6: On-Resistance vs. Gate Voltage

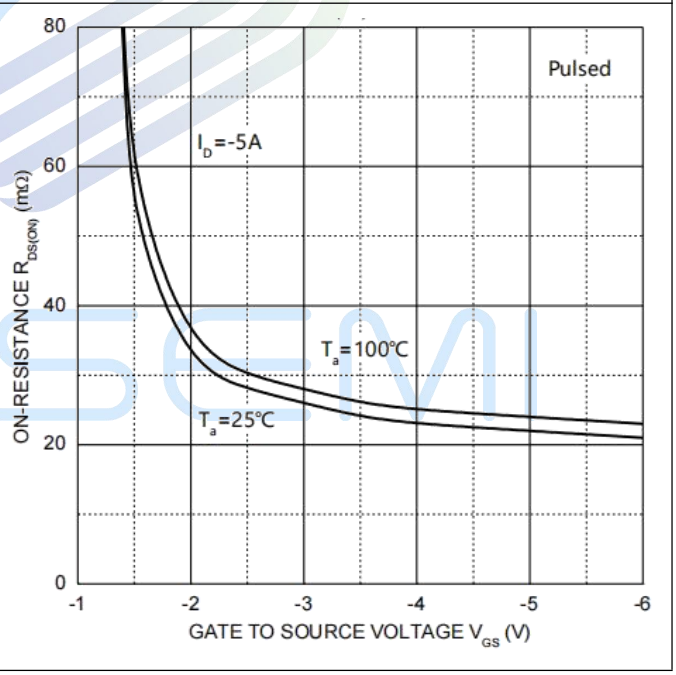


Figure 7: Body Diode Characteristics

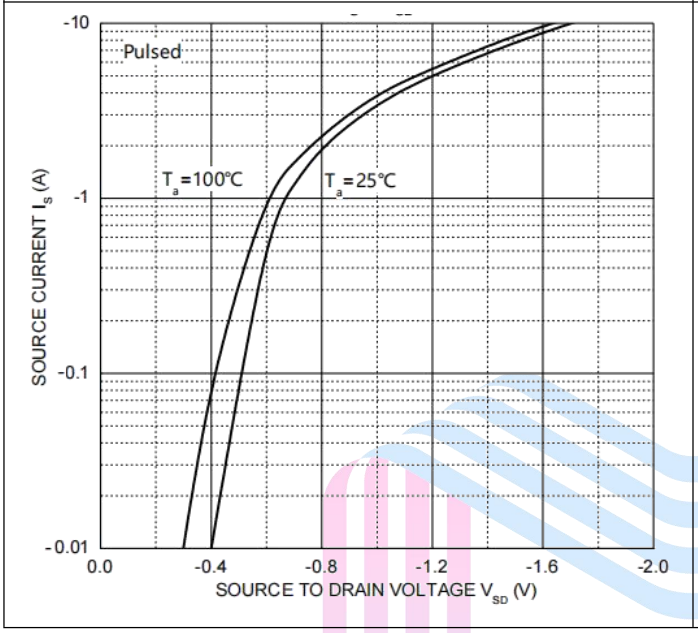
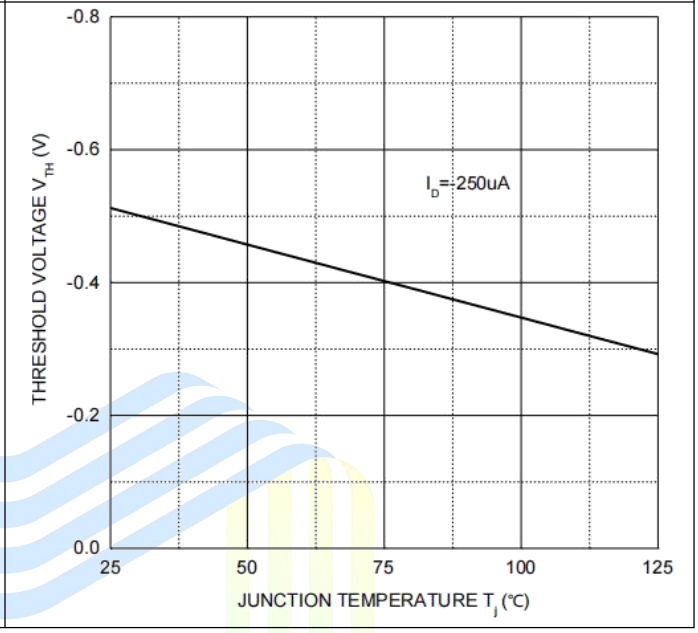
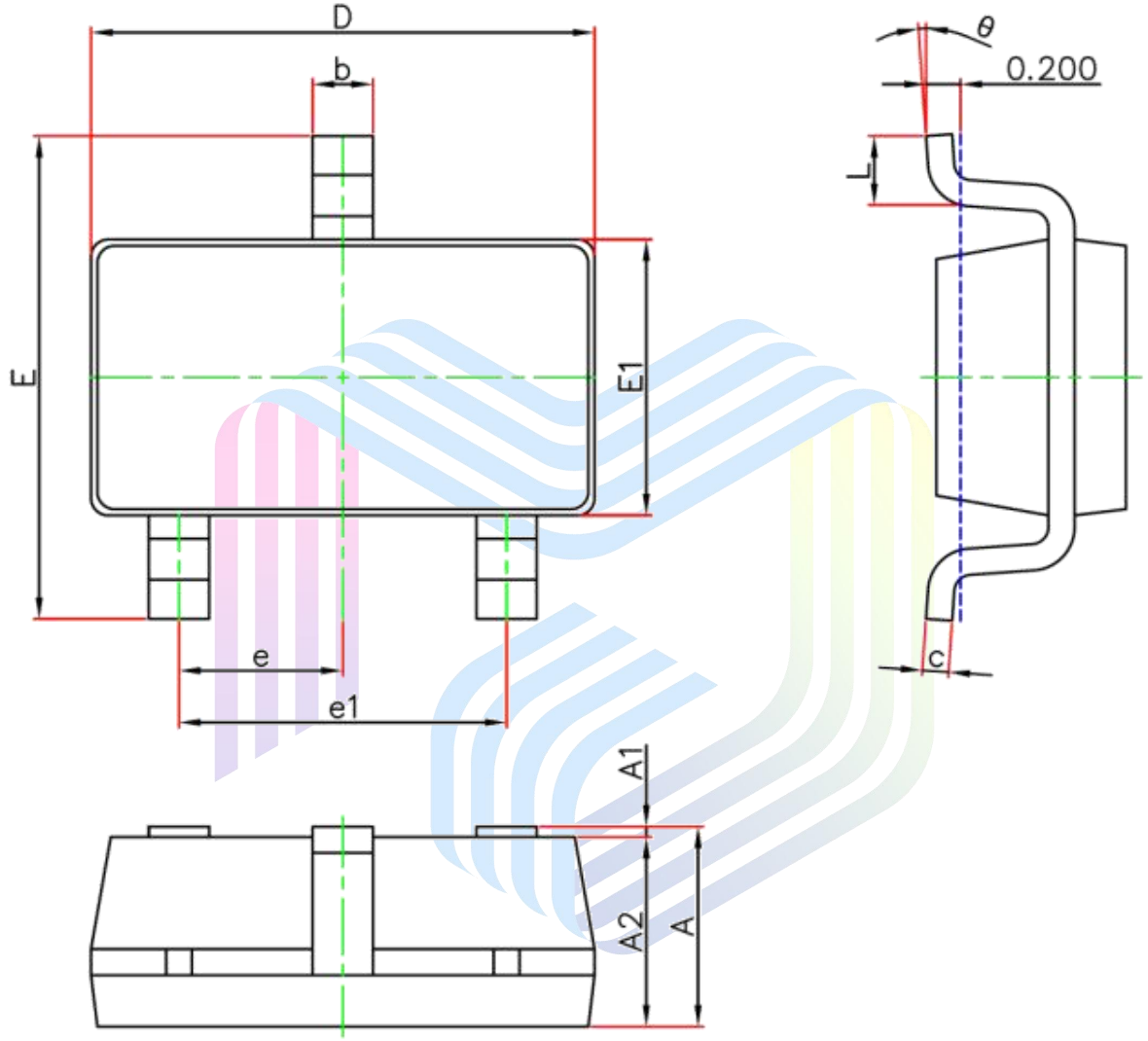


Figure 8: Threshold Voltage



Mechanical Dimensions:

SOT-23-3L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0	0.150	0.000	0.006
A2	1.050	1.250	0.041	0.049
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	2.650	2.950	0.104	0.116
E1	1.500	1.700	0.059	0.067
e	0.950TYP		0.037TYP	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	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