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WX020N04KF

# Enhancement Mode N-Channel Power MOSFET

TO-263/NMOS/40V/±20V/1.5V/200A/2.0mΩ

Rev0.1

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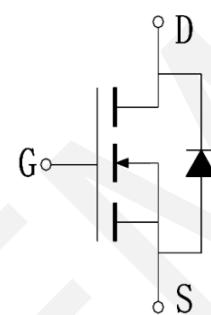


## 40V, 2.0mΩ, 200A, N-Channel Enhancement MOSFET

### 1. Features

- ◆ 40V MOSFET technology
- ◆ Low on-state resistance
- ◆ Fast switching
- ◆  $V_{GS} \pm 20V$
- ◆ 100% RG Tested
- ◆ 100% UIS Tested

$V_{DS}$	$R_{DS(on)}$ Typ.	$I_D$ Max.
40V	2.0mΩ @ 10V	200A
	2.7mΩ @ 4.5V	



Schematic Diagram



Pin Description

### 3. Package Marking and Ordering Information

Part no.	Marking	Package	PCS/Reel	PCS/CTN.
WX020N04KF	020N04	TO-263	800	4,800

### 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	$V_{GSS}$	$\pm 20$	V
Drain Current (DC)	$I_D$	200	A
Drain Current (Pulse), $PW \leq 300\mu s$	$I_{DP}$	800	A
Total Dissipation	$P_D$	66	W
Avalanche Energy, Single Pulsed	$E_{AS}$	126	mJ
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

Parameter	Symbol	Value	Unit
Junction to Case	$R_{\theta JC}$	1.6	°C/W

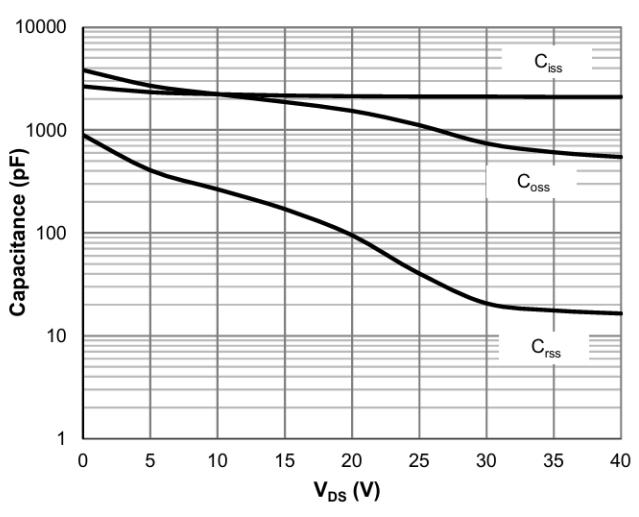
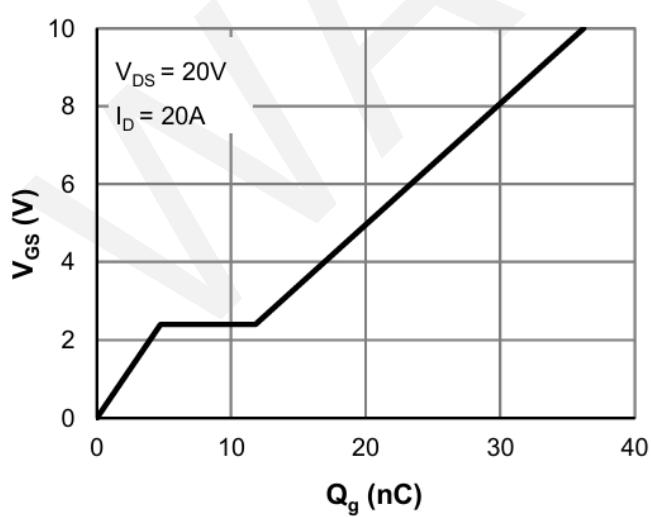
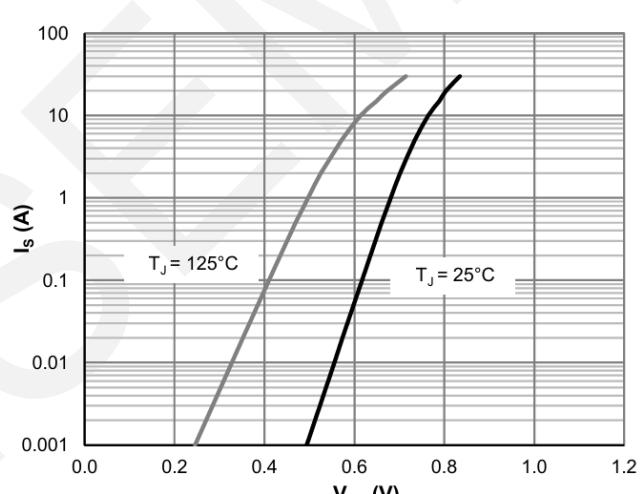
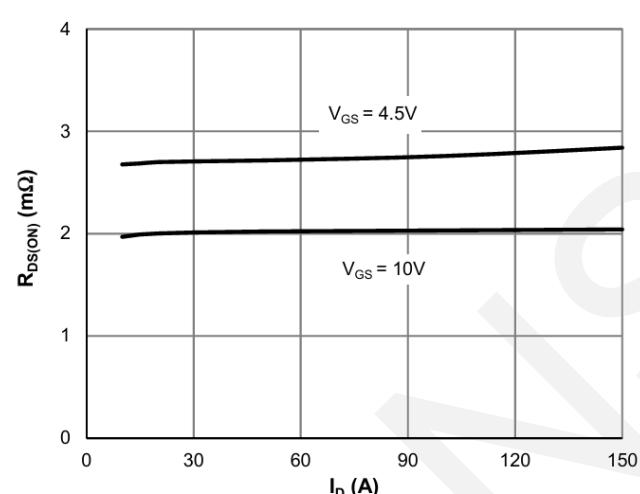
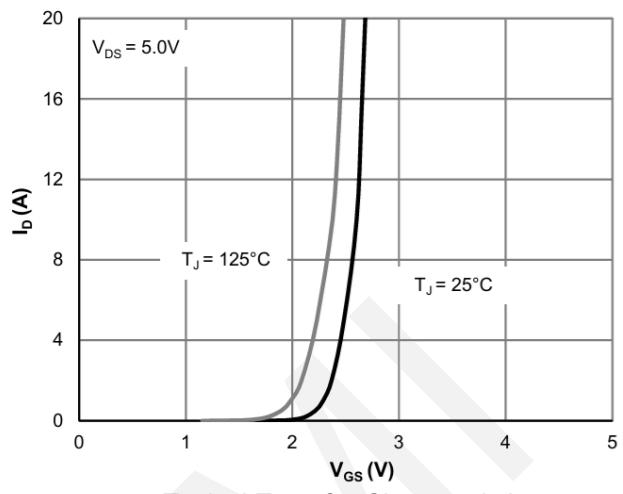
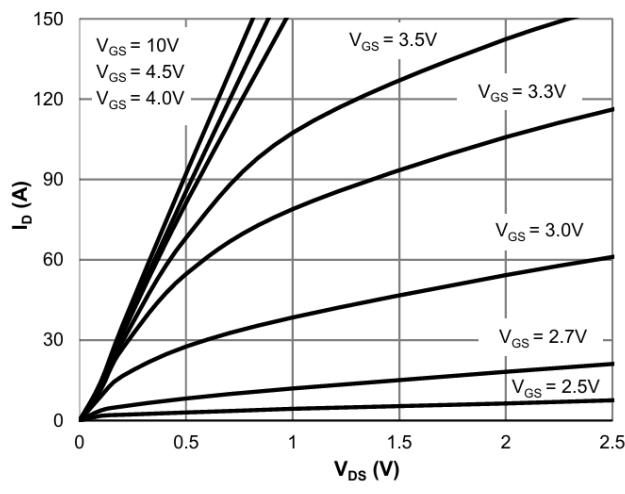
Note 2: When mounted on 1 inch square copper board  $t \leq 10\text{sec}$  The value in any given application depends on the user's specific board design.

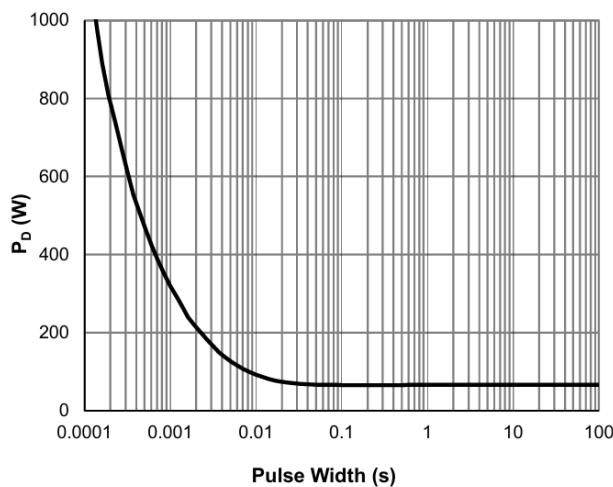
## 6.Electrical Characteristics at $T_a=25^\circ\text{C}$ (Note 3)

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	$\mu\text{A}$
Gate to Source Leakage Current	$I_{GSS}$	$V_{GS} = \pm 20\text{V}, V_{SS} = 0\text{V}$	-	-	$\pm 100$	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	$R_{DS(on)}$	$I_D = 20\text{A}, V_{GS} = 10\text{V}$	-	2.0	2.5	$\text{m}\Omega$
		$I_D = 15\text{A}, V_{GS} = 4.5\text{V}$		2.7	3.5	$\text{m}\Omega$
Input Capacitance	$C_{iss}$	$V_{GS}=0\text{V}, V_{DS}=20\text{V},$ Frequency=1.0MHz	-	2131	-	nF
Output Capacitance	$C_{oss}$		-	1538	-	pF
Reverse Transfer Capacitance	$C_{rss}$		-	95	-	pF
Turn-ON Delay Time	$t_{d(on)}$	$V_{DS} = 20\text{V}, R_L = 1.0\Omega$ $V_{GS} = 10\text{V}, R_G = 6\Omega$	-	5.5	-	ns
Rise Time	$t_r$		-	8.7	-	ns
Turn-OFF Delay Time	$t_{d(off)}$		-	31	-	ns
Fall Time	$t_f$		-	15.8	-	ns
Total Gate Charge	$Q_g$	$V_{DS} = 20\text{V},$ $V_{GS} = 0 \text{ to } 10\text{V},$ $I_D = 20\text{A}$	-	36	-	nC
	$Q_{gs}$		-	4.7	-	nC
	$Q_{gd}$		-	7.1	-	nC
Diode Forward Voltage	$V_{FSD}$	$I_S = 20\text{A}, V_{GS} = 0$	0.5	-	1.2	V

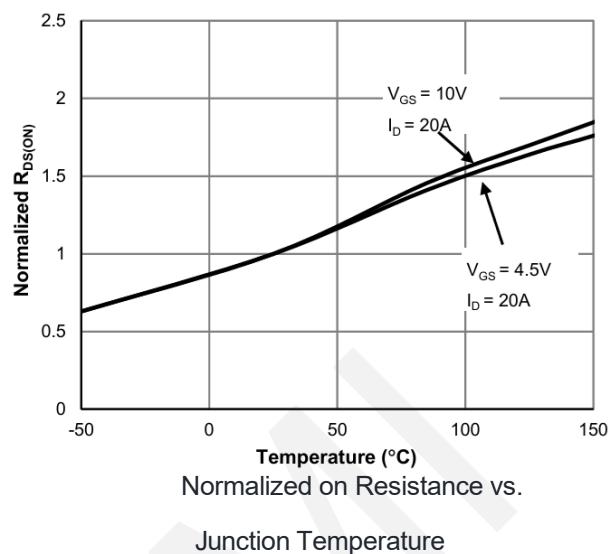
Note 3: Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

## 7.Typical electrical and thermal characteristics

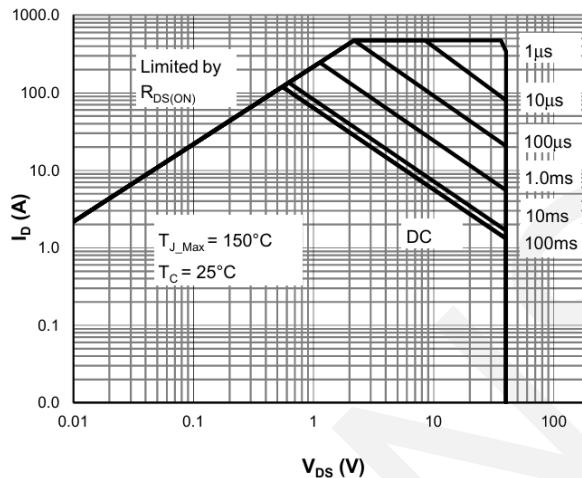




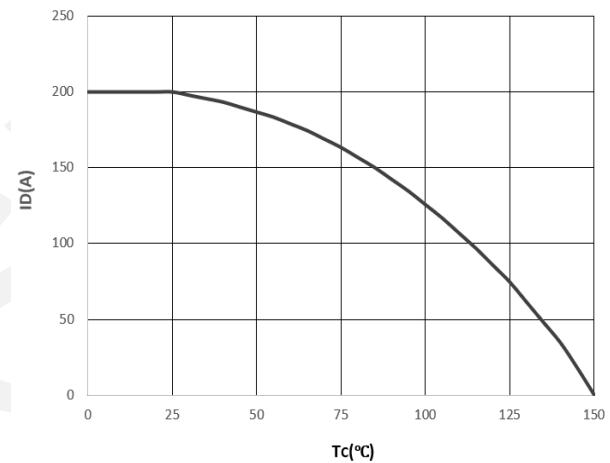
Single Pulse Power Rating, Junction-to-Case



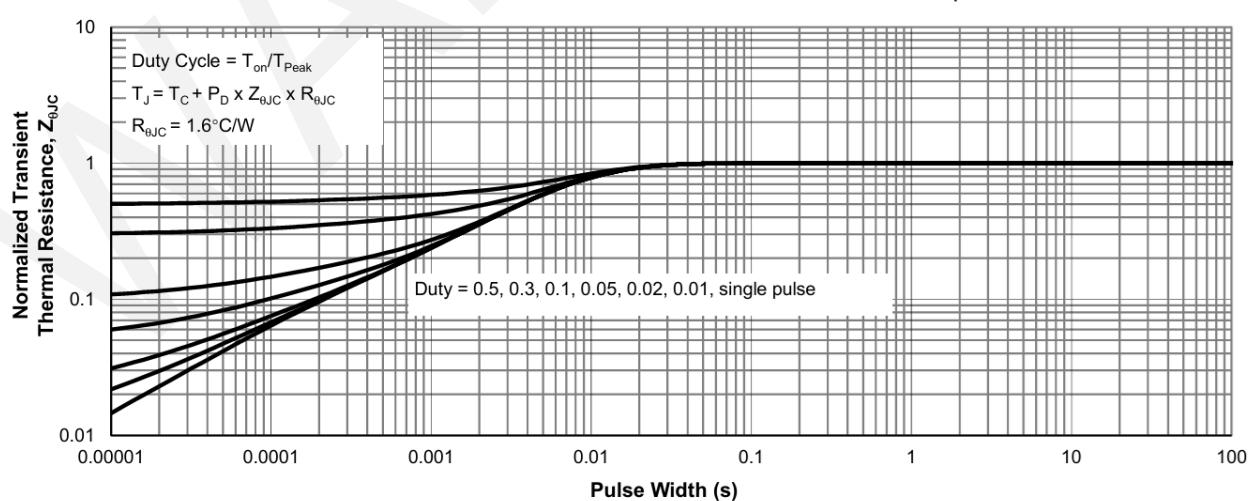
Normalized on Resistance vs. Junction Temperature



Maximum Safe Operating Area



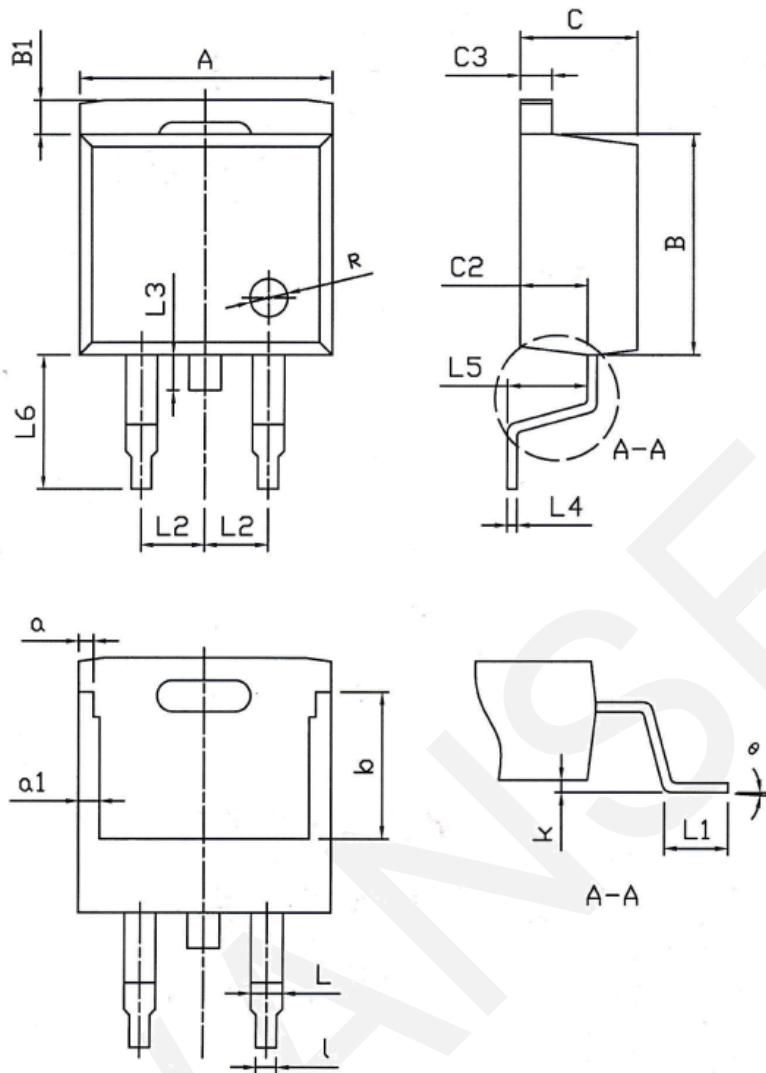
Maximum Continuous Drain Current vs. Case Temperature



Maximum Effective Transient Thermal Impedance, Junction-to-Case



## 8.Package Dimensions



Dimensions In Millimeters			
Symbol	MIN	TYP	MAX
A	10.00	10.20	10.40
B	8.50	8.70	8.90
B1	1.06	1.26	1.46
C	4.49	4.69	4.89
C2	2.54	2.69	2.84
C3	1.17	1.27	1.37
L	1.12	1.27	1.42
L1	2.34	2.54	2.74
L2	-	2.54	-
L3	1.20	1.40	1.60
L4	0.281	0.381	0.481
L5	2.54	2.79	3.04
L6	5.05	5.30	5.55
R	-	1.50	-
a	0.455	0.655	0.855
a1	0.70	0.90	1.10
b	5.648	5.798	5.948
k	0.00	-	0.25
l	0.70	0.81	0.96
θ	0°	-	9°

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