

## General Description

The WST2N7002K is the highest performance trench N-Ch MOSFET with extreme high cell density, which provide excellent RDSON and gate charge for most of the small power switching and load switch applications.

The WST2N7002K meet the RoHS and Green Product requirement with full function reliability approved.

## Features

- High-speed switching
- Green Device Available
- ESD Protected:2KV

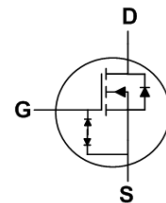
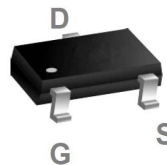
## Product Summary

BVDSS	RDSON	ID
60V	1Ω	300mA

## Applications

- High Frequency Point-of-Load Synchronous Buck Converter for MB/NB/UMPC
- Networking DC-DC Power System
- Load Switch

## SOT-23N Pin Configuration



## Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	60	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D@T_A=25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	300	mA
$I_D@T_A=70^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	150	mA
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	1.2	A
$P_D@T_A=25^\circ\text{C}$	Total Power Dissipation <sup>3</sup>	0.2	W
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

## Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient <sup>1</sup>	---	625	$^\circ\text{C/W}$

**Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	60	---	---	V
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	BV <sub>DSS</sub> Temperature Coefficient	Reference to 25°C, I <sub>D</sub> =1mA	---	0.05	---	V/°C
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =0.5A	---	1	3	Ω
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =0.2A	---	4	5	
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	1	---	2.5	V
ΔV <sub>GS(th)</sub>	V <sub>GS(th)</sub> Temperature Coefficient		---	-3.7	---	mV/°C
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	1	uA
		V <sub>DS</sub> =60V, V <sub>GS</sub> =0V, T <sub>J</sub> =55°C	---	---	5	
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	---	---	±10	uA
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =0.3A	---	300	---	mS
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> =30V, V <sub>GS</sub> =10V, R <sub>G</sub> =3.3Ω, I <sub>D</sub> =0.5A	---	15	6	ns
T <sub>r</sub>	Rise Time		---	35	3.3	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	35	16	
T <sub>f</sub>	Fall Time		---	35	13.6	
C <sub>iSS</sub>	Input Capacitance	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz	---	32	56	pF
C <sub>oss</sub>	Output Capacitance		---	7	17	
C <sub>rSS</sub>	Reverse Transfer Capacitance		---	3	10.6	

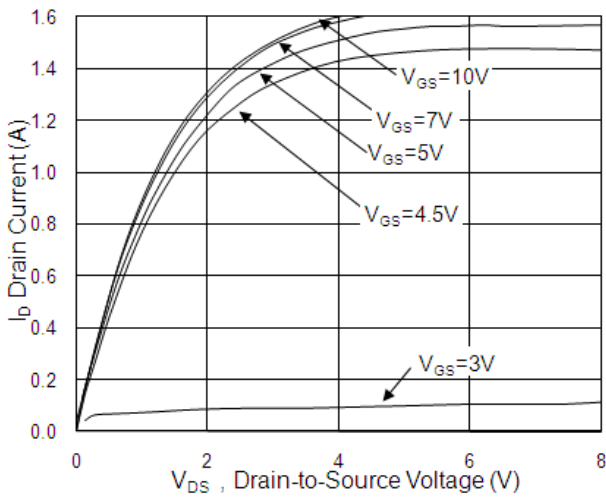
**Diode Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current <sup>1,4</sup>	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	---	---	300	mA
I <sub>SM</sub>	Pulsed Source Current <sup>2,4</sup>		---	---	1.2	A
V <sub>SD</sub>	Diode Forward Voltage <sup>2</sup>	V <sub>GS</sub> =0V, I <sub>S</sub> =1A, T <sub>J</sub> =25°C	---	---	1	V

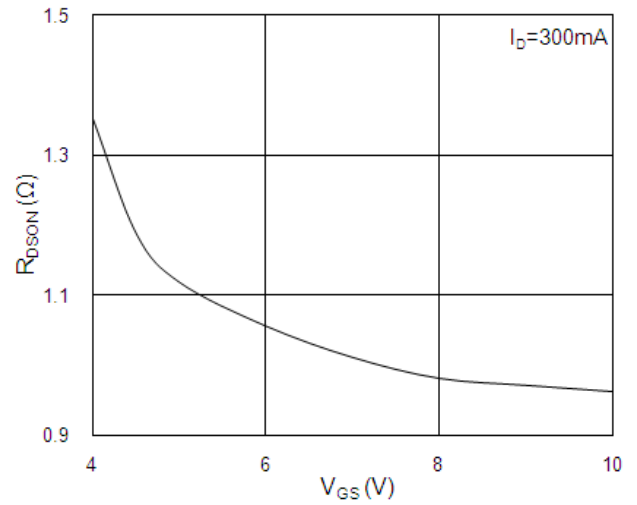
Note :

- 1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- 2.The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%
- 3.The power dissipation is limited by 150°C junction temperature.
- 4.The data is theoretically the same as I<sub>D</sub> and I<sub>DM</sub>, in real applications, should be limited by total power dissipation.

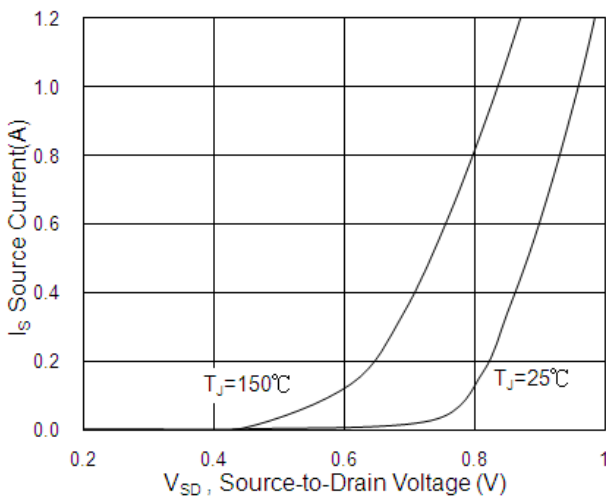
**Typical Characteristics**



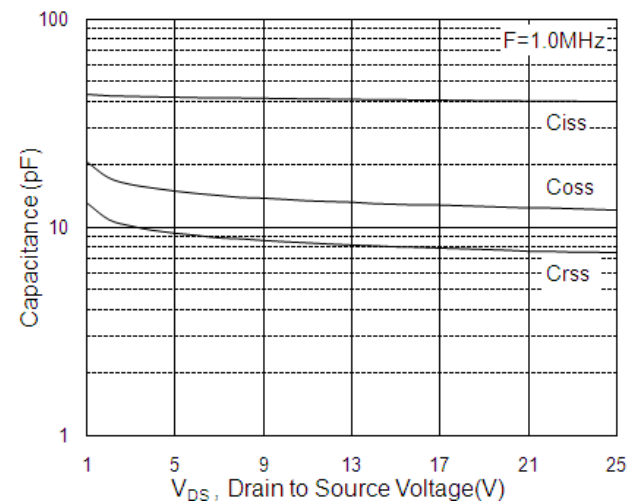
**Fig.1 Typical Output Characteristics**



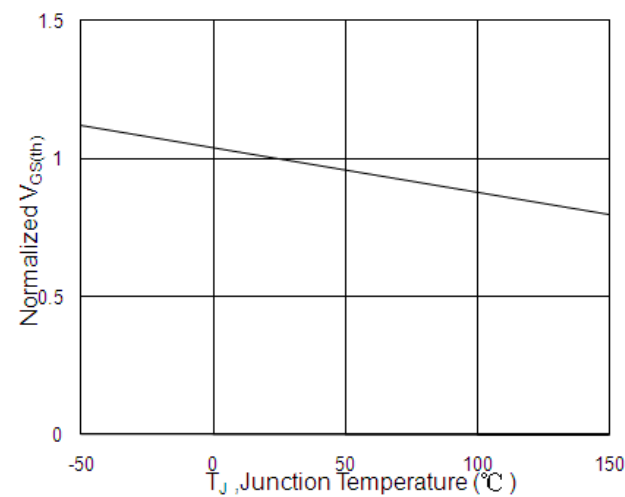
**Fig.2 On-Resistance vs. Gate-Source Voltage**



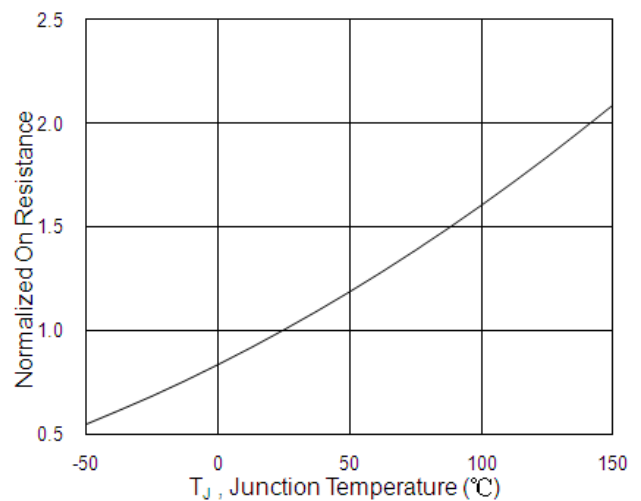
**Fig.3 Forward Characteristics of Reverse**



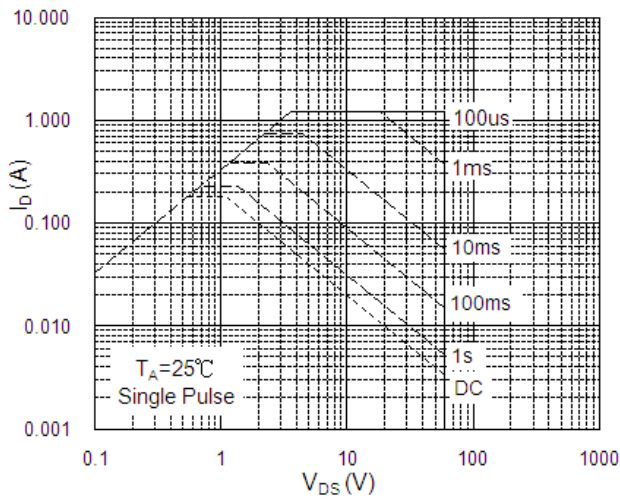
**Fig.4 Capacitance**



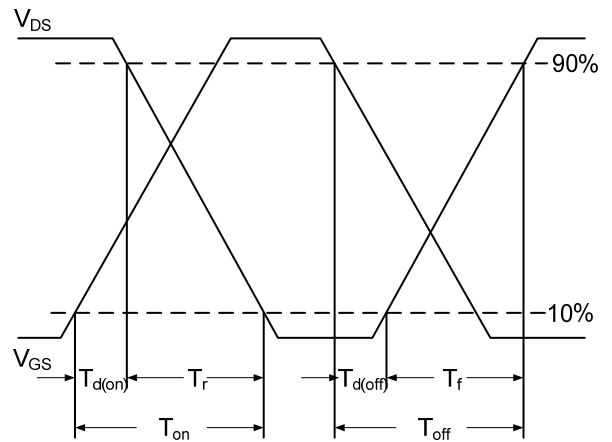
**Fig.5 Normalized  $V_{GS(th)}$  vs.  $T_J$**



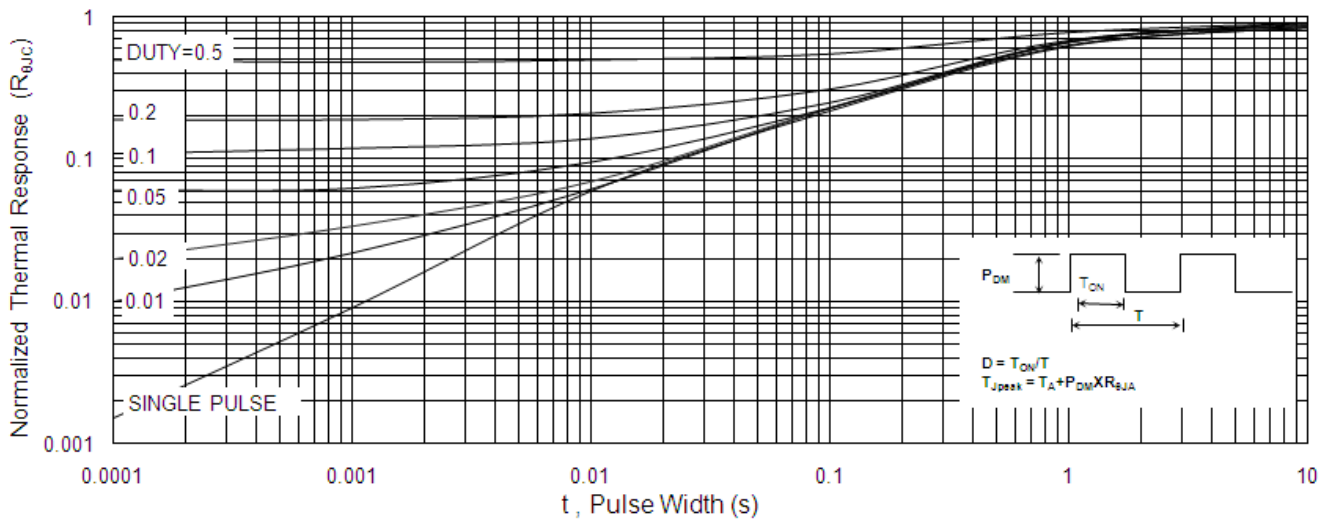
**Fig.6 Normalized  $R_{DS(on)}$  vs.  $T_J$**



**Fig.8 Safe Operating Area**



**Fig.10 Switching Time Waveform**



**Fig.9 Normalized Maximum Transient Thermal Impedance**



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