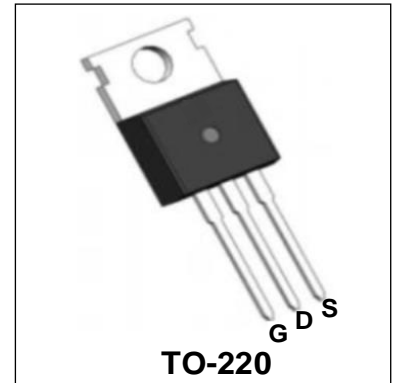


## 120V N-Channel Enhancement Mode Power MOSFET

### Description

WMK125N12LG2 uses Wayon's 2<sup>nd</sup> generation power trench MOSFET technology that has been especially tailored to minimize the on-state resistance and yet maintain superior switching performance. This device is well suited for high efficiency fast switching applications.

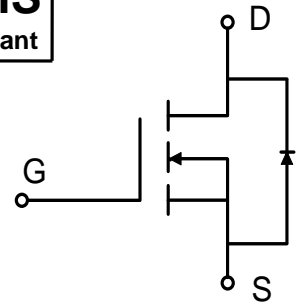


### Features

- $V_{DS} = 100V$ ,  $I_D = 74A$ (Silicon Limited)  
 $R_{DS(on)} < 12.5m\Omega @ V_{GS} = 10V$   
 $R_{DS(on)} < 17m\Omega @ V_{GS} = 4.5V$
- High Speed Power Switching
- Low  $R_{DS(ON)}$
- Low Gate Charge
- 100% EAS Guaranteed

### Applications

- Hard Switching and High Speed Circuit
- DC/DC Converter
- Synchronous Rectification in SMPS



### Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	120	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current <sup>1</sup> (Silicon Limited)	$I_D$	$T_C=25^\circ C$	74
		$T_C=100^\circ C$	52
Pulsed Drain Current <sup>2</sup>	$I_{DM}$	248	A
Single Pulse Avalanche Energy <sup>3</sup>	<b>EAS</b>	180	mJ
Avalanche Current	$I_{AS}$	30	A
Total Power Dissipation <sup>4</sup>	$P_D$	143	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>	$R_{\theta JA}$	45	$^\circ C/W$
Thermal Resistance from Junction-to-Case <sup>1</sup>	$R_{\theta JC}$	1.05	$^\circ C/W$

**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	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	120	-	-	V	
Gate-body Leakage current	$I_{GSS}$	$V_{DS} = 0V, V_{GS} = \pm 20V$	-	-	$\pm 100$	nA	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 120V, V_{GS} = 0V$	$T_J = 25^\circ\text{C}$	-	-	1	$\mu A$
			$T_J = 100^\circ\text{C}$	-	-	100	
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.3	2	2.5	V	
Drain-Source on-Resistance <sup>2</sup>	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 20A$	-	10.2	12.5	m $\Omega$	
		$V_{GS} = 4.5V, I_D = 20A$	-	12.5	17		
Forward Transconductance <sup>2</sup>	$g_{fs}$	$V_{DS} = 5V, I_D = 20A$	-	66	-	S	
<b>Dynamic Characteristics</b>							
Input Capacitance	$C_{iss}$	$V_{DS} = 60V, V_{GS} = 0V,$ $f = 1\text{MHz}$	-	2075	-	pF	
Output Capacitance	$C_{oss}$		-	235	-		
Reverse Transfer Capacitance	$C_{rss}$		-	9	-		
<b>Switching Characteristics</b>							
Gate Resistance	$R_g$	$V_{DS} = 0V, V_{GS} = 0V,$ $f = 1\text{MHz}$	-	2	-	$\Omega$	
Total Gate Charge	$Q_g$	$V_{DS} = 60V, V_{GS} = 10V,$ $I_D = 20A$	-	16	-	nC	
Total Gate Charge	$Q_g$		-	30	-		
Gate-Source Charge	$Q_{gs}$		-	7.9	-		
Gate-Drain Charge	$Q_{gd}$		-	4	-		
Turn-on Delay Time	$t_{d(on)}$	$V_{GS} = 10V, V_{DS} = 60V,$ $R = 10\Omega, I_D = 20A$	-	10.5	-	nS	
Rise Time	$t_r$		-	8.8	-		
Turn-off Delay Time	$t_{d(off)}$		-	17	-		
Fall Time	$t_f$		-	9.8	-		
<b>Drain-Source Body Diode Characteristics</b>							
Diode Forward Voltage <sup>2</sup>	$V_{SD}$	$I_S = 1A, V_{GS} = 0V$	-	-	1.0	V	
Body Diode Reverse Recovery Time	$t_{rr}$	$V_R = 60V, I_F = 20A,$ $di/dt = 500A/\mu s$	-	51	-	nS	
Body Diode Reverse Recovery Charge	$Q_{rr}$		-	76	-	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  $V_{DD} = 25V, V_{GS} = 10V, L = 0.4mH, I_{AS} = 30A$
- The power dissipation is limited by  $175^\circ\text{C}$  junction temperature

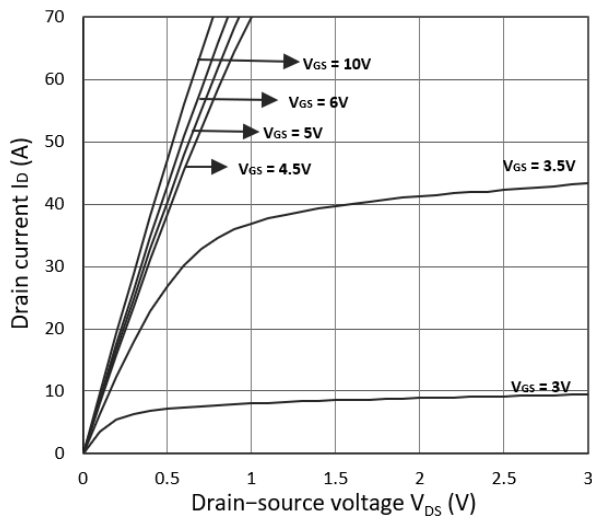


Figure 1. Output Characteristics

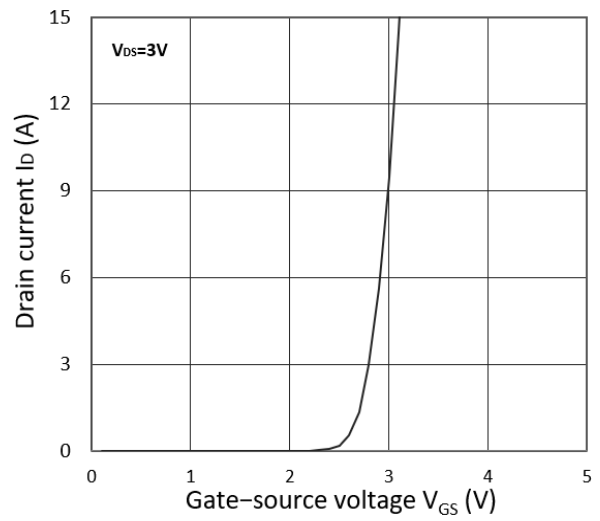


Figure 2. Transfer Characteristics

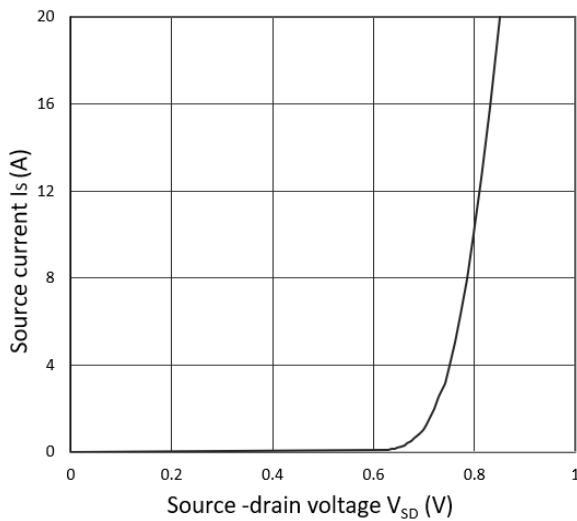


Figure 3. Forward Characteristics of Reverse

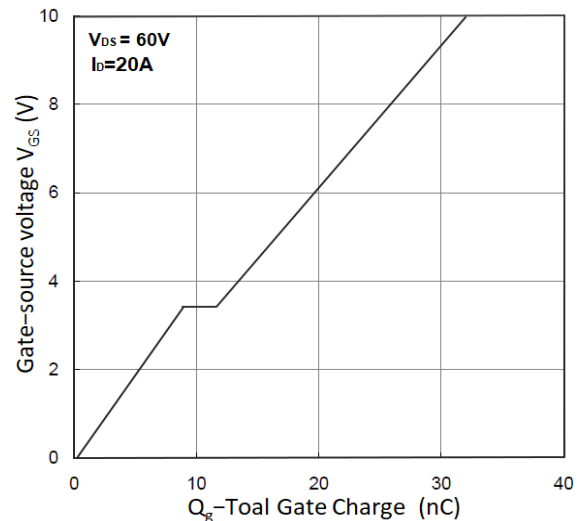


Figure 4. Gate Charge Characteristics

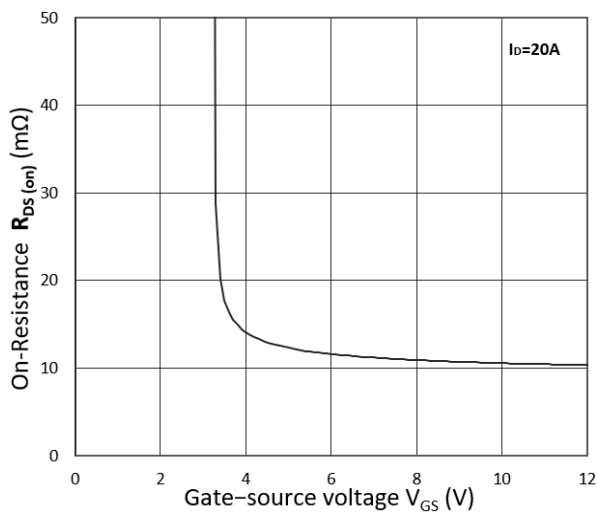


Figure 5.  $R_{DS(ON)}$  vs.  $V_{GS}$

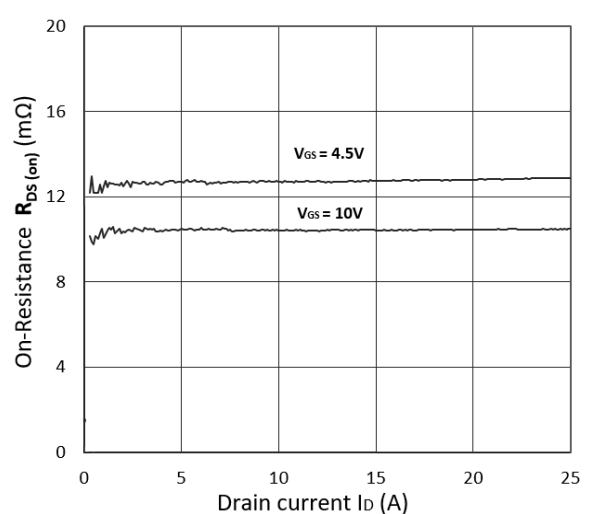


Figure 6.  $R_{DS(ON)}$  vs.  $I_D$

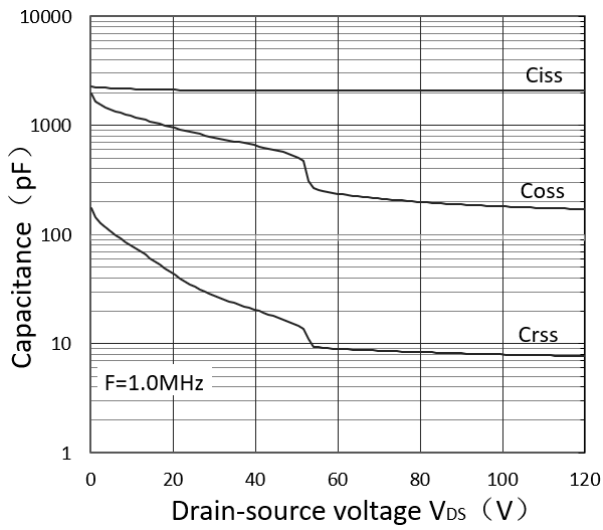


Figure 7. Capacitance Characteristics

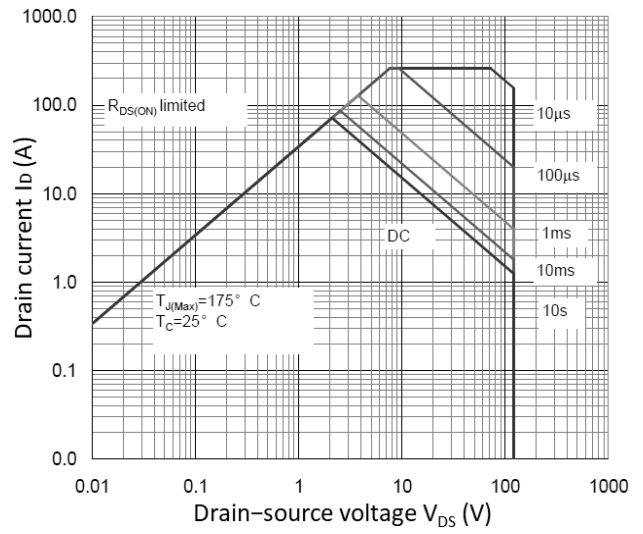


Figure 8. Safe Operating Area

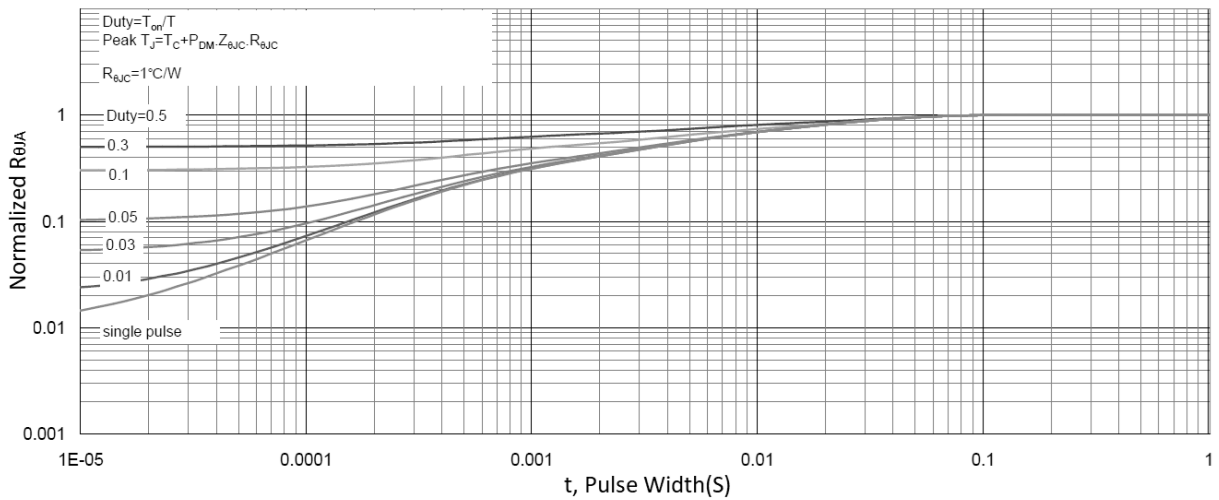


Figure 9. Normalized Maximum Transient Thermal Impedance

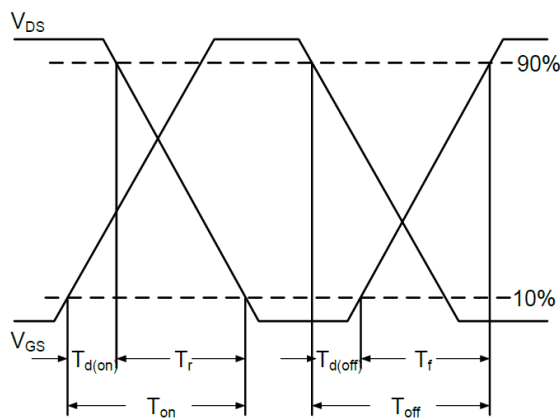


Figure 10. Switching Time Waveform

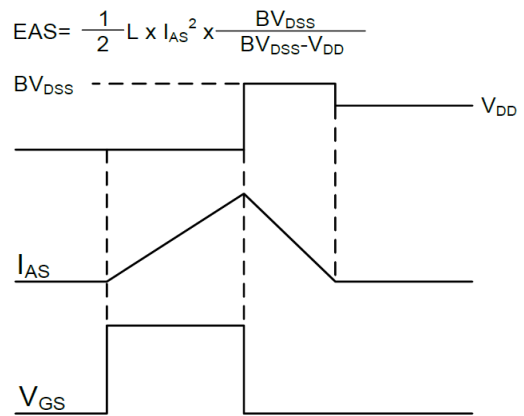
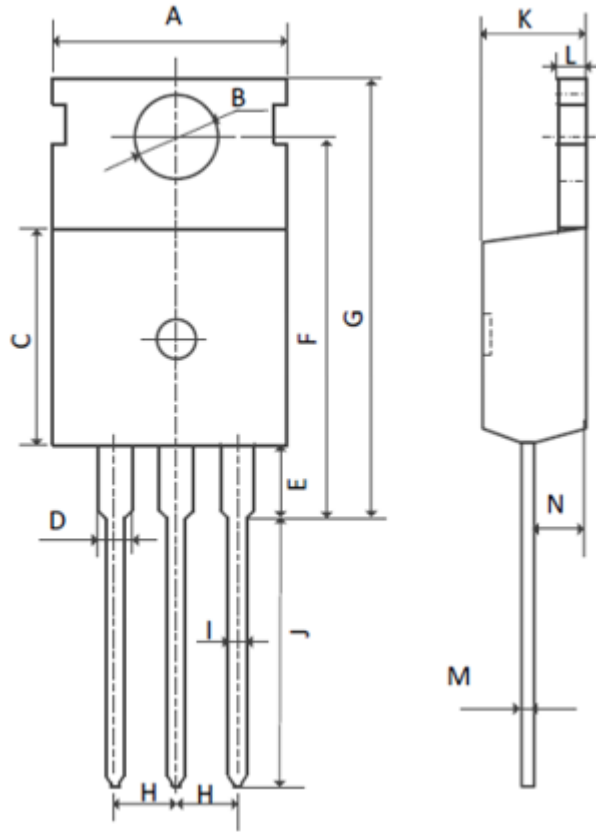


Figure 11. Unclamped Inductive Switching Waveform

Mechanical Dimensions for TO-220



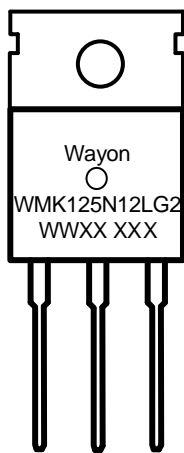
COMMON DIMENSIONS

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
WMK125N12LG2	TO-220	WMK125N12LG2	Tube

## Marking Information



WMK125N12LG2 = Device code

WWXX XXX = Date code

## Contact Information

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