VUSB003R520NA

Datasheet

General Description

$V_{(BR)DSS}$	$R_{DS(ON)\_max}$	I_D
30V	52mΩ@10V	4.0A
	65mΩ@4.5V	
	85mΩ@2.5V	

Symbol

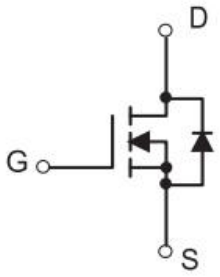
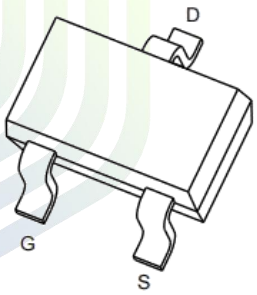


Figure 1 Symbol of VUSB003R520NA

Features

- Trench Technology Power MOSFET
- Low $R_{DS(on)}$
- Low Gate Charge

Package Type



SOT-23

Figure 2 Package Type of VUSB003R520NA

Application

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

Ordering Information

Product Name	Package
VUSB003R520NA	SOT-23

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

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DSS}	30	V
Gate-Source Voltage		V_{GSS}	±12	V
Continuous Drain Current Note1	T_A= 25 ºC	I_D	4	A
Pulsed Drain Current Note2		I_{DM}	15	A
Total Power Dissipation Note4	T_A= 25 ºC	P_D	1.5	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	$R_{\theta JA}$		83.3		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	30			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}= 30V, V_{GS}=0V			1	uA
Gate-Body Leakage Current	I_{GSS}	V_{GS} = ±12V, V_{DS}= 0V			±100	nA
Gate Threshold Voltage[Note3]	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250uA	0.5	0.95	1.5	V
Static Drain-Source On-Resistance[Note3]	$R_{DS(ON)}$	V_{GS}= 10V, I_D= 4A		34	52	mΩ
		V_{GS}= 4.5V, I_D= 3A		37	65	
		V_{GS}= 2.5V, I_D= 2A		45	85	
Forward tranconductance[Note3]	g_{FS}	V_{DS}= 5V, I_D= 3.6A		13		S
Dynamic Characteristics						
Input Capacitance	C_{ISS}	V_{DS}=15V		389		pF
Output Capacitance	C_{OSS}	V_{GS}=0V		54		pF
Reverse Transfer Capacitance	C_{RSS}	f=1MHz		40		pF
Total Gate charge	Q_g	V_{DS}=15V		4.4		nC
Gate-source charge	Q_{gs}	V_{GS}=4.5V		0.7		
Gate-drain charge	Q_{gd}	I_D= 4A		1.3		
Gate Resistance	Rg	f = 1MHz,open drain		3.5		Ω
Switching Parameters						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}= 15V		3.5		ns
Turn-on Rise Time	t_r	V_{GS}= 10V		1.2		
Turn-off Delay Time	$t_{d(off)}$	R_L=3.75Ω		22		
Turn-off Fall Time	t_f	R_G=6Ω		2.2		
Source - Drain Diode Characteristics						
Diode Forward Voltage [Note3]	V_{SD}	V_{GS} = 0V, I_S = 1A			1.0	V
Continuous Source-Drain Diode Current	I_S	T_C= 25 ºC			1.5	A
Body diode reverse recovery time	t_{rr}	I_F=4A		1.3		ns
Body diode reverse recovery charge	Q_{rr}	dI/dt=100A/μs		6.2		nC

Notes :

1.The maximum current rating is limited by package.

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.

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

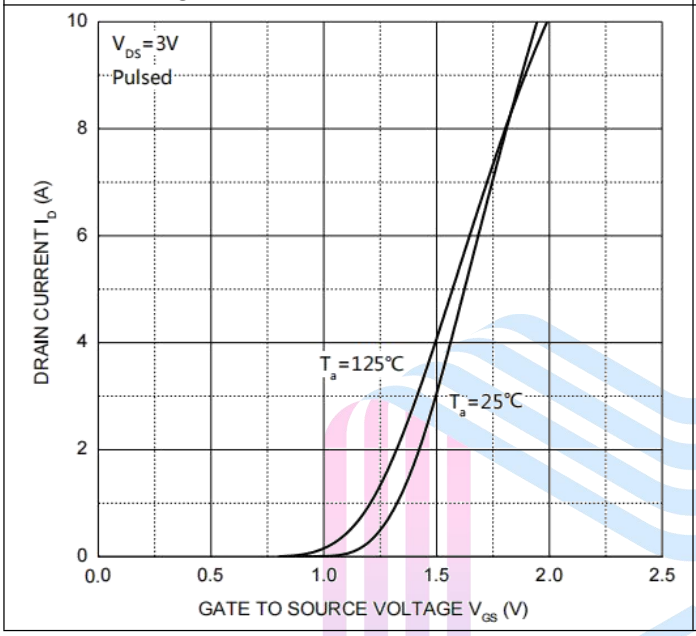


Figure 4: Output Characteristics

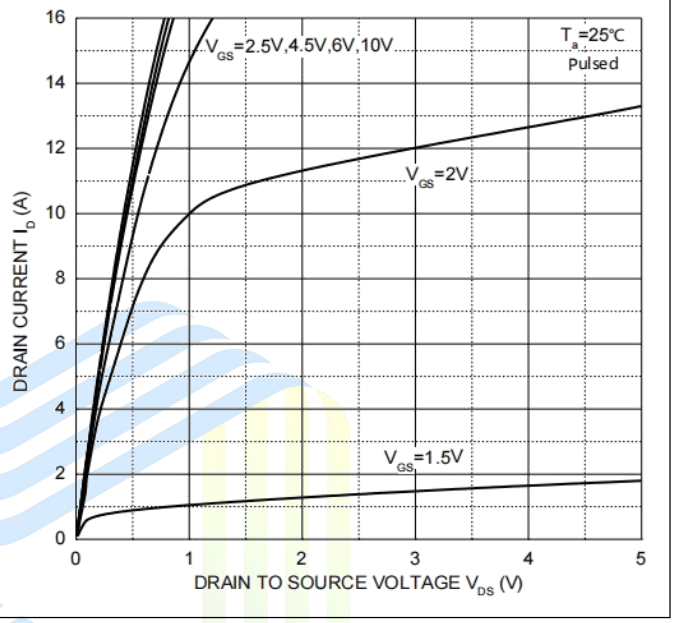


Figure 5: On-Resistance vs. Drain Current

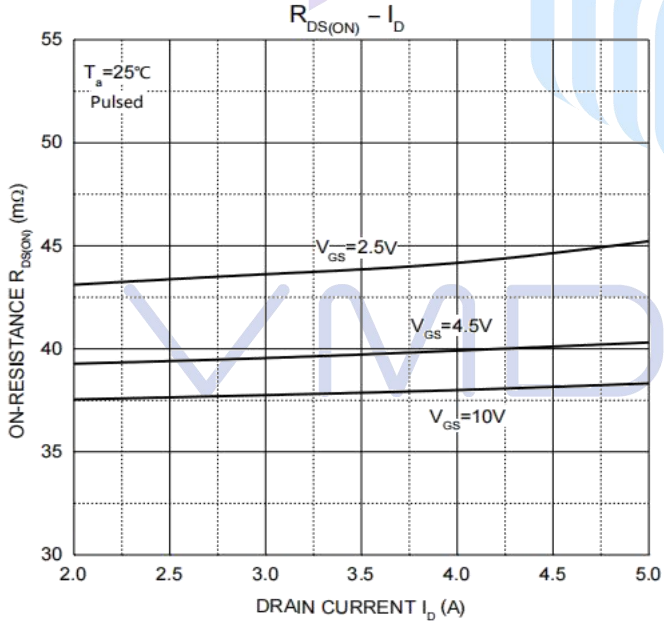


Figure 6: On-Resistance vs. Gate Voltage

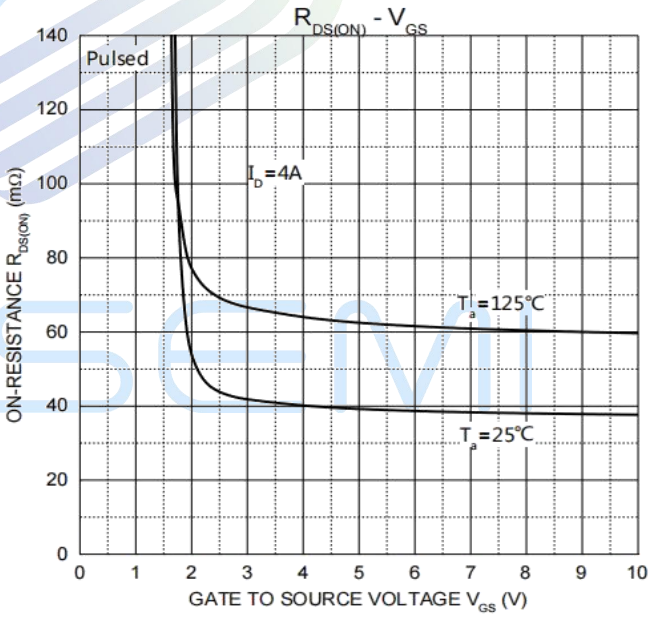


Figure 7: Body Diode Characteristics

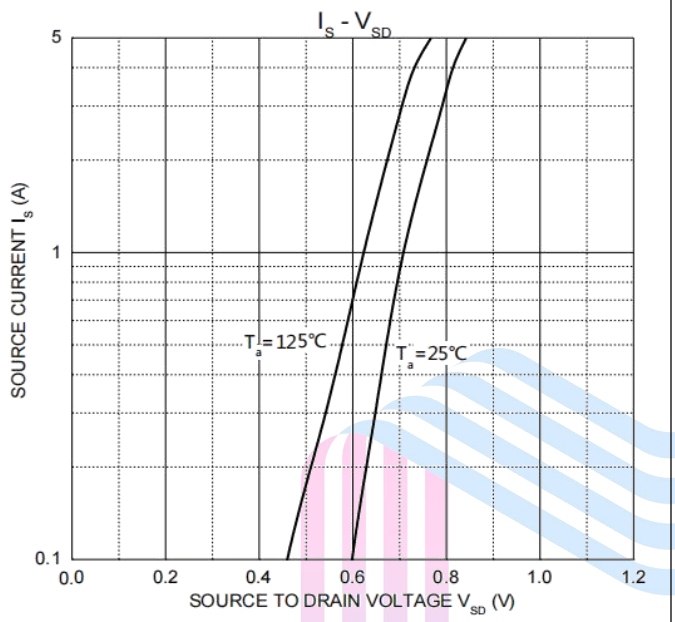
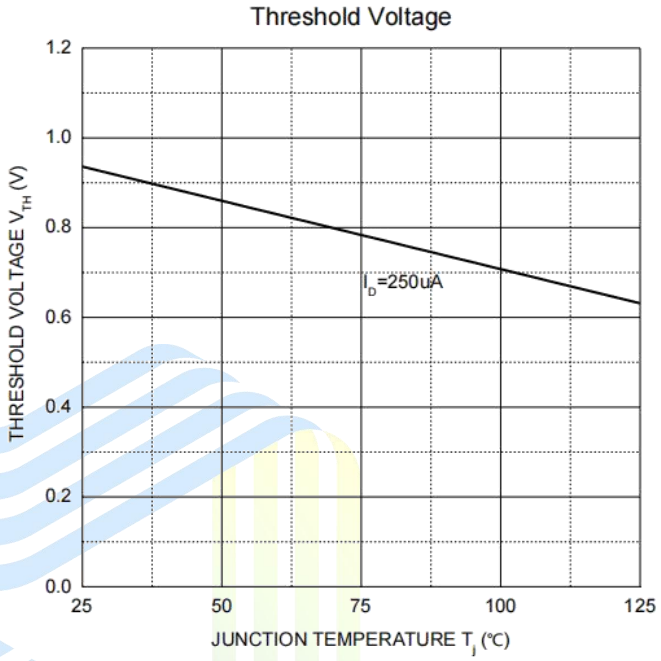
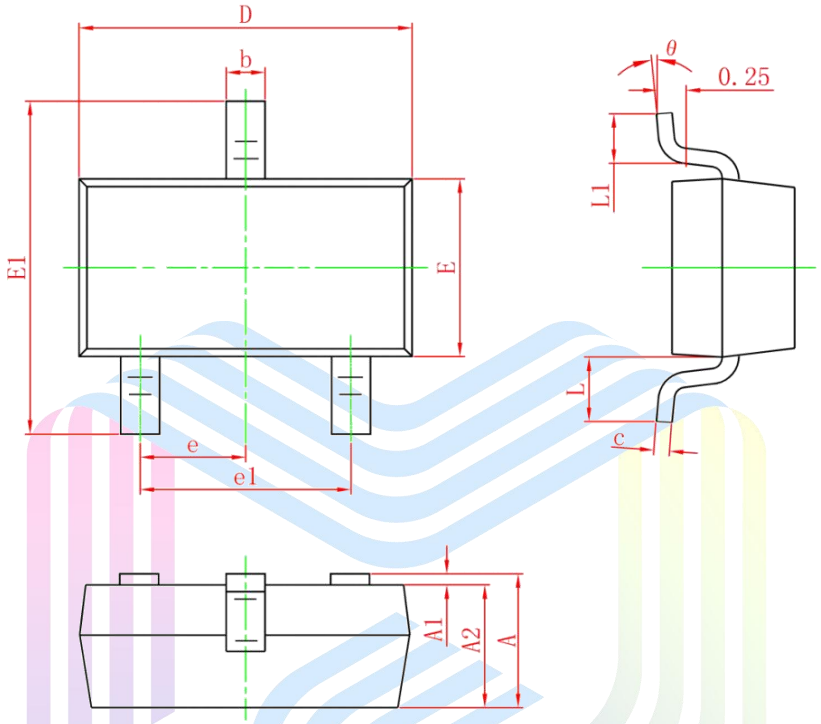


Figure 8: Threshold Voltage



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°

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