



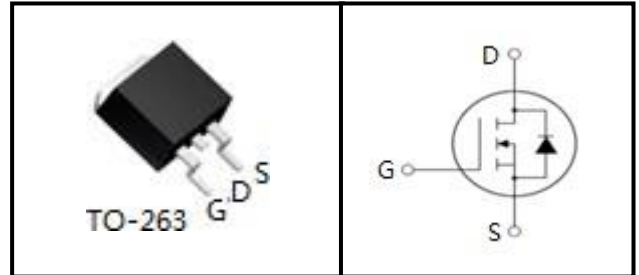
## 100V N-Channel Trench MOSFET

### FEATURES

- VDS=100V, ID=180A RDS(ON)\_typ : 3.1mΩ @ VGS=10V
- Ultra-Low RDS(ON)
- Low Gate Charge
- High Current Capability

### APPLICATIONS

- Power Management in Telecom., Industrial Automation
- Motor Driving in Power Tool, E-vehicle, Robotics
- Current Switching in DC/DC&AC/DC(SR) Sub-systems



### Device Marking and Package Information

Device	Package	Marking
PW10N15T	TO-263	PW10N15T

### Absolute Maximum Ratings $T_C = 25^\circ\text{C}$ , unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage ( $V_{GS} = 0V$ )	$V_{DSS}$	100	V
Continuous Drain Current	$I_D$	150	A
Pulsed Drain Current (note1)	$I_{DM}$	700	A
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Single Pulse Avalanche Energy (note2)	$E_{AS}$	1733	mJ
Avalanche Current (note1)	$I_{AR}$	64	A
Power Dissipation ( $T_C = 25^\circ\text{C}$ )	$P_D$	208	W
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55~+175	$^\circ\text{C}$

### Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{thJC}$	0.72	KW
Thermal Resistance, Junction-to-Ambient	$R_{thJA}$	62.5	



Specifications $T_J = 25^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	100	--	--	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 100V, V_{GS} = 0V, T_J = 25^\circ\text{C}$	--	--	1	$\mu A$
		$V_{DS} = 100V, V_{GS} = 0V, T_J = 150^\circ\text{C}$	--	--	100	
Gate-Source Leakage	$I_{GSS}$	$V_{GS} = \pm 20V$	--	--	$\pm 100$	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	3	3.2	3.5	V
Drain-Source On-Resistance (Note3)	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 30A$		3.1	3.5	$m\Omega$
Forward Transconductance (Note3)	$g_{fs}$	$V_{DS} = 5V, I_D = 20A$	40	--	--	S
<b>Dynamic</b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0V,$ $V_{DS} = 25V,$ $f = 1.0MHz$	--	6000	--	$pF$
Output Capacitance	$C_{oss}$		--	2950	--	
Reverse Transfer Capacitance	$C_{rss}$		--	275	--	
Total Gate Charge	$Q_g$	$V_{DD} = 50V, I_D = 20A,$ $V_{GS} = 10V$	--	130	--	nC
Gate-Source Charge	$Q_{gs}$		--	24	--	
Gate-Drain Charge	$Q_{gd}$		--	49	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 50V, I_D = 2A,$ $R_G = 2.5\Omega$	--	28	--	ns
Turn-on Rise Time	$t_r$		--	30	--	
Turn-off Delay Time	$t_{d(off)}$		--	41	--	
Turn-off Fall Time	$t_f$		--	16	--	
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$	$T_C = 25^\circ\text{C}$	--	--	150	A
Pulsed Diode Forward Current	$I_{SM}$		--	--	700	
Body Diode Voltage	$V_{SD}$	$T_J = 25^\circ\text{C}, I_{SD} = 20A, V_{GS} = 0V$	--	--	1.2	V
Reverse Recovery Time	$t_{rr}$	$I_F = 20A,$ $di_F/dt = 500A/\mu s$	--	45	--	ns
Reverse Recovery Charge	$Q_{rr}$		--	54	--	nC

#### Notes

1. Repetitive Rating: Pulse Width limited by maximum junction temperature
2.  $I_{AS} = 60A, V_{DD} = 50V, R_G = 25\Omega$ , Starting  $T_J = 25^\circ\text{C}$
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 1\%$



Typical Characteristics  $T_J = 25^\circ\text{C}$ , unless otherwise noted

Figure 1. Output Characteristics

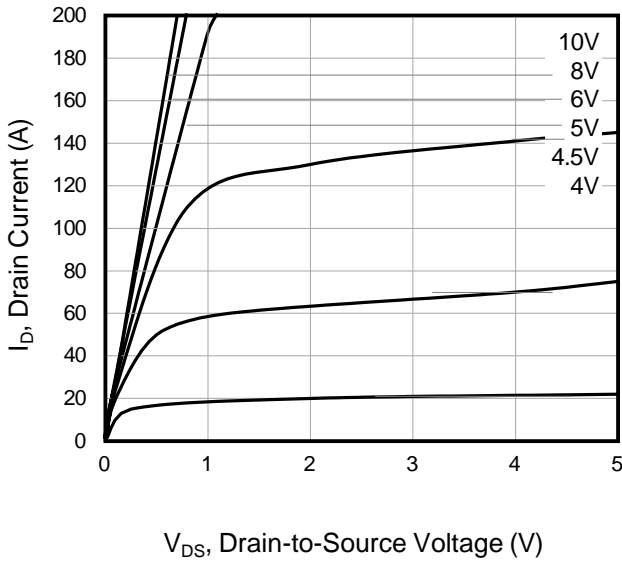


Figure 2. Transfer Characteristics

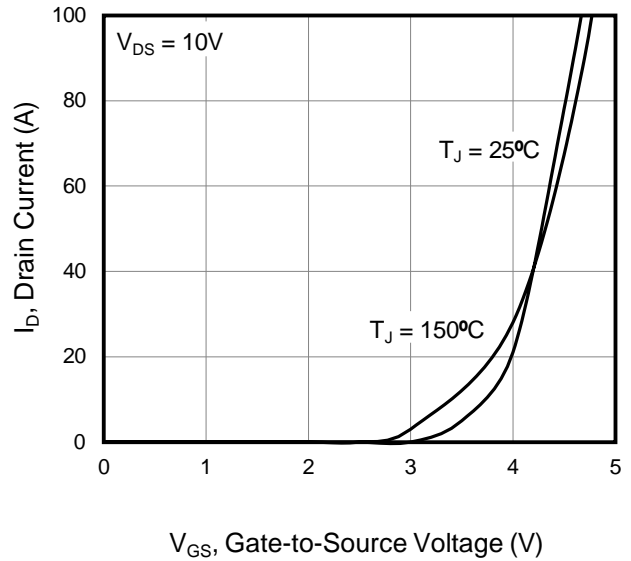


Figure 3. On-Resistance vs. Drain Current

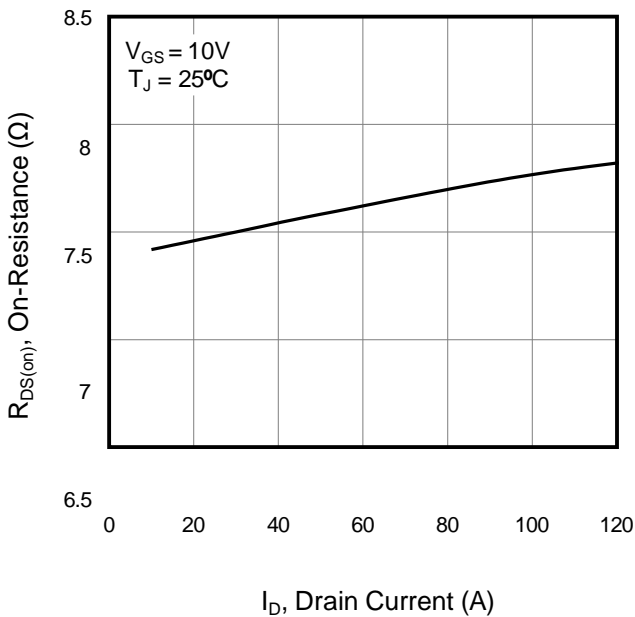


Figure 4. Capacitance

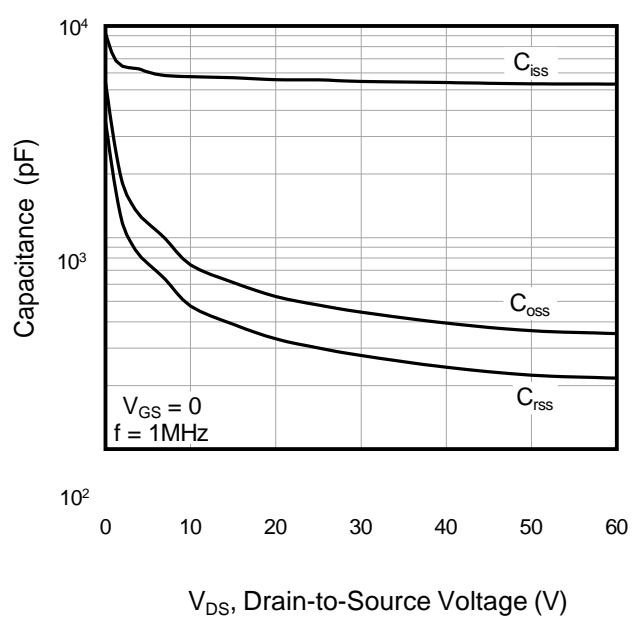


Figure 5. Gate Charge

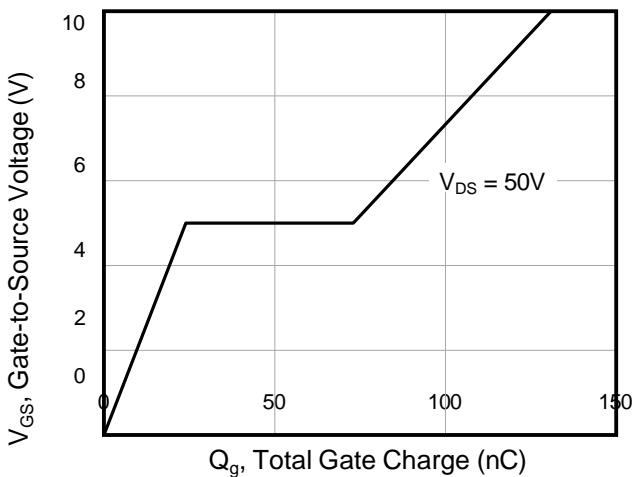
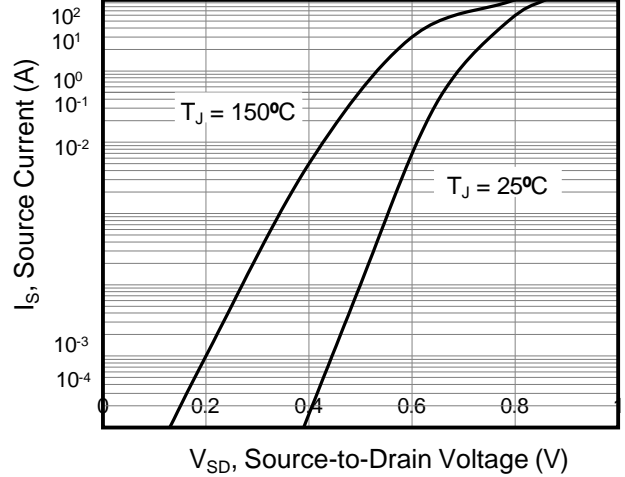


Figure 6. Body Diode Forward Voltage





Typical Characteristics  $T_J = 25^\circ\text{C}$ , unless otherwise noted

Figure 7. On-Resistance vs. Temperature

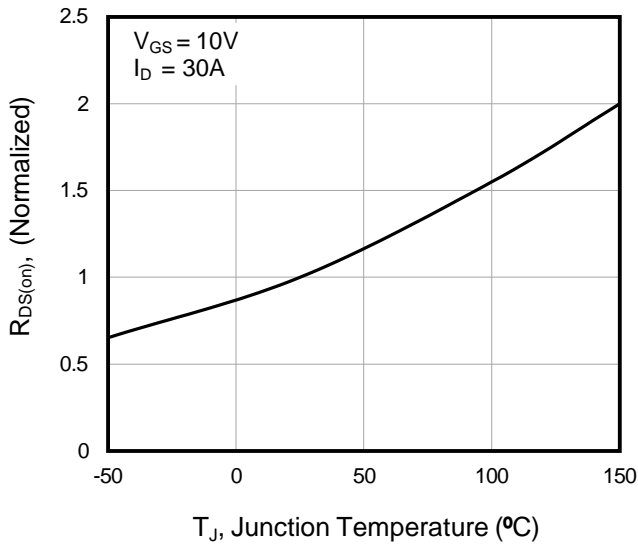


Figure 8. Threshold Voltage vs. Temperature

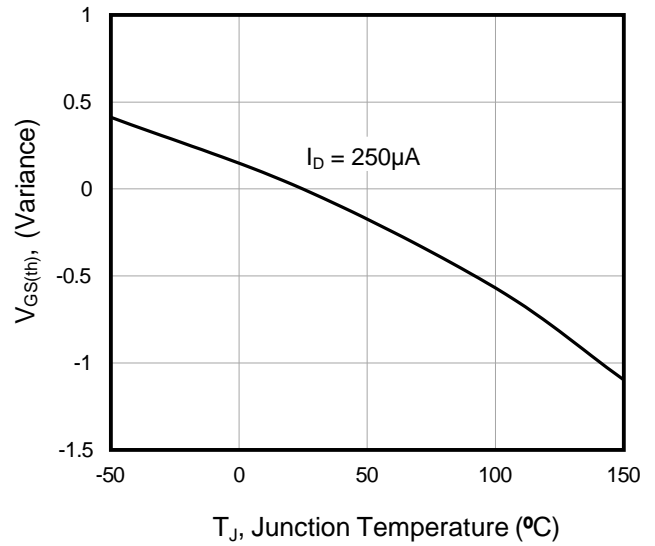


Figure 9. Transient Thermal Impedance

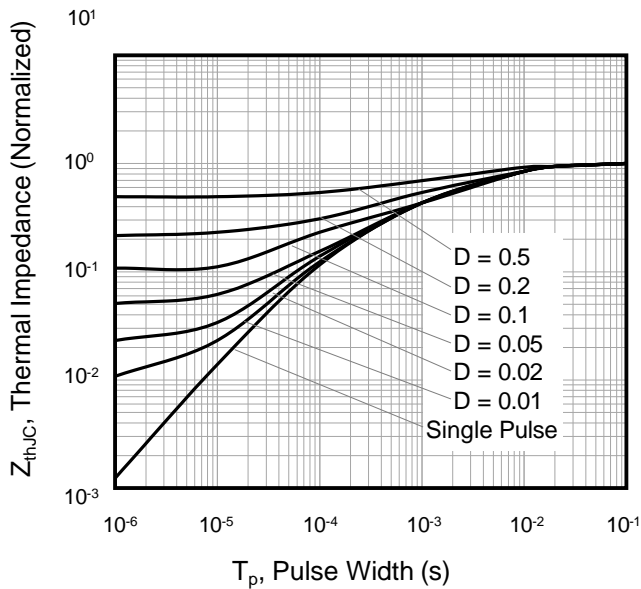




Figure A: Gate Charge Test Circuit and Waveform

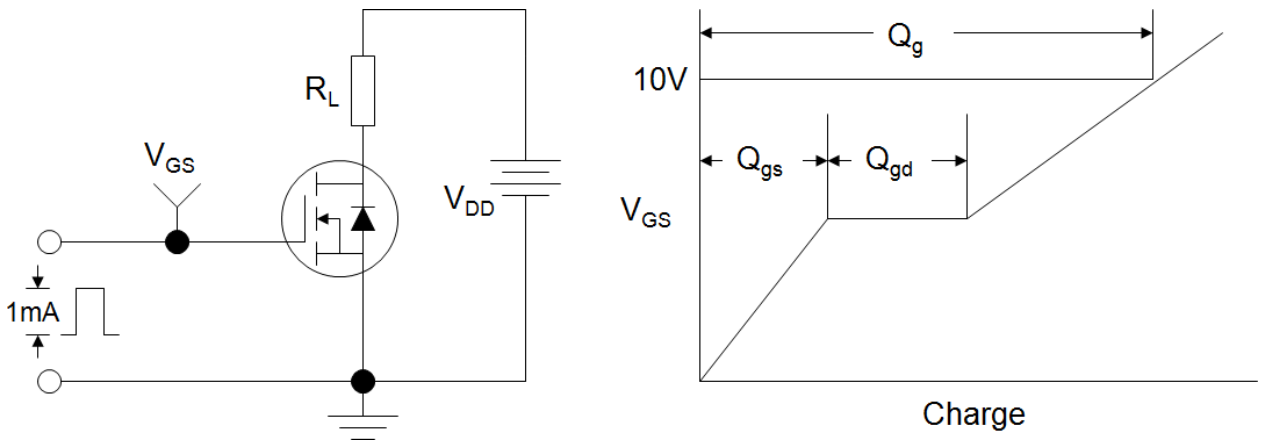


Figure B: Resistive Switching Test Circuit and Waveform

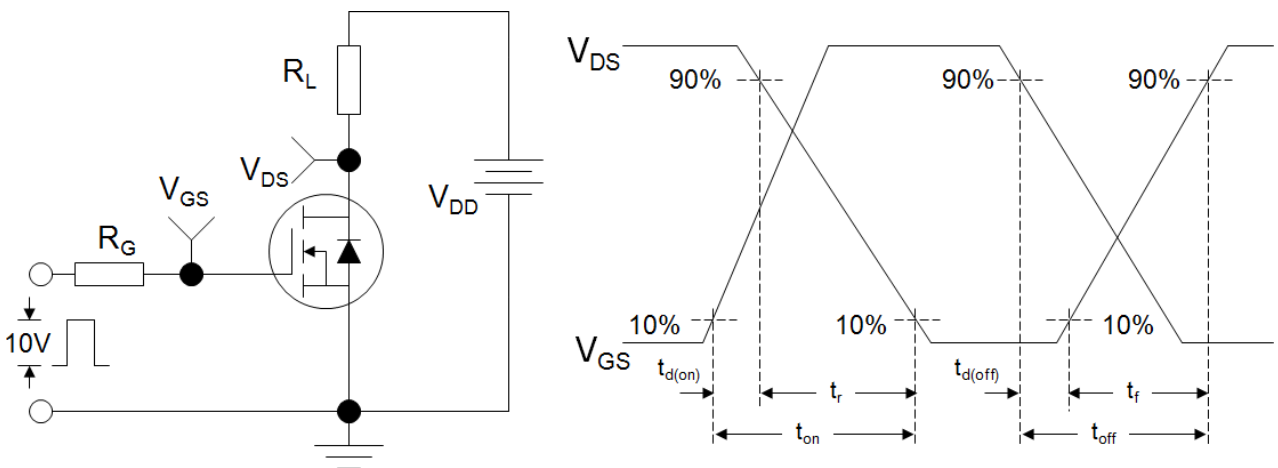
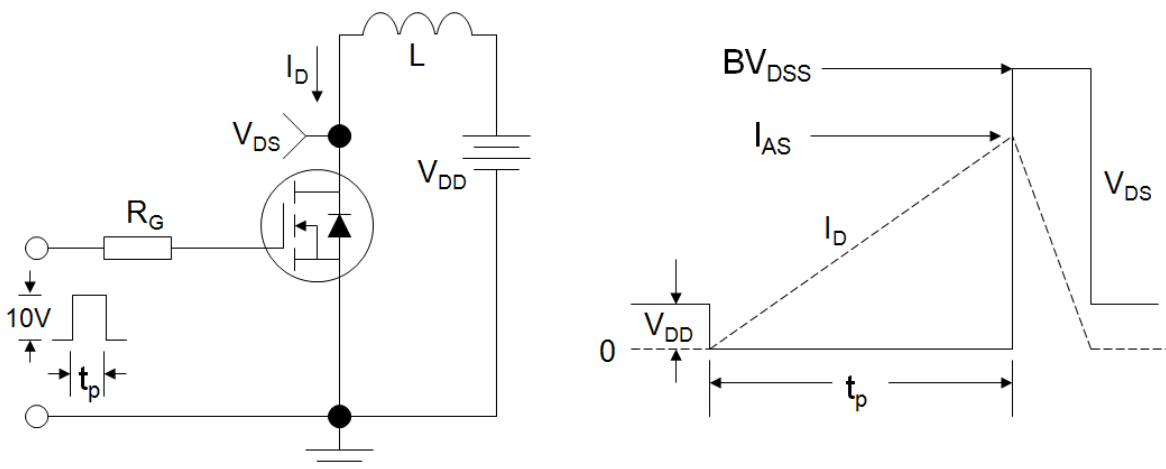
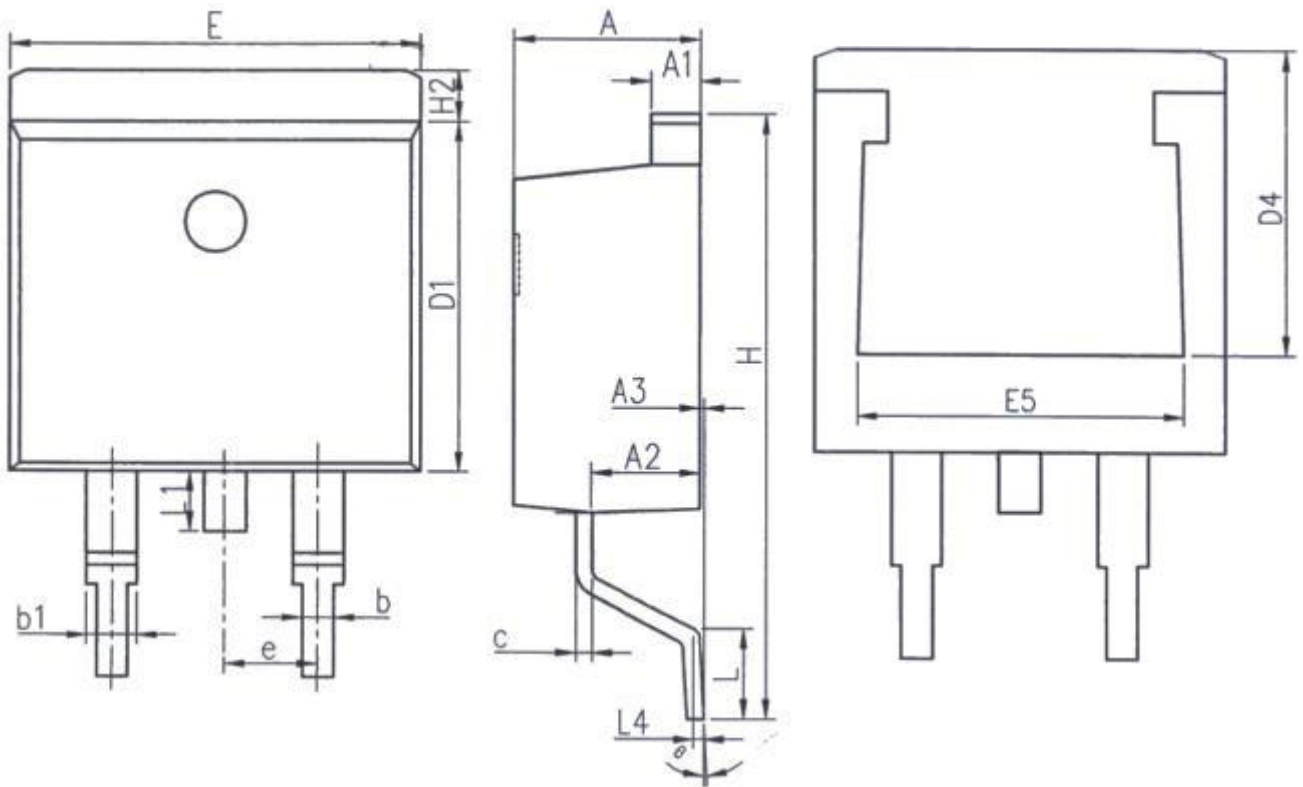


Figure C: Unclamped Inductive Switching Test Circuit and Waveform



# TO-263



Unit: mm		
Symbol	Min.	Max.
A	4.37	4.77
A1	1.22	1.42
A2	2.49	2.89
A3	0.00	0.25
b	0.70	0.96
b1	1.17	1.47
c	0.30	0.53
D1	8.50	8.90
D4	6.60	-

Unit: mm		
Symbol	Min.	Max.
E	9.86	10.36
E5	7.06	-
e	2.54BSC	
H	14.70	15.50
H2	1.07	1.47
L	2.00	2.60
L1	1.40	1.70
L4	0.25BSC	
θ	0°	9°