

## 150V N-Channel Enhancement Mode Power MOSFET

### Description

WMK161N15T2 uses advanced power trench technology that has been especially tailored to minimize the on-state resistance and yet maintain superior switching performance.

### Features

- $V_{DS} = 150V$ ,  $I_D = 161A$   
 $R_{DS(on)} < 6\ m\Omega @ V_{GS} = 10V$
- High Speed Power Switching
- Low  $R_{DS(ON)}$
- Low Gate Charge
- 100% EAS Guaranteed

### Applications

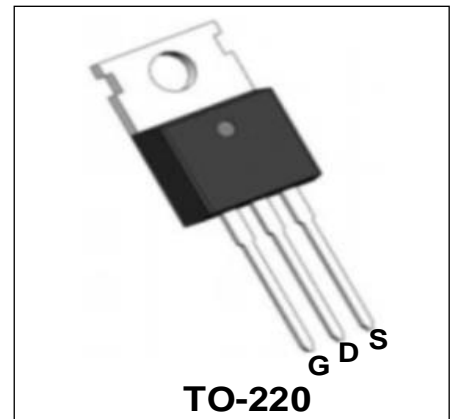
- Synchronous Rectification in SMPS
- Hard Switching and High Speed Circuit
- UPS

### Absolute Maximum Ratings

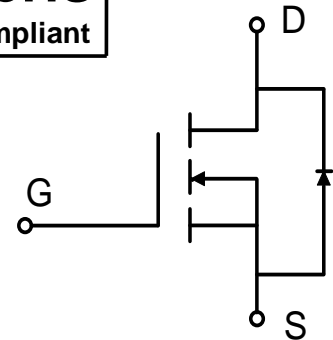
Parameter		Symbol	Value	Unit
Drain-Source voltage		$V_{DS}$	150	V
Gate-Source voltage		$V_{GS}$	$\pm 20$	V
Continuous Drain Current <sup>1</sup>	$T_C=25^\circ C$	$I_D$	161	A
	$T_C=100^\circ C$		115	
Pulsed Drain Current <sup>2</sup>		$I_{DM}$	540	A
Single Pulse Avalanche Energy <sup>3</sup>		<b>EAS</b>	720	mJ
Total Power Dissipation <sup>4</sup>	$T_C=25^\circ C$	<b><math>P_D</math></b>	360	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-Ambient <sup>1</sup>	$R_{\theta JA}$	61	$^\circ C/W$
Thermal Resistance from Junction-to-Case <sup>1</sup>	$R_{\theta JC}$	0.4	$^\circ C/W$



**RoHS**  
compliant



**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	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	150	-	-	V
Gate-body Leakage current	$I_{GSS}$	$V_{DS} = 0V, V_{GS} = \pm 20V$	-	-	$\pm 100$	nA
Zero Gate Voltage Drain Current	$T_J = 25^\circ\text{C}$	$V_{DS} = 150V, V_{GS} = 0V$	-	-	1	$\mu A$
	$T_J = 100^\circ\text{C}$		-	-	100	
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2	3	4	V
Drain-Source On-Resistance <sup>2</sup>	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 20A$	-	5.4	6	m $\Omega$
Transconductance	$g_{fs}$	$V_{DS} = 5V, I_D = 20A$	-	80	-	S
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 75V, V_{GS} = 0V, f = 1\text{MHz}$	-	6220	-	pF
Output Capacitance	$C_{oss}$		-	480	-	
Reverse Transfer Capacitance	$C_{rss}$		-	11	-	
<b>Switching Characteristics</b>						
Gate Resistance	$R_g$	$V_{GS} = 0V, V_{DS} = 0V, f = 1\text{MHz}$	-	2.7	-	$\Omega$
Total Gate Charge	$Q_g$	$V_{GS} = 10V, V_{DD} = 75V, I_D = 20A$	-	78	-	nC
Gate-Source Charge	$Q_{gs}$		-	29	-	
Gate-Drain Charge	$Q_{gd}$		-	11	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = 10V, V_{DD} = 75V, R_G = 10\Omega, I_D = 20A$	-	26	-	nS
Rise Time	$t_r$		-	19	-	
Turn-Off Delay Time	$t_{d(off)}$		-	39	-	
Fall Time	$t_f$		-	15	-	
<b>Drain-source body diode Characteristics</b>						
Diode Forward Voltage <sup>2</sup>	$V_{SD}$	$I_S = 20A, V_{GS} = 0V$	-	0.9	1.2	V
Body Diode Reverse Recovery Time	$t_{rr}$	$V_R = 75V, I_F = 20A, di/dt = 100A/\mu s$	-	80	-	nS
Body Diode Reverse Recovery Charge	$Q_{rr}$		-	160	-	nC

## Notes:

- The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- The data tested by pulsed, pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$
- The EAS data shows Max. rating. The test condition is  $V_{DD} = 25V, V_{GS} = 10V, L = 0.4\text{mH}, I_{AS} = 60A$
- The power dissipation is limited by  $175^\circ\text{C}$  junction temperature

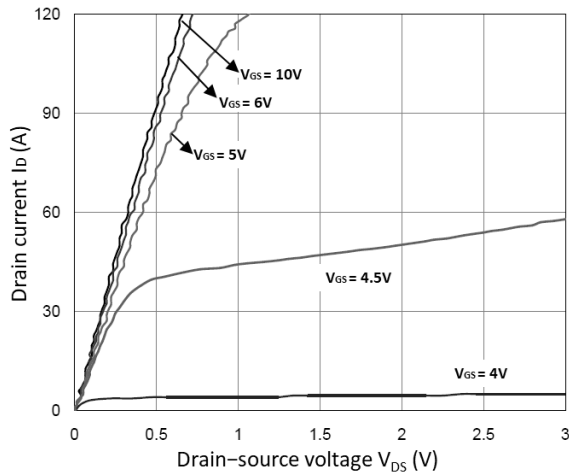


Figure 1. Output Characteristics

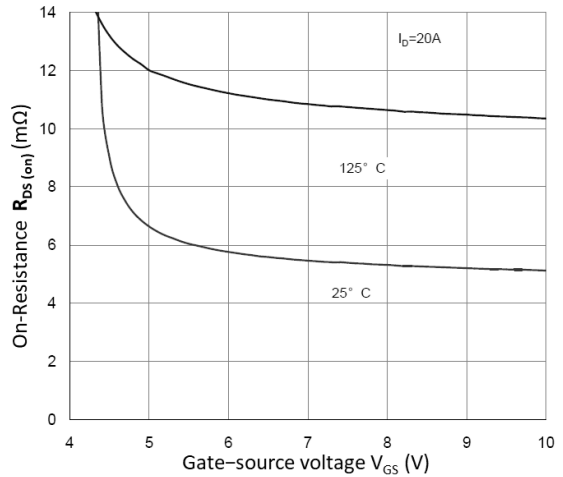


Figure 2.  $R_{DS(on)}$  vs.  $V_{GS}$

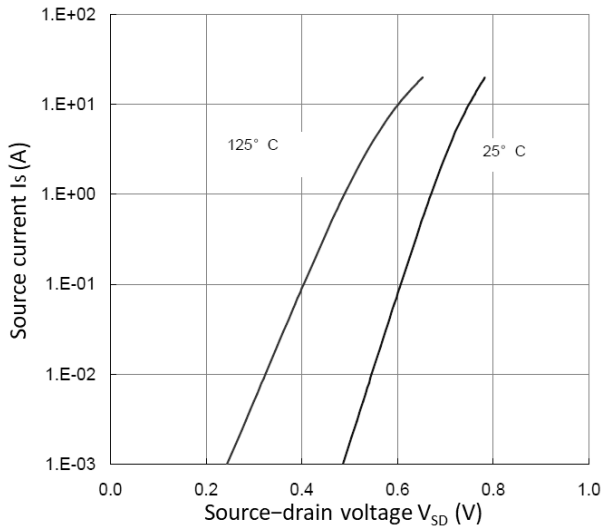


Figure 3. Forward Characteristics of Reverse

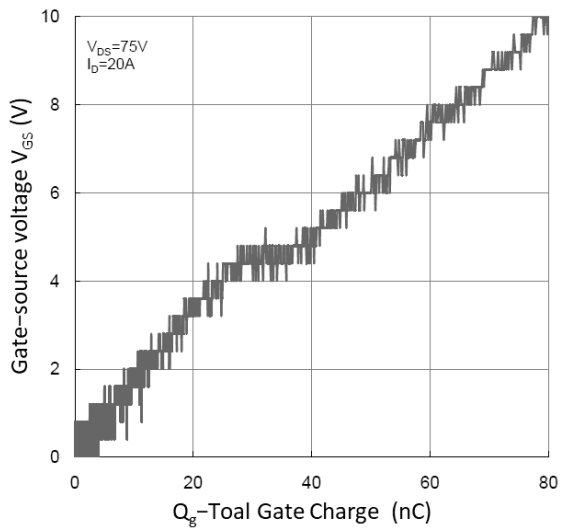


Figure 4. Gate Charge Characteristics

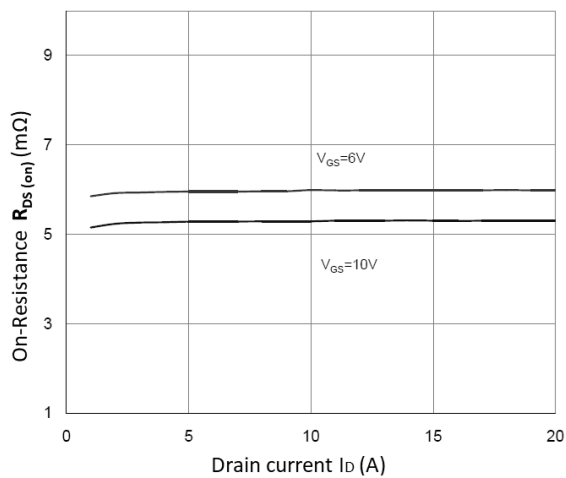


Figure 5.  $R_{DS(ON)}$  vs.  $I_D$

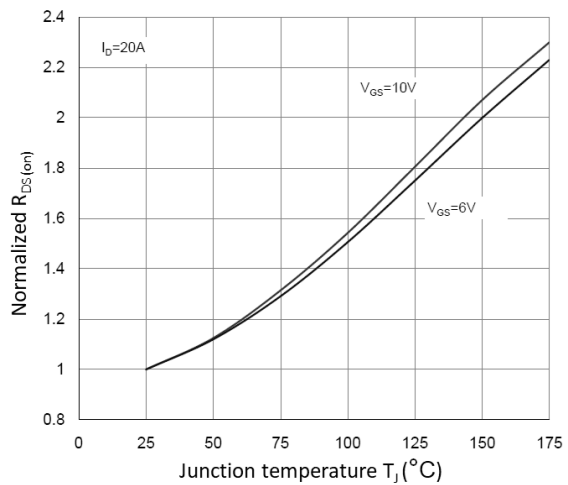


Figure 6. Normalized  $R_{DS(on)}$  vs.  $T_J$

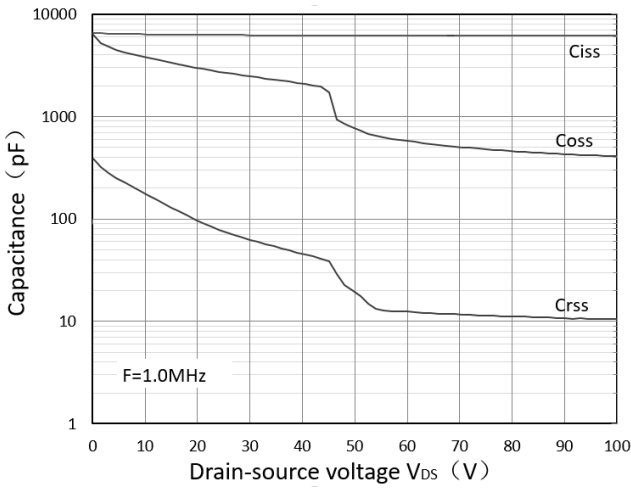


Figure 7. Capacitance Characteristics

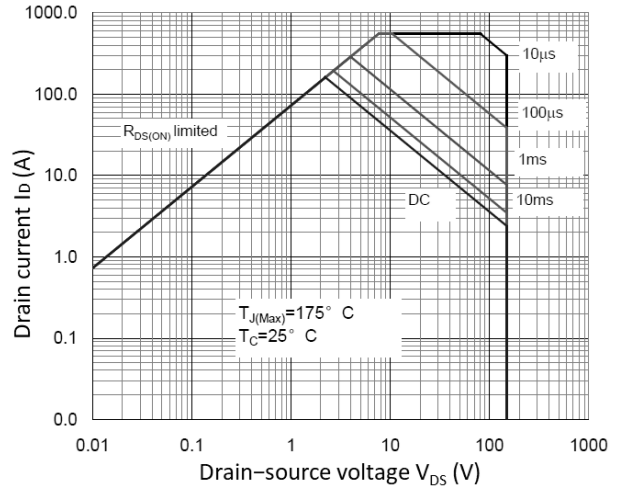


Figure 8. Safe Operating Area

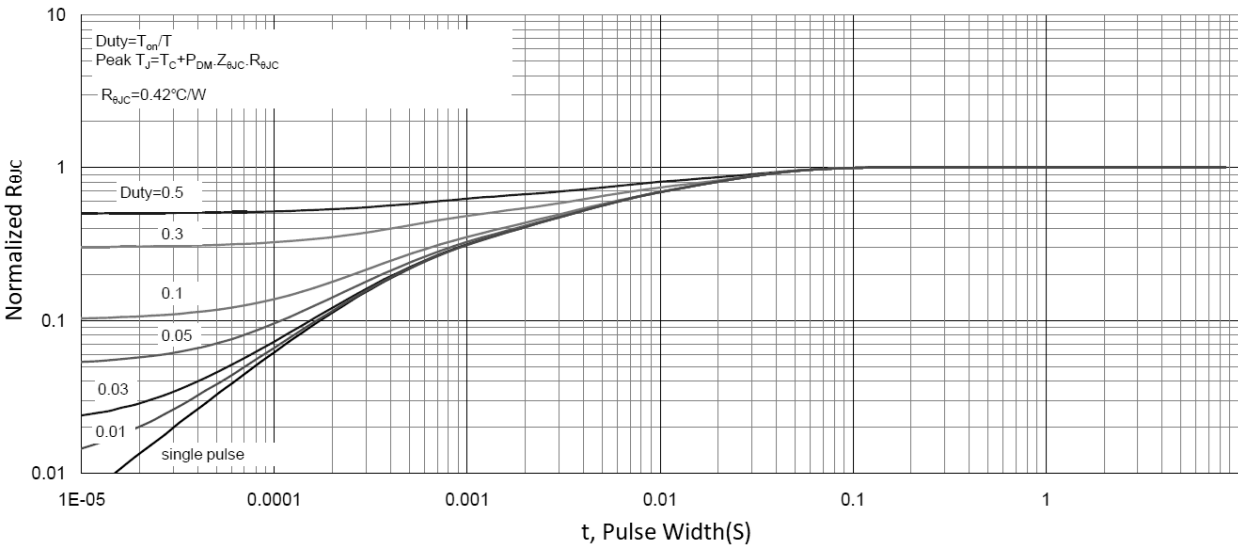


Figure 9. Normalized Maximum Transient Thermal Impedance

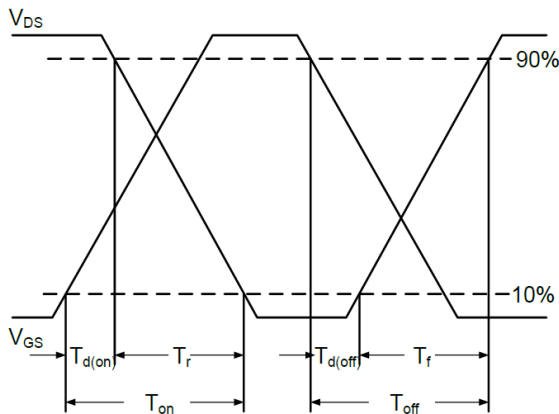


Figure 10. Switching Time Waveform

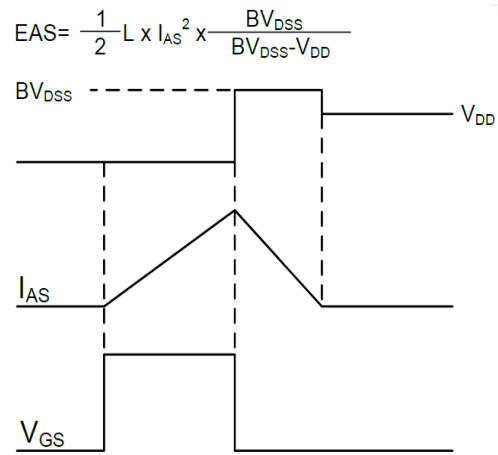
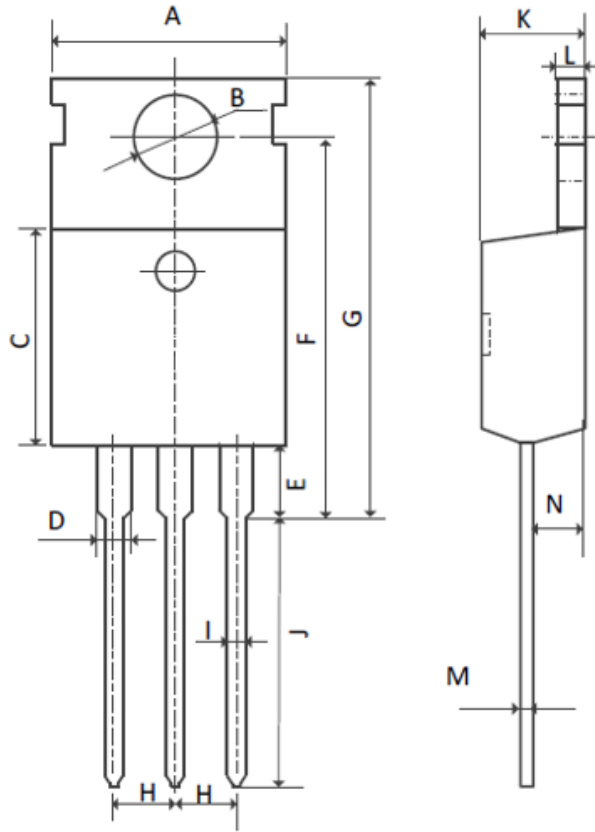


Figure 11. Unclamped Inductive Switching Waveform

Mechanical Dimensions for TO-220

COMMON DIMENSIONS

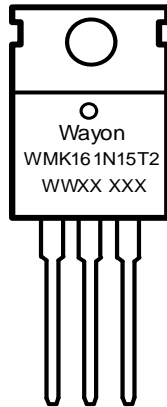


SYMBOL	MM	
	MIN	MAX
A	9.70	10.30
B	3.40	3.80
C	8.80	9.40
D	1.17	1.47
E	2.60	3.40
F	15.10	16.70
G	19.55MAX	
H	2.54REF	
I	0.70	0.95
J	9.35	11.00
K	4.30	4.77
L	1.20	1.45
M	0.40	0.65
N	2.20	2.60

## Ordering Information

Part	Package	Marking	Packing method
WMK161N15T2	TO-220	WMK161N15T2	Tube

## Marking Information



WMK161N15T2= Device code  
WWXX XXX= Date code

## Contact Information

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