



WANSEMI
万芯半导体

WP5N50BD

Enhancement Mode N-Channel Power MOSFET

TO-252/NMOS/500V/ $\pm 30V$ /3V/5A/2.7 Ω

Rev0.6

Enhancement Mode N-Channel Power MOSFET

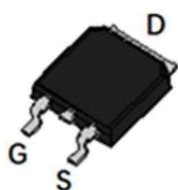
1.Features

- ◆ Fast Switching
- ◆ Improved dv/dt Capability

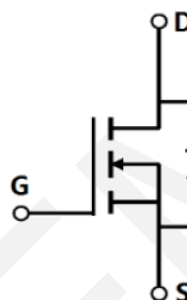
V_{DS}	$R_{DS(on)}$ Typ.	I_D Max.
500V	$2.7\Omega @ 10V$	5A

2.Applications

- ◆ Load Switch
- ◆ PWM Application
- ◆ Power management



Pin Description
TO-252



Schematic Diagram

3.Package Marking and Ordering Information

Part no.	Marking	Package	PCS/Reel	PCS/CTN.
WP5N50BD	WP5N50B	TO-252	2,500	25,000

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

Parameter	Symbol	Value	Units
Drain to Source Voltage	V_{DS}	500	V
Gate to Source Voltage	V_{GS}	± 30	V
Drain Current (DC)	I_D	5	A
Drain Current (Pulse), $PW \leq 300\mu s$	I_{DP}	17	A
Total Dissipation	P_D	104	W
Avalanche Energy, Single Pulsed	E_{AS}	137	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	$^{\circ}\text{C/W}$
Junction to ambient	$R_{\theta JA}$	43	$^{\circ}\text{C/W}$

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.

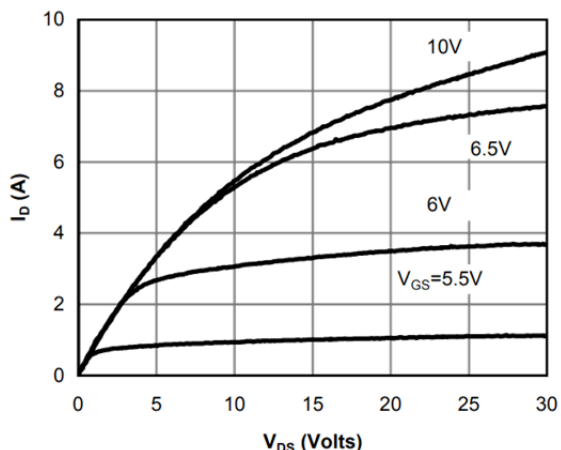
6. Electrical Characteristics at $T_a=25^{\circ}\text{C}$ (Note 3)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D = 250\mu\text{A}$, $V_{GS} = 0\text{V}$	500	-	-	V
Zero-Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 500\text{V}$, $V_{GS} = 0\text{V}$	-	-	1	μA
Gate to Source Leakage Current	I_{GSS}	$V_{GS} = \pm 30\text{V}$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$, $I_{DS}=250\mu\text{A}$	2	3	4	V
Static Drain to Source On-State Resistance	$R_{DS(on)}$	$I_D = 1\text{A}$, $V_{GS} = 10\text{V}$	-	2.7	3.2	Ω
Input Capacitance	C_{iss}	$V_{GS}=0\text{V}$, $V_{DS}=25\text{V}$, Frequency=1.0MHz	-	538	-	pF
Output Capacitance	C_{oss}		-	58	-	pF
Reverse Transfer Capacitance	C_{rss}		-	4.5	-	pF
Turn-ON Delay Time	$t_{d(on)}$	$V_{GS}=10\text{V}$, $V_{DS} = 250\text{V}$, $I_D = 5\text{A}$, $R_G = 25\Omega$	-	18	-	ns
Rise Time	t_r		-	32	-	ns
Turn-OFF Delay Time	$t_{d(off)}$		-	34	-	ns
Fall Time	t_f		-	22	-	ns
Total Gate Charge	Q_g	$V_{DS} = 450\text{V}$, $V_{GS} = 10\text{V}$, $I_D = 5\text{A}$	-	11.5	-	nC
	Q_{gs}		-	3.8	-	nC
	Q_{gd}		-	4.1	-	nC
Diode Forward Voltage	V_{FSD}	$I_S = 5\text{A}$, $V_{GS} = 0$	-	0.85	1.2	V

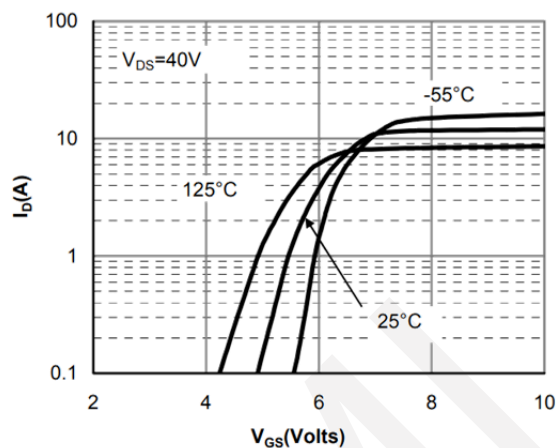
Note 3: Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.



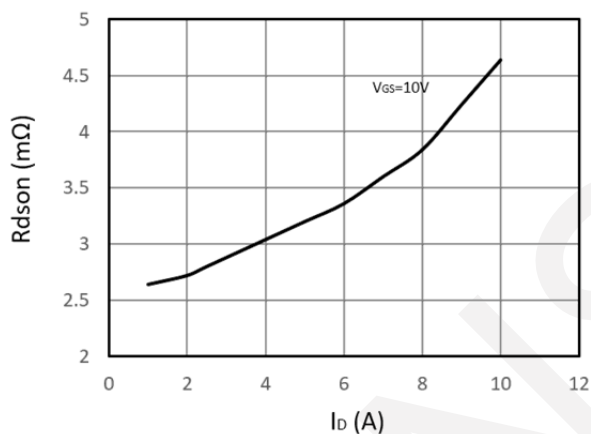
7. Typical electrical and thermal characteristics



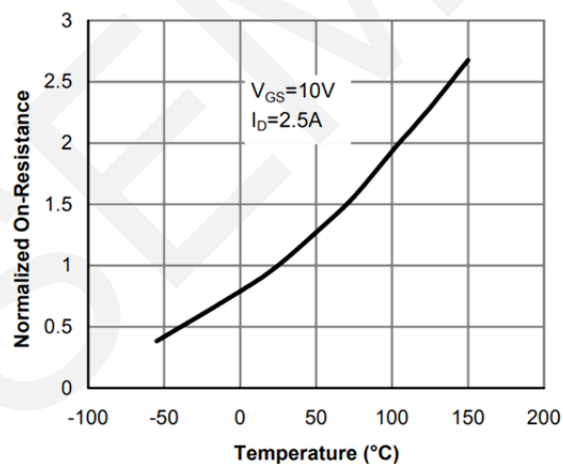
On-Region Characteristics



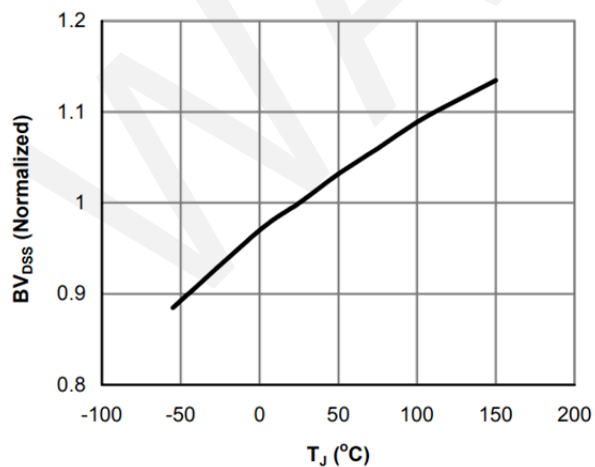
Transfer Characteristics



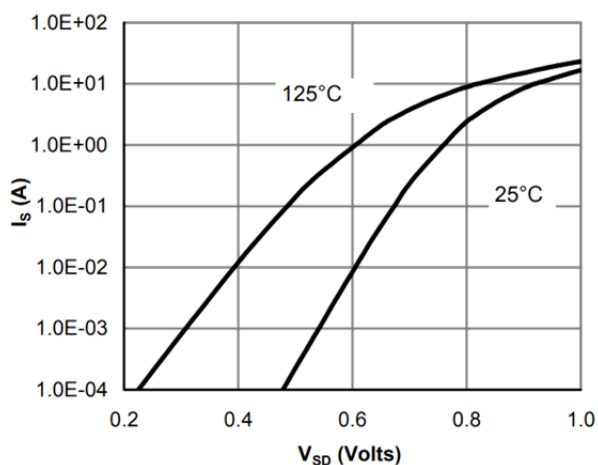
On-Resistance vs. Drain Current
and Gate Voltage



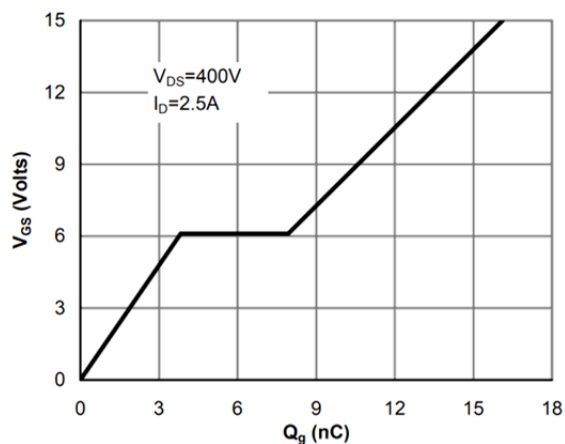
On-Resistance vs. Junction
Temperature



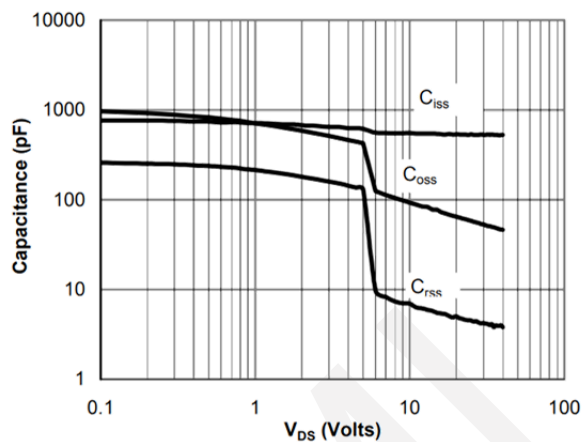
Break Down vs. Junction Temperature



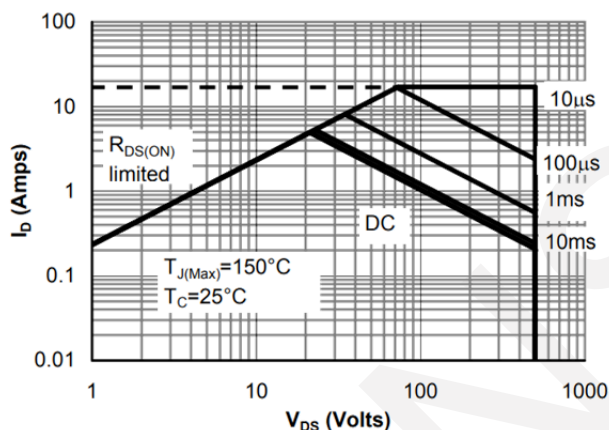
Body-Diode Characteristics



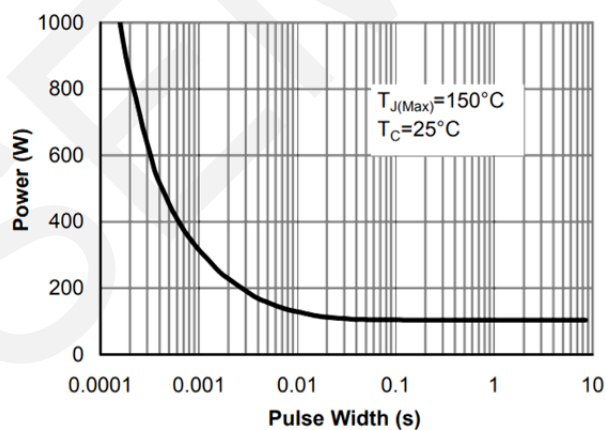
Gate-Charge Characteristics



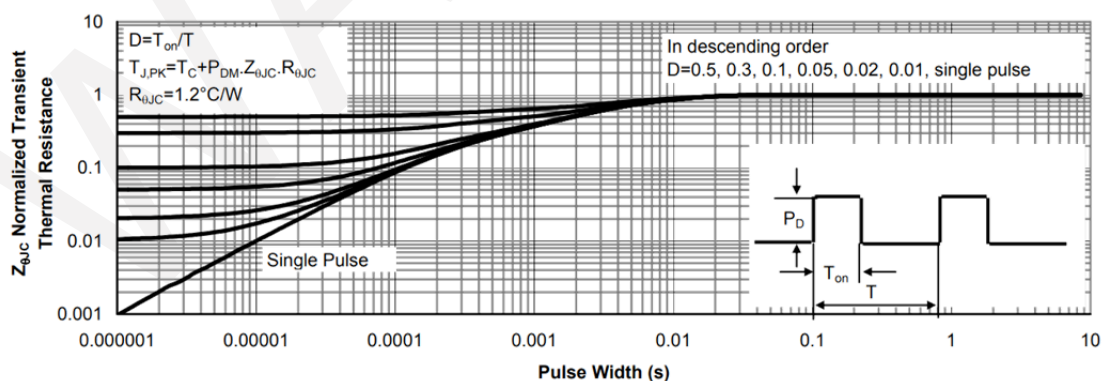
Capacitance Characteristics



Maximum Forward Biased Safe
Operating Area

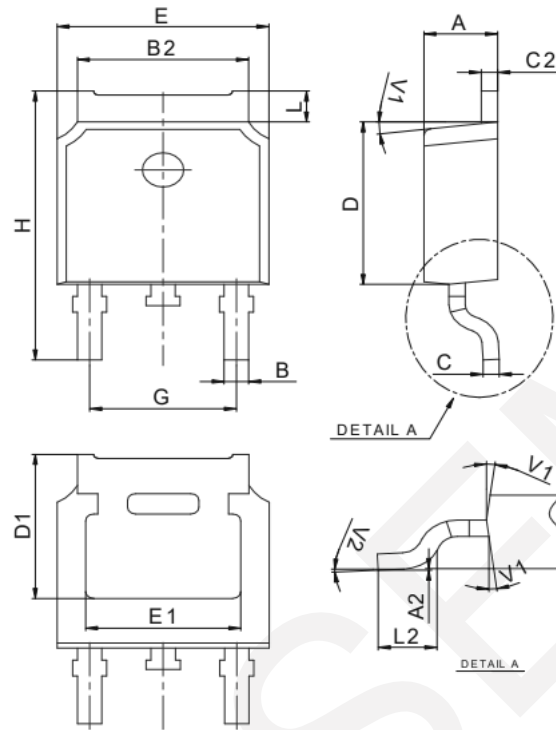


Single Pulse Power Rating
Junction-to-Case



Normalized Maximum Transient Thermal Impedance

8.Package Dimensions



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

9. Important Notice

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