RECTRON SEMICONDUCTOR
TECHNICAL SPECIFICATION

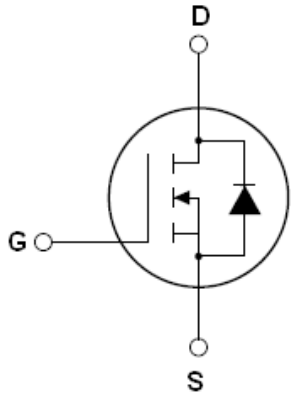
RM3N700S4

N-Channel Super Junction Power MOSFET Ⅲ

General Description

The series of devices use advanced trench gate super junction technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. This super junction MOSFET fits the industry's AC-DC SMPS requirements for PFC, AC/DC power conversion, and industrial power applications.

V_{DS}	700	V
$R_{DS(ON)TYP.}$	1500	mΩ
I_D	3	A



Schematic diagram

Features

- ●New technology for high voltage device
- ●Low on-resistance and low conduction losses
- ●Small package
- ●Ultra Low Gate Charge cause lower driving requirements
- ●100% Avalanche Tested
- ●ROHS compliant

Application

- Power factor correction（PFC）
- Switched mode power supplies(SMPS)
- Uninterruptible Power Supply（UPS）
- Halogen-free

SOT-223-2L

Package Marking And Ordering Information

Device	Device Package	Marking
RM3N700S4	SOT-223-2L	3N700

Absolute Maximum Ratings T_C 25ºC, unless otherwise noted

Parameter		Symbol	Value	Unit
Drain-Source Voltage (V_{GS} 0V)		V_{DSS}	700	V
Continuous Drain Current	T_C 25ºC	I_D	3	A
	TC 100ºC		1.8	
Pulsed Drain Current (note1)		I_{DM}	9	A
Gate-Source Voltage		V_{GSS}	±20	V
Single Pulse Avalanche Energy (note2)		E_{AS}	26	mJ
Repetitive Avalanche Energy (note2)		E_{AR}	0.10	mJ

Avalanche Current	I_{AR}	0.6	A
MOSFET dv/dt ruggedness, V_{DS} = 0...480V	dv/dt	50	V/ns
Power Dissipation	P_D	6.2	W
Continuous Body Diode Current	I_S	2.5	A
Pulsed Diode Forward Current (note1)	I_{SM}	33	
Reverse diode dv/dt (note3)	dv/dt	15	V/ns
Maximum diode commutation speed (note3)	di_f/dt	500	A/us
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55~+150	ºC

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	R_{thJC}	20	ºC/W
Thermal Resistance, Junction-to-Ambient	R_{thJA}	160	

Specifications T_J = 25ºC, unless otherwise noted

Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	700	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 700V, V_{GS} = 0V, T_J = 25ºC	--	--	1	μA
		V_{DS} = 700V, V_{GS} = 0V, T_J = 150ºC	--	--	100	
Gate-Source Leakage	I_{GSS}	V_{GS} = ±20V	--	--	±1	μA
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	2.5	--	4.0	V
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 1.5A	--	1.3	1.5	Ω
Gate resistance	R_G	f = 1.0MHz open drain	--	5.5	--	Ω
Dynamic						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 100V, f = 1.0MHz	--	225	--	pF
Output Capacitance	C_{oss}		--	10	--	
Reverse Transfer Capacitance	C_{rss}		--	0.4	--	
Total Gate Charge	Q_g	V_{DD} = 560V, I_D = 3A, V_{GS} = 10V	--	7	--	nC
Gate-Source Charge	Q_{gs}		--	1.3	--	
Gate-Drain Charge	Q_{gd}		--	3.5	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 400V, I_D = 3A, R_G = 25Ω	--	8.5	--	ns
Turn-on Rise Time	t_r		--	7.7	--	
Turn-off Delay Time	$t_{d(off)}$		--	19.0	--	
Turn-off Fall Time	t_f		--	16.5	--	

Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Drain-Source Body Diode Characteristics						
Body Diode Voltage	V_{SD}	T_J = 25ºC, I_{SD} = 1.5A, V_{GS} = 0V	--	0.9	1.2	V
Reverse Recovery Time	t_{rr}	V_R = 400V, I_F = 3A, di_F/dt = 100A/µs	--	155	--	ns
Reverse Recovery Charge	Q_{rr}		--	0.85	--	µC
Peak Reverse Recovery Current	I_{rrm}		--	11	--	A

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. I_{AS} = 0.6A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C
3. Identical low side and high side switch with identical R_G

RATING AND CHARACTERISTICS CURVES (RM3N700S4)

Figure 1. Output Characteristics

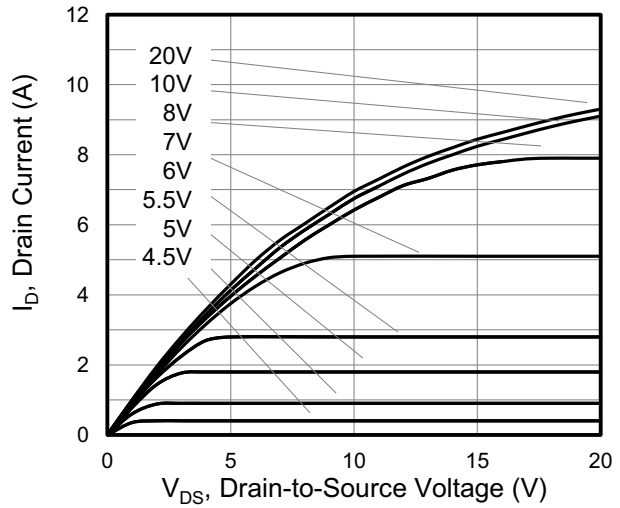


Figure 2. Transfer Characteristics

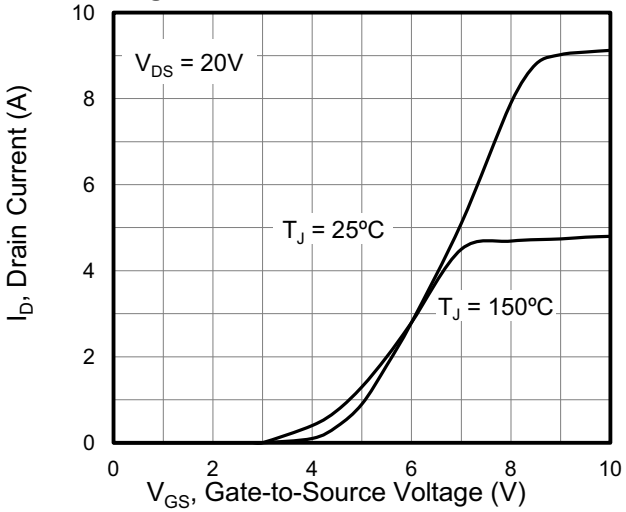


Figure 3. On-Resistance vs. Drain Current

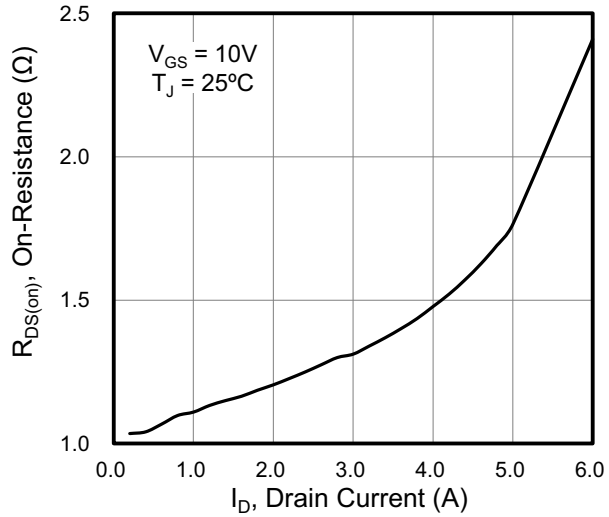


Figure 4. Capacitance

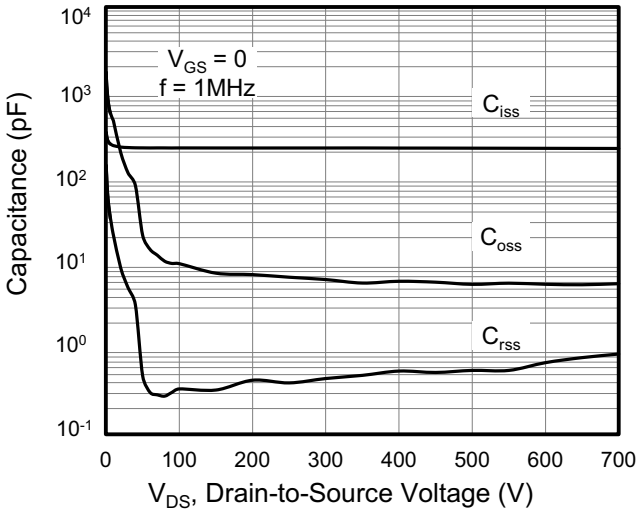


Figure 5. Gate Charge

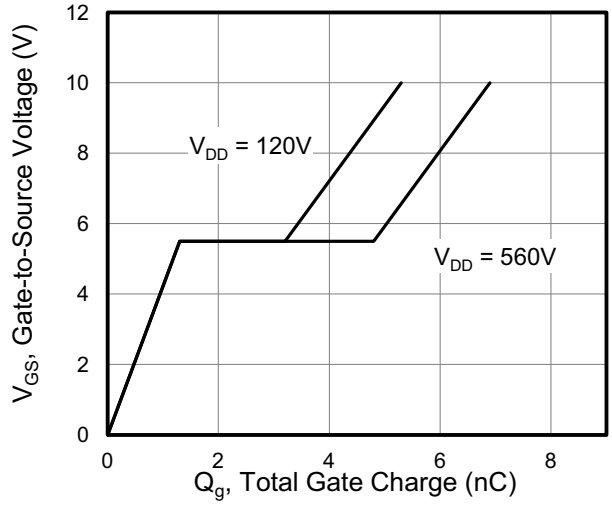
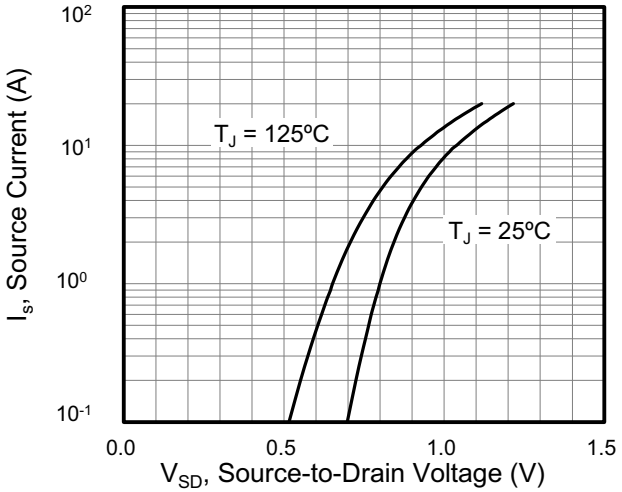


Figure 6. Body Diode Forward Voltage



RATING AND CHARACTERISTICS CURVES (RM3N700S4)

Figure 7. On-Resistance vs. Junction Temperature

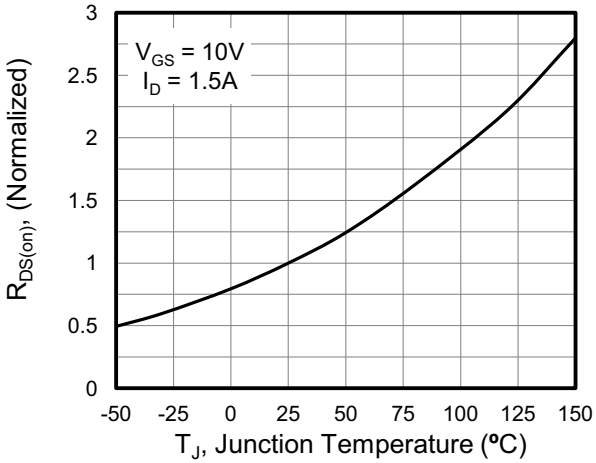


Figure 8. Breakdown voltage vs. Junction Temperature

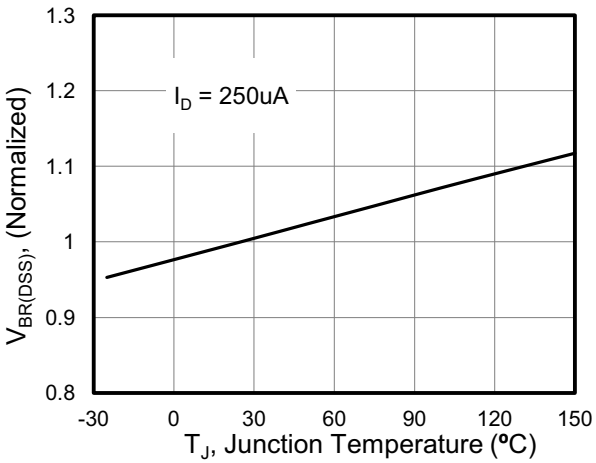


Figure 9. Transient Thermal Impedance for SOT-223-2L

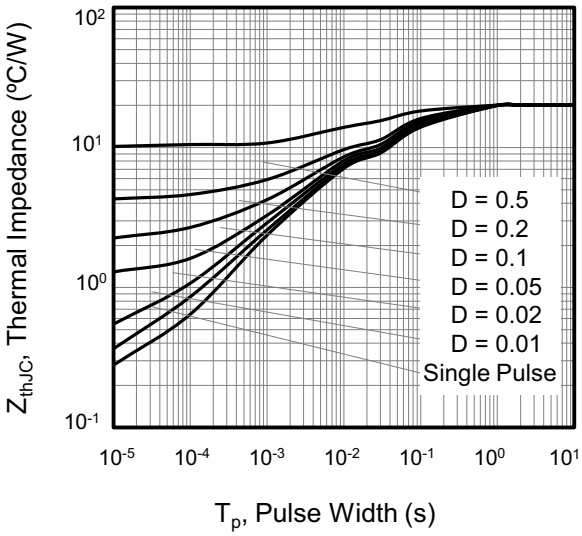
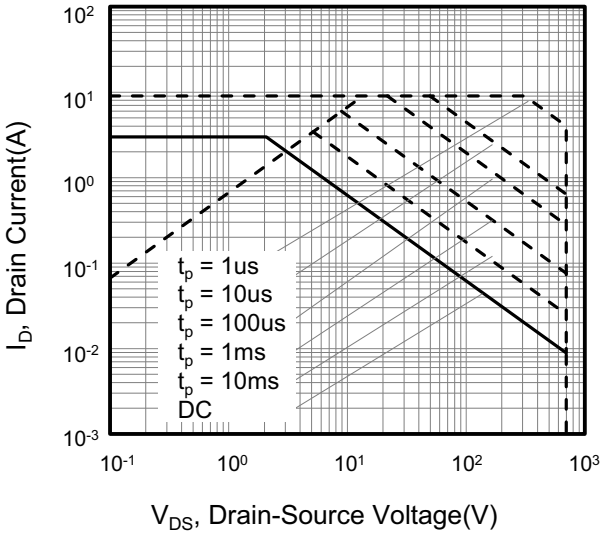


Figure 10. Safe operation area for SOT-223-2L



Test circuit

Figure A：Gate Charge Test Circuit and Waveform

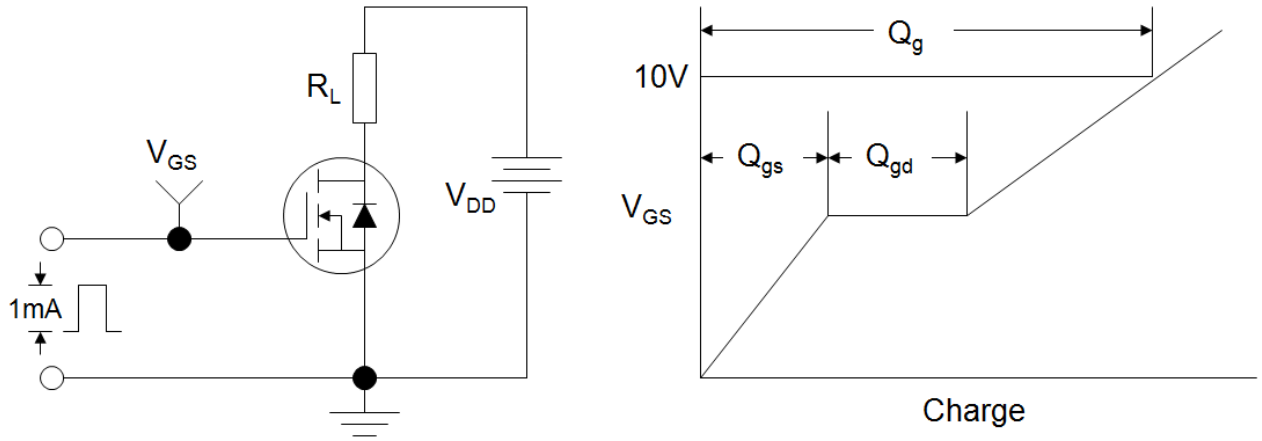


Figure B：Resistive Switching Test Circuit and Waveform

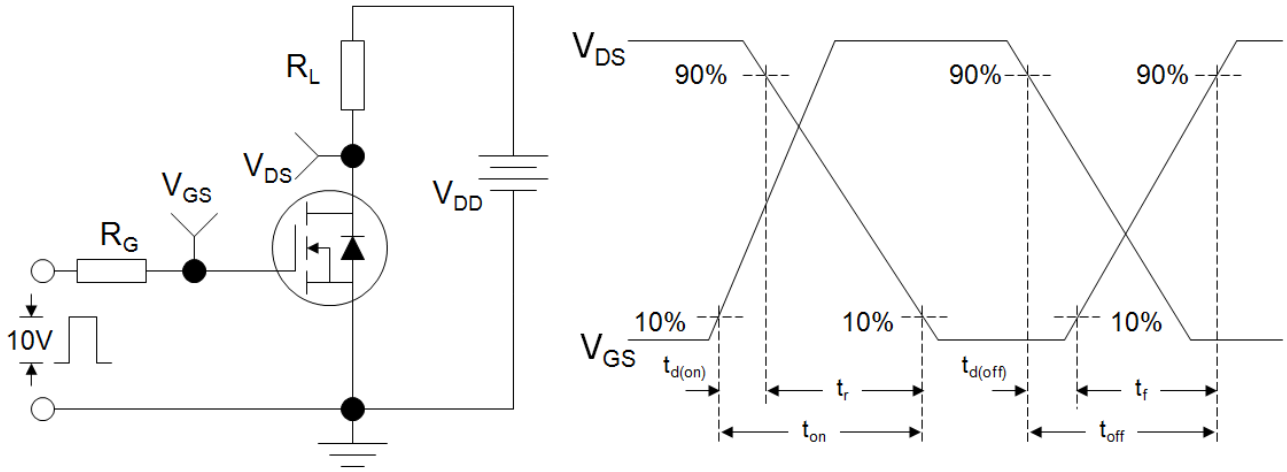
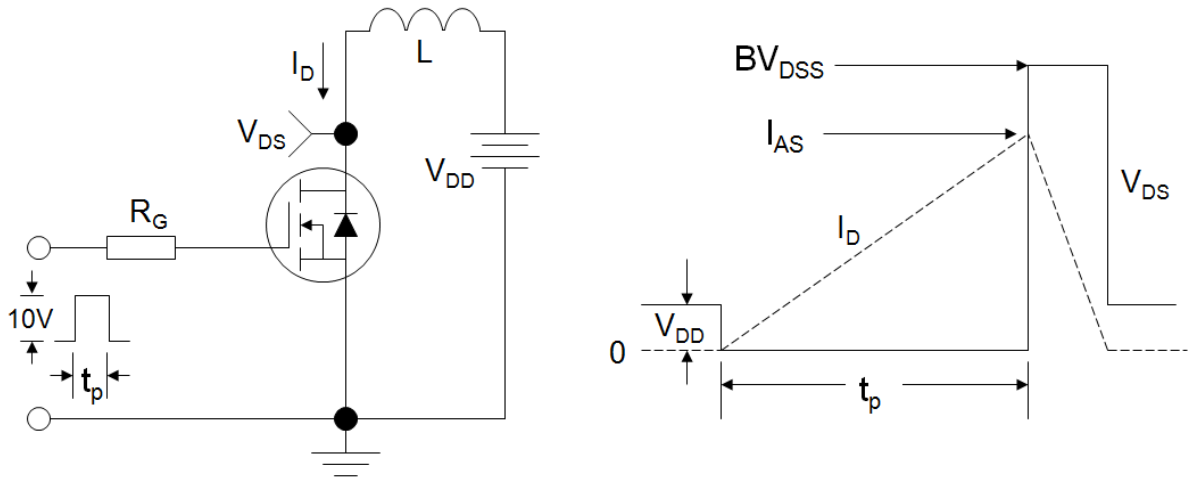
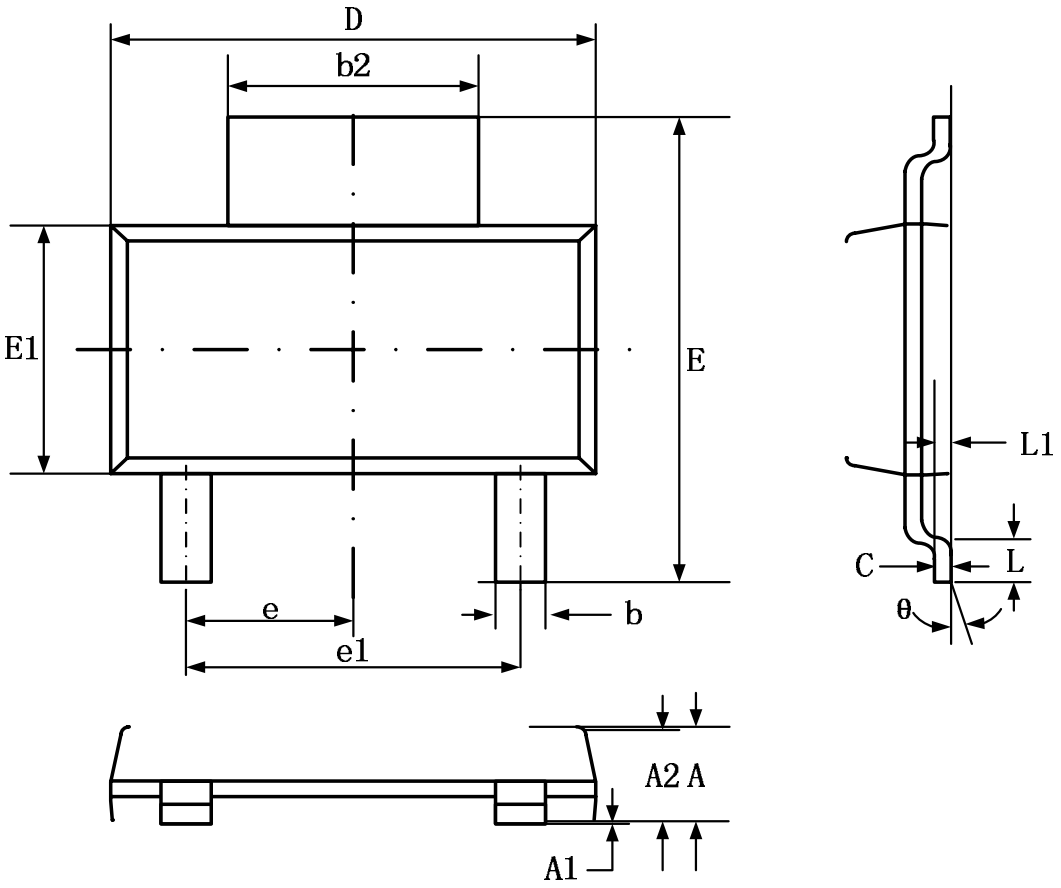


Figure C：Unclamped Inductive Switching Test Circuit and Waveform



SOT-223-2L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	——	1.80	——	0.071
A1	0.02	0.10	0.001	0.004
A2	1.50	1.70	0.059	0.067
b	0.66	0.84	0.026	0.033
b2	2.90	3.10	0.114	0.122
c	0.23	0.35	0.009	0.014
D	6.30	6.70	0.248	0.264
E	6.70	7.30	0.264	0.287
E1	3.30	3.70	0.130	0.146
e	2.30 BSC.		0.091 BSC.	
e1	4.60 BSC.		0.182 BSC.	
L	0.81	——	0.032	——
L1	0.25 BSC.		0.032 BSC.	
θ	0°	10°	0°	10°

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