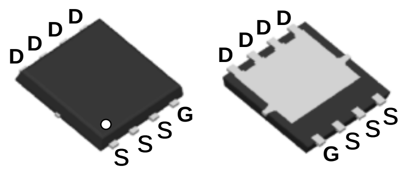
30V N-Channel Enhancement Mode Power MOSFET

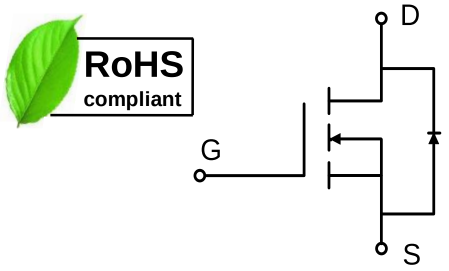
Description

WMB81N03T1 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} = 30 V, I_D = 81A
  $R_{DS(on)}$ < 5.5mΩ @ V_{GS} = 10 V
  $R_{DS(on)}$ < 9mΩ @ V_{GS} = 4.5V
- Green Device Available
- 100% EAS Guaranteed
- Low Gate Charge
- Low $R_{DS(on)}$



Applications

- Power Management Switches
- DC/DC Converter

Absolute Maximum Ratings

Parameter		Symbol	Value	Unit
Drain-Source voltage		V_{DS}	30	V
Gate-Source voltage		V_{GS}	±20	V
Continuous Drain Current@10V[1]	T_C=25℃	I_D	81	A
	T_C=100℃		51	
	T_A=25℃		15	
	T_A=70℃		12	
Pulsed Drain Current[2]		I_{DM}	160	A
Single Pulse Avalanche Energy[3]		EAS	115.2	mJ
Avalanche Current		I_{AS}	48	A
Total Power Dissipation[4]	T_C=25℃	P_D	59	W
	T_A=25℃		2	
Operating Junction and Storage Temperature Range		T_J , T_{STG}	-55 to+150	°C

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction-to-Ambient[1]	$R_{\theta JA}$	62	°C/W
Thermal Resistance from Junction-to-Case[1]	$R_{\theta JC}$	2.1	°C/W

Electrical Characteristics T_c = 25°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	30	-	-	V
Gate-body Leakage Current		I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
Zero Gate Voltage Drain Current	T_J=25℃	I_{DSS}	V_{DS} = 24V, V_{GS} = 0V	-	-	1	μA
	T_J=55℃			-	-	5	
Gate-Threshold Voltage		$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1.2	1.7	2.5	V
Drain-Source On-Resistance[2]		$R_{DS(on)}$	V_{GS} = 10V, I_D = 30A	-	4.8	5.5	mΩ
			V_{GS} = 4.5V, I_D = 15A	-	6	9	
Forward Transconductance		g_{fs}	V_{DS} = 5V, I_D = 30A	-	41	-	S
Dynamic Characteristics							
Input Capacitance		C_{iss}	V_{DS} = 15V, V_{GS} =0V, f =1MHz	-	1880	-	pF
Output Capacitance		C_{oss}		-	267	-	
Reverse Transfer Capacitance		C_{rss}		-	185	-	
Switching Characteristics							
Gate Resistance		R_g	V_{DS}= 0V , V_{GS}= 0V , f= 1MHz	-	1.7	-	Ω
Total Gate Charge(4.5V)		Q_g	V_{GS} = 4.5V,V_{DS} = 15V, I_D= 15A	-	20	-	nC
Gate-Source Charge		Q_{gs}		-	7.6	-	
Gate-Drain Charge		Q_{gd}		-	7.2	-	
Turn-On Delay Time		$t_{d(on)}$	V_{GS} =10V, V_{DD} = 15V, R_G = 3.3Ω, I_D= 15A	-	7.8	-	nS
Rise Time		t_r		-	15	-	
Turn-Off Delay Time		$t_{d(off)}$		-	37.3	-	
Fall Time		t_f		-	10.6	-	
Drain-source body diode Characteristics							
Diode Forward Voltage[2]		V_{SD}	I_S = 1A, V_{GS} = 0V	-	-	1.0	V
Continuous Source Current[1,5]		I_S	V_G=V_D=0V , Force Current	-	-	81	A
Body Diode Reverse Recovery Time		t_{rr}	I_F = 30A, dI/dt = 100A/μs	-	14	-	nS
Body Diode Reverse Recovery Charge		Q_{rr}		-	5	-	nC

Notes:

1.The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.

2.The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%

3.The EAS data shows Max. rating . The test condition is V_{DD}=25V,V_{GS}=10V,L=0.1mH,I_{AS}=48A

4.The power dissipation is limited by 150℃ 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.

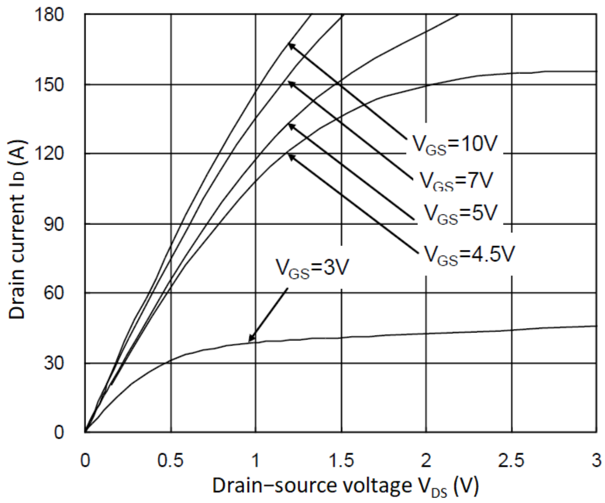


Figure 1. Output Characteristics

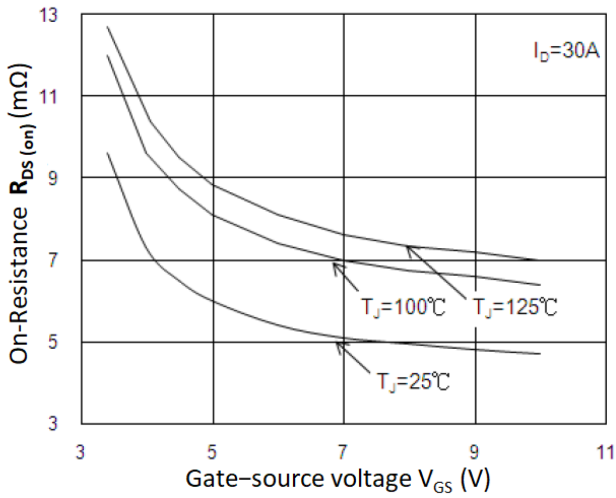


Figure 2. $R_{DS(on)}$ vs. V_{GS}

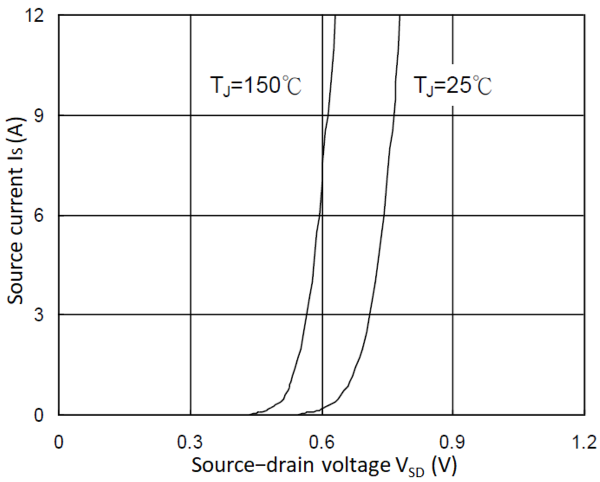


Figure 3. Forward Characteristics of Reverse

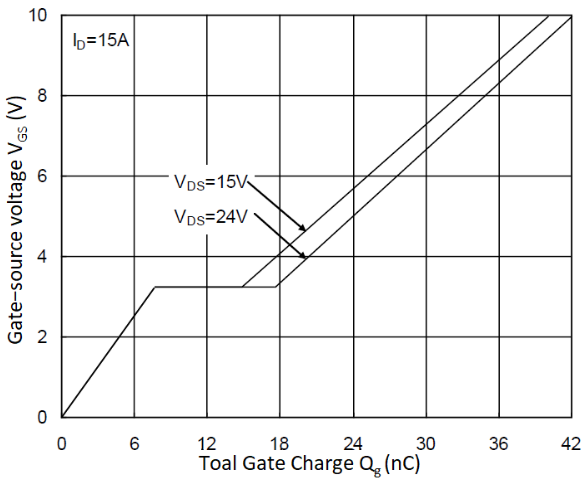


Figure 4.Gate Charge Characteristics

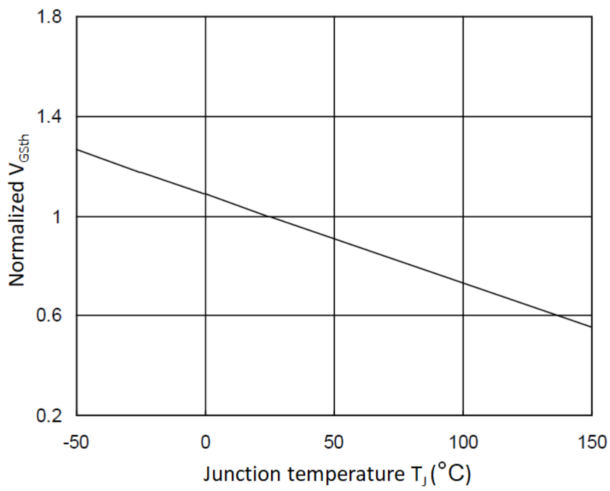


Figure 5. Normalized V_{GSth} vs. T_J

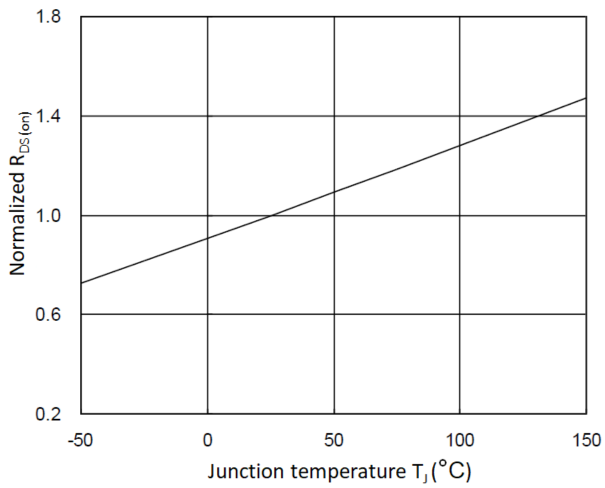


Figure 6. Normalized $R_{DS(on)}$ vs. T_J

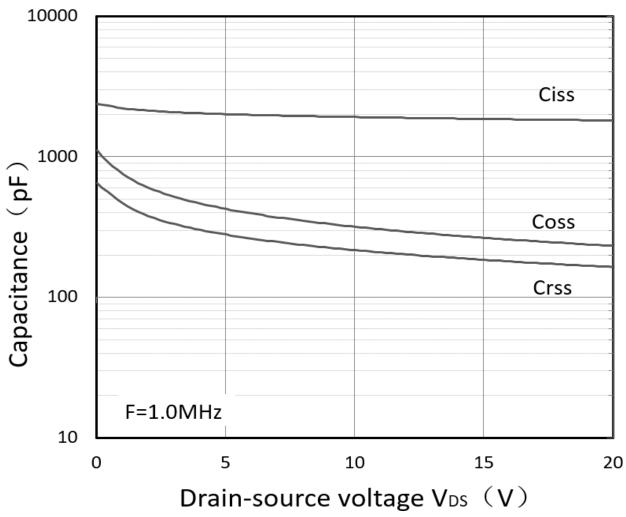


Figure 7. Capacitance Characteristics

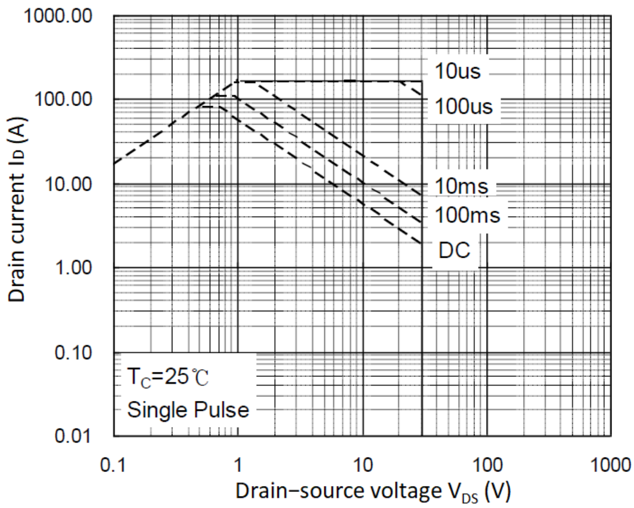


Figure 8. Safe Operating Area

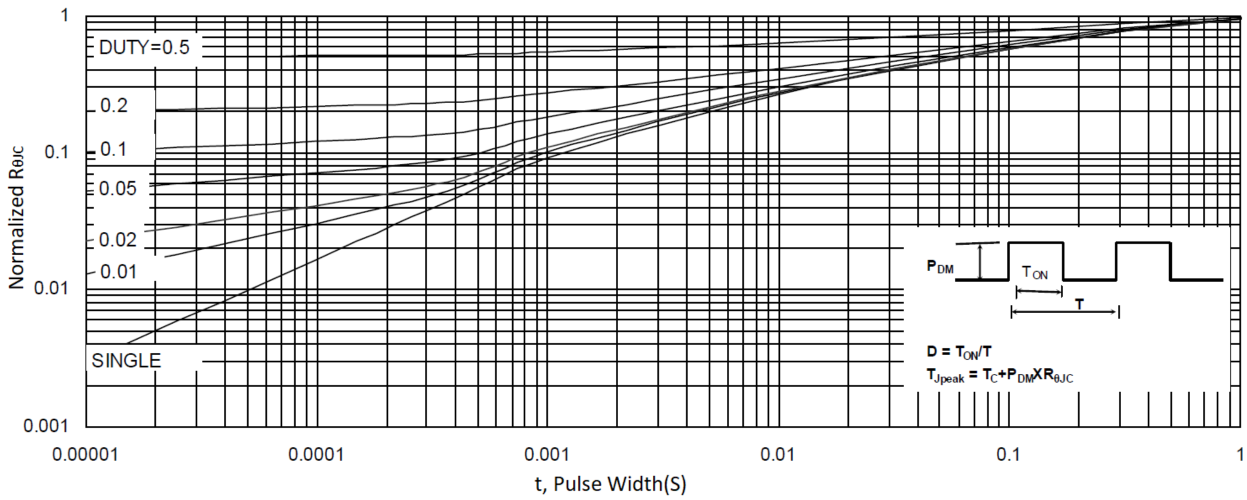


Figure 9. Normalized Maximum Transient Thermal Impedance

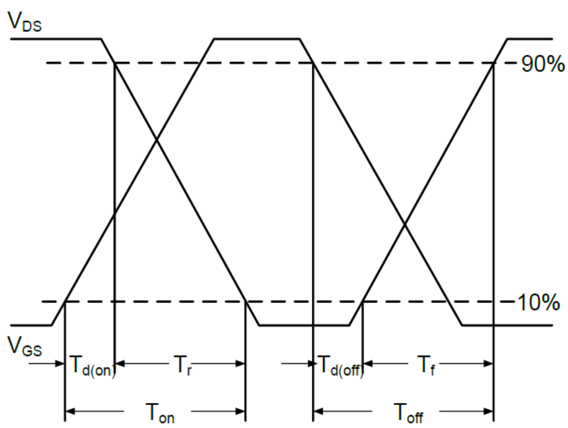


Figure 10.Switching Time Waveform

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

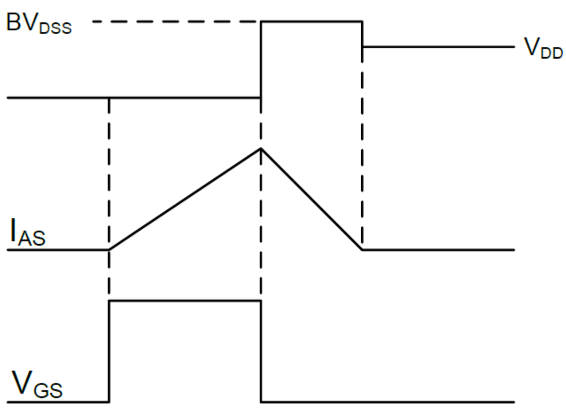
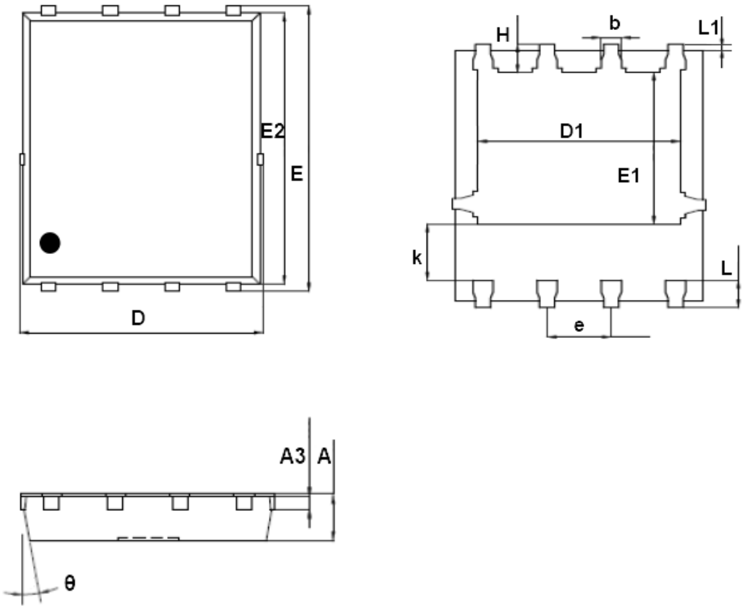


Figure 11.Unclamped Inductive Switching Waveform

Mechanical Dimensions for PDFN5060-8L



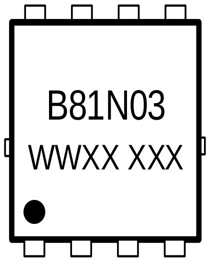
COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	0.90	1.17
A3	0.20	0.35
D	4.80	5.40
E	5.90	6.15
D1	3.61	4.31
E1	3.3	3.78
E2	5.65	5.85
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
WMB81N03T1	PDFN5060-8L	B81N03	Tape and Reel

Marking Information



B81N03= Device code

WWXX XXX= Date code

Contact Information

No.1001, Shiwan(7) Road, Pudong District, Shanghai, P.R.China.201207
Tel: 86-21-50310888 Fax: 86-21-50757680 Email: market@way-on.com
WAYON website: **http://www.way-on.com**
For additional information, please contact your local Sales Representative.

Disclaimer