
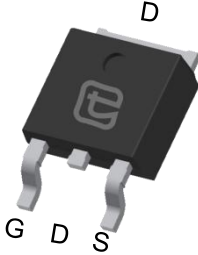
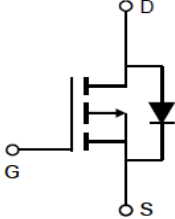


**30V P-Channel Trench MOSFET**

<b>Features</b> <ul style="list-style-type: none"> <li>● Trench Power Technology</li> <li>● Low <math>R_{DS(ON)}</math></li> <li>● Low Gate Charge</li> <li>● Optimized for Fast-switching Applications</li> </ul>		<b>Product Summary</b>	
<b>Applications</b> <ul style="list-style-type: none"> <li>● Synchronous Rectification in DC/DC and AC/DC Converters</li> <li>● Isolated DC/DC Converters in Telecom and Industrial</li> </ul>		$V_{DS}$ -30V $R_{DS(ON)}$ (at $V_{GS}=10V$ ) < 6.5m $\Omega$ $R_{DS(ON)}$ (at $V_{GS}=4.5V$ ) < 10m $\Omega$ $I_D$ (at $V_{GS}=10V$ ) -110A 100% UIS Tested	
			
 			
<b>Device</b>	<b>Package</b>	<b>Marking</b>	
TTD110P03AT	TO-252	110P03AT	

<b>Absolute Maximum Ratings</b> $T_C = 25^\circ\text{C}$ , unless otherwise noted			
Parameter	Symbol	Value	Unit
Drain-Source Voltage ( $V_{GS} = 0V$ )	$V_{DSS}$	-30	V
Continuous Drain Current	$I_D$	$T_C = 25^\circ\text{C}$	-110
		$T_C = 100^\circ\text{C}$	-77
Pulsed Drain Current (note1)	$I_{DM}$	-440	A
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Single Pulse Avalanche Energy (note2)	$E_{AS}$	135	mJ
Avalanche Current	$I_{AS}$	-30	A
Power Dissipation (note3)	$P_D$	$T_C = 25^\circ\text{C}$	83
		$T_C = 100^\circ\text{C}$	42
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55~+175	$^\circ\text{C}$

<b>Thermal Resistance</b>			
Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{thJC}$	1.8	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Ambient	$R_{thJA}$	60	



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	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-30	--	--	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -30V, V_{GS} = 0V, T_J = 25^\circ\text{C}$	--	--	-1	$\mu A$
		$V_{DS} = -30V, V_{GS} = 0V, T_J = 100^\circ\text{C}$	--	--	-25	
Gate-Source Leakage	$I_{GSS}$	$V_{GS} = \pm 20V$	--	--	$\pm 100$	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-1.0	-1.7	-2.4	V
Drain-Source On-Resistance (Note3)	$R_{DS(on)}$	$V_{GS} = -10V, I_D = -20A$	--	5.3	6.5	$m\Omega$
		$V_{GS} = -4.5V, I_D = -20A$	--	9	10	$m\Omega$
Forward Transconductance (Note3)	$g_{fs}$	$V_{DS} = -5V, I_D = -20A$	31	--	--	S
<b>Dynamic</b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0V,$ $V_{DS} = -15V,$ $f = 1.0\text{MHz}$	--	6182	--	$pF$
Output Capacitance	$C_{oss}$		--	571	--	
Reverse Transfer Capacitance	$C_{rss}$		--	555	--	
Total Gate Charge	$Q_g$	$V_{DD} = -15V, I_D = -20A,$ $V_{GS} = -10V$	--	100	--	$nC$
Gate-Source Charge	$Q_{gs}$		--	18	--	
Gate-Drain Charge	$Q_{gd}$		--	32	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = -15V, I_D = -20A,$ $R_G = 2.5\Omega$	--	212	--	$ns$
Turn-on Rise Time	$t_r$		--	290	--	
Turn-off Delay Time	$t_{d(off)}$		--	15	--	
Turn-off Fall Time	$t_f$		--	11	--	
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$	$T_C = 25^\circ\text{C}$	--	--	-110	A
Pulsed Diode Forward Current	$I_{SM}$		--	--	-440	
Body Diode Voltage	$V_{SD}$	$T_J = 25^\circ\text{C}, I_{SD} = -15A, V_{GS} = 0V$	--	--	-1.2	V
Reverse Recovery Time	$t_{rr}$	$I_F = -15A,$ $di_F/dt = 100A/\mu s$	--	34	--	ns
Reverse Recovery Charge	$Q_{rr}$		--	79	--	nC

**Notes**

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2.  $I_{AS} = -30A, L=0.3mH, V_{DD} = 30V, R_G = 25\Omega,$  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

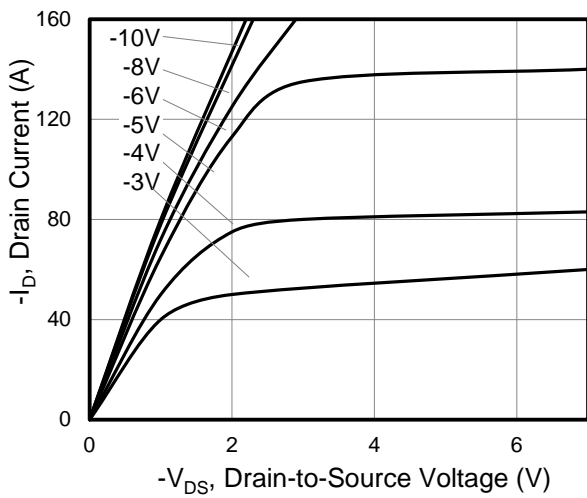


Figure 2. Transfer Characteristics

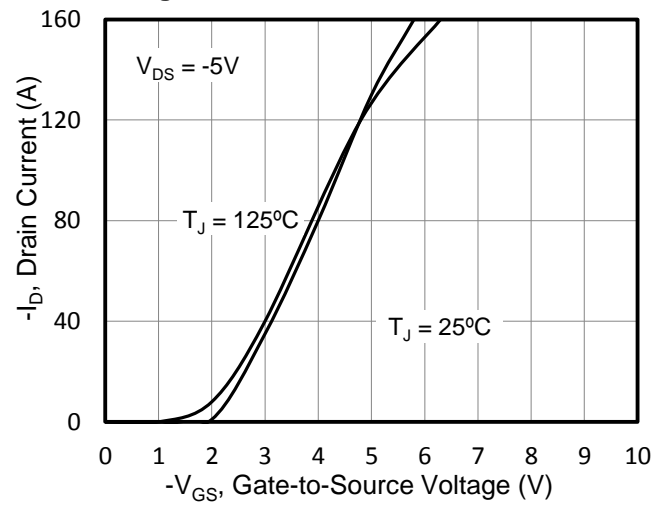


Figure 3. On-Resistance vs. Drain Current

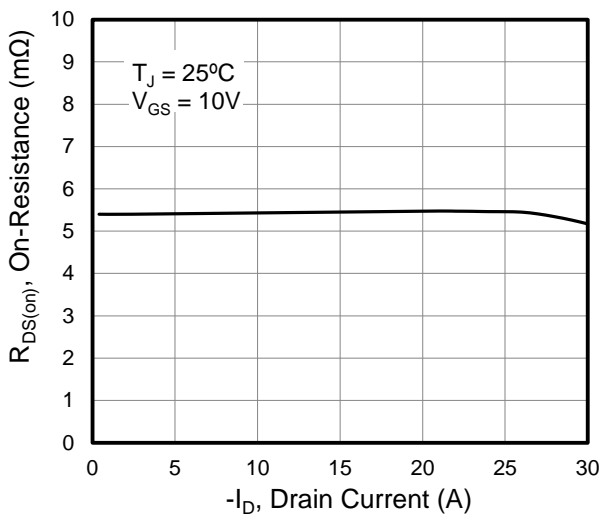


Figure 4. Capacitance

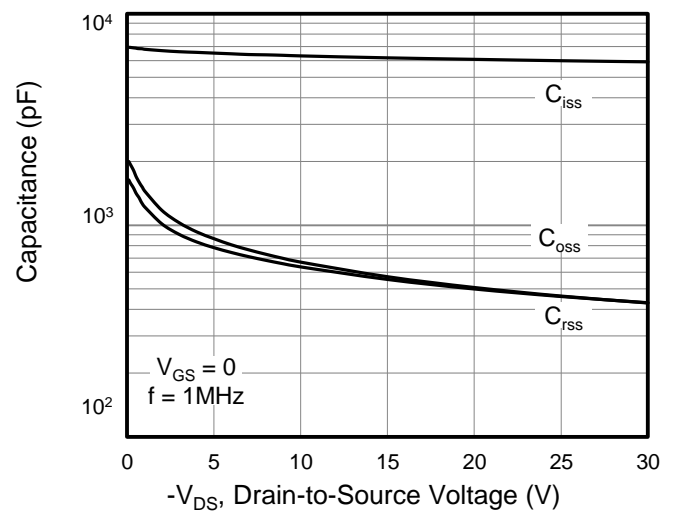


Figure 5. Gate Charge

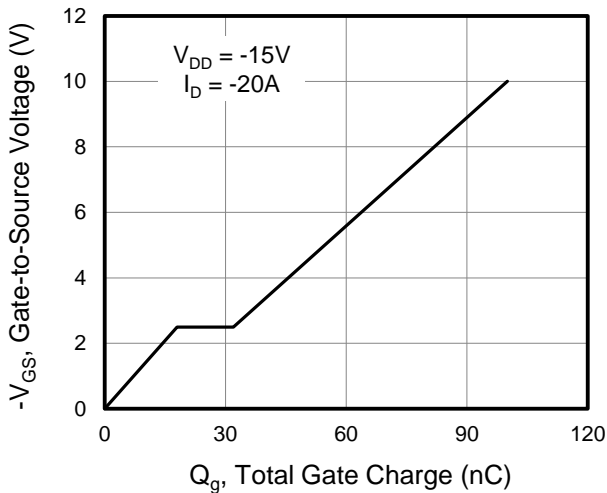
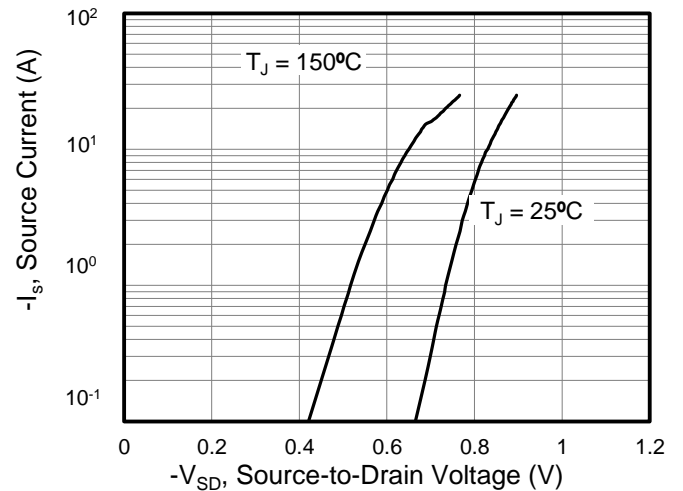


Figure 6. Body Diode Forward Voltage





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

Figure 7. On-Resistance vs. Junction Temperature

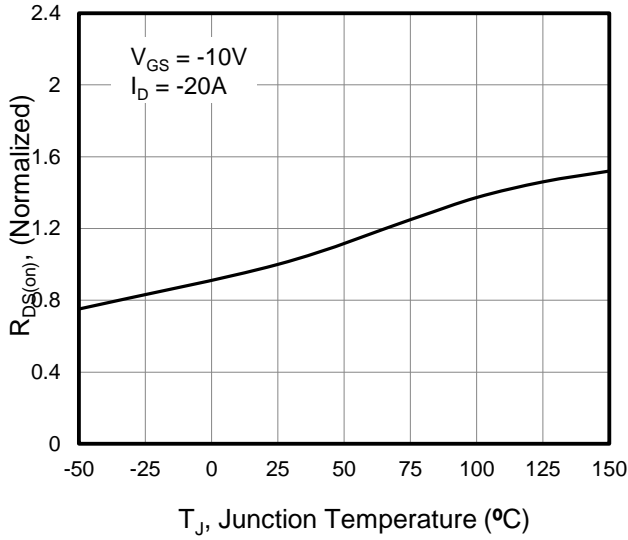


Figure 8. Threshold Voltage vs. Junction Temperature

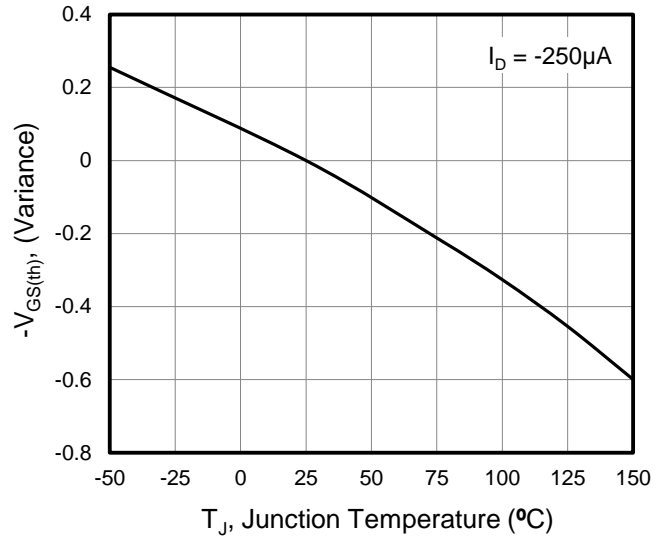


Figure 9. Transient Thermal Impedance

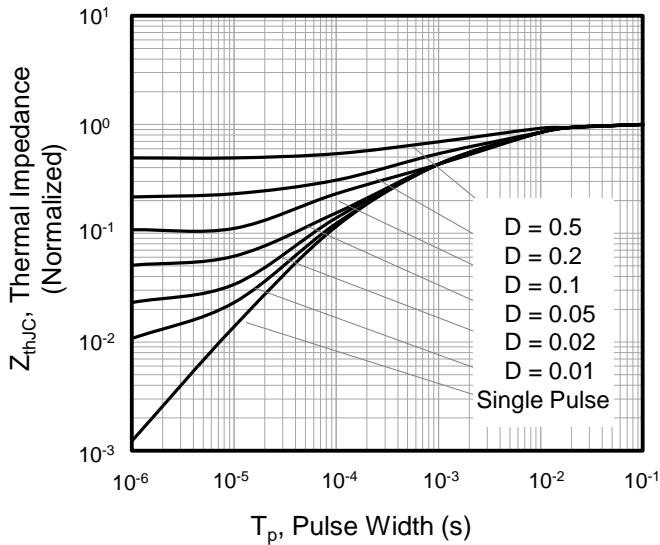


Figure 10. Safe operation area

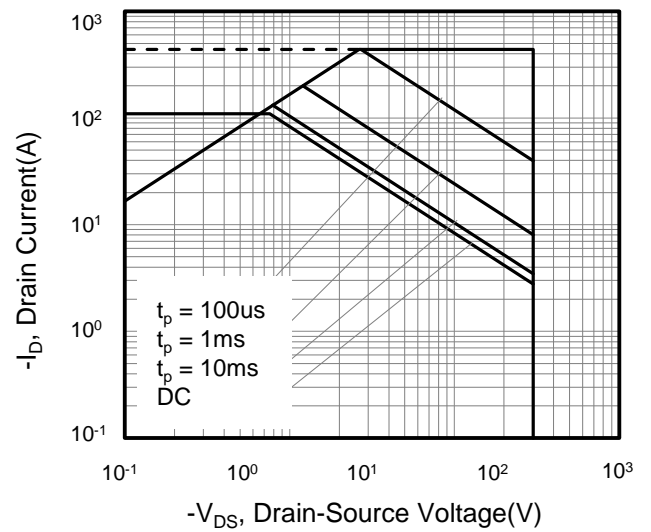




Figure A: Gate Charge Test Circuit and Waveform

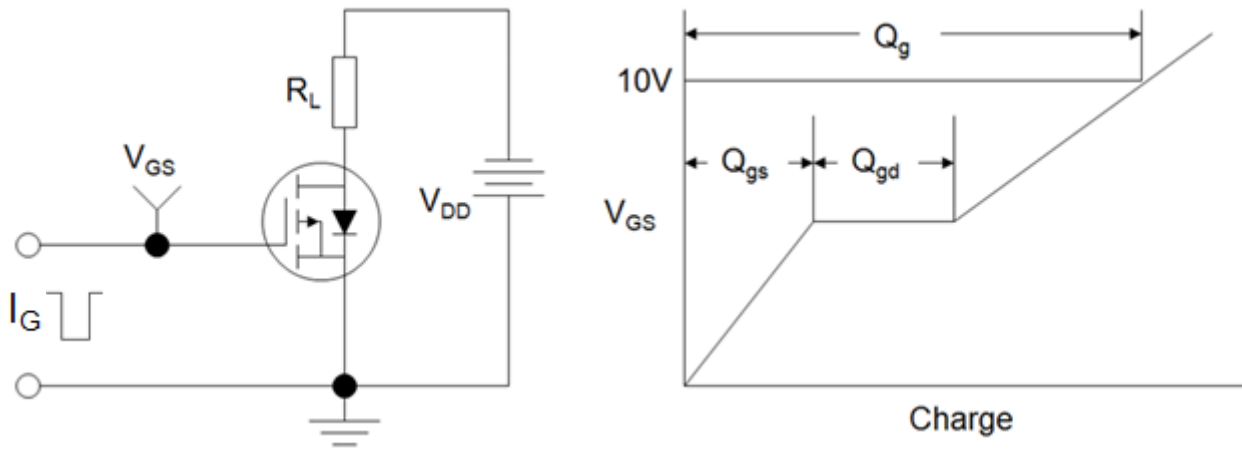


Figure B: Resistive Switching Test Circuit and Waveform

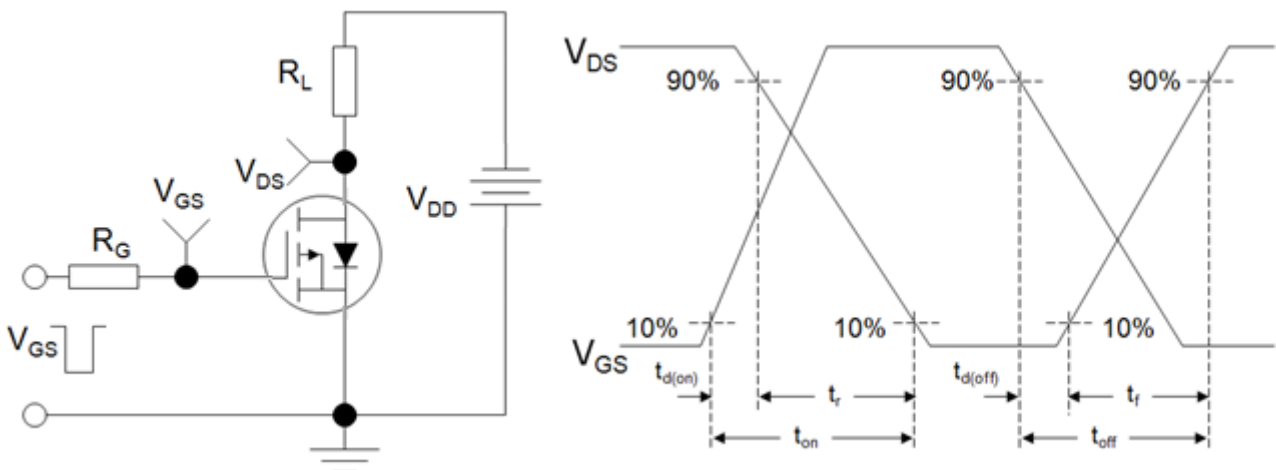
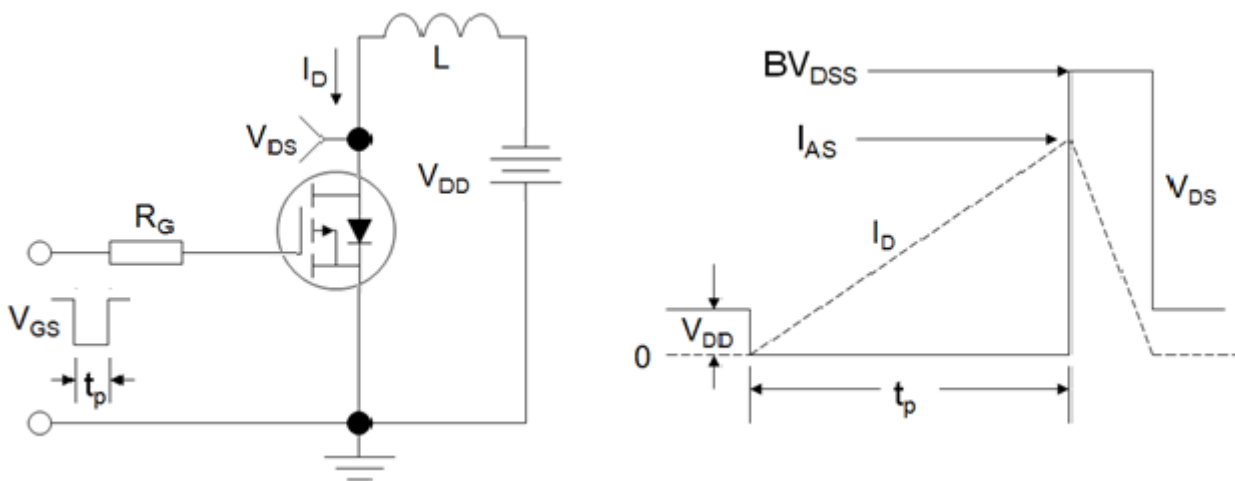
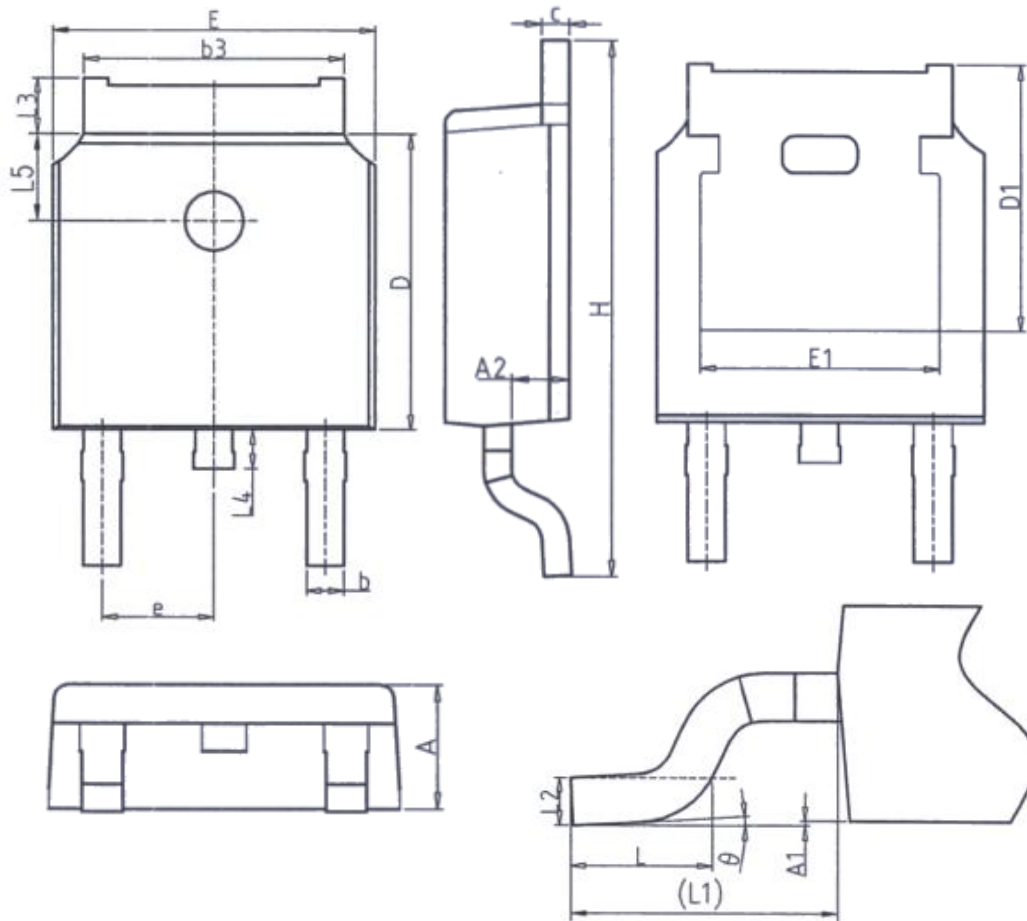


Figure C: Unclamped Inductive Switching Test Circuit and Waveform





### TO-252



Unit: mm		
Symbol	Min.	Max.
A	2.20	2.40
A1	0.00	0.20
A2	0.97	1.17
b	0.68	0.90
b3	5.20	5.50
c	0.43	0.63
D	5.98	6.22
D1	5.30REF	
E	6.40	6.80
E1	4.63	-

Unit: mm		
Symbol	Min.	Max.
e	2.286BSC	
H	9.40	10.50
L	1.38	1.75
L1	2.90REF	
L2	0.51BSC	
L3	0.88	1.28
L4	-	1.00
L5	1.65	1.95
$\theta$	0°	8°



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