

30V N-Channel Enhancement Mode Power MOSFET

Description

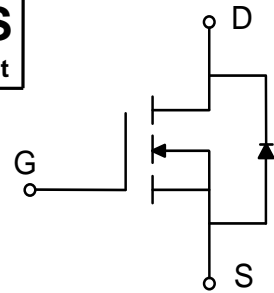
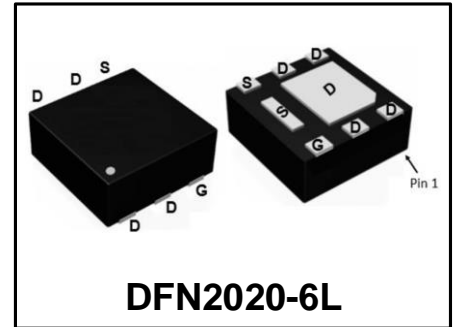
WMR12N03T1 uses advanced power trench technology that has been especially tailored to minimize the on-state resistance and yet maintain superior switching performance.

Features

- $V_{DS} = 30V$, $I_D = 12A$
 $R_{DS(on)} < 9m\Omega$ @ $V_{GS} = 10V$
 $R_{DS(on)} < 12.5m\Omega$ @ $V_{GS} = 4.5V$
- Green Device Available
- High Power and Current Handling Capability

Applications

- Battery Protection
- Power Management
- Load Switch



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

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_A = 25^\circ C$	I_D	12	A
	$T_A = 100^\circ C$		7	
Pulsed Drain Current ⁴		I_{DM}	48	A
Single Pulse Avalanche Energy ³		E_{AS}	20	mJ
Total Power Dissipation	$T_A = 25^\circ C$	P_D	2.1	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 ¹	$R_{\theta JA}$	60	$^\circ C/W$

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	30	-	-	V
Gate-body Leakage current	I _{GSS}	V _{DS} = 0V, V _{GS} = ±20V	-	-	±100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 30V, V _{GS} = 0V	-	-	1	μA
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	1	1.6	2.5	V
Drain-Source on-Resistance ²	R _{DS(on)}	V _{GS} = 10V, I _D = 8A	-	6.8	9	mΩ
		V _{GS} = 4.5V, I _D = 6A	-	10	12.5	
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} = 15V, V _{GS} = 0V, f = 1.0 MHz	-	1250	-	pF
Output Capacitance	C _{oss}		-	174	-	
Reverse Transfer Capacitance	C _{rss}		-	142	-	
Switching Characteristics						
Gate Resistance	R _G	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz	-	2.8	-	Ω
Total Gate Charge	Q _g	V _{GS} = 4.5V, V _{DS} = 15V, I _D = 12A	-	10	-	nC
Gate-Source Charge	Q _{gs}		-	3.5	-	
Gate-Drain Charge	Q _{gd}		-	2.2	-	
Turn-on Delay Time	t _{d(on)}	V _{GS} = 4.5V, V _{DS} = 15V, I _D = 10A, R _G = 3Ω	-	8	-	ns
Rise Time	t _r		-	28	-	
Turn-off Delay Time	t _{d(off)}		-	15	-	
Fall Time	t _f		-	7	-	
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	-	-	12	A

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} = 25V, V_{GS} = 10V, L = 0.1mH, I_{AS} = 20A
4. Repetitive rating, pulse width limited by junction temperature T_{J(MAX)} = 150°C.
5. The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation

Typical Characteristics

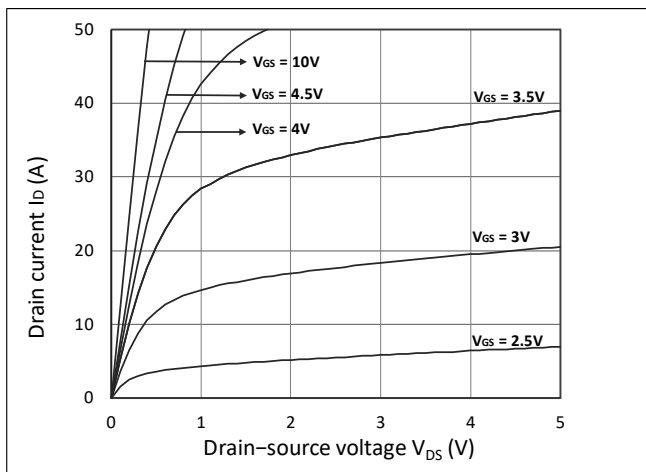


Figure 1. Output Characteristics

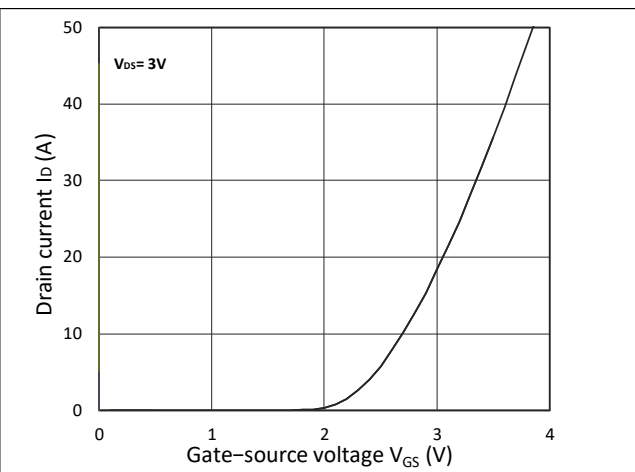


Figure 2. Transfer Characteristics

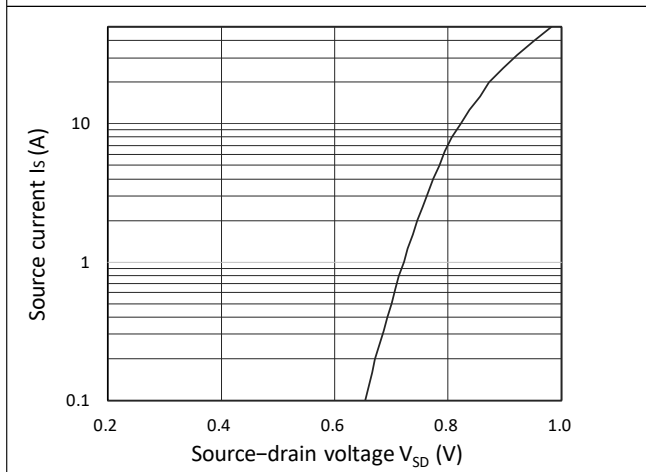


Figure 3. Forward Characteristics of Reverse

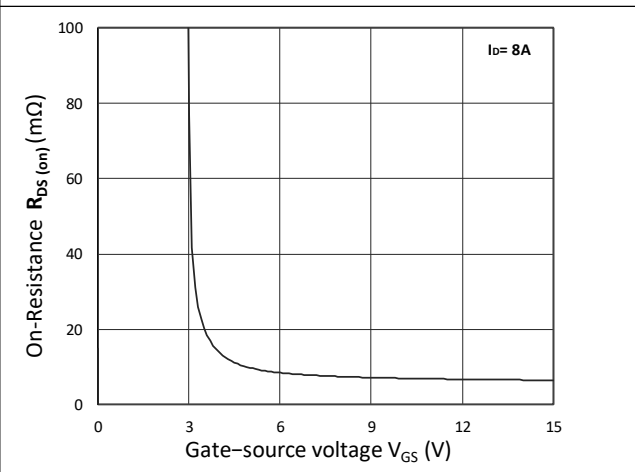


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

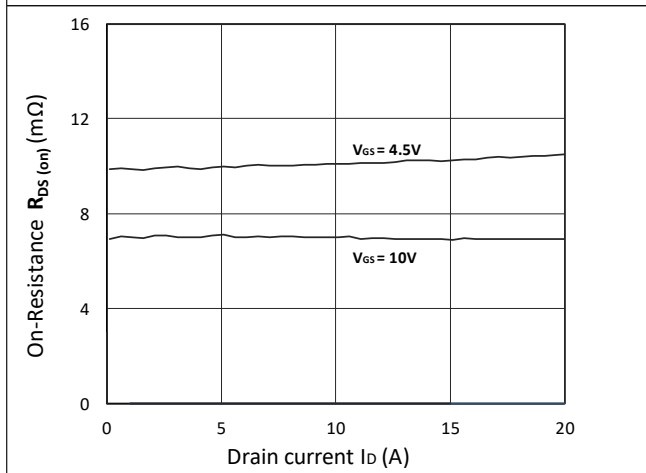


Figure 5. $R_{DS(ON)}$ vs. I_D

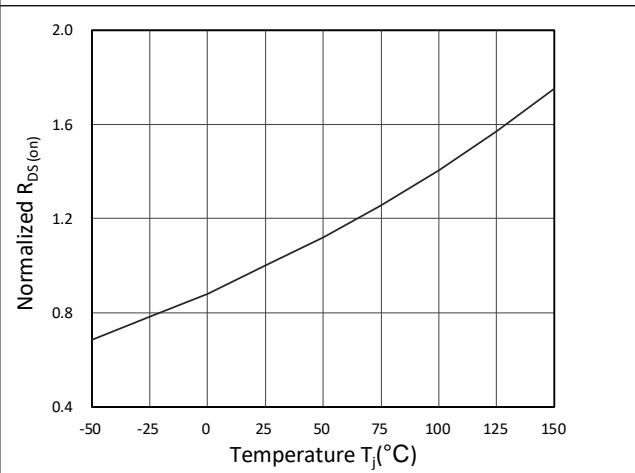


Figure 6. Normalized $R_{DS(ON)}$ vs. Temperature

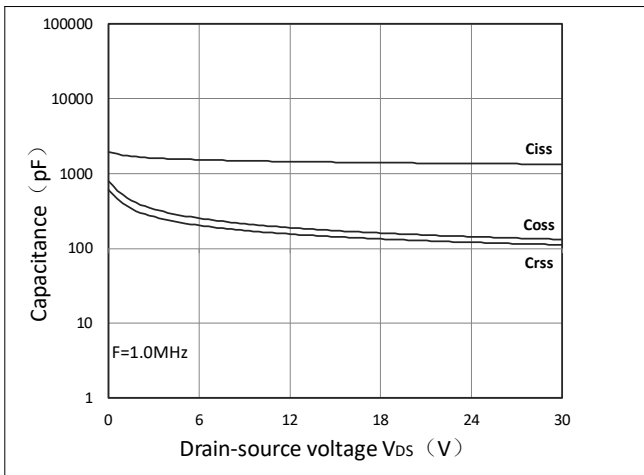


Figure 7. Capacitance Characteristics

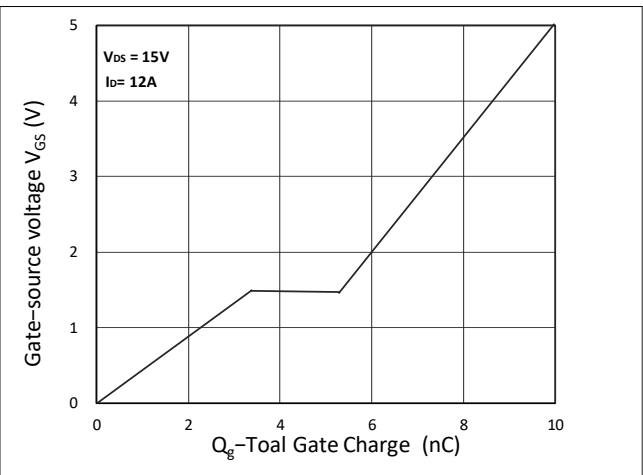


Figure 8. Gate Charge Characteristics

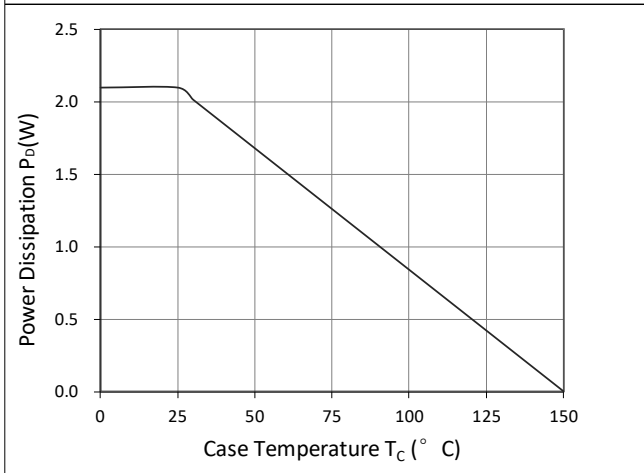


Figure 9. Power Dissipation

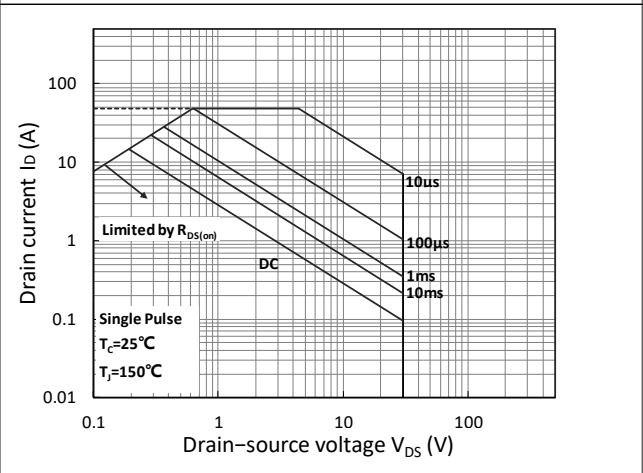


Figure 10. Safe Operating Area

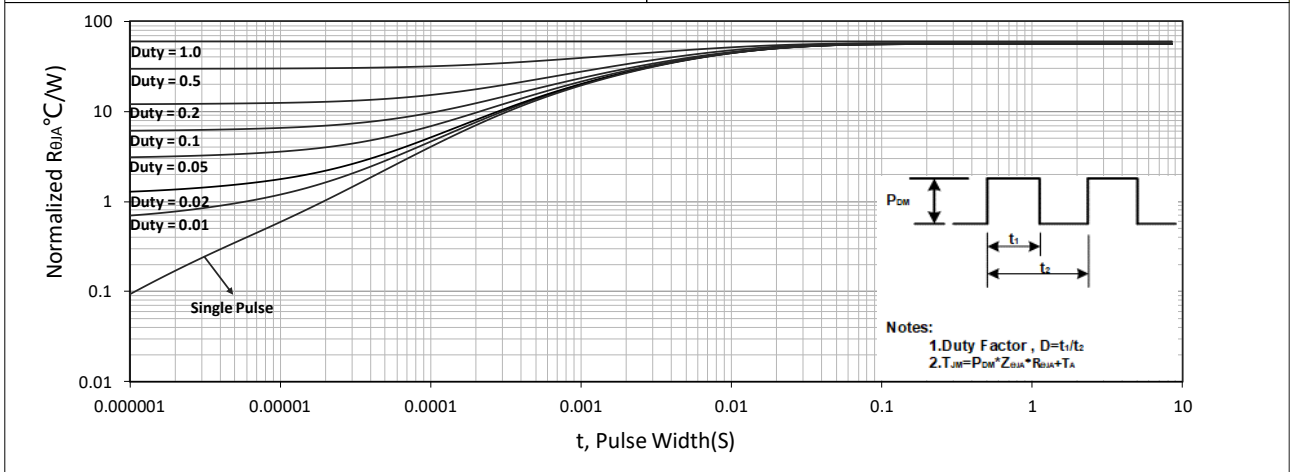


Figure 11. Normalized Maximum Transient Thermal Impedance

Test Circuit

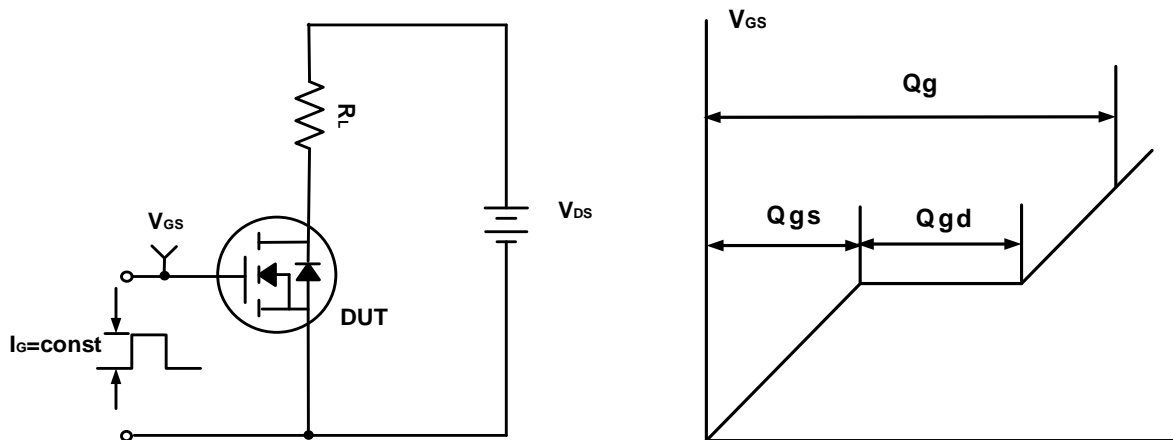


Figure A. Gate Charge Test Circuit & Waveforms

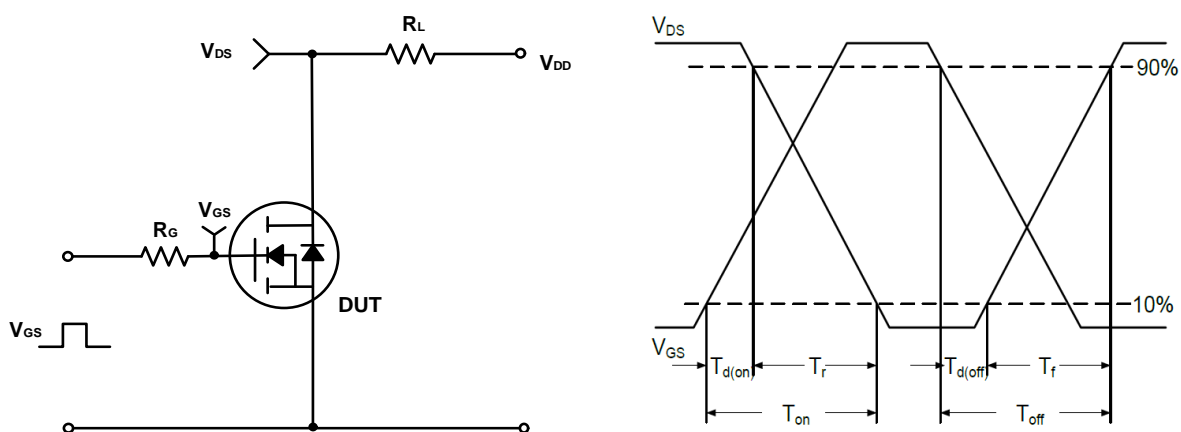


Figure B. Switching Test Circuit & Waveforms

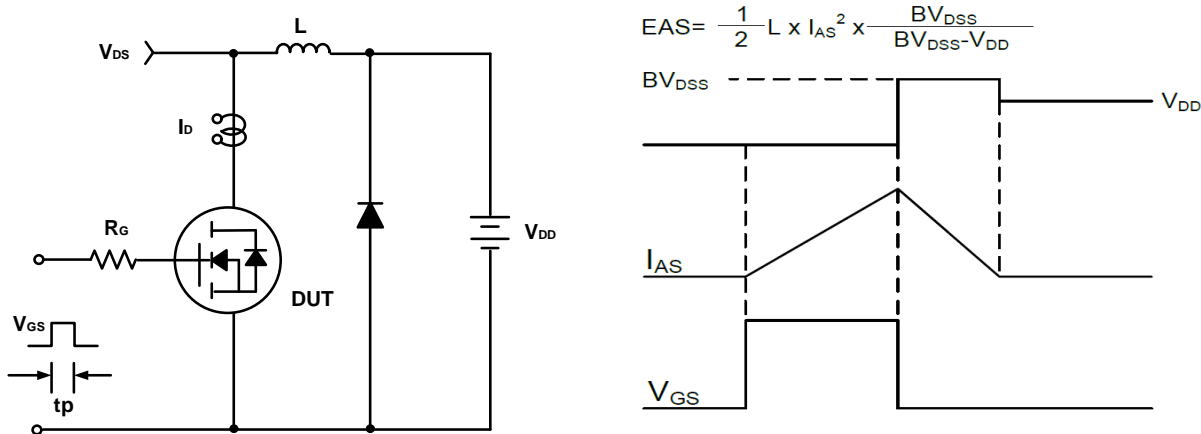
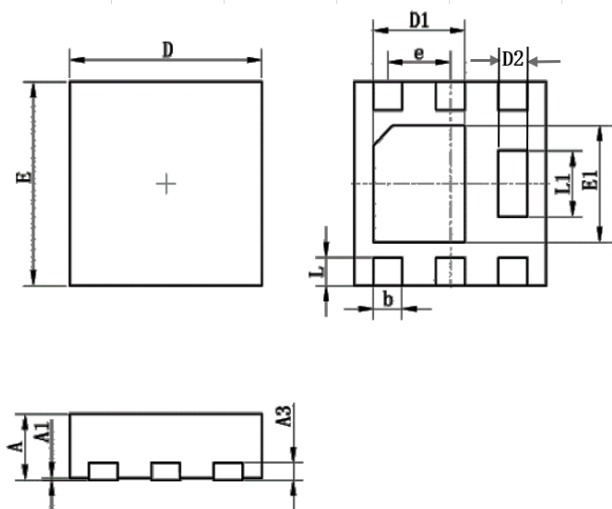


Figure C. Unclamped Inductive Switching Circuit & Waveforms

Mechanical Dimensions for DFN2020-6L



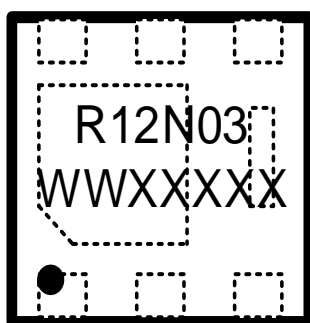
COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	0.50	0.60
A1	0.00	0.05
A3	0.152REF	
b	0.25	0.35
D	1.90	2.10
D1	0.80	1.00
E	1.90	2.10
E1	0.80	1.00
L1	0.46	0.66
D2	0.25	0.35
e	0.65BSC	
L	0.25	0.35

Ordering Information

Part	Package	Marking	Packing method
WMR12N03T1	DFN2020-6L	R12N03	Tape and Reel

Marking Information



R12N03= Device code

WWXXX:XXX= Date code

Contact Information

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