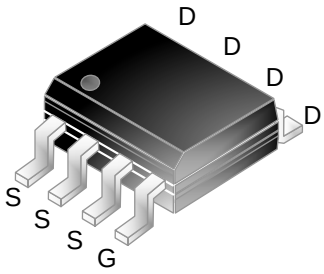
WMS13N03T1

30V N-Channel Enhancement Mode Power MOSFET



SOP-8L

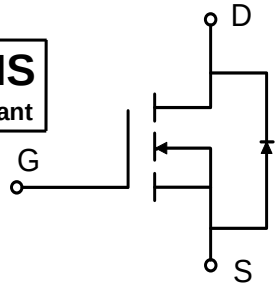
Description

WMS13N03T1 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 = 13A
  $R_{DS(on)}$ < 6mΩ @ V_{GS} = 10V
  $R_{DS(on)}$ < 9mΩ @ V_{GS} = 4.5V
- Low $R_{DS(on)}$
- Low Gate Charge
- 100% EAS Guaranteed

RoHS compliant



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]	T_A=25℃	I_D	13	A
	T_A=70℃		10	
Pulsed Drain Current[2]		I_{DM}	66	A
Single Pulse Avalanche Energy[3]		EAS	80	mJ
Avalanche Current		I_{AS}	40	A
Total Power Dissipation[4]	T_A=25℃	P_D	3.1	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction-to-Ambient[1]	$R_{\theta JA}$	48.3	°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	T_J=25℃	I_{DSS}	V_{DS} = 24V, V_{GS} = 0V	-	-	1	μA
	T_J=55℃			-	-	5	
Gate-Threshold Voltage		$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1.2	1.7	2.5	V
Drain-Source on-Resistance[2]		$R_{DS(on)}$	V_{GS} = 10V, I_D = 12A	-	4.9	6	mΩ
			V_{GS} = 4.5V, I_D = 10A	-	6.1	9	
Forward Transconductance[2]		g_{fs}	V_{DS} = 5V I_D = 12A	-	46	-	S
Dynamic Characteristics							
Input Capacitance		C_{iss}	V_{DS} = 15V, V_{GS} =0V, f =1MHz	-	1846	-	pF
Output Capacitance		C_{oss}		-	267	-	
Reverse Transfer Capacitance		C_{rss}		-	190	-	
Switching Characteristics							
Gate Resistance		R_g	V_{DS} = 0V, V_{GS} =0V, f =1MHz	-	1.9	-	Ω
Total Gate Charge		Q_g	V_{GS} = 4.5V, V_{DS} = 15V, I_D= 10A	-	20	-	nC
Gate-Source Charge		Q_{gs}		-	7.1	-	
Gate-Drain Charge		Q_{gd}		-	6.8	-	
Turn-on Delay Time		$t_{d(on)}$	V_{GS} =10V, V_{DS} = 15V, R_G = 3.3Ω, I_D= 10A	-	9.5	-	nS
Rise Time		t_r		-	8.5	-	
Turn-off Delay Time		$t_{d(off)}$		-	60	-	
Fall Time		t_f		-	15.5	-	
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	-	-	13	A
Body Diode Reverse Recovery Time		t_{rr}	I_F = 10A, dI/dt = 100A/μs	-	12	-	nS
Body Diode Reverse Recovery Charge		Q_{rr}		-	4.8	-	nC

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}=45A

4.The power dissipation is limited by 150℃ 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.

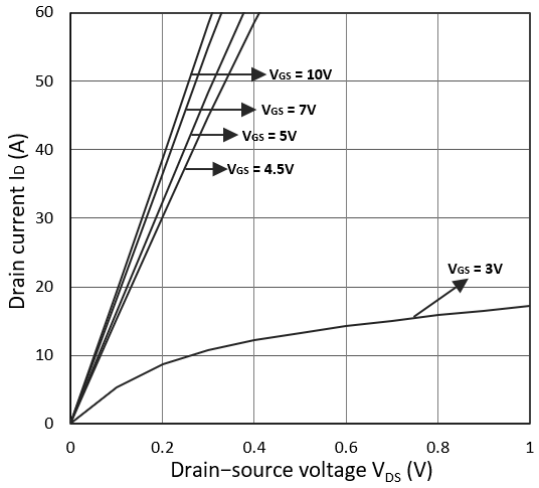


Figure1. Output Characteristics

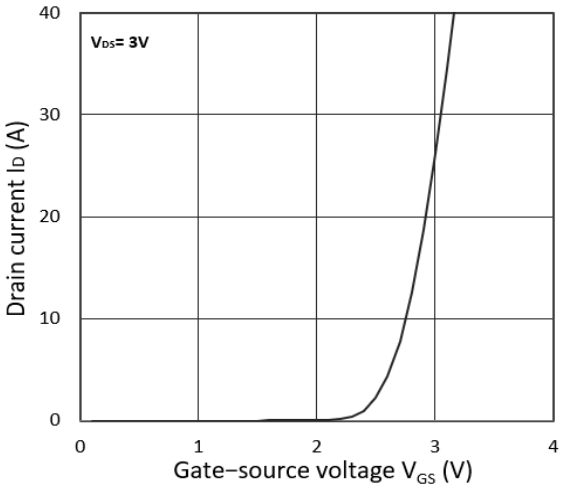


Figure2. Transfer Characteristics

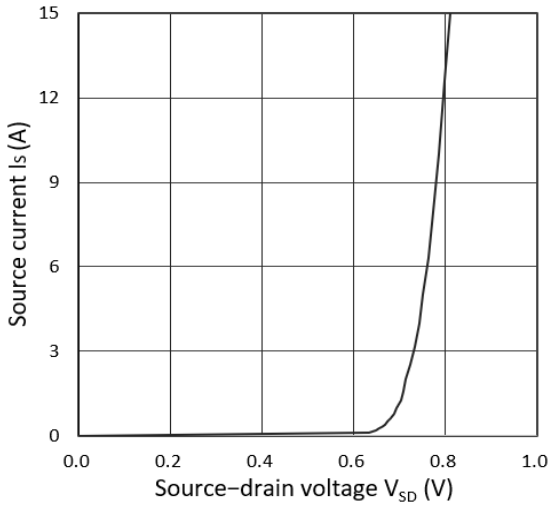


Figure 3. Forward Characteristics of Reverse

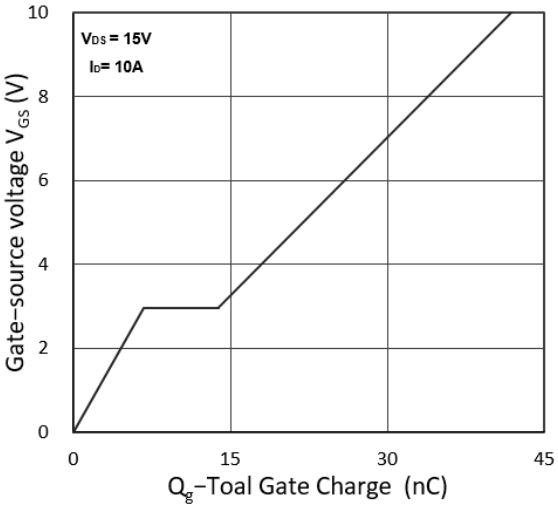


Figure 4. Gate Charge Characteristics

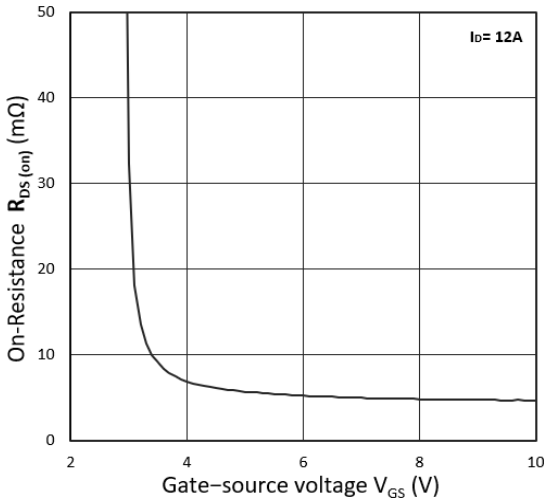


Figure5. $R_{DS(on)}$ vs. V_{GS}

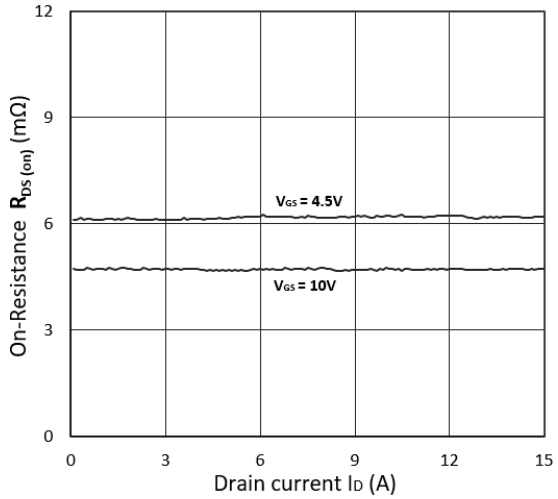


Figure6. $R_{DS(on)}$ vs. I_D

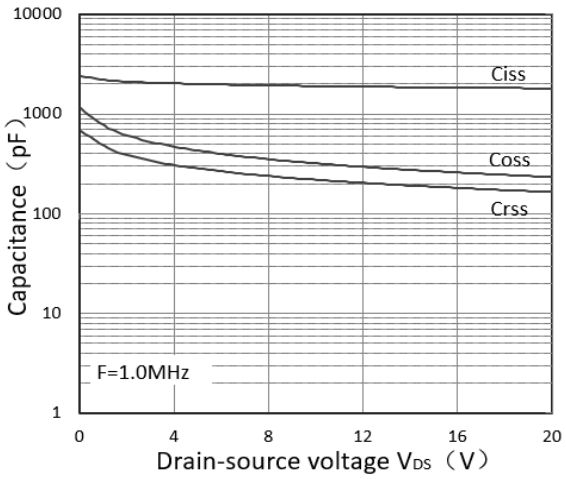


Figure7. Capacitance Characteristics

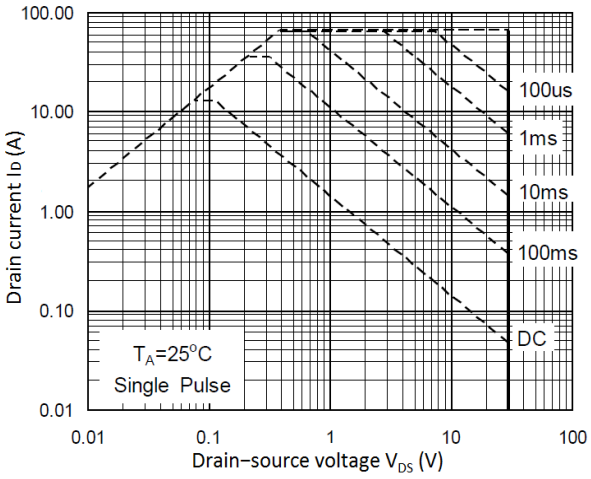


Figure8. Safe Operating Area

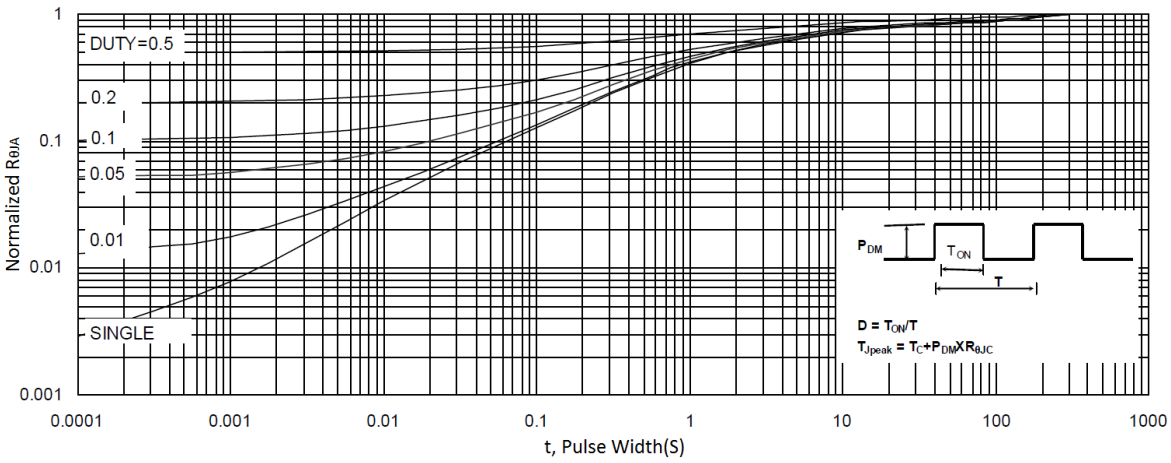


Figure 9. Normalized Maximum Transient Thermal Impedance

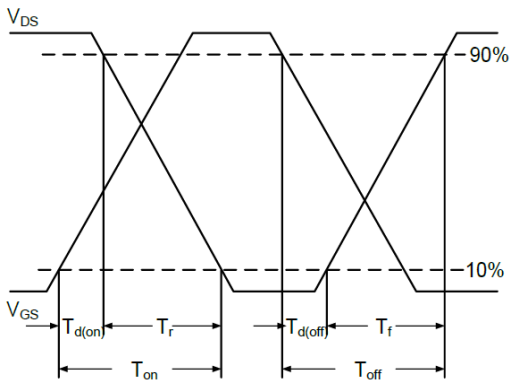


Figure 10. Switching Time Waveform

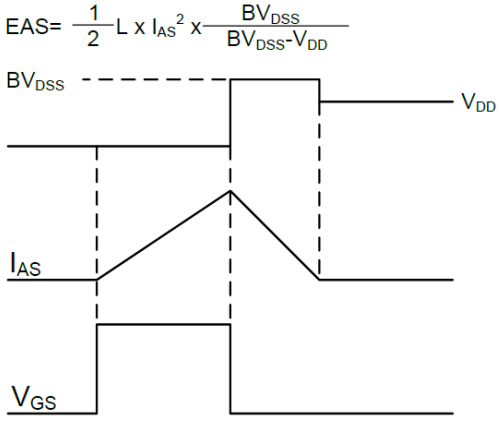
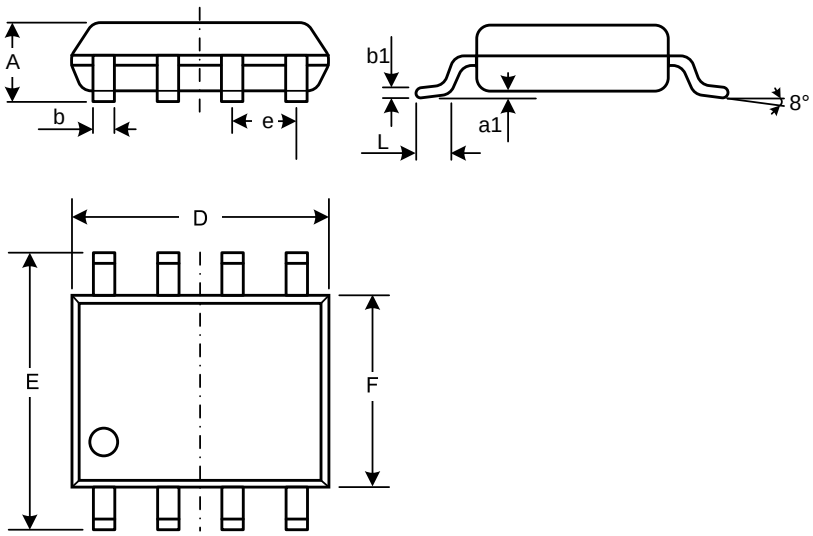


Figure 11. Unclamped Inductive Switching Waveform

Mechanical Dimensions for SOP-8L



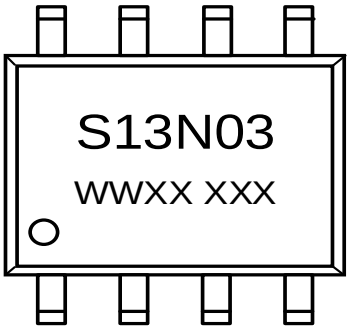
COMMON DIMENSIONS

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
WMS13N03T1	SOP-8L	S13N03	Tape and Reel

Marking Information



S13N03 = Device code

WWXX XXX= Date code

Contact Information

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