



WANSEMI
万芯半导体

WX060N02DP

Enhancement Mode N-Channel Power MOSFET

DFN3X3/NMOS/20V/ ± 12 V/0.75V/15A/6.0m Ω

Rev0.2

20V, 6.0mΩ, 15A, Dual N-Channel MOSFET

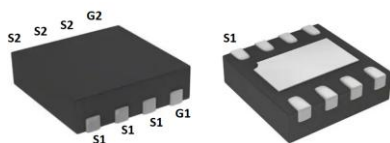
1.Features

- ◆ High Power and current handing capability
- ◆ Lead free product is acquired
- ◆ Surface Mount Package
- ◆ 100% RG Tested
- ◆ 100% UIS Tested

V _{DS} Typ.	R _{DS(on)} Typ.	I _D Max.
20V	6.0mΩ @ 4.5V	15A
	7.0mΩ @ 2.5V	

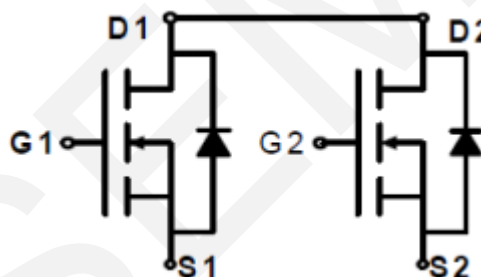
2.Applications

- ◆ Battery Protection
- ◆ Battery Powered Systems
- ◆ Power Management in Notebook Computer
- ◆ Portable Equipment



Pin Description

DFN3X3-8L



Schematic Diagram

3.Package Marking and Ordering Information

Part no.	Marking	Package	PCS/Reel	PCS/CTN.
WX060N02DP	060N02	DFN3x3	5,000	50,000

4.Absolute Max Ratings at Ta=25°C (Note1)

Parameter	Symbol	Maximum	Units
Drain to Source Voltage	V _{DSS}	20	V
Gate to Source Voltage	V _{GSS}	±12	V
Drain Current-Continuous	I _D	15	A
Drain Current (Pulse)	I _{DM}	60	A
Avalanche Energy, Single Pulsed	E _{AS}	29	mJ
Maximum Power Dissipation	P _D	1.5	W
Operating Junction and Storage Temperature Range	T _j , 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
Maximum Junction-to-Ambien	$R_{\theta JA}$	38	$^{\circ}\text{C/W}$

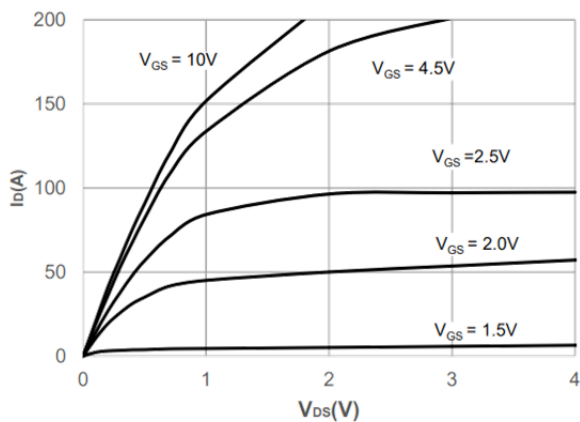
Note 2: When mounted on 1 inch square copper board $t \leq 10\text{sec}$ The value in any given application depends on the user's specific board design.

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

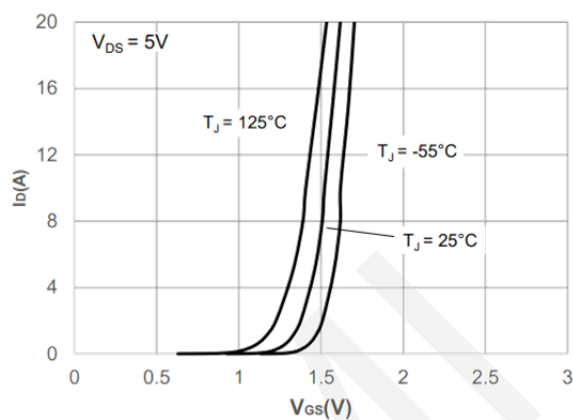
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D = 250\mu\text{A}, V_{GS} = 0\text{V}$	20	-	-	V
Zero-Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V}$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS} = \pm 12\text{V}, V_{DS} = 0\text{V}$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_{DS}=250\mu\text{A}$	0.5	0.75	1.2	V
Drain to Source On-State Resistance	$R_{DS(on)}$	$I_D = 8\text{A}, V_{GS} = 4.5\text{V}$	-	6.0	7.5	$\text{m}\Omega$
		$I_D = 6\text{A}, V_{GS} = 2.5\text{V}$	-	7.0	10	$\text{m}\Omega$
Input Capacitance	C_{iss}	$V_{GS}=0\text{V},$ $V_{DS}=10\text{V},$ Frequency=1.0MHz	-	1651	-	pF
Output Capacitance	C_{oss}		-	278	-	pF
Reverse Transfer Capacitance	C_{rss}		-	252	-	pF
Turn-ON Delay Time	$t_{d(on)}$	$V_{DS} = 10\text{V}, V_{GS} = 4.5\text{V},$ $R_{GEN} = 3\Omega, I_D = 6\text{A}$	-	6.4	-	ns
Turn-ON Rise Time	t_r		-	24.5	-	ns
Turn-OFF Delay Time	$t_{d(off)}$		-	260.4	-	ns
Turn-ON Fall Time	t_f		-	143	-	ns
Total Gate Charge	Q_g	$V_{DS} = 10\text{V},$ $V_{GS} = 4.5\text{V},$ $I_D = 6\text{A}$	-	25.2	-	nC
Gate-Source Charge	Q_{gs}		-	2.24	-	nC
Gate-Drain Charge	Q_{gd}		-	9.1	-	nC
Diode Forward Voltage	V_{SD}	$I_S = 8\text{A}, V_{GS} = 0\text{V}$	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.

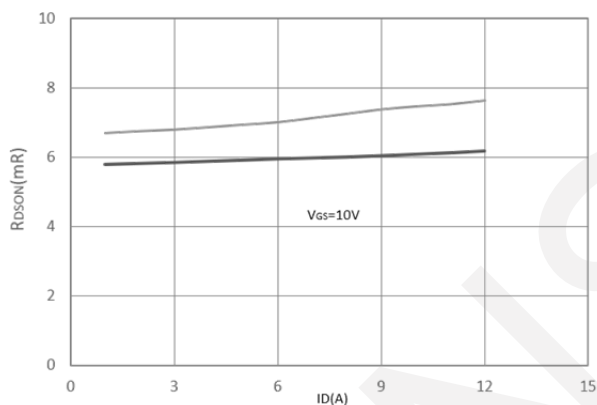
7. Typical electrical and thermal characteristics



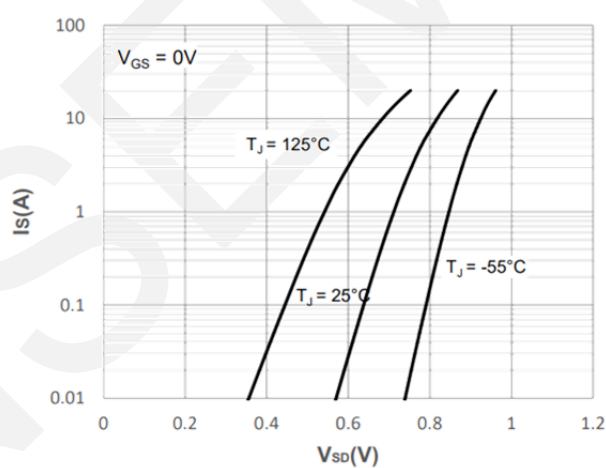
On-Region Characteristics



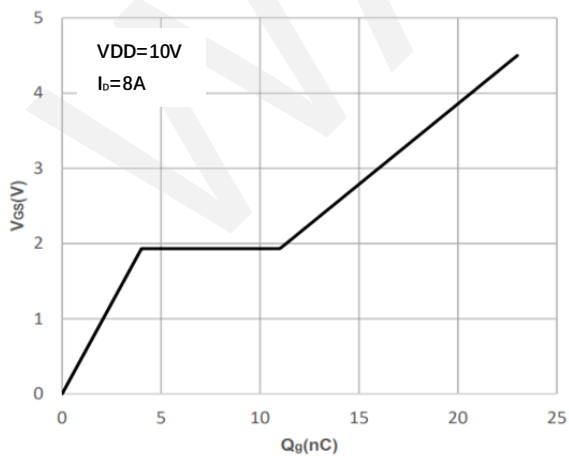
Transfer Characteristics



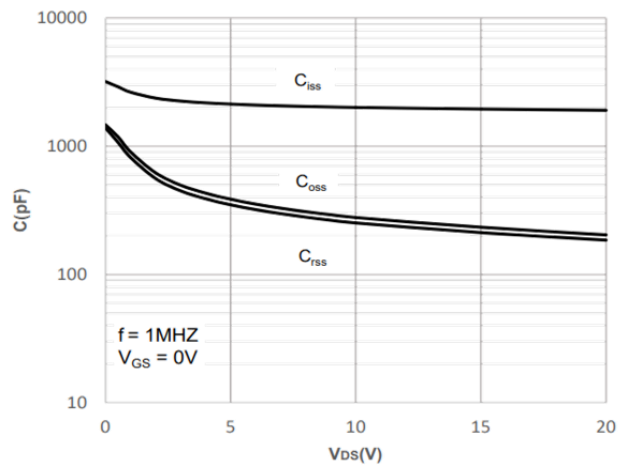
On-Resistance vs. Drain
Current and Gate Voltage



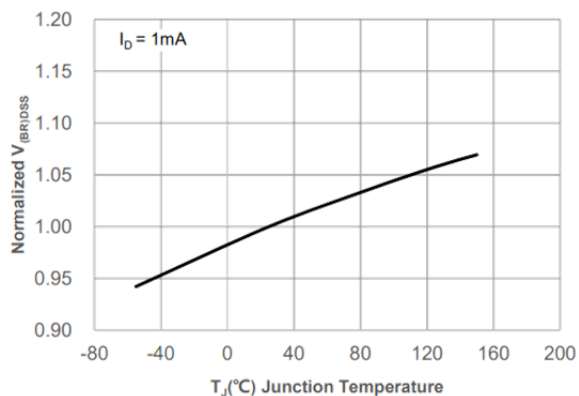
Body Diode Characteristics



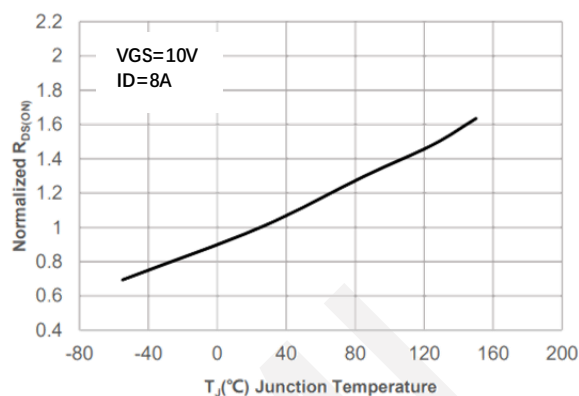
Gate Charge Characteristics



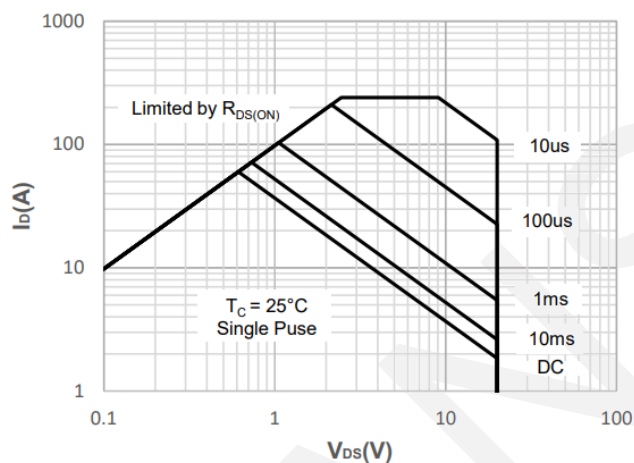
Capacitance Characteristics



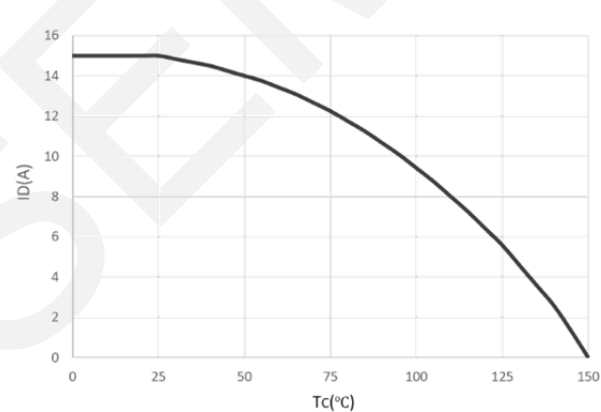
Normalized Breakdown Voltage vs.
Junction Temperature



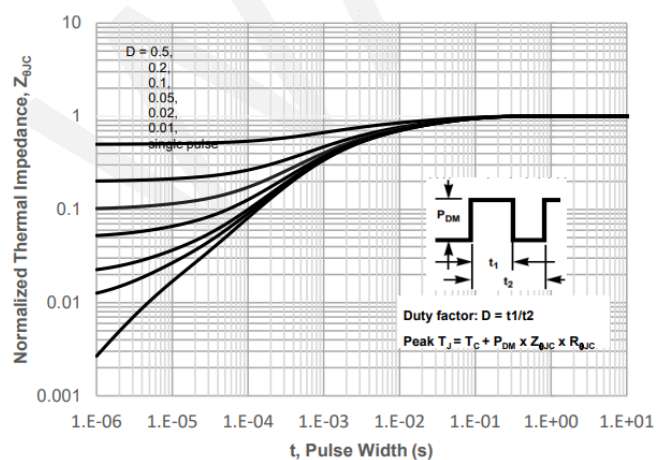
Normalized on Resistance vs.
Junction Temperature



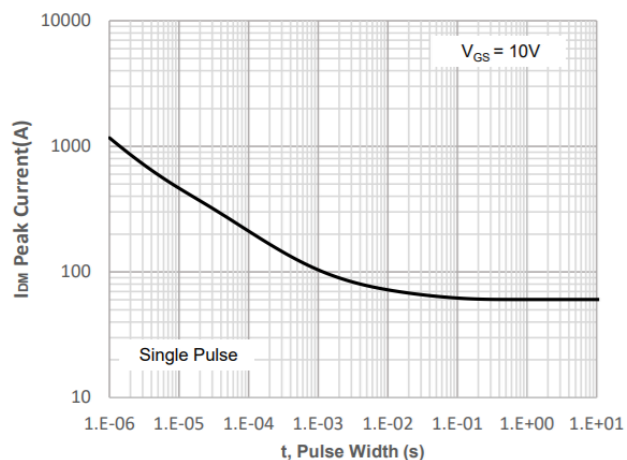
Maximum Safe Operating Area



Maximum Continuous Drain Current vs.
Case Temperature

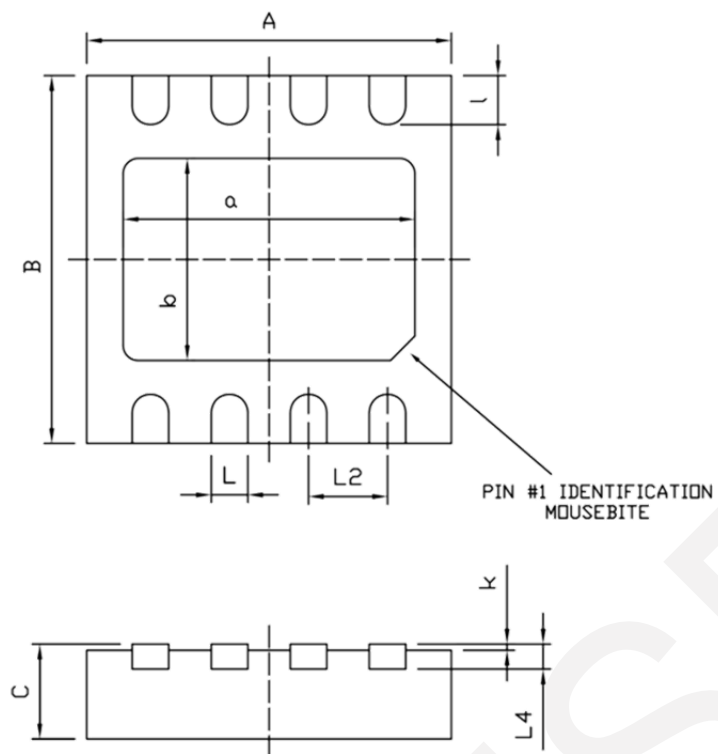


Normalized Maximum Transient
Thermal Impedance



Peak Current Capacity

8.Package Dimensions



Dimensions In Millimeterer			
Symbol	MIN	TYP	MAX
A	2.95	3.00	3.05
B	2.95	3.00	3.05
C	0.70	0.75	0.80
L	0.25	0.30	0.35
l	0.324	0.40	0.476
L2	-	0.65	-
L4	-	0.20	-
a	2.20	2.30	2.40
b	1.40	1.50	1.60
k	0.00	-	0.05

9.Important Notice

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