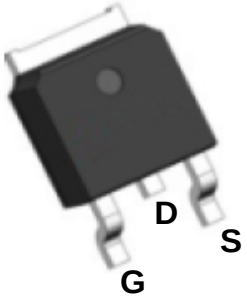
WMO90N02T1

20V N-Channel Enhancement Mode Power MOSFET



TO-252

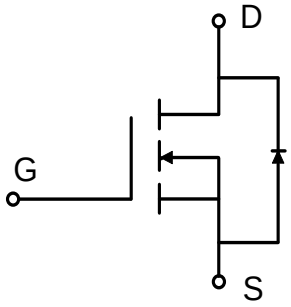
Description

WMO90N02T1 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}= 20V, I_D = 90A
  $R_{DS(on)}$ < 4.5mΩ @ V_{GS} = 4.5V
  $R_{DS(on)}$ < 5mΩ @ V_{GS} = 2.5V
- Low $R_{DS(on)}$
- Advanced High Cell Density Trench Technology
- 100% EAS Guaranteed

RoHS compliant



Applications

- High Current Load Applications
- Load Switching
- Hard Switched and High Frequency Circuits
- Uninterruptible Power Supply

Absolute Maximum Ratings

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	±10	V
Continuous Drain Current[1]	T_C=25℃	I_D	90	A
	T_C=100℃		62	
Pulsed Drain Current[2]		I_{DM}	222	A
Single Pulse Avalanche Energy[3]		EAS	101.2	mJ
Avalanche Current		I_{AS}	45	A
Total Power Dissipation[4]	T_C=25℃	P_D	39	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- Ambient[1]	$R_{\theta JA}$	35	°C/W
Thermal Resistance from Junction-to-Case[1]	$R_{\theta JC}$	3.2	°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	20	-	-	V
Gate-body Leakage current	I_{GSS}	V_{DS} = 0V, V_{GS} = ±10V	-	-	±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 20V, V_{GS} = 0V	-	-	1	μA
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	0.4	0.65	1	V
Drain-Source on-Resistance[2]	$R_{DS(on)}$	V_{GS} = 4.5V, I_D = 30A	-	3.2	4.5	mΩ
		V_{GS} = 2.5V, I_D = 20A	-	3.9	5	
		V_{GS} = 1.8V, I_D = 10A		5.3	7.5	
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS} = 10V, V_{GS} =0V, f =1MHz	-	3850	-	pF
Output Capacitance	C_{oss}		-	490	-	
Reverse Transfer Capacitance	C_{rss}		-	440	-	
Switching Characteristics						
Gate Resistance	R_g	V_{DS} = 0V, V_{GS} =0V, f =1MHz	-	1.8	-	Ω
Total Gate Charge	Q_g	V_{GS} = 4.5V, V_{DS} = 10V, I_D= 15A	-	100	-	nC
Gate-Source Charge	Q_{gs}		-	24	-	
Gate-Drain Charge	Q_{gd}		-	20	-	
Turn-on Delay Time	$t_{d(on)}$	V_{GS} =4.5V, V_{DS} = 10V, R_G = 3Ω, R_L = 1Ω, I_D= 10A	-	11.5	-	nS
Rise Time	t_r		-	24.5	-	
Turn-off Delay Time	$t_{d(off)}$		-	33.2	-	
Fall Time	t_f		-	9.6	-	
Drain-Source Body Diode Characteristics						
Diode Forward Voltage[2]	V_{SD}	I_S = 20A, V_{GS} = 0V	-	-	1.2	V
Continuous Source Current[1,5]	I_S	V_G=V_D=0V , Force Current	-	-	90	A
Body Diode Reverse Recovery Time	t_{rr}	V_R = 10V, I_F = 15A dI/dt = 100A/μs	-	36	-	nS
Body Diode Reverse Recovery Charge	Q_{rr}		-	40	-	nC

Note :

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}=15V, V_{GS}=10V, L=0.1mH, I_{AS}=45A

4.The power dissipation is limited by 175°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.

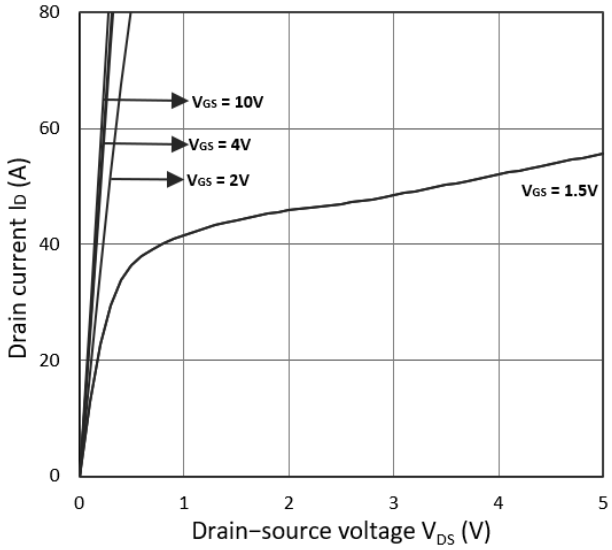


Figure 1. Output Characteristics

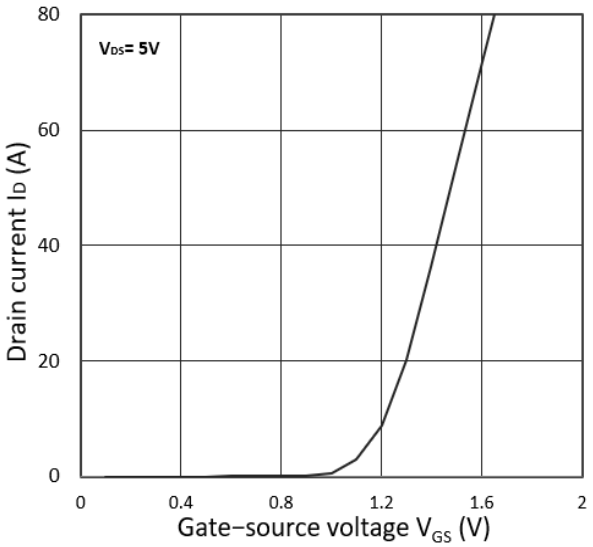


Figure 2. Transfer Characteristics

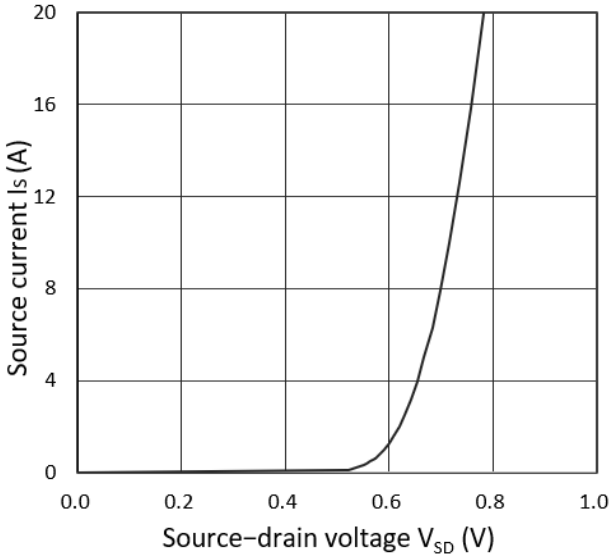


Figure 3. Forward Characteristics of Reverse

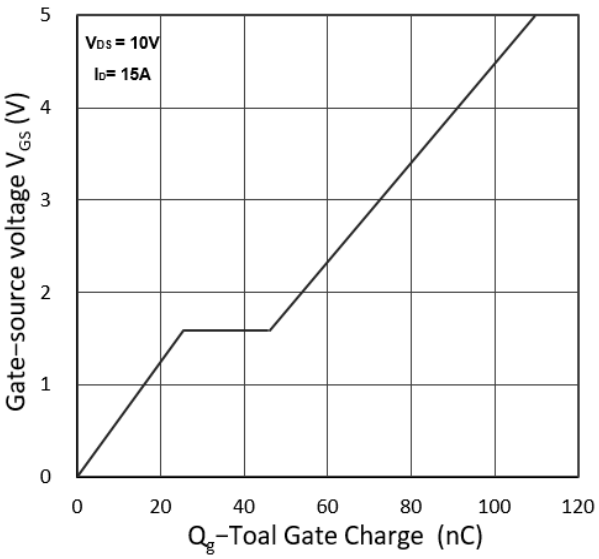


Figure 4. Gate Charge Characteristics

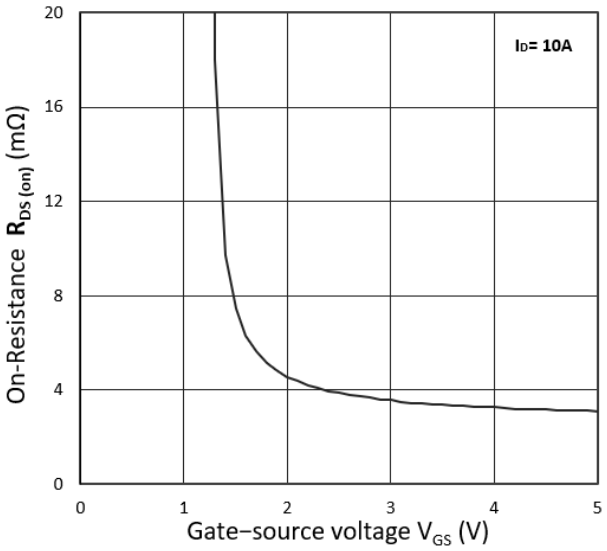


Figure 5. $R_{DS(on)}$ vs. V_{GS}

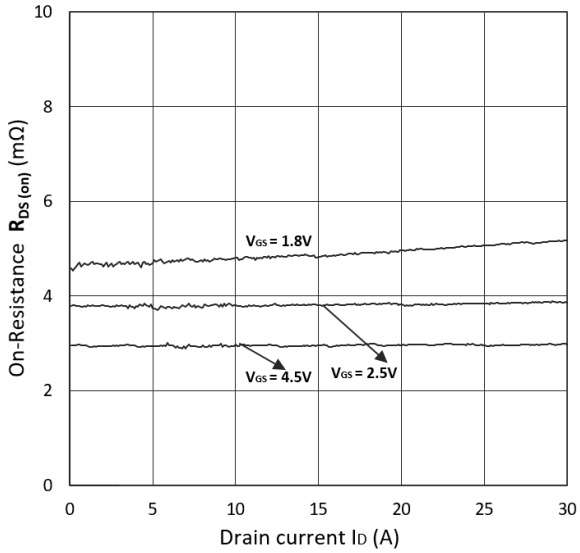


Figure 6. $R_{DS(on)}$ vs. I_D

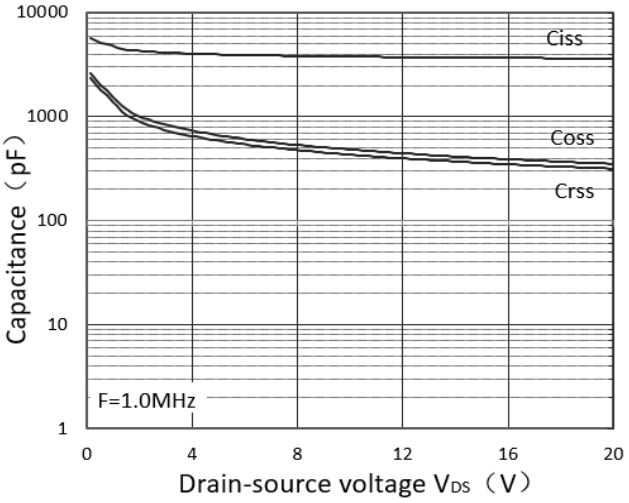


Figure 7. Capacitance Characteristics

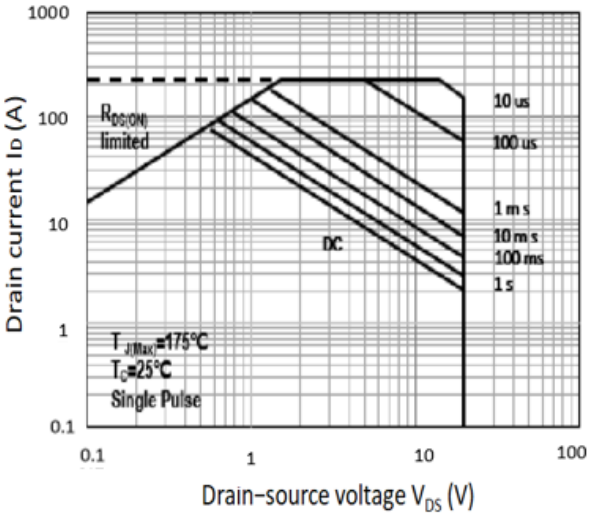


Figure 8. Safe Operating Area

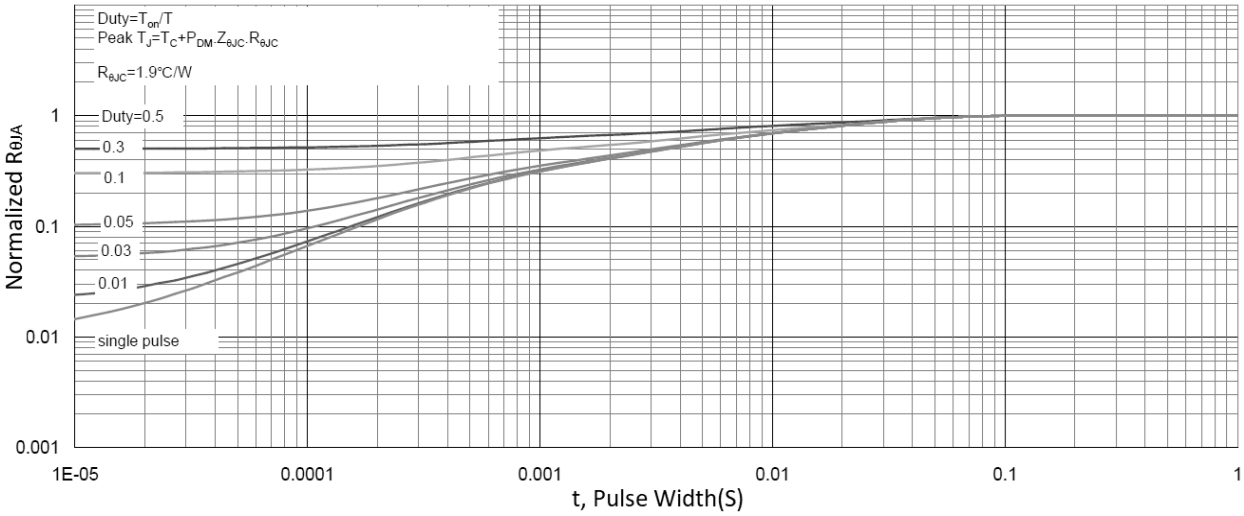


Figure 9. Normalized Maximum Transient Thermal Impedance

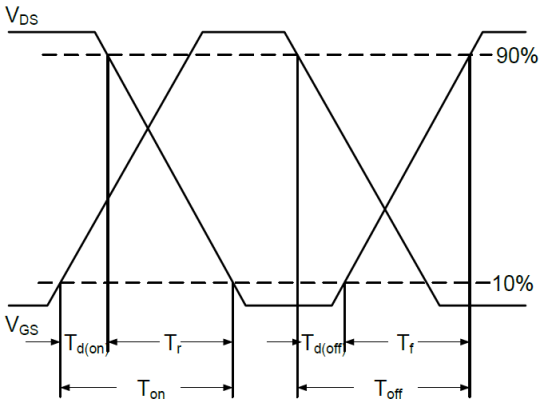


Figure 10. Switching Time Waveform

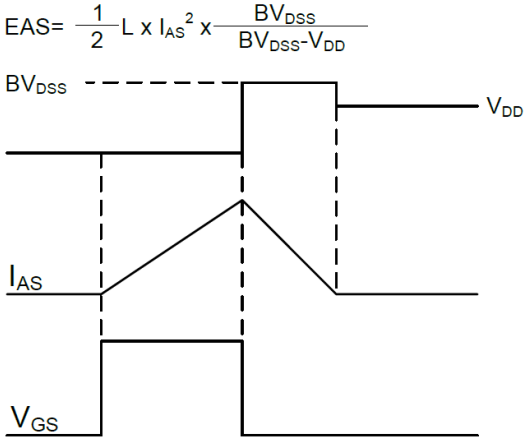
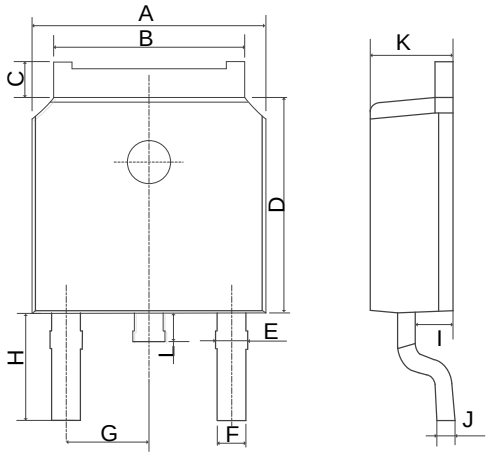


Figure 11. Unclamped Inductive Switching Waveform

Mechanical Dimensions for TO-252



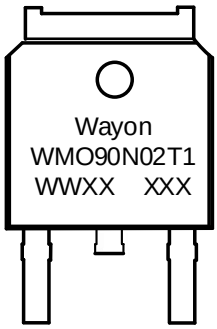
COMMON DIMENSIONS

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
WMO90N02T1	TO-252	WMO90N02T1	Tape and Reel

Marking Information



WMO90N02T1 = Device code

WWXX XXX= Date code

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