

## 30V N-Channel Enhancement Mode Power MOSFET

### Description

WMQ45N03T1 uses advanced power trench technology that has been especially tailored to minimize the on-state resistance and yet maintain superior switching performance.

### Features

- $V_{DS} = 30V$ ,  $I_D = 45A$   
 $R_{DS(on)} < 3.8m\Omega @ V_{GS} = 10V$   
 $R_{DS(on)} < 5.8m\Omega @ V_{GS} = 4.5V$
- Protect ESD
- Low Gate Charge
- Low  $R_{DS(ON)}$
- 100% EAS Guaranteed

### Applications

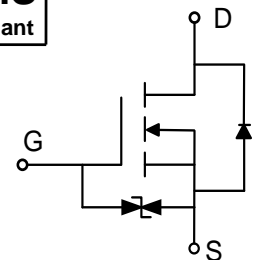
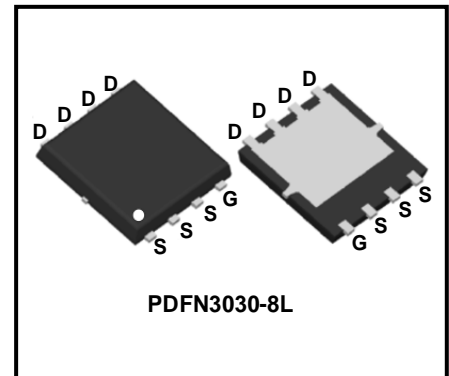
- Power Management Switches
- DC/DC Converter

### Absolute Maximum Ratings

Parameter		Symbol	Value	Unit
Drain-Source Voltage		$V_{DS}$	30	V
Gate-Source Voltage		$V_{GS}$	$\pm 20$	V
Continuous Drain Current@10V <sup>1</sup>	$T_C = 25^\circ C$	$I_D$	45	A
	$T_C = 100^\circ C$		36	
	$T_A = 25^\circ C$		24	
	$T_A = 70^\circ C$		19	
Pulsed Drain Current <sup>2</sup>		$I_{DM}$	160	A
Single Pulse Avalanche Energy <sup>3</sup>		<b>EAS</b>	140	mJ
Avalanche Current		$I_{AS}$	53	A
Total Power Dissipation <sup>4</sup>	$T_C = 25^\circ C$	$P_D$	37	W
	$T_A = 25^\circ C$		3.2	
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 <sup>1</sup>	$R_{\theta JA}$	75	$^\circ C/W$
Thermal Resistance from Junction-to-Case <sup>1</sup>	$R_{\theta JC}$	3	$^\circ C/W$



**Electrical Characteristics**  $T_c = 25^\circ\text{C}$ , unless otherwise noted

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit	
<b>Static Characteristics</b>							
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	30	-	-	V	
Gate-body Leakage current	$I_{GSS}$	$V_{DS} = 0V, V_{GS} = \pm 20V$	-	-	$\pm 10$	$\mu A$	
Zero Gate Voltage Drain Current	$T_J=25^\circ\text{C}$	$I_{DSS}$	$V_{DS} = 30V, V_{GS} = 0V$	-	-	1	$\mu A$
	$T_J=55^\circ\text{C}$			-	-	5	
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.0	-	2.5	V	
Drain-Source On-Resistance <sup>2</sup>	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 20A$	-	3	3.8	m $\Omega$	
		$V_{GS} = 4.5V, I_D = 15A$	-	3.7	5.8		
Forward Transconductance	$g_{fs}$	$V_{DS} = 5V, I_D = 20A$	-	76	-	S	
<b>Dynamic Characteristics</b>							
Input Capacitance	$C_{iss}$	$V_{DS} = 15V, V_{GS} = 0V, f = 1\text{MHz}$	-	2550	-	pF	
Output Capacitance	$C_{oss}$		-	495	-		
Reverse Transfer Capacitance	$C_{rss}$		-	271	-		
<b>Switching Characteristics</b>							
Gate Resistance	$R_g$	$V_{DS} = 0V, V_{GS} = 0V, f = 1\text{MHz}$	-	1.2	-	$\Omega$	
Total Gate Charge	$Q_g$	$V_{GS} = 4.5V, V_{DS} = 20V, I_D = 20A$	-	24.0	-	nC	
Gate-Source Charge	$Q_{gs}$		-	11.2	-		
Gate-Drain Charge	$Q_{gd}$		-	8.3	-		
Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = 10V, V_{DD} = 15V, R_G = 1.5\Omega, I_D = 20A$	-	12.3	-	nS	
Rise Time	$t_r$		-	10.4	-		
Turn-Off Delay Time	$t_{d(off)}$		-	57	-		
Fall Time	$t_f$		-	5.5	-		
<b>Drain-Source Body Diode Characteristics</b>							
Diode Forward Voltage <sup>2</sup>	$V_{SD}$	$I_S = 1A, V_{GS} = 0V$	-	-	1	V	
Continuous Source Current <sup>1,5</sup>	$I_S$	$V_G = V_D = 0V$ , Force Current	-	-	45	A	

Note :

- 1.The data tested by surface mounted on a 1 inch<sup>2</sup> 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  $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=53A$
- 4.The power dissipation is limited by  $150^\circ\text{C}$  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

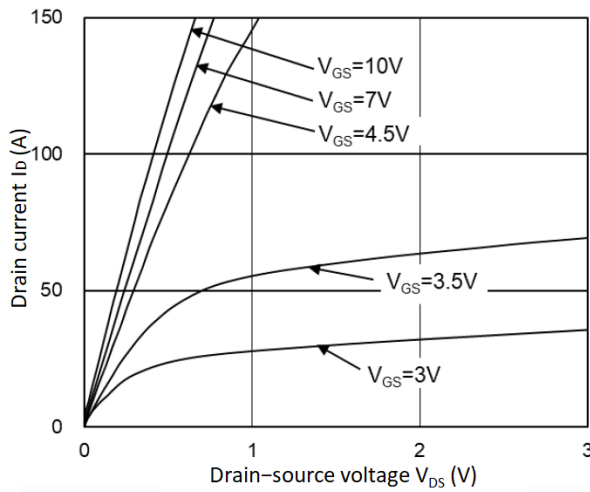


Figure 1. Output Characteristics

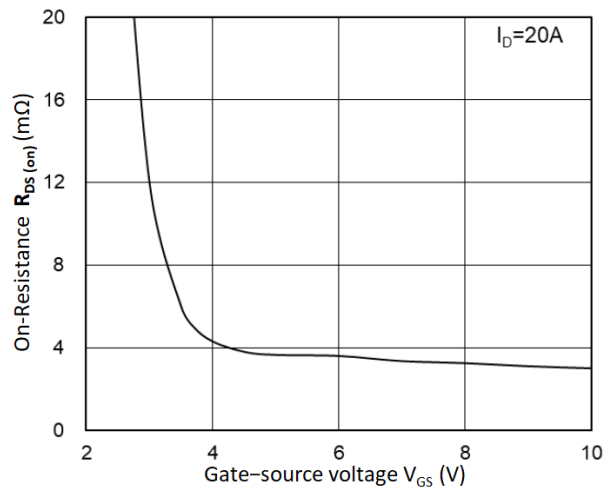


Figure 2.  $R_{DS(on)}$  vs.  $V_{GS}$

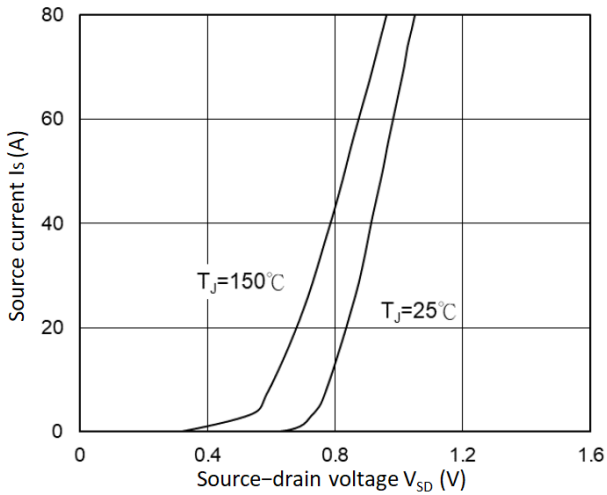


Figure 3. Forward Characteristics of Reverse

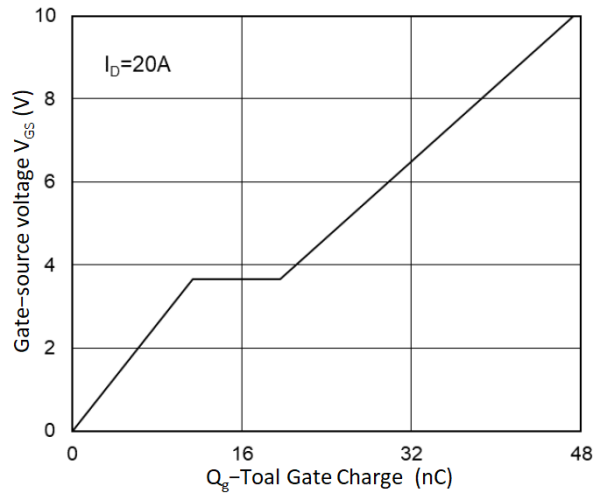


Figure 4. Gate Charge Characteristics

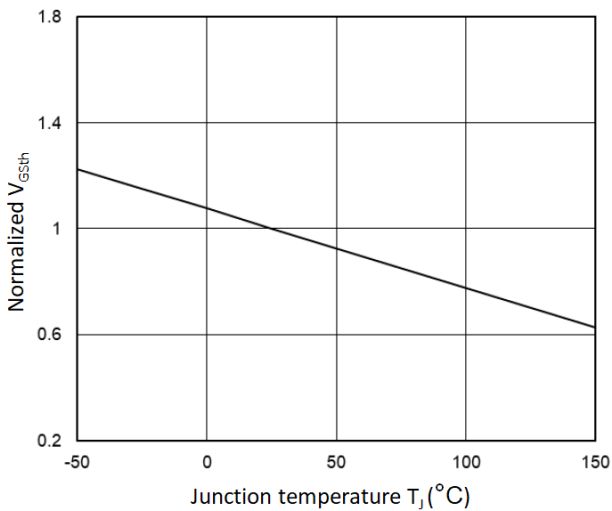


Figure 5. Normalized  $V_{GS(th)}$  vs.  $T_J$

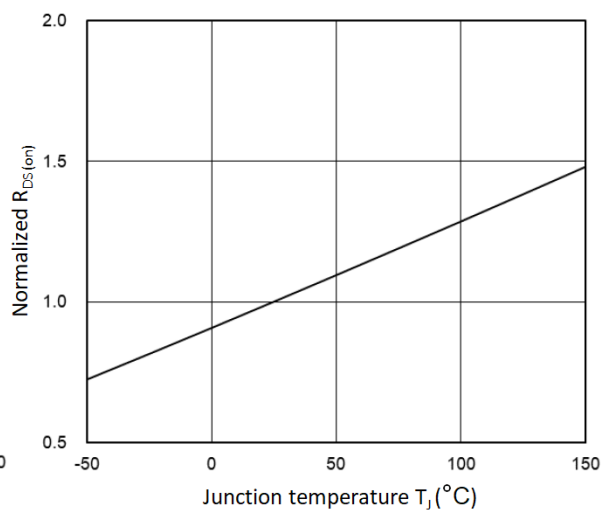


Figure 6. Normalized  $R_{DS(on)}$  vs.  $T_J$

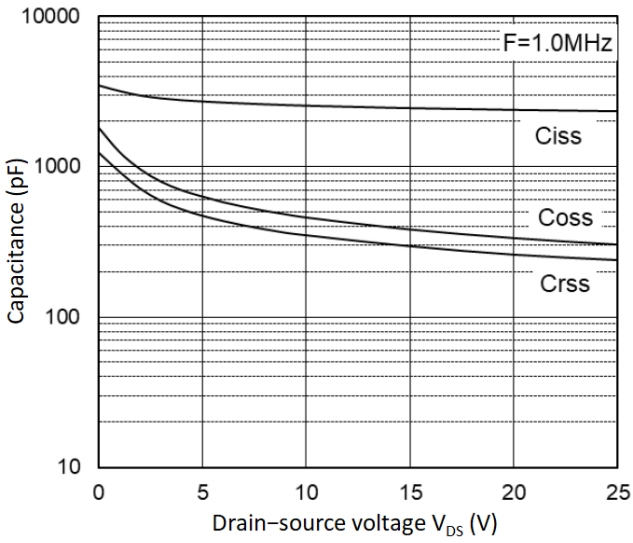


Figure 7. Capacitance Characteristics

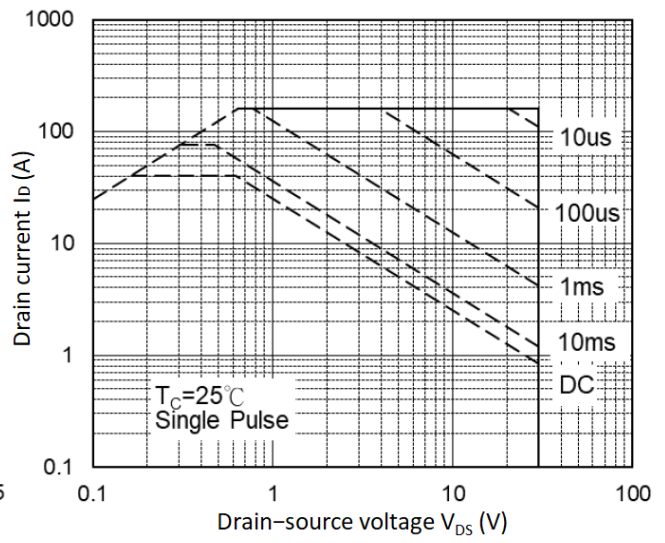


Figure 8. Safe Operating Area

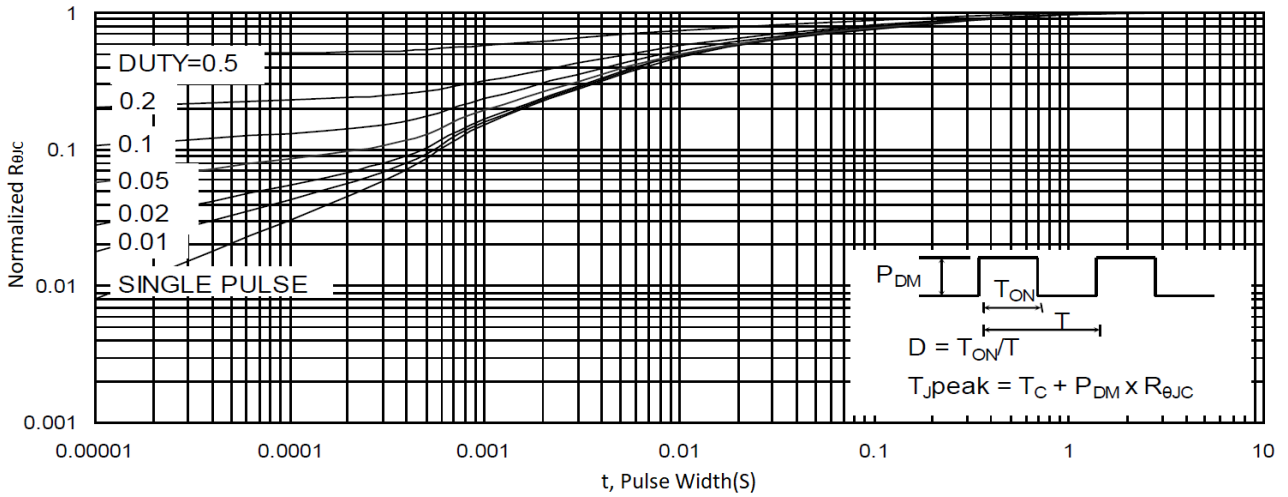


Figure 9. Normalized Maximum Transient Thermal Impedance

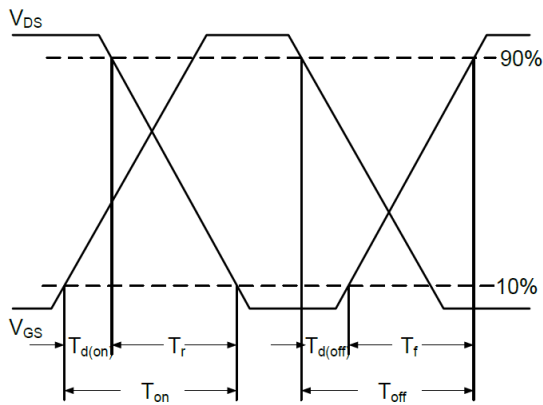


Figure 10. Switching Time Waveform

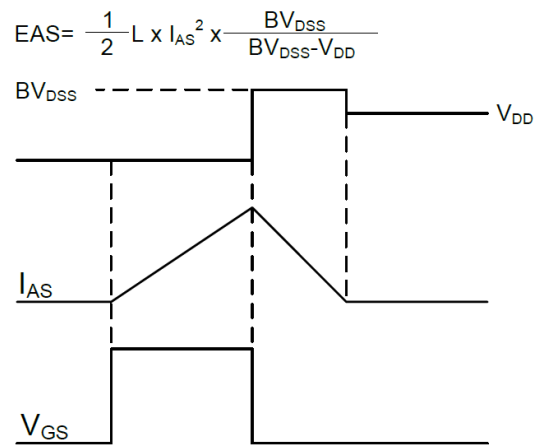
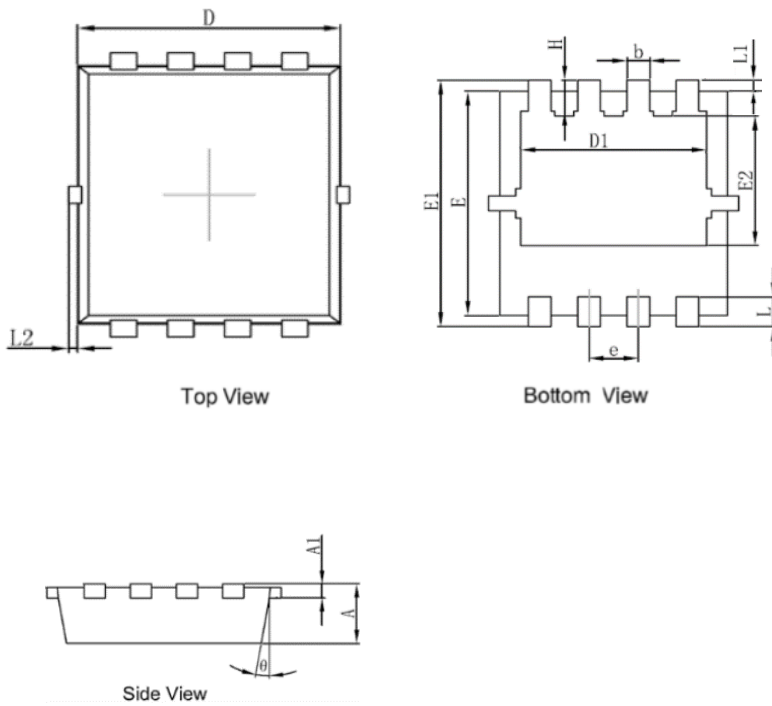


Figure 11. Unclamped Inductive Switching Waveform

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

Mechanical Dimensions for PDFN3030-8L



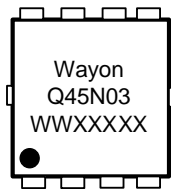
COMMON DIMENSIONS

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
$\theta$	0°	14°

## Ordering Information

Part	Package	Marking	Packing method
WMQ45N03T1	PDFN3030-8L	Q45N03	Tape and Reel

## Marking Information



Q45N03 = Device code

WWXXXXX= Date code

## Contact Information

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