

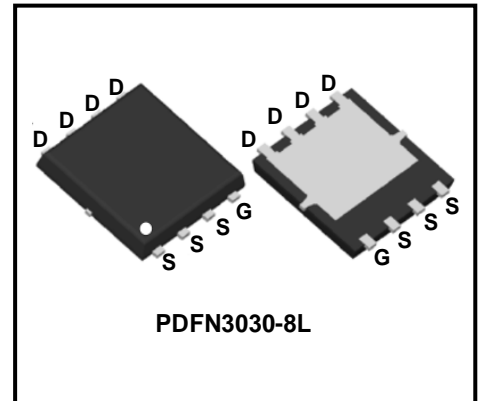
20V N-Channel Enhancement Mode Power MOSFET

Description

WMQ30N02T1 uses advanced power trench technology that has been especially tailored to minimize the on-state resistance and yet maintain superior switching performance.

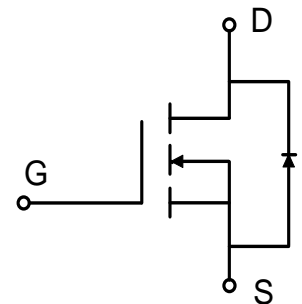
Features

- $V_{DS} = 20V$, $I_D = 30A$
 $R_{DS(on)} < 4.5m\Omega @ V_{GS} = 4.5V$
 $R_{DS(on)} < 5m\Omega @ V_{GS} = 2.5V$
- Low $R_{DS(on)}$
- Advanced High Cell Density Trench Technology
- 100% EAS Guaranteed



Applications

- High Current Load Applications
- Load Switching
- Hard Switched and High Frequency Circuits
- Uninterruptible Power Supply



Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 10	V
Continuous Drain Current ¹	I_D	$T_C = 25^\circ C$	30
		$T_C = 100^\circ C$	11
Pulsed Drain Current ²	I_{DM}	110	A
Single Pulse Avalanche Energy ³	EAS	61.2	mJ
Avalanche Current	I_{AS}	35	A
Total Power Dissipation ⁴	P_D	37.8	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	$R_{\theta JA}$	36	$^\circ C/W$
Thermal Resistance from Junction-to-Case ¹	$R_{\theta JC}$	3.3	$^\circ C/W$

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	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	20	-	-	V
Gate-body Leakage current	I_{GSS}	$V_{DS} = 0V, V_{GS} = \pm 10V$	-	-	± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$T_J = 25^\circ\text{C}$ $V_{DS} = 20V, V_{GS} = 0V$	-	-	1	μA
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	0.4	0.65	1	V
Drain-Source On-Resistance ²	$R_{DS(on)}$	$V_{GS} = 4.5V, I_D = 20A$	-	2.9	4.5	m Ω
		$V_{GS} = 2.5V, I_D = 15A$	-	3.7	5	
		$V_{GS} = 1.8V, I_D = 10A$	-	4.9	7.5	
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS} = 10V, V_{GS} = 0V, f = 1\text{MHz}$	-	3850	-	pF
Output Capacitance	C_{oss}		-	490	-	
Reverse Transfer Capacitance	C_{rss}		-	440	-	
Switching Characteristics						
Gate Resistance	R_g	$V_{DS} = 0V, V_{GS} = 0V, f = 1\text{MHz}$	-	1.75	-	Ω
Total Gate Charge	Q_g	$V_{GS} = 4.5V, V_{DS} = 10V, I_D = 15A$	-	100	-	nC
Gate-Source Charge	Q_{gs}		-	24	-	
Gate-Drain Charge	Q_{gd}		-	20	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = 4.5V, V_{DD} = 10V,$ $R_G = 3\Omega, R_L = 1\Omega, I_D = 10A$	-	11.5	-	nS
Rise Time	t_r		-	24.5	-	
Turn-Off Delay Time	$t_{d(off)}$		-	33.2	-	
Fall Time	t_f		-	9.6	-	
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	-	-	30	A
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 15A, di/dt = 100A/\mu s$	-	35	-	nS
Body Diode Reverse Recovery Charge	Q_{rr}		-	39	-	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 $V_{DD} = 15V, V_{GS} = 10V, L = 0.1\text{mH}, I_{AS} = 35A$
4. The power dissipation is limited by 175 $^\circ\text{C}$ 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.

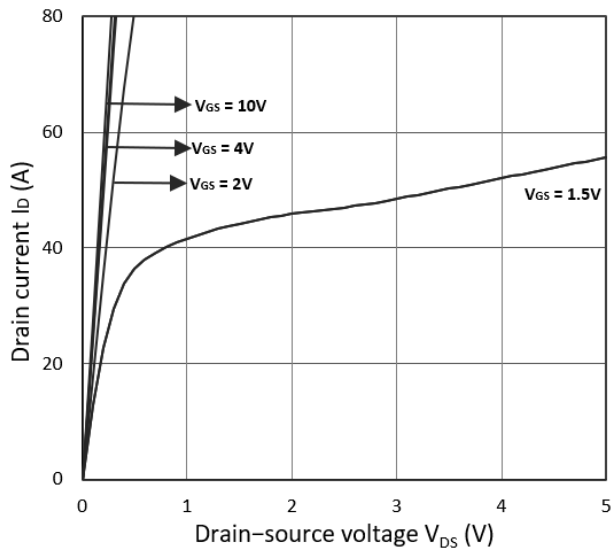


Figure 1. Output Characteristics

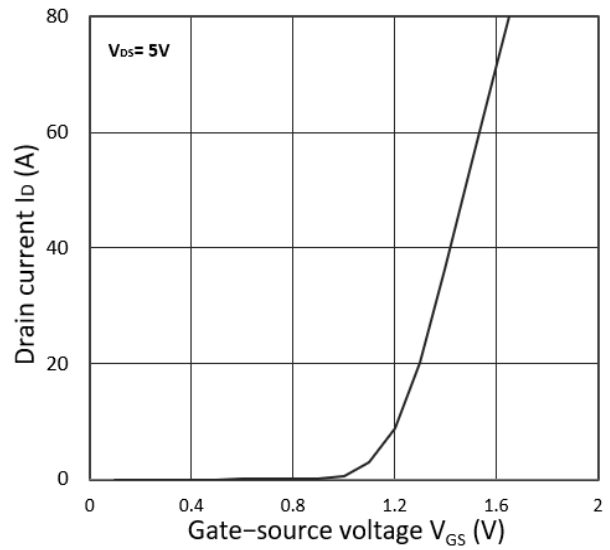


Figure 2. Transfer Characteristics

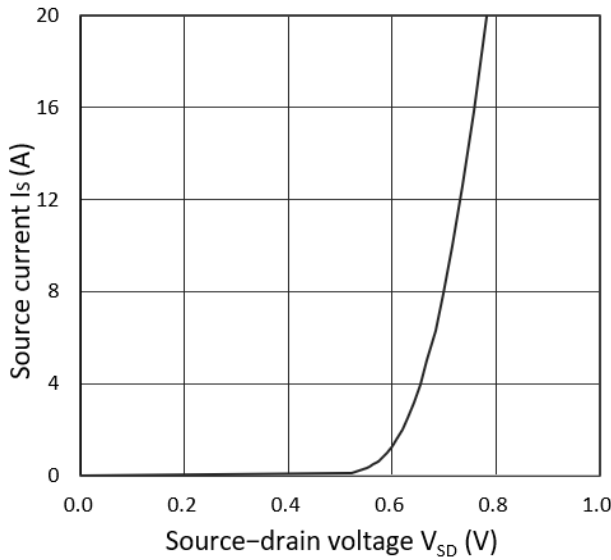


Figure 3. Forward Characteristics of Reverse

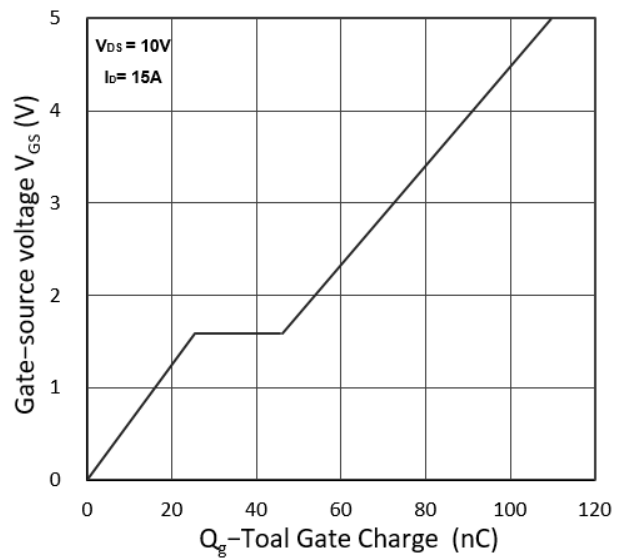


Figure 4. Gate Charge Characteristics

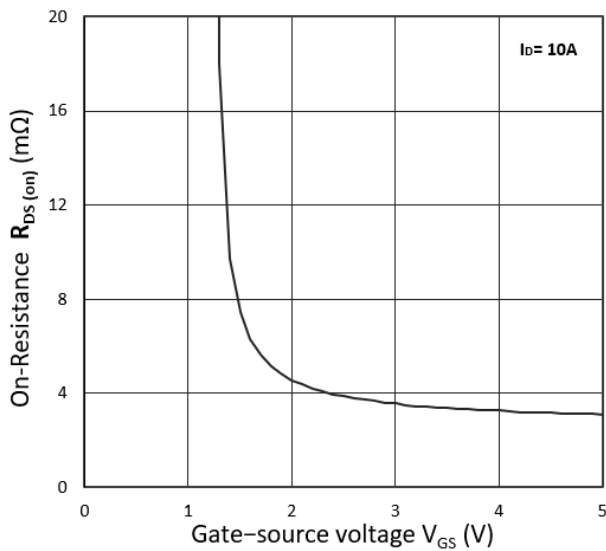


Figure 5. $R_{DS(on)}$ vs. V_{GS}

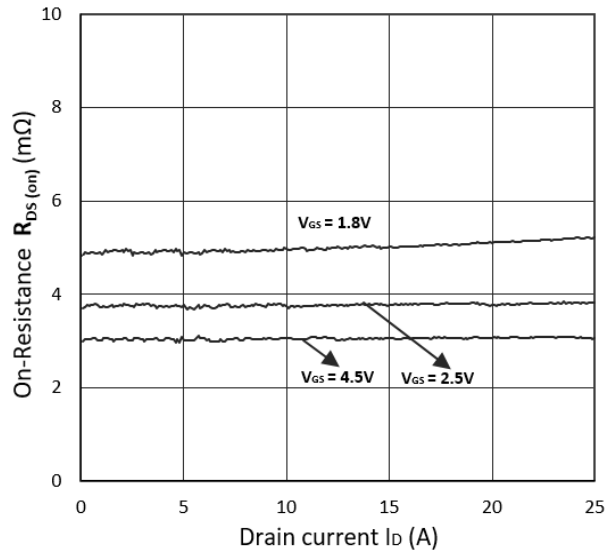


Figure 6. $R_{DS(on)}$ vs. I_D

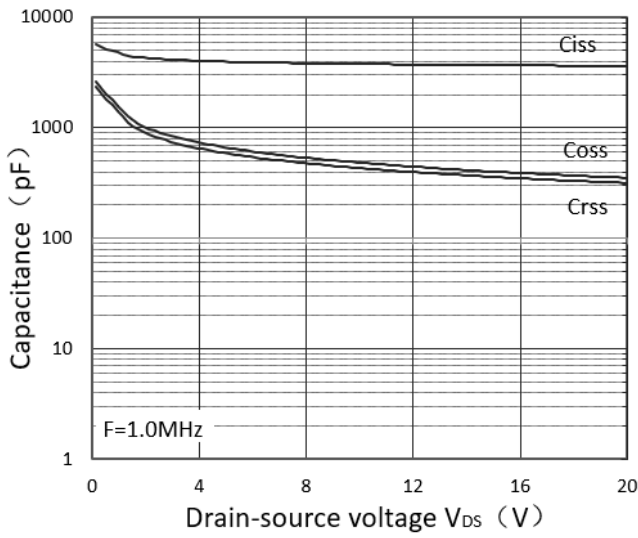


Figure 7. Capacitance Characteristics

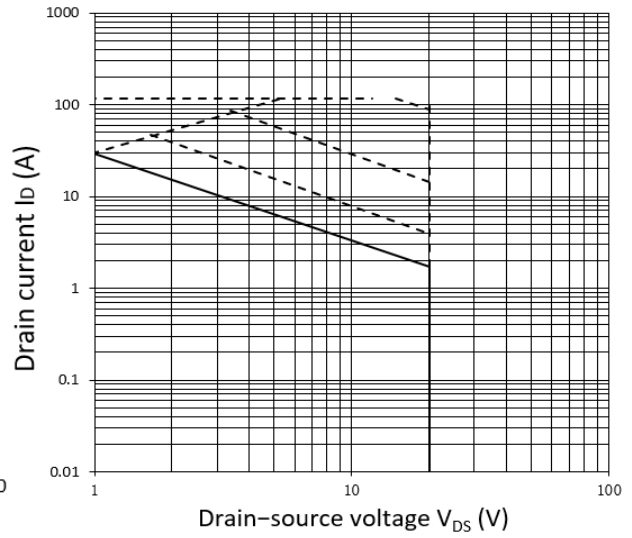


Figure 8. Safe Operating Area

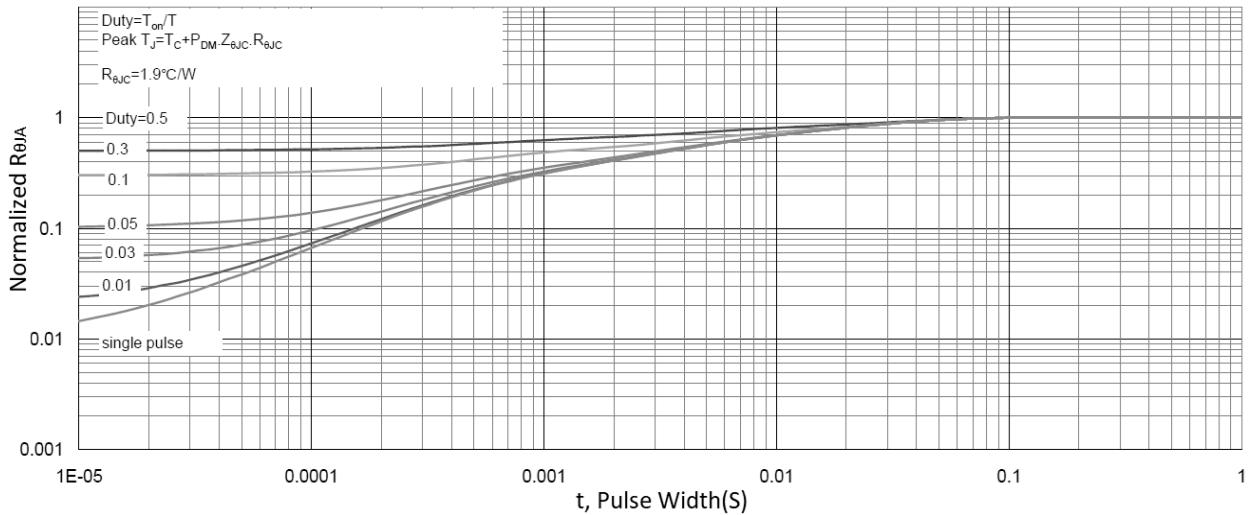


Figure 9. Normalized Maximum Transient Thermal Impedance

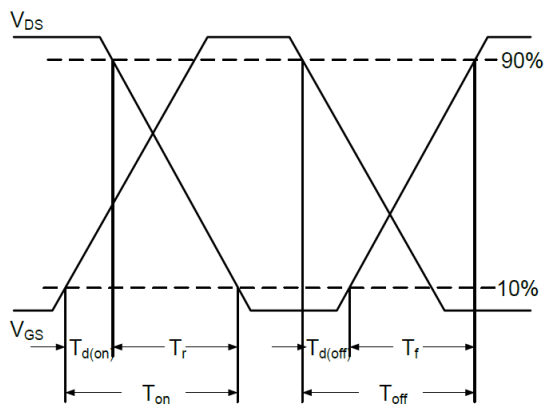


Figure 10. Switching Time Waveform

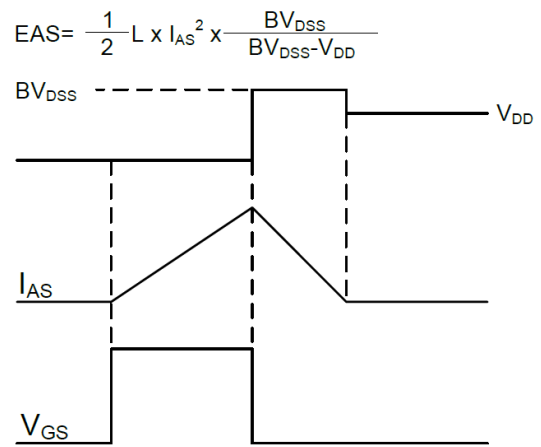
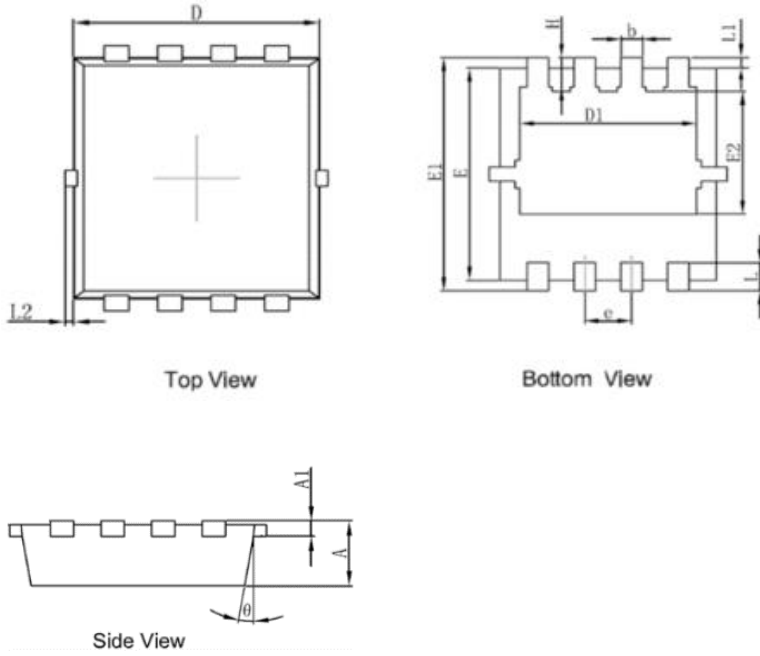


Figure 11. Unclamped Inductive Switching Waveform

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

Mechanical Dimensions for PDFN3030-8L



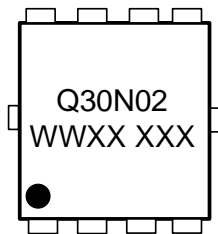
COMMON DIMENSIONS

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
WMQ30N02T1	PDFN3030-8L	Q30N02	Tape and Reel

Marking Information



Q30N02 = Device code
 WWXX XXX= Date code


Contact Information

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