

30V P-Channel Enhancement Mode Power MOSFET

Description

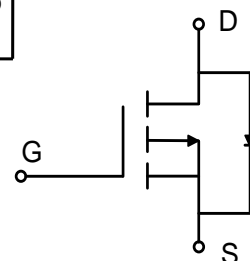
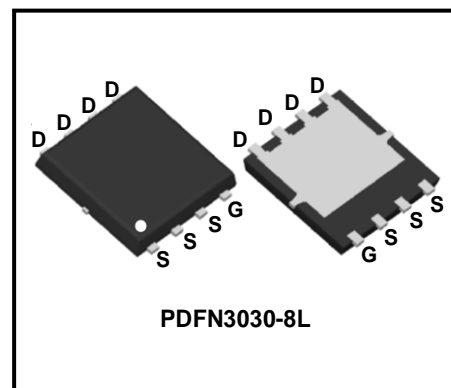
WMQ42P03T1 uses advanced power trench technology that has been especially tailored to minimize the on-state resistance and yet maintain superior switching performance.

Features

- $V_{DS} = -30V$, $I_D = -42A$
Typ. $R_{DS(on)} = 7.5m\Omega$ @ $V_{GS} = -10V$
Typ. $R_{DS(on)} = 10.5m\Omega$ @ $V_{GS} = -4.5V$
- Green Device Available
- Low Gate Charge
- RoHS Compliant & Halogen-Free
- Advanced High Cell Density Trench Technology
- 100% EAS Guaranteed

Applications

- Power Management Switches
- DC/DC Converter



Absolute Maximum Ratings ($T_A = 25^\circ C$, unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	-30	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_C = 25^\circ C$	I_D	-42	A
	$T_C = 100^\circ C$		-27	
Pulsed Drain Current ¹		I_{DM}	-168	A
Single Pulse Avalanche Energy ²		EAS	45	mJ
Total Power Dissipation	$T_C = 25^\circ C$	P_D	37	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 ³	R_{θJA}	75	$^\circ C/W$
Thermal Resistance from Junction-to-Case	R_{θJC}	3.36	$^\circ C/W$

Electrical Characteristics ($T_J = 25^\circ\text{C}$, 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	$T_J=25^{\circ}C$	I_{DSS}	$V_{DS} = -30V, V_{GS} = 0V$	-	-	-1	μA
	$T_J=100^{\circ}C$			-	-	-100	
Gate-Threshold Voltage		$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-1.0	-1.5	-2.0	V
Drain-Source On-Resistance ⁴		$R_{DS(on)}$	$V_{GS} = -10V, I_D = -30A$	-	7.5	9.6	mΩ
			$V_{GS} = -4.5V, I_D = -15A$	-	10.5	13.5	
Forward Transconductance ⁴		g_{fs}	$V_{DS} = -5V, I_D = -30A$	-	57	-	S
Dynamic Characteristics ⁵							
Input Capacitance		C_{iss}	$V_{DS} = -15V, V_{GS} = 0V, f = 1MHz$	-	2396	-	pF
Output Capacitance		C_{oss}		-	325	-	
Reverse Transfer Capacitance		C_{rss}		-	283	-	
Gate Resistance		R_g	$f = 1MHz$	-	10.5	-	Ω
Switching Characteristics ⁵							
Total Gate Charge		Q_g	$V_{GS} = -10V, V_{DS} = -15V, I_D = -30A$	-	30	-	nC
Gate-Source Charge		Q_{gs}		-	5	-	
Gate-Drain Charge		Q_{gd}		-	7.5	-	
Turn-On Delay Time		$t_{d(on)}$	$V_{GS} = -10V, V_{DD} = -15V, R_G = 3\Omega, I_D = -30A$	-	14.1	-	ns
Rise Time		t_r		-	20	-	
Turn-Off Delay Time		$t_{d(off)}$		-	94	-	
Fall Time		t_f		-	65	-	
Body Diode Reverse Recovery Time		t_{rr}	$I_F = -30A, di/dt = -100A/\mu s$	-	19	-	ns
Body Diode Reverse Recovery Charge		Q_{rr}		-	9	-	nC
Drain-Source Body Diode Characteristics							
Diode Forward Voltage ⁴		V_{SD}	$I_S = -1A, V_{GS} = 0V$	-	-	-1.2	V
Continuous Source Current	$T_C=25^{\circ}C$	I_S	-	-	-	-42	A

Note :

1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)} = 150^\circ\text{C}$.
2. The test condition is $V_{DD} = -25V, V_{GS} = -10V, L = 0.1\text{mH}, I_{AS} = -30A$.
3. The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper, The value in any given application depends on the user's specific board design.
4. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
5. This value is guaranteed by design hence it is not included in the production test.

Typical Characteristics

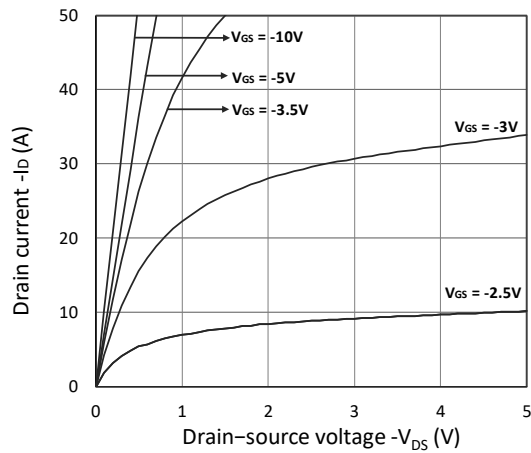


Figure 1. Output Characteristics

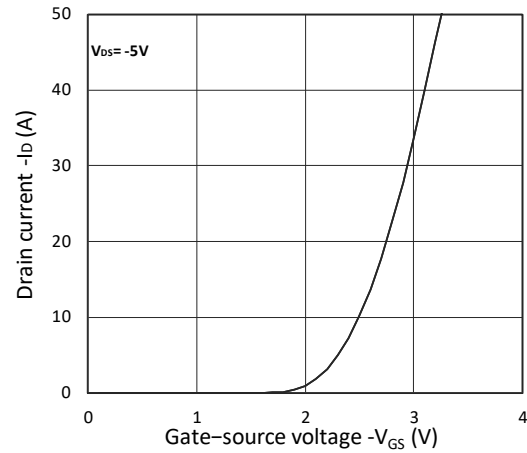


Figure 2. Transfer Characteristics

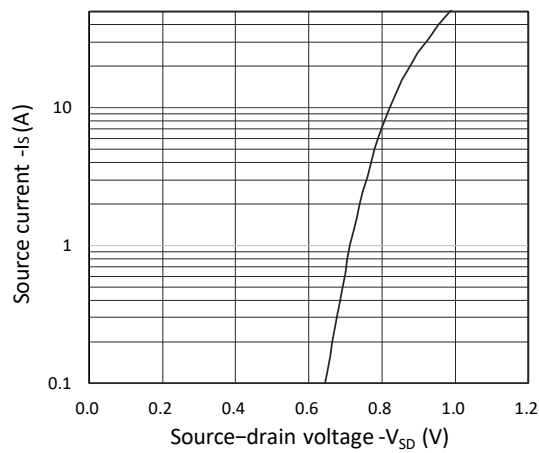
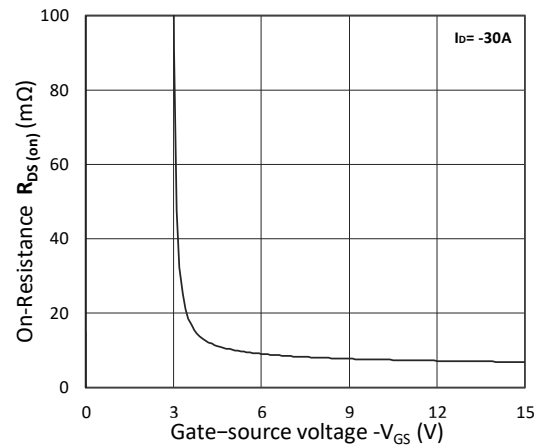
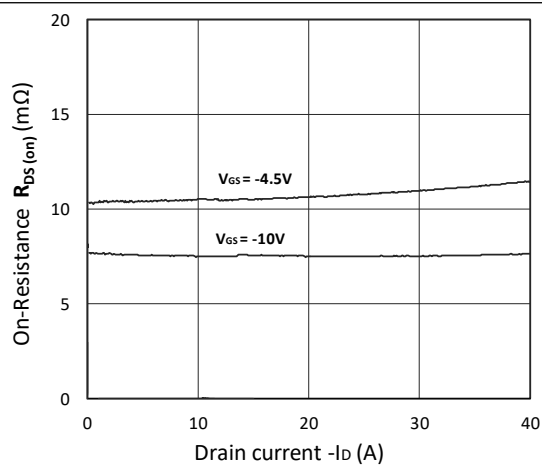
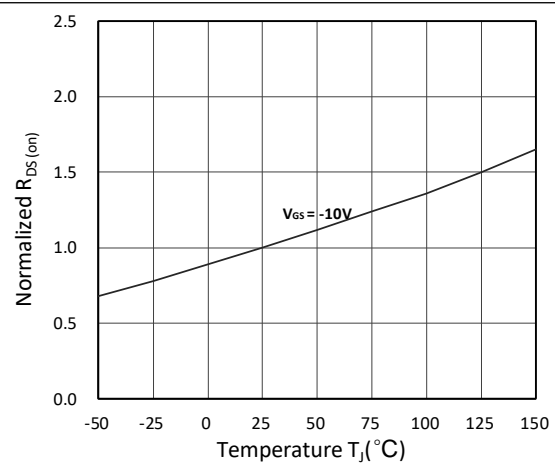


Figure 3. Forward Characteristics of Reverse

Figure 4. $R_{DS(on)}$ vs. V_{GS} Figure 5. $R_{DS(on)}$ vs. I_D Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

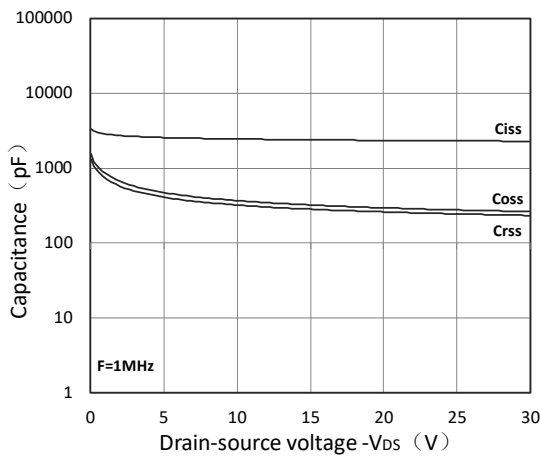


Figure 7. Capacitance Characteristics

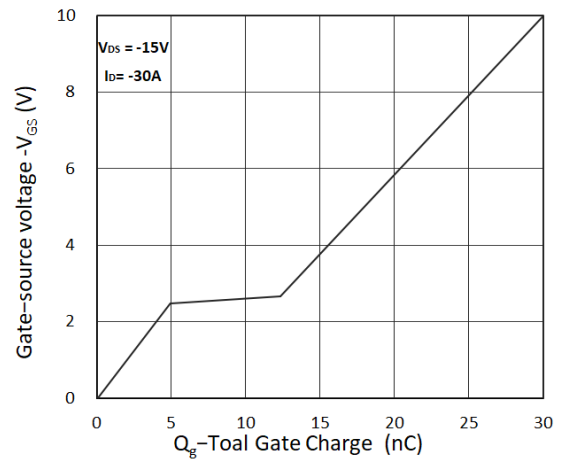


Figure 8. Gate Charge Characteristics

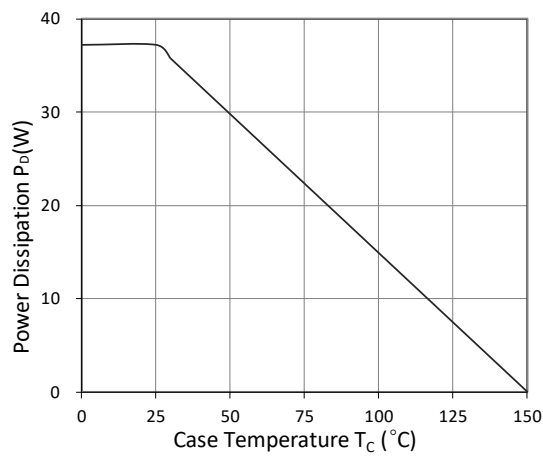


Figure 9. Power Dissipation

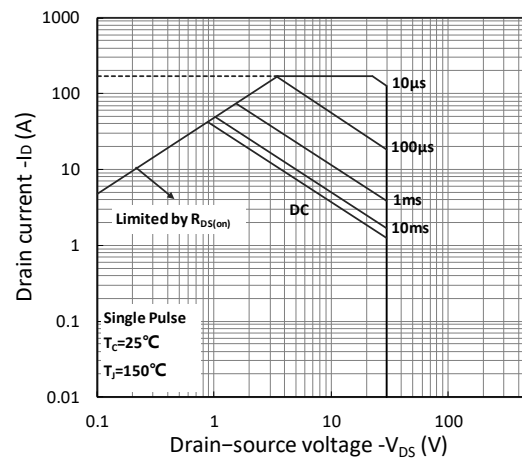


Figure 10. Safe Operating Area

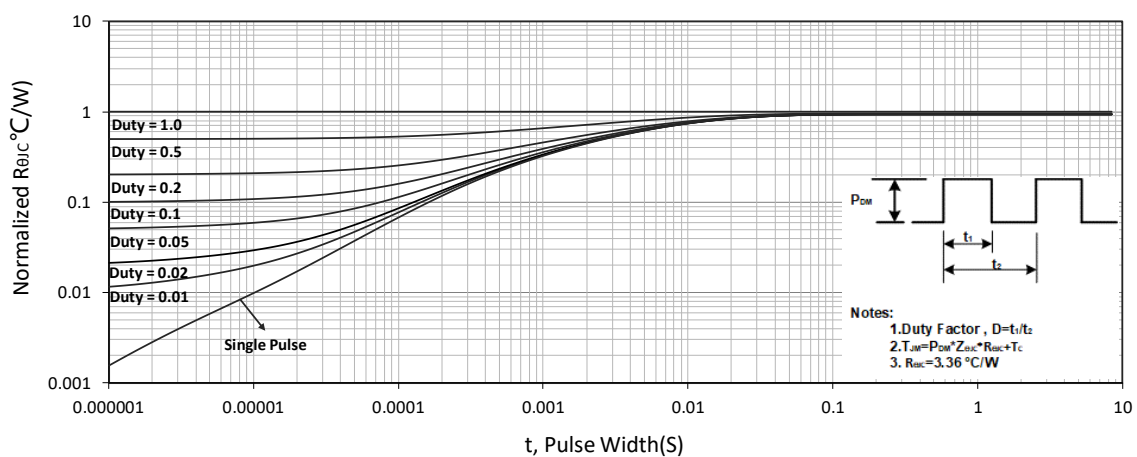


Figure 11. Normalized Maximum Transient Thermal Impedance

Test Circuit

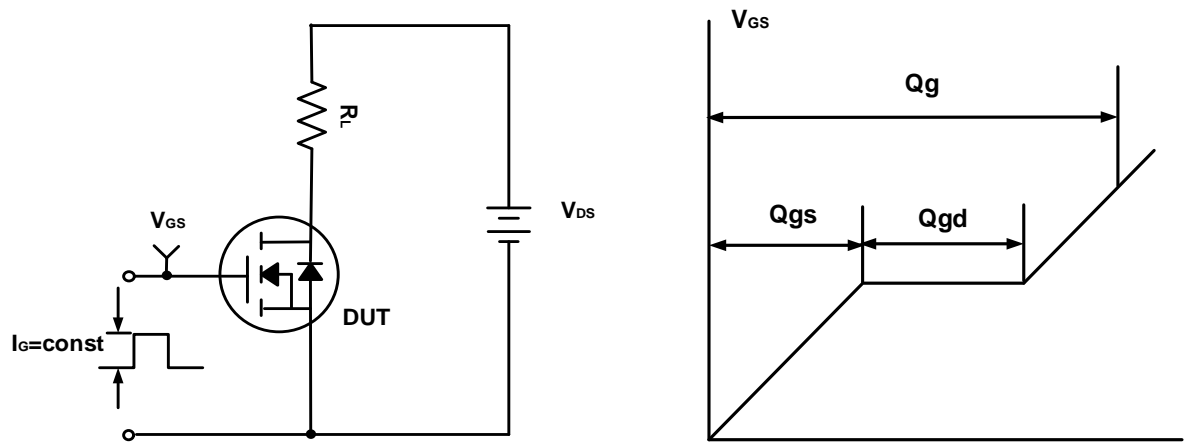


Figure A. Gate Charge Test Circuit & Waveforms

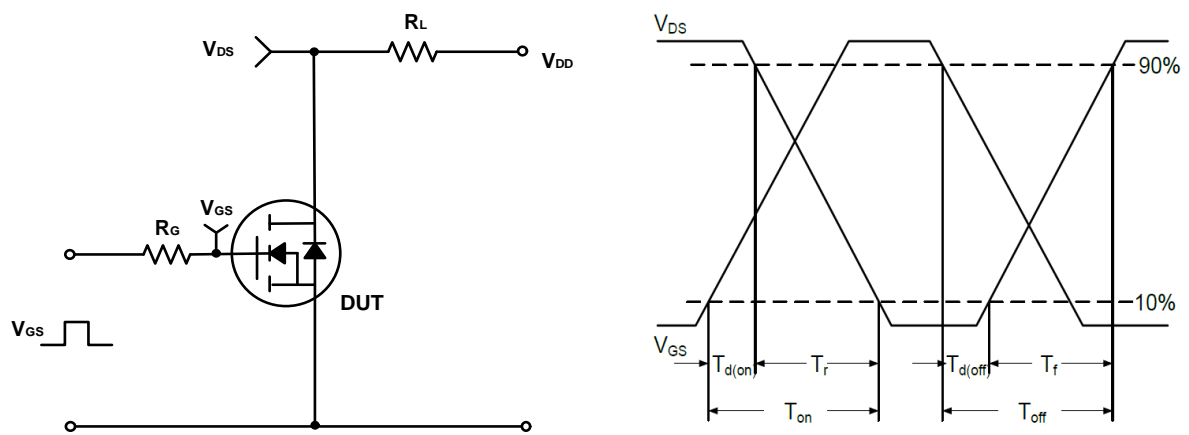


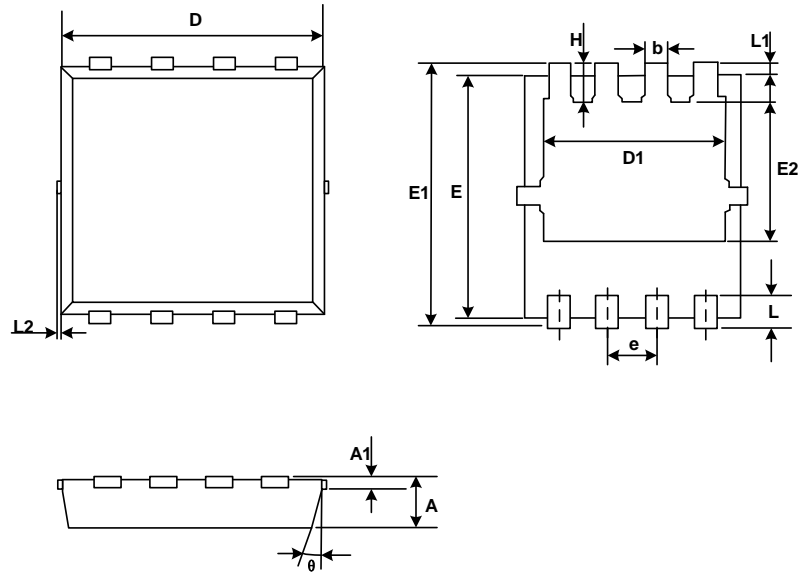
Figure B. Switching Test Circuit & Waveforms



Figure C. Unclamped Inductive Switching Circuit & Waveforms

Mechanical Dimensions for PDFN3030-8L

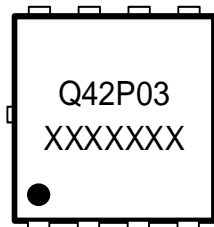
COMMON DIMENSIONS



SYMBOL	MM	
	MIN	MAX
A	0.65	0.90
A1	0.10	0.25
D	2.90	3.30
D1	2.25	2.69
E	2.90	3.20
E1	3.00	3.60
E2	1.35	2.20
b	0.20	0.40
e	0.65BSC	
L	0.15	0.50
L1	0.13BSC	
L2	0.00	0.20
H	0.15	0.65
θ	0°	14°

Ordering Information

Part	Package	Marking	Packing method
WMQ42P03T1	PDFN3030-8L	Q42P03	Tape and Reel

Marking Information

Q42P03 = Device code

XXXXXXX= Date code

Contact Information

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WAYON website: <http://www.way-on.com>

For additional information, please contact your local Sales Representative.

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2. The product parameters described in the product specification are numerical values, characteristics, and functions obtained through actual testing or theoretical calculations of the product in an independent or ideal state. Due to the complexity of product applications and variations in test conditions and equipment, there may be slight fluctuations in parameter test values. WAYON shall not guarantee that the actual performance of the product when installed in the customer's system or equipment will be entirely consistent with the product specification, especially concerning dynamic parameters. It is recommended that users consult with professionals for product selection and system design. Users should also thoroughly validate and assess whether the actual parameters and performance when installed in their respective systems or equipment meet their requirements or expectations. Additionally, users should exercise caution in verifying product compatibility issues, and WAYON assumes no responsibility for the application of the product.
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