



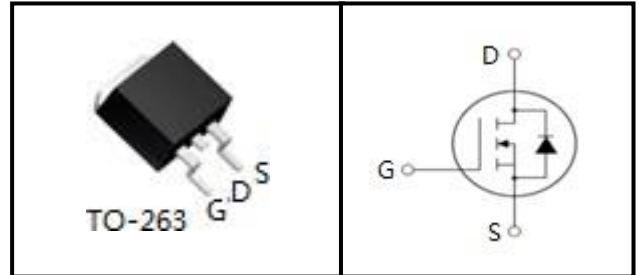
100V N-Channel Trench MOSFET

FEATURES

- VDS=100V, ID=120A RDS(ON)_typ : 3.8mΩ @ 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
PW10N12T	TO-263	PW10N12T

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	120	A
Pulsed Drain Current (note1)	I_{DM}	500	A
Gate-Source Voltage	V_{GSS}	± 20	V
Single Pulse Avalanche Energy (note2)	E_{AS}	1163	mJ
Avalanche Current (note1)	I_{AR}	52	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.	
Static						
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	μA
		$V_{DS} = 100V, V_{GS} = 0V, T_J = 150^\circ\text{C}$	--	--	100	
Gate-Source Leakage	I_{GSS}	$V_{GS} = \pm 20V$	--	--	± 100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.0	2.9	3.4	V
Drain-Source On-Resistance (Note3)	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 30A$		3.8	4.5	m Ω
Forward Transconductance (Note3)	g_{fs}	$V_{DS} = 5V, I_D = 20A$	40	--	--	S
Dynamic						
Input Capacitance	C_{iss}	$V_{GS} = 0V,$ $V_{DS} = 25V,$ $f = 1.0\text{MHz}$	--	4350	--	μF
Output Capacitance	C_{oss}		--	2150	--	
Reverse Transfer Capacitance	C_{rss}		--	220	--	
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	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	$T_C = 25^\circ\text{C}$	--	--	120	A
Pulsed Diode Forward Current	I_{SM}		--	--	500	
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. $I_{AS} = 60A, V_{DD} = 50V, R_G = 25\Omega, \text{Starting } T_J = 25^\circ\text{C}$
3. Pulse Test: Pulse Width $\leq 300\mu s, \text{Duty Cycle } \leq 1\%$



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

Figure 1. Output Characteristics

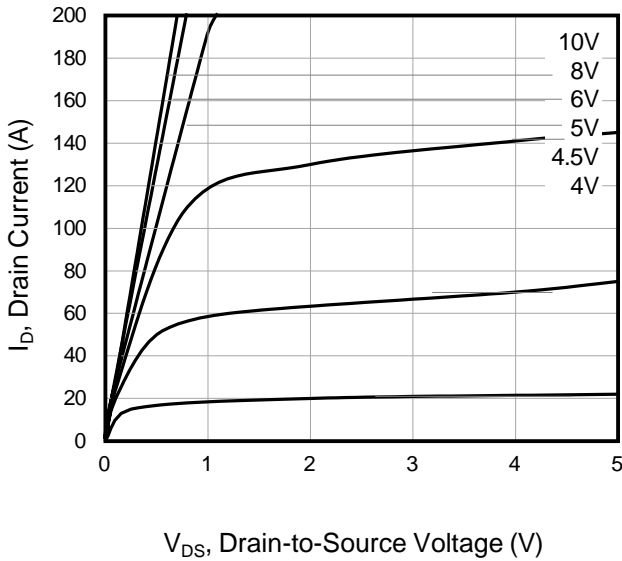


Figure 2. Transfer Characteristics

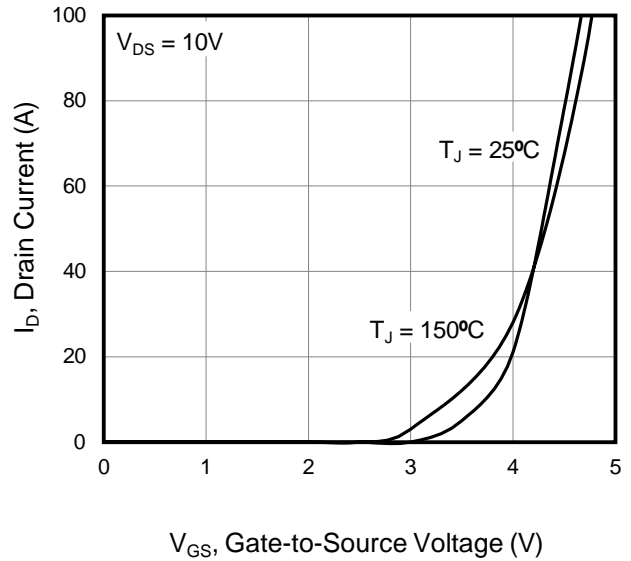


Figure 3. On-Resistance vs. Drain Current

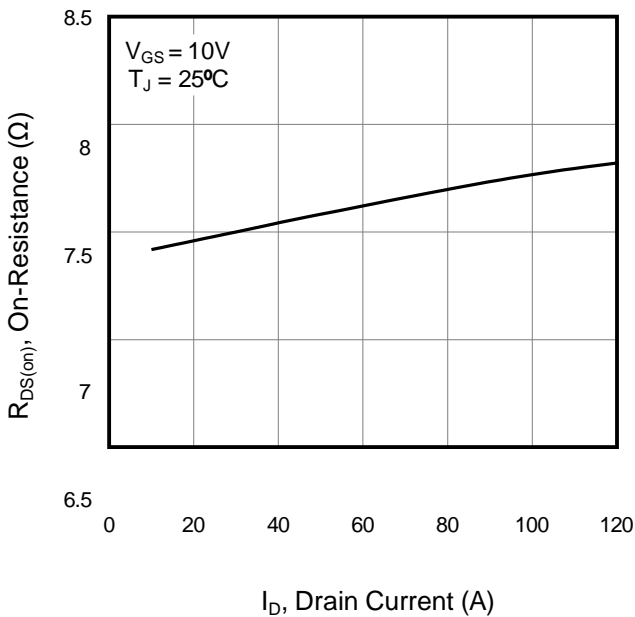


Figure 4. Capacitance

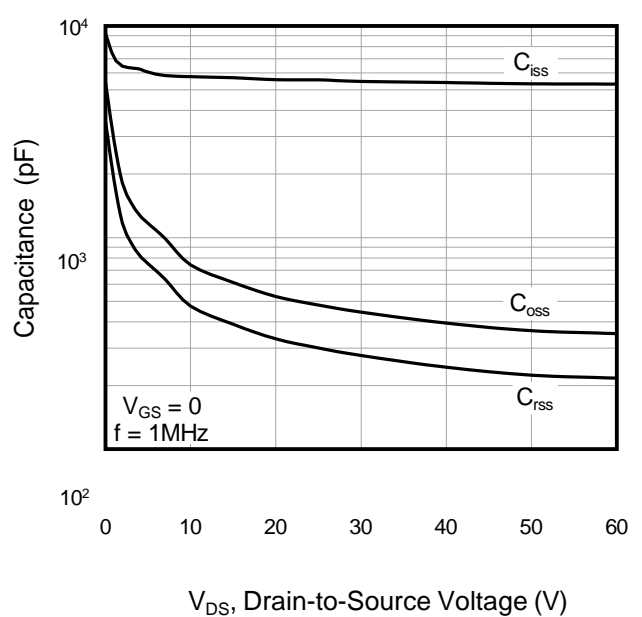


Figure 5. Gate Charge

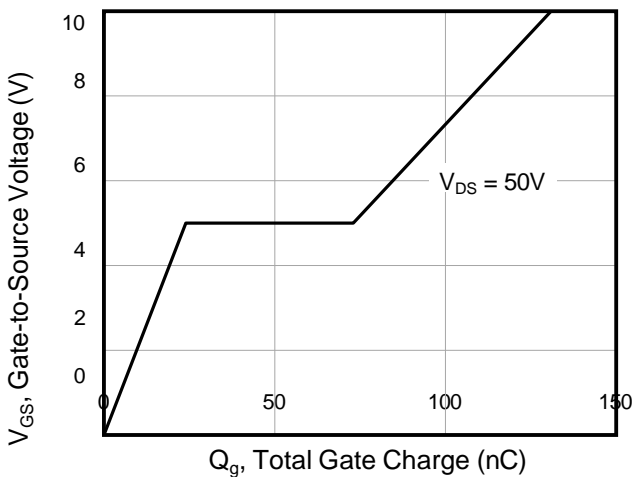
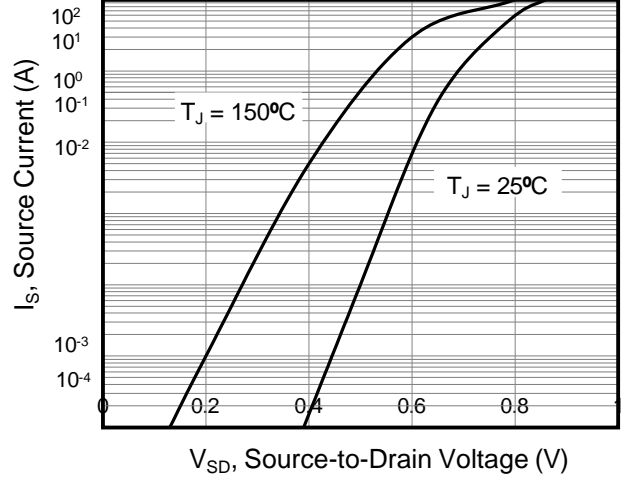


Figure 6. Body Diode Forward Voltage





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

Figure 7. On-Resistance vs. Temperature

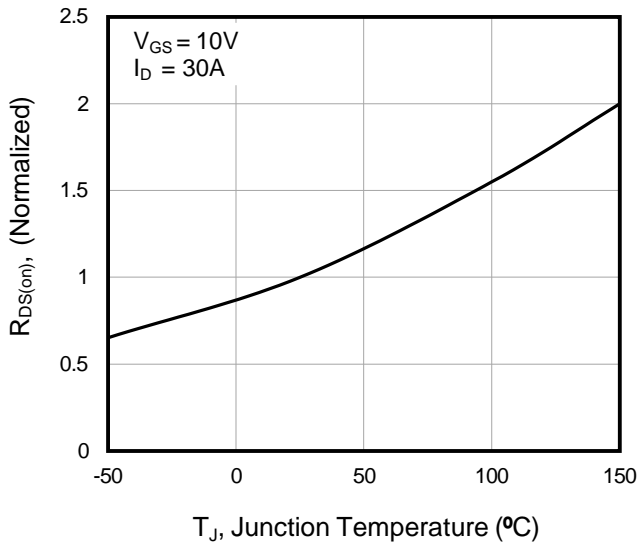


Figure 8. Threshold Voltage vs. Temperature

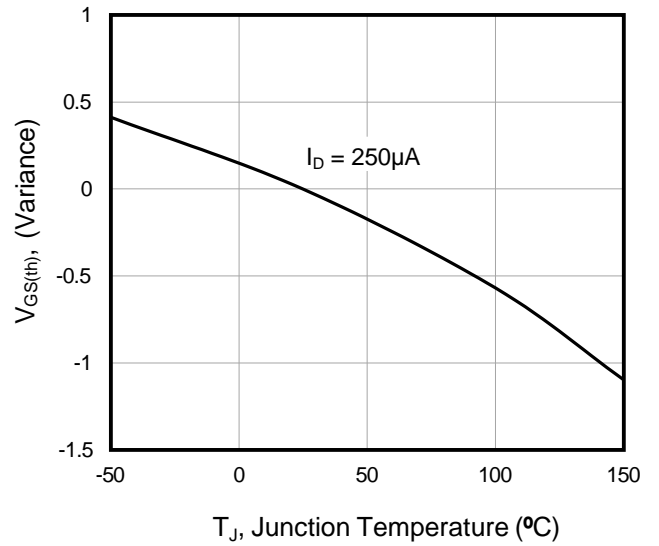


Figure 9. Transient Thermal Impedance

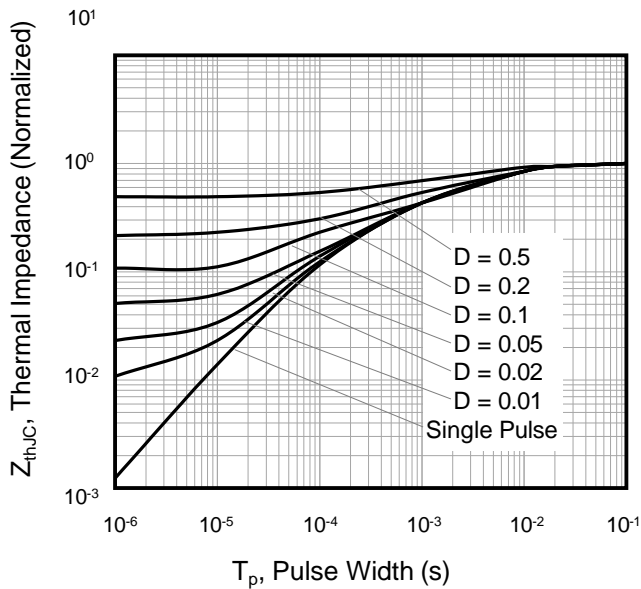




Figure A: Gate Charge Test Circuit and Waveform

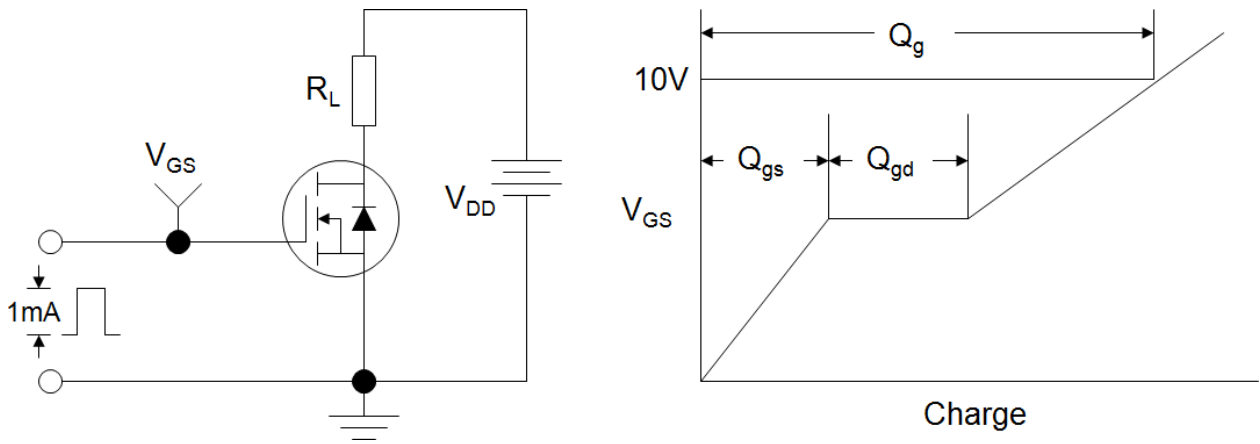


Figure B: Resistive Switching Test Circuit and Waveform

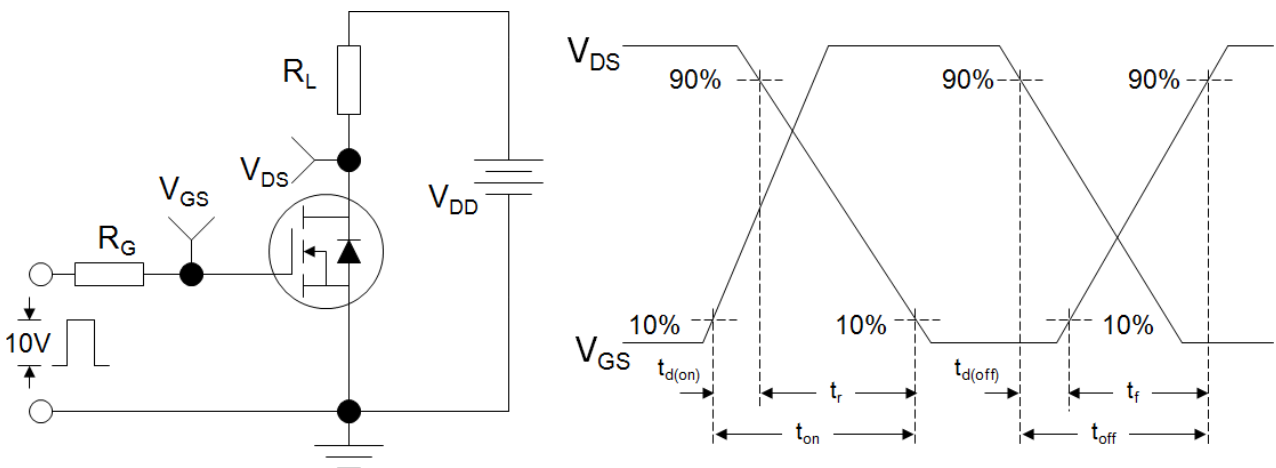
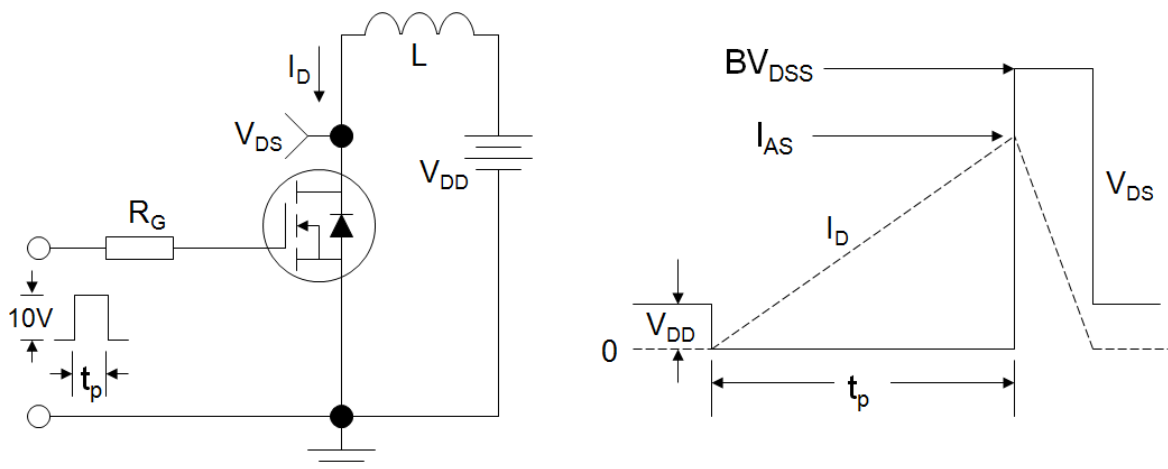
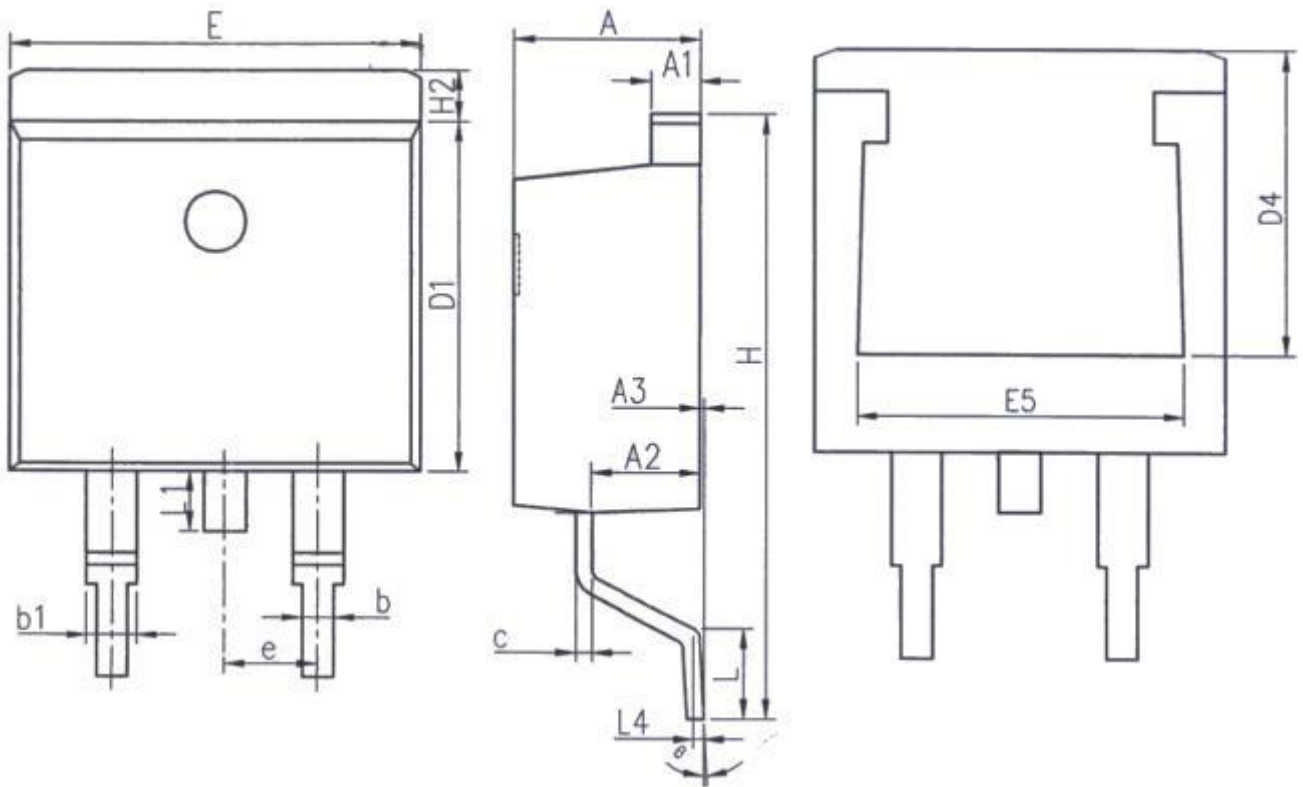


Figure C: Unclamped Inductive Switching Test Circuit and Waveform



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°