VUSB002R940PA

Datasheet

General Description

VUSB002R940PA MOSFET is based on unique device design to achieve low $R_{DS(ON)}$.

Symbol

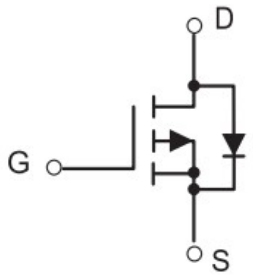


Figure 1 Symbol of VUSB002R940PA

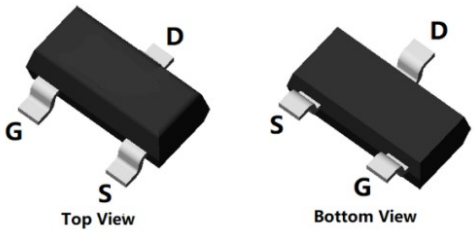
Features

- $R_{DS(ON)\_max}$ = 94.0mΩ@V_{GS} = -4.5V
- $R_{DS(ON)\_max}$ = 127mΩ@V_{GS} = -2.5V
- Trench Power LV MOSFET technology
- High Density Cell Design for Low $R_{DS(ON)}$
- Moisture Sensitivity Level 1
- Meets UL 94 V-0 Flammability Rating

Application

- Video Monitor
- Power Management

Package Type



SOT-23

Figure 2 Package Type of VUSB002R940PA

Ordering Information

Product Name	Package
VUSB002R940PA	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}	±10	V
Continuous Drain Current T_A = 25℃@Steady state	I_D	-2	A
Continuous Drain Current T_A = 70℃@Steady state		-1.6	A
Pulsed Drain Current[Note1]	I_{DM}	-8	A
Total Power Dissipation T_A = 25℃	P_D	0.7	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 [Note2]	$R_{\theta JA}$		178		ºC/W

Notes :

1. Pulse Test: Pulse Width≤300us,Duty cycle ≤2%.
2. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch.

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}= -20V, V_{GS}=0V T_C= 25 ºC			-1	uA
Gate-Body Leakage Current	I_{GSS}	V_{GS} = ±10V, V_{DS}= 0V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D= -250uA	-0.4	-0.62	-1.0	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}= -4.5V, I_D= -1.5A		81	94	mΩ
		V_{GS}= -2.5V, I_D= -1.5A		109	127	
		V_{GS}= -1.8V, I_D= -1.5A		183	215	
Dynamic Characteristics						
Input Capacitance	C_{ISS}	V_{DS}= -10V		327		pF
Output Capacitance	C_{OSS}	V_{GS}=0V		62		pF
Reverse Transfer Capacitance	C_{RSS}	f=1MHz		55		pF
Switching Parameters						
Gate to Source Charge	Q_{gs}	V_{DS}= -10V		0.85		nC
Gate to Drain Charge	Q_{gd}	V_{GS}= -4.5V		1.4		
Gate Charge Total	Q_g	I_D= -2A		4.5		
Reverse Recovery Charge	Q_{rr}	I_F= -2A		2.3		
Reverse Recovery Time	t_{rr}	di/dt=-100A/us		27		ns
Turn-on Delay Time	$t_{d(on)}$	V_{DD}= -10V		6		
Turn-on Rise Time	t_r	V_{GS}= -4.5V		30		
Turn-off Delay Time	$t_{d(off)}$	I_D= -1A		45		
Turn-off Fall Time	t_f	R_{GEN}=2.5Ω		46		
Diode Characteristics						
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S= -2A		-0.8	-1.2	V
Maximum Body-Diode Continuous Current	I_S				-2	A

Typical Performance Characteristics

Figure 3: Transfer Characteristics

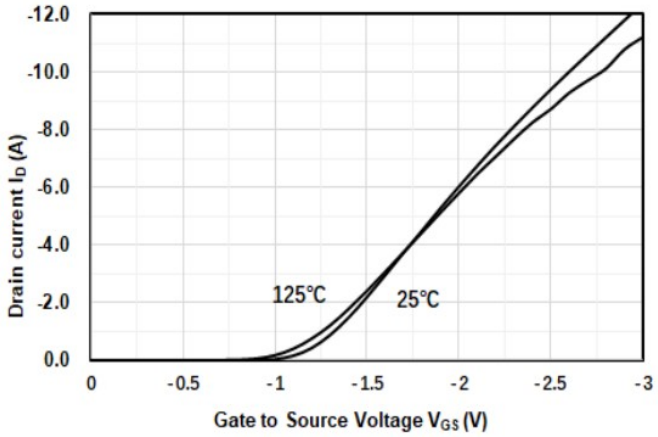


Figure 4: Output Characteristics

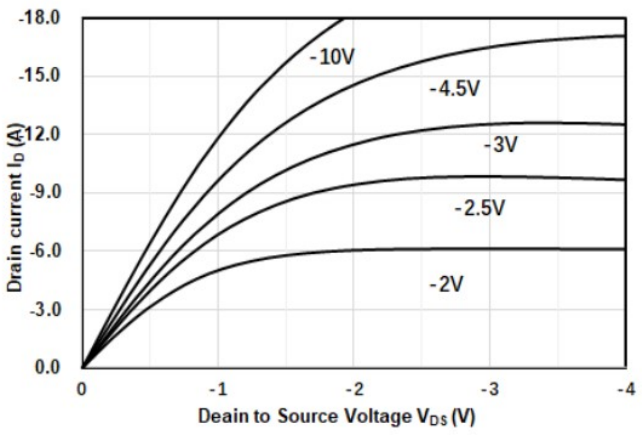


Figure 5: On-Resistance vs. Drain Current and Gate Voltage

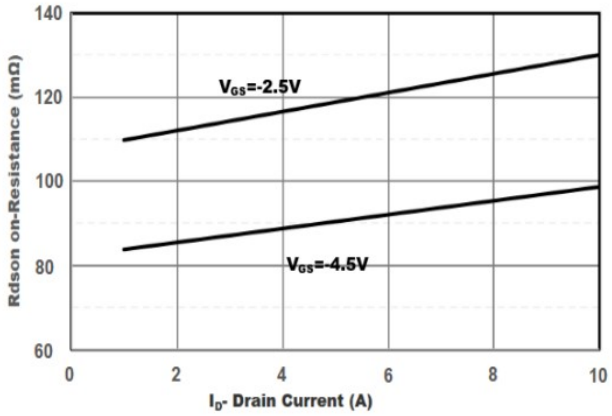


Figure 6: On-Resistance vs. Junction Temperature

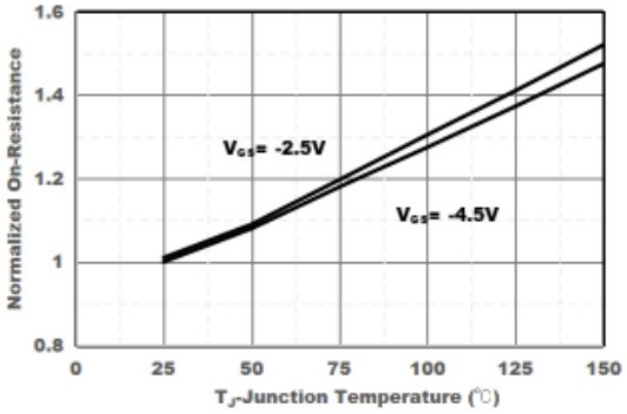


Figure 7: Capacitance Characteristics

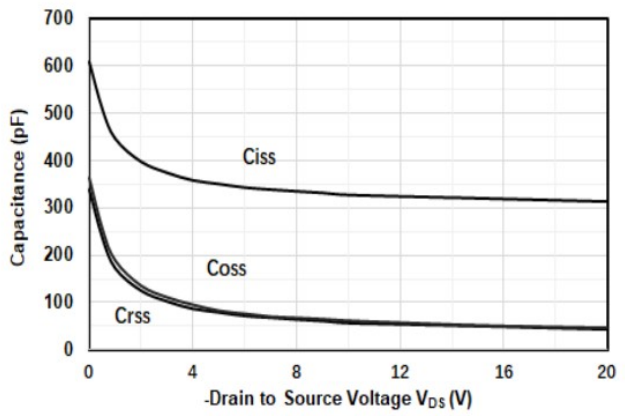


Figure 8: Gate Charge

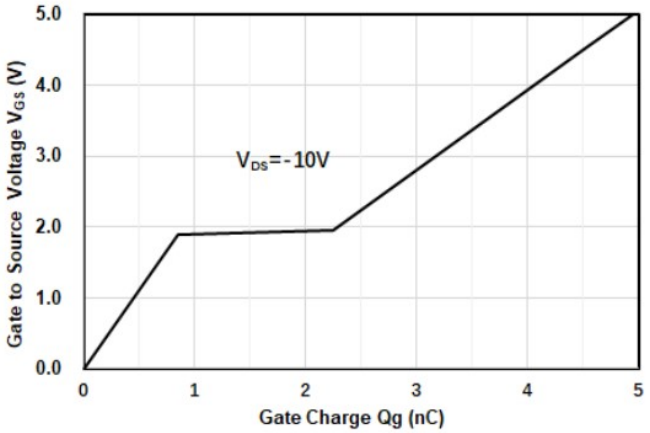


Figure 9: Safe Operation Area

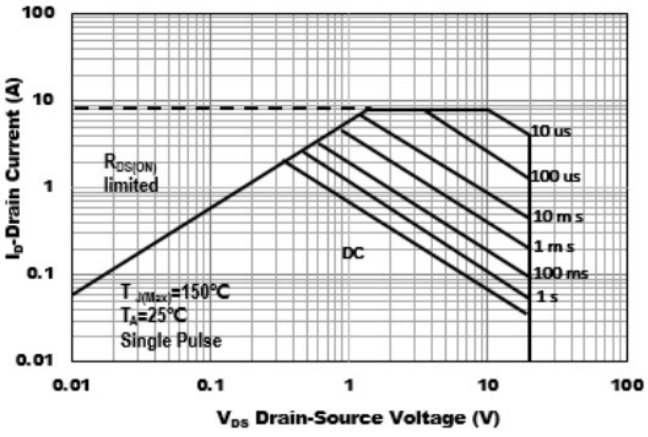


Figure 10: Drain Current vs Ambient temperature

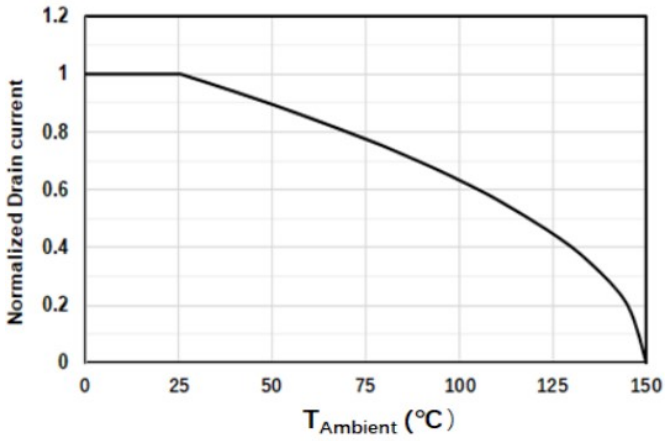
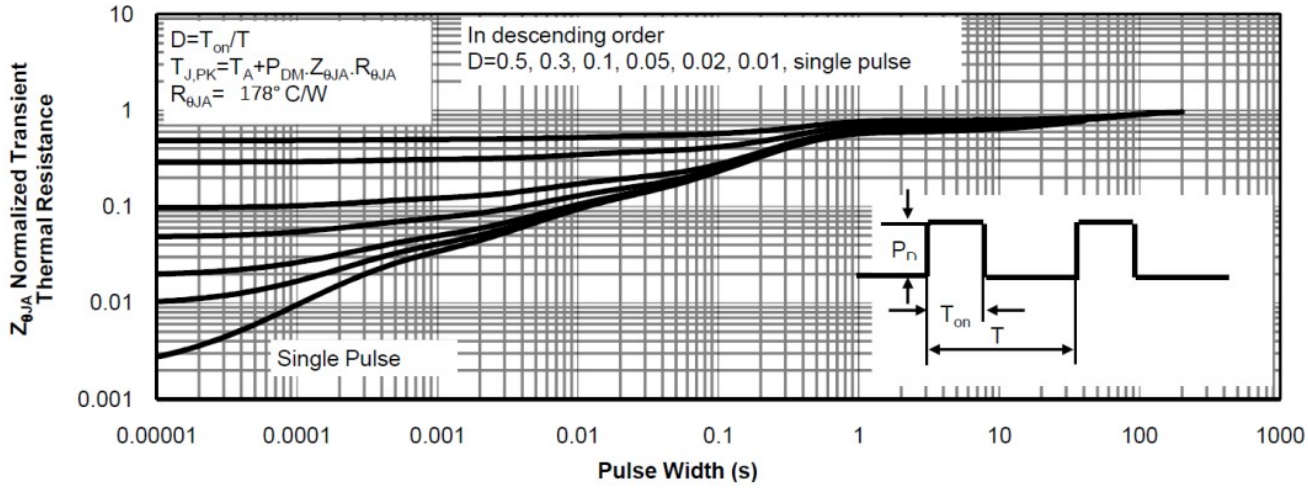
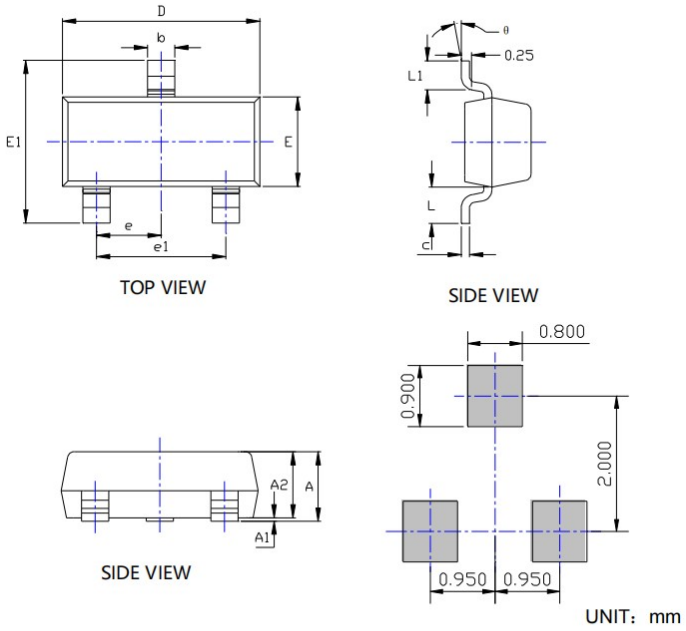


Figure 11: Normalized Maximum Transient Thermal Impedance



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	0.000	0.100		0.000	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	0.950REF			0.037REF	
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°

Note:

1. Package body sizes exclude mode flash and gate burrs.
2. Tolerance 0.1mm unless otherwise specified.
3. The pad layout is for reference purposes only.

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