

30V N-Channel Enhancement Mode Power MOSFET

Description

WMS15N03T1 uses advanced power trench technology that has been especially tailored to minimize the on-state resistance and yet maintain superior switching performance.

Features

- $V_{DS} = 30V$, $I_D = 15A$
 $R_{DS(on)} < 4m\Omega @ V_{GS} = 10V$
 $R_{DS(on)} < 6m\Omega @ V_{GS} = 4.5V$
- Green Device Available
- Low Gate Charge
- 100% EAS Guaranteed

Applications

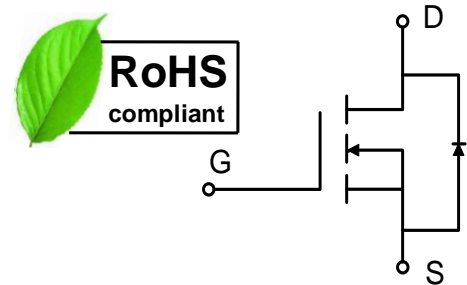
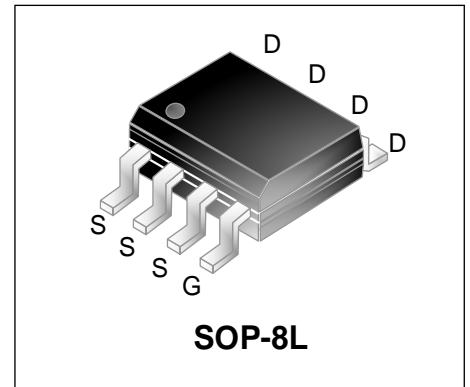
- Power Management Switches
- DC/DC Converter

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ¹	I_D	$T_A = 25^\circ C$	15
		$T_A = 100^\circ C$	11
Pulsed Drain Current ²	I_{DM}	49	A
Single Pulse Avalanche Energy ³	EAS	105.8	mJ
Avalanche Current	I_{AS}	46	A
Total Power Dissipation ⁴	P_D	3	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	$R_{\theta JA}$	41.7	$^\circ C/W$



Electrical Characteristics $T_c = 25^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	30	-	-	V
Gate-body Leakage current	I_{GSS}	$V_{DS} = 0V, V_{GS} = \pm 20V$	-	-	± 100	nA
Zero Gate Voltage Drain Current	$T_J=25^\circ\text{C}$	$V_{DS} = 30V, V_{GS} = 0V$	-	-	1	μA
	$T_J=55^\circ\text{C}$		-	-	5	
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.2	1.7	2.5	V
Drain-Source On-Resistance ²	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 10A$	-	3.2	4	m Ω
		$V_{GS} = 4.5V, I_D = 8A$	-	4	6	
Forward Transconductance ²	g_{fs}	$V_{DS} = 5V, I_D = 12A$	-	26.1	-	S
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS} = 15V, V_{GS} = 0V, f = 1\text{MHz}$	-	2808	-	μF
Output Capacitance	C_{oss}		-	420	-	
Reverse Transfer Capacitance	C_{rss}		-	297	-	
Switching Characteristics						
Gate Resistance	R_g	$V_{DS} = 0V, V_{GS} = 0V, f = 1\text{MHz}$	-	0.6	-	Ω
Total Gate Charge	Q_g	$V_{GS} = 4.5V, V_{DS} = 20V, I_D = 12A$	-	35	-	nC
Gate-Source Charge	Q_{gs}		-	8	-	
Gate-Drain Charge	Q_{gd}		-	16.2	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = 10V, V_{DD} = 15V, R_G = 1.5\Omega, I_D = 12A$	-	13.5	-	nS
Rise Time	t_r		-	53	-	
Turn-Off Delay Time	$t_{d(off)}$		-	38	-	
Fall Time	t_f		-	9.5	-	
Drain-Source Body Diode Characteristics						
Diode Forward Voltage ²	V_{SD}	$I_S = 1A, V_{GS} = 0V$	-	-	1	V
Continuous Source Current ^{1,5}	I_S	$V_G = V_D = 0V$, Force Current	-	-	15	A

Notes:

- The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- The EAS data shows Max. rating. The test condition is $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=46A$
- The power dissipation is limited by 150°C junction temperature
- The data is theoretically the same as I_D and I_{DM} , in real applications, should be limited by total power dissipation.

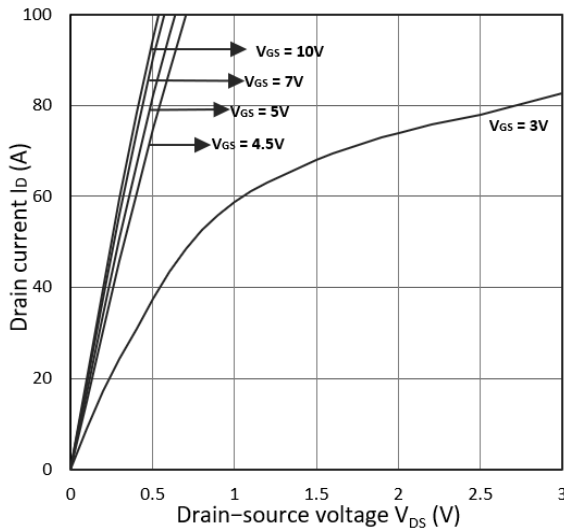


Figure 1. Typical Output Characteristics

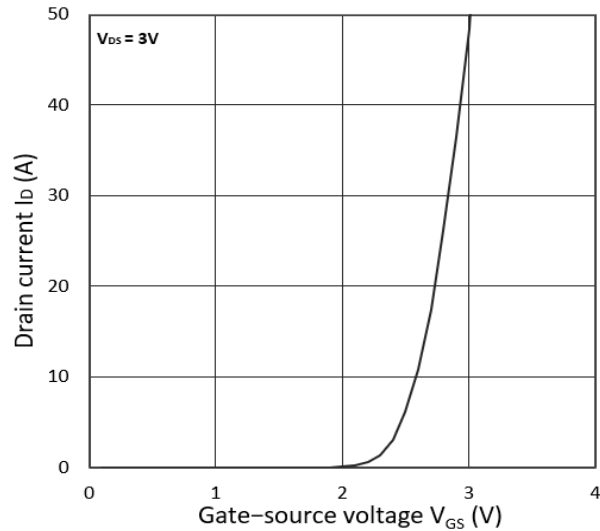


Figure 2. Transfer Characteristics

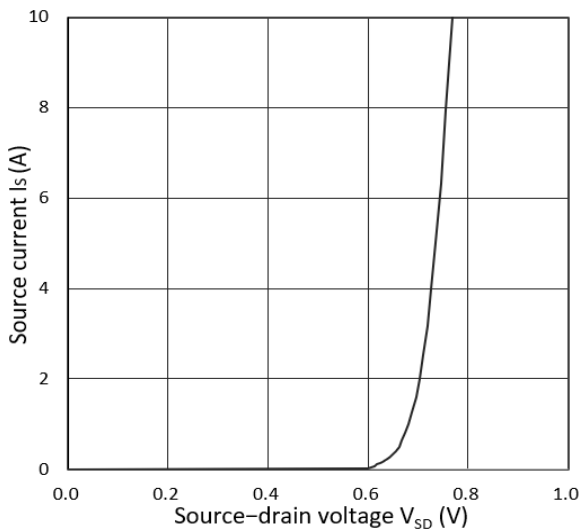


Figure 3. Forward Characteristics of Reverse

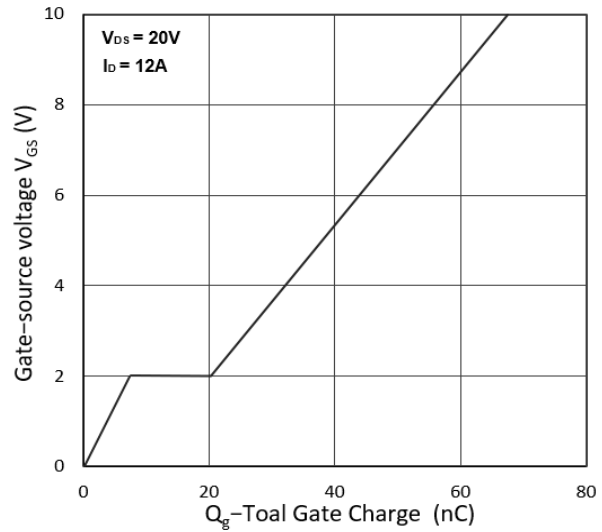


Figure 4. Gate Charge Characteristics

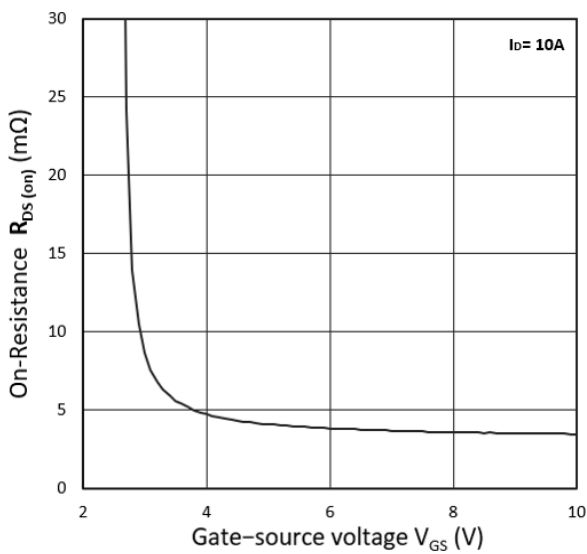


Figure 5. $R_{DS(on)}$ vs. V_{GS}

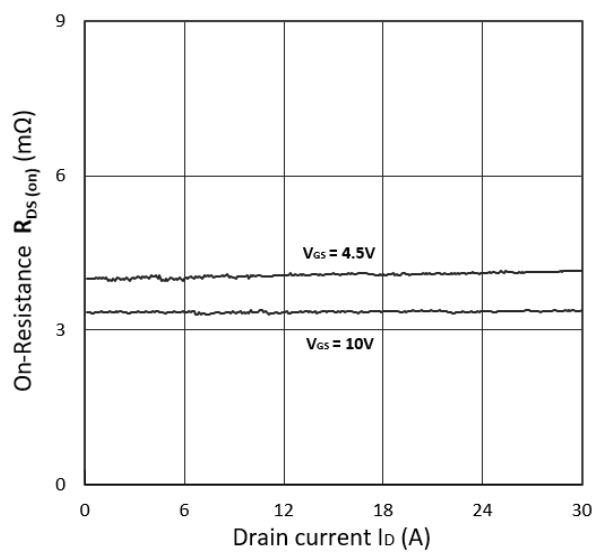


Figure 6. $R_{DS(on)}$ vs. I_D

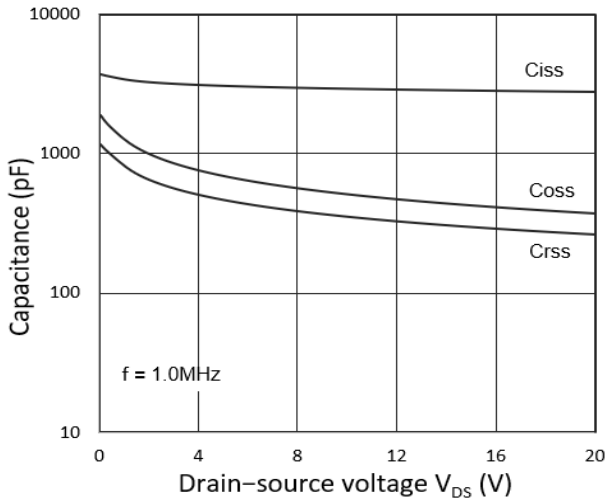


Figure 7. Capacitance Characteristics

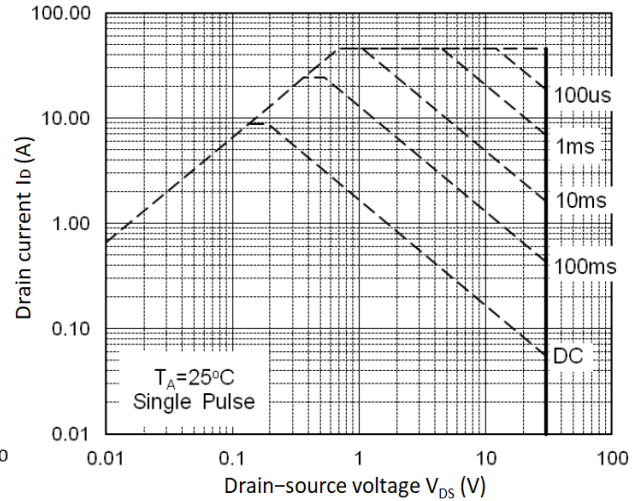


Figure 8. Safe Operating Area

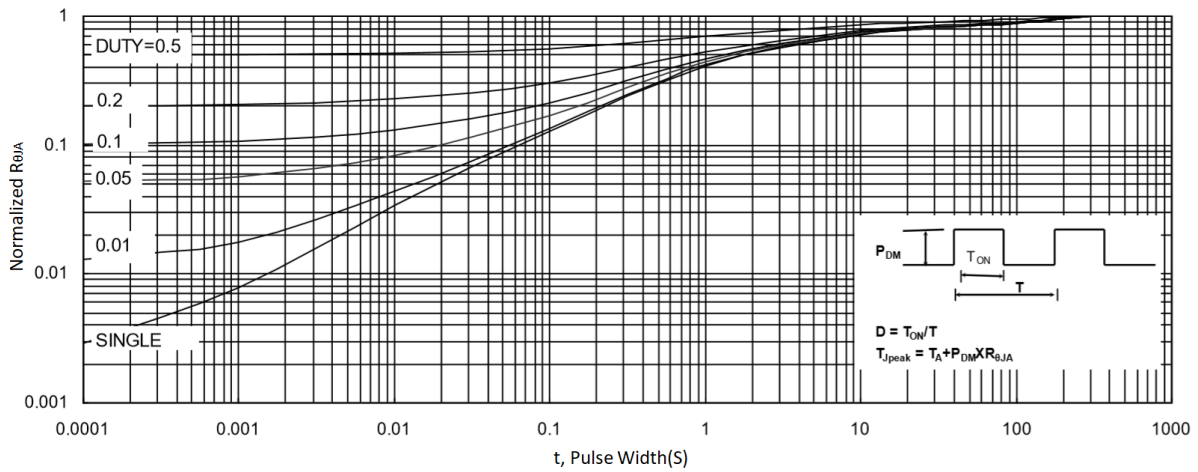


Figure 9. Normalized Maximum Transient Thermal Impedance

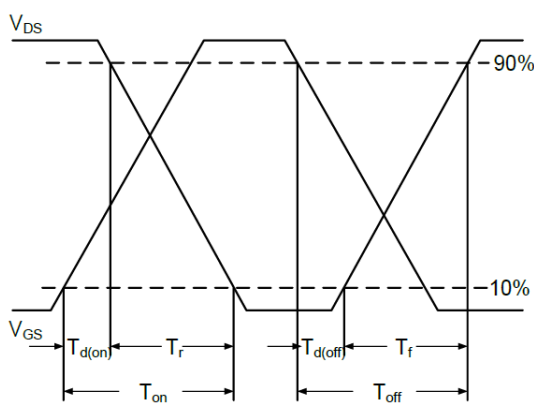


Figure 10. Switching Time Waveform

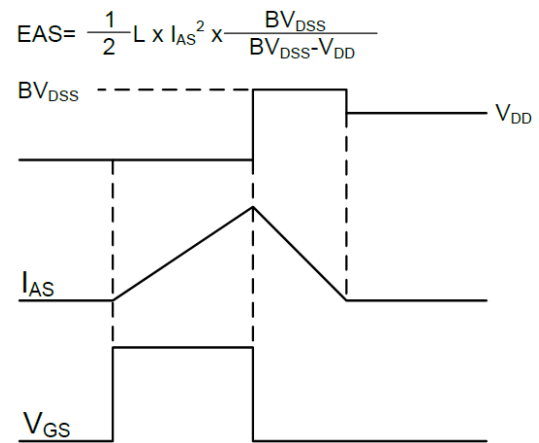
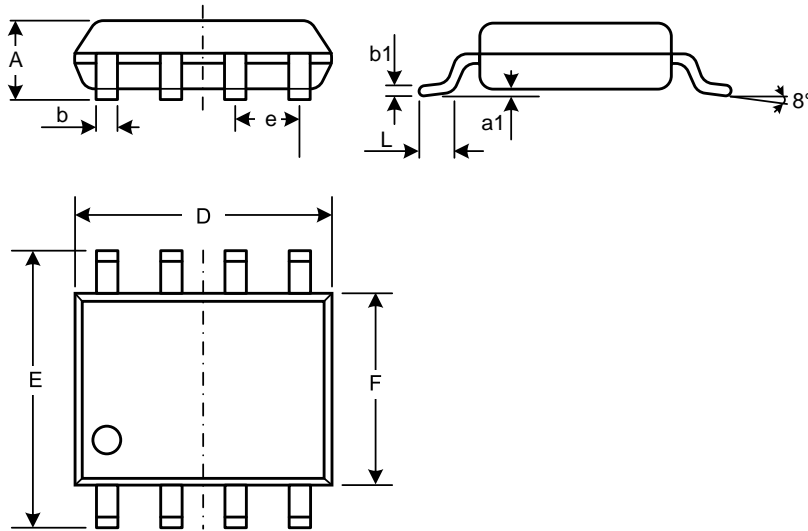


Figure 11. Unclamped Inductive Switching Waveform

$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$

Mechanical Dimensions for SOP-8L

COMMON DIMENSIONS

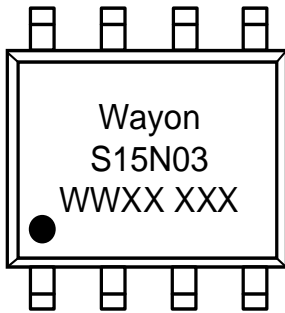


SYMBOL	MM	
	MIN	MAX
A	1.23	1.75
a1	0.05	0.25
b	0.31	0.51
b1	0.16	0.25
D	4.70	5.15
E	5.75	6.25
e	1.07	1.47
F	3.70	4.10
L	0.4	1.27

Ordering Information

Part	Package	Marking	Packing method
WMS15N03T1	SOP-8L	S15N03	Tape and Reel

Marking Information



S15N03 = Device code

WWXX XXX= Date code


Contact Information

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