
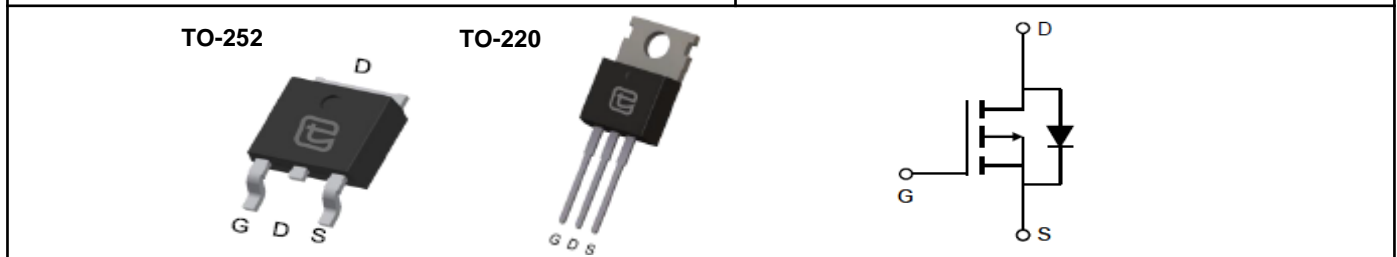




100V P-Channel Trench MOSFET(Preliminary)

<p>General Description</p> <ul style="list-style-type: none"> ● Trench Power technology ● Low $R_{DS(ON)}$ ● Low Gate Charge ● Optimized for fast-switching applications <p>Applications</p> <ul style="list-style-type: none"> ● Synchronous Rectification in DC/DC and AC/DC Converters ● Isolated DC/DC Converters in Telecom and Industrial 	<p>Product Summary</p> <table border="0"> <tr> <td>V_{DS}</td> <td>-100V</td> </tr> <tr> <td>I_D (at $V_{GS}=-10V$)</td> <td>-18A</td> </tr> <tr> <td>$R_{DS(ON)}$ (at $V_{GS}=-10V$)</td> <td>< 96mΩ</td> </tr> <tr> <td>$R_{DS(ON)}$ (at $V_{GS}=-4.5V$)</td> <td>< 108mΩ</td> </tr> </table> <p>100% UIS Tested</p> 	V_{DS}	-100V	I_D (at $V_{GS}=-10V$)	-18A	$R_{DS(ON)}$ (at $V_{GS}=-10V$)	< 96m Ω	$R_{DS(ON)}$ (at $V_{GS}=-4.5V$)	< 108m Ω
V_{DS}	-100V								
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Part Number	Package Type	Form	Marking
TTD18P10AT	TO-252	Tape&Reel	18P10AT
TTP18P10AT	TO-220	Tube	18P10AT

Absolute Maximum Ratings ($T_A = 25^\circ C$ unless otherwise noted)

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	- 100	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ^B	I_D	$T_C = 25^\circ C$	-18
		$T_C = 100^\circ C$	-12.6
Pulsed Drain Current ^A	I_{DM}	-54	A
Avalanche Current ^A	I_{AS}	-20	A
Single Pulse Avalanche Energy $L = 0.3mH$ ^A	E_{AS}	60	mJ
Power Dissipation ^C	P_D	$T_C = 25^\circ C$	113
		$T_C = 100^\circ C$	56.8
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 175	$^\circ C$

Thermal Characteristics

Parameter	Symbol	Maximum	Units
Maximum Junction-to-Case	$R_{\theta JC}$	1.32	$^\circ C/W$
Maximum Junction-to-Ambient			
	$R_{\theta JA}$	100	



Electrical Characteristics($T_J = 25^\circ\text{C}$ unless otherwise noted)						
Symbol	Parameter	Conditions	Value			Units
			Min	Typ	Max	
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	$I_D = -250\mu\text{A}, V_{GS} = 0\text{V}$	-100			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = -100\text{V}, V_{GS} = 0\text{V}$	$T_J = 25^\circ\text{C}$		-1	μA
			$T_J = 100^\circ\text{C}$		-100	
I_{GSS}	Gate-Body Leakage Current	$V_{DS} = 0\text{V}, V_{GS} = \pm 20\text{V}$			± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$	-1	-1.7	-2.4	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = -10\text{V}, I_D = -9\text{A}$		80	96	$\text{m}\Omega$
		$V_{GS} = -4.5\text{V}, I_D = -9\text{A}$		90	108	$\text{m}\Omega$
g_{FS}	Forward Transconductance	$V_{DS} = -5\text{V}, I_D = -9\text{A}$		4.7		S
V_{SD}	Diode Forward Voltage	$I_S = -10\text{A}, V_{GS} = 0\text{V}$			-1	V
I_S	Maximum Body-Diode Continuous Current ^B				-18	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	$V_{GS} = 0\text{V}, V_{DS} = -50\text{V}, f = 1\text{MHz}$		1358		pF
C_{oss}	Output Capacitance			233		
C_{rss}	Reverse Transfer Capacitance			176		
SWITCHING PARAMETERS						
$Q_g(10\text{V})$	Total Gate Charge	$V_{GS} = -10\text{V}, V_{DS} = -50\text{V}, I_D = -18\text{A}$		70		nC
Q_{gs}	Gate Source Charge			13		
Q_{gd}	Gate Drain Charge			16		
$t_{D(on)}$	Turn-On Delay Time	$V_{GS} = -10\text{V}, V_{DS} = -50\text{V}, I_D = -18\text{A}, R_G = 2.5\Omega$		16		ns
t_r	Turn-On Rise Time			73		
$T_{D(off)}$	Turn-Off Delay Time			34		
t_f	Turn-Off Fall Time			57		
t_{rr}	Body Diode Reverse Recovery Time	$I_F = -18\text{A}, di/dt = 100\text{A}/\mu\text{s}$		89		ns
Q_{rr}	Body Diode Reverse Recovery Charge			66		nC

A. Single pulse width limited by maximum junction temperature.

B. The maximum current rating is package limited.

C. The power dissipation P_D is based on $T_{J(MAX)} = 175^\circ\text{C}$, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.



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

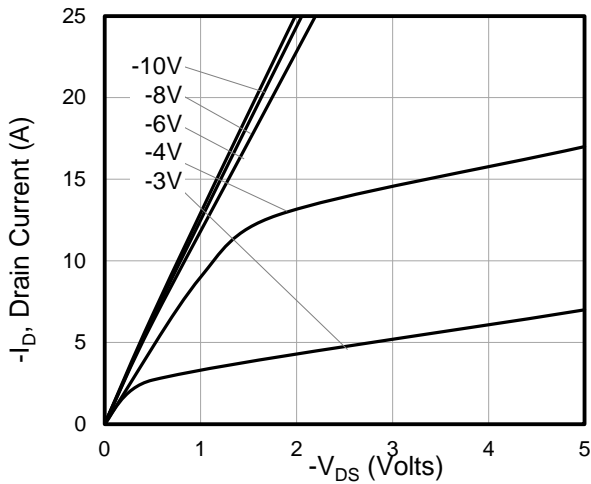


Figure 1: On-Region Characteristics

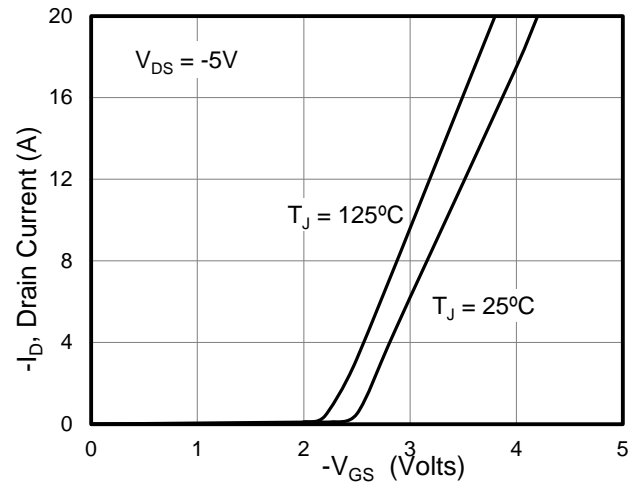


Figure 2: Transfer Characteristics

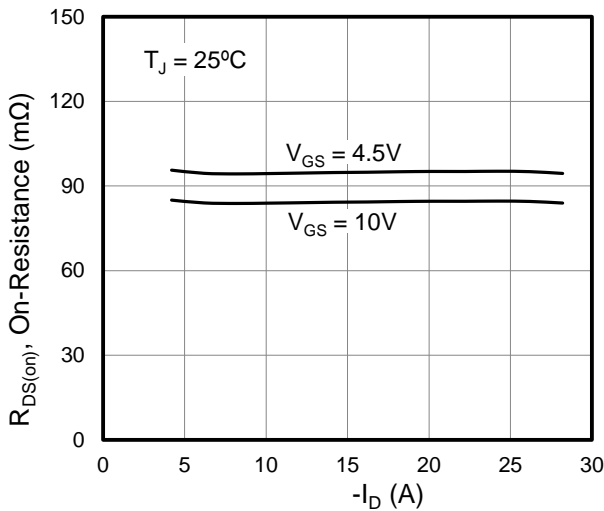


Figure 3: On-Resistance vs. Drain Current

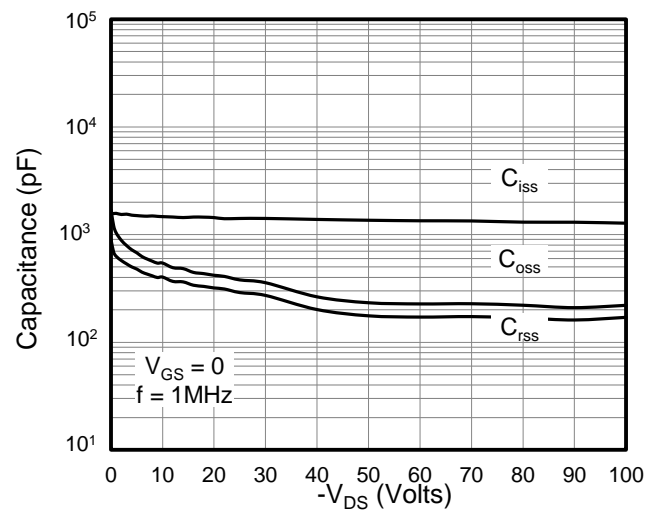


Figure 4: Capacitance Characteristics

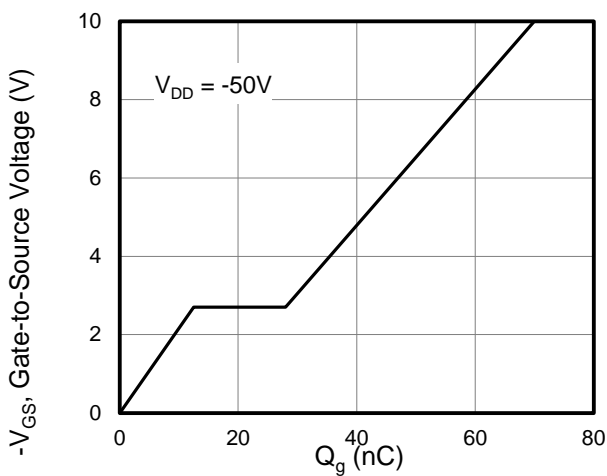


Figure 5: Gate Charge Characteristics

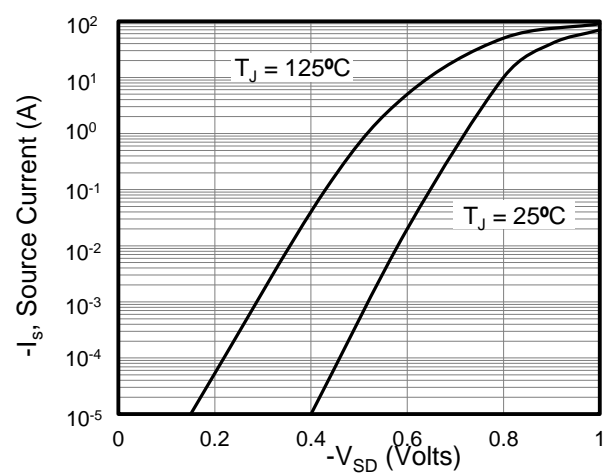


Figure 6: Body Diode Forward Voltage



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

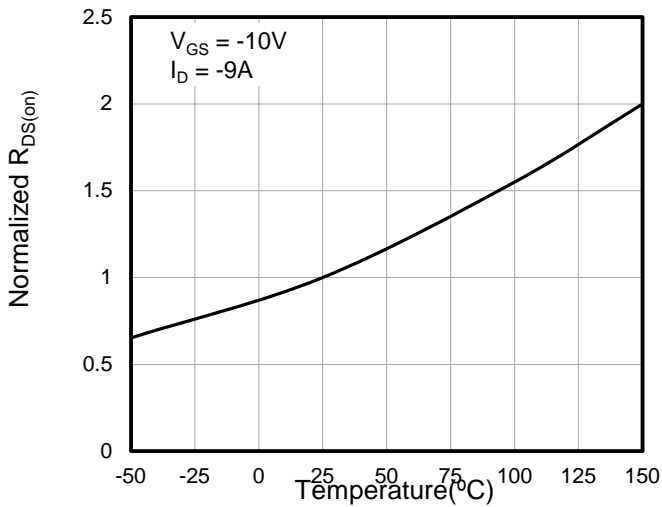


Figure 7: On-Resistance vs. Junction Temperature

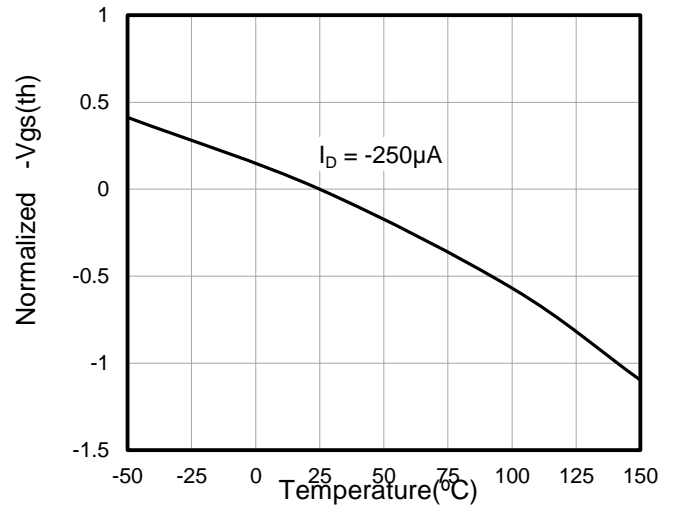


Figure 8: $V_{GS(th)}$ vs. Junction Temperature

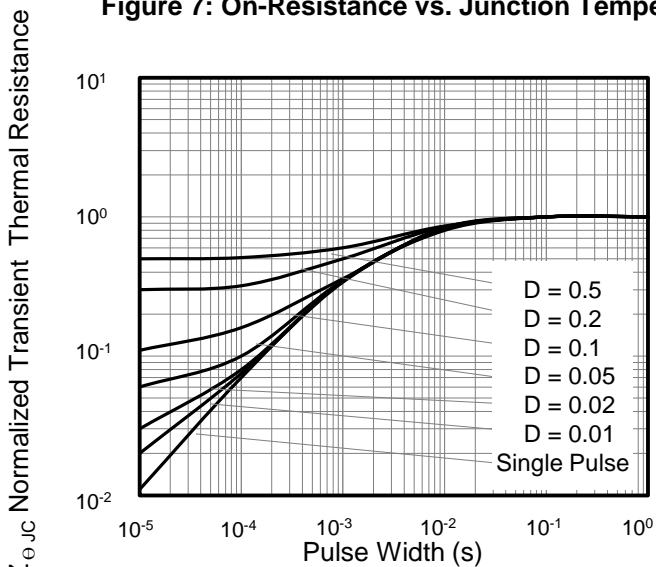


Figure 11: Normalized Transient Thermal Resistance

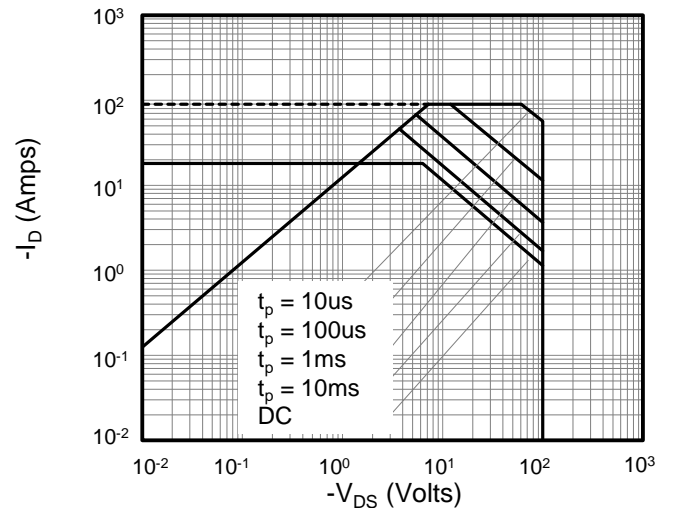


Figure 12: Safe Operating Area



Figure A: Gate Charge Test Circuit and Waveform

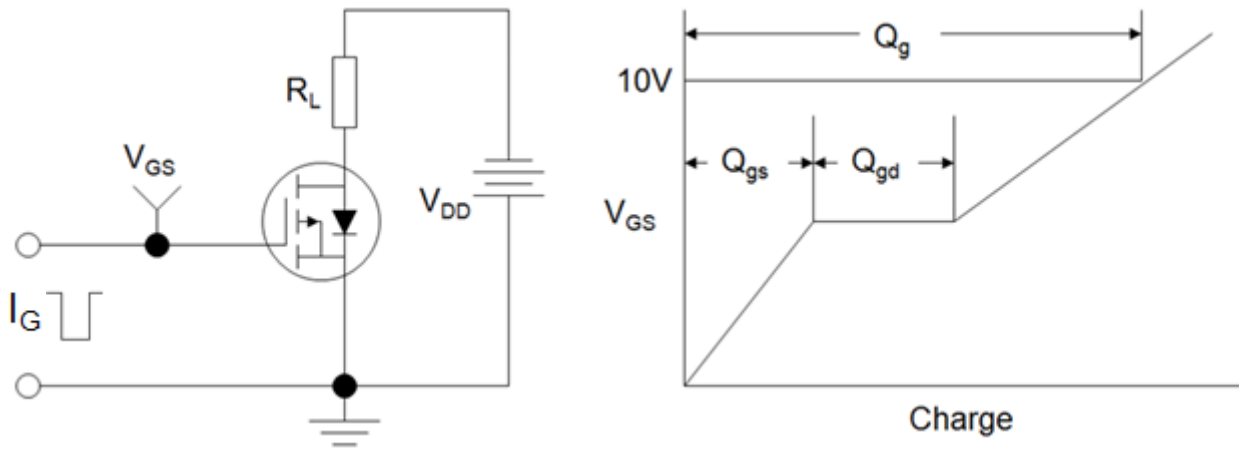


Figure B: Resistive Switching Test Circuit and Waveform

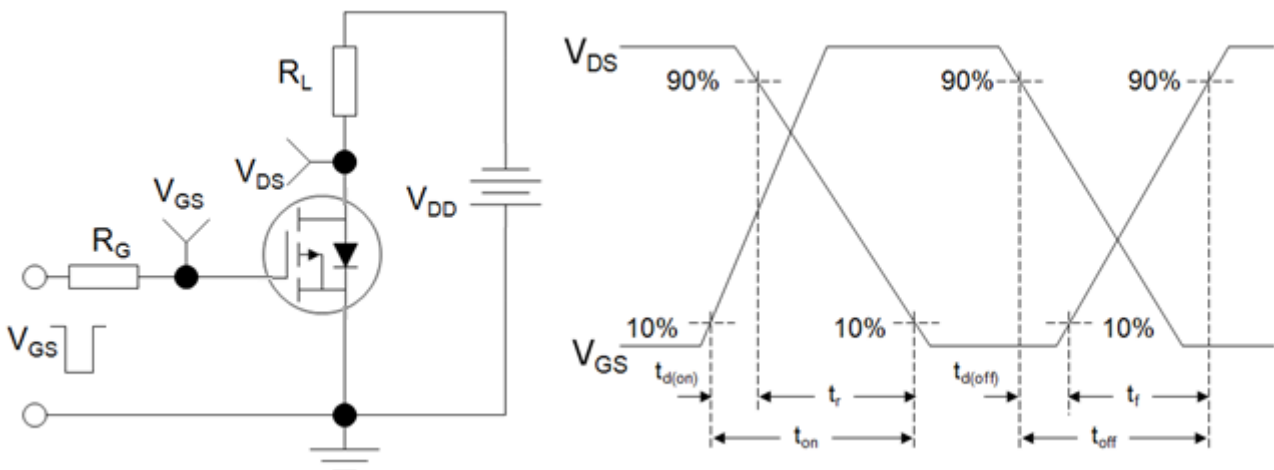
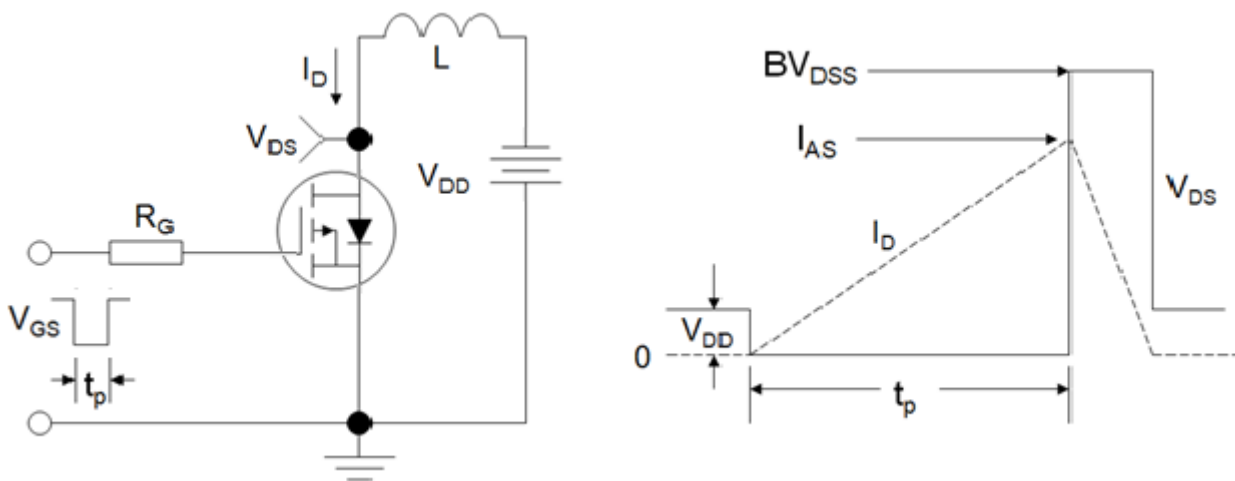
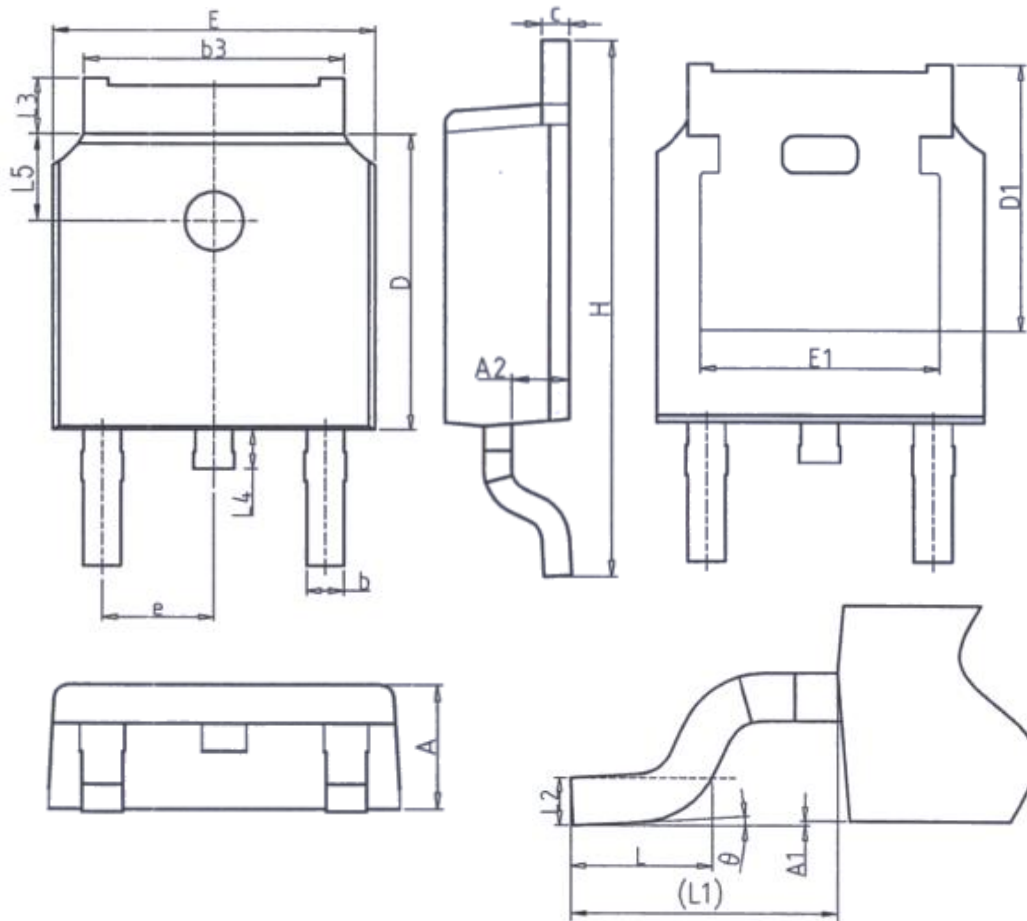


Figure C: Unclamped Inductive Switching Test Circuit and Waveform





TO-252(H)

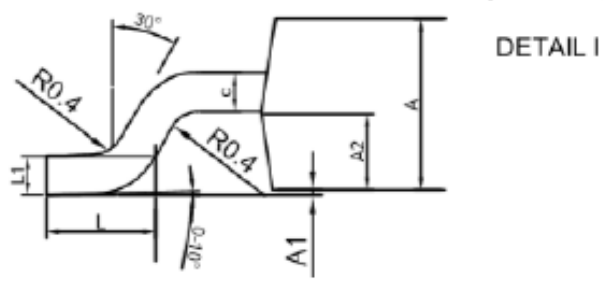
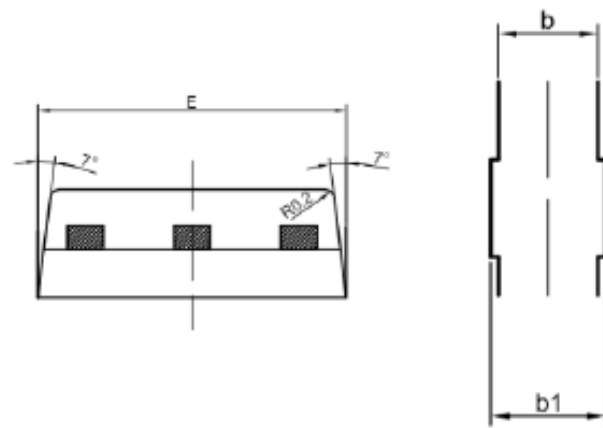
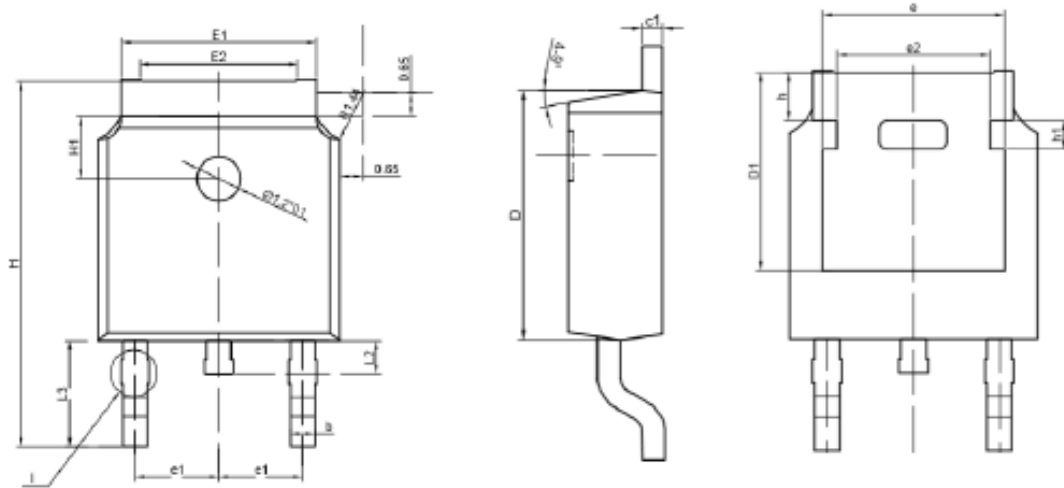


Unit: mm		
Symbol	Min.	Max.
A	2.20	2.40
A1	0.00	0.20
A2	0.97	1.17
b	0.68	0.90
b3	5.20	5.50
c	0.43	0.63
D	5.98	6.22
D1	5.30REF	
E	6.40	6.80
E1	4.63	-

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
θ	0°	8°



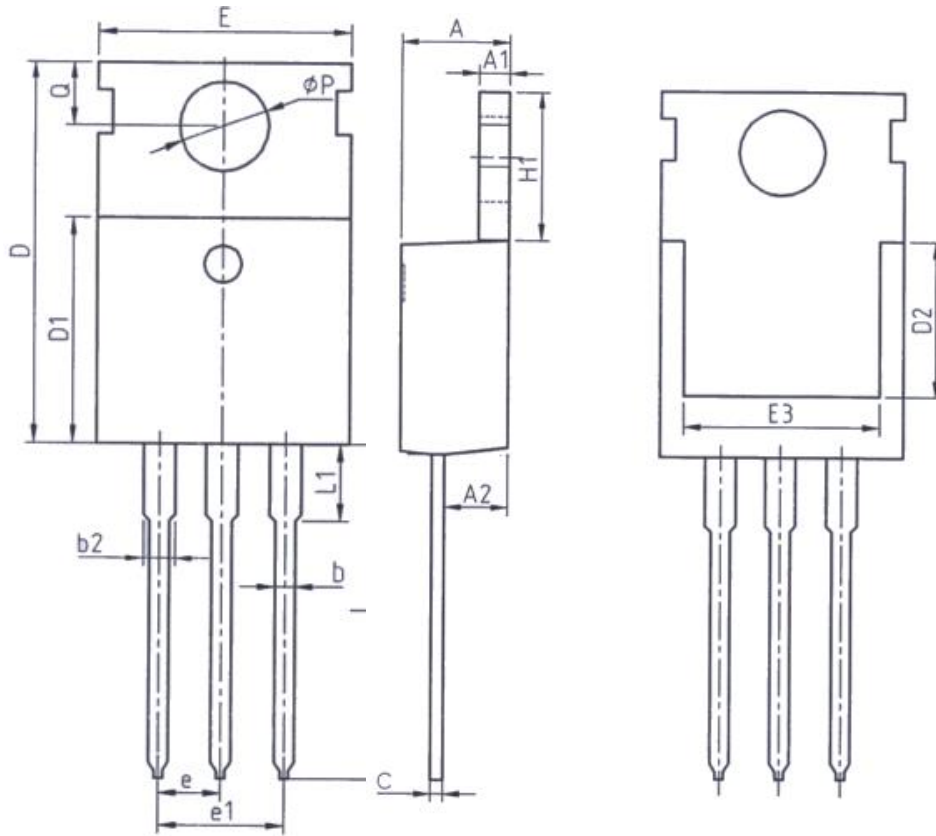
TO-252(Q)



SYMBOL	MIN	NOM	MAX
A	2.29	2.30	2.31
A1	0.00	0.07	0.15
A2	1.020	1.025	1.030
b	0.645	0.670	0.695
b1	0.67	0.77	0.87
c	0.523	0.528	0.533
c1	0.498	0.508	0.518
D	6.09	6.10	6.11
D1	5.244	5.249	5.254
E	6.50	6.60	6.70
E1	5.284	5.334	5.384
E2	4.284	4.334	4.312
e	4.821	4.826	4.831
e1	2.281	2.266	2.291
e2	4.059	4.064	4.069
H	9.8	10.0	10.2
H1	1.5	1.6	1.7
h	1.316	1.321	1.326
h1	0.757	0.762	0.767
L	1.4	1.5	1.6
L1	0.50	0.51	0.52
L2	0.8	0.9	1.0
L3	2.88	2.888	2.893



TO-220(H)



Unit: mm		
Symbol	Min.	Max.
A	4.37	4.77
A1	1.25	1.45
A2	2.20	2.60
b	0.70	0.95
b2	1.17	1.47
c	0.40	0.65
D	15.10	16.10
D1	8.80	9.40
D2	5.50	-

Unit: mm		
Symbol	Min.	Max.
E	9.70	10.30
E3	7.00	-
e	2.54BSC	
e1	5.08BSC	
H1	6.25	6.85
L	12.75	13.80
L1	-	3.40
P	3.40	3.80
Q	2.60	3.00



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