

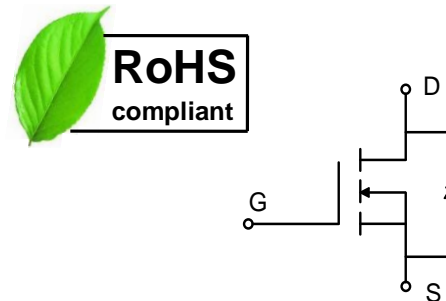
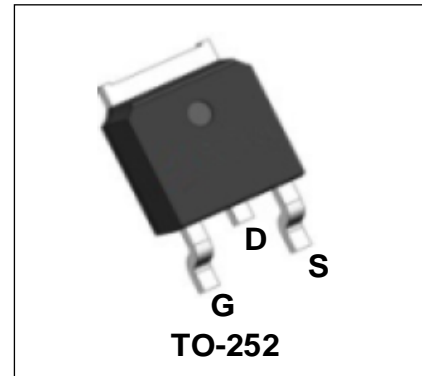
40V N-Channel Enhancement Mode Power MOSFET

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

- $V_{DS} = 40V$, $I_D = 60A$
 $R_{DS(on)} < 7m\Omega @ V_{GS} = 10V$
 $R_{DS(on)} < 12m\Omega @ V_{GS} = 4.5V$
- 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

- Load Switch
- Uninterruptible Power Supply
- Hard Switched and High Frequency Circuits

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ¹	I_D	$T_C = 25^\circ C$	60
		$T_C = 100^\circ C$	42
Pulsed Drain Current ²	I_{DM}	180	A
Single Pulse Avalanche Energy ³	EAS	121	mJ
Avalanche Current	I_{AS}	22	A
Total Power Dissipation ⁴	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-Case ¹	$R_{\theta JC}$	2.7	$^\circ C/W$

Electrical Characteristics T_c = 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	40	-	-	V
Gate-body Leakage current	I_{GSS}	V _{DS} = 0V, V _{GS} = ±20V	-	-	±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V _{DS} = 40V, V _{GS} = 0V	-	-	1	μA
Gate-Threshold Voltage	V_{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	1	1.7	2.5	V
Drain-Source on-Resistance ²	R_{DS(on)}	V _{GS} = 10V, I _D = 30A	-	6	7	mΩ
		V _{GS} = 4.5V, I _D = 20A	-	8.8	12	
Forward Transconductance ²	g_{fs}	V _{DS} = 5V, I _D = 15A	-	28	-	S
Dynamic Characteristics						
Input Capacitance	C_{iss}	V _{DS} = 20V, V _{GS} = 0V, f = 1MHz	-	2400	-	pF
Output Capacitance	C_{oss}		-	192	-	
Reverse Transfer Capacitance	C_{rss}		-	160	-	
Switching Characteristics						
Gate Resistance	R_g	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz	-	1.7	-	Ω
Total Gate Charge	Q_g	V _{GS} = 10, V _{DS} = 20V, I _D = 30A	-	44	-	nC
Gate-Source Charge	Q_{gs}		-	5	-	
Gate-Drain Charge	Q_{gd}		-	11.5	-	
Turn-on Delay Time	t_{d(on)}	V _{GS} = 10V, V _{DD} = 20V, R _G = 3Ω, R _L = 1Ω, I _D = 30A	-	11	-	nS
Rise Time	t_r		-	33	-	
Turn-off Delay Time	t_{d(off)}		-	42	-	
Fall Time	t_f		-	13	-	
Drain-Source Body Diode Characteristics						
Diode Forward Voltage ²	V_{sD}	I _S = 1A, V _{GS} = 0V	-	-	1.2	V
Continuous Source Current ^{1,5}	I_S	V _G =V _D =0V, Force Current	-	-	60	A
Body Diode Reverse Recovery Time	t_{rr}	I _F = 20A, dI/dt = 100A/μs	-	13.5	-	nS
Body Diode Reverse Recovery Charge	Q_{rr}		-	5	-	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 ≤ 300us, duty cycle ≤ 2%
3. The EAS data shows Max. rating. The test condition is V_{DD}=30V, V_{GS}=10V, L=0.5mH, I_{AS}=22A
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.

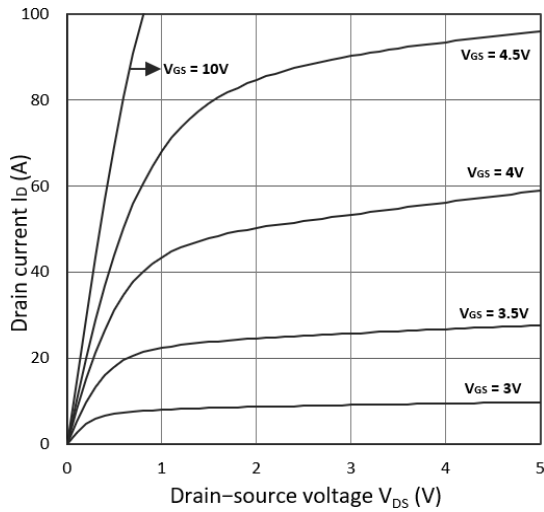


Figure 1. Output Characteristics

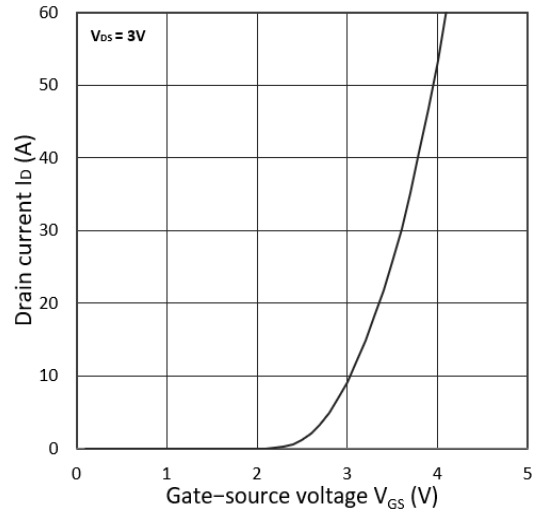


Figure 2. Transfer Characteristics

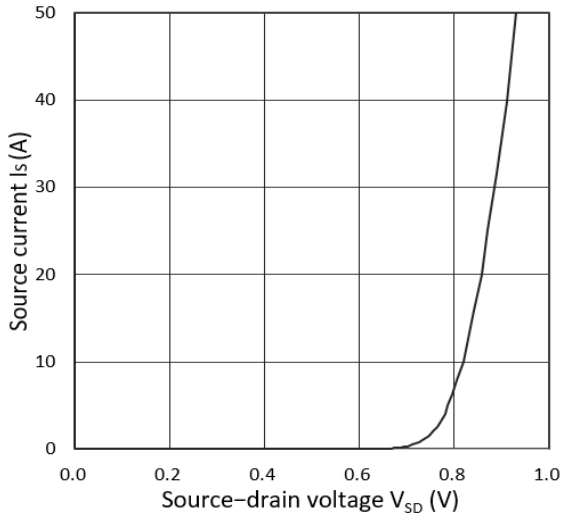


Figure 3. Forward Characteristics of Reverse

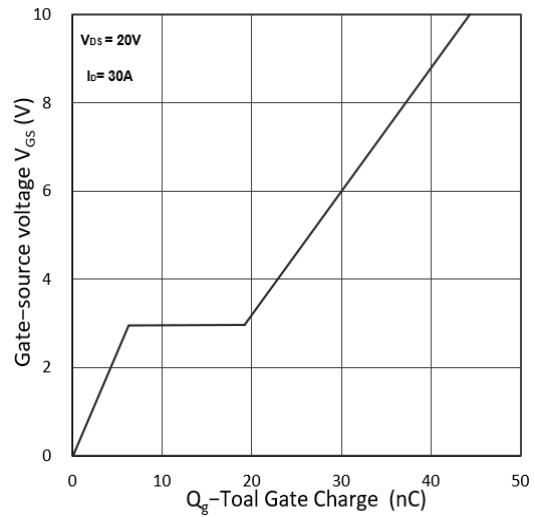


Figure 4. Gate Charge Characteristics

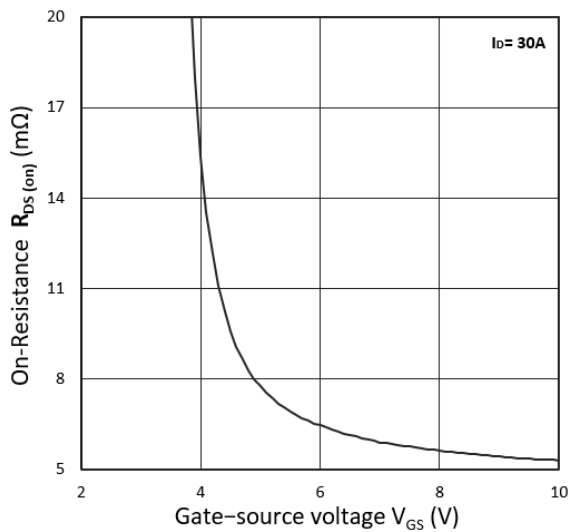


Figure 5. $R_{DS(on)}$ vs. V_{GS}

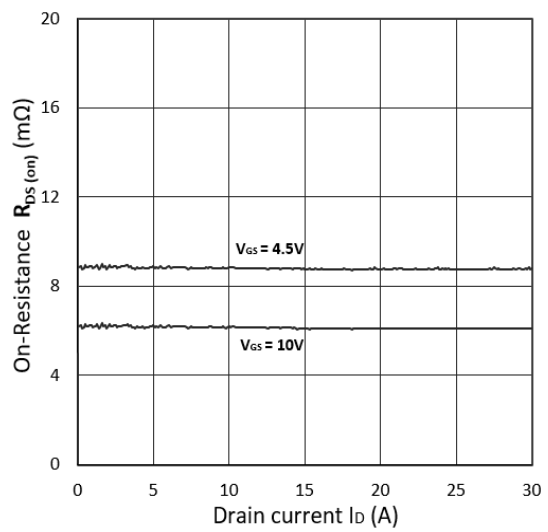


Figure 6. $R_{DS(on)}$ vs. I_D

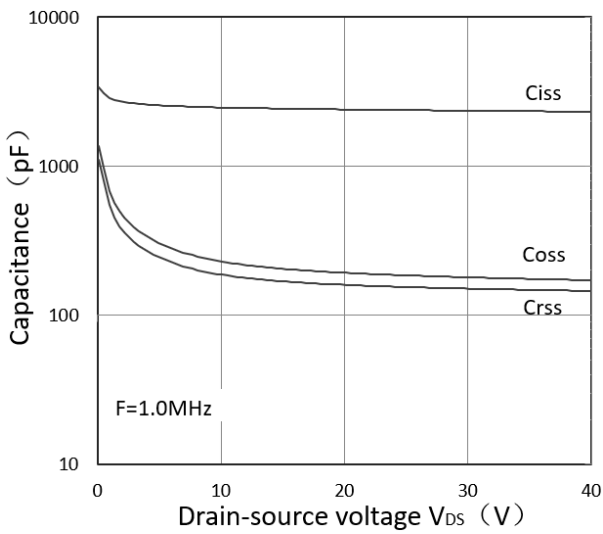


Figure 7. Capacitance Characteristics

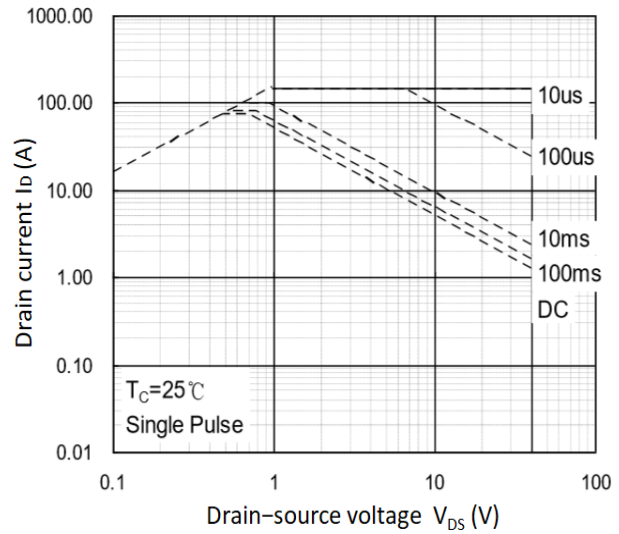


Figure 8. Safe Operating Area

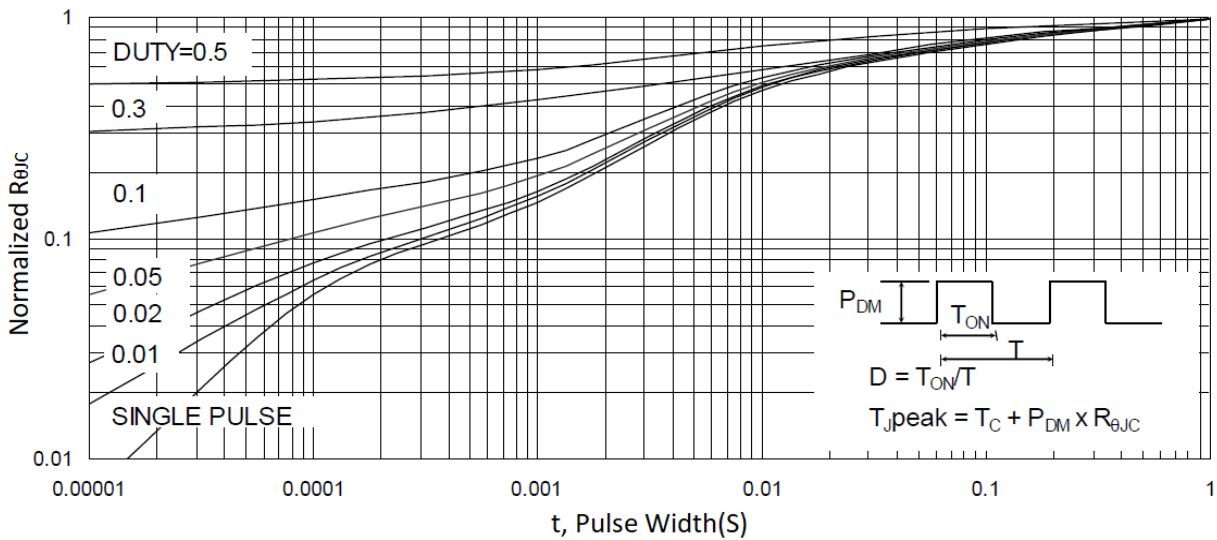


Figure 9. Normalized Maximum Transient Thermal Impedance

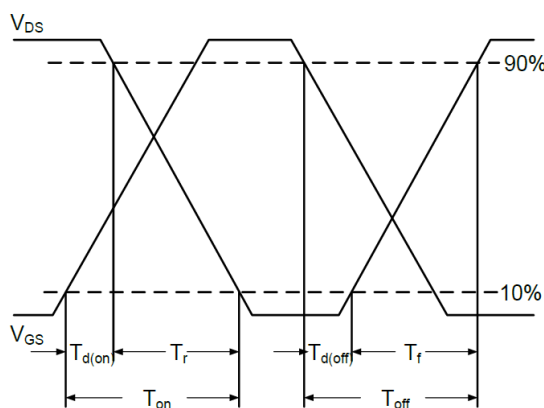


Figure 10. Switching Time Waveform

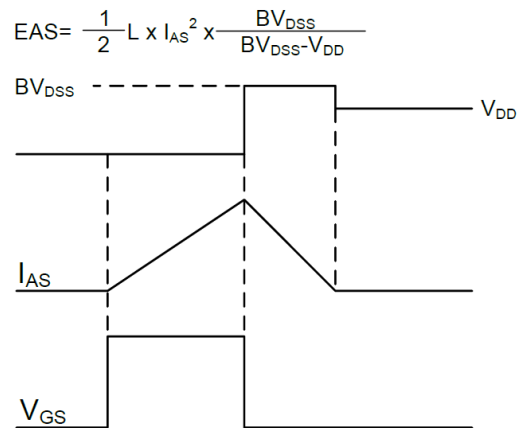
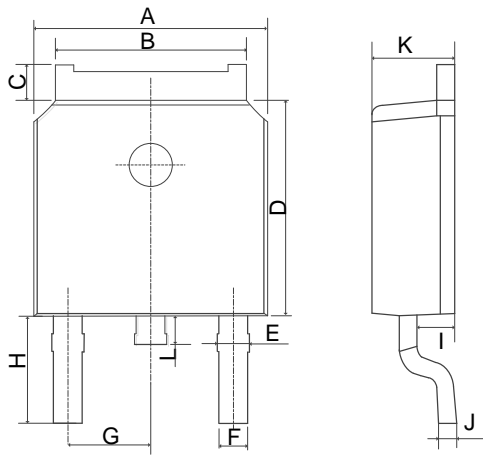


Figure 11. Unclamped Inductive Switching Waveform

Mechanical Dimensions for TO-252



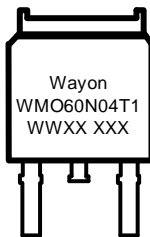
COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	6.40	6.80
B	5.13	5.50
C	0.88	1.28
D	5.90	6.22
E	0.68	1.10
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

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>

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