



WANSEMI
万尚半导体

WX021N04S3

Enhancement Mode N-Channel Power MOSFET

SOT23-3/NMOS/40V/±20V/1.5V/7A/21mΩ

Rev0.1



40V, 21mΩ, 7A, Single N-Channel

1. Features

- ◆ 40V MOSFET technology
- ◆ Low on-state resistance
- ◆ Fast switching
- ◆ $V_{GS} \pm 20V$

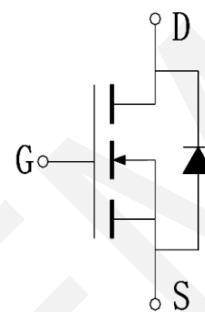
V_{DS}	$R_{DS(on)}$ Typ.	I_D Max.
40V	21mΩ @ 10V	7A
	25mΩ @ 4.5V	

2. Applications

- ◆ Power Switching Application
- ◆ Load Switching



SOT23-3
Pin Description



Schematic Diagram

3. Package Marking and Ordering Information

Part no.	Marking	Package	PCS/Reel	PCS/CTN.
WX021N04S3	021N04	SOT23-3	3,000	180,000

4. Absolute Max Ratings at $T_a=25^\circ C$ (Note1)

Parameter	Symbol	Maximum	Units
Drain to Source Voltage	V_{DSS}	40	V
Gate to Source Voltage	V_{GSS}	± 20	V
Drain Current (DC)	I_D	7	A
Drain Current (Pulse), $PW \leq 300\mu s$	I_{DP}	28	A
Total Dissipation	P_D	2.0	W
Junction Temperature	T_j	150	°C
Storage Temperature	T_{stg}	-55 to +150	°C

Note 1: Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

**5.Thermal Resistance Ratings (Note 2)**

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	48	°C/W

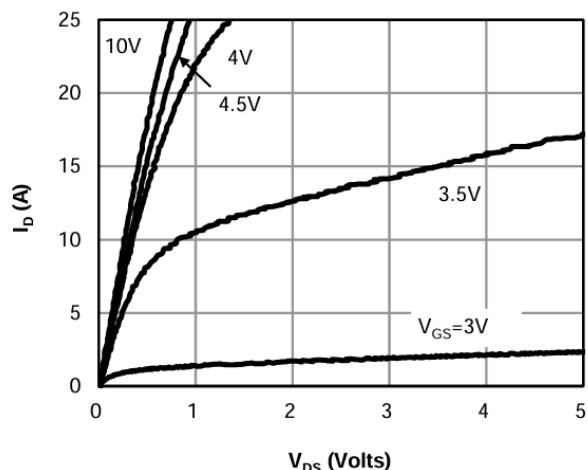
Note 2: When mounted on 1 inch square copper board $t \leq 10\text{sec}$ The value in any given application depends on the user's specific board design.

6.Electrical Characteristics at $T_a=25^\circ\text{C}$ (Note 3)

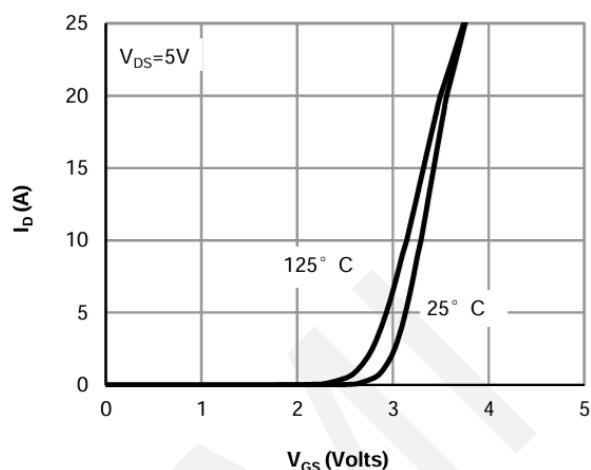
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D = 250\mu\text{A}, V_{GS} = 0\text{V}$	40	-	-	V
Zero-Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 40\text{V}, V_{GS} = 0\text{V}$	-	-	1	μA
Gate to Source Leakage Current	I_{GS}	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_{DS}=250\mu\text{A}$	1.0	1.5	2.5	V
Static Drain to Source On-State Resistance	$R_{DS(on)}$	$I_D = 5\text{A}, V_{GS} = 10\text{V}$	-	21	28	$\text{m}\Omega$
		$I_D = 3\text{A}, V_{GS} = 4.5\text{V}$	-	25	35	$\text{m}\Omega$
Input Capacitance	C_{iss}	$V_{GS}=0\text{V}, V_{DS}=20\text{V},$ Frequency=1.0MHz	-	520	-	pF
Output Capacitance	C_{oss}		-	65	-	pF
Reverse Transfer Capacitance	C_{rss}		-	32	-	pF
Turn-ON Delay Time	$t_{d(on)}$	$V_{DS} = 20\text{V}, R_L = 3.3\Omega$ $V_{GS} = 10\text{V}, R_G = 3\Omega$	-	5.5	-	ns
Rise Time	t_r		-	2.5	-	ns
Turn-OFF Delay Time	$t_{d(off)}$		-	20.5	-	ns
Fall Time	t_f		-	7	-	ns
Total Gate Charge	Q_g	$V_{DS} = 20\text{V}, V_{GS} = 10\text{V},$ $I_D = 6\text{A}$	-	9	-	nC
	Q_{gs}		-	2	-	nC
	Q_{gd}		-	1.5	-	nC
Diode Forward Voltage	V_{FSD}	$I_S = 5\text{A}, V_{GS} = 0$	0.5	-	1.2	V

Note 3: Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

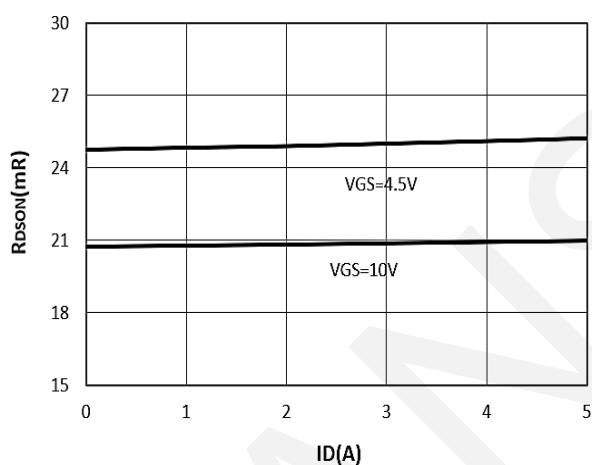
7.Typical Electrical and Thermal Characteristics



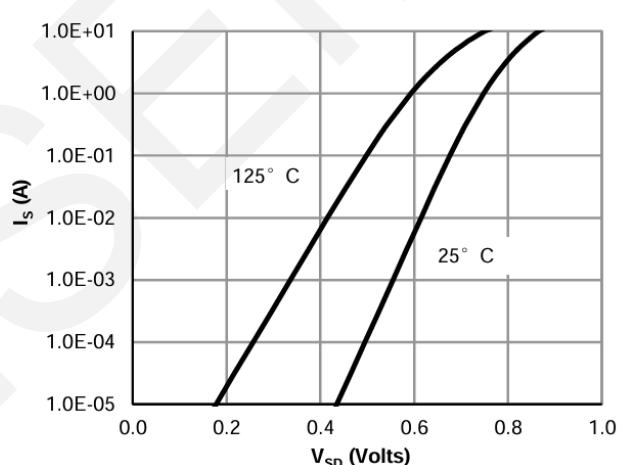
Output Characteristics



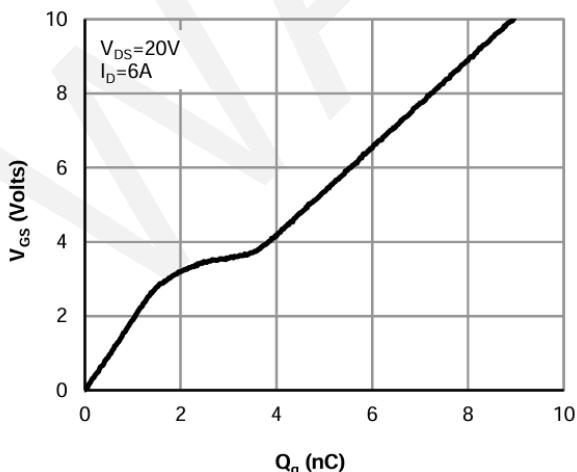
Typical Transfer Characteristics



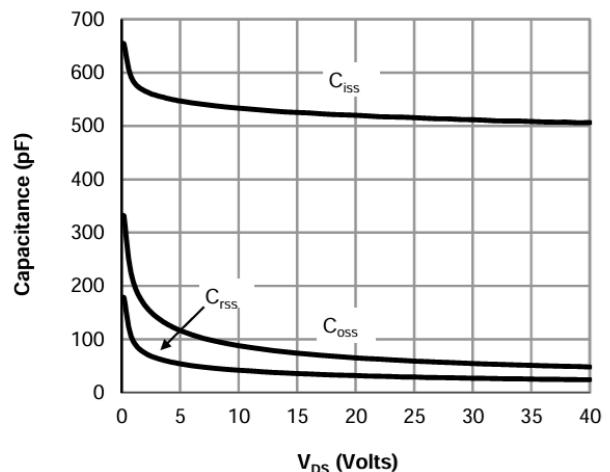
On-resistance vs. Drain Current



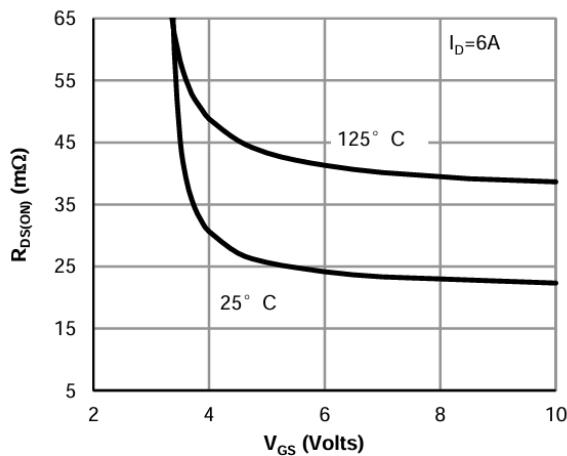
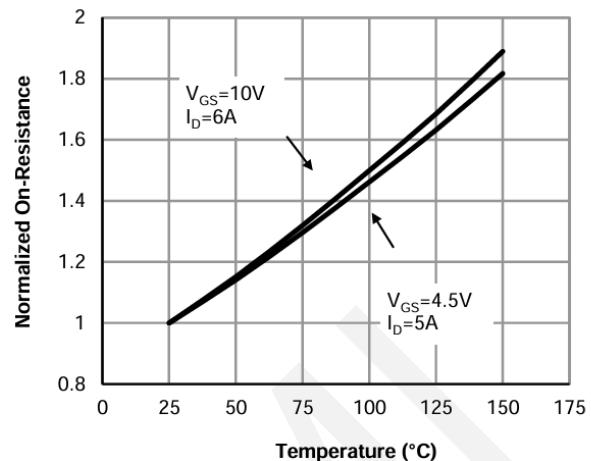
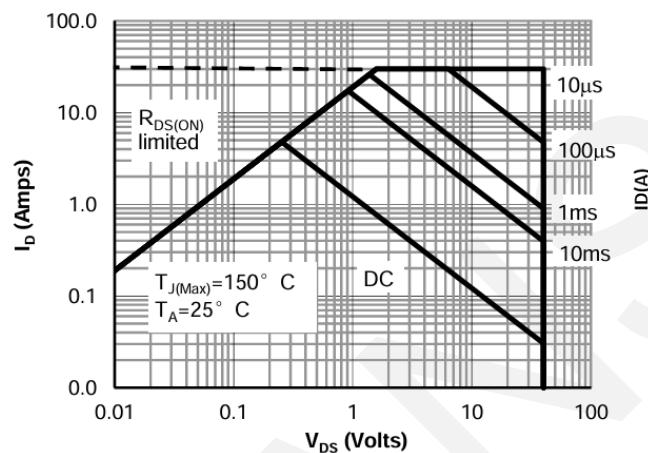
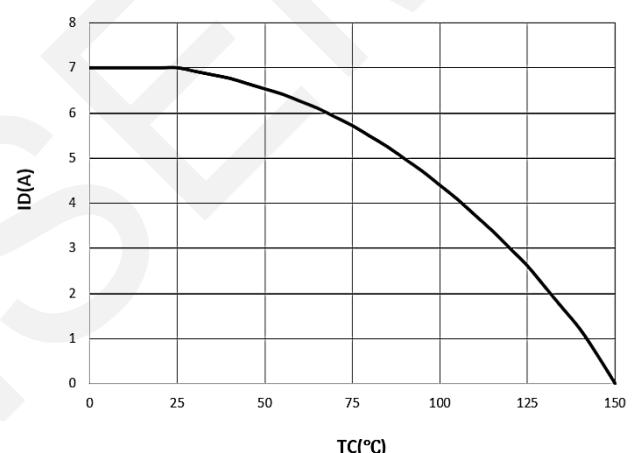
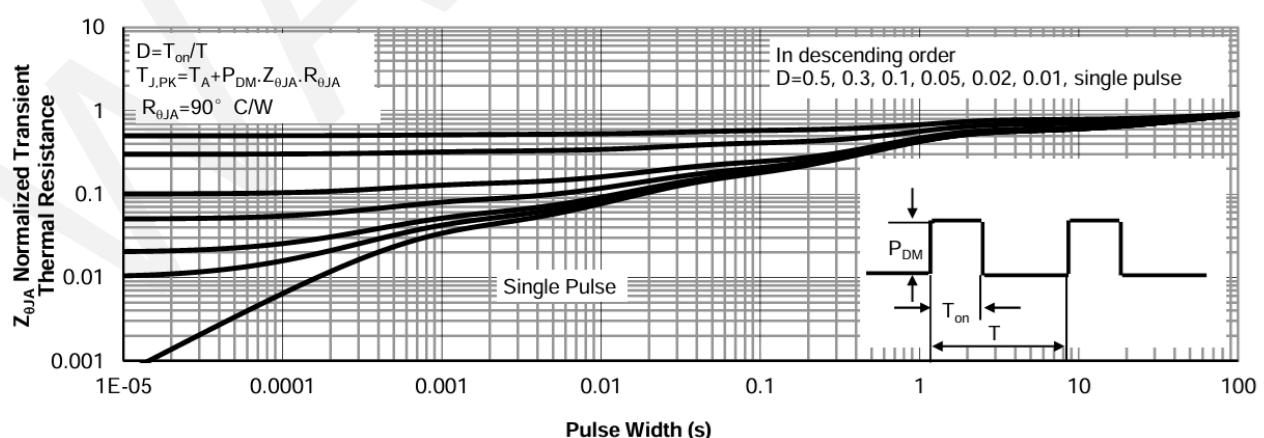
Body Diode Characteristics



Gate Charge Characteristics

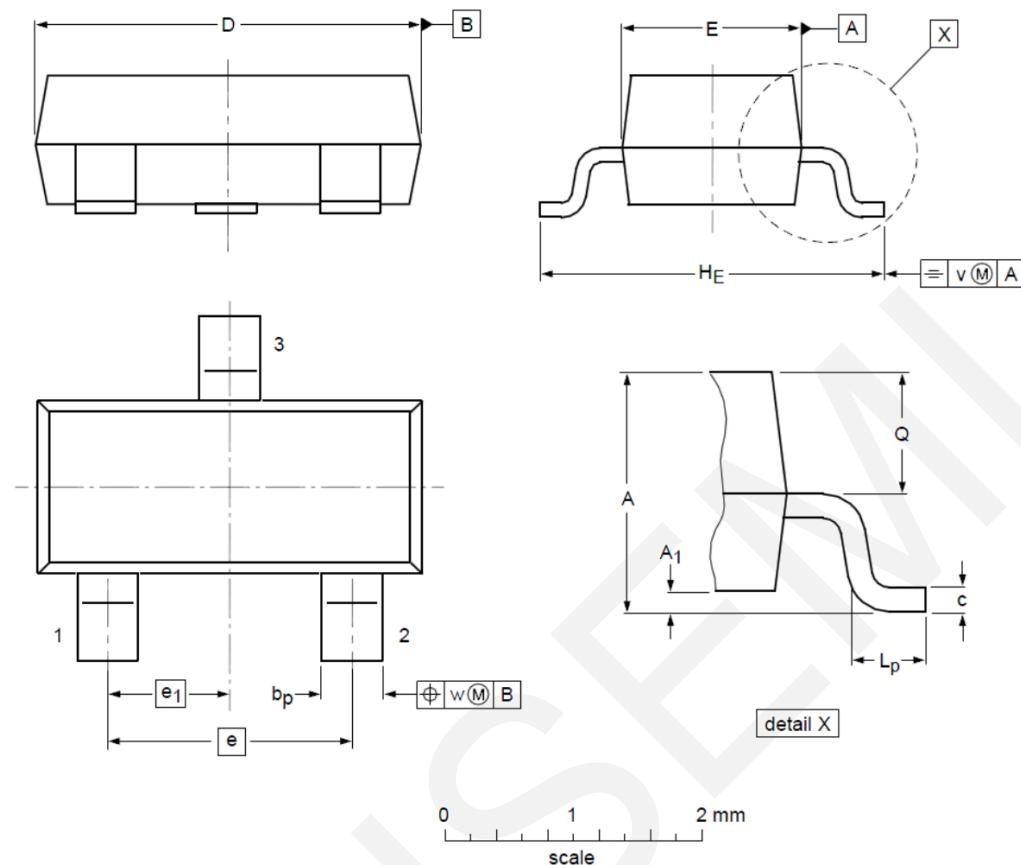


Capacitance Characteristics


RDS(ON) vs. VGS

Normalized on Resistance vs. Junction Temperature

Maximum Safe Operating Area

Maximum Continuous Drain Current vs. Case Temperature

Maximum Effective Transient
Thermal Impedance, Junction-to-Case



8.Package Dimensions



DIMENSIONS (unit : mm)

Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	1.00	1.17	1.30	A₁	0.01	0.05	0.10
b_p	0.35	0.39	0.50	c	0.10	0.20	0.26
D	2.70	2.90	3.10	E	1.30	1.58	1.70
e	--	1.90	--	e₁	--	0.95	--
H_E	2.50	2.78	3.00	L_p	0.20	0.32	0.60
Q	0.23	0.27	0.33	v	--	0.20	--
w	--	0.20	--				

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