

## 30V P-Channel Enhancement Mode Power MOSFET

### Description

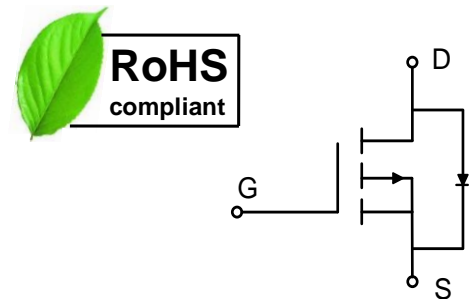
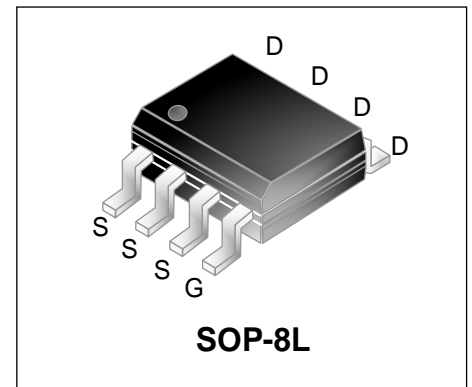
WMS16P03T1 uses advanced power trench technology that has been especially tailored to minimize the on-state resistance and yet maintain superior switching performance.

### Features

- $V_{DS} = -30V$ ,  $I_D = -16A$   
 $R_{DS(on)} < 8.8m\Omega @ V_{GS} = -10V$   
 $R_{DS(on)} < 13m\Omega @ V_{GS} = -4.5V$
- High Power and Current Handling Capability
- Low Gate Charge

### Applications

- Power Management Switches
- PWM Applications
- Load Switch



### Absolute Maximum Ratings

Parameter		Symbol	Value	Unit
Drain-Source voltage		$V_{DS}$	-30	V
Gate-Source voltage		$V_{GS}$	$\pm 20$	V
Continuous Drain Current @ -10V <sup>1</sup>	$T_A = 25^\circ C$	$I_D$	-16	A
	$T_A = 70^\circ C$		-11	
Pulsed Drain Current <sup>2</sup>		$I_{DM}$	-62	A
Single Pulse Avalanche Energy <sup>3</sup>		<b>EAS</b>	64.8	mJ
Avalanche Current		$I_{AS}$	-36	A
Total Power Dissipation <sup>4</sup>	$T_A = 25^\circ C$	<b>P<sub>D</sub></b>	2.9	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 <sup>1</sup>	$R_{\theta JA}$	42.5	$^\circ C/W$
Thermal Resistance from Junction-to-Case <sup>1</sup>	$R_{\theta JC}$	23	$^\circ C/W$

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

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-30	-	-	V
Gate-Body Leakage current	$I_{GSS}$	$V_{DS} = 0V, V_{GS} = \pm 20V$	-	-	$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$T_J = 25^\circ\text{C}$ $V_{DS} = -30V, V_{GS} = 0V$	-	-	-1	$\mu A$
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-1.0	-1.6	-2.5	V
Drain-Source on-Resistance <sup>2</sup>	$R_{DS(on)}$	$V_{GS} = -10V, I_D = -12A$	-	6.4	8.8	m $\Omega$
		$V_{GS} = -4.5V, I_D = -8A$	-	9.4	13	
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS} = -15V, V_{GS} = 0V, f = 1\text{MHz}$	-	4180	-	pF
Output Capacitance	$C_{oss}$		-	525	-	
Reverse Transfer Capacitance	$C_{rss}$		-	430	-	
<b>Switching Characteristics</b>						
Gate Resistance	$R_g$	$V_{DS} = 0V, V_{GS} = 0V, f = 1\text{MHz}$	-	6.5	-	$\Omega$
Total Gate Charge	$Q_g$	$V_{GS} = -10V, V_{DS} = -15V$ $I_D = -15A$	-	44	-	nC
Gate-Source Charge	$Q_{gs}$		-	8.2	-	
Gate-Drain Charge	$Q_{gd}$		-	11.5	-	
Turn-on Delay Time	$t_{d(on)}$	$V_{GS} = -10V, V_{DD} = -15V$ $R_G = 2.5\Omega, I_D = -15A$	-	18.9	-	nS
Rise Time	$t_r$		-	14.6	-	
Turn-off Delay Time	$t_{d(off)}$		-	66	-	
Fall Time	$t_f$		-	35	-	
<b>Drain-source body diode Characteristics</b>						
Diode Forward Voltage <sup>2</sup>	$V_{SD}$	$I_S = -1A, V_{GS} = 0V$	-	-	-1.0	V
Continuous Source Current <sup>1,5</sup>	$I_S$	$V_G = V_D = 0V$ , Force Current	-	-	-16	A

## Notes:

1. The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
2. The data tested by pulsed, pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$
3. The EAS data shows Max. rating. The test condition is  $V_{DD} = -15V, V_{GS} = -10V, L = 0.1\text{mH}, I_{AS} = -36A$
4. The power dissipation is limited by  $150^\circ\text{C}$  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.

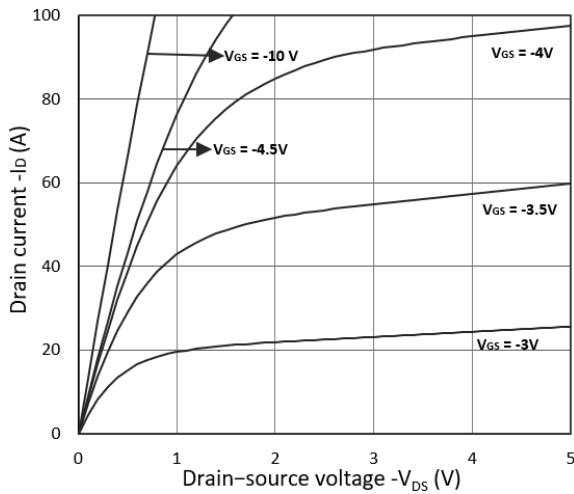


Figure 1. Typical Output Characteristics

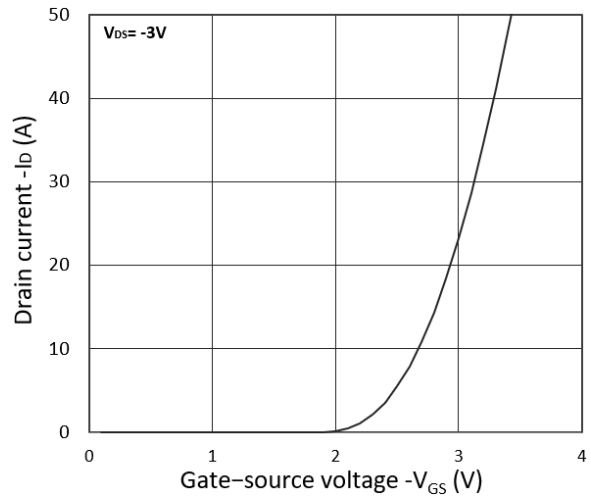


Figure 2. Transfer Characteristics

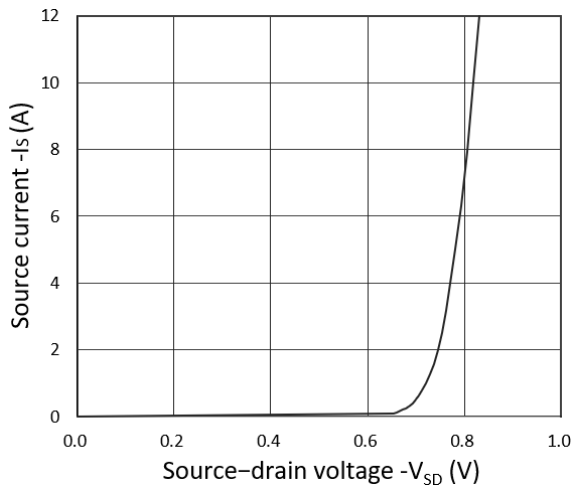


Figure 3. Forward Characteristics of Reverse

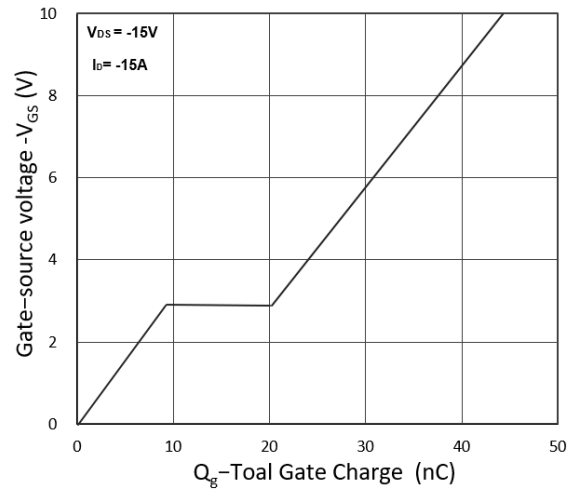


Figure 4. Gate Charge Characteristics

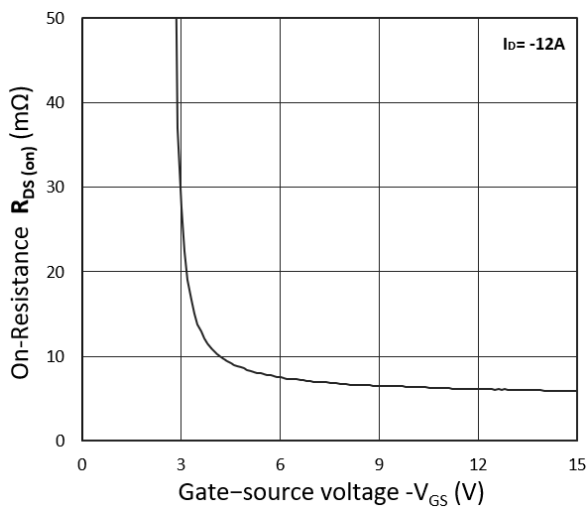


Figure 5.  $R_{DS(ON)}$  vs.  $V_{GS}$

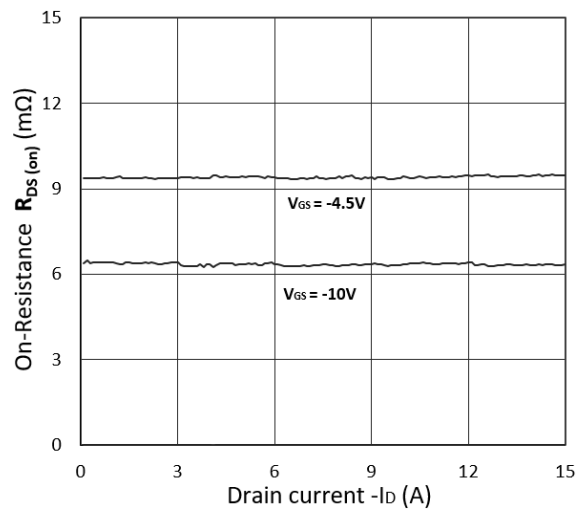


Figure 6.  $R_{DS(ON)}$  vs.  $I_D$

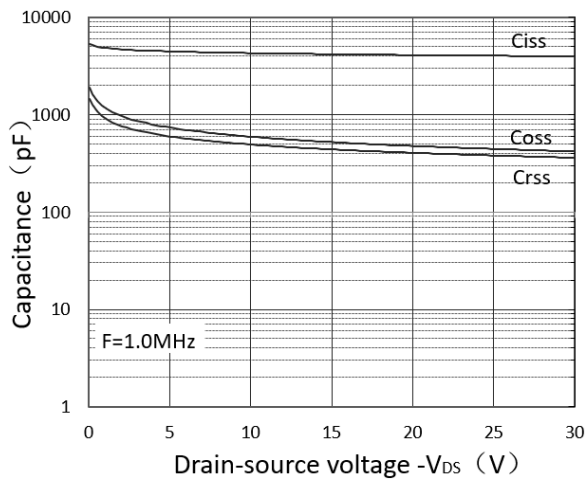


Figure 7. Capacitance Characteristics

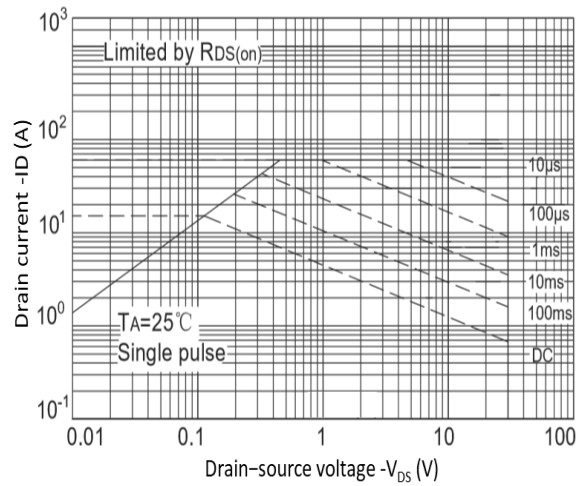


Figure 8. Safe Operating Area

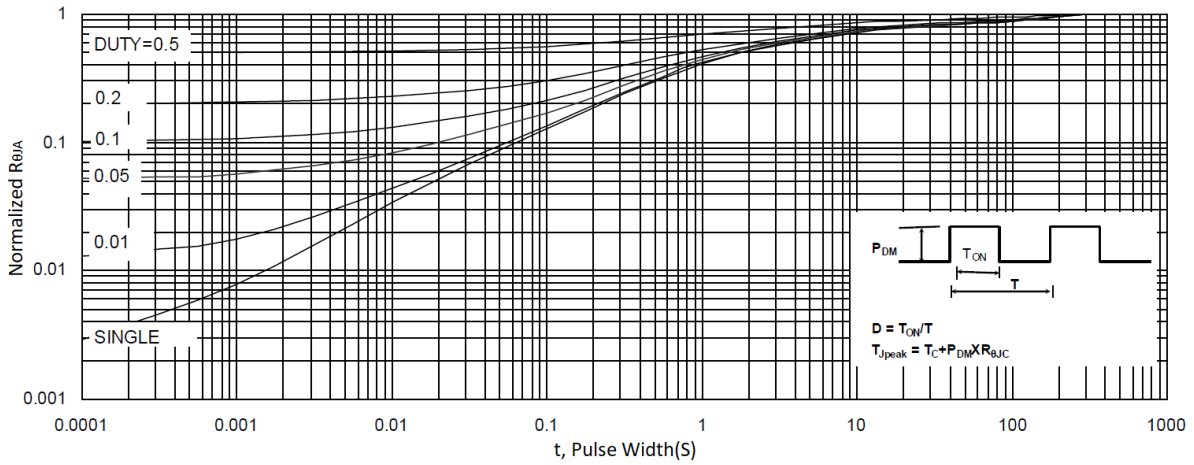


Figure 9. Normalized Maximum Transient Thermal Impedance

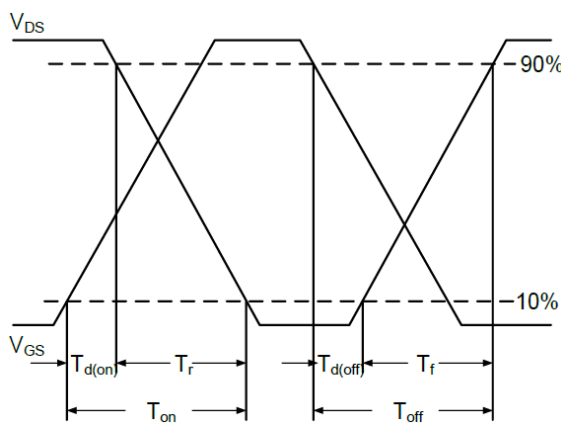


Figure 10. Switching Time Waveform

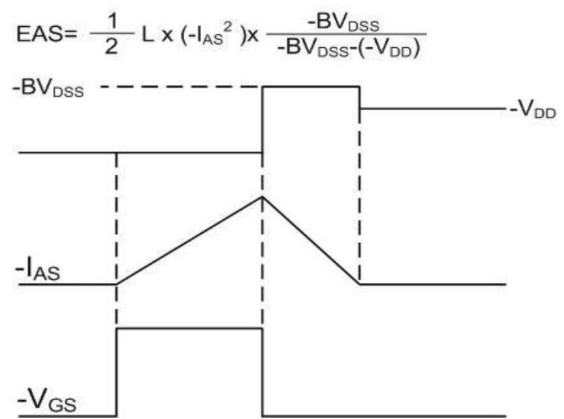
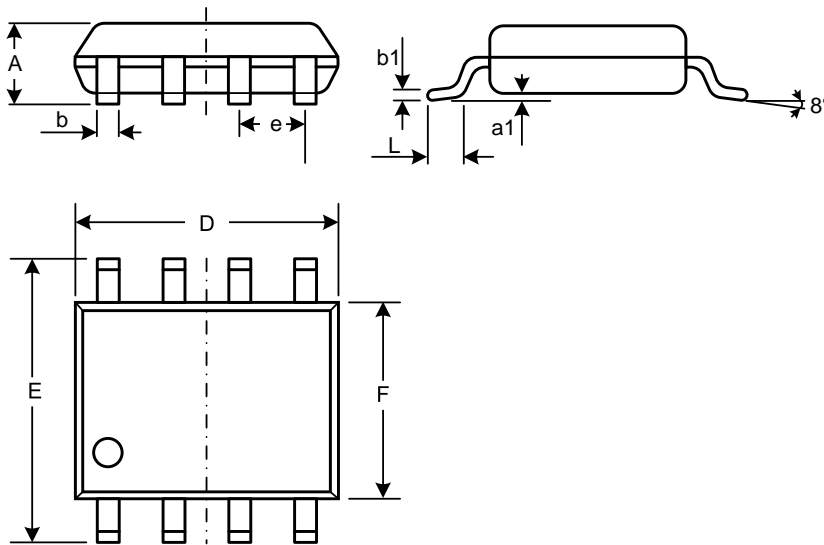


Figure 11. Unclamped Inductive Switching Waveform

## Mechanical Dimensions for SOP-8L

## COMMON DIMENSIONS

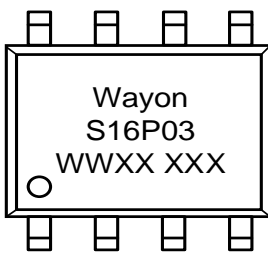


SYMBOL	MM	
	MIN	MAX
A	1.23	1.75
a1	0.05	0.25
b	0.31	0.51
b1	0.16	0.25
D	4.70	5.15
E	5.75	6.25
e	1.07	1.47
F	3.70	4.10
L	0.4	1.27

## Ordering Information

Part	Package	Marking	Packing method
WMS16P03T1	SOP-8L	S16P03	Tape and Reel

## Marking Information



S16P03 = Device code

WWXX XXX= Date code


## Contact Information

No.1001, Shiwan(7) Road, Pudong District, Shanghai, P.R.China.201207

Tel: 86-21-50310888 Fax: 86-21-50757680 Email: market@way-on.com

WAYON website: <http://www.way-on.com>

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