

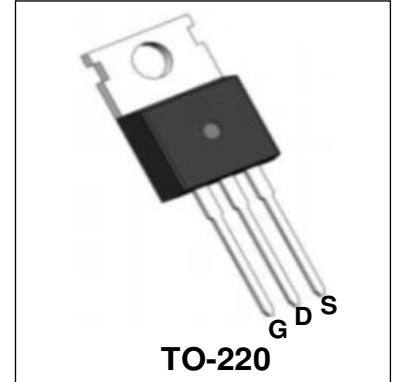
120V N-Channel Enhancement Mode Power MOSFET

Description

WMK125N12LG2 uses Wayon's 2nd 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.

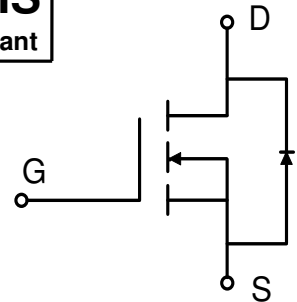
Features

- $V_{DS} = 120V$, $I_D = 74A$ (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}	± 20	V
Continuous Drain Current ¹ (Silicon Limited)	$T_C=25^\circ C$	I_D	74	A
	$T_C=100^\circ C$		52	
Pulsed Drain Current ²		I_{DM}	248	A
Single Pulse Avalanche Energy ³		EAS	72.2	mJ
Avalanche Current		I_{AS}	38	A
Total Power Dissipation ⁴	$T_C=25^\circ C$	P_D	119	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	$^\circ C$

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction-to-Ambient ¹	R_{θJA}	45	$^\circ C/W$
Thermal Resistance from Junction-to-Case ¹	R_{θJC}	1.05	$^\circ C/W$

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 = 250μA	120	-	-	V
Gate-body Leakage current		I _{GSS}	V _{DS} = 0V, V _{GS} = ±20V	-	-	±100	nA
Zero Gate Voltage Drain Current	T _J =25°C	I _{DSS}	V _{DS} = 120V, V _{GS} = 0V	-	-	1	μA
	T _J =100°C			-	-	100	
Gate-Threshold Voltage		V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	1.3	2	2.5	V
Drain-Source on-Resistance ²		R _{DS(on)}	V _{GS} = 10V, I _D = 20A	-	9.3	12.5	mΩ
			V _{GS} = 4.5V, I _D = 20A	-	11.6	17	
Forward Transconductance ²		g _{fs}	V _{DS} = 5V, I _D = 20A	-	66	-	S
Dynamic Characteristics							
Input Capacitance		C _{iss}	V _{DS} = 60V, V _{GS} = 0V, f = 1MHz	-	2075	-	pF
Output Capacitance		C _{oss}		-	235	-	
Reverse Transfer Capacitance		C _{rss}		-	9	-	
Switching Characteristics							
Gate Resistance		R _g	V _{DS} = 0V , V _{GS} = 0V , f = 1MHz	-	2.45	-	Ω
Total Gate Charge		Q _g	V _{DS} = 60V, V _{GS} = 4.5V, I _D = 20A	-	16	-	nC
Total Gate Charge		Q _g	V _{DS} = 60V, V _{GS} = 10V, I _D = 20A	-	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 = 10Ω, 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	-	
Drain-Source Body Diode Characteristics							
Diode Forward Voltage ²		V _{SD}	I _S = 1A, V _{GS} = 0V	-	-	1	V
Continuous Source Current ^{1,5}		I _S	V _G =V _D =0V , Force Current	-	-	74	A
Body Diode Reverse Recovery Time		t _{rr}	V _R = 60V ,I _F = 20A, di/dt=500A/μs	-	51	-	nS
Body Diode Reverse Recovery Charge		Q _{rr}		-	76	-	nC

Notes:

1. The data tested by surface mounted on a 1 inch² FR-4 board with 20Z 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 $V_{DD} = 25V, V_{GS} = 10V, L = 0.1mH, I_{AS} = 38A$
4. The power dissipation is limited by 150°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.

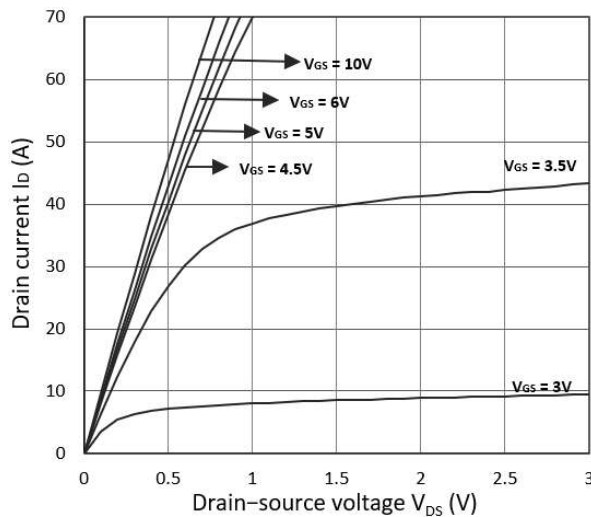


Figure 1. Output Characteristics

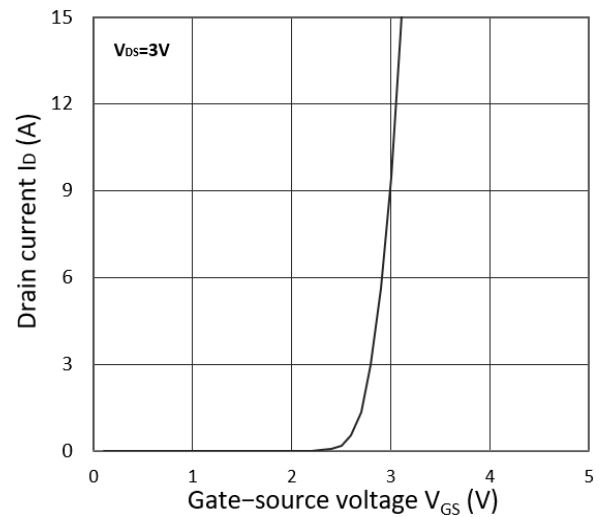


Figure 2. Transfer Characteristics

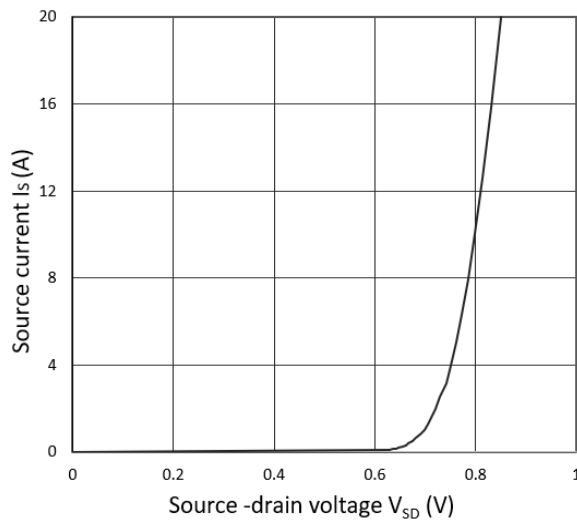


Figure 3. Forward Characteristics of Reverse

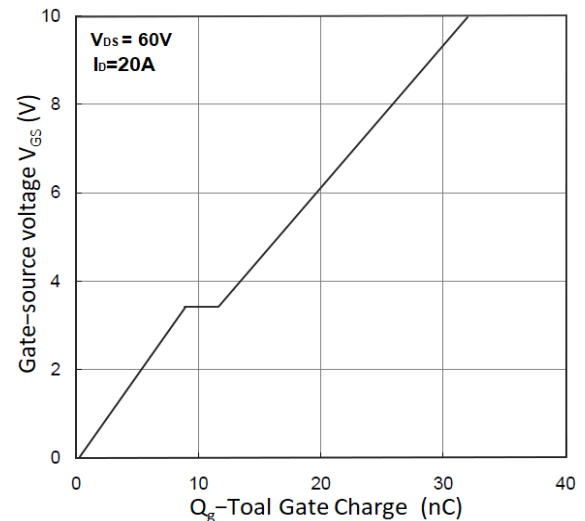
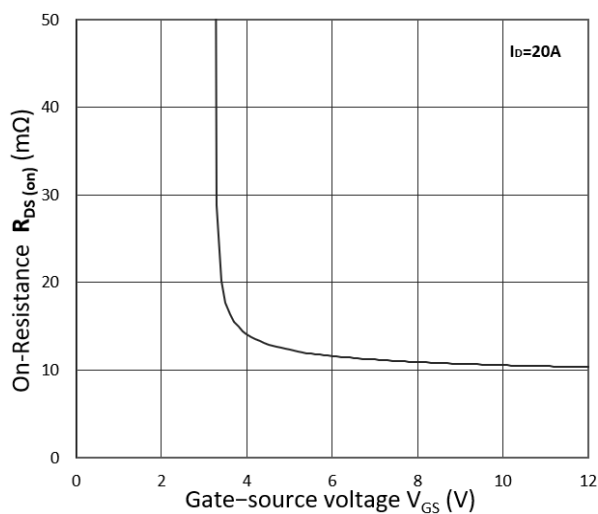
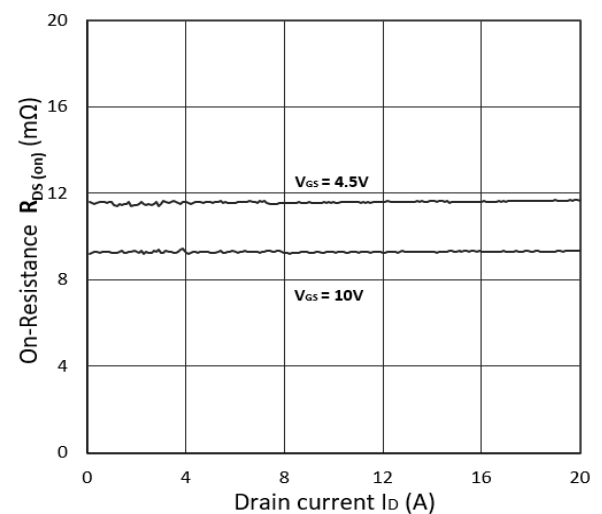


Figure 4. Gate Charge Characteristics

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

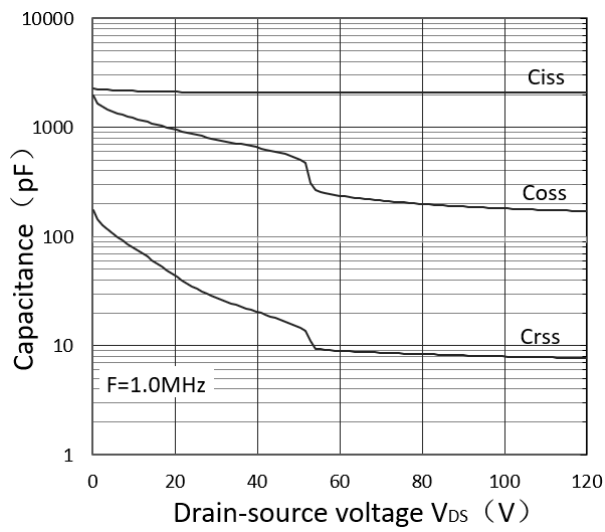


Figure 7. Capacitance Characteristics

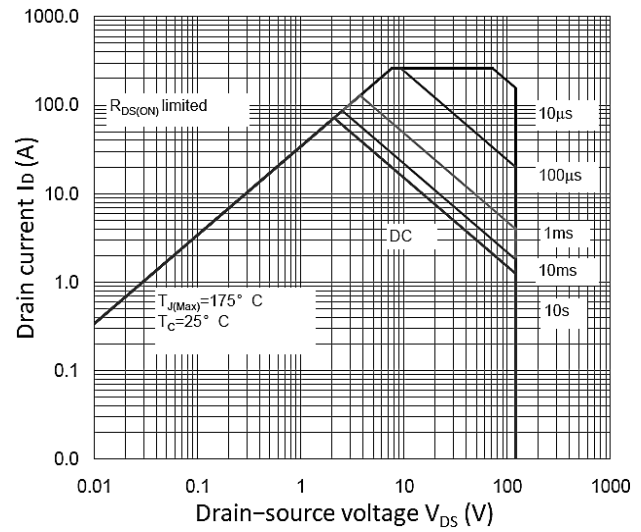


Figure 8. Safe Operating Area

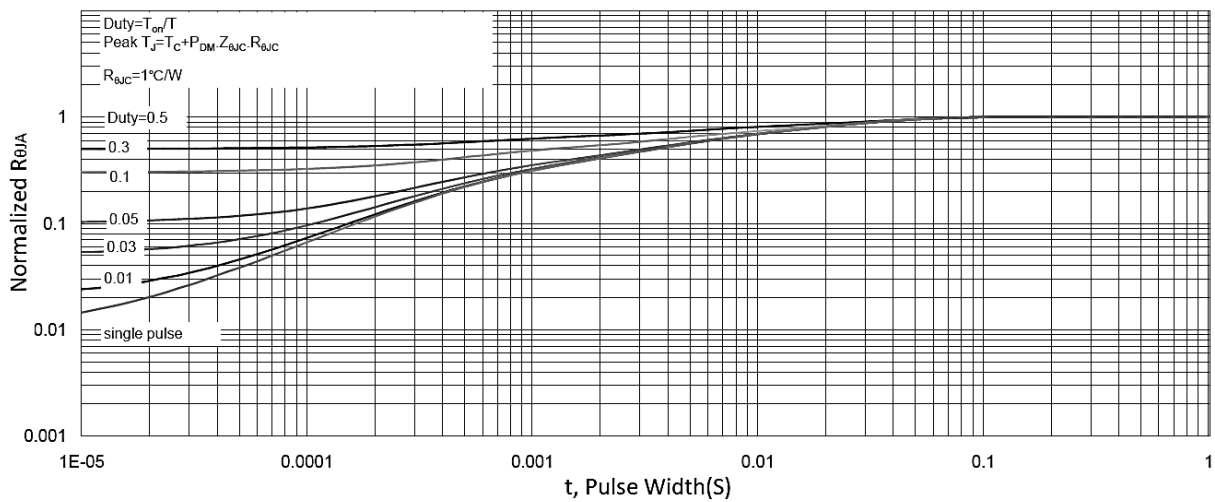


Figure 9. Normalized Maximum Transient Thermal Impedance

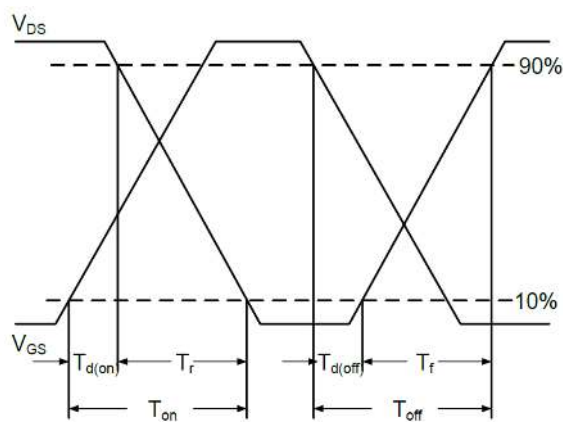
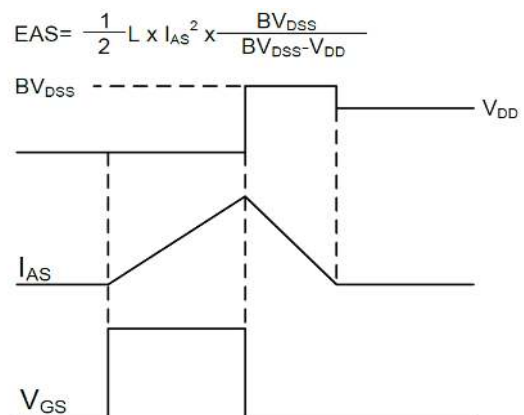
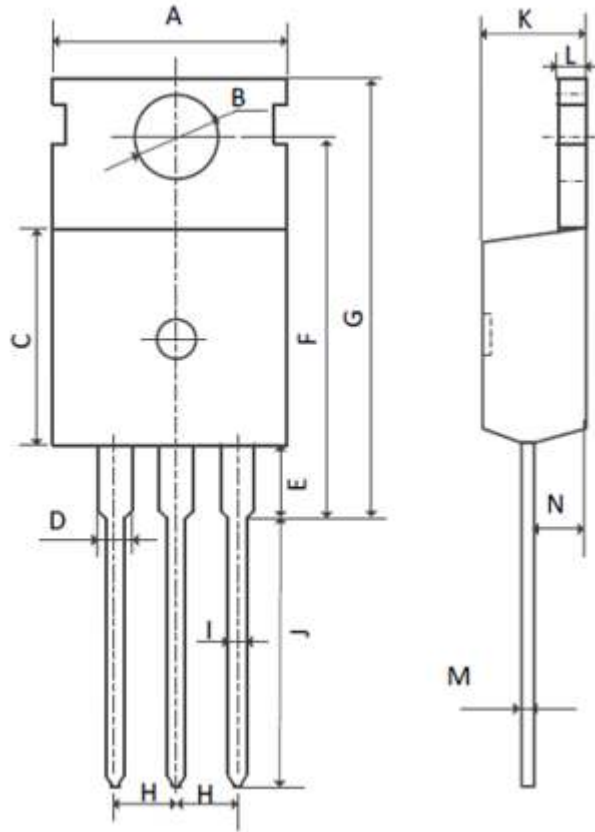


Figure 10. Switching Time Waveform

Figure 11. Unclamped Inductive Switching
Waveform

Mechanical Dimensions for TO-220



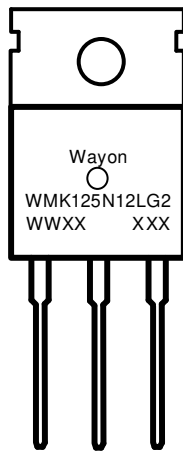
COMMON DIMENSIONS

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
WMK125N12LG2	TO-220	WMK125N12LG2	Tube

Marking Information



WMK125N12LG2 = Device code
WWXX XXX = Date code

Contact Information

No.1001, Shiwan(7) Road, Pudong District, Shanghai, P.R.China.201207

Tel: 86-21-50310888 Fax: 86-21-50757680 Email: market@way-on.com

WAYON website: <http://www.way-on.com>

For additional information, please contact your local Sales Representative.

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