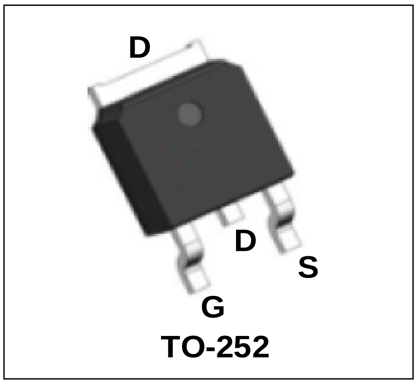
40V N-Channel Enhancement Mode Power MOSFET



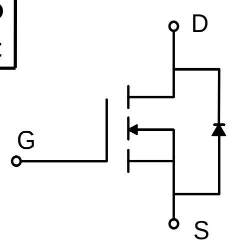
Description

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
  $R_{DS(on)}$ < 7mΩ @ V_{GS} = 10V
  $R_{DS(on)}$ < 12mΩ @ 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

RoHS compliant



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@10V[1]	T_C=25℃	I_D	60	A
	T_C=100℃		42	
Pulsed Drain Current[2]		I_{DM}	240	A
Single Pulse Avalanche Energy[3]		EAS	193.2	mJ
Avalanche Current		I_{AS}	27.8	A
Total Power Dissipation[4]	T_C=25℃	P_D	55	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 175	°C

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction-to-Case[1]	$R_{\theta JC}$	2.7	°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	T_J=25℃	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	1.7	2.5	V
Drain-Source on-Resistance[2]		$R_{DS(on)}$	V_{GS} = 10V, I_D = 30A	-	5.4	7	mΩ
			V_{GS} = 4.5V, I_D = 20A	-	9.3	12	
Forward Transconductance		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							
Total Gate Charge		Q_g	V_{GS} = 10, V_{DS} = 20V, I_D = 30A	-	46	-	nC
Gate-Source Charge		Q_{gs}		-	5.8	-	
Gate-Drain Charge		Q_{gd}		-	12.5	-	
Turn-on Delay Time		$t_{d(on)}$	V_{GS} = 10V, V_{DD} = 20V, R_G = 3Ω, RL = 1Ω, I_D = 30A	-	12.5	-	nS
Rise Time		t_r		-	36	-	
Turn-off Delay Time		$t_{d(off)}$		-	45	-	
Fall Time		t_f		-	14.4	-	
Drain-Source Body Diode Characteristics							
Diode Forward Voltage[2]		V_{SD}	I_S = 30A, 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	-	14.5	-	nS
Body Diode Reverse Recovery Charge		Q_{rr}		-	5.8	-	nC

Notes:

1.The data tested by surface mounted on a 1 $inch^2$ 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}=27.8A

4.The power dissipation is limited by 175℃ 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.

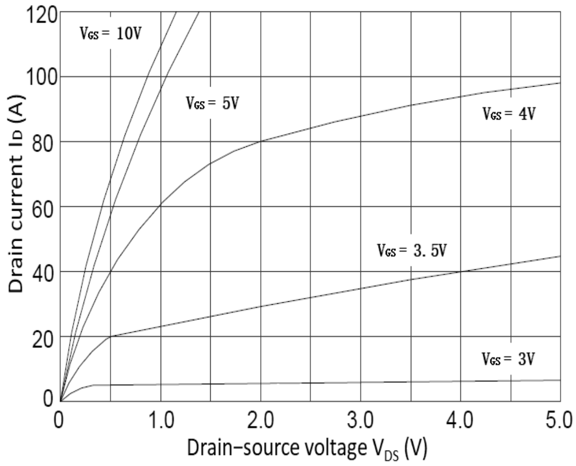


Figure 1. Output Characteristics

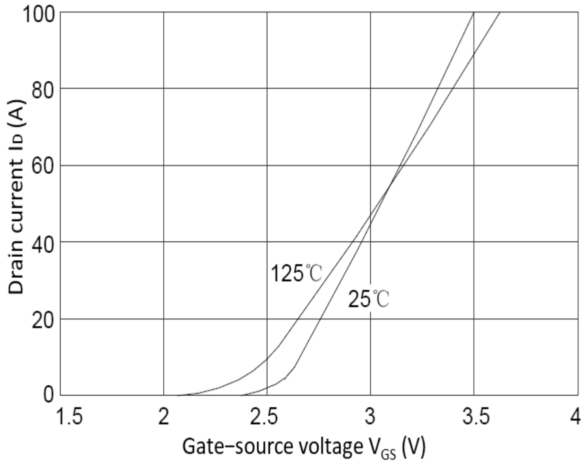


Figure 2. Transfer Characteristics

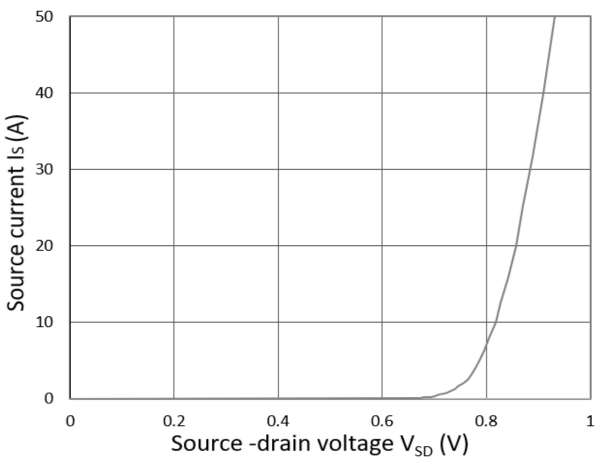


Figure 3. Forward Characteristics of Reverse

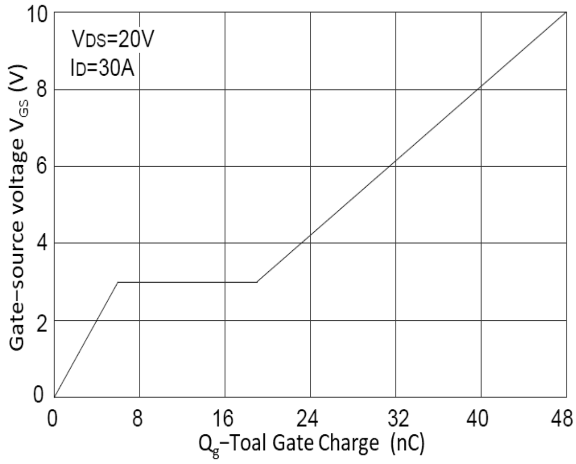


Figure 4. Gate Charge Characteristics

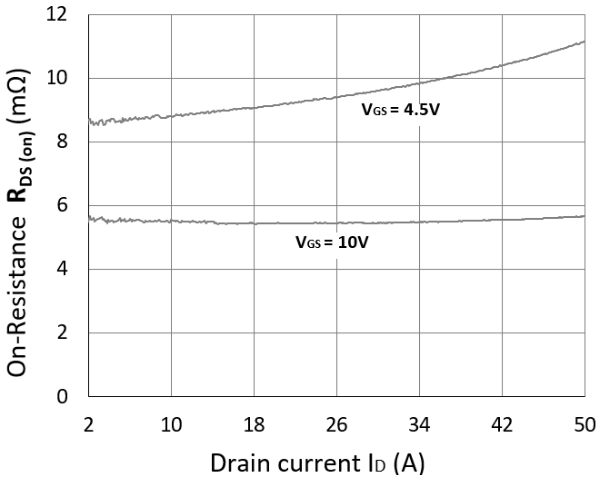


Figure 5. $R_{DS(on)}$ vs. I_D

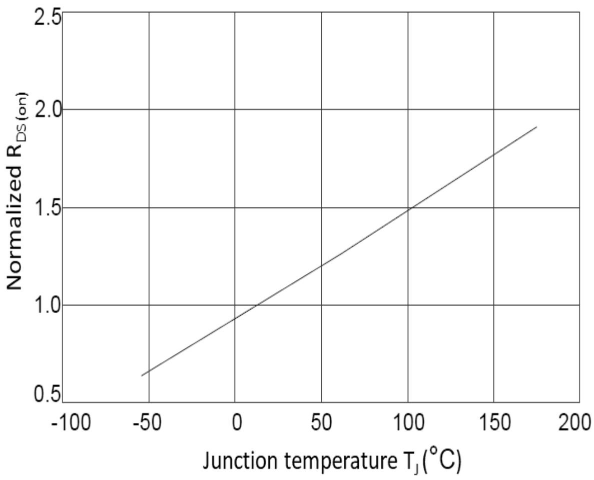


Figure 6. Normalized $R_{DS(on)}$ vs. T_J

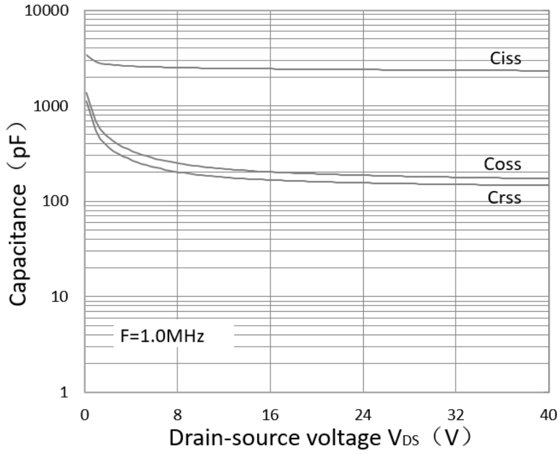


Figure 7. Capacitance Characteristics

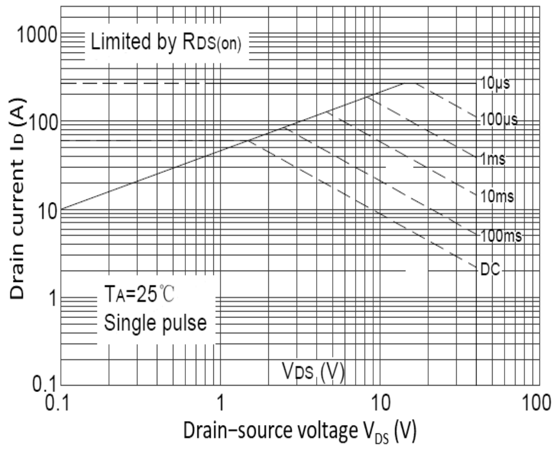


Figure 8. Safe Operating Area

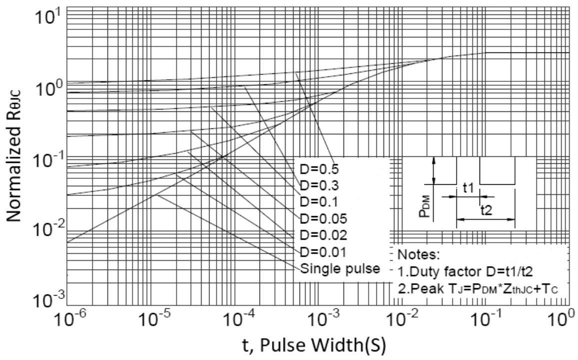
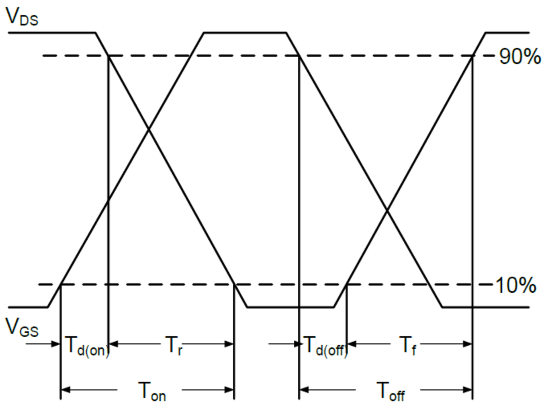


Figure 9. Normalized Maximum Transient

Thermal Impedance



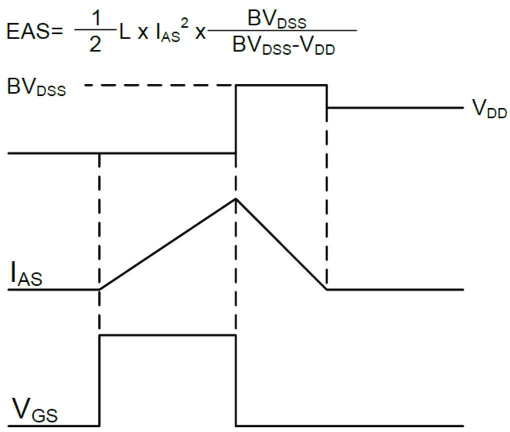
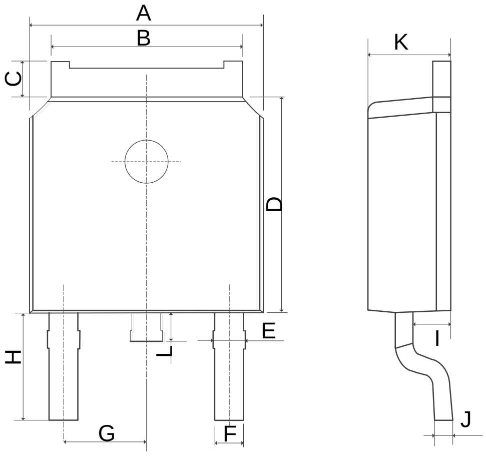


Figure 10. Switching Time Waveform

Figure 11. Unclamped Inductive Switching

Waveform

Mechanical Dimensions for TO-252



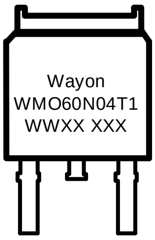
COMMON DIMENSIONS

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

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