

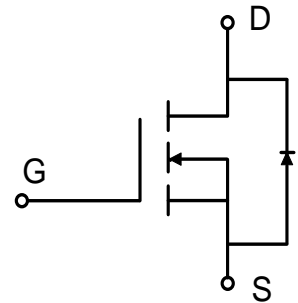
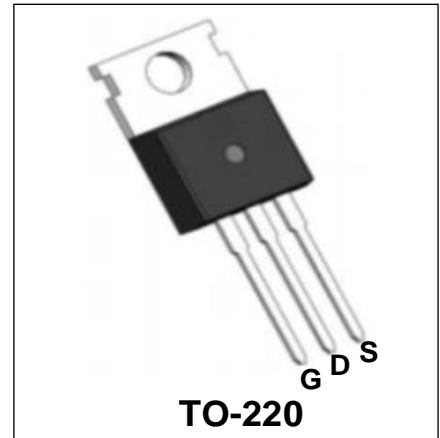
## 30V N-Channel Enhancement Mode Power MOSFET

### Description

WMK180N03T1 uses advanced power trench technology that has been especially tailored to minimize the on-state resistance and yet maintain superior switching performance.

### Features

- $V_{DS} = 30V$ ,  $I_D = 180A$ (Silicon Limited)  
 $R_{DS(on)} < 3.2m\Omega @ V_{GS} = 10V$   
 $R_{DS(on)} < 6m\Omega @ V_{GS} = 4.5V$
- Lead Free Product is Acquired
- Low Gate Charge
- Low  $R_{DS(on)}$
- 100% EAS Guaranteed



### Applications

- Load Switch
- PWM Application
- Power Management

### 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 <sup>1</sup> (Silicon Limited)	$T_C = 25^\circ C$	$I_D$	180	A
	$T_C = 100^\circ C$		103	
Pulsed Drain Current <sup>2</sup>		$I_{DM}$	608	A
Single Pulse Avalanche Energy <sup>3</sup>		<b>EAS</b>	196	mJ
Avalanche Current		$I_{AS}$	28	A
Total Power Dissipation <sup>4</sup>	$T_C = 25^\circ C$	$P_D$	108	W
Operating Junction and Storage Temperature Range		$T_J, T_{STG}$	-55 to 175	$^\circ C$

### Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction-to-Case <sup>1</sup>	$R_{\theta JC}$	1.38	$^\circ C/W$

**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	$I_{GSS}$	$V_{DS} = 0V, V_{GS} = \pm 20V$	-	-	$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$T_J = 25^\circ\text{C}$ $V_{DS} = 30V, V_{GS} = 0V$	-	-	1	$\mu A$
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.0	1.6	2.5	V
Drain-Source on-Resistance <sup>2</sup>	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 30A$	-	2.6	3.2	m $\Omega$
		$V_{GS} = 4.5V, I_D = 20A$	-	4.7	6	
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 15V, V_{GS} = 0V,$ $f = 1\text{MHz}$	-	3570	-	pF
Output Capacitance	$C_{oss}$		-	510	-	
Reverse Transfer Capacitance	$C_{rss}$		-	431	-	
<b>Switching Characteristics</b>						
Total Gate Charge	$Q_g$	$V_{GS} = 10V, V_{DS} = 15V,$ $I_D = 30A$	-	37	-	nC
Gate-Source Charge	$Q_{gs}$		-	8.8	-	
Gate-Drain Charge	$Q_{gd}$		-	12.5	-	
Turn-on Delay Time	$t_{d(on)}$	$V_{GS} = 10V, V_{DS} = 15V,$ $R_G = 3\Omega, I_D = 30A$	-	25	-	nS
Rise Time	$t_r$		-	23.5	-	
Turn-off Delay Time	$t_{d(off)}$		-	90	-	
Fall Time	$t_f$		-	38	-	
<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	-	-	180	A
Reverse Recovery Time	$t_{rr}$	$I_F = 20A, dI_F/dt = 100A/\mu s$	-	43	-	ns
Reverse Recovery Charge	$Q_{rr}$		-	40	-	nC

## Notes:

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  $V_{DD} = 25V, V_{GS} = 10V, L = 0.5mH, I_{AS} = 28A$
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.

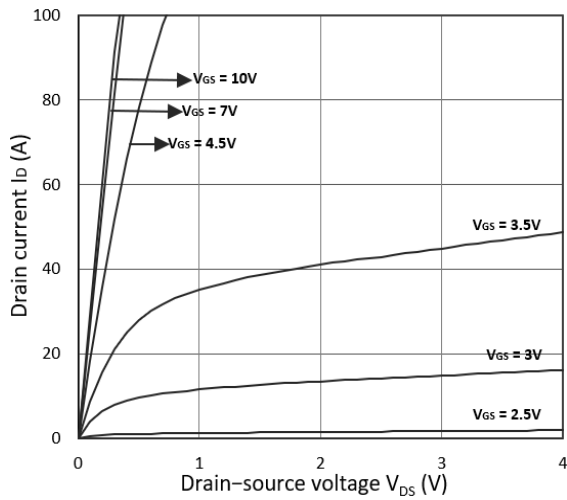


Figure 1. Output Characteristics

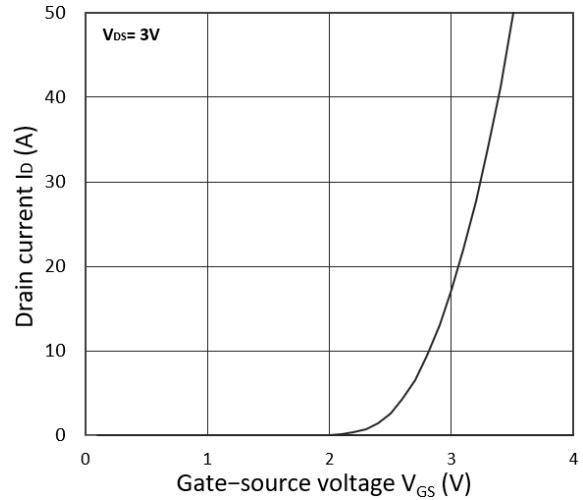


Figure 2. Transfer Characteristics

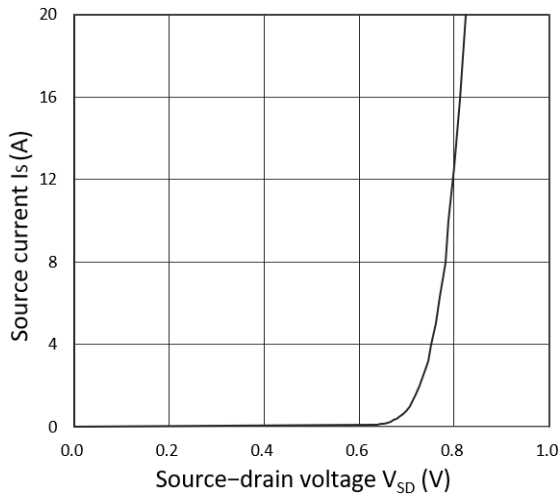


Figure 3. Forward Characteristics of Reverse

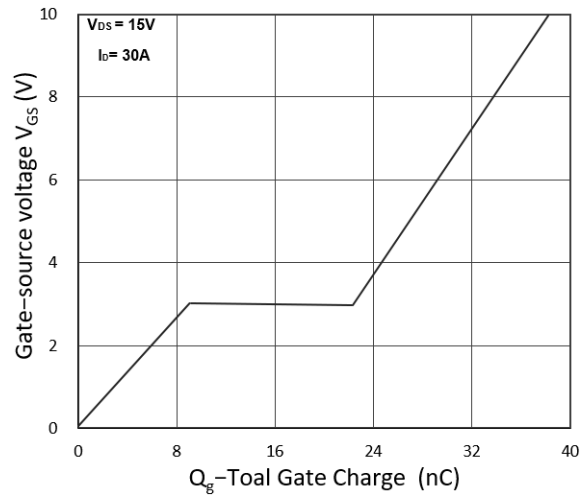


Figure 4. Gate Charge Characteristics

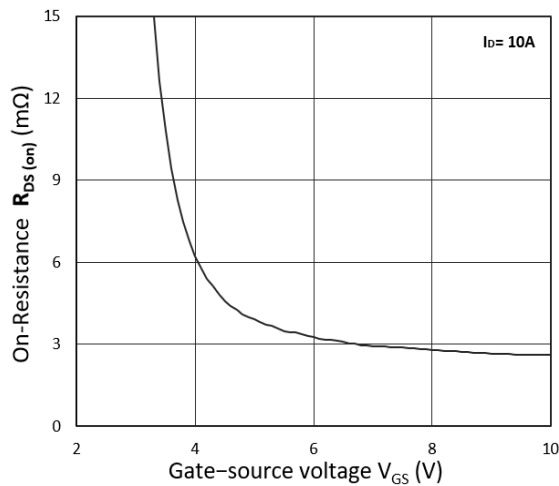


Figure 5.  $R_{DS(on)}$  vs.  $V_{GS}$

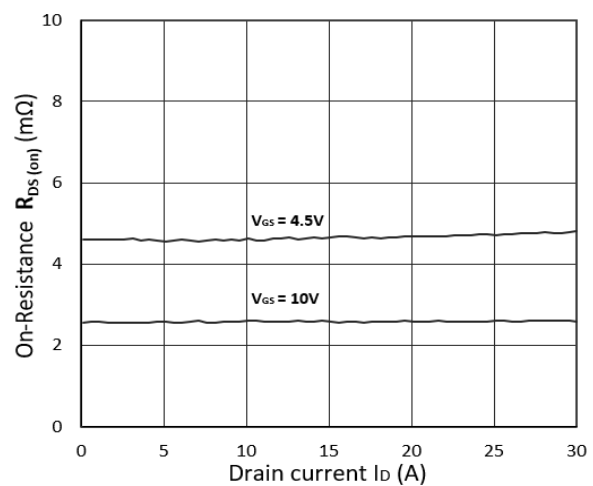


Figure 6.  $R_{DS(on)}$  vs.  $I_D$

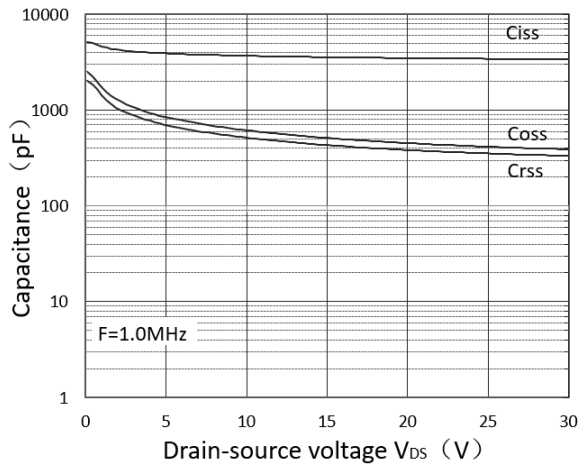


Figure 7. Capacitance Characteristics

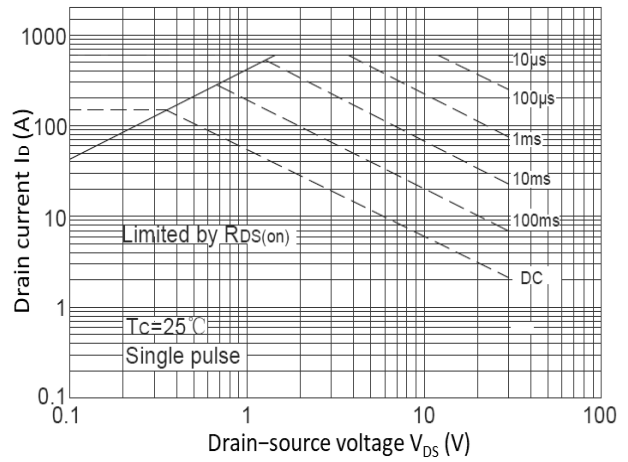


Figure 8. Safe Operating Area

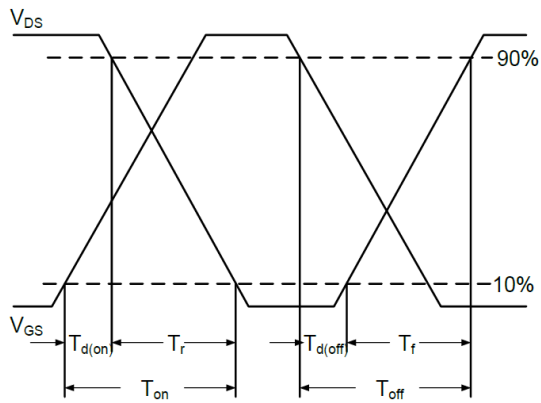


Figure 9. Switching Time Waveform

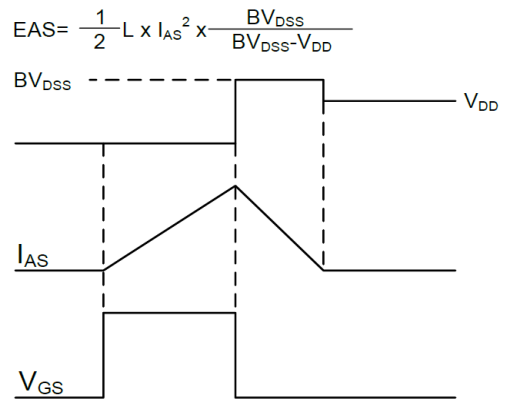
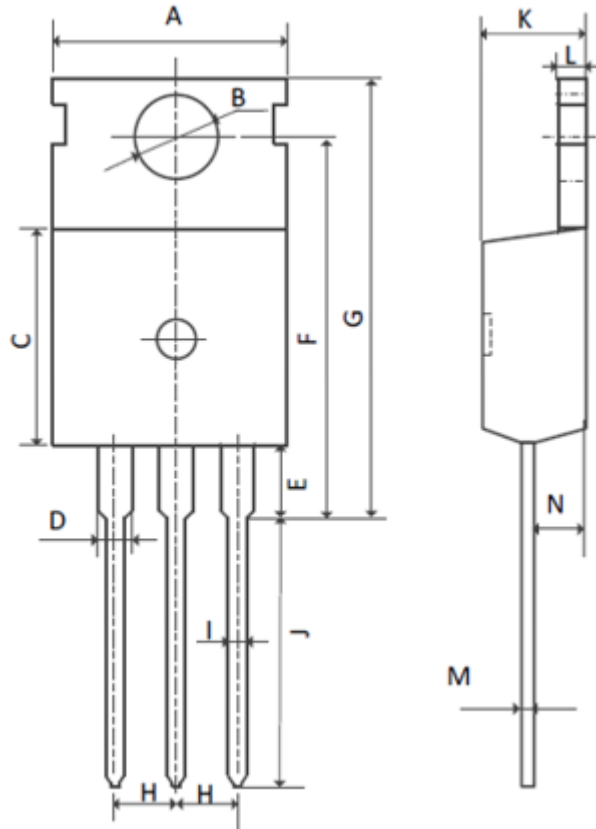


Figure 10. Unclamped Inductive Switching Waveform

Mechanical Dimensions for TO-220



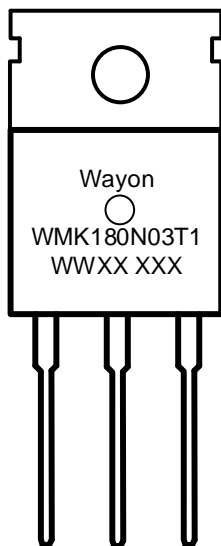
COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	9.70	10.30
B	3.40	3.80
C	8.80	9.40
D	1.17	1.47
E	2.60	3.40
F	15.10	16.70
G	19.55MAX	
H	2.54REF	
I	0.70	0.95
J	9.35	11.00
K	4.30	4.77
L	1.20	1.45
M	0.40	0.65
N	2.20	2.60

## Ordering Information

Part	Package	Marking	Packing method
WMK180N03T1	TO-220	WMK180N03T1	Tube

## Marking Information



WMK180N03T1 = Device code

WWXX XXX = Date code

## Contact Information

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