

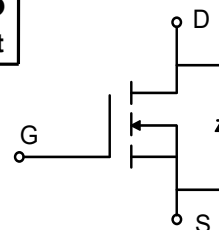
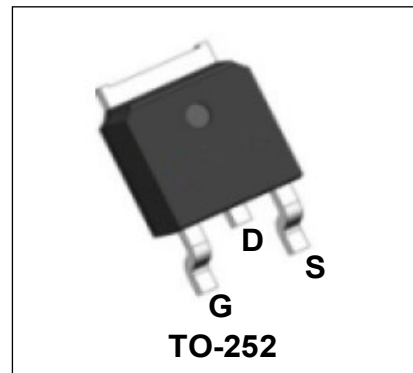
40V N-Channel Enhancement Mode Power MOSFET

Description

WMO60N04T1 uses advanced power trench technology that has been especially tailored to minimize the on-state resistance and yet maintain superior switching performance.

Features

- $V_{DS} = 40V$, $I_D = 60A$
 $R_{DS(on)} < 7.2m\Omega$ @ $V_{GS} = 10V$
 $R_{DS(on)} < 8.5m\Omega$ @ $V_{GS} = 4.5V$
- High Density Cell Design
- Fully Characterized Avalanche Voltage and Current
- Low $R_{DS(on)}$
- Good Stability and Uniformity with High EAS
- Excellent Package for Good Heat Dissipation



Applications

- Power Management Switches
- DC/DC Converter

Absolute Maximum Ratings ($T_A = 25^\circ C$, unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_C = 25^\circ C$	I_D	60	A
	$T_C = 100^\circ C$		38	
Pulsed Drain Current ¹		I_{DM}	240	A
Single Pulse Avalanche Energy ²		EAS	45	mJ
Total Power Dissipation	$T_C = 25^\circ C$	P_D	46.2	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 ³	$R_{\theta JA}$	35	$^\circ C/W$
Thermal Resistance from Junction-to-Case	$R_{\theta JC}$	2.7	$^\circ C/W$

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

Parameter		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics							
Drain-Source Breakdown Voltage		$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	40	-	-	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}	$V_{DS} = 40V, V_{GS} = 0V$	-	-	1	μA
	$T_J=100^{\circ}C$			-	-	100	
Gate-Threshold Voltage		$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1	1.6	2.5	V
Drain-Source on-Resistance ⁴		$R_{DS(on)}$	$V_{GS} = 10V, I_D = 30A$	-	5.5	7.2	m Ω
			$V_{GS} = 4.5V, I_D = 20A$	-	6.5	8.5	
Forward Transconductance ⁴		g_{fs}	$V_{DS} = 10V, I_D = 30A$	-	28	-	S
Dynamic Characteristics ⁵							
Input Capacitance		C_{iss}	$V_{DS} = 20V, V_{GS} = 0V, f = 1MHz$	-	2400	-	pF
Output Capacitance		C_{oss}		-	192	-	
Reverse Transfer Capacitance		C_{rss}		-	142	-	
Gate Resistance		R_g	$f = 1MHz$	-	2	-	Ω
Switching Characteristics ⁵							
Total Gate Charge		Q_g	$V_{GS} = 10, V_{DS} = 20V, I_D = 30A$	-	36	-	nC
Gate-Source Charge		Q_{gs}		-	6.2	-	
Gate-Drain Charge		Q_{gd}		-	7.3	-	
Turn-on Delay Time		$t_{d(on)}$	$V_{GS} = 10V, V_{DD} = 20V, R_G = 3\Omega, I_D = 30A$	-	8.8	-	ns
Rise Time		t_r		-	9.5	-	
Turn-off Delay Time		$t_{d(off)}$		-	88	-	
Fall Time		t_f		-	40	-	
Body Diode Reverse Recovery Time		t_{rr}	$I_F = 20A, dI/dt = 100A/\mu s$	-	34	-	ns
Body Diode Reverse Recovery Charge		Q_{rr}		-	8	-	nC
Drain-Source Body Diode Characteristics							
Diode Forward Voltage ⁴		V_{SD}	$I_S = 1A, V_{GS} = 0V$	-	-	1.2	V
Continuous Source Current	$T_C=25^{\circ}C$	I_S	-	-	-	60	A

Notes:

1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)} = 150^\circ\text{C}$.
2. The EAS data shows Max. rating . The test condition is $V_{DD} = 25V, V_{GS} = 10V, L = 0.1\text{mH}, I_{AS} = 30A$.
3. The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper, The value in any given application depends on the user's specific board design.
4. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
5. This value is guaranteed by design hence it is not included in the production test.

Typical Characteristics

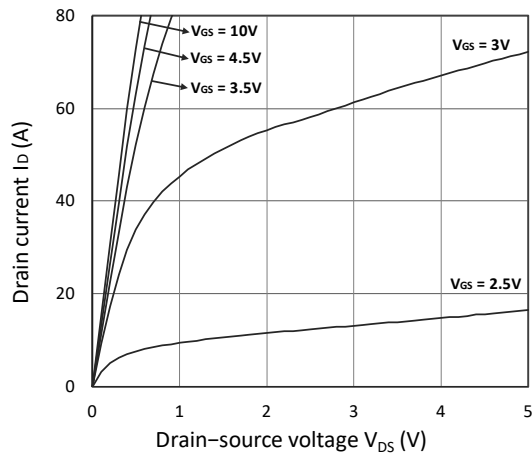


Figure 1. Output Characteristics

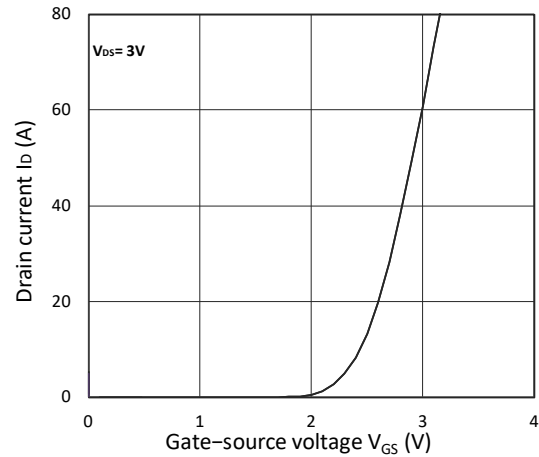


Figure 2. Transfer Characteristics

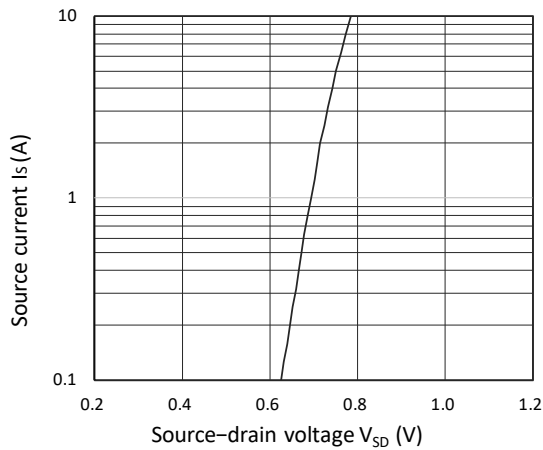
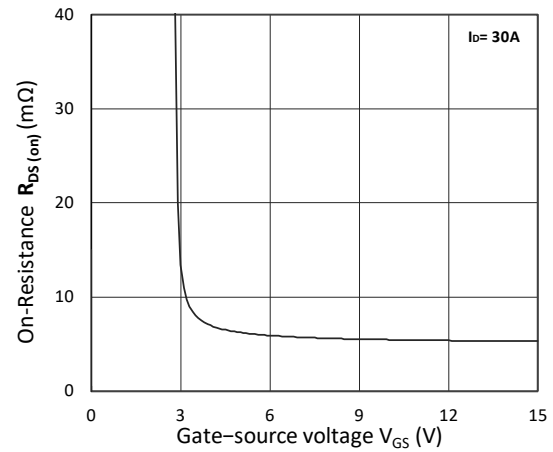
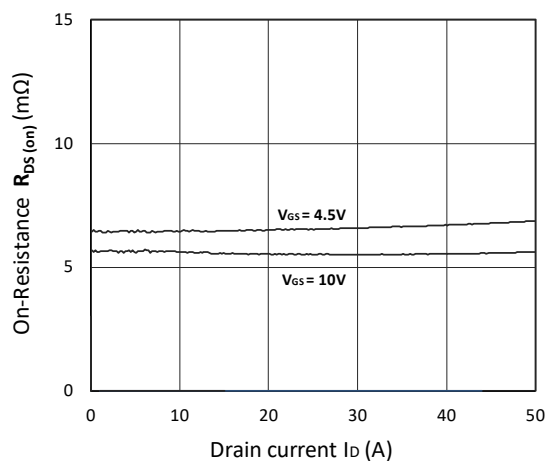
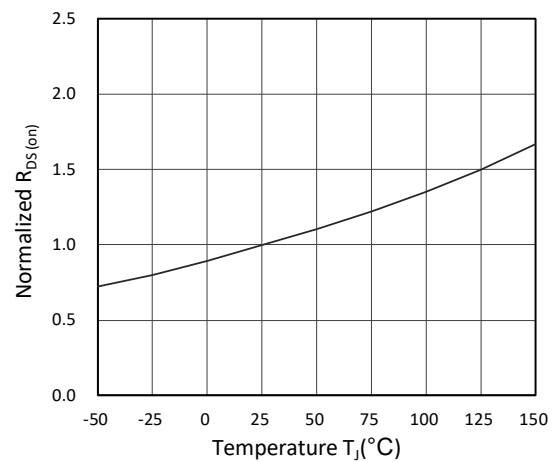


Figure 3. Forward Characteristics of Reverse

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

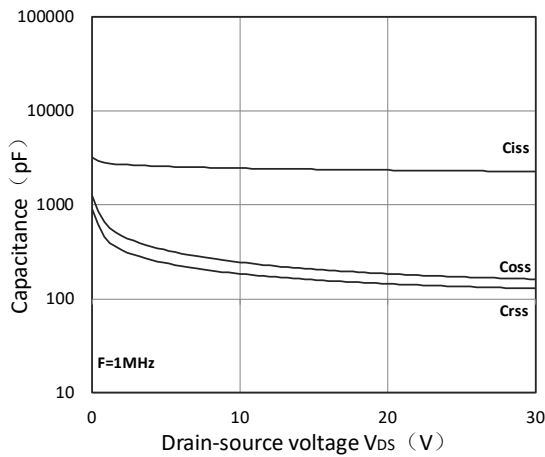


Figure 7. Capacitance Characteristics

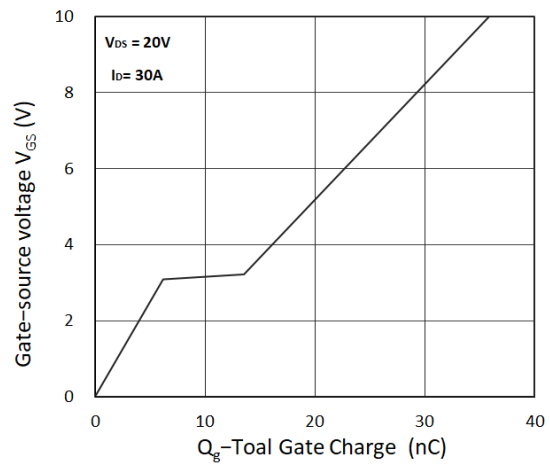


Figure 8. Gate Charge Characteristics

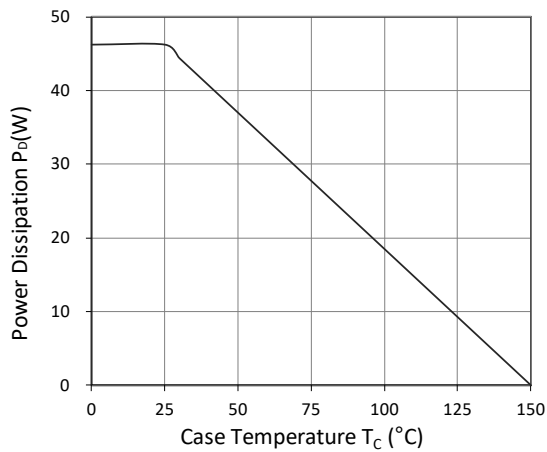


Figure 9. Power Dissipation

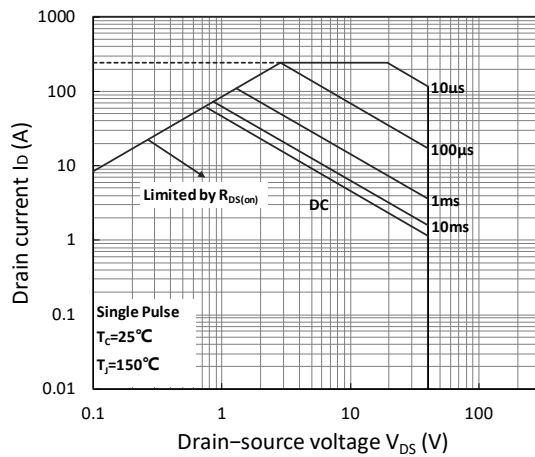


Figure10. Safe Operating Area

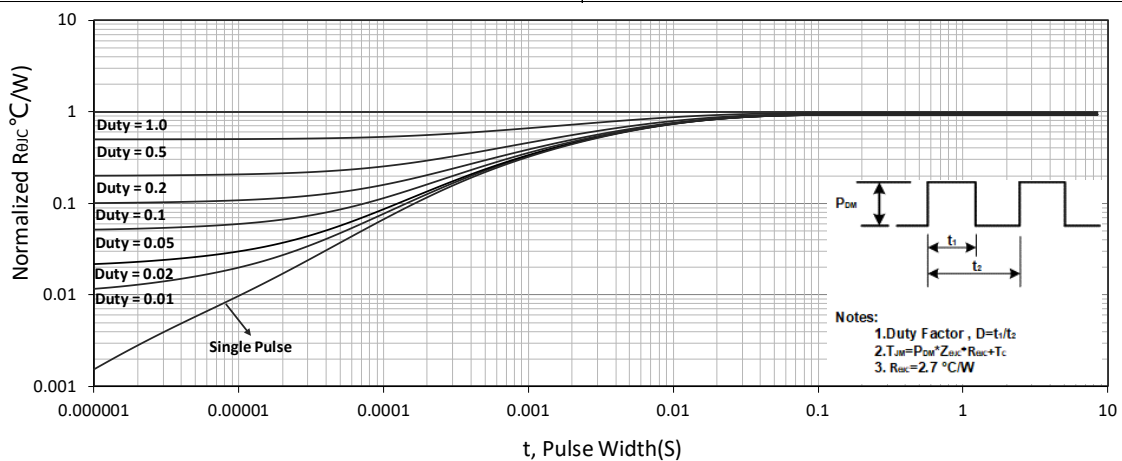


Figure 11. Normalized Maximum Transient Thermal Impedance

Test Circuit

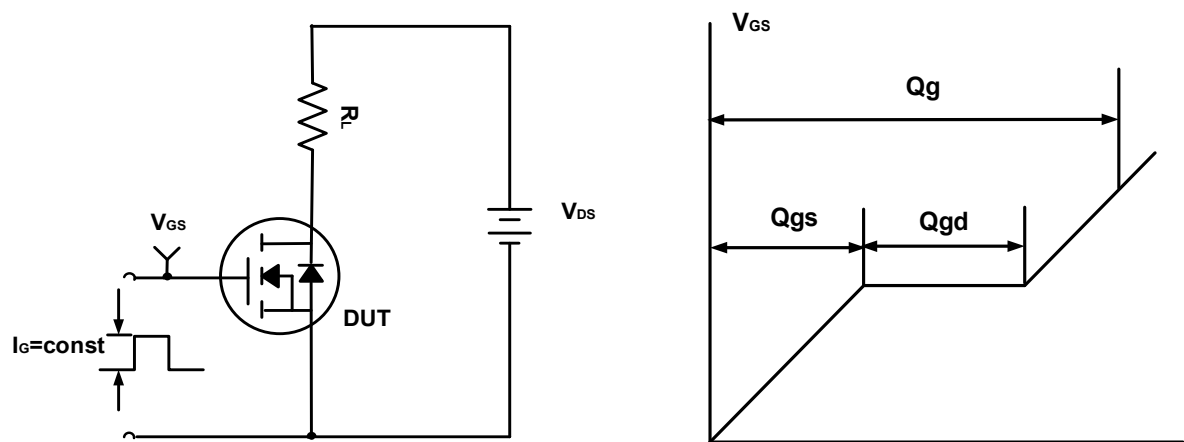


Figure A. Gate Charge Test Circuit & Waveforms

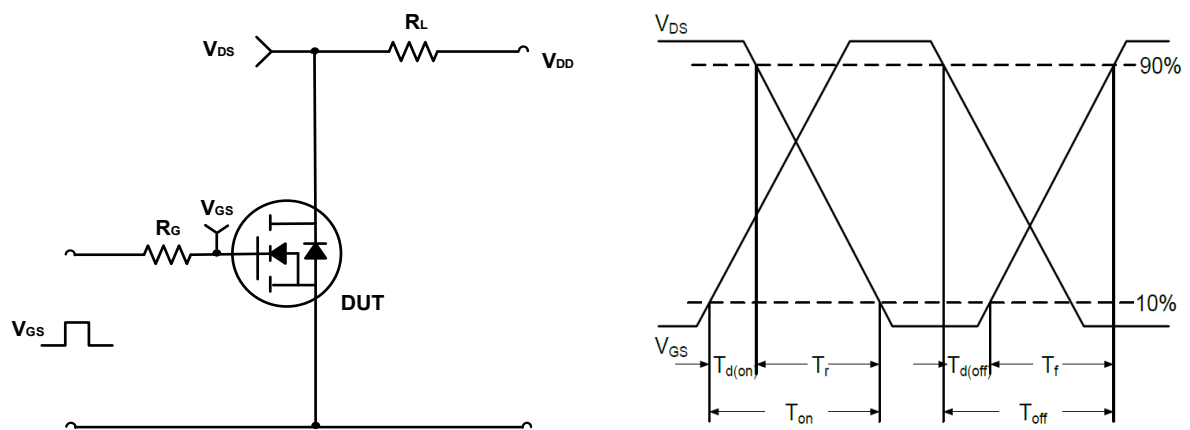


Figure B. Switching Test Circuit & Waveforms

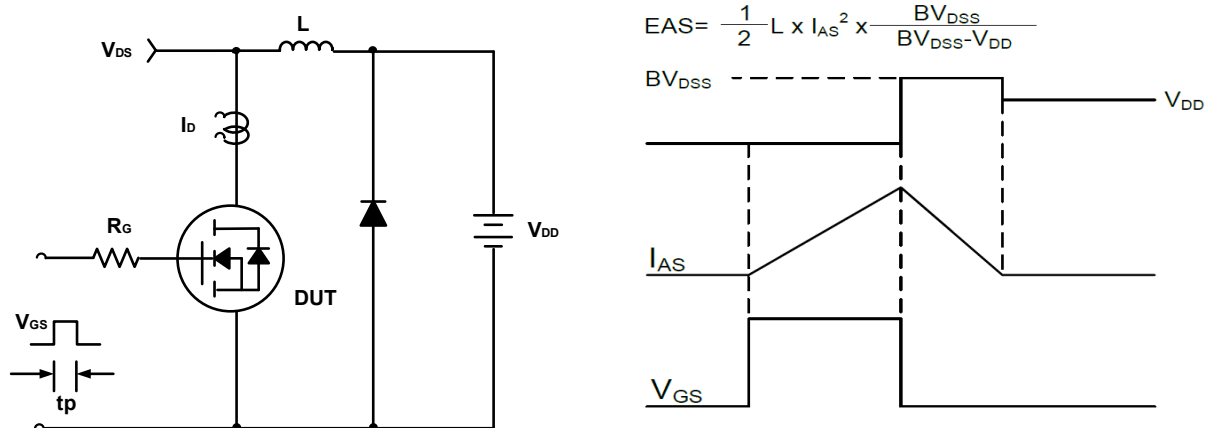
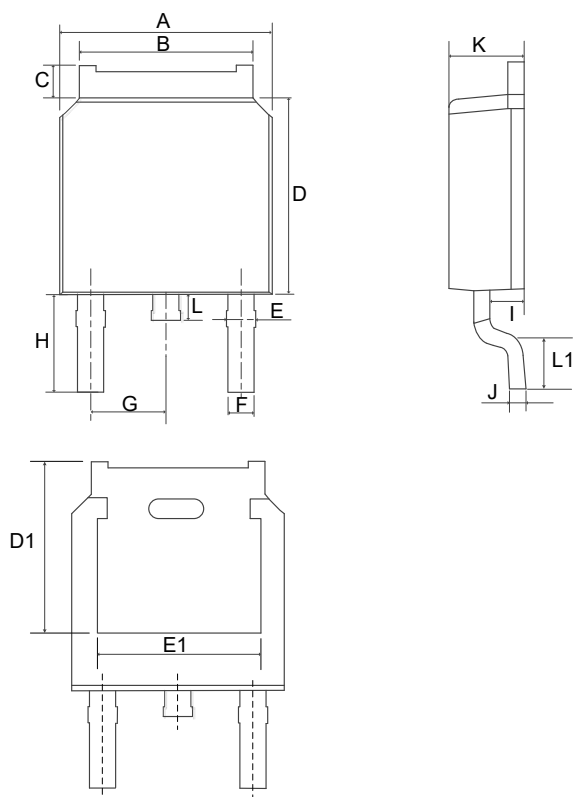


Figure C. Unclamped Inductive Switching Circuit & Waveforms

Mechanical Dimensions for TO-252



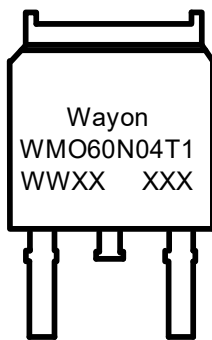
COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	6.40	6.80
B	5.13	5.50
C	0.88	1.28
D	5.90	6.22
D1	5.35REF	
E	0.68	1.10
E1	4.83REF	
F	0.68	0.91
G	2.29REF	
H	2.90REF	
I	0.85	1.17
J	0.51REF	
K	2.10	2.50
L	0.40	1.00
L1	1.50REF	

Ordering Information

Part	Package	Marking	Packing method
WMO60N04T1	TO-252	WMO60N04T1	Tape and Reel

Marking Information



WMO60N04T1 = 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.

WAYON® is registered trademarks of Wayon Corporation.

Disclaimer

WAYON reserves the right to make changes without further notice to any Products herein to improve reliability, function, or design. The Products are not designed for use in hostile environments, including, without limitation, aircraft, nuclear power generation, medical appliances, and devices or systems in which malfunction of any Product can reasonably be expected to result in a personal injury. The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. WAYON does not assume any liability for infringement of patents, copyrights, or other intellectual property rights of third parties by or arising from the use of Products or technical information described in this document.