VUSC002R140NA

Datasheet

General Description

$V_{(BR)DSS}$	$R_{DS(ON)\_max}$	I_D
20V	14mΩ@10V	7A
	15mΩ@4.5V	
	16mΩ@3.8V	
	19mΩ@2.5V	

Symbol

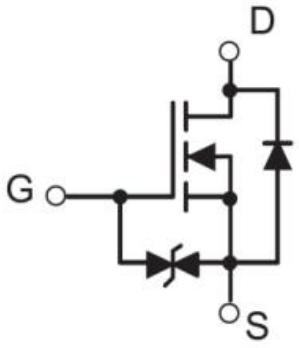
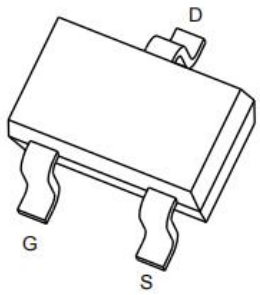


Figure 1 Symbol of VUSC002R140NA

Features

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

Package Type



SOT-23-3L

Figure 2 Package Type of VUSC002R140NA

Application

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

Ordering Information

Product Name	Package
VUSC002R140NA	SOT-23-3L

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}	25	A
Total Power Dissipation Note4	P_D	1.6	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	$R_{\theta JA}$		78		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} = ±10V, V_{DS}= 0V			±5	uA
Gate Threshold Voltage[Note3]	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250uA	0.5	0.7	1	V
Static Drain-Source On-Resistance[Note3]	$R_{DS(ON)}$	V_{GS}= 10V, I_D= 3A		10.8	14	mΩ
		V_{GS}= 4.5V, I_D= 3A		11.8	15	
		V_{GS}= 3.8V, I_D= 3A		12.3	16	
		V_{GS}= 2.5V, I_D= 3A		14.7	19	
Forward tranconductance[Note3]	g_{FS}	V_{DS}= 5V, I_D= 3A	9			S
Dynamic Characteristics						
Input Capacitance	C_{ISS}	V_{DS}=10V		1800		pF
Output Capacitance	C_{OSS}	V_{GS}=0V		230		pF
Reverse Transfer Capacitance	C_{RSS}	f=1MHz		200		pF
Total gate charge	Q_g	V_{DS}=10V		17.9		nC
Gate-source charge	Q_{gs}	V_{GS}=4.5V		1.5		nC
Gate-drain charge	Q_{gd}	I_D= 3.0A		4.7		nC
Switching Parameters						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}= 10V		2.5		ns
Turn-on Rise Time	t_r	V_{GEN}=10V		7.2		
Turn-off Delay Time	$t_{d(off)}$	R_L=1.2Ω		49		
Turn-off Fall Time	t_f	R_{GEN}=3Ω		10.8		
Diode Characteristics						
Diode Forward Voltage [Note3]	V_{SD}	V_{GS}=0V, I_S= 1A			1.0	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

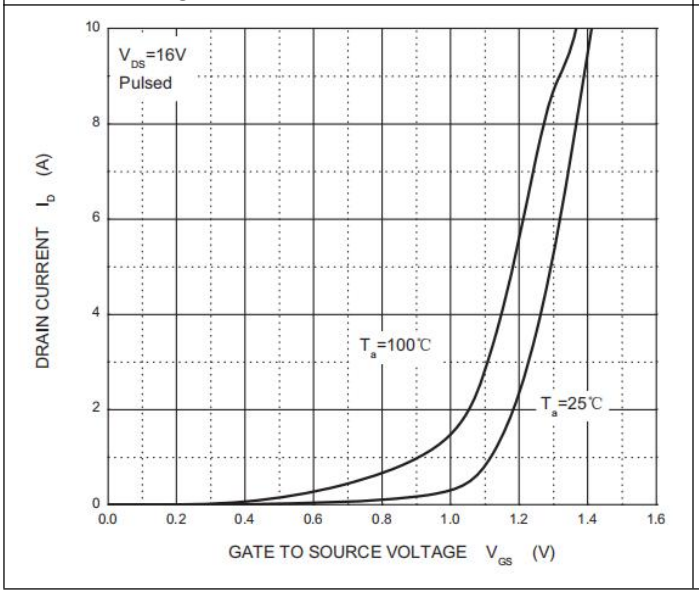


Figure 4: Output Characteristics

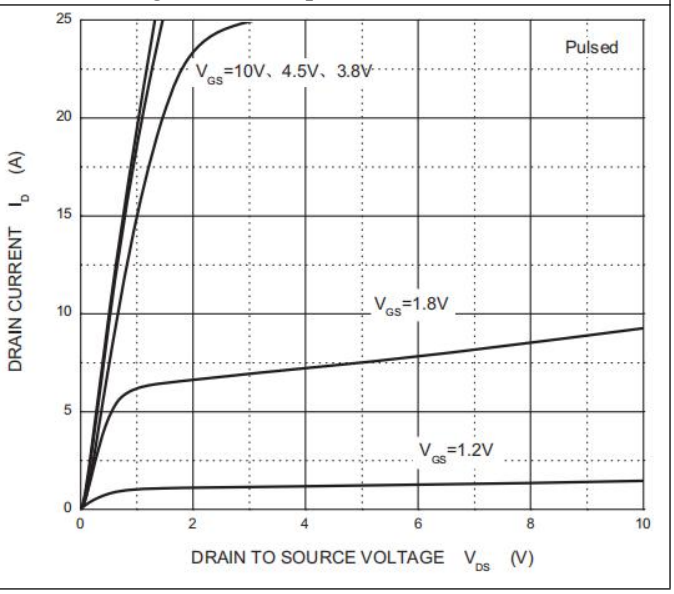


Figure 5: On-Resistance vs. Drain Current

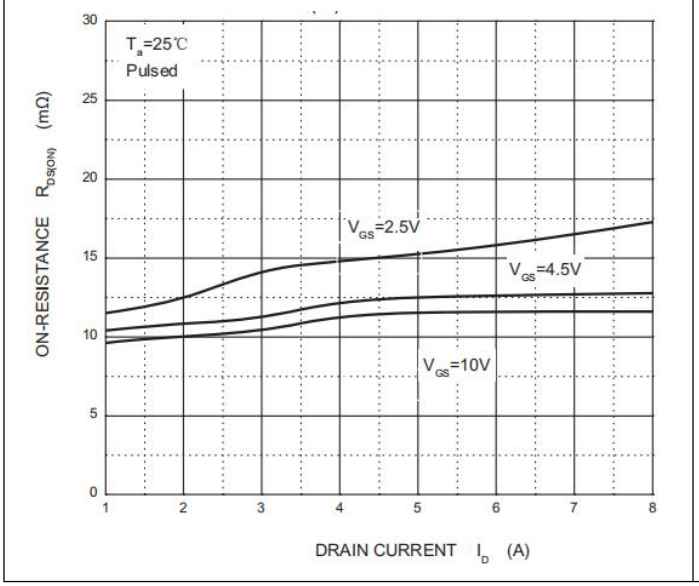


Figure 6: On-Resistance vs. Gate Voltage

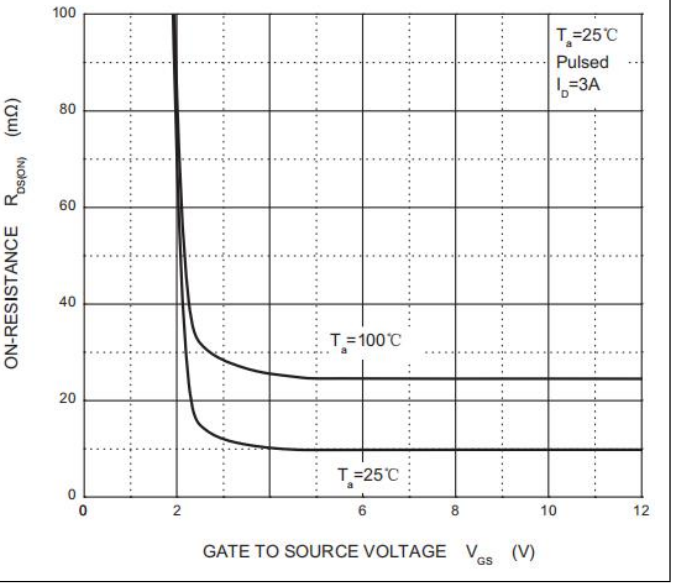


Figure 7: Body Diode Characteristics

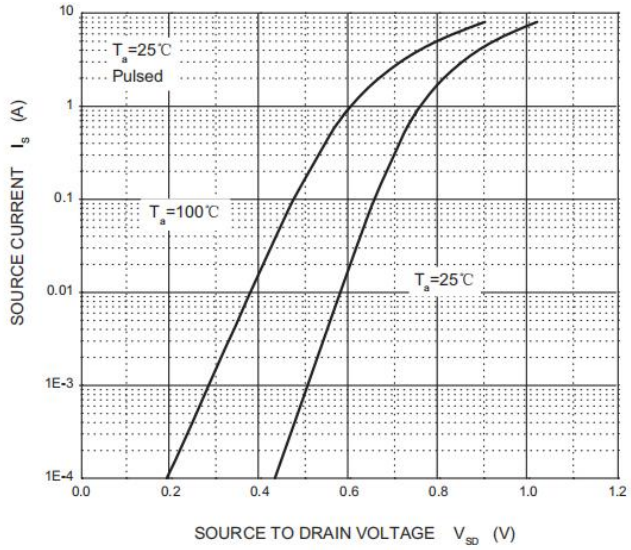
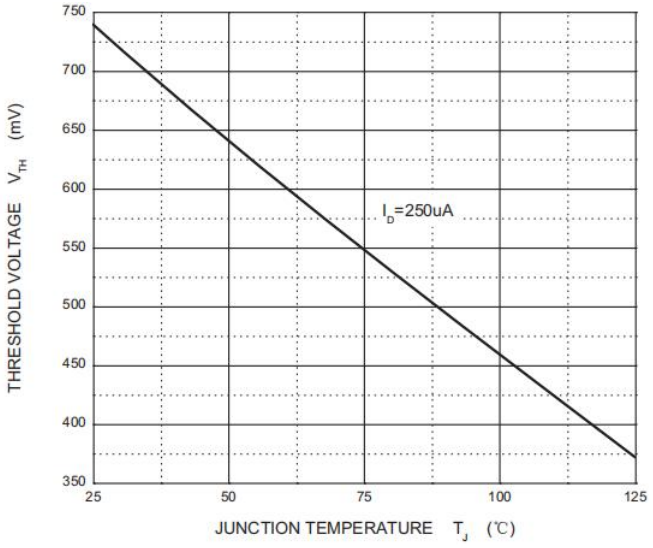
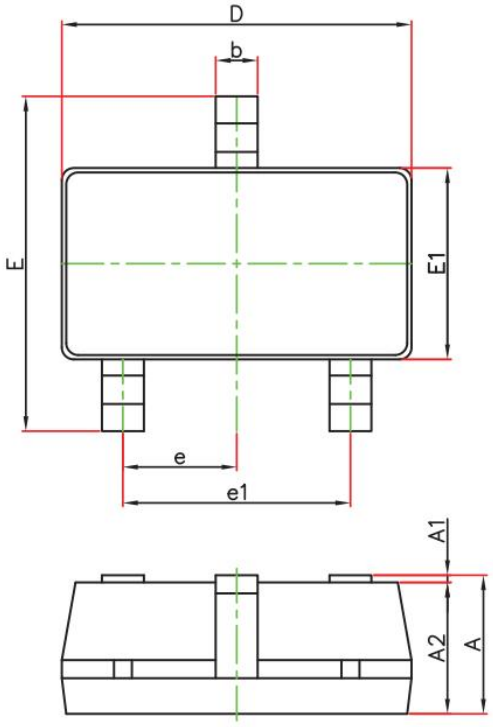


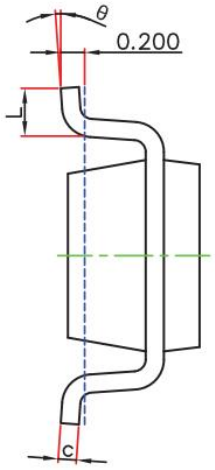
Figure 8: Threshold Voltage



Mechanical Dimensions:

SOT-23-3LPackage Information





Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
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
E1	1.500	1.700	0.059	0.067
E	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

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