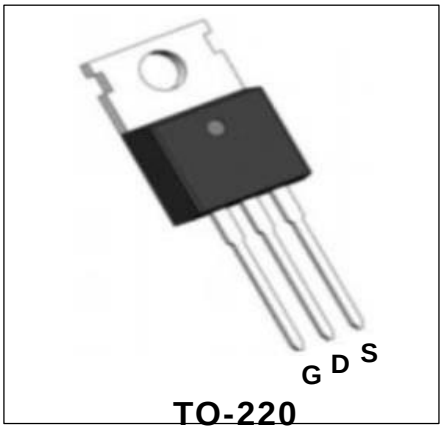
Description

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

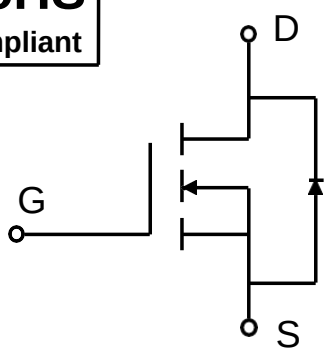


TO-220

Features

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

RoHS compliant



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}	±20	V
Continuous Drain Current[1]	T_C=25℃	I_D	161	A
	T_C=100℃		115	
Pulsed Drain Current[2]		I_{DM}	540	A
Single Pulse Avalanche Energy[3]		EAS	720	mJ
Total Power Dissipation[4]	T_C=25℃	P_D	360	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 175	°C

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction-to-Ambient[1]	$R_{\theta JA}$	61	°C/W
Thermal Resistance from Junction-to-Case[1]	$R_{\theta JC}$	0.4	°C/W

Electrical Characteristics T_c = 25°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 = 250μA	150	-	-	V
Gate-body Leakage current		I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
Zero Gate Voltage Drain Current	T_J=25℃	I_{DSS}	V_{DS} = 150V, V_{GS} = 0V	-	-	1	μA
	T_J=100℃			-	-	100	
Gate-Threshold Voltage		$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	2	3	4	V
Drain-Source On-Resistance[2]		$R_{DS(on)}$	V_{GS} = 10V, I_D = 20A	-	5.4	6	mΩ
Transconductance		g_{fs}	V_{DS}=5V, I_D=20A	-	80	-	S
Dynamic Characteristics							
Input Capacitance		C_{iss}	V_{DS} = 75V, V_{GS} =0V, f =1MHz	-	6220	-	pF
Output Capacitance		C_{oss}		-	480	-	
Reverse Transfer Capacitance		C_{rss}		-	11	-	
Switching Characteristics							
Gate Resistance		R_g	V_{GS} =0V, V_{DS} =0V f =1MHz	-	2.7	-	Ω
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 = 10Ω, I_D= 20A	-	26	-	nS
Rise Time		t_r		-	19	-	
Turn-Off Delay Time		$t_{d(off)}$		-	39	-	
Fall Time		t_f		-	15	-	
Drain-source body diode Characteristics							
Diode Forward Voltage[2]		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/μs	-	80	-	nS
Body Diode Reverse Recovery Charge		Q_{rr}		-	160	-	nC

Notes:

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 ≤ 300us , duty cycle ≤ 2%

3. The EAS data shows Max. rating . The test condition is V_{DD}=25V, V_{GS}=10V, L=0.4mH, I_{AS}=60A

4. The power dissipation is limited by 175℃ junction temperature

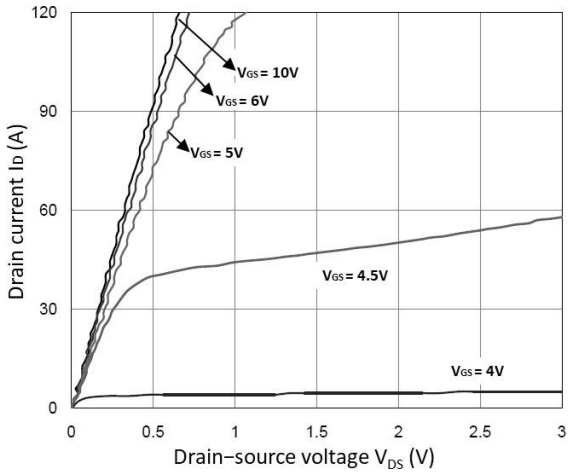


Figure 1. Output Characteristics

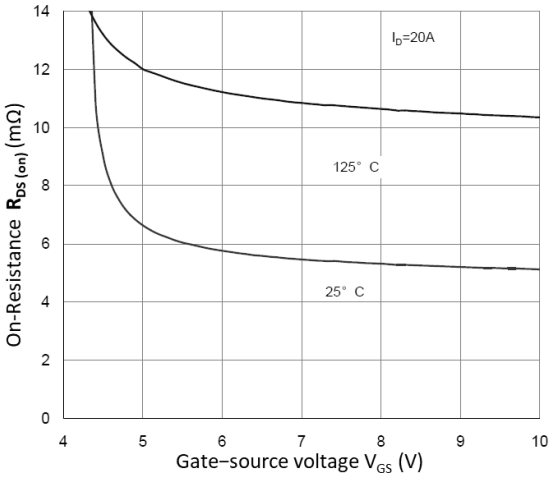


Figure 2. $R_{DS}(on)$ vs. V_{GS}

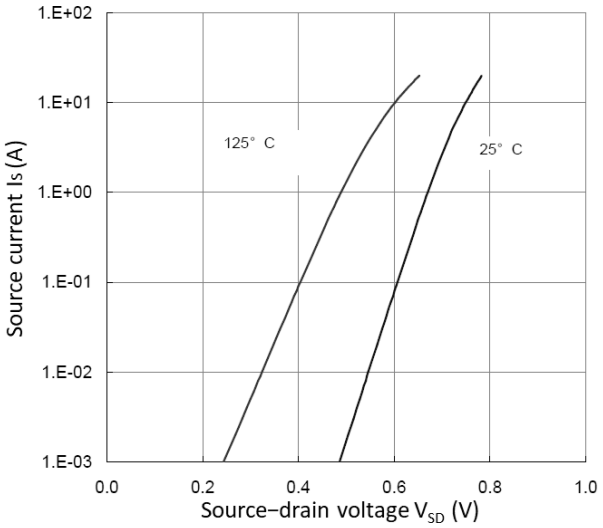


Figure 3. Forward Characteristics of Reverse

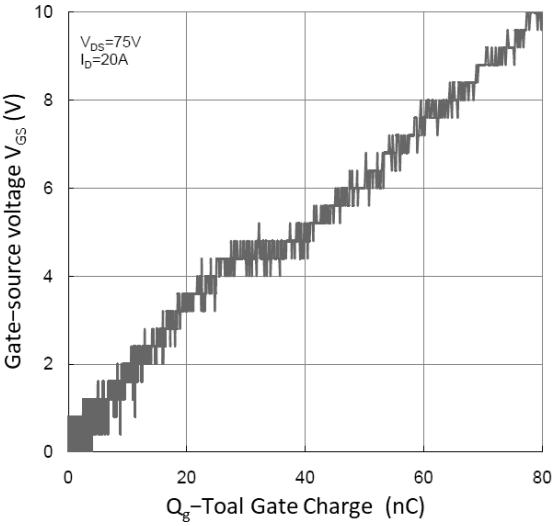


Figure 4. Gate Charge Characteristics

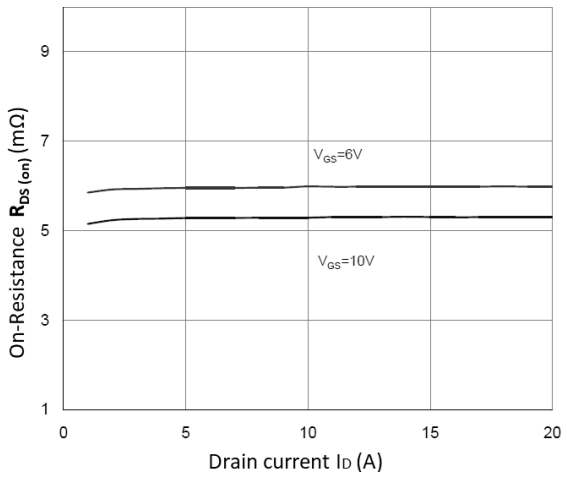


Figure 5. $R_{DS(ON)}$ vs. I_D

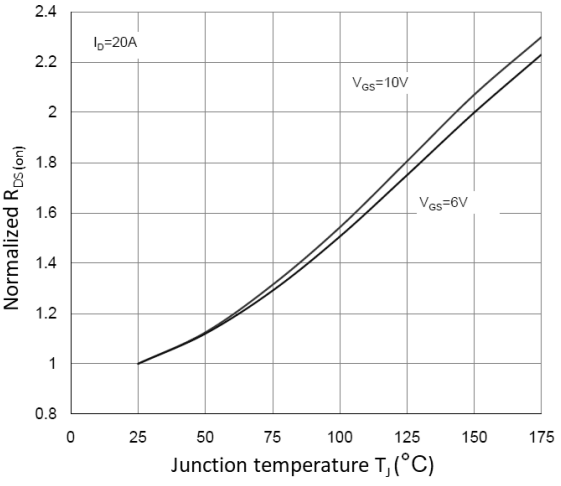


Figure 6. Normalized $R_{DS(on)}$ vs. T_J

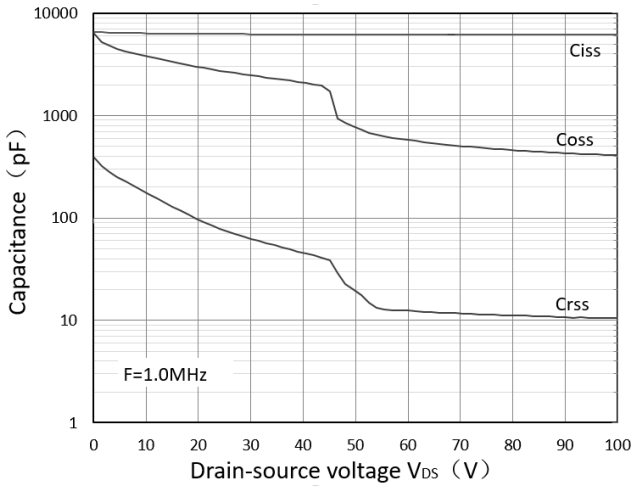


Figure 7. Capacitance Characteristics

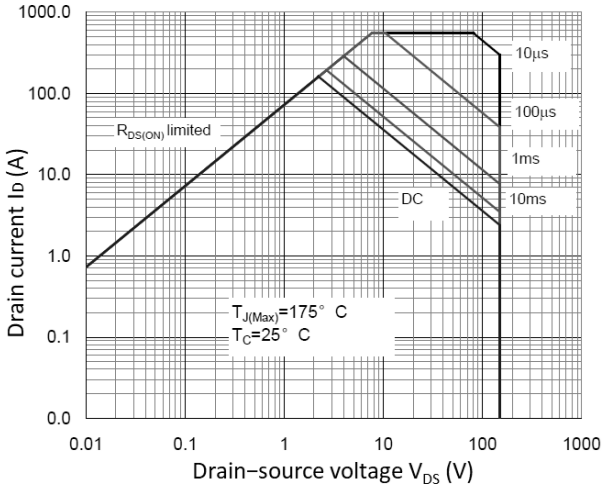


Figure 8. Safe Operating Area

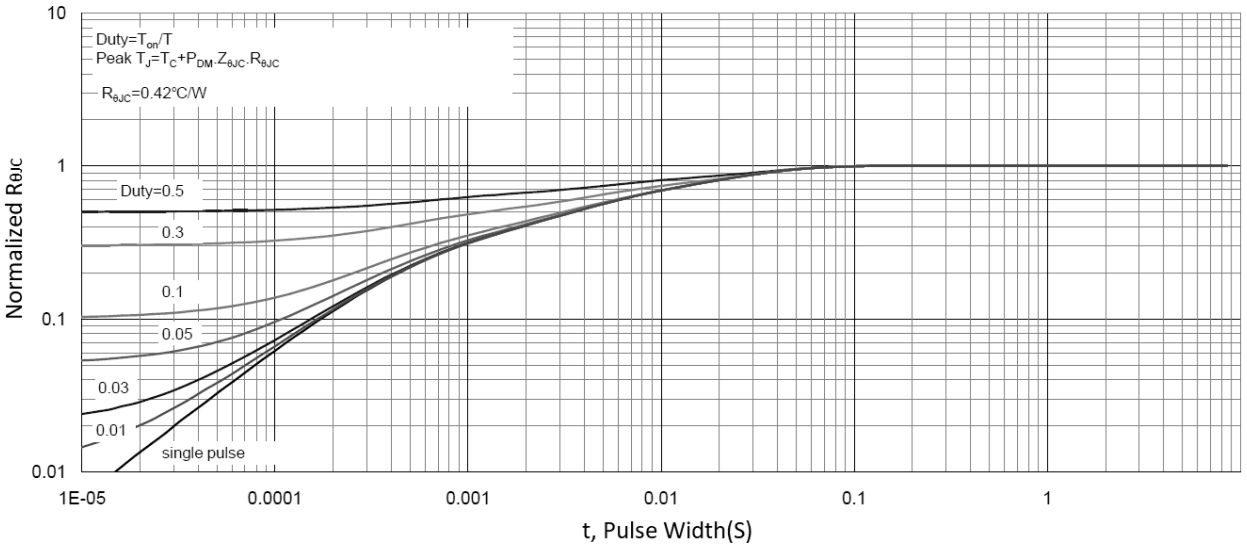


Figure 9. Normalized Maximum Transient Thermal Impedance

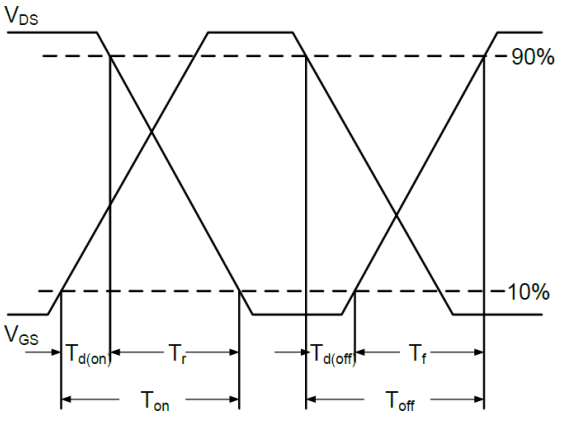


Figure 10. Switching Time Waveform

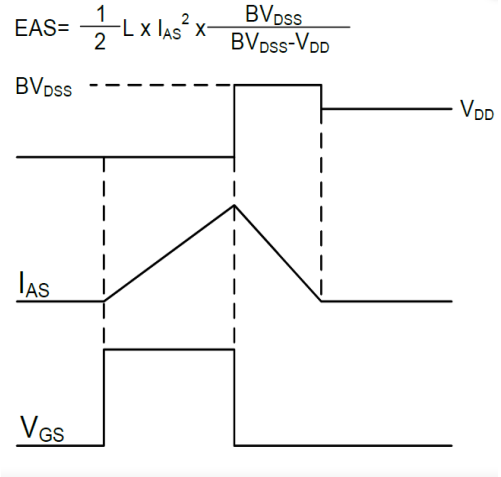
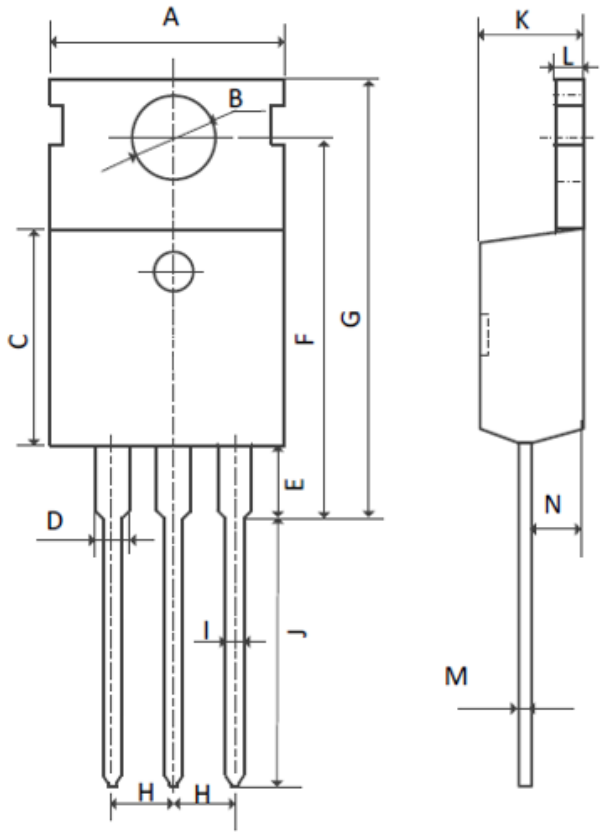


Figure 11. Unclamped Inductive Switching Waveform

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