

30V N-Channel Enhancement Mode Power MOSFET

Description

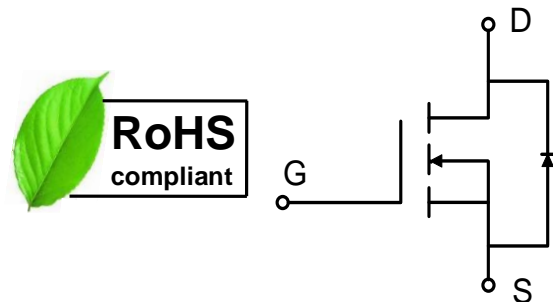
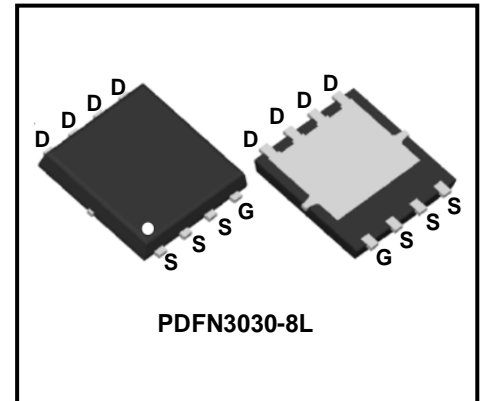
WMQ46N03T1 uses advanced power trench technology that has been especially tailored to minimize the on-state resistance and yet maintain superior switching performance.

Features

- $V_{DS} = 30\text{ V}$, $I_D = 46\text{ A}$
 $R_{DS(on)} < 8.5\text{ m}\Omega @ V_{GS} = 10\text{ V}$
 $R_{DS(on)} < 13.0\text{ m}\Omega @ V_{GS} = 4.5\text{ V}$
- Green Device Available
- Low Gate Charge
- Advanced High Cell Density Trench Technology
- 100% EAS Guaranteed

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	$T_C = 25^\circ\text{C}$	I_D	46	A
	$T_C = 100^\circ\text{C}$		29	
	$T_A = 25^\circ\text{C}$		11	
	$T_A = 70^\circ\text{C}$		9	
Pulsed Drain Current ²		I_{DM}	92	A
Single Pulse Avalanche Energy ³		EAS	45	mJ
Avalanche Current		I_{AS}	30	A
Total Power Dissipation ⁴	$T_C = 25^\circ\text{C}$	P_D	29	W
	$T_A = 25^\circ\text{C}$		1.65	
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	$R_{\theta JA}$	74	$^\circ\text{C/W}$
Thermal Resistance from Junction-to-Case ¹	$R_{\theta JC}$	4.3	$^\circ\text{C/W}$

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	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	30	-	-	V	
Gate-body Leakage current	I_{GSS}	$V_{DS} = 0V, V_{GS} = \pm 20V$	-	-	± 100	nA	
Zero Gate Voltage Drain Current	$T_J=25^\circ\text{C}$	I_{DSS}	$V_{DS} = 24V, V_{GS} = 0V$	-	-	1	μA
	$T_J=55^\circ\text{C}$			-	-	5	
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.0	1.7	2.5	V	
Drain-Source On-Resistance ²	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 12A$	-	6.8	8.5	m Ω	
		$V_{GS} = 4.5V, I_D = 10A$	-	9	13		
Forward Transconductance	g_{fs}	$V_{DS} = 5V, I_D = 15A$	-	9.9	-	S	
Dynamic Characteristics							
Input Capacitance	C_{iss}	$V_{DS} = 15V, V_{GS} = 0V, f = 1\text{MHz}$	-	1105	-	pF	
Output Capacitance	C_{oss}		-	163	-		
Reverse Transfer Capacitance	C_{rss}		-	131	-		
Switching Characteristics							
Gate Resistance	R_g	$V_{DS} = 0V, V_{GS} = 0V, f = 1\text{MHz}$	-	2.2	-	Ω	
Total Gate Charge	Q_g	$V_{GS} = 4.5V, V_{DS} = 20V, I_D = 12A$	-	12.6	-	nC	
Gate-Source Charge	Q_{gs}		-	3.3	-		
Gate-Drain Charge	Q_{gd}		-	6.5	-		
Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = 10V, V_{DD} = 12V, R_G = 3.3\Omega, I_D = 5A$	-	4.5	-	nS	
Rise Time	t_r		-	10.6	-		
Turn-Off Delay Time	$t_{d(off)}$		-	25.2	-		
Fall Time	t_f		-	9.3	-		
Drain-source body diode Characteristics							
Diode Forward Voltage ²	V_{SD}	$I_S = 1A, V_{GS} = 0V$	-	-	1	V	
Continuous Source Current ^{1,5}	I_S	$V_G = V_D = 0V$, Force Current	-	-	46	A	

Note :

- 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 $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=30A$
- 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.

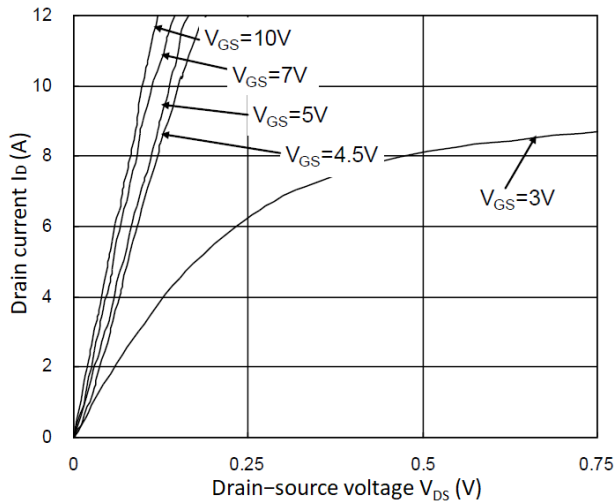


Figure 1. Output Characteristics

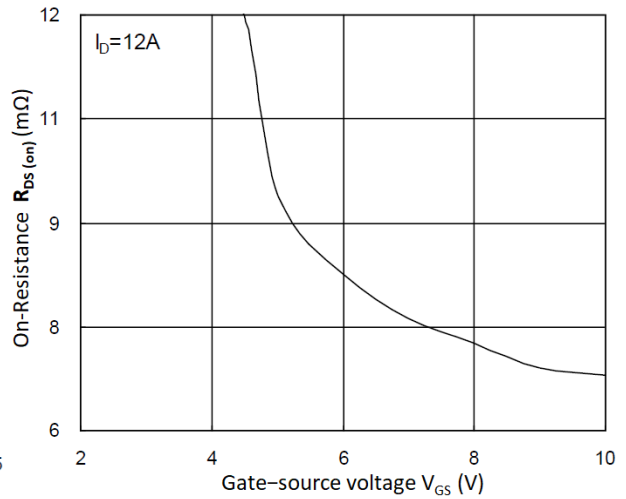


Figure 2. $R_{DS(on)}$ vs. V_{GS}

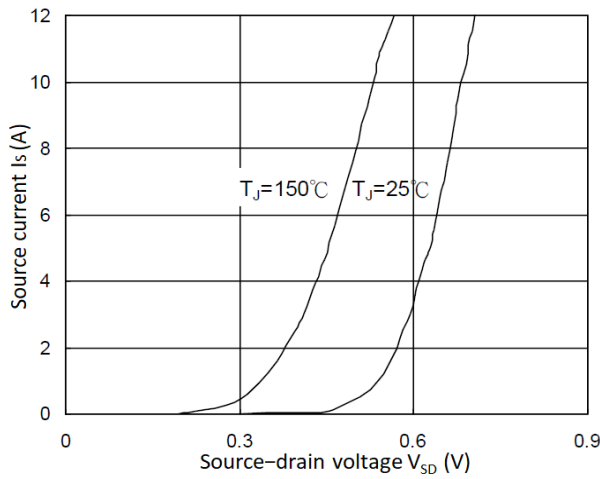


Figure 3. Forward Characteristics of Reverse

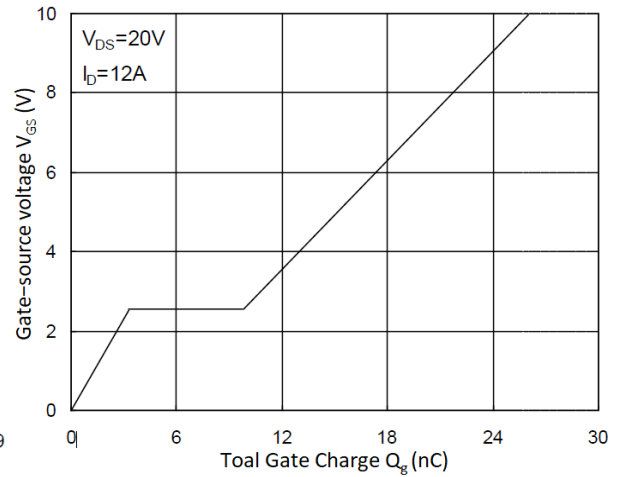


Figure 4. Gate Charge Characteristics

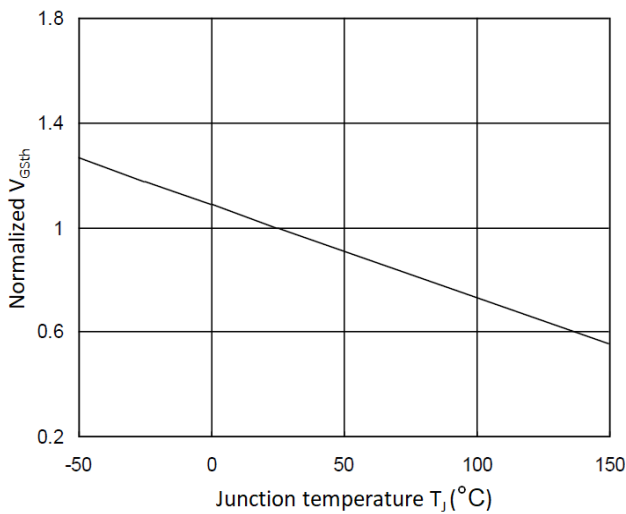


Figure 5. Normalized $V_{GS(th)}$ vs. T_J

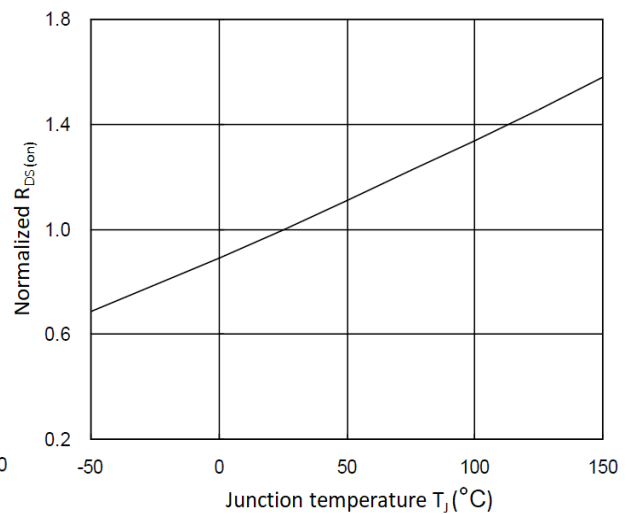


Figure 6. Normalized $R_{DS(on)}$ vs. T_J

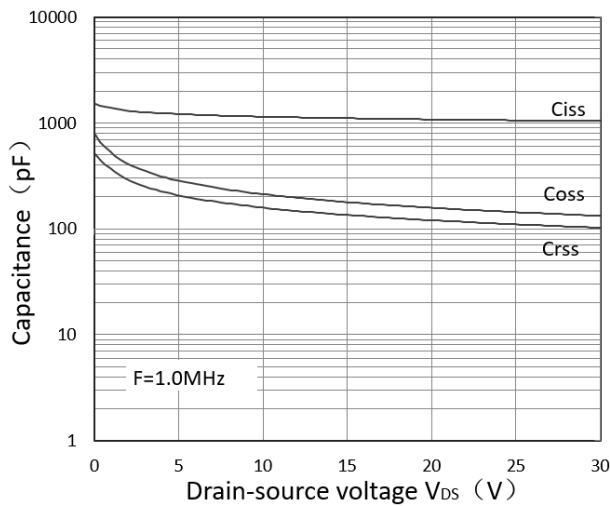


Figure 7. Capacitance Characteristics

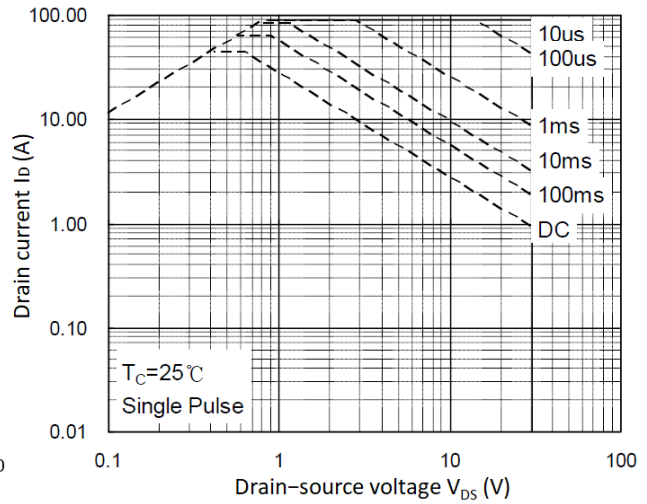


Figure 8. Safe Operating Area

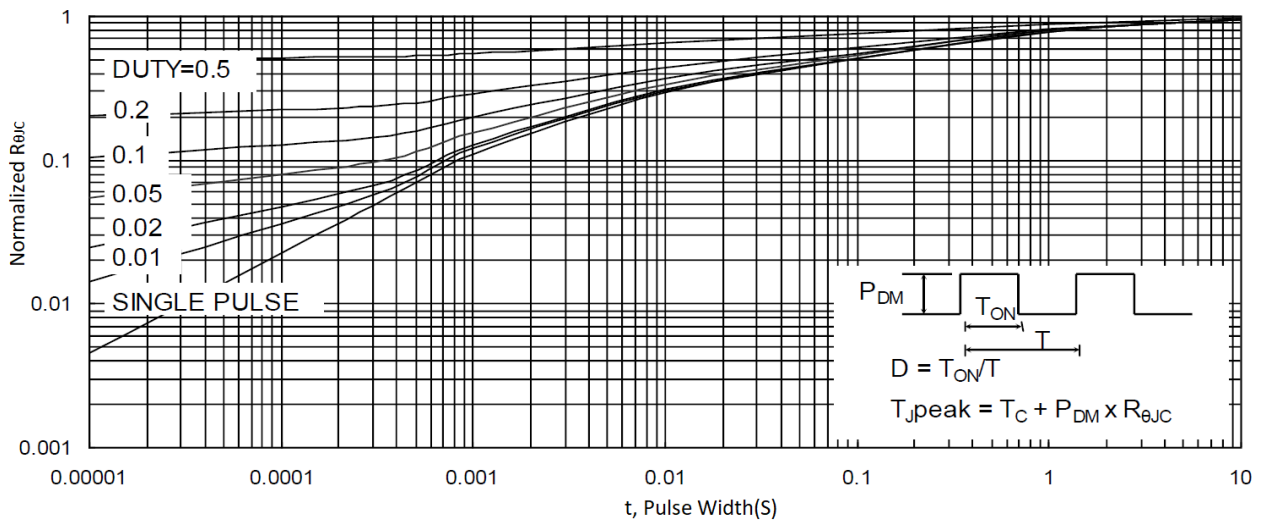


Figure 9. Normalized Maximum Transient Thermal Impedance

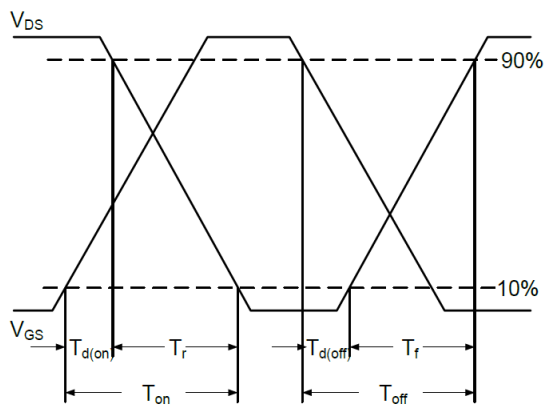


Figure 10. Switching Time Waveform

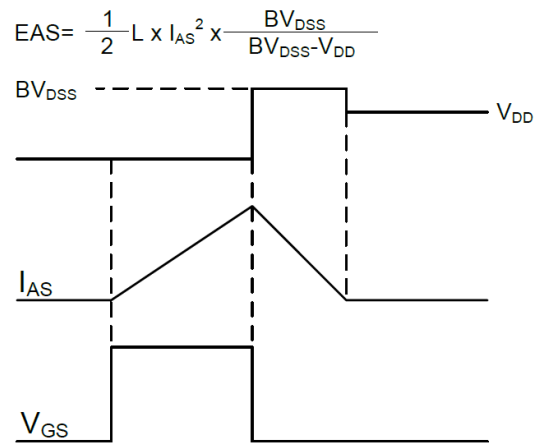
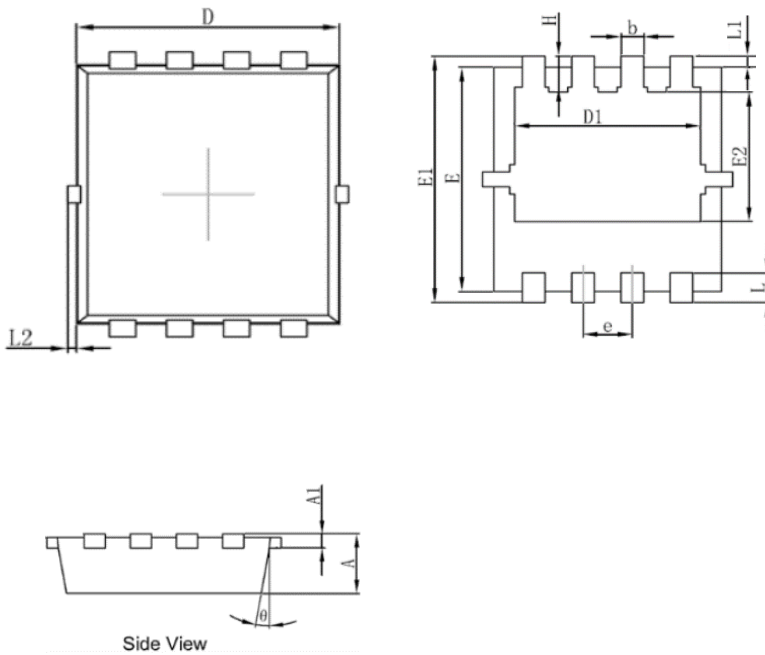


Figure 11. Unclamped Inductive Switching Waveform

Mechanical Dimensions for PDFN3030-8L



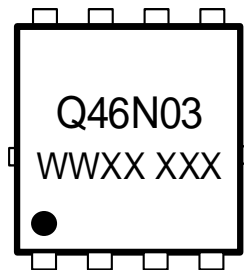
COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	0.70	0.85
A1	0.10	0.25
D	2.90	3.25
D1	2.25	2.65
E	2.90	3.20
E1	3.10	3.45
E2	1.54	1.98
b	0.20	0.40
e	0.60	0.70
L	0.30	0.50
L1	0.13BSC	
L2	0.00	0.15
H	0.20	0.65
θ	0°	14°

Ordering Information

Part	Package	Marking	Packing method
WMQ46N03T1	PDFN3030-8L	Q46N03	Tape and Reel

Marking Information



Q46N03 = Device code
 WWXX XXX= Date code

Contact Information

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