

100V N-Channel Enhancement Mode Power MOSFET

Description

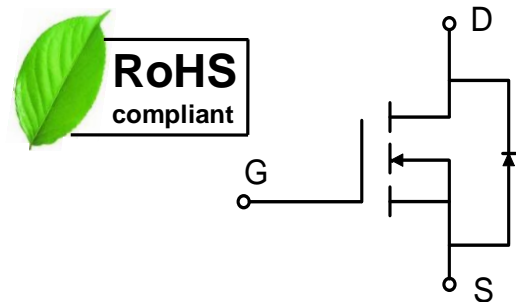
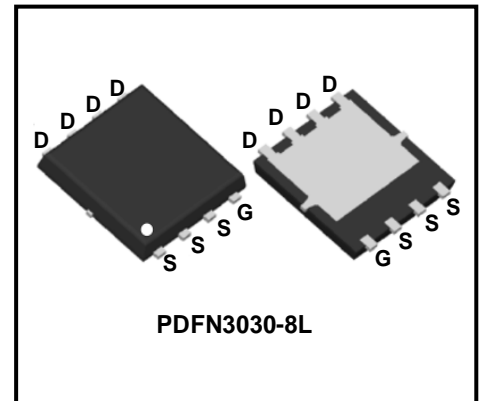
WMQ47N10T2 uses advanced power trench technology that has been especially tailored to minimize the on-state resistance and yet maintain superior switching performance.

Features

- $V_{DS} = 100V$, $I_D = 47A$
 $R_{DS(on)} < 9.8m\Omega @ V_{GS} = 10V$
 $R_{DS(on)} < 13m\Omega @ V_{GS} = 4.5V$
- Low Gate Charge
- High Speed Power Switching
- 100% EAS Guaranteed

Applications

- Power Management Switches
- Synchronous Rectification in SMPS
- DC/DC Converter



Absolute Maximum Ratings

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current@10V ¹	$T_C = 25^\circ C$	I_D	47	A
	$T_C = 100^\circ C$		30	
Continuous Drain Current(Package Limited)@10V ¹	$T_C = 25^\circ C$		36	
Pulsed Drain Current ²		I_{DM}	160	A
Single Pulse Avalanche Energy ³		EAS	28.8	mJ
Avalanche Current		I_{AS}	24	A
Total Power Dissipation ⁴	$T_C = 25^\circ C$	P_D	42	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	$R_{\theta JA}$	50	$^\circ C/W$
Thermal Resistance from Junction-to-Case ¹	$R_{\theta JC}$	3	$^\circ C/W$

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	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	100	-	-	V
Gate-body Leakage current	I_{GSS}	$V_{DS} = 0V, V_{GS} = \pm 20V$	-	-	± 100	nA
Zero Gate Voltage Drain Current	$T_J=25^\circ\text{C}$	$V_{DS} = 24V, V_{GS} = 0V$	-	-	1	μA
	$T_J=100^\circ\text{C}$		-	-	100	
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.3	1.75	2.4	V
Drain-Source On-Resistance ²	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 20A$	-	8.4	9.8	m Ω
		$V_{GS} = 4.5V, I_D = 20A$	-	11.5	13	
Forward Transconductance	g_{fs}	$V_{DS} = 5V, I_D = 10A$	-	80	-	S
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS} = 50V, V_{GS} = 0V, f = 1\text{MHz}$	-	1620	-	μF
Output Capacitance	C_{oss}		-	300	-	
Reverse Transfer Capacitance	C_{rss}		-	5.5	-	
Switching Characteristics						
Gate Resistance	R_g	$V_{DS} = 0V, V_{GS} = 0V, f = 1\text{MHz}$	-	1.3	-	Ω
Total Gate Charge	Q_g	$V_{GS} = 4.5V, V_{DD} = 50V, I_D = 20A$	-	11.6	-	nC
Total Gate Charge	Q_g	$V_{GS} = 10V, V_{DD} = 50V, I_D = 20A$	-	23	-	nC
Gate-Source Charge	Q_{gs}		-	3.8	-	
Gate-Drain Charge	Q_{gd}		-	6.3	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = 10V, V_{DD} = 50V, R_G = 10\Omega, I_D = 20A$	-	5.9	-	nS
Rise Time	t_r		-	3.9	-	
Turn-Off Delay Time	$t_{d(off)}$		-	17	-	
Fall Time	t_f		-	2.9	-	
Drain-Source Body Diode Characteristics						
Diode Forward Voltage ²	V_{SD}	$I_S = 20A, V_{GS} = 0V$	-	-	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$V_R = 50V, I_F = 20A, di/dt = 500A/\mu s$	-	42	-	nS
Body Diode Reverse Recovery Charge	Q_{rr}		-	155	-	nC

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 $V_{DD}=135V, V_{GS}=10V, L=0.1mH, I_{AS}=24A$
4. The power dissipation is limited by 150 $^\circ\text{C}$ junction temperature

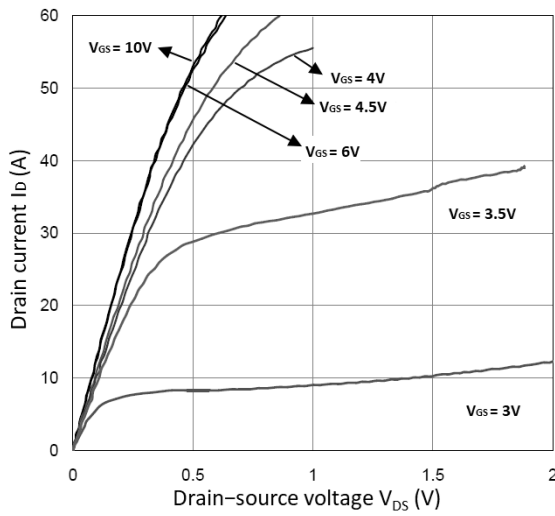


Figure 1. Output Characteristics

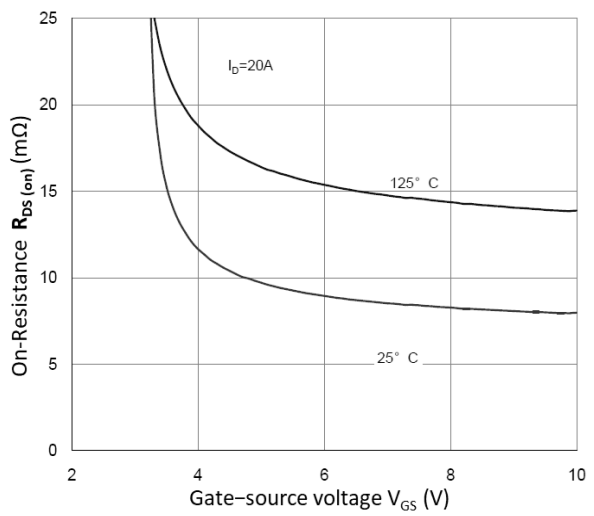


Figure 2. $R_{DS(on)}$ vs. V_{GS}

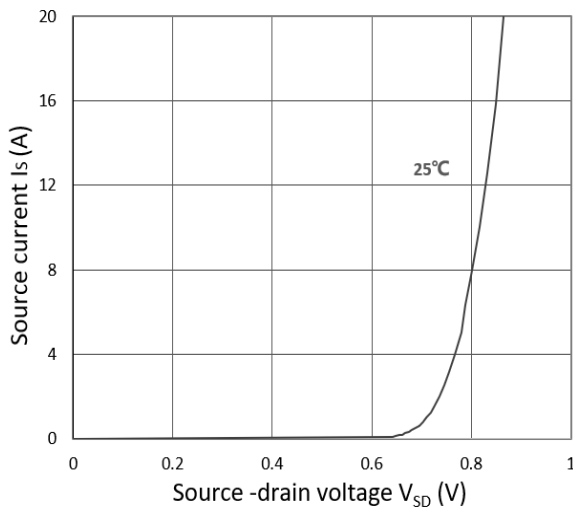


Figure 3. Forward Characteristics of Reverse

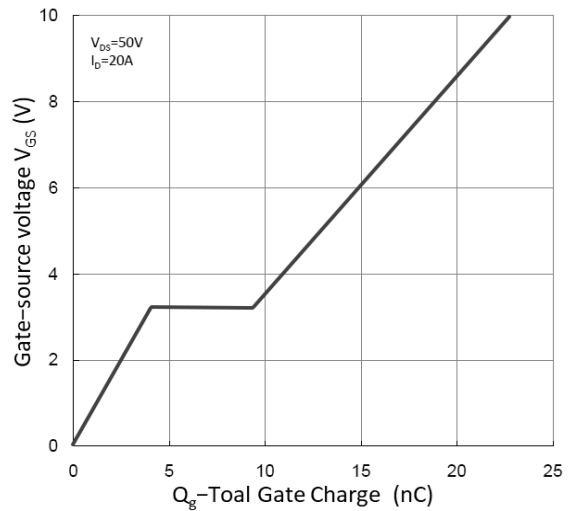


Figure 4. Gate Charge Characteristics

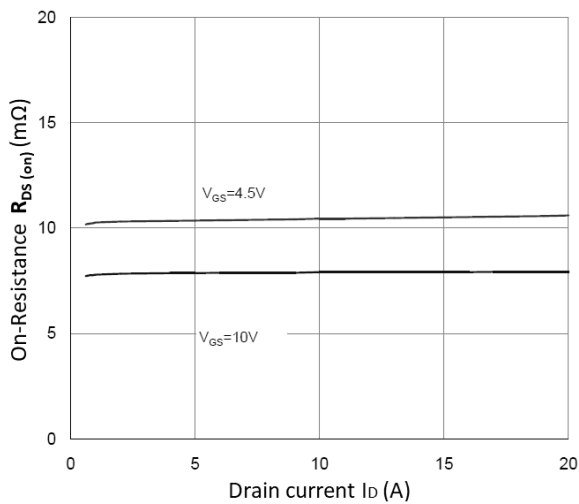


Figure 5. $R_{DS(ON)}$ vs. I_D

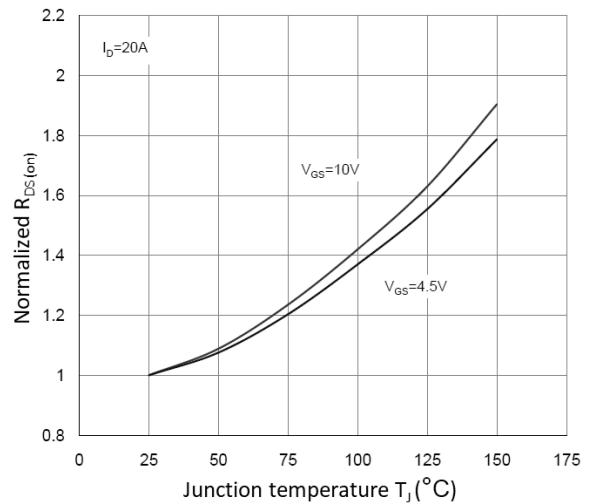


Figure 6. Normalized $R_{DS(on)}$ vs. T_J

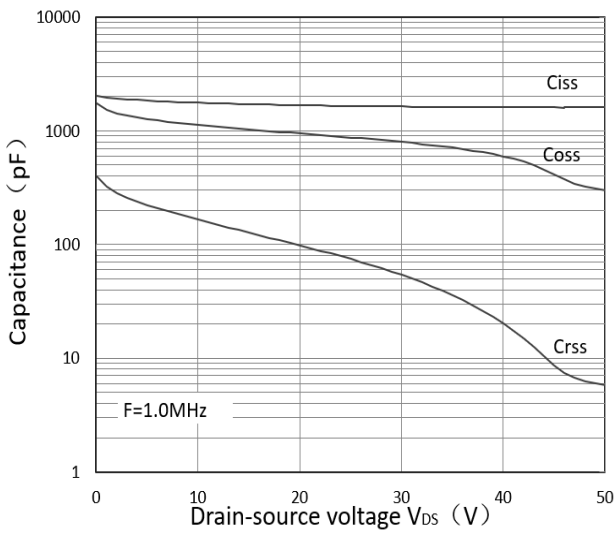


Figure 7. Capacitance Characteristics

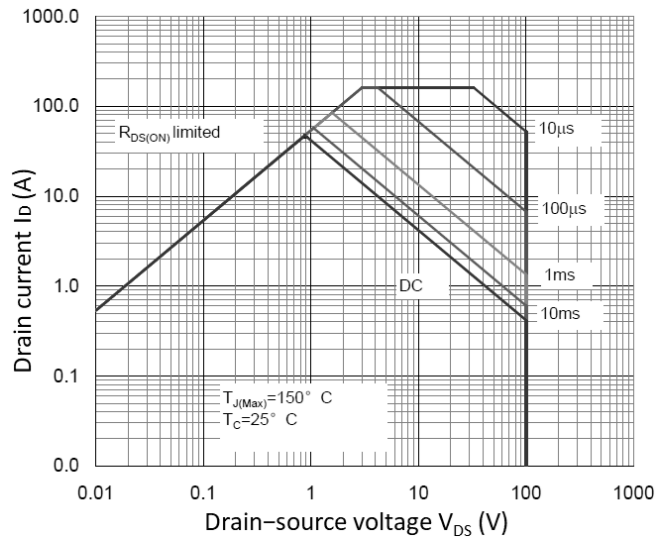


Figure 8. Safe Operating Area

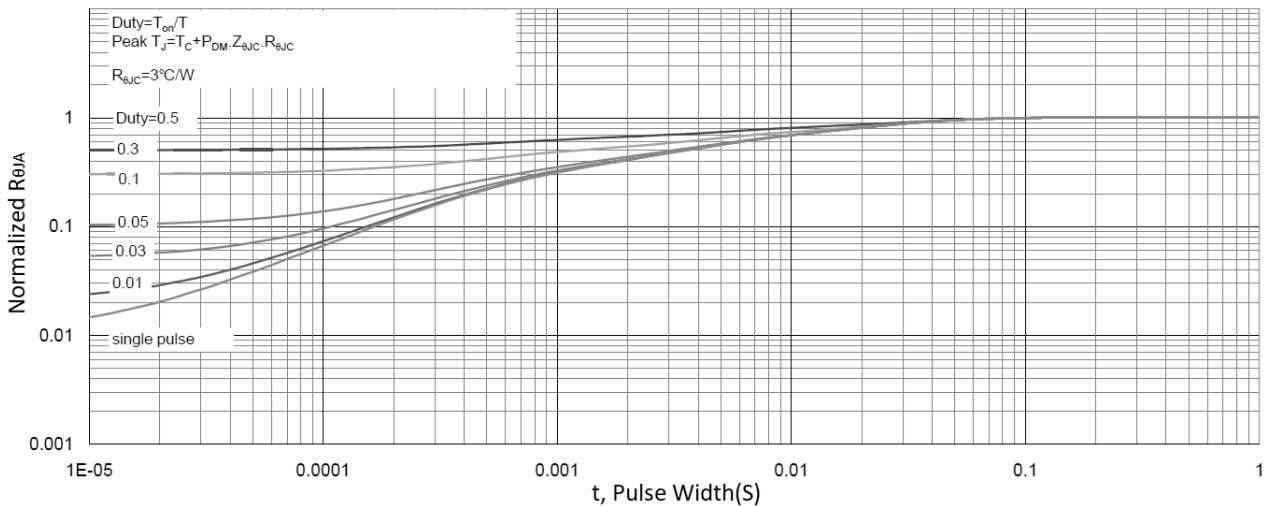


Figure 9. Normalized Maximum Transient Thermal Impedance

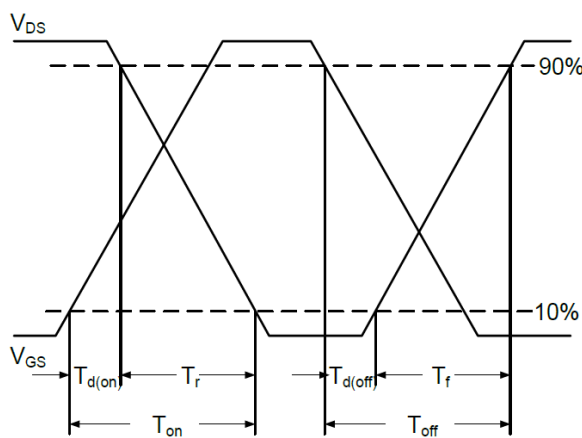


Figure 10. Switching Time Waveform

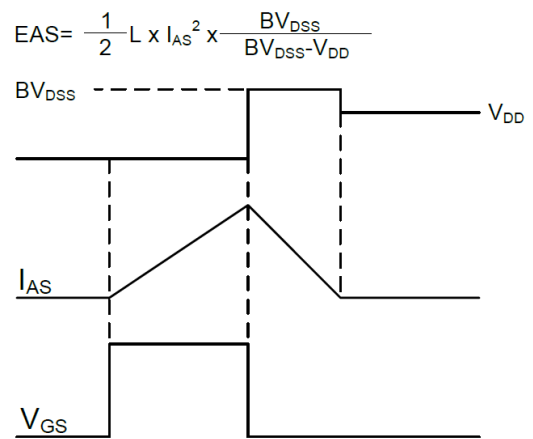
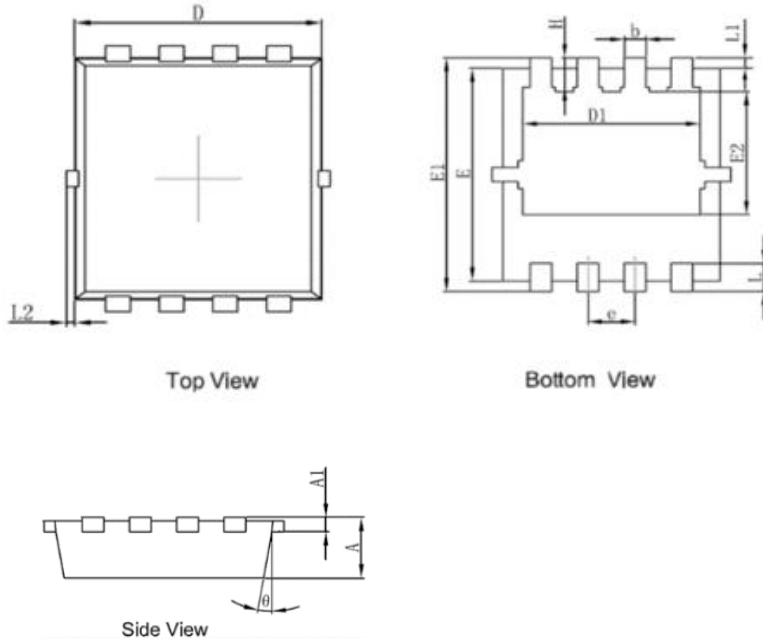


Figure 11. Unclamped Inductive Switching Waveform

Mechanical Dimensions for PDFN3030-8L



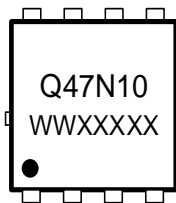
COMMON DIMENSIONS

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	0.15
H	0.20	0.65
θ	0°	14°

Ordering Information

Part	Package	Marking	Packing method
WMQ47N10T2	PDFN3030-8L	Q47N10	Tape and Reel

Marking Information



Q47N10 = Device code
 WWXXXXX= Date code


Contact Information

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