

100V N-Channel Enhancement Mode Power MOSFET

Description

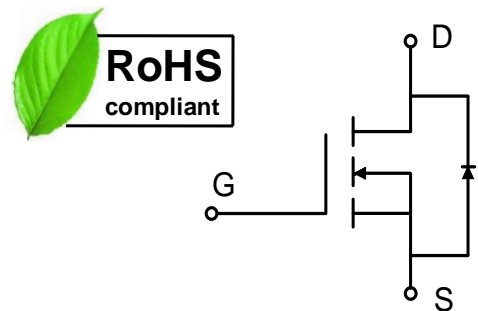
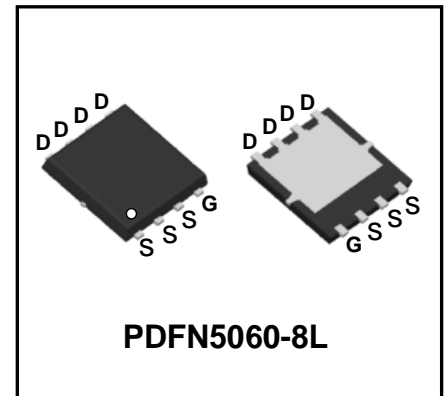
WMB128N10T2 uses advanced power trench technology that has been especially tailored to minimize the on-state resistance and yet maintain superior switching performance.

Features

- $V_{DS} = 100\text{ V}$, $I_D = 128\text{ A}$ (Silicon Limited)
 $R_{DS(on)} < 4.2\text{ m}\Omega @ V_{GS} = 10\text{ V}$
- Green Device Available
- 100% EAS Guaranteed
- Optimized for High Speed Smooth Switching

Applications

- Hard Switching and High Speed Circuit
- DC/DC Conversion
- Power Tools
- UPS
- SSR



Absolute Maximum Ratings

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current ¹ (Silicon Limited)	$T_C=25^\circ\text{C}$	I_D	128	A
	$T_C=100^\circ\text{C}$		81	
Continuous Drain Current ¹ (Package Limited)	$T_C=25^\circ\text{C}$		60	
Pulsed Drain Current ²		I_{DM}	402	A
Single Pulse Avalanche Energy ³		EAS	281	mJ
Avalanche Current		I_{AS}	75	A
Total Power Dissipation ⁴	$T_C=25^\circ\text{C}$	P_D	126	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction-to-Ambient ¹	$R_{\theta JA}$	49	$^\circ\text{C/W}$
Thermal Resistance from Junction-to-Case ¹	$R_{\theta JC}$	0.98	$^\circ\text{C/W}$

Electrical Characteristics $T_c = 25^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	100	-	-	V
Gate-body Leakage Current	I_{GSS}	$V_{DS} = 0V, V_{GS} = \pm 20V$	-	-	± 100	nA
Zero Gate Voltage Drain Current	$T_J=25^\circ\text{C}$	$V_{DS} = 100V, V_{GS} = 0V$	-	-	1	μA
	$T_J=100^\circ\text{C}$		-	-	100	
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2	3	4	V
Drain-Source On-Resistance ²	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 20A$	-	3.6	4.2	m Ω
Forward Transconductance ²	g_{fs}	$V_{DS} = 5V, I_D = 20A$	-	49.3	-	S
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS} = 50V, V_{GS} = 0V, f = 1\text{MHz}$	-	3745	-	μF
Output Capacitance	C_{oss}		-	934	-	
Reverse Transfer Capacitance	C_{rss}		-	32	-	
Switching Characteristics						
Gate Resistance	R_g	$V_{DS} = 0V, V_{GS} = 0V, f = 1\text{MHz}$	-	1.1	-	Ω
Total Gate Charge	Q_g	$V_{GS} = 10V, V_{DD} = 50V, I_D = 20A$	-	72	-	nC
Gate-Source Charge	Q_{gs}		-	9.1	-	
Gate-Drain Charge	Q_{gd}		-	33	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = 10V, V_{DD} = 50V, R_G = 10\Omega, I_D = 20A$	-	12.5	-	nS
Rise Time	t_r		-	18	-	
Turn-Off Delay Time	$t_{d(off)}$		-	43.6	-	
Fall Time	t_f		-	26	-	
Drain-Source Body Diode Characteristics						
Diode Forward Voltage ²	V_{SD}	$I_S = 20A, V_{GS} = 0V$	-	-	1.2	V
Continuous Source Current ^{1,5}	I_S	$V_G = V_D = 0V$, Force Current	-	-	128	A
Reverse Recovery Time	t_{rr}	$V_R = 50V, I_F = 20A, dI_F/dt = 500A/\mu s$	-	49	-	nS
Reverse Recovery Charge	Q_{rr}		-	272	-	nC

Notes:

- The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- The EAS data shows Max. rating. The test condition is $V_{DD} = 25V, V_{GS} = 10V, L = 0.1\text{mH}, I_{AS} = 75A$
- The power dissipation is limited by 150 $^\circ\text{C}$ junction temperature
- The data is theoretically the same as I_D and I_{DM} , in real applications, should be limited by total power dissipation.

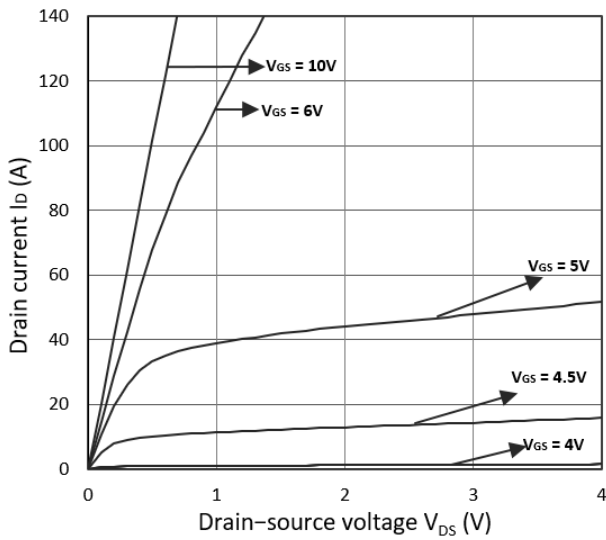


Figure 1. Output Characteristics

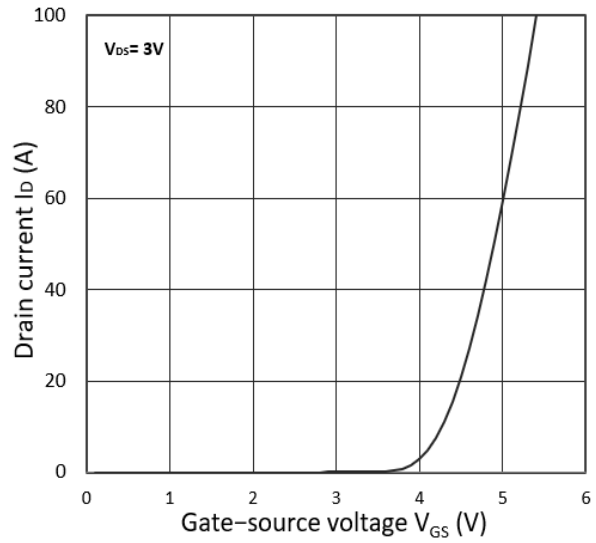


Figure 2. Transfer Characteristics

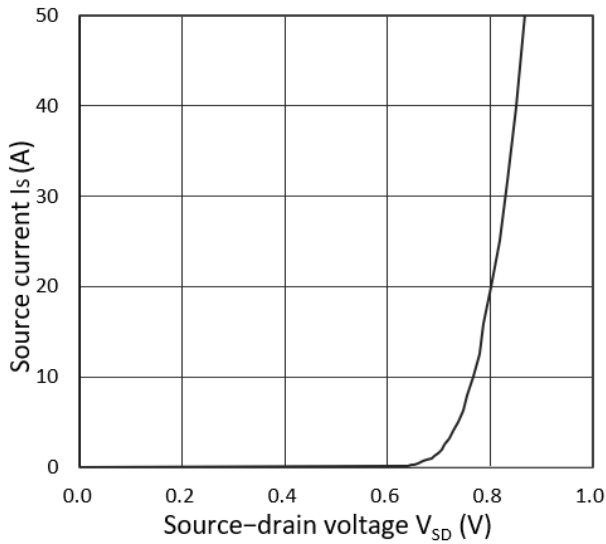


Figure 3. Forward Characteristics of Reverse

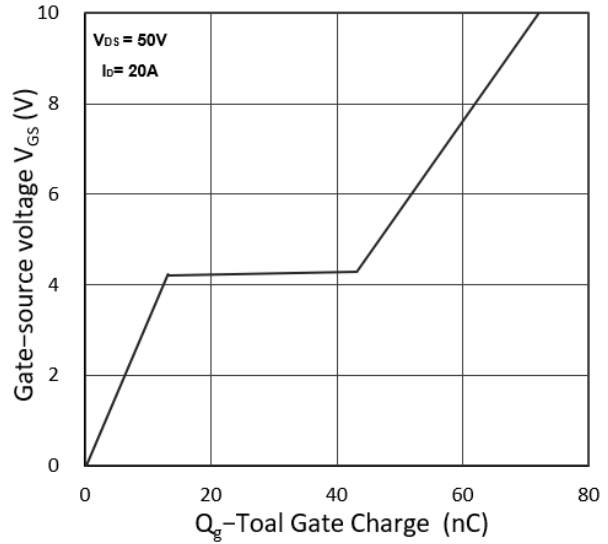


Figure 4. Gate Charge Characteristics

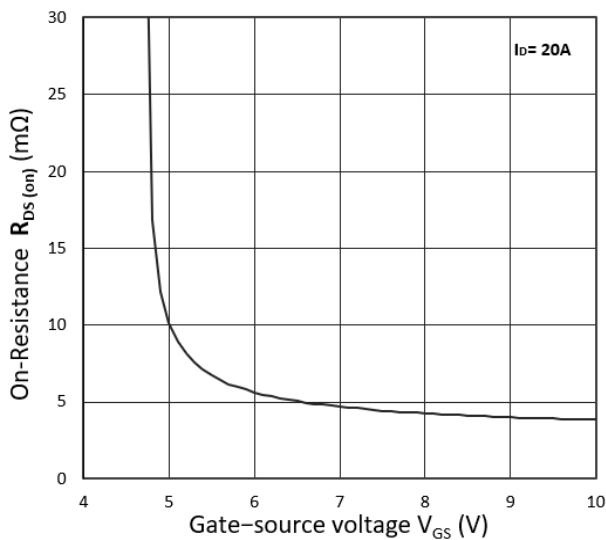


Figure 5. $R_{DS(on)}$ vs. V_{GS}

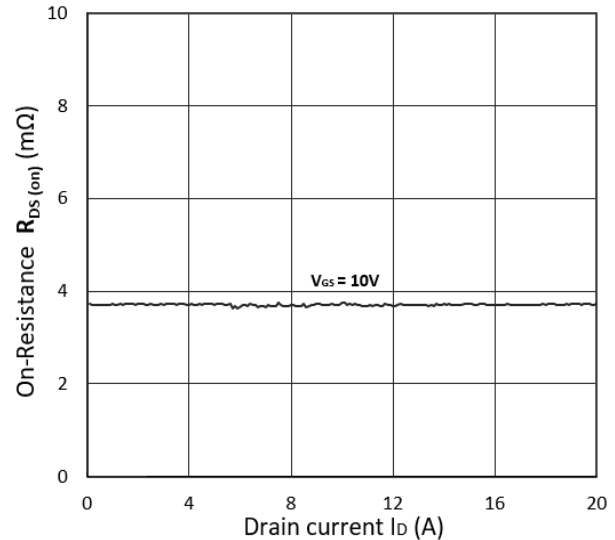


Figure 6. $R_{DS(on)}$ vs. I_D

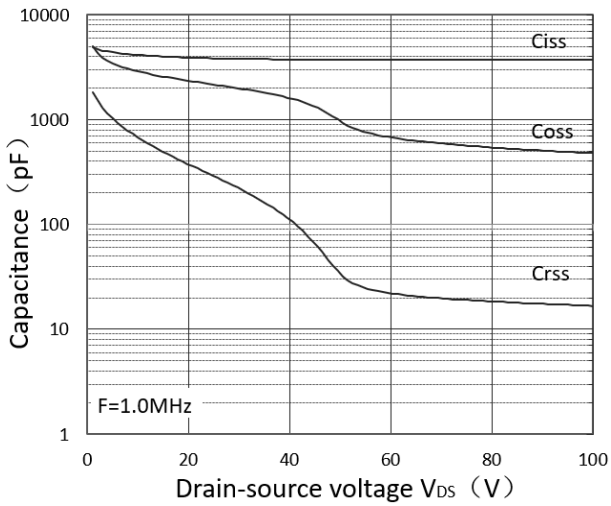


Figure 7. Capacitance Characteristics

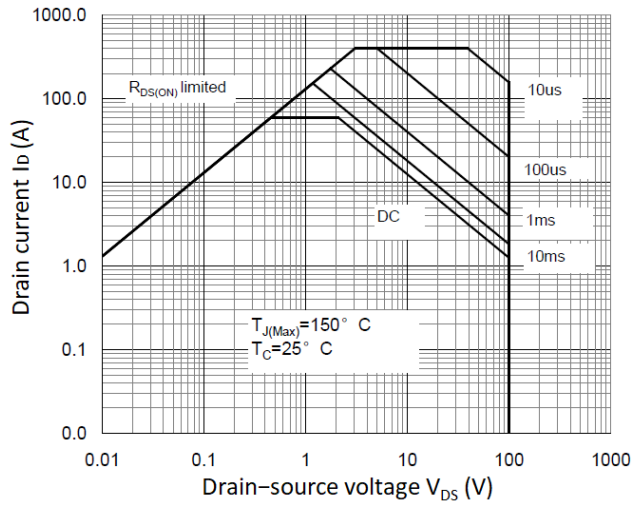


Figure 8. Safe Operating Area

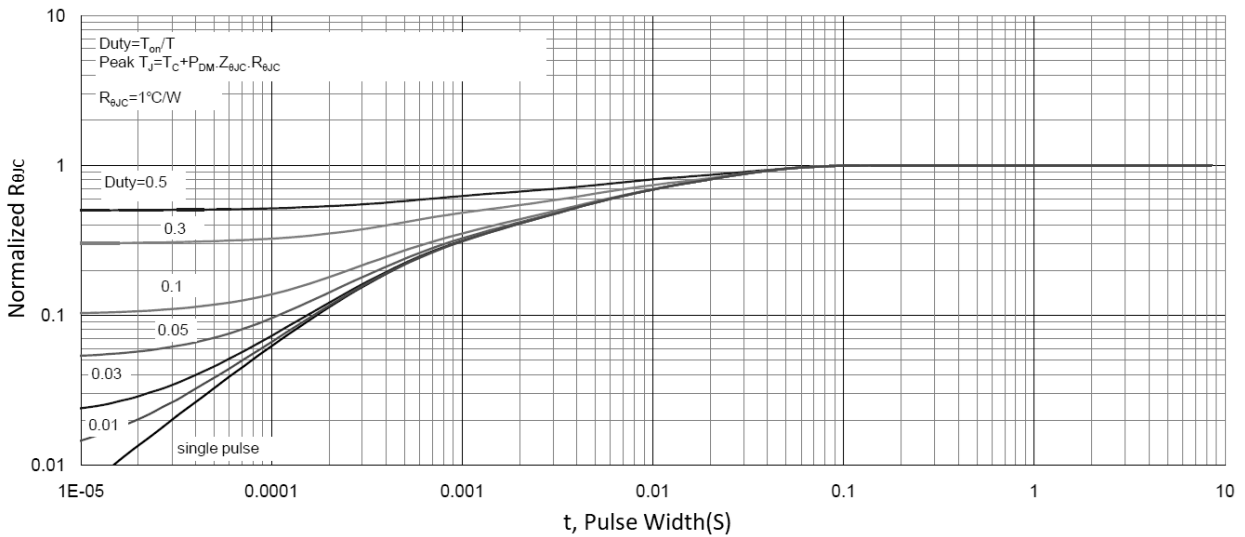


Figure 9. Normalized Maximum Transient Thermal Impedance

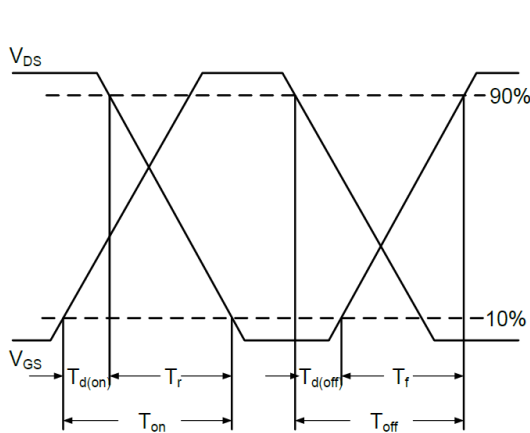


Figure 10. Switching Time Waveform

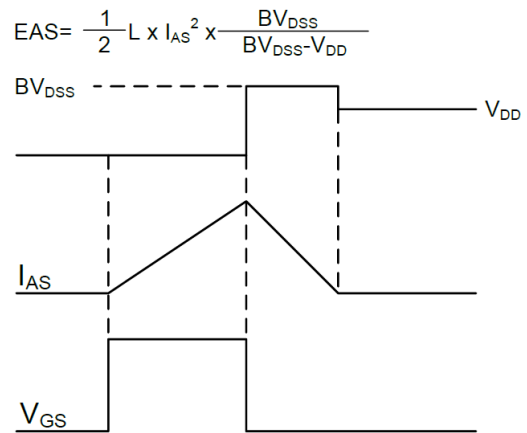
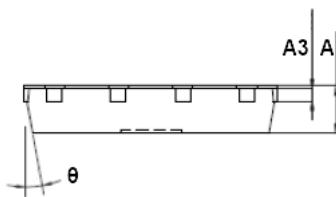
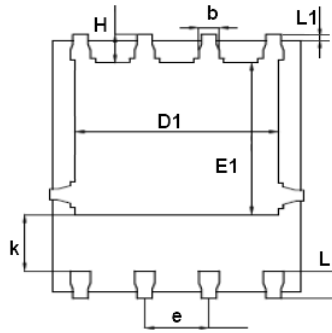
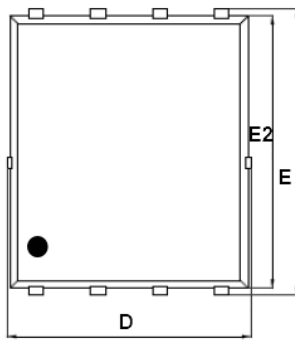


Figure 11. Unclamped Inductive Switching Waveform

$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$

Mechanical Dimensions for PDFN5060-8L



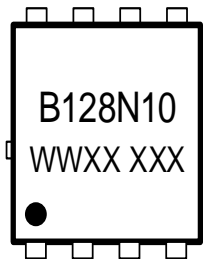
COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	0.90	1.20
A3	0.15	0.35
D	4.80	5.40
E	5.90	6.35
D1	3.61	4.31
E1	3.30	3.92
E2	5.65	6.06
k	1.10	-
b	0.30	0.51
e	1.27BSC	
L	0.38	0.71
L1	0.05	0.36
H	0.38	0.61
θ	0°	12°

Ordering Information

Part	Package	Marking	Packing method
WMB128N10T2	PDFN5060-8L	B128N10	Tape and Reel

Marking Information



B128N10= Device code

WWXX XXX= Date code

Contact Information

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