

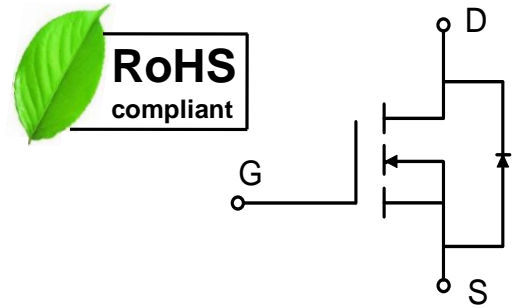
## 20V N-Channel Enhancement Mode Power MOSFET

### Description

WMR15N02T1 uses advanced power trench technology that has been especially tailored to minimize the on-state resistance and yet maintain superior switching performance.

### Features

- $V_{DS} = 20V$ ,  $I_D = 15A$   
 $R_{DS(on)} < 6m\Omega @ V_{GS} = 4.5V$   
 $R_{DS(on)} < 8.8m\Omega @ V_{GS} = 2.5V$
- Green Device Available
- Super Low Gate Charge
- 100% EAS Guaranteed
- Advanced High Cell Density Trench Technology



### Applications

- Battery Management,
- Power Management
- DC-DC Converters

### Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	20	V
Gate-Source Voltage	$V_{GS}$	$\pm 10$	V
Continuous Drain Current <sup>1</sup>	$I_D$	$T_C = 25^\circ C$	15
		$T_C = 100^\circ C$	10
Pulsed Drain Current <sup>2</sup>	$I_{DM}$	48	A
Single Pulse Avalanche Energy <sup>3</sup>	<b>EAS</b>	56.2	mJ
Avalanche Current	$I_{AS}$	15	A
Total Power Dissipation <sup>4</sup>	$T_C = 25^\circ C$	$P_D$	2.2
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 <sup>1</sup>	$R_{\theta JA}$	55	$^\circ C/W$

**Electrical Characteristics** T<sub>c</sub> = 25°C, unless otherwise noted

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	<b>V<sub>(BR)DSS</sub></b>	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA	20	-	-	V
Gate-body Leakage current	<b>I<sub>GSS</sub></b>	V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±10V	-	-	±100	nA
Zero Gate Voltage Drain Current	<b>I<sub>DSS</sub></b>	T <sub>J</sub> =25°C V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0V	-	-	1	μA
Gate-Threshold Voltage	<b>V<sub>GS(th)</sub></b>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	0.4	0.65	1	V
Drain-Source on-Resistance <sup>2</sup>	<b>R<sub>DS(on)</sub></b>	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 10A	-	4.8	6	mΩ
		V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 8A	-	5.8	8.8	
		V <sub>GS</sub> = 1.8V, I <sub>D</sub> = 6A	-	8.5	14	
<b>Dynamic Characteristics</b>						
Input Capacitance	<b>C<sub>iss</sub></b>	V <sub>DS</sub> = 10V, V <sub>GS</sub> = 0V, f = 1MHz	-	2445	-	pF
Output Capacitance	<b>C<sub>oss</sub></b>		-	426	-	
Reverse Transfer Capacitance	<b>C<sub>rss</sub></b>		-	202	-	
<b>Switching Characteristics</b>						
Total Gate Charge	<b>Q<sub>g</sub></b>	V <sub>GS</sub> = 4.5V, V <sub>DS</sub> = 10V, I <sub>D</sub> = 15A	-	63	-	nC
Gate-Source Charge	<b>Q<sub>gs</sub></b>		-	14.5	-	
Gate-Drain Charge	<b>Q<sub>gd</sub></b>		-	12.6	-	
Turn-On Delay Time	<b>t<sub>d(on)</sub></b>	V <sub>GS</sub> = 4.5V, V <sub>DS</sub> = 10V, R <sub>G</sub> = 1Ω, I <sub>D</sub> = 15A	-	11.5	-	nS
Rise Time	<b>t<sub>r</sub></b>		-	25	-	
Turn-Off Delay Time	<b>t<sub>d(off)</sub></b>		-	33	-	
Fall Time	<b>t<sub>f</sub></b>		-	9.7	-	
<b>Drain-Source Body Diode Characteristics</b>						
Diode Forward Voltage <sup>2</sup>	<b>V<sub>SD</sub></b>	I <sub>S</sub> = 1A, V <sub>GS</sub> = 0V	-	-	1.0	V
Continuous Source Current <sup>1,5</sup>	<b>I<sub>S</sub></b>	V <sub>G</sub> = V <sub>D</sub> = 0V, Force Current	-	-	15	A
Reverse Recovery Time	<b>t<sub>rr</sub></b>	I <sub>F</sub> = 15A, dI <sub>F</sub> /dt = 100A/μs	-	38	-	nS
Reverse Recovery Charge	<b>Q<sub>rr</sub></b>		-	33.5	-	nC

## Notes:

- The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%
- The EAS data shows Max. rating. The test condition is V<sub>DD</sub> = 25V, V<sub>GS</sub> = 10V, L = 0.5mH, I<sub>AS</sub> = 15A
- The power dissipation is limited by 150°C junction temperature
- The data is theoretically the same as I<sub>D</sub> and I<sub>DM</sub>, in real applications, should be limited by total power dissipation.

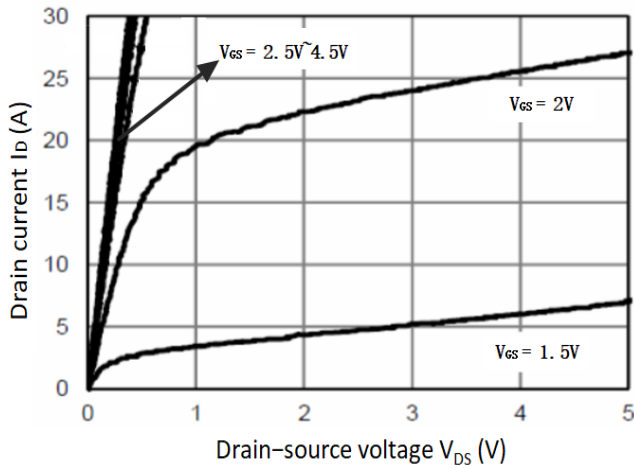


Figure 1. Output Characteristics

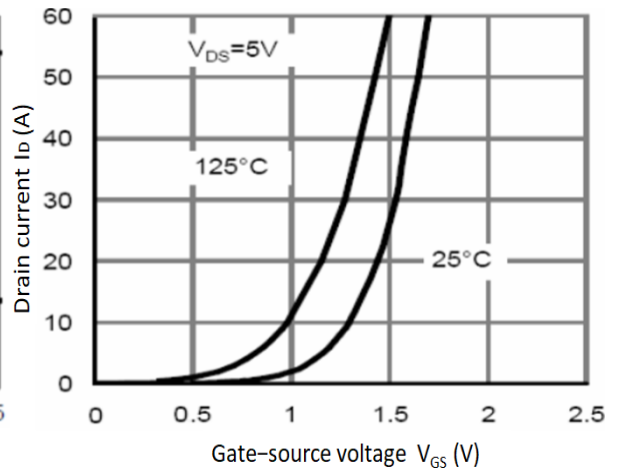


Figure 2. Transfer Characteristics

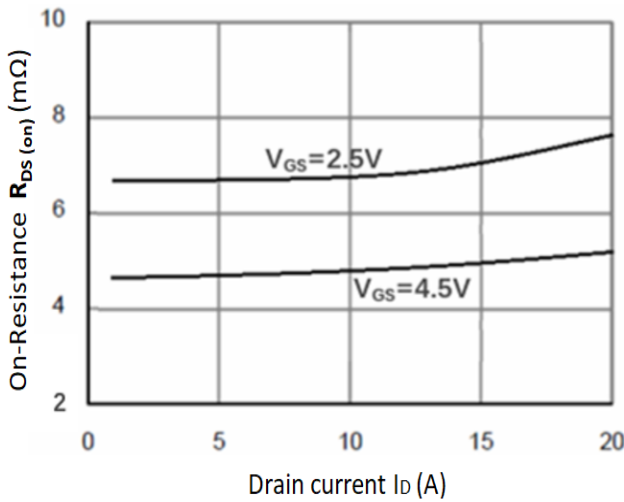


Figure 3.  $R_{DS(on)}$  vs.  $I_D$

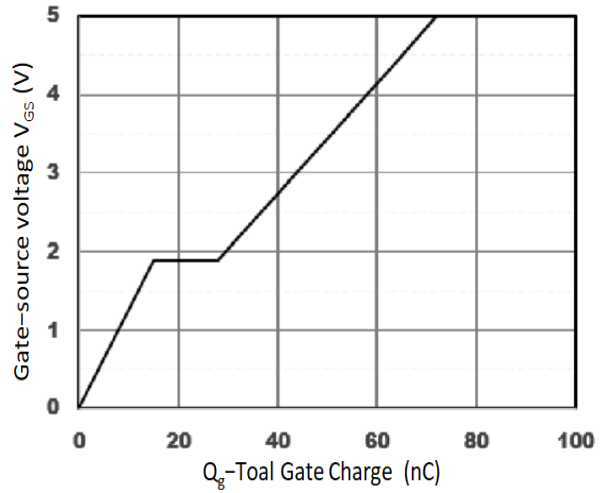


Figure 4. Gate Charge Characteristics

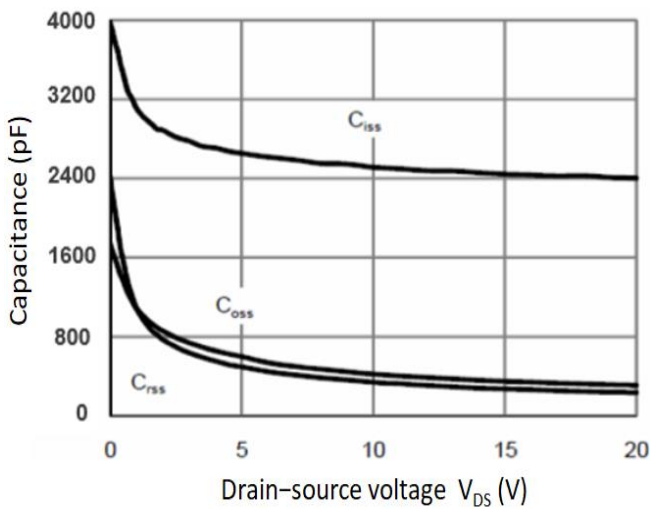


Figure 5. Capacitance Characteristics

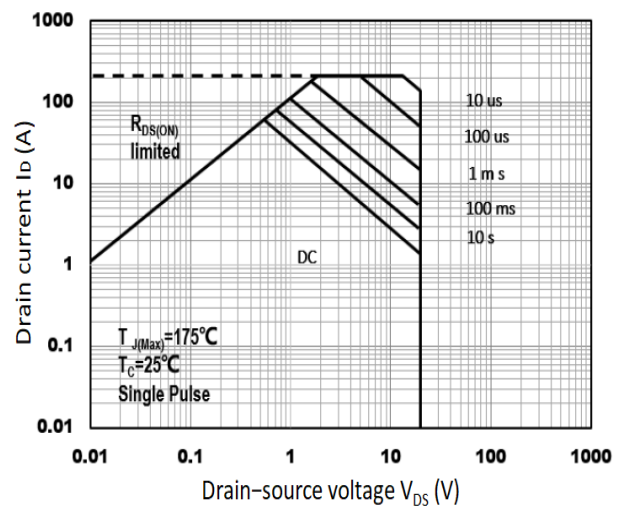


Figure 6. Safe Operating Area

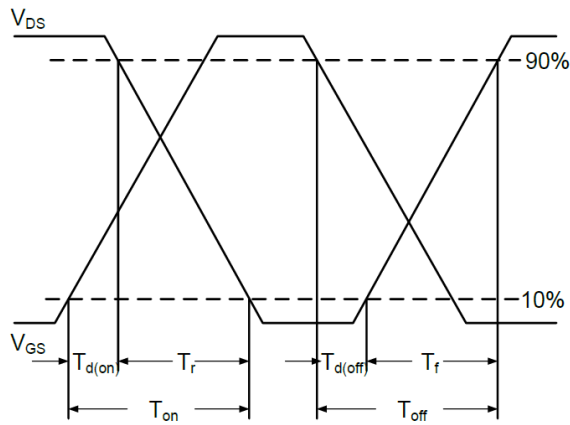


Figure 7. Switching Time Waveform

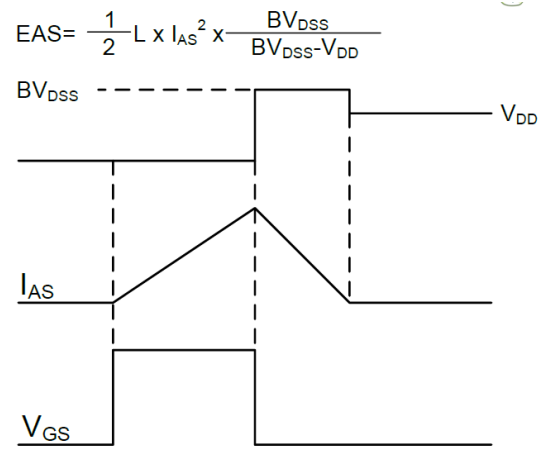
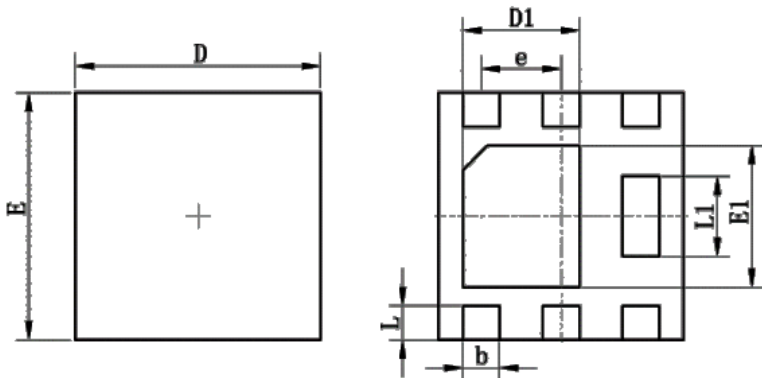


Figure 8. Unclamped Inductive Switching Waveform

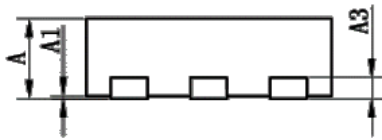
## Mechanical Dimensions for DFN2020-6L

## COMMON DIMENSIONS



TOP VIEW

BOTTOM VIEW



SIDE VIEW

SYMBOL	MM	
	MIN	MAX
A	0.50	0.60
A1	0.00	0.05
A3	0.152REF	
b	0.25	0.35
D	1.95	2.05
D1	0.80	1.00
E	1.95	2.05
E1	0.80	1.00
L1	0.46	0.66
e	0.65BSC	
L	0.25	0.35

## Ordering Information

Part	Package	Marking	Packing method
WMR15N02T1	DFN2020-6L	R15N02	Tape and Reel

## Marking Information



R15N02 = Device code

WWXXXXX= Date code


## Contact Information

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