

100V N-Channel Enhancement Mode Power MOSFET

Description

WMK043N10HGS uses Wayon's advanced 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

- $V_{DS} = 100V$, $I_D = 145A$
- $R_{DS(on)} < 5m\Omega$ @ $V_{GS} = 10V$
- Green Device Available
- Low Gate Charge
- 100% EAS Guaranteed

Applications

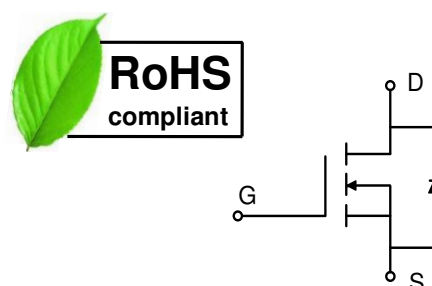
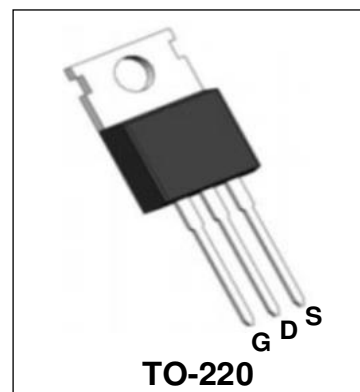
- Power Management Switches
- DC/DC Converter
- LED Backlighting

Absolute Maximum Ratings (Tc = 25°C, unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	T _C =25°C	I_D	145	A
	T _C =100°C		92	
Pulsed Drain Current ⁴		I_{DM}	580	A
Single Pulse Avalanche Energy ³		EAS	320	mJ
Total Power Dissipation	T _C =25°C	P_D	208	W
Operating Junction and Storage Temperature Range		T_J , T_{STG}	-55 to 150	°C

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction-to-Ambient ¹	R_{θJA}	38	°C/W
Thermal Resistance from Junction-to-Case	R_{θJC}	0.6	°C/W



Electrical Characteristics (Tc = 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	100	-	-	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} =100V, V _{GS} = 0V	-	-	1	μA
	T _J =100°C			-	-	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	-	4.1	5	mΩ
Forward Transconductance ²		g _{fs}	V _{DS} =10V, I _D =20A	-	62	-	S
Dynamic Characteristics							
Input Capacitance		C _{iss}	V _{DS} = 50V, V _{GS} =0V, f =1MHz	-	6868	-	pF
Output Capacitance		C _{oss}		-	740	-	
Reverse Transfer Capacitance		C _{rss}		-	21	-	
Switching Characteristics							
Gate Resistance		R _g	V _{GS} = 0V, V _{DS} = 0V, f =1MHz	-	1.3	-	Ω
Total Gate Charge		Q _g	V _{GS} = 10V, V _{DS} = 50V, I _D =20A	-	112.5	-	nC
Gate-Source Charge		Q _{gs}		-	30.5	-	
Gate-Drain Charge		Q _{gd}		-	27.3	-	
Turn-on Delay Time		t _{d(on)}	V _{GS} =10V, V _{DS} =50V, R _G = 3Ω, I _D = 20A	-	33	-	ns
Rise Time		t _r		-	39	-	
Turn-off Delay Time		t _{d(off)}		-	67.1	-	
Fall Time		t _f		-	32	-	
Drain-Source Body Diode Characteristics							
Diode Forward Voltage ²		V _{SD}	I _F = 20A, V _{GS} = 0V	-	-	1.2	V
Continuous Source Current ^{1,5}		I _s	V _G =V _D =0V , Force Current	-	-	145	A
Body Diode Reverse Recovery Time		t _{rr}	I _F = 20A, dI/dt=100A/μs	-	58.7	-	ns
Body Diode Reverse Recovery Charge		Q _{rr}		-	97.3	-	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 $V_{DD} = 35V, V_{GS} = 10V, L = 0.4mH, I_{AS} = 40A$
4. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)} = 150^\circ C$.
5. The data is theoretically the same as I_D and I_{DM} , in real applications, should be limited by total power dissipation.

Typical Characteristics

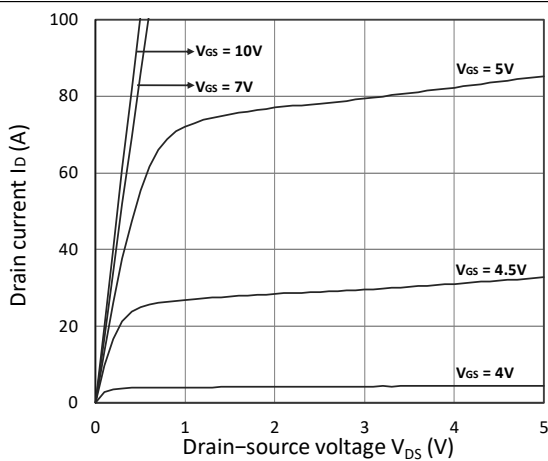


Figure 1. Output Characteristics

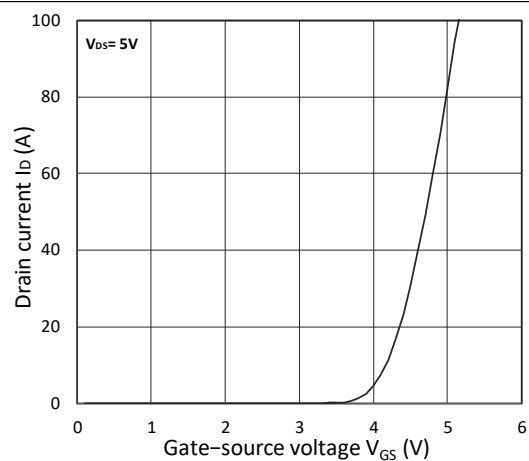


Figure 2. Transfer Characteristics

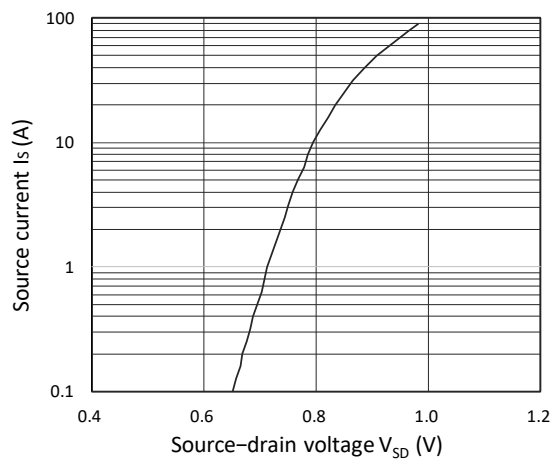
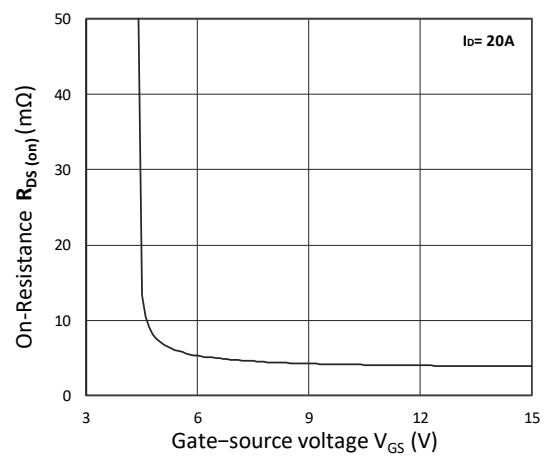
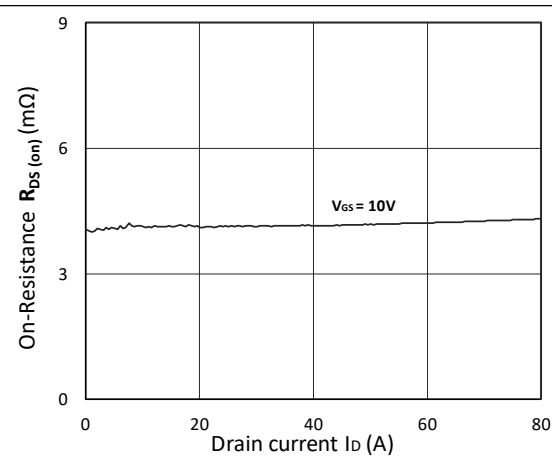
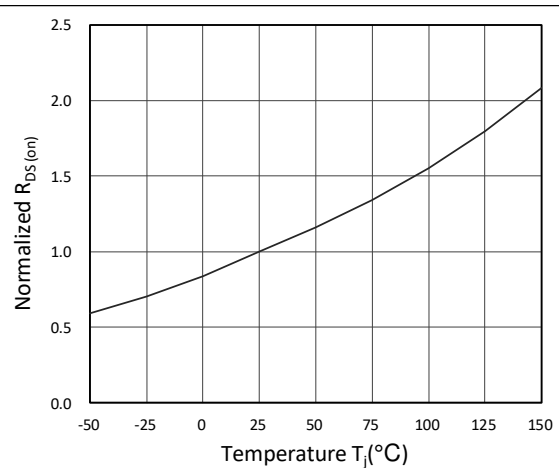


Figure 3. Forward Characteristics of Reverse

Figure 4. $R_{DS(ON)}$ vs. V_{GS} Figure 5. $R_{DS(ON)}$ vs. I_D Figure 6. Normalized $R_{DS(ON)}$ vs. Temperature

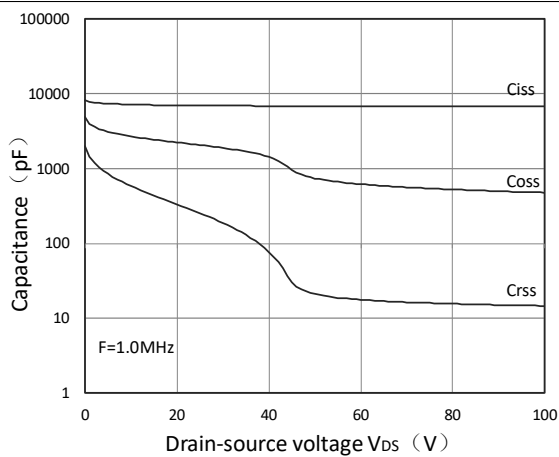


Figure 7. Capacitance Characteristics

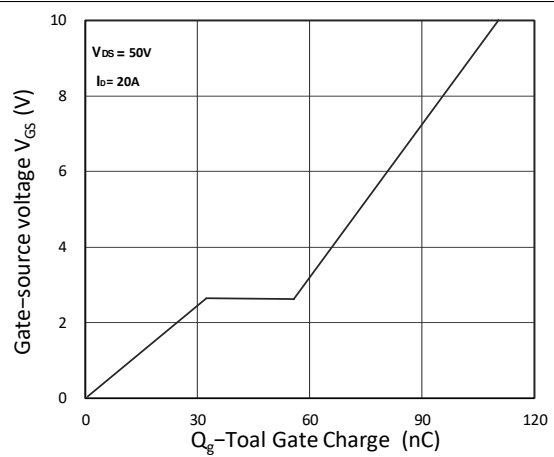


Figure 8. Gate Charge Characteristics

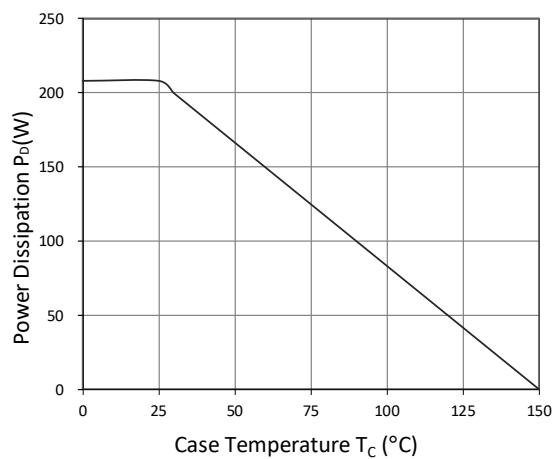


Figure 9. Power Dissipation

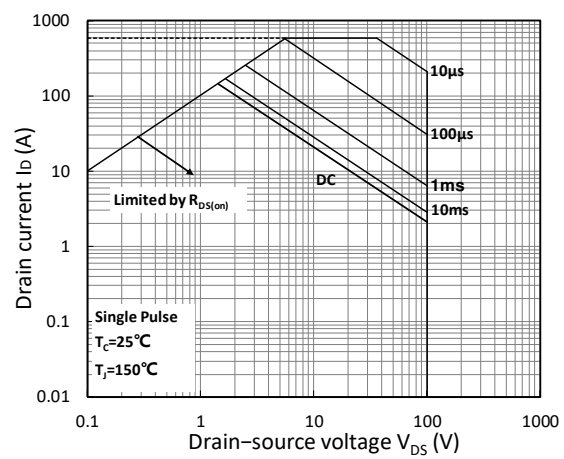


Figure 10. Safe Operating Area

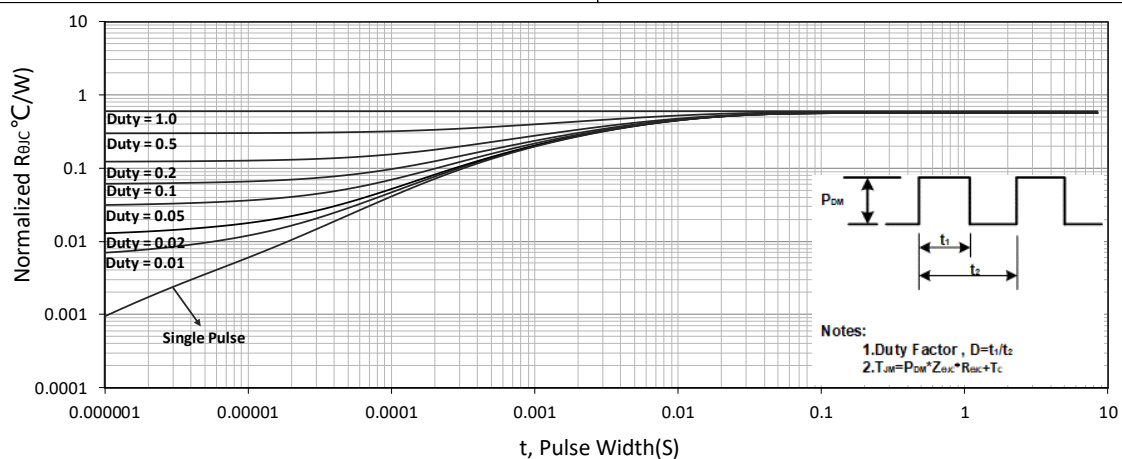


Figure 11. Normalized Maximum Transient Thermal Impedance

Test Circuit

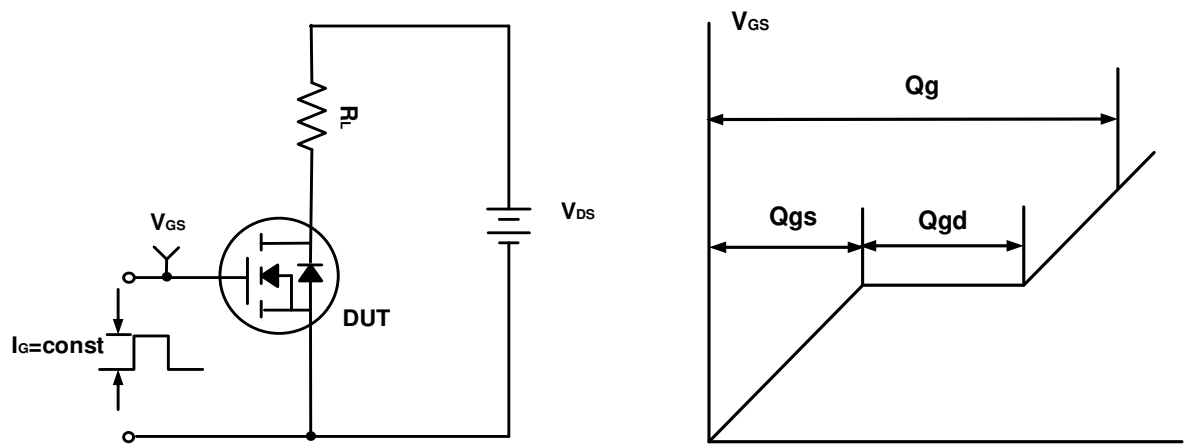


Figure A. Gate Charge Test Circuit & Waveforms

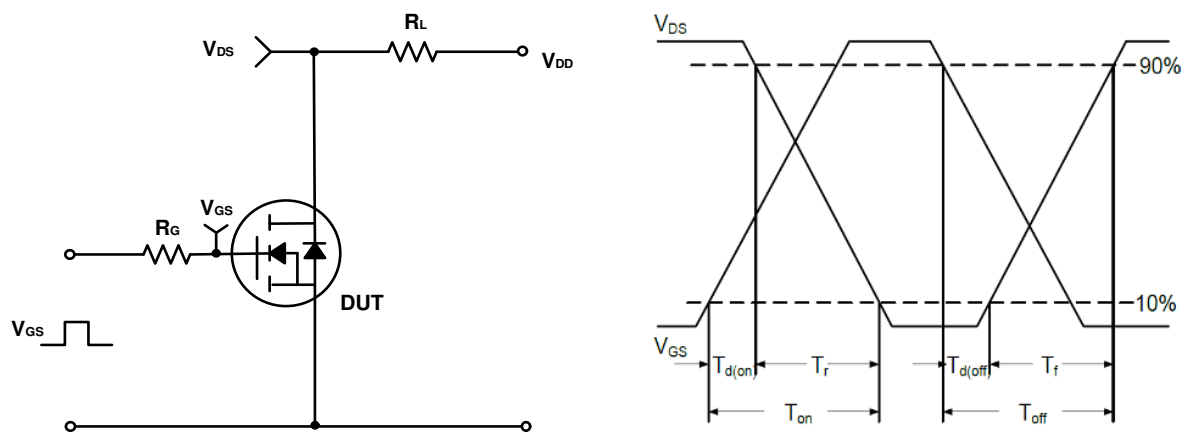


Figure B. Switching Test Circuit & Waveforms

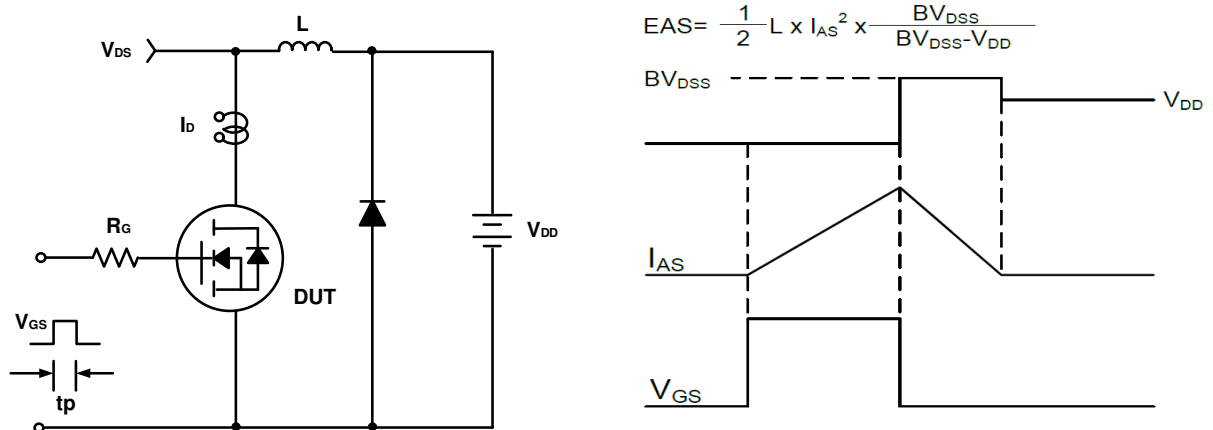
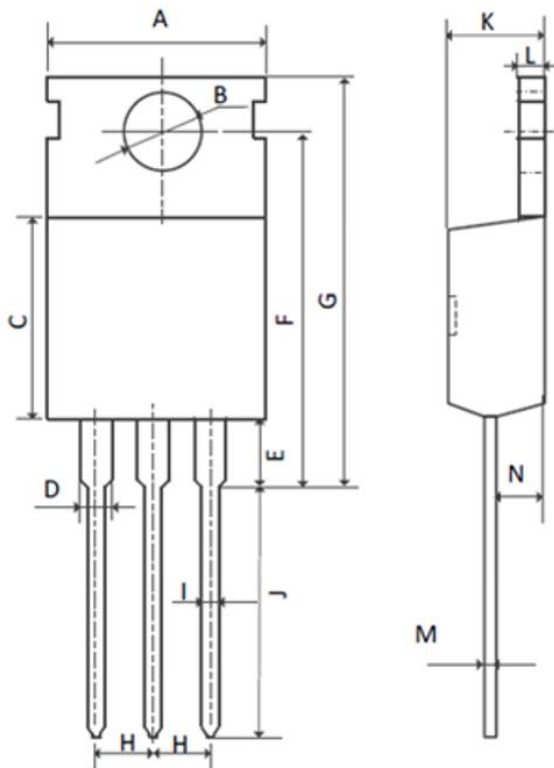


Figure C. Unclamped Inductive Switching Circuit & Waveforms

Mechanical Dimensions for TO-220

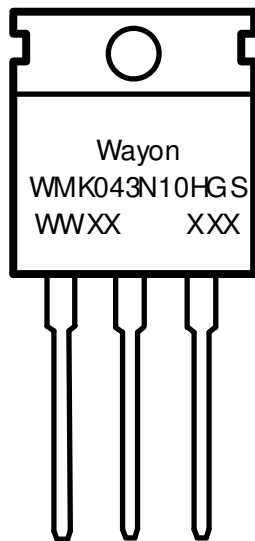
COMMON DIMENSIONS



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	3.50
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
WMK043N10HGS	TO-220	WMK043N10HGS	Tube

Marking Information

WMK043N10HGS = Device code

WWXX XXX= Date code

Contact Information

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