

60V N-Channel Enhancement Mode Power MOSFET

Description

WMB116N06T1 uses advanced power trench technology that has been especially tailored to minimize the on-state resistance and yet maintain superior switching performance.

Features

- $V_{DS} = 60V$, $I_D = 116A$
 $R_{DS(on)} < 5.2m\Omega$ @ $V_{GS} = 10V$
 $R_{DS(on)} < 7.0m\Omega$ @ $V_{GS} = 4.5V$
- Low $R_{DS(on)}$
- Low Gate Charge
- 100% EAS Guaranteed

Applications

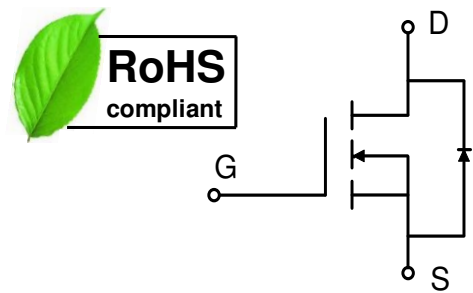
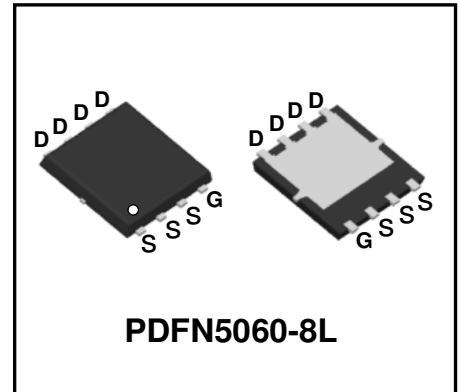
- Power Management Switches
- Synchronous Rectification for AC/DC Quick Charger

Absolute Maximum Ratings

Parameter		Symbol	Value	Unit
Drain-Source voltage		V_{DS}	60	V
Gate-Source voltage		V_{GS}	± 20	V
Continuous Drain Current@10V ¹	$T_C = 25^\circ C$	I_D	116	A
	$T_C = 100^\circ C$		74.5	
Pulsed Drain Current ²		I_{DM}	251	A
Single Pulse Avalanche Energy ³		EAS	125	mJ
Avalanche Current		I_{AS}	50	A
Total Power Dissipation ⁴	$T_C = 25^\circ C$	P_D	114	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to +150	$^\circ C$

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction-to-Ambient ¹	$R_{\theta JA}$	61	$^\circ C/W$
Thermal Resistance from Junction-to-Case ¹	$R_{\theta JC}$	1.09	$^\circ C/W$



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 = 250μA	60	-	-	V
Gate-body Leakage current		I _{GSS}	V _{DS} = 0V, V _{GS} = ±20V	-	-	±100	nA
Zero Gate Voltage Drain Current	T _J =25°C	I _{DSS}	V _{DS} = 48V, V _{GS} = 0V	-	-	1	μA
	T _J =55°C			-	-	5	
Gate-Threshold Voltage		V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	1.2	1.8	2.5	V
Drain-Source on-Resistance ²		R _{DS(on)}	V _{GS} = 10V, I _D = 15A	-	4.0	5.2	mΩ
			V _{GS} = 4.5V, I _D = 10A	-	5.2	7	
Forward Trans conductance ²		g _{fs}	V _{DS} = 10V, I _D = 30A	-	74	-	S
Dynamic Characteristics							
Input Capacitance		C _{iss}	V _{DS} = 15V, V _{GS} =0V, f =1MHz	-	5323	-	pF
Output Capacitance		C _{oss}		-	400	-	
Reverse Transfer Capacitance		C _{rss}		-	325	-	
Switching Characteristics							
Gate Resistance		R _g	V _{DS} = 0V, V _{GS} =0V, f =1MHz	-	1.1	-	Ω
Total Gate Charge		Q _g	V _{GS} = 10V,V _{DS} = 48V, I _D = 25A	-	76	-	nC
Gate-Source Charge		Q _{gs}		-	15.2	-	
Gate-Drain Charge		Q _{gd}		-	20	-	
Turn-on Delay Time		t _{d(on)}	V _{GS} =10V, V _{DD} = 30V R _G = 3.3Ω, I _D = 30A	-	18.2	-	nS
Rise Time		t _r		-	8.6	-	
Turn-off Delay Time		t _{d(off)}		-	58.5	-	
Fall Time		t _f		-	15.6	-	
Drain-Source Body Diode Characteristics							
Diode Forward Voltage ²		V _{SD}	I _S = 1A, V _{GS} = 0V	-	-	1.2	V
Continuous Source Current ^{1,5}		I _S	V _G =V _D =0V , Force Current	-	-	116	A
Body Diode Reverse Recovery Time		t _{rr}	I _F = 30A, dI/dt = 100A/μs	-	23	-	nS
Body Diode Reverse Recovery Charge		Q _{rr}		-	11.5	-	nC

Notes:

1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
2. The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
3. The EAS data shows Max. rating. The test condition is $V_{DD} = 50V, V_{GS} = 10V, L = 0.1mH, I_{AS} = 50A$
4. The power dissipation is limited by 150°C junction temperature
5. The data is theoretically the same as I_D and I_{DM} , in real applications, should be limited by total power dissipation.

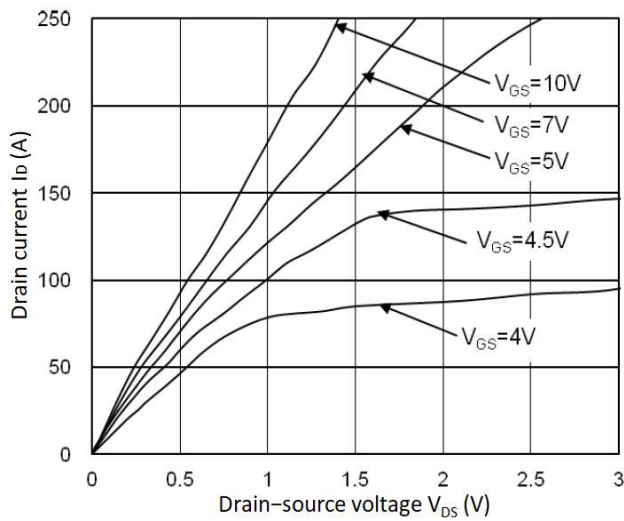


Figure 1. Typical Output Characteristics

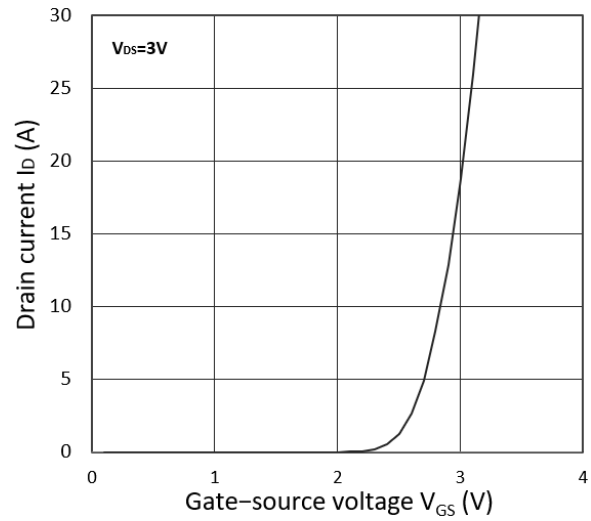


Figure 2. Transfer Characteristics

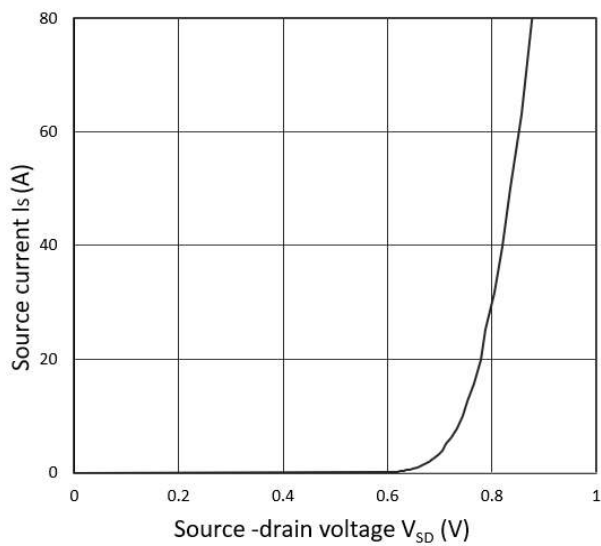


Figure 3. Forward Characteristics of Reverse

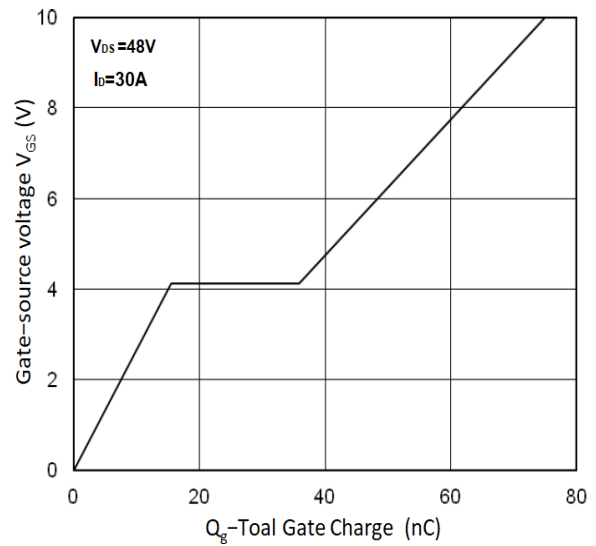
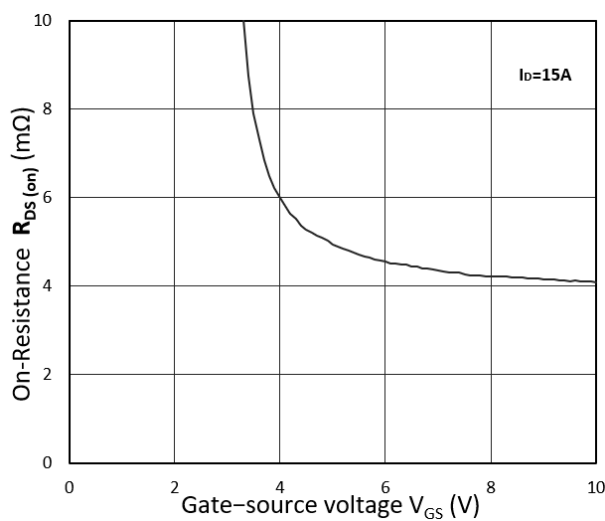
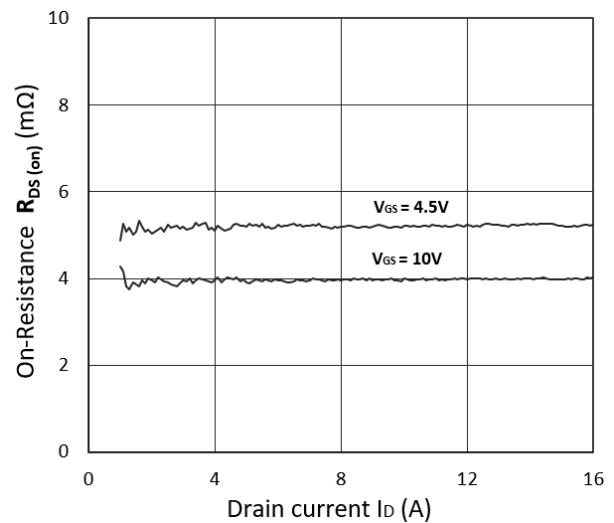


Figure 4. Gate Charge Characteristics

Figure 5. $R_{DS(on)}$ vs. V_{GS} Figure 6. $R_{DS(on)}$ vs. I_D

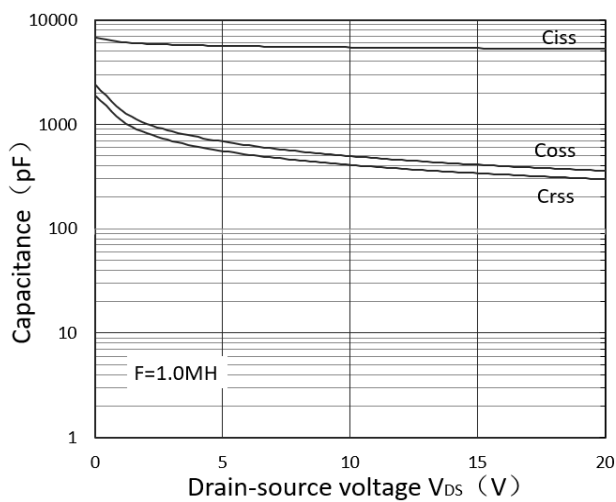


Figure 7. Capacitance

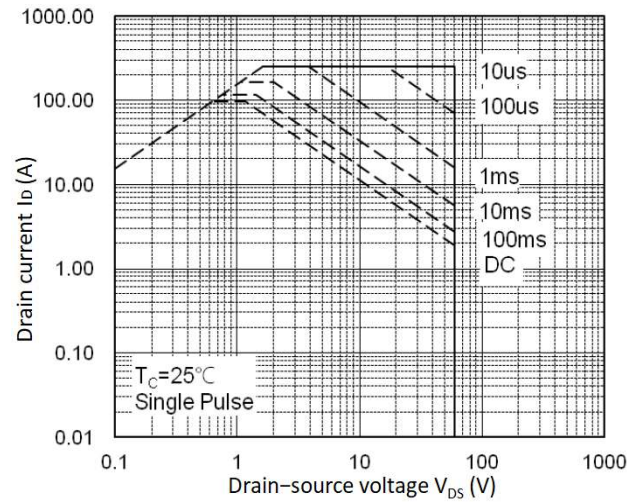


Figure 8. Safe Operating Area

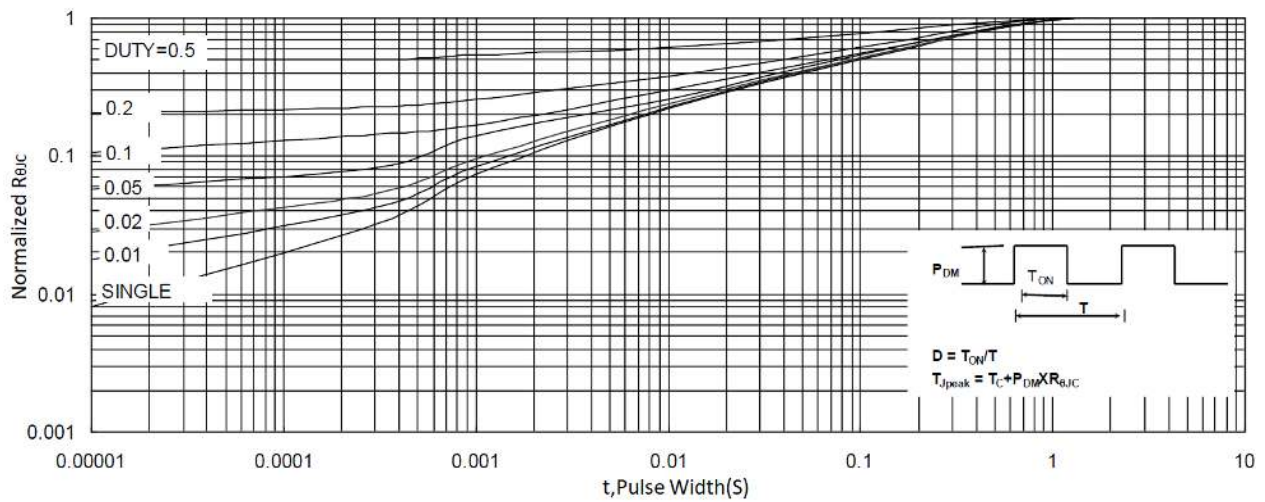


Figure 9. Normalized Maximum Transient Thermal Impedance

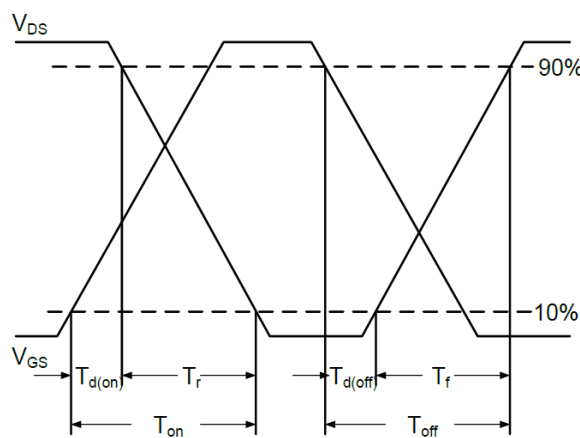


Figure 10. Switching Time Waveform

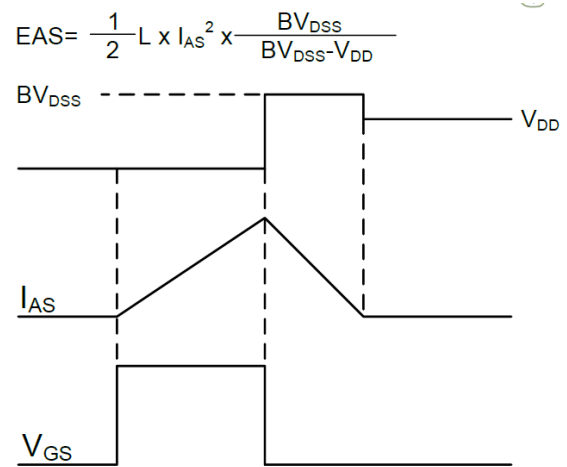
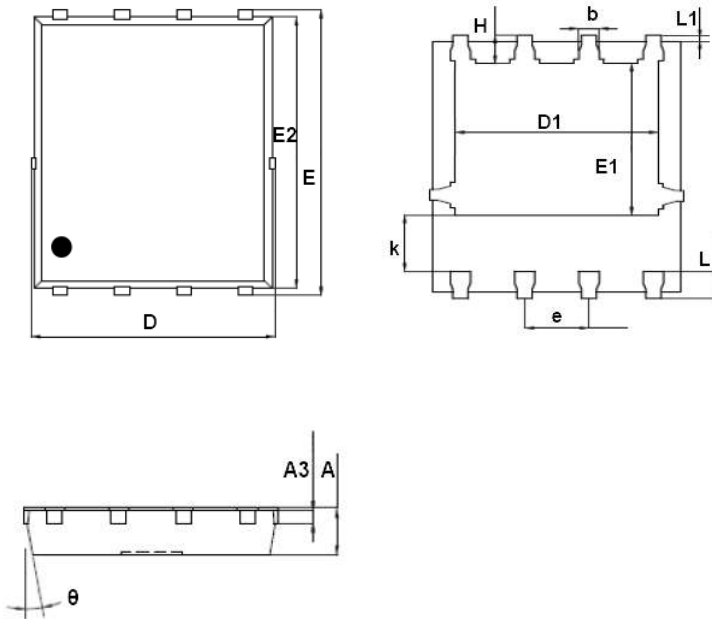


Figure 11. Unclamped Inductive Switching Waveform

Mechanical Dimensions for PDFN5060-8L

COMMON DIMENSIONS

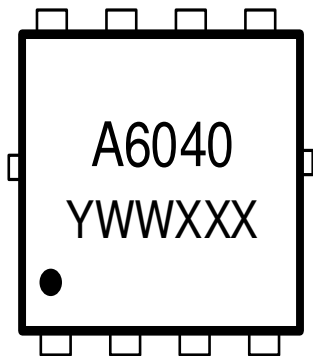


SYMBOL	MM	
	MIN	MAX
A	0.90	1.20
A3	0.15	0.35
D	4.80	5.40
E	5.90	6.35
D1	3.61	4.31
E1	3.30	3.92
E2	5.65	6.06
k	1.10	-
b	0.30	0.51
e	1.27BSC	
L	0.38	0.71
L1	0.05	0.36
H	0.38	0.61
θ	0°	12°

Ordering Information

Part	Package	Marking	Packing method
WMB116N06T1	PDFN5060-8L	A6040	Tape and Reel

Marking Information



A6040 = Device code

YWWXXX= Date code

Contact Information

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