VUSB002R52APA

Datasheet

520mΩ, -20V, P-Channel Power MOSFET VUSB002R52APA

General Description

$V_{(BR)DSS}$	$R_{DS(ON)\_max}$	I_D
-20V	520mΩ@-4.5V	-0.66A
	780mΩ@-2.5V	
	1100mΩ@-1.8V	

Symbol

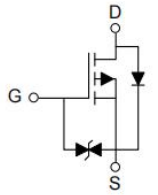
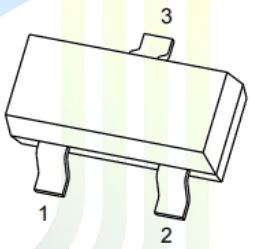


Figure 1 Symbol of VUSB002R52APA

Features

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

Package Type



1. GATE
2. SOURCE
3. DRAIN

SOT-23

Figure 2 Package Type of VUSB002R52APA

Application

- Load Switching
- Low Current Inverters
- Low Current DC/DC Converters

Ordering Information

Product Name	Package
VUSB002R52APA	SOT-23

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

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DSS}	-20	V
Gate-Source Voltage	V_{GSS}	±12	V
Continuous Drain Current[Note1]	I_D	-0.66	A
Pulsed Drain Current [Note2]	I_{DM}	-2.0	
Total Power Dissipation[Note4]	P_D	0.35	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]	$R_{\theta JA}$		357		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	-20			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}= -16V, V_{GS}=0V			-1	uA
Gate-Body Leakage Current	I_{GSS}	V_{GS} = ±10V, V_{DS}= 0V			±10	uA
Gate Threshold Voltage[Note3]	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250uA	-0.4	-0.7	-1.0	V
Static Drain-Source On-Resistance[Note3]	$R_{DS(ON)}$	V_{GS}=-4.5V, I_D= -0.5A		400	520	mΩ
		V_{GS}=-2.5V, I_D= -0.3A		570	780	
		V_{GS}=-1.8V, I_D= -0.12A		810	1100	
Forward Transconductance[Note3]	g_{FS}	V_{DS}=-5V, I_D= -0.4A		1		S
Dynamic Characteristics						
Input Capacitance	C_{ISS}	V_{DS}=-10V		79		pF
Output Capacitance	C_{OSS}	V_{GS}=0V		15		pF
Reverse Transfer Capacitance	C_{RSS}	f=1MHz		13		pF
Total Gate Charge	Q_g	V_{DS}=-10V		2.26		nC
Gate-Source Charge	Q_{gs}	V_{GS}=-4.5V		0.45		
Gate-Drain Charge	Q_{gd}	I_D= -0.2A		0.24		
Gate Resistance	Rg	f = 1MHz, Open drain		5		Ω
Switching Parameters						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}= -10V		8		ns
Turn-on Rise Time	t_r	V_{GS}= -4.5V		5.5		
Turn-off Delay Time	$t_{d(off)}$	R_L=50Ω		30		
Turn-off Fall Time	t_f	R_G=3Ω		17		
Diode Characteristics						
Diode Forward Voltage [Note3]	V_{SD}	V_{GS}=0V, I_S= -0.5A			-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.Pulse Test : Pulse Width ≤ 300μs, 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

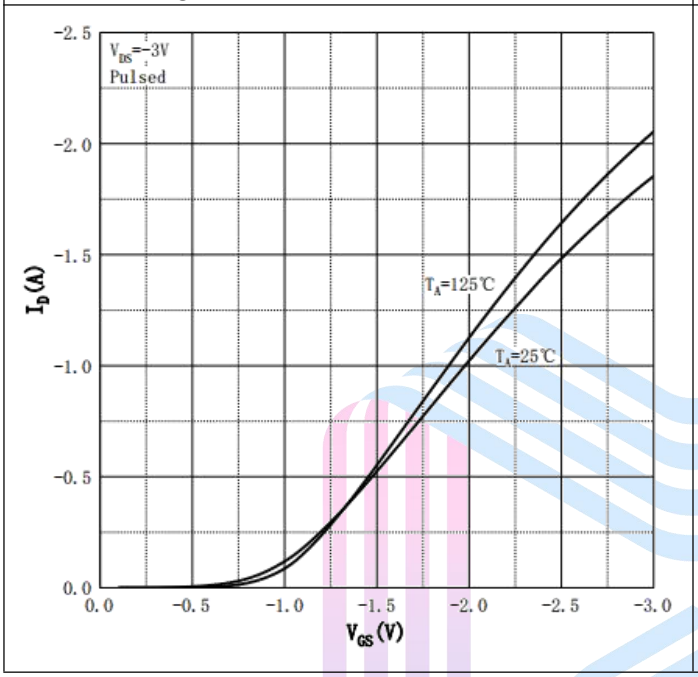


Figure 4: Output Characteristics

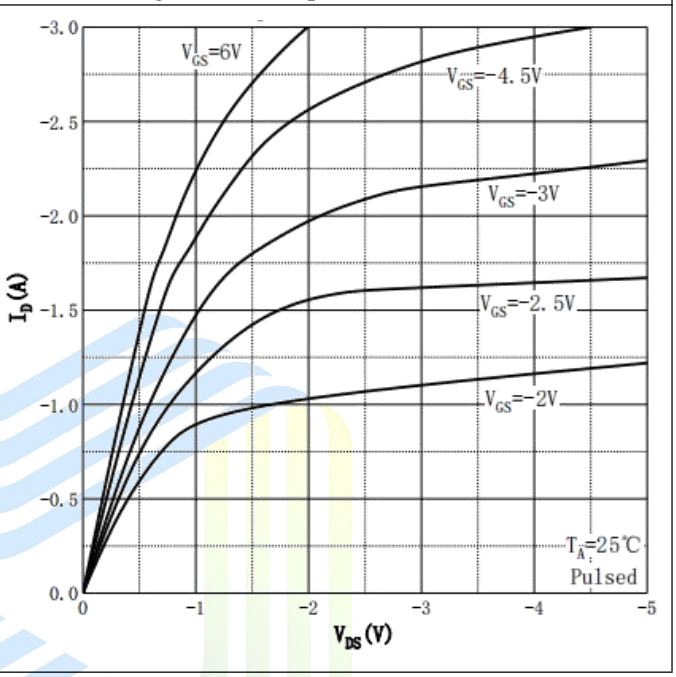


Figure 5: On-Resistance vs. Drain Current

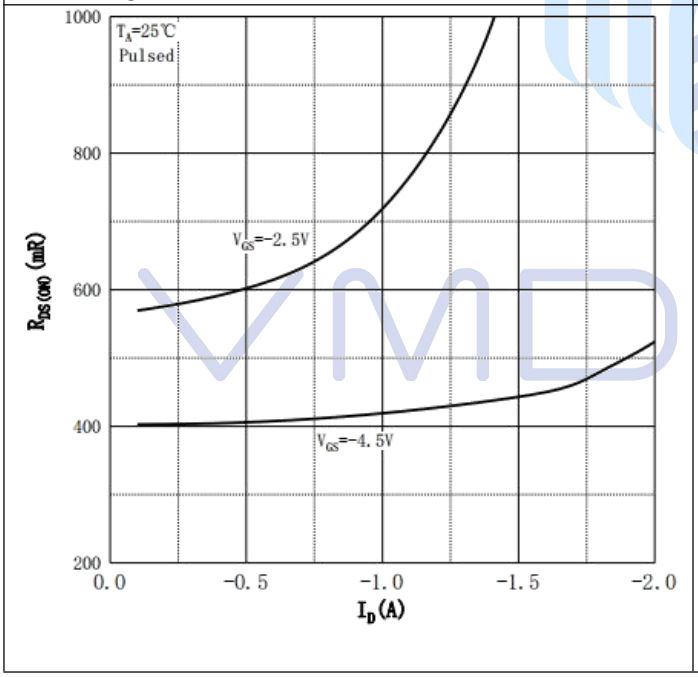


Figure 6: On-Resistance vs. Gate Voltage

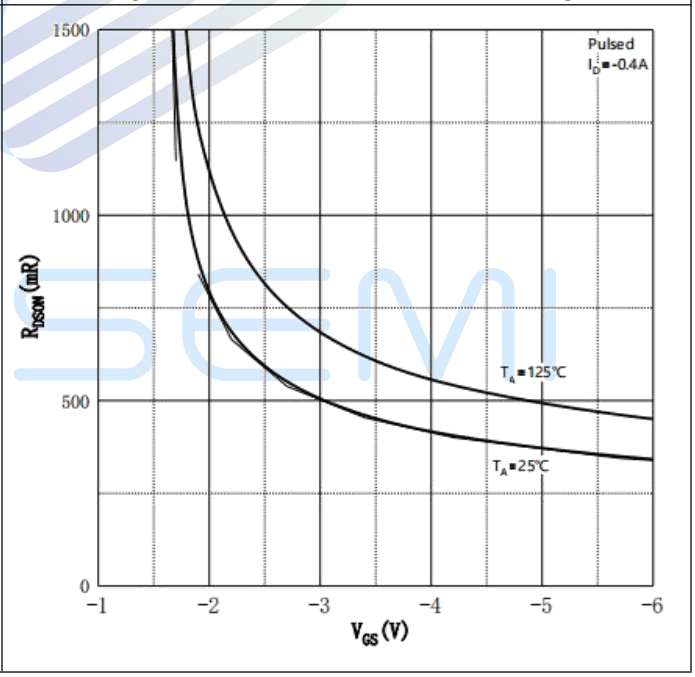


Figure 7: Body Diode Characteristics

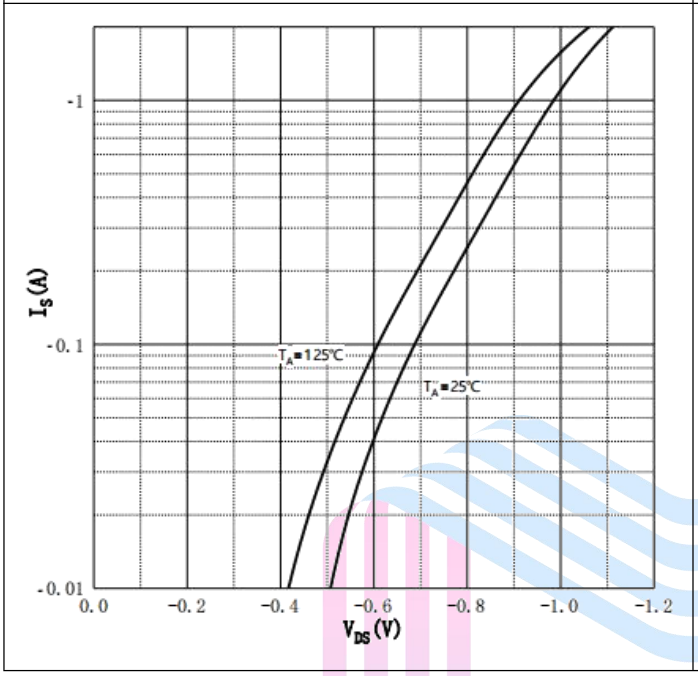
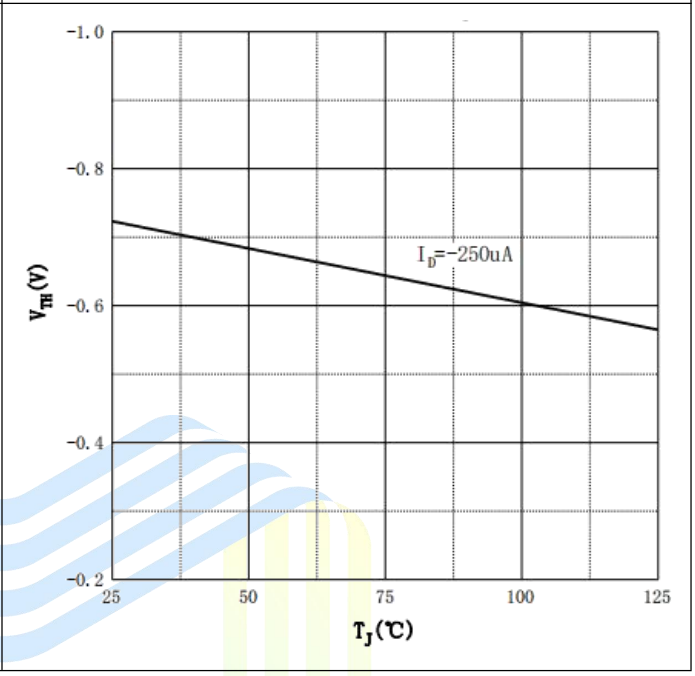
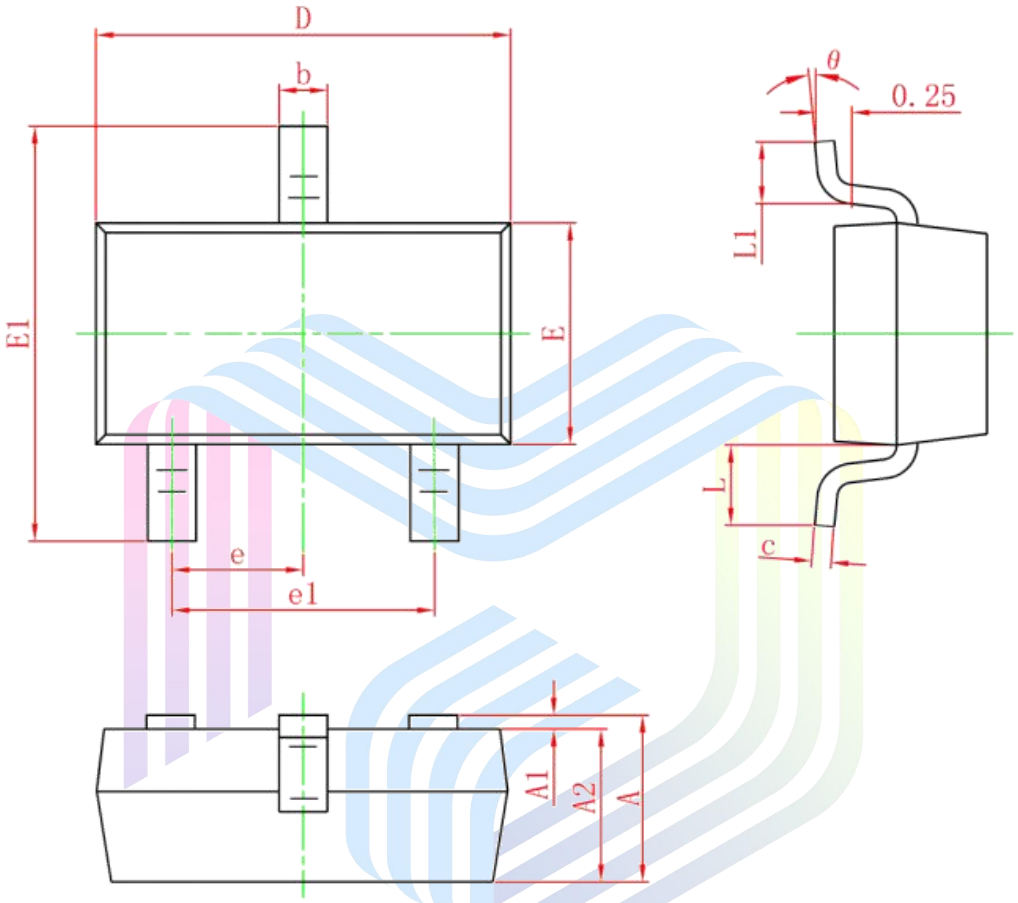


Figure 8: Threshold Voltage



Mechanical Dimensions:

SOT-23 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0	0.100	0	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.150	1.500	0.045	0.059
E1	2.250	2.650	0.089	0.104
e	0.950TYP		0.037TYP	
e1	1.800	2.000	0.071	0.079
L	0.550REF		0.022REF	
L1	0.300	0.500	0.012	0.020
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