
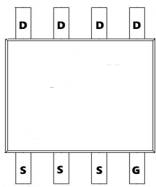
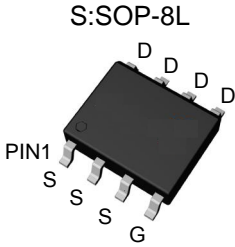
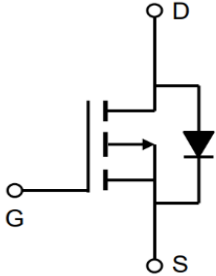


**TM18P03S**

**P-Channel Enhancement Mosfet**

<p><b>General Description</b></p> <ul style="list-style-type: none"> <li>• Low <math>R_{DS(ON)}</math></li> <li>• RoHS and Halogen-Free Compliant</li> </ul> <p><b>Applications</b></p> <ul style="list-style-type: none"> <li>• Load switch</li> <li>• PWM</li> </ul>	<p><b>General Features</b></p> <p><math>V_{DS} = -30V</math> <math>I_D = -18A</math>  <math>R_{DS(ON)} = 8.8m\Omega</math> (typ.) @ <math>V_{GS} = -10V</math></p> <p>100% UIS Tested                  100% <math>R_g</math> Tested</p> 
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Marking: 18P03 OR 4409

<b>Absolute Maximum Ratings</b> ( $T_A = 25^\circ C$ unless otherwise noted)			
Parameter	Symbol	Value	Unit
Drain-Source voltage	$V_{DS}$	-30	V
Gate-Source voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$I_D$	$T_A = 25^\circ C$	-18
		$T_A = 100^\circ C$	-11.7
Pulsed Drain Current <sup>1</sup>	$I_{DM}$	-67	A
Single Pulse Avalanche Energy <sup>2</sup>	$E_{AS}$	80	mJ
Total Power Dissipation	$P_D$	3	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to 150	$^\circ C$
<b>Thermal Characteristics</b>			
Parameter	Symbol	Value	Unit
Thermal Resistance from Junction-to-Ambient <sup>3</sup>	$R_{\theta JA}$	41.6	$^\circ C/W$

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**Electrical Characteristics (T<sub>J</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	-30	-	-	V	
Gate-body Leakage current	<b>I<sub>GSS</sub></b>	V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±20V	-	-	±100	nA	
Zero Gate Voltage Drain Current	<b>I<sub>DSS</sub></b>	V <sub>DS</sub> = -30V, V <sub>GS</sub> = 0V	T <sub>J</sub> =25°C	-	-	-1	μA
			T <sub>J</sub> =100°C	-	-	-100	
Gate-Threshold Voltage	<b>V<sub>GS(th)</sub></b>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA	-1.0	-1.8	2.5	V	
Drain-Source On-Resistance <sup>4</sup>	<b>R<sub>DS(on)</sub></b>	V <sub>GS</sub> = -10V, I <sub>D</sub> = -12A	-	8.8	12	mΩ	
		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -10A	-	13	15		
Forward Transconductance <sup>4</sup>	<b>g<sub>fs</sub></b>	V <sub>DS</sub> = -10V, I <sub>D</sub> = -10A	-	50	-	S	
<b>Dynamic Characteristics<sup>5</sup></b>							
Input Capacitance	<b>C<sub>iss</sub></b>	V <sub>DS</sub> = -15V, V <sub>GS</sub> = 0V, f = 1MHz	-	2100	-	pF	
Output Capacitance	<b>C<sub>oss</sub></b>		-	430	-		
Reverse Transfer Capacitance	<b>C<sub>rss</sub></b>		-	358	-		
Gate Resistance	<b>R<sub>g</sub></b>	f=1MHz	-	9.5	-	Ω	
<b>Switching Characteristics<sup>5</sup></b>							
Total Gate Charge	<b>Q<sub>g</sub></b>	V <sub>GS</sub> = -10V, V <sub>DS</sub> = -15V I <sub>D</sub> = -12A	-	35	-	nC	
Gate-Source Charge	<b>Q<sub>gs</sub></b>		-	9.9	-		
Gate-Drain Charge	<b>Q<sub>gd</sub></b>		-	10.5	-		
Turn-On Delay Time	<b>t<sub>d(on)</sub></b>	V <sub>GS</sub> = -10V, V <sub>DD</sub> = -15V R <sub>G</sub> = 3Ω, I <sub>D</sub> = -12A	-	10.8	-	ns	
Rise Time	<b>t<sub>r</sub></b>		-	13.2	-		
Turn-Off Delay Time	<b>t<sub>d(off)</sub></b>		-	73	-		
Fall Time	<b>t<sub>f</sub></b>		-	35	-		
Reverse Recovery Time	<b>t<sub>rr</sub></b>	I <sub>F</sub> = -12A, dI <sub>F</sub> /dt = 100A/μs	-	25	-	ns	
Reverse Recovery Charge	<b>Q<sub>rr</sub></b>		-	10	-	nC	
<b>Drain-source body diode Characteristics</b>							
Diode Forward Voltage <sup>4</sup>	<b>V<sub>SD</sub></b>	I <sub>S</sub> = -1A, V <sub>GS</sub> = 0V	-	-	-1.2	V	
Continuous Source Current	<b>I<sub>S</sub></b>	T <sub>A</sub> =25°C	-	-	-18	A	

**Notes:**

1. Repetitive rating, pulse width limited by junction temperature T<sub>J(MAX)</sub>=150°C.
2. The EAS data shows Max. rating . The test condition is V<sub>DD</sub>= -25V, V<sub>GS</sub>= -10V, L=0.1mH, I<sub>AS</sub>= -40A.
3. The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
4. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
5. This value is guaranteed by design hence it is not included in the production test.



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Typical Characteristics

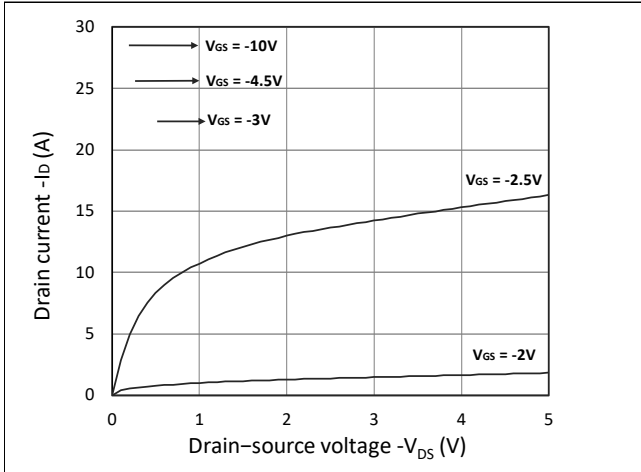


Figure 1. Output Characteristics

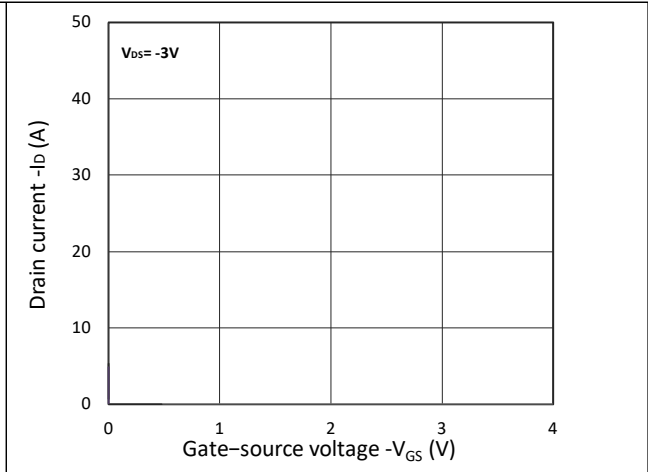


Figure 2. Transfer Characteristics

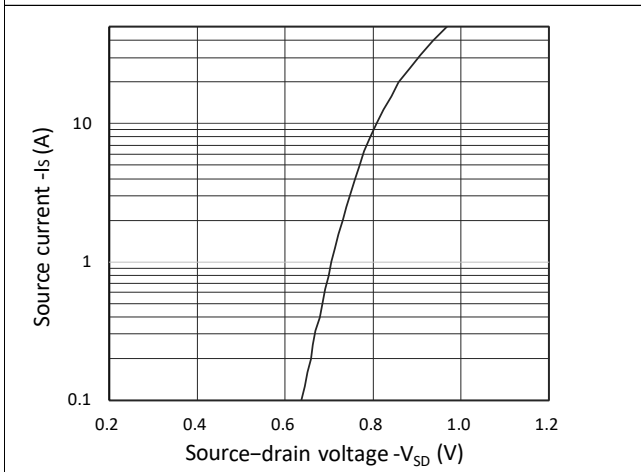


Figure 3. Forward Characteristics of Reverse

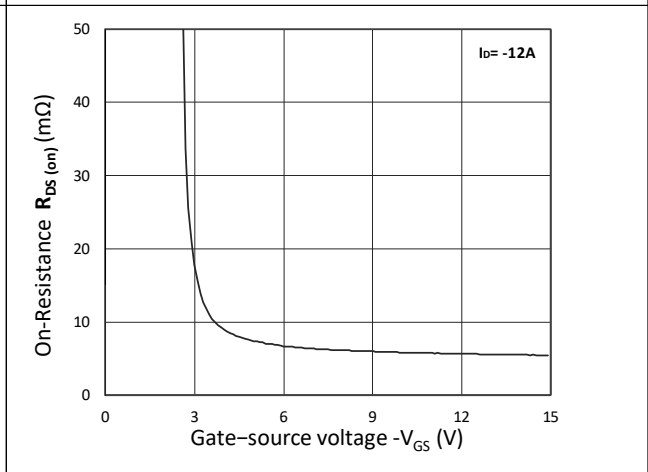


Figure 4.  $R_{DS(on)}$  vs.  $V_{GS}$

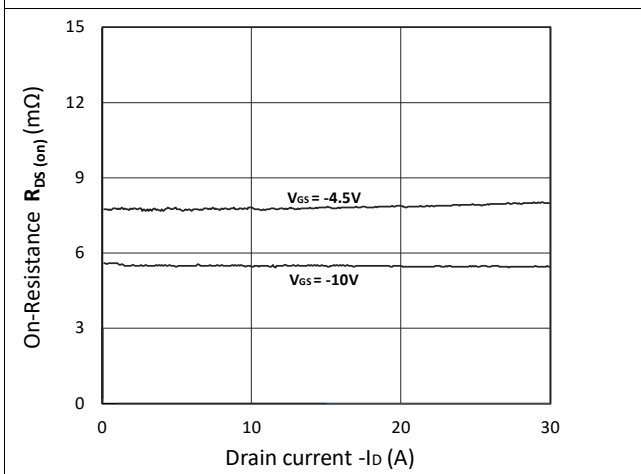


Figure 5.  $R_{DS(on)}$  vs.  $I_D$

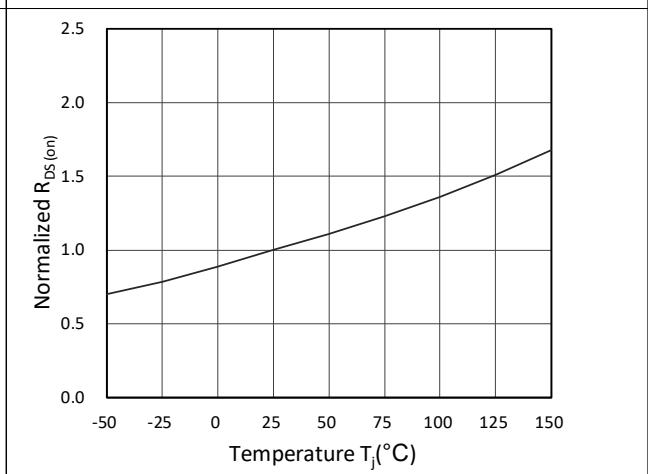


Figure 6. Normalized  $R_{DS(on)}$  vs. Temperature



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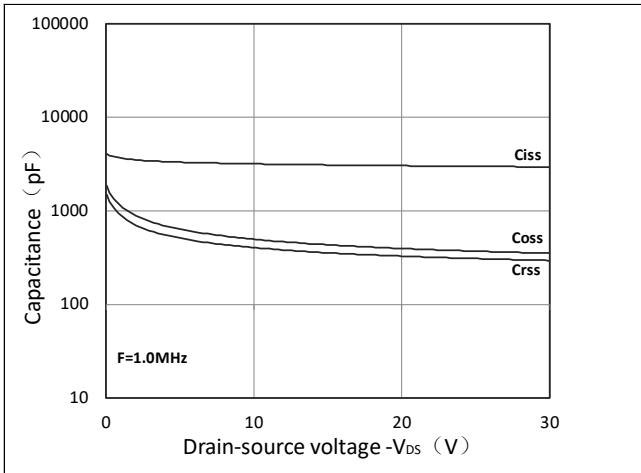


Figure 7. Capacitance Characteristics

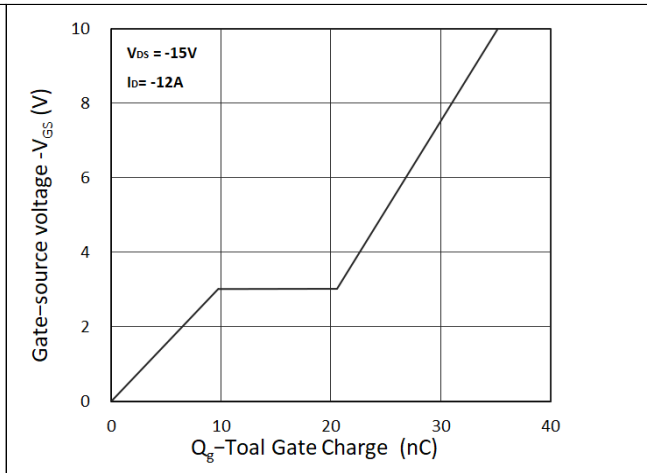


Figure 8. Gate Charge Characteristics

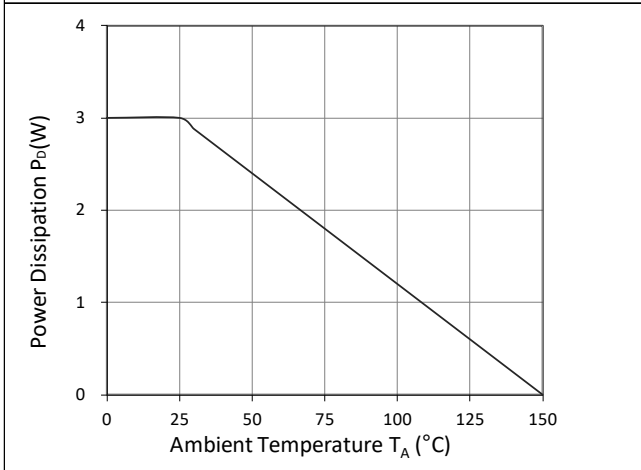


Figure 9. Power Dissipation

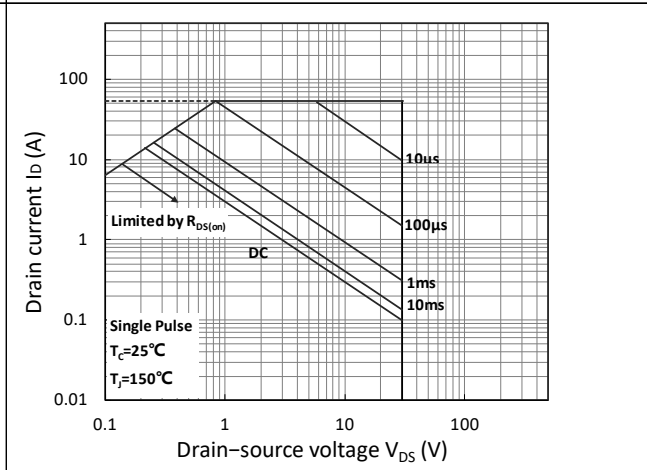


Figure 10. Safe Operating Area

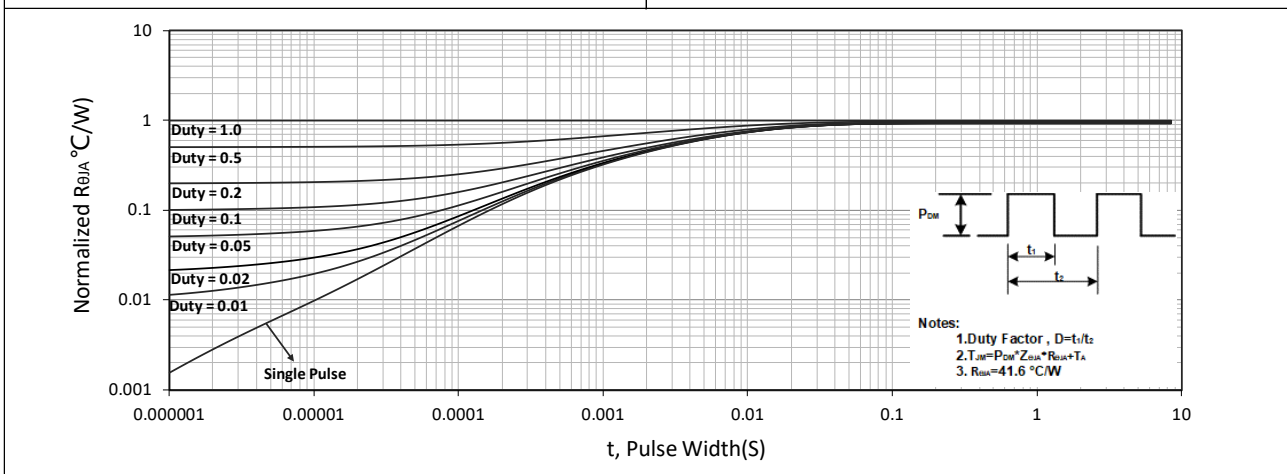
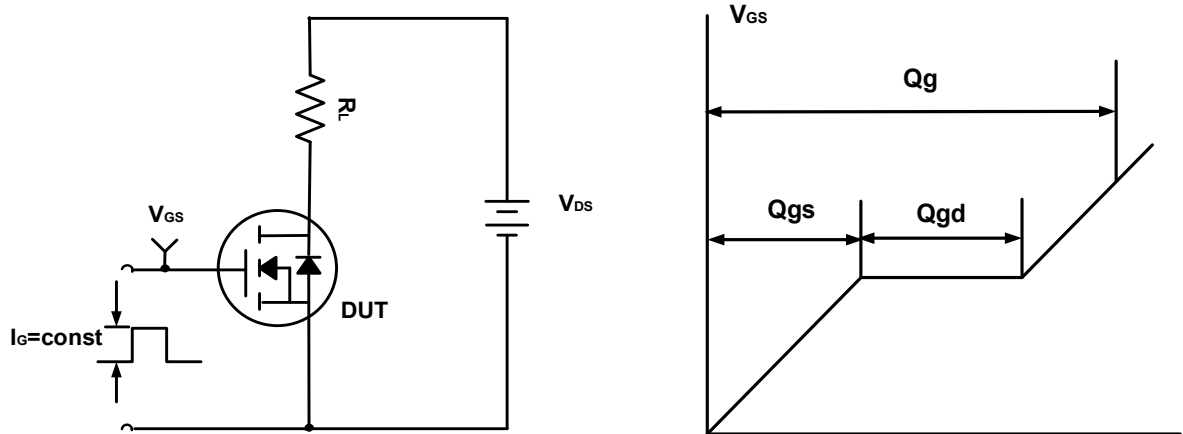
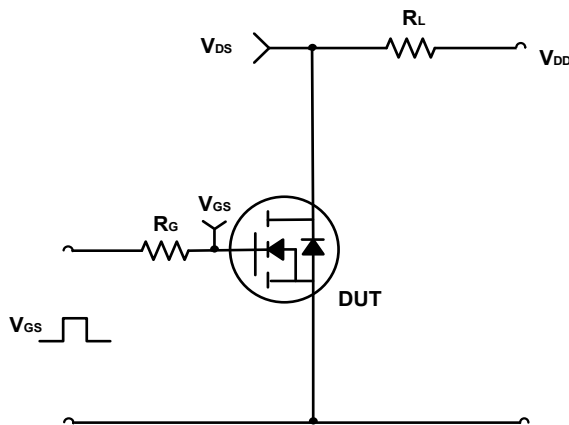


Figure 11. Normalized Maximum Transient Thermal Impedance

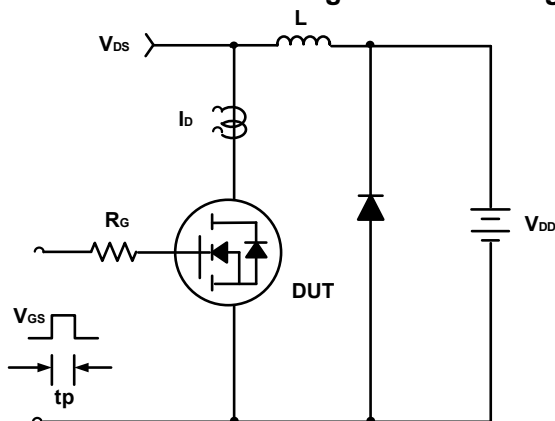
**Test Circuit**



**Figure A. Gate Charge Test Circuit & Waveforms**

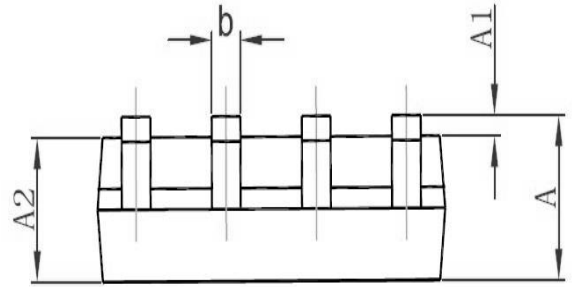
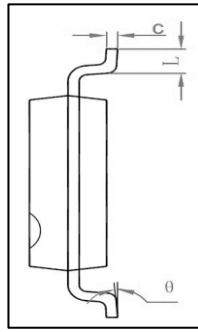
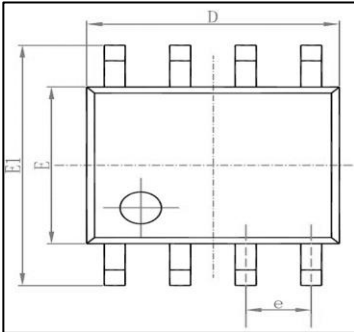


**Figure B. Switching Test Circuit & Waveforms**

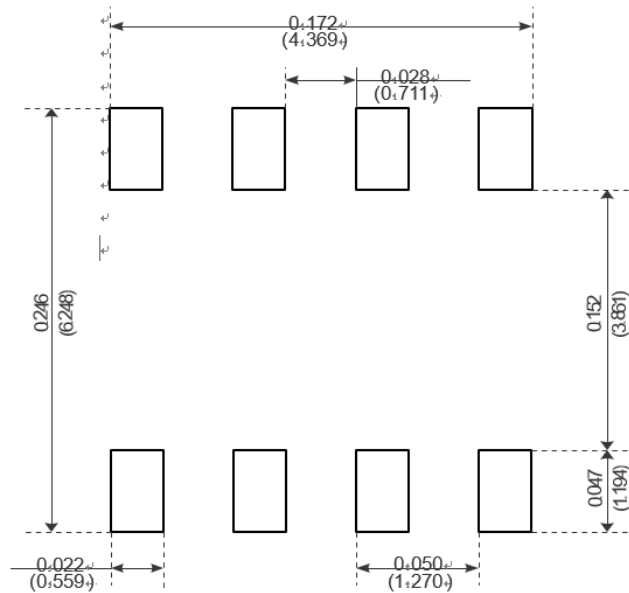


**Figure C. Unclamped Inductive Switching Circuit & Waveforms**

# Package Mechanical Data:SOP-8L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
$\theta$	0°	8°	0°	8°



Recommended Minimum Pads