
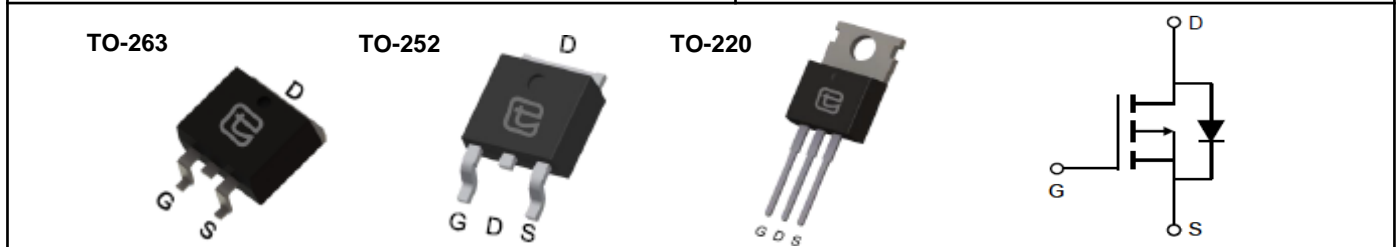




# 100V P-Channel Trench MOSFET(Preliminary)

<p><b>General Description</b></p> <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> <p><b>Applications</b></p> <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>	<p><b>Product Summary</b></p> <table border="0"> <tr> <td><math>V_{DS}</math></td> <td>-100V</td> </tr> <tr> <td><math>I_D</math> (at <math>V_{GS}=-10V</math>)</td> <td>-30A</td> </tr> <tr> <td><math>R_{DS(ON)}</math> (at <math>V_{GS}=-10V</math>)</td> <td>&lt; 46mΩ</td> </tr> <tr> <td><math>R_{DS(ON)}</math> (at <math>V_{GS}=-4.5V</math>)</td> <td>&lt; 50mΩ</td> </tr> </table> <p>100% UIS Tested</p> 	$V_{DS}$	-100V	$I_D$ (at $V_{GS}=-10V$ )	-30A	$R_{DS(ON)}$ (at $V_{GS}=-10V$ )	< 46mΩ	$R_{DS(ON)}$ (at $V_{GS}=-4.5V$ )	< 50mΩ
$V_{DS}$	-100V								
$I_D$ (at $V_{GS}=-10V$ )	-30A								
$R_{DS(ON)}$ (at $V_{GS}=-10V$ )	< 46mΩ								
$R_{DS(ON)}$ (at $V_{GS}=-4.5V$ )	< 50mΩ								



Part Number	Package Type	Form	Marking
TTB30P10AT	TO-263	Tape&Reel	30P10AT
TTD30P10AT	TO-252	Tape&Reel	30P10AT
TTP30P10AT	TO-220	Tube	30P10AT

**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	$V_{GS}$	$\pm 20$	V
Continuous Drain Current <sup>B</sup>	$I_D$	$T_C = 25^\circ C$	-30
		$T_C = 100^\circ C$	-21
Pulsed Drain Current <sup>A</sup>	$I_{DM}$	-90	A
Avalanche Current <sup>A</sup>	$I_{AS}$	-30	A
Single Pulse Avalanche Energy L = 0.3mH <sup>A</sup>	$E_{AS}$	135	mJ
Power Dissipation <sup>C</sup>	$P_D$	$T_C = 25^\circ C$	136
		$T_C = 100^\circ C$	68.2
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to 175	$^\circ C$

**Thermal Characteristics**

Parameter	Symbol	Maximum	Units
Maximum Junction-to-Case	$R_{\theta JC}$	1.1	$^\circ C/W$
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	
<b>STATIC PARAMETERS</b>						
$BV_{DSS}$	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	$\mu\text{A}$
			$T_J = 100^\circ\text{C}$		-100	
$I_{GSS}$	Gate-Body Leakage Current	$V_{DS} = 0\text{V}, V_{GS} = \pm 20\text{V}$			$\pm 100$	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	$V_{GS} = -10\text{V}, I_D = -15\text{A}$		35	46	$\text{m}\Omega$
		$V_{GS} = -4.5\text{V}, I_D = -15\text{A}$		38	50	$\text{m}\Omega$
$g_{FS}$	Forward Transconductance	$V_{DS} = -50\text{V}, I_D = -10\text{A}$		11		S
$V_{SD}$	Diode Forward Voltage	$I_S = -15\text{A}, V_{GS} = 0\text{V}$			-1	V
$I_S$	Maximum Body-Diode Continuous Current <sup>B</sup>				-30	A
<b>DYNAMIC PARAMETERS</b>						
$C_{iss}$	Input Capacitance	$V_{GS} = 0\text{V}, V_{DS} = -50\text{V}, f = 1\text{MHz}$		2513		$\text{pF}$
$C_{oss}$	Output Capacitance			625		
$C_{rss}$	Reverse Transfer Capacitance			376		
<b>SWITCHING PARAMETERS</b>						
$Q_g(10\text{V})$	Total Gate Charge	$V_{GS} = -10\text{V}, V_{DS} = -50\text{V}, I_D = -15\text{A}$		140		nC
$Q_{gs}$	Gate Source Charge			23		
$Q_{gd}$	Gate Drain Charge			27		
$t_{D(on)}$	Turn-On Delay Time	$V_{GS} = -10\text{V}, V_{DS} = -50\text{V}, I_D = -15\text{A}, R_G = 2.5\Omega$		20		ns
$t_r$	Turn-On Rise Time			80		
$T_{D(off)}$	Turn-Off Delay Time			50		
$t_f$	Turn-Off Fall Time			70		
$t_{rr}$	Body Diode Reverse Recovery Time	$I_F = -15\text{A}, di/dt = 100\text{A}/\mu\text{s}$		90		ns
$Q_{rr}$	Body Diode Reverse Recovery Charge			70		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

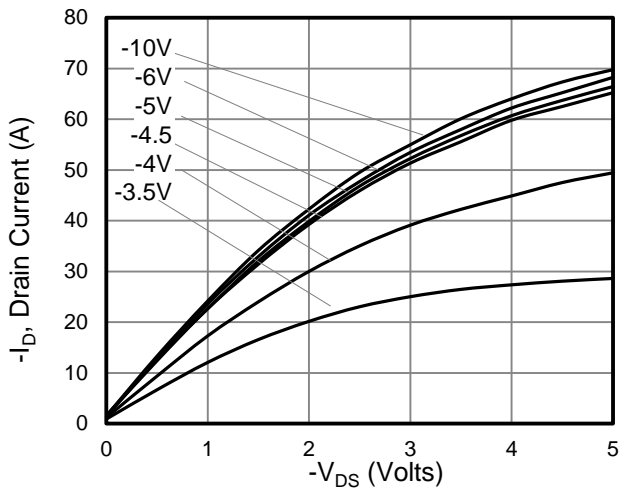


Figure 1: On-Region Characteristics

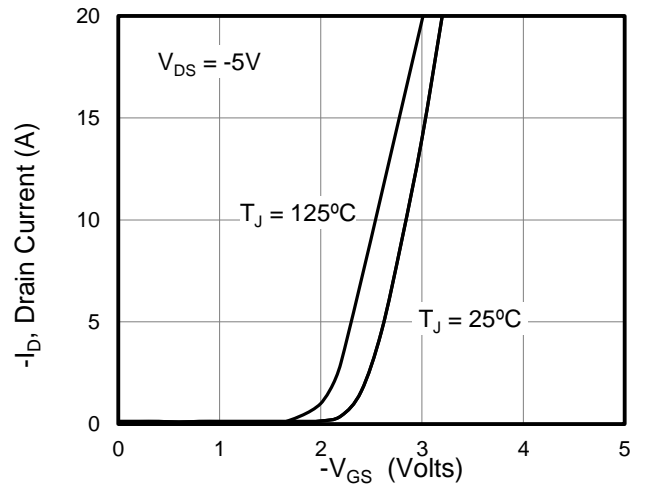


Figure 2: Transfer Characteristics

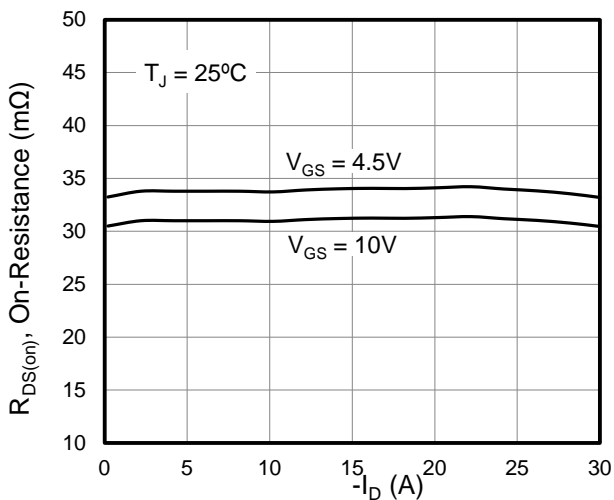


Figure 3: On-Resistance vs. Drain Current

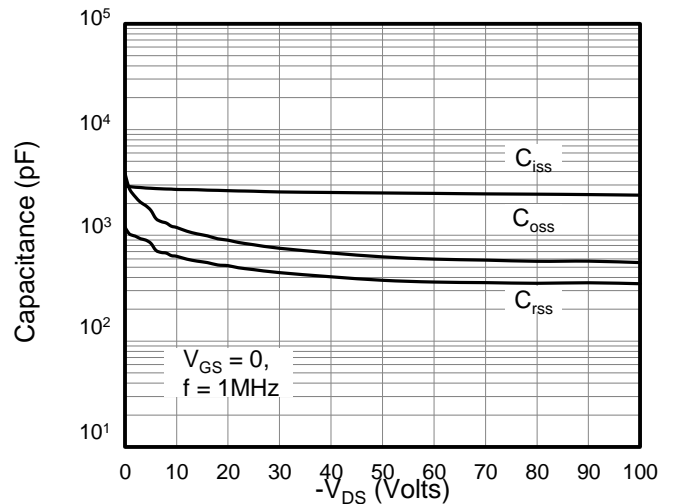


Figure 4: Capacitance Characteristics

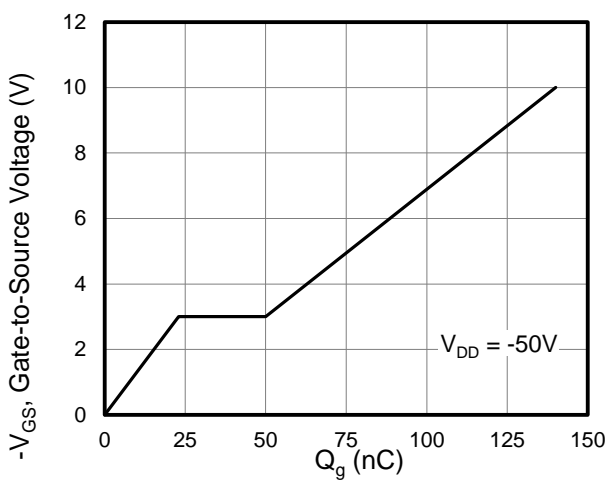


Figure 5: Gate Charge Characteristics

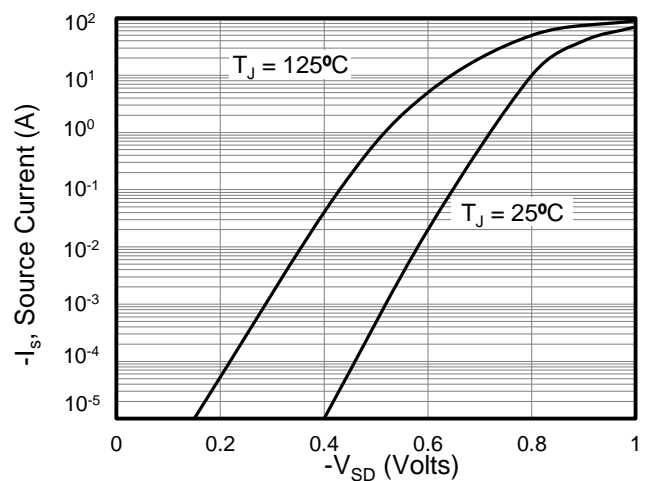


Figure 6: Body Diode Forward Voltage



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

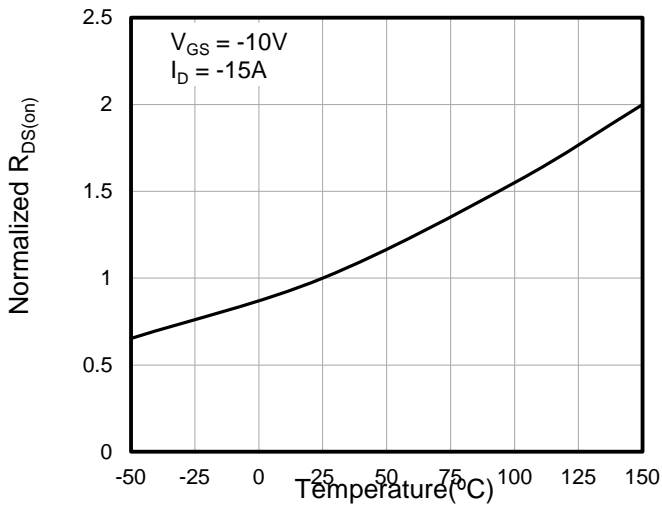


Figure 7: On-Resistance vs. Junction Temperature

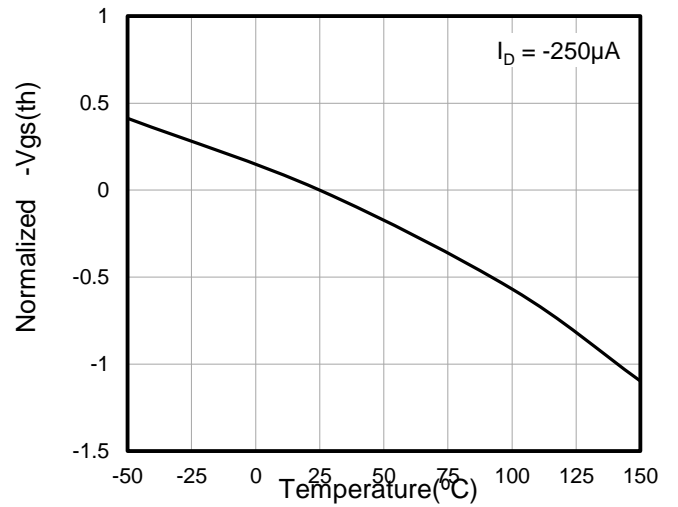


Figure 8:  $V_{GS(th)}$  vs. Junction Temperature

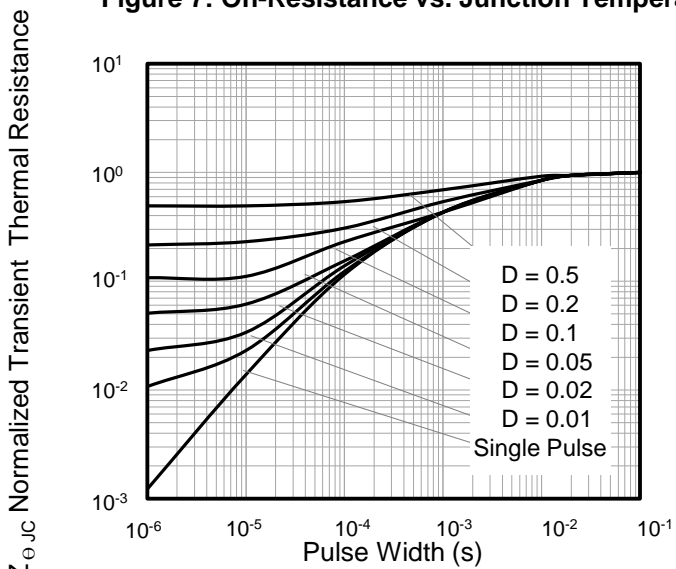


Figure 11: Normalized Transient Thermal Resistance

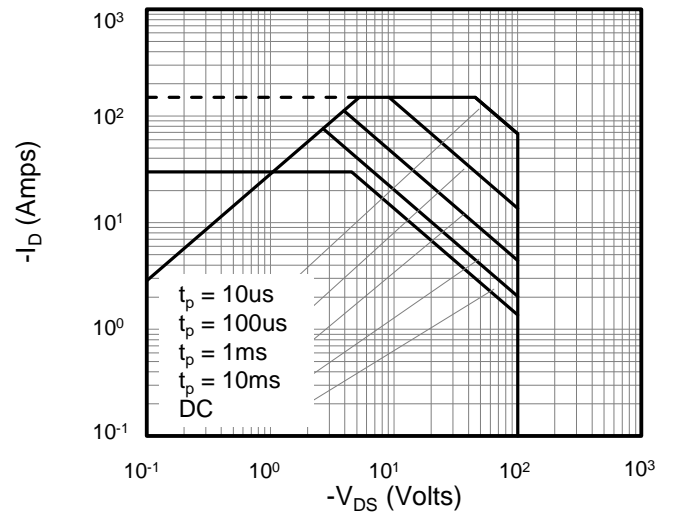


Figure 12: Safe Operating Area



Figure A: Gate Charge Test Circuit and Waveform

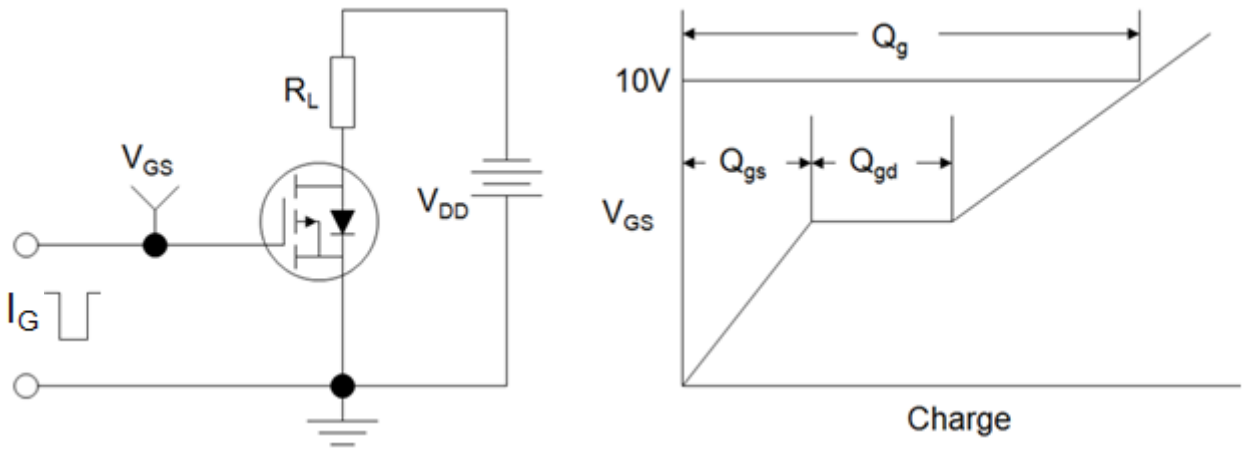


Figure B: Resistive Switching Test Circuit and Waveform

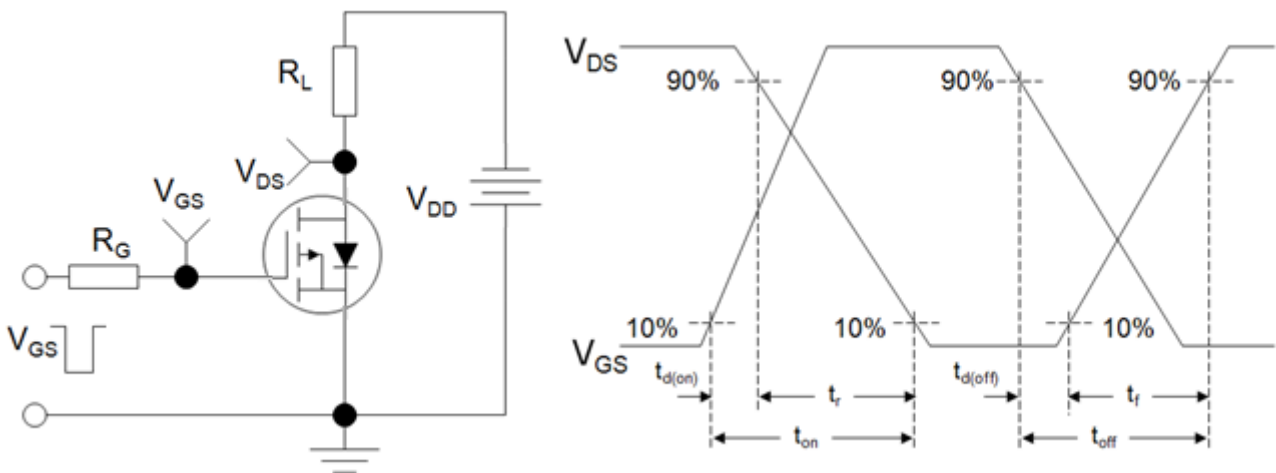
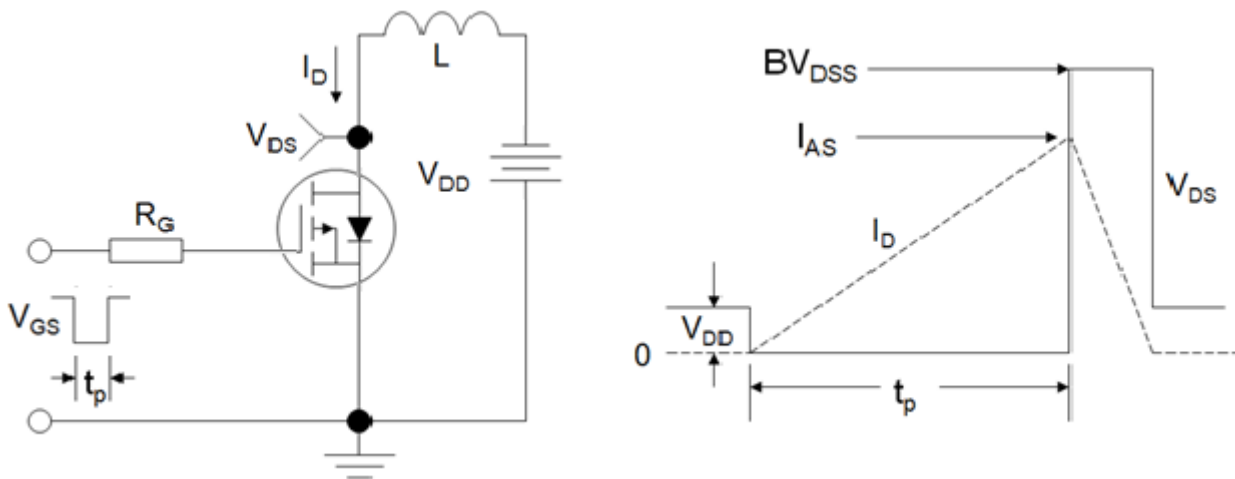
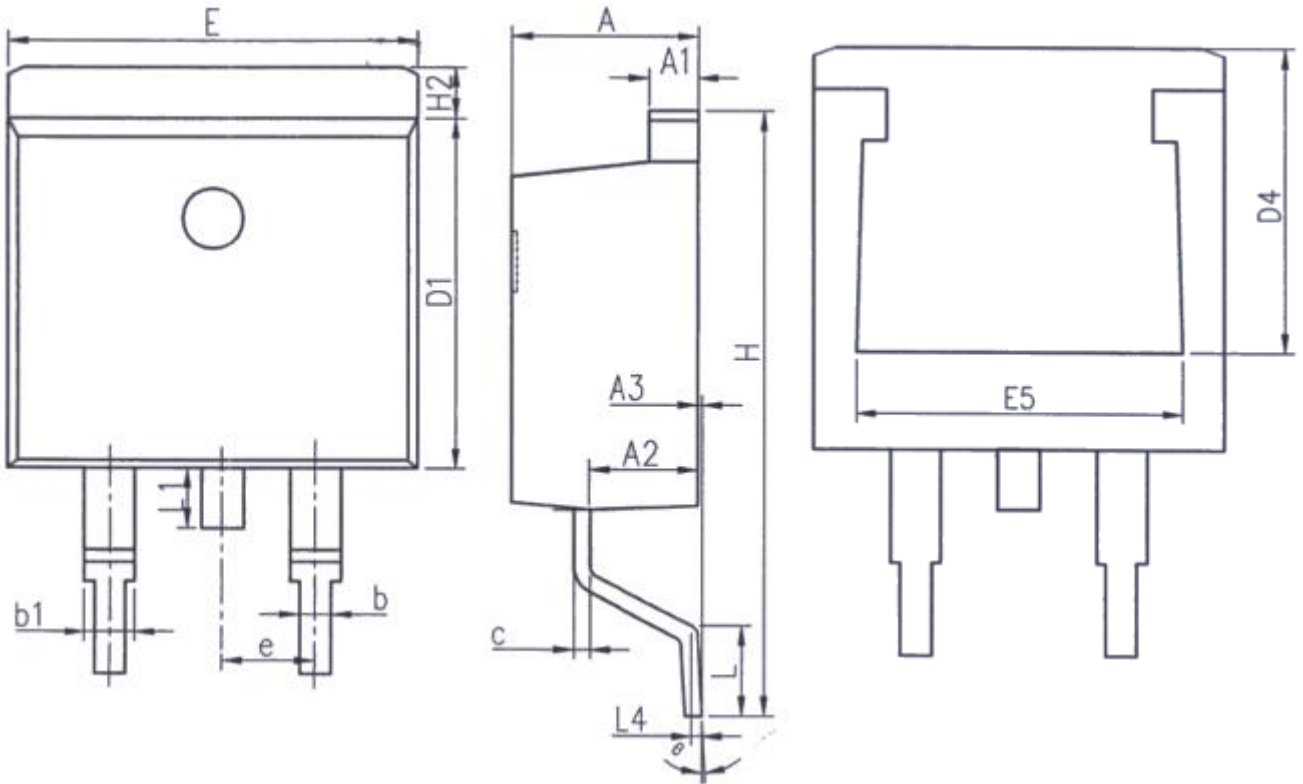


Figure C: Unclamped Inductive Switching Test Circuit and Waveform





### TO-263(华天)

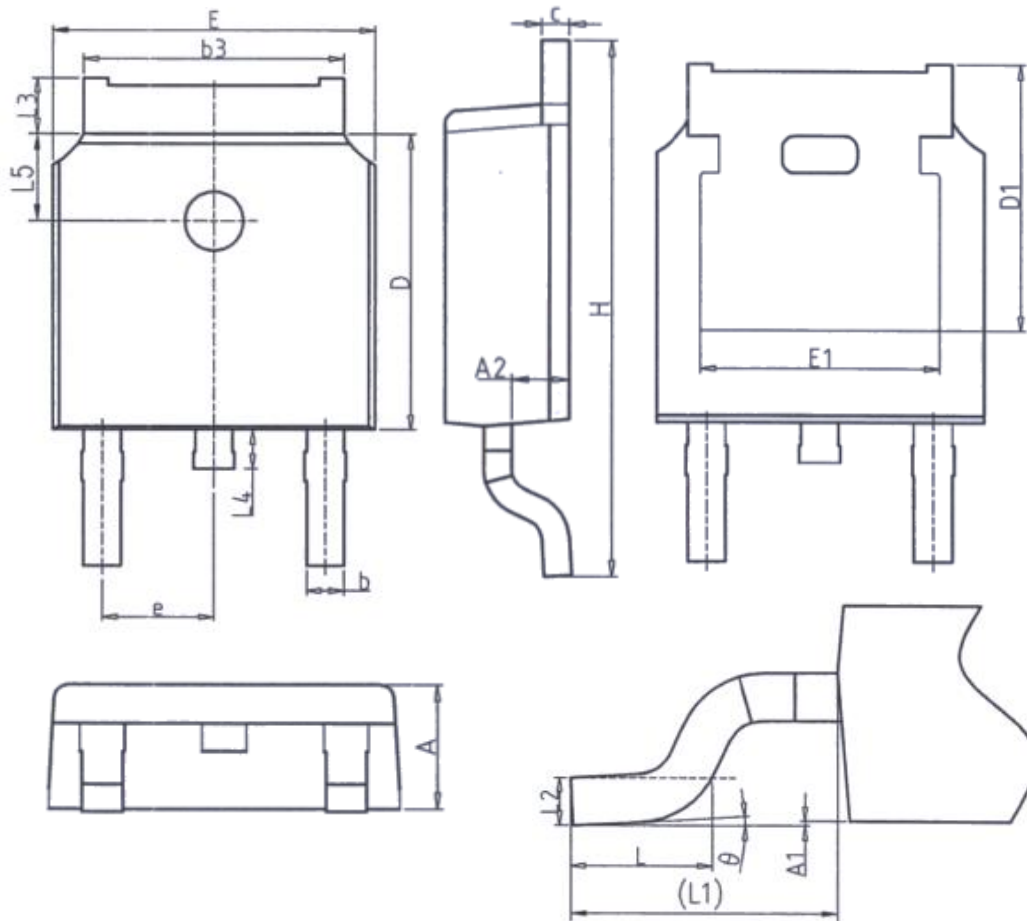


Unit: mm		
Symbol	Min.	Max.
A	4.37	4.77
A1	1.22	1.42
A2	2.49	2.89
A3	0.00	0.25
b	0.70	0.96
b1	1.17	1.47
c	0.30	0.53
D1	8.50	8.90
D4	6.60	-

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	
$\theta$	0°	9°



### TO-252(华天)

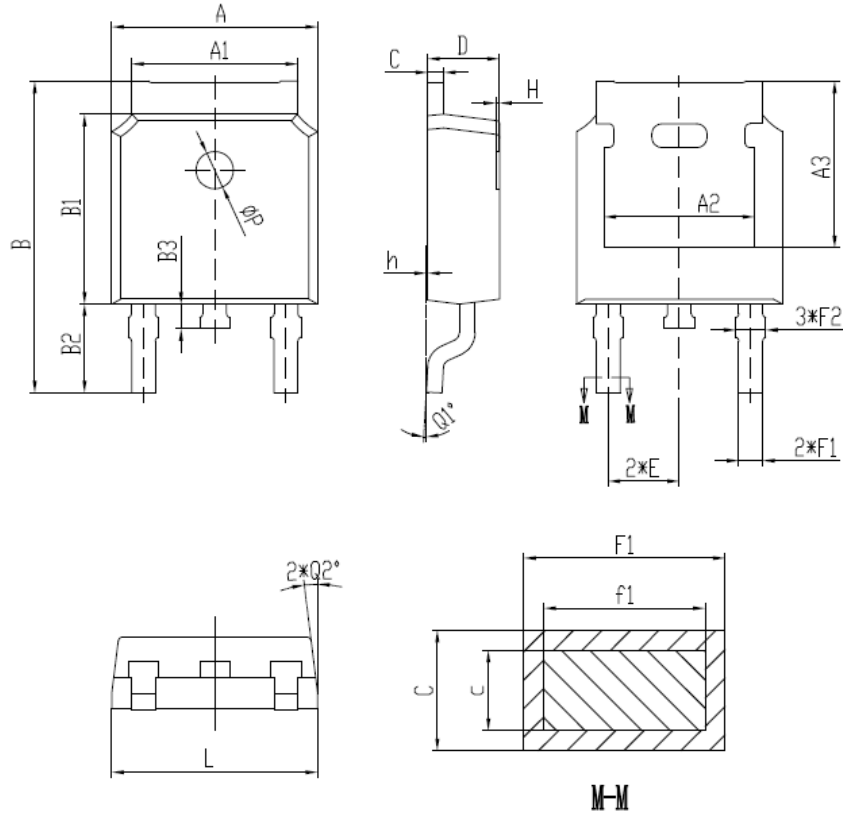


Unit: mm		
Symbol	Min.	Max.
A	2.20	2.40
A1	0.00	0.20
A2	0.97	1.17
b	0.68	0.90
b3	5.20	5.50
c	0.43	0.63
D	5.98	6.22
D1	5.30REF	
E	6.40	6.80
E1	4.63	-

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°



## TO-252(海天)

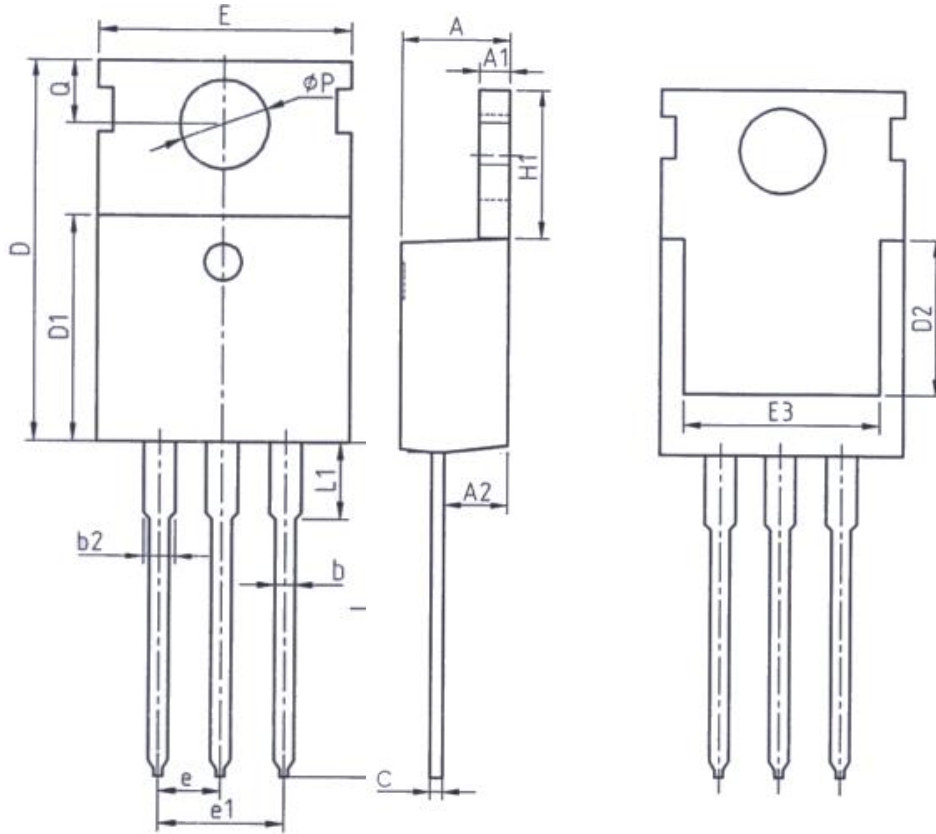


SYMBOL	MIN	NOM	MAX
A	6.50	6.60	6.70
A1	5.16	5.31	5.46
A2	4.83 REF		
A3	5.30 REF		
B	9.77	9.97	10.17
B1	6.00	6.10	6.20
B2	2.60	2.80	3.00
B3	0.70	0.80	0.90
C	0.41	—	0.61
c	0.40	0.50	0.60
D	2.20	2.30	2.40
E	2.186	2.286	2.386
F1	0.67	—	0.87
f1	0.66	0.76	0.86
F2	0.76	0.86	0.96
H	0.00	—	0.30
h	0.00	—	0.20
L	6.50	6.60	6.70
$\phi P$	1.10	1.20	1.30
Q1°	0°	—	8°
Q2°	6°	7°	8°





### TO-220(华天)



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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