VUSB002R190NA

Datasheet

General Description

$V_{(BR)DSS}$	$R_{DS(ON)\_max}$	I_D
20V	19mΩ@10V	7A
	22mΩ@4.5V	
	26mΩ@3.8V	
	33mΩ@2.5V	
	70mΩ@1.8V	

Symbol

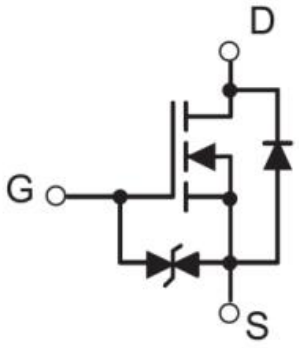
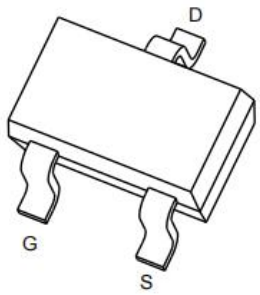


Figure 1 Symbol of VUSB002R190NA

Features

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

Package Type



SOT-23

Figure 2 Package Type of VUSB002R190NA

Application

- DC/DC Converter
- Load Switch for Portable Devices
- Small Portable Electronics

Ordering Information

Product Name	Package
VUSB002R190NA	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	7	A
Pulsed Drain Current Note2	I_{DM}	30	A
Total Power Dissipation Note4	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	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} = ±4.5V, V_{DS}= 0V			±1	uA
		V_{GS} = ±8V, V_{DS}= 0V			±10	uA
Gate Threshold Voltage[Note3]	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250uA	0.4	0.8	1.0	V
Static Drain-Source On-Resistance[Note3]	$R_{DS(ON)}$	V_{GS}= 10V, I_D= 7A		14	19	mΩ
		V_{GS}= 4.5V, I_D= 6.6A		16	22	
		V_{GS}= 3.8V, I_D= 6.6A		17	26	
		V_{GS}= 2.5V, I_D= 5.5A		23	33	
		V_{GS}= 1.8V, I_D= 3A		48	70	
Forward tranconductance[Note3]	g_{FS}	V_{DS}= 5V, I_D= 7A	9	13.6		S
Dynamic Characteristics						
Input Capacitance	C_{ISS}	V_{DS}=10V		740		pF
Output Capacitance	C_{OSS}	V_{GS}=0V		141		pF
Reverse Transfer Capacitance	C_{RSS}	f=1MHz		136		pF
Total gate charge	Q_g	V_{DS}=10V		15		nC
Gate-source charge	Q_{gs}	V_{GS}=4.5V		0.8		nC
Gate-drain charge	Q_{gd}	I_D= 7.0A		3.2		nC
Gate resistance	R_g	f=1MHz,open drain		2		Ω
Switching Parameters						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}= 10V		6		ns
Turn-on Rise Time	t_r	V_{GEN}=5V		13		
Turn-off Delay Time	$t_{d(off)}$	R_L=1.35Ω		52		
Turn-off Fall Time	t_f	R_{GEN}=3Ω		16		
Diode Characteristics						
Diode Forward Voltage [Note3]	V_{SD}	V_{GS}=0V, I_S= 1A		0.77	1.2	V

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

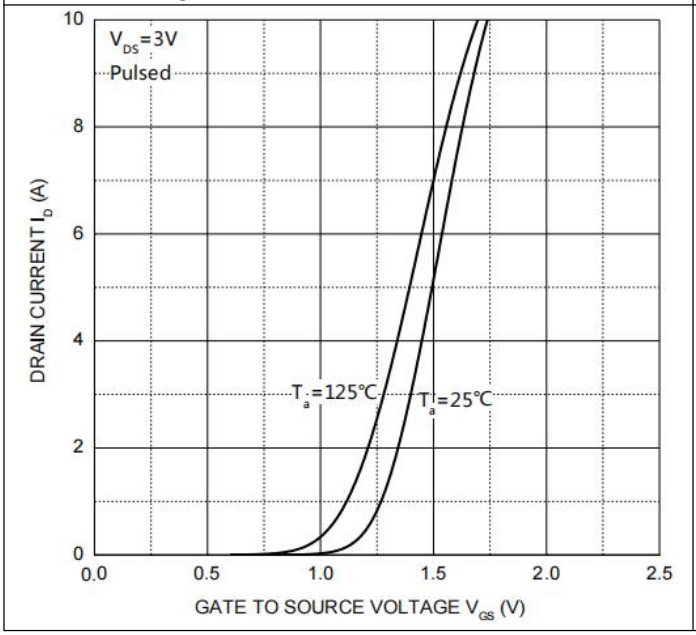


Figure 4: Output Characteristics

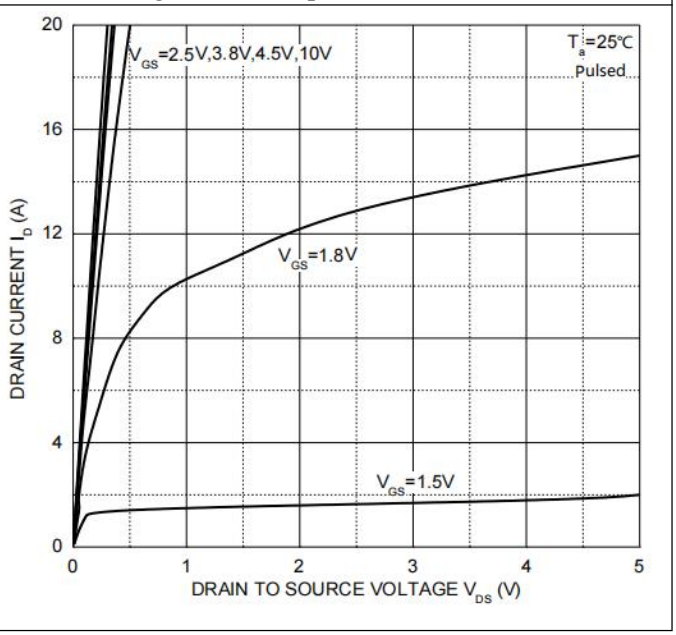


Figure 5: On-Resistance vs. Drain Current

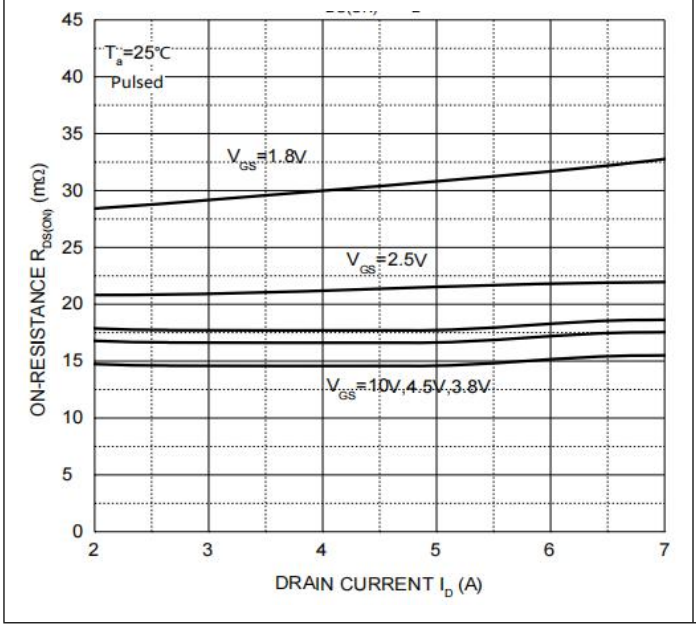


Figure 6: On-Resistance vs. Gate Voltage

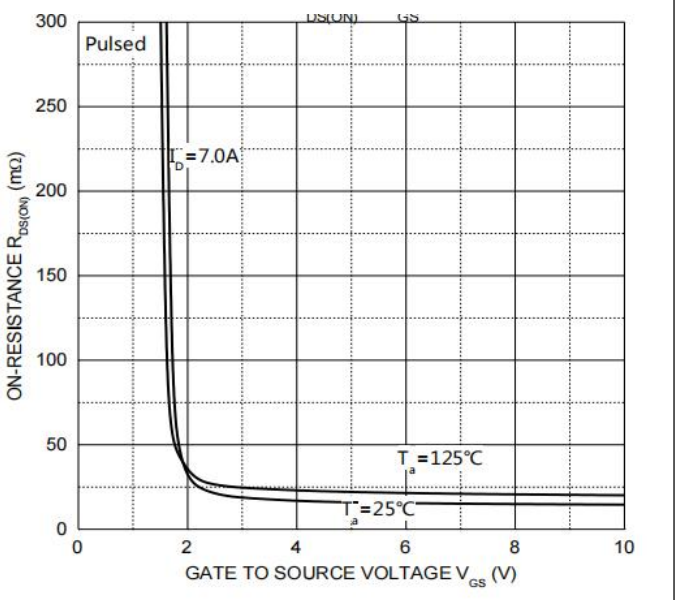


Figure 7: Body Diode Characteristics

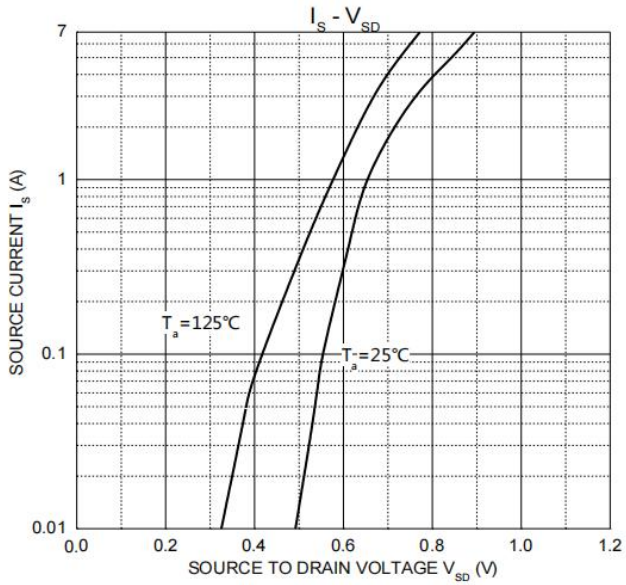
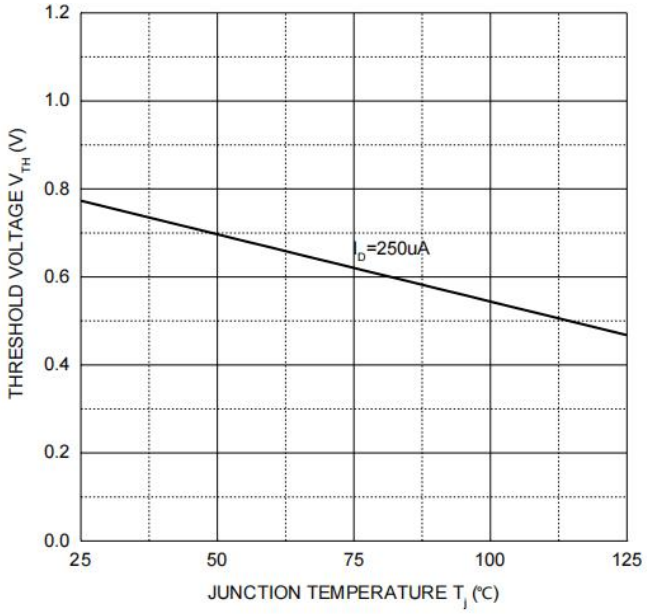
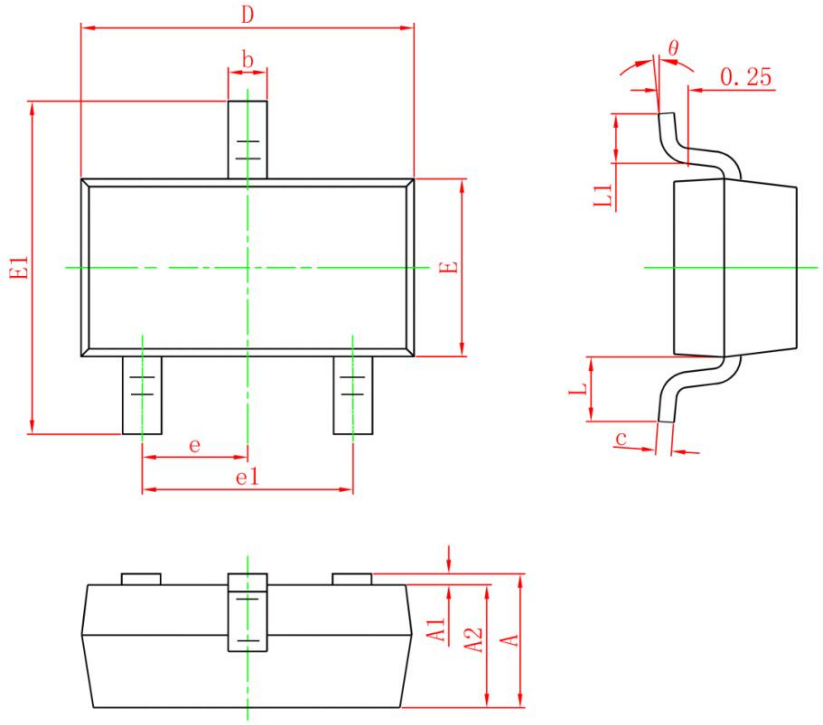


Figure 8: Threshold Voltage



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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