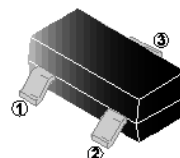


RoHS Compliant Product  
A suffix of "-C" specifies halogen & lead-free

## DESCRIPTION

S2N7002SW-C provides designers with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness. SOT-323 package is universally preferred for all commercial-industrial surface mount applications and suited for low voltage applications such as DC/DC converters.

## SOT-323



## FEATURES

- Halogen free products available
- ESD protected
- LOW  $R_{DS(on)}$

## APPLICATIONS

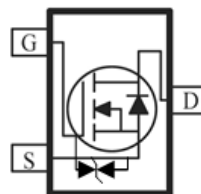
- Low side load switch
- Level shift circuits
- DC-DC converter
- Portable applications

## MARKING

701

## PACKAGE INFORMATION

Package	MPQ	Leader Size
SOT-323	3K	7 inch



## ORDER INFORMATION

Part Number	Type
S2N7002SW-C	Lead (Pb)-free and Halogen-free

## ABSOLUTE MAXIMUM RATINGS ( $T_A=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$I_D$	Steady state, $T_A=25^\circ\text{C}$	0.32
		Steady state, $T_A=85^\circ\text{C}$	0.23
		$t < 5\text{s}$ , $T_A=25^\circ\text{C}$	0.38
		$t < 5\text{s}$ , $T_A=85^\circ\text{C}$	0.27
Pulsed Drain Current @ $t_p=10\mu\text{s}$	$I_{DM}$	1.5	A
Source Current (Body diode)	$I_S$	0.3	A
Total Device Power Dissipation <sup>1</sup>	$P_D$	Steady state	300
		$t < 5\text{s}$	420
Thermal Resistance from Junction to Ambient <sup>1</sup>	$R_{\theta JA}$	Steady state	417
		$t < 5\text{s}$	300
Gate-Source ESD Rating (HBM, method 3015)	ESD	2	kV
Lead Temperature for Soldering Purposes @ 1/8" from case for 10s	$T_L$	260	$^\circ\text{C}$
Operating Junction and Storage Temperature	$T_J, T_{STG}$	-55~150	$^\circ\text{C}$

**ELECTRICAL CHARACTERISTICS** ( $T_J=25^\circ\text{C}$  unless otherwise specified)

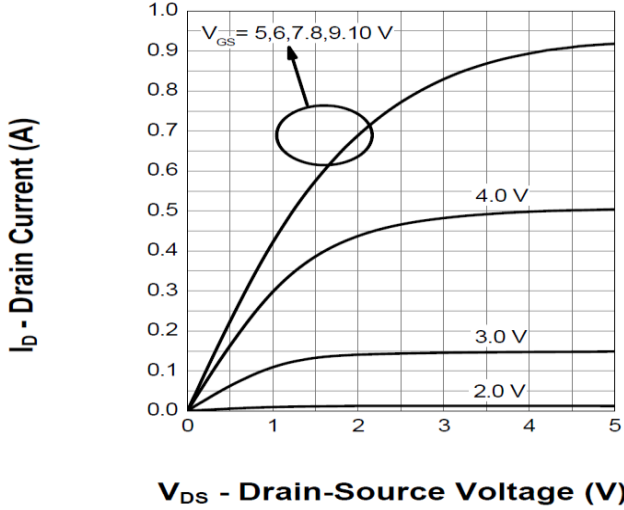
Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	60	-	-	V	$V_{GS}=0, I_D=250\mu\text{A}$
Drain-Source Breakdown Voltage Temperature Coefficient	$BV_{DSS}/T_J$	-	71	-	mV / $^\circ\text{C}$	
Gate-Source Leakage Current	$I_{GSS}$	-	-	$\pm 10$	$\mu\text{A}$	$V_{DS}=0, V_{GS}=\pm 20\text{V}$
Drain-Source Leakage Current	$I_{DSS}$	-	-	1	$\mu\text{A}$	$V_{DS}=60\text{V}, V_{GS}=0, T_J=25^\circ\text{C}$
		-	-	500		$V_{DS}=60\text{V}, V_{GS}=0, T_J=125^\circ\text{C}$
		-	-	0.1		$V_{DS}=50\text{V}, V_{GS}=0, T_J=25^\circ\text{C}$
<b>On Characteristics <sup>2</sup></b>						
Gate-Threshold Voltage	$V_{GS(th)}$	1	-	2	V	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$
Negative Threshold Voltage Temperature Coefficient	$V_{GS(th)}/T_J$	-	4	-	mV / $^\circ\text{C}$	
Forward Transconductance	$g_{fs}$	0.08	-	-	S	$V_{DS}=5\text{V}, I_D=0.2\text{A}$
Static Drain-Source On-Resistance <sup>3</sup>	$R_{DS(ON)}$	-	-	2.8	$\Omega$	$V_{GS}=10\text{V}, I_D=500\text{mA}$
		-	-	3.2		$V_{GS}=4.5\text{V}, I_D=200\text{mA}$
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	-	35	-	pF	$V_{DS}=25\text{V}$ $V_{GS}=0$ $f=1\text{MHz}$
Output Capacitance	$C_{oss}$	-	11	-		
Reverse Transfer Capacitance	$C_{rss}$	-	1	-		
Total Gate Charge	$Q_g$	-	0.675	-	nC	$V_{DS}=10\text{V}$ $V_{GS}=4.5\text{V}$ $I_D=0.5\text{A}$
Gate-Source Charge	$Q_{gs}$	-	0.49	-		
Gate-Drain Charge	$Q_{gd}$	-	0.14	-		
<b>Switching Characteristics</b>						
Turn-on Delay Time	$T_{d(on)}$	-	4.3	-	nS	$V_{DD}=30\text{V}$ $V_{GEN}=10\text{V}$ $R_G=25\Omega$ $R_L=60\Omega$ $I_D=0.5\text{A}$
Rise Time	$T_r$	-	3.6	-		
Turn-off Delay Time	$T_{d(off)}$	-	17.2	-		
Fall Time	$T_f$	-	27.3	-		
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage	$V_{SD}$	-	0.85	-	V	$I_S=0.5\text{A}, V_{GS}=0$

Notes:

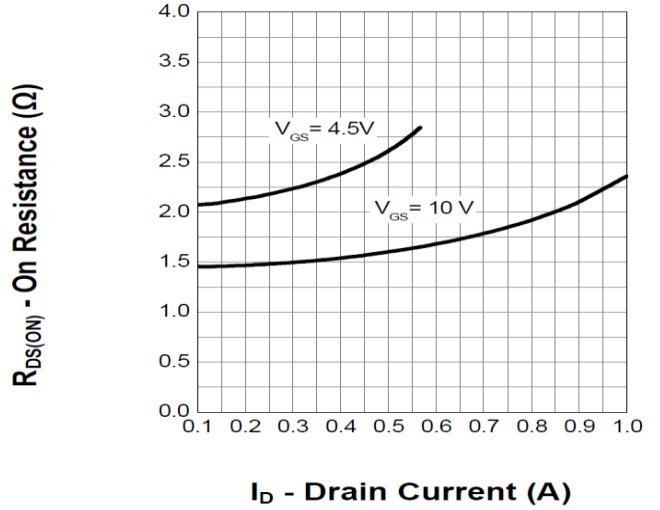
- FR-4 board is  $1 \times 0.75 \times 0.062$  inch.
- Pulse Test: Pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .

**CHARACTERISTIC CURVES**

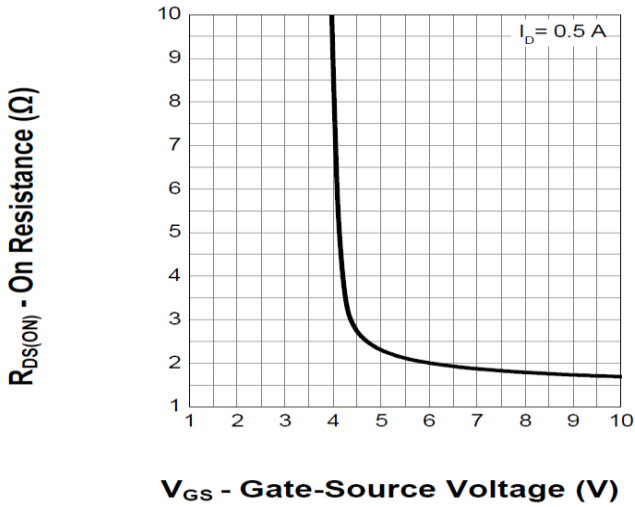
**Output Characteristics**



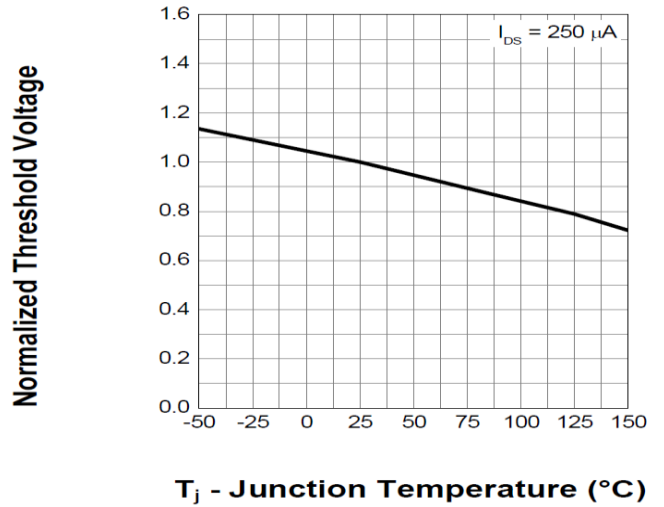
**Drain-Source On Resistance**



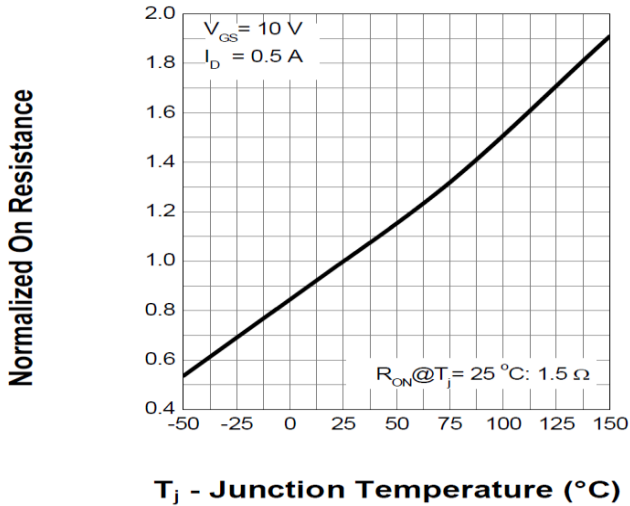
**Transfer Characteristics**



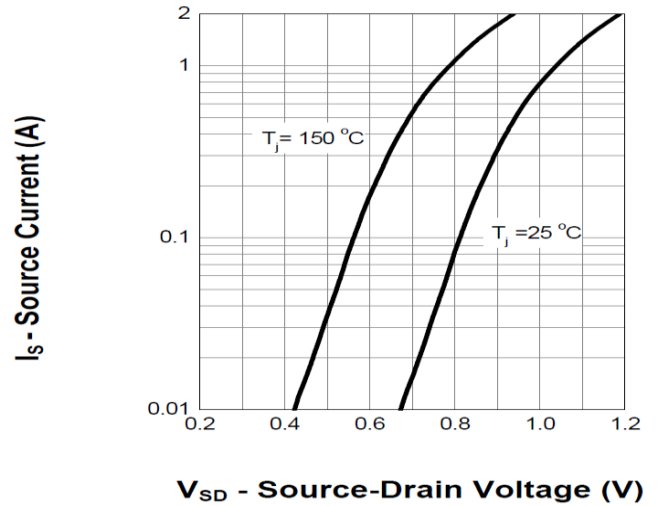
**Gate Threshold Voltage**



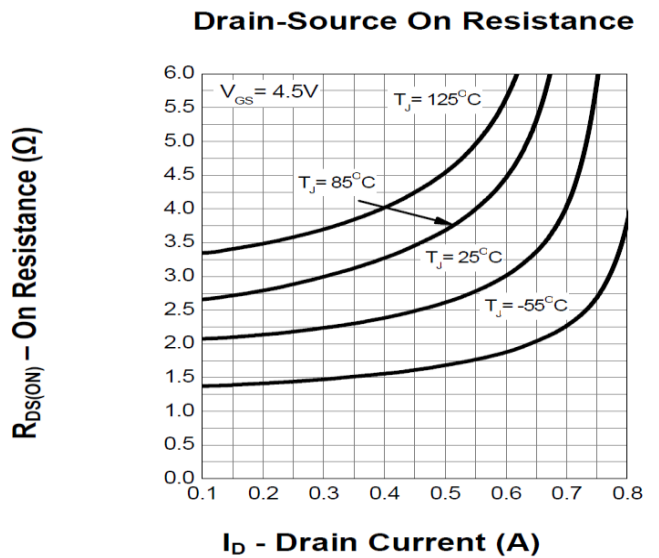
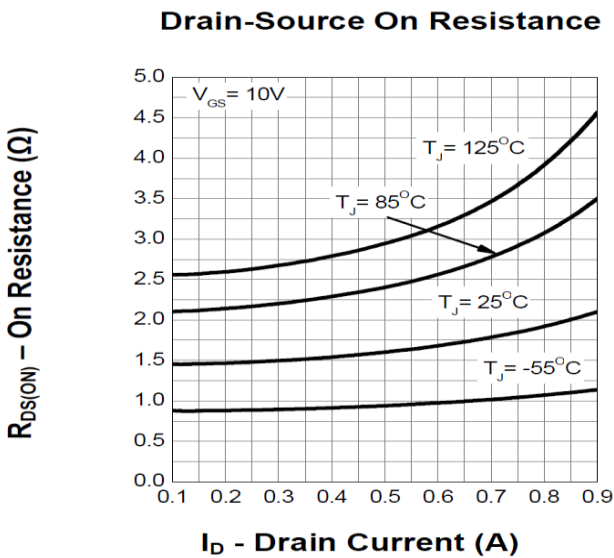
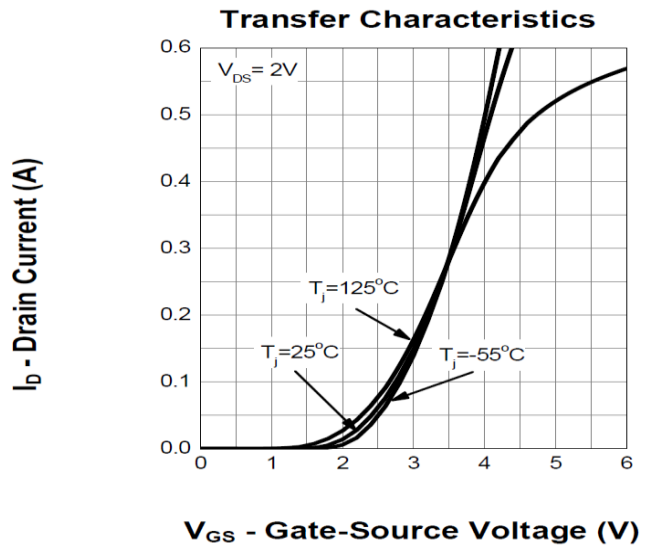
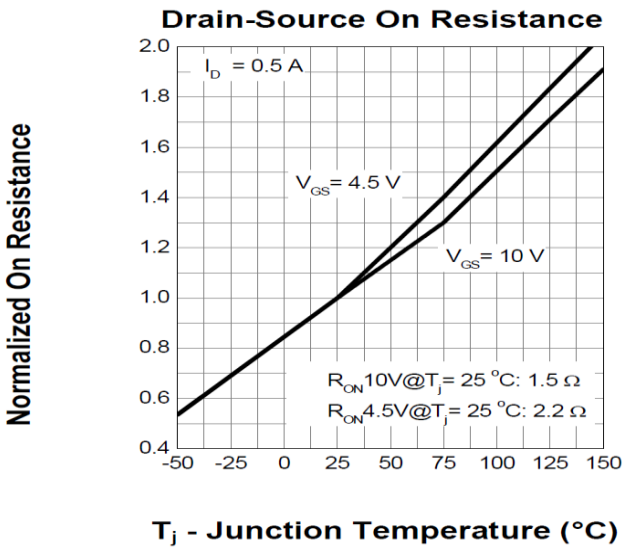
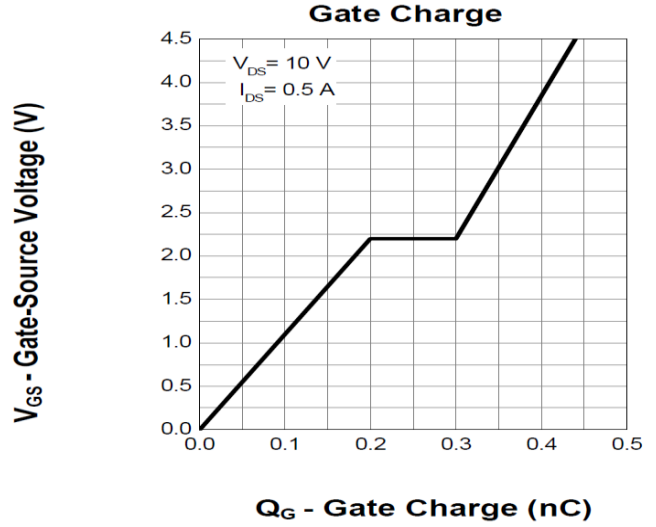
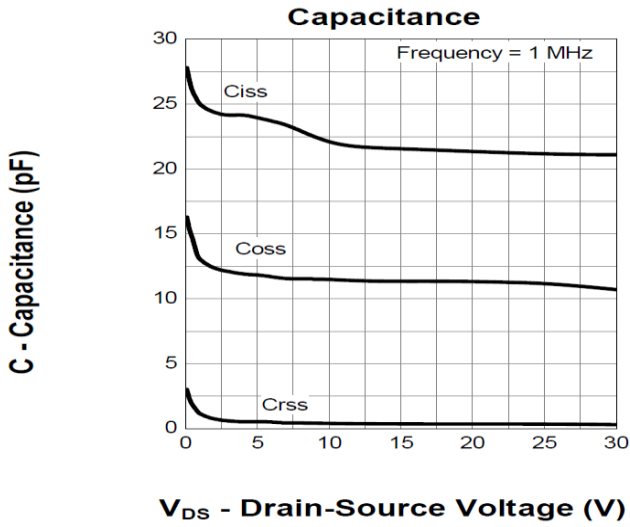
**Drain-Source On Resistance**



**Source-Drain Diode Forward**

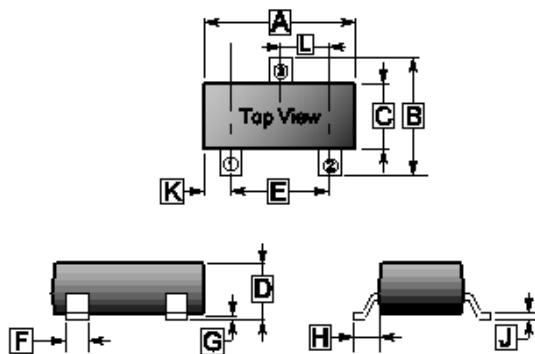


**CHARACTERISTIC CURVES**



**PACKAGE OUTLINE DIMENSIONS**

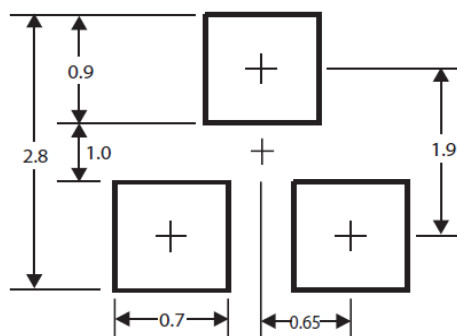
**SOT-323**



REF.	Millimeter	
	Min.	Max.
A	1.80	2.20
B	1.80	2.55
C	1.10	1.40
D	0.80	1.15
E	1.20	2.00
F	0.15	0.50
G	0.10 REF.	
H	0.525 REF.	
J	0.05	0.25
K	0.35 REF.	
L	0.65 TYP.	

**MOUNTING PAD LAYOUT**

**SOT-323**



\*Dimensions in millimeters