

100V N-Channel Enhancement Mode Power MOSFET

Description

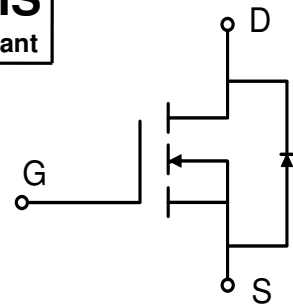
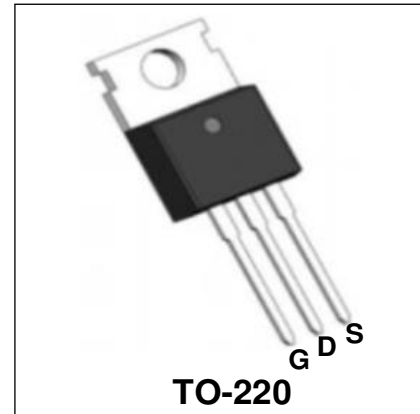
WMK166N10T2 uses advanced power trench technology that has been especially tailored to minimize the on-state resistance and yet maintain superior switching performance.

Features

- $V_{DS} = 100V$, $I_D = 166A$
 $R_{DS(on)} < 4.3m\Omega @ V_{GS} = 10V$
- High Speed Power Switching
- Low $R_{DS(ON)}$
- Low Gate Charge
- 100% EAS Guaranteed

Applications

- Hard Switching and High Speed Circuit
- DC/DC Conversion
- Power Tools
- UPS
- SSR



Absolute Maximum Ratings

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current@10V ¹	$T_C=25^\circ C$	I_D	166	A
	$T_C=100^\circ C$		118	
Pulsed Drain Current ²		I_{DM}	450	A
Single Pulse Avalanche Energy ³		EAS	180	mJ
Avalanche Current		I_{AS}	60	A
Total Power Dissipation ⁴	$T_C=25^\circ C$	P_D	231	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 ¹	$R_{\theta JA}$	60	$^\circ C/W$
Thermal Resistance from Junction-to-Case ¹	$R_{\theta JC}$	0.65	$^\circ C/W$

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

Parameter		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics							
Drain-Source Breakdown Voltage		$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	100	-	-	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}	$V_{DS} = 100V, V_{GS} = 0V$	-	-	1	μA
	$T_J=100^{\circ}C$			-	-	100	
Gate-Threshold Voltage		$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2	3	4	V
Drain-Source On-Resistance ²		$R_{DS(on)}$	$V_{GS} = 10V, I_D = 20A$	-	3.9	4.3	m Ω
Forward Transconductance ²		g_{fs}	$V_{DS} = 5V, I_D = 20A$	-	51	-	S
Dynamic Characteristics							
Input Capacitance		C_{iss}	$V_{DS} = 50V, V_{GS} = 0V,$ $f = 1MHz$	-	3629	-	pF
Output Capacitance		C_{oss}		-	850	-	
Reverse Transfer Capacitance		C_{rss}		-	31	-	
Switching Characteristics							
Gate Resistance		R_g	$V_{DS} = 0V, V_{GS} = 0V,$ $f = 1MHz$	-	1.1	-	Ω
Total Gate Charge		Q_g	$V_{DD} = 50V, V_{GS} = 10V,$ $I_D = 20A$	-	73	-	nC
Gate-Source Charge		Q_{gs}		-	9	-	
Gate-Drain Charge		Q_{gd}		-	32	-	
Turn-On Delay Time		$t_{d(on)}$	$V_{GS} = 10V, V_{DD} = 50V,$ $R = 10\Omega, I_D = 20A$	-	13	-	nS
Rise Time		t_r		-	18	-	
Turn-Off Delay Time		$t_{d(off)}$		-	43	-	
Fall Time		t_f		-	26	-	
Drain-Source Body Diode Characteristics							
Diode Forward Voltage ²		V_{SD}	$I_S = 20A, V_{GS} = 0V$	-	-	1.2	V
Continuous Source Current ^{1,5}		I_S	$V_G=V_D=0V$, Force Current	-	-	166	A
Body Diode Reverse Recovery Time		t_{rr}	$V_R = 50V, I_F = 20A,$ $di/dt=500A/\mu s$	-	49	-	nS
Body Diode Reverse Recovery Charge		Q_{rr}		-	273	-	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 $\leq 300\mu s$, duty cycle $\leq 2\%$
3. The EAS data shows Max. rating. The test condition is $V_{DD} = 25V, V_{GS} = 10V, L = 0.1mH, I_{AS} = 60A$
4. The power dissipation is limited by 175°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.

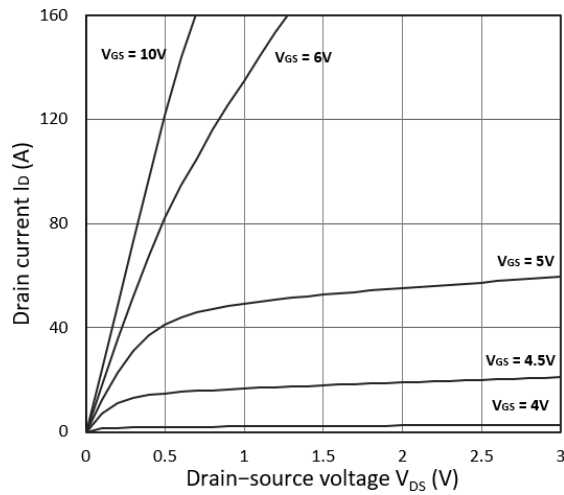


Figure 1. Output Characteristics

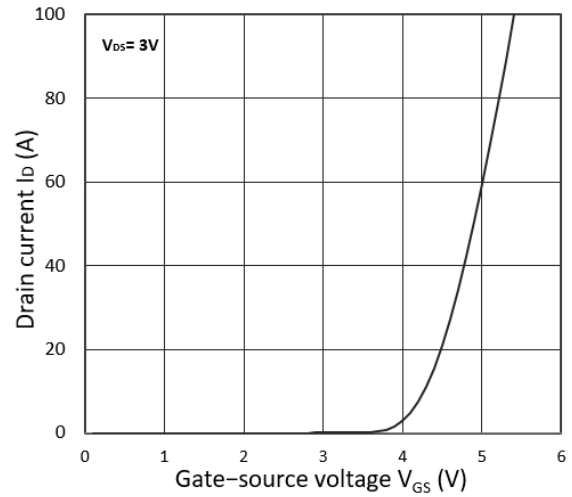


Figure 2. Transfer Characteristics

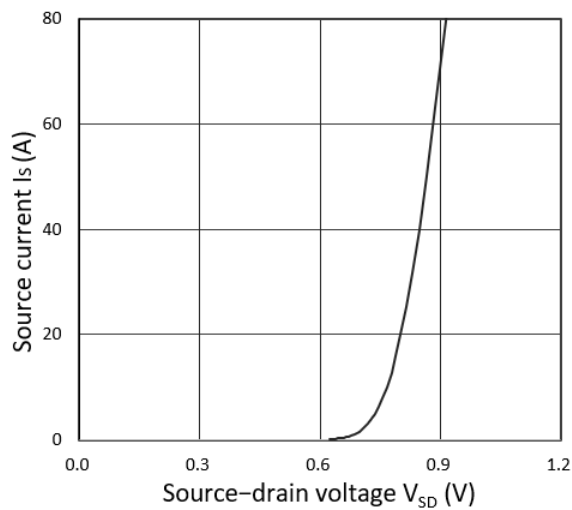


Figure 3. Forward Characteristics of Reverse

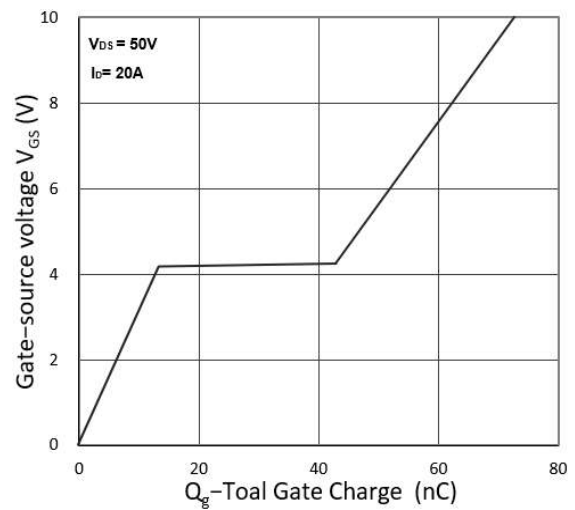
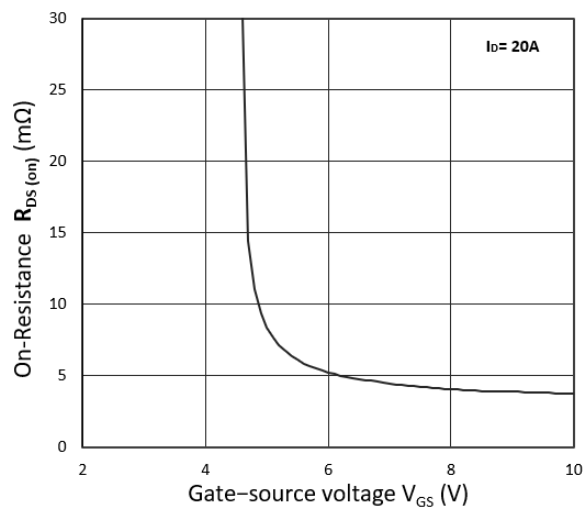
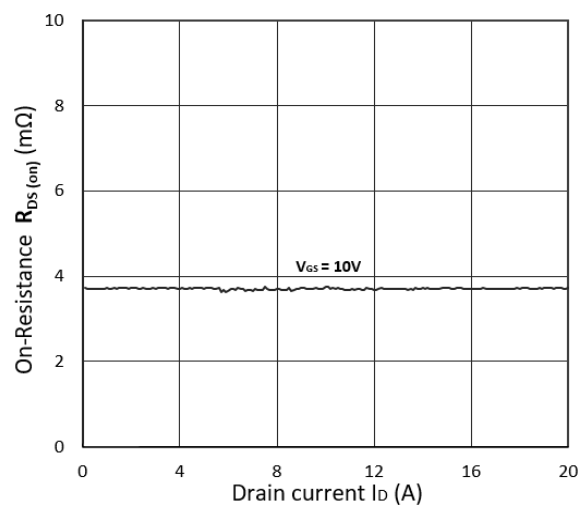


Figure 4. Gate Charge Characteristics

Figure 5. $R_{DS(ON)}$ vs. V_{GS} Figure 6. $R_{DS(ON)}$ vs. I_D

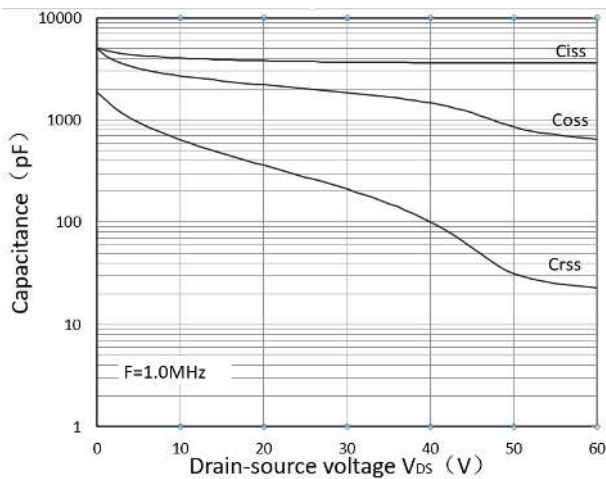


Figure 7. Capacitance Characteristics

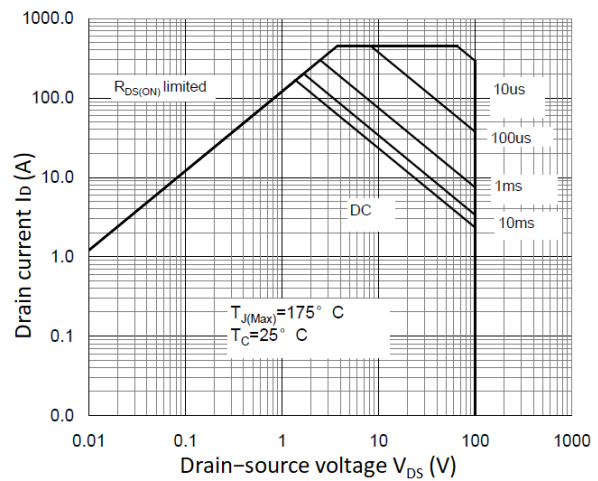


Figure 8. Safe Operating Area

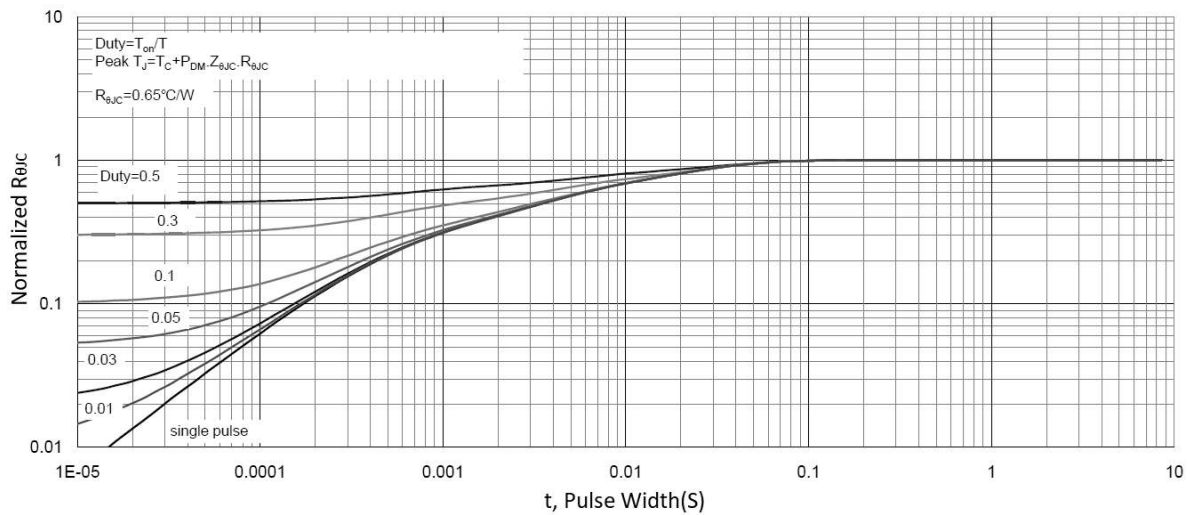


Figure 9. Normalized Maximum Transient Thermal Impedance

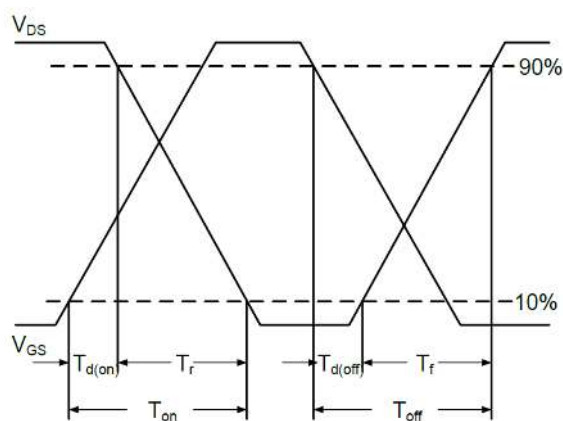
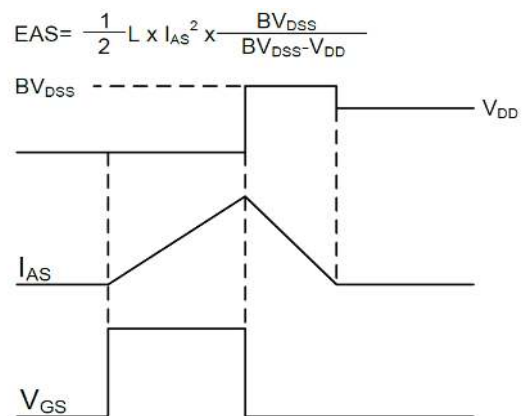
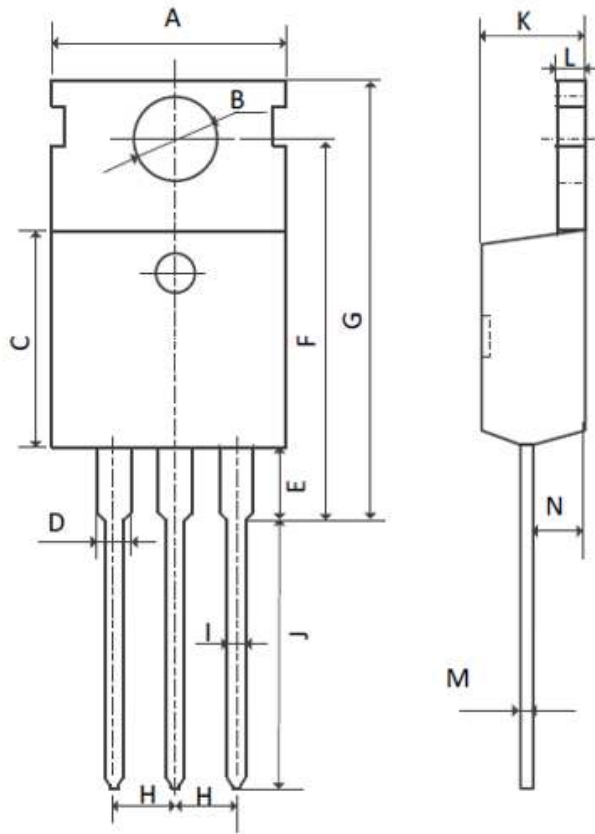


Figure 10. Switching Time Waveform

Figure 11. Unclamped Inductive Switching
Waveform

Mechanical Dimensions for TO-220

COMMON DIMENSIONS

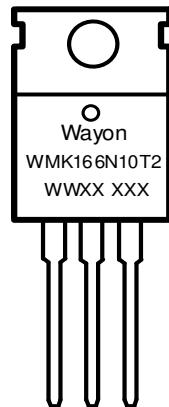


SYMBOL	MM	
	MIN	MAX
A	9.70	10.30
B	3.40	3.80
C	8.80	9.40
D	1.17	1.47
E	2.60	3.40
F	15.10	16.70
G	19.55MAX	
H	2.54REF	
I	0.70	0.95
J	9.35	11.00
K	4.30	4.77
L	1.20	1.45
M	0.40	0.65
N	2.20	2.60

Ordering Information

Part	Package	Marking	Packing method
WMK166N10T2	TO-220	WMK166N10T2	Tube

Marking Information



WMK166N10T2 = Device code

WWXX XXX = Date code

Contact Information

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