




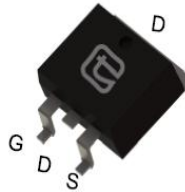
# 85V N-Channel Trench MOSFET(Preliminary)

<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> <tr> <td><math>V_{DS}</math></td> <td>85V</td> </tr> <tr> <td><math>I_D</math> (at <math>V_{GS}=10V</math>)</td> <td>145A</td> </tr> <tr> <td><math>R_{DS(ON)}</math> (at <math>V_{GS}=10V</math>)</td> <td>&lt; 5.9m<math>\Omega</math></td> </tr> </table> <p>100% UIS Tested 100% DVDS Tested</p> 	$V_{DS}$	85V	$I_D$ (at $V_{GS}=10V$ )	145A	$R_{DS(ON)}$ (at $V_{GS}=10V$ )	< 5.9m $\Omega$
$V_{DS}$	85V						
$I_D$ (at $V_{GS}=10V$ )	145A						
$R_{DS(ON)}$ (at $V_{GS}=10V$ )	< 5.9m $\Omega$						

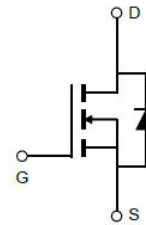
TO-220F



TO-263



TO-220



Part Number	Package Type	Form	Marking
TTA145N08A	TO-220F	Tape&Reel	145N08A
TTB145N08A	TO-263	Tape&Reel	145N08A
TTP145N08A	TO-220	Tube	145N08A

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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	$V_{DS}$	85	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current <sup>B</sup>	$I_D$	$T_C = 25^\circ\text{C}$	105
		$T_C = 100^\circ\text{C}$	102
Pulsed Drain Current <sup>A</sup>	$I_{DM}$	435	A
Avalanche Current <sup>A</sup>	$I_{AS}$	56	A
Single Pulse Avalanche Energy $L = 0.3\text{mH}$ <sup>A</sup>	$E_{AS}$	470	mJ
Power Dissipation <sup>C</sup>	$P_D$	$T_C = 25^\circ\text{C}$	272
		$T_C = 100^\circ\text{C}$	136
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to 175	$^\circ\text{C}$

## Thermal Characteristics

Parameter	Symbol	Maximum	Units
Maximum Junction-to-Case	$R_{\theta JC}$	0.55	$^\circ\text{C/W}$
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	$I_D = 250\mu\text{A}, V_{GS} = 0\text{V}$	85	--	--	V	
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 85\text{V}, V_{GS} = 0\text{V}$	$T_J = 25^\circ\text{C}$	--	--	1	$\mu\text{A}$
			$T_J = 125^\circ\text{C}$	--	--	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	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	2	3	4	V	
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = 10\text{V}, I_D = 30\text{A}$	--	4.8	5.9	m $\Omega$	
$g_{FS}$	Forward Transconductance	$V_{DS} = 5\text{V}, I_D = 20\text{A}$	--	45	--	S	
$V_{SD}$	Diode Forward Voltage	$I_S = 30\text{A}, V_{GS} = 0\text{V}$	--	--	1	V	
$I_S$	Maximum Body-Diode Continuous Current <sup>B</sup>		--	--	105	A	
<b>DYNAMIC PARAMETERS</b>							
$C_{iss}$	Input Capacitance	$V_{GS} = 0\text{V}, V_{DS} = 45\text{V}, f = 1\text{MHz}$	--	9532	--	$\mu\text{F}$	
$C_{oss}$	Output Capacitance		--	397	--		
$C_{rss}$	Reverse Transfer Capacitance		--	362	--		
$R_g$	Gate Resistance	$f = 1\text{MHz}$	--	2.1	--	$\Omega$	
<b>SWITCHING PARAMETERS</b>							
$Q_g$	Total Gate Charge	$V_{GS} = 10\text{V}, V_{DS} = 45\text{V}, I_D = 20\text{A}$	--	168	--	nC	
$Q_{gs}$	Gate Source Charge		--	39.8	--		
$Q_{gd}$	Gate Drain Charge		--	45.8	--		
$t_{D(on)}$	Turn-On Delay Time	$V_{GS} = 10\text{V}, V_{DS} = 45\text{V}, I_D = 20\text{A}, R_G = 1.6\Omega$	--	52.8	--	ns	
$t_r$	Turn-On Rise Time		--	44.6	--		
$T_{D(off)}$	Turn-Off Delay Time		--	105.5	--		
$t_f$	Turn-Off Fall Time		--	20.4	--		
$t_{rr}$	Body Diode Reverse Recovery Time	$I_F = 20\text{A}, di/dt = 100\text{A}/\mu\text{s}$	--	46.8	--	ns	
$Q_{rr}$	Body Diode Reverse Recovery Charge		--	73	--	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 ELECTRICAL AND THERMAL CHARACTERISTICS

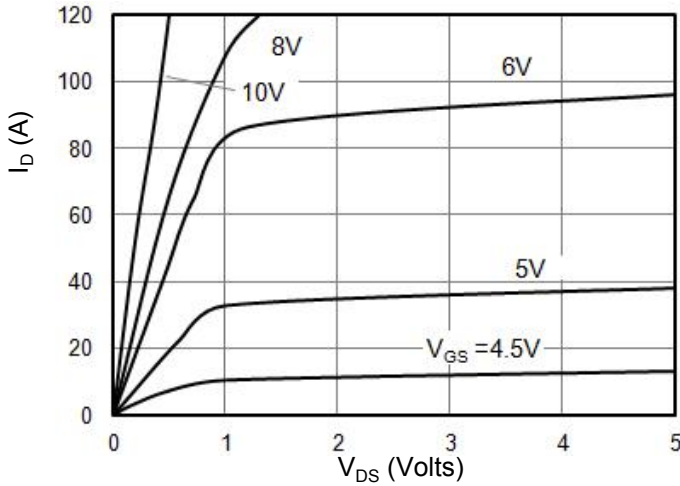


Figure 1: On-Region Characteristics

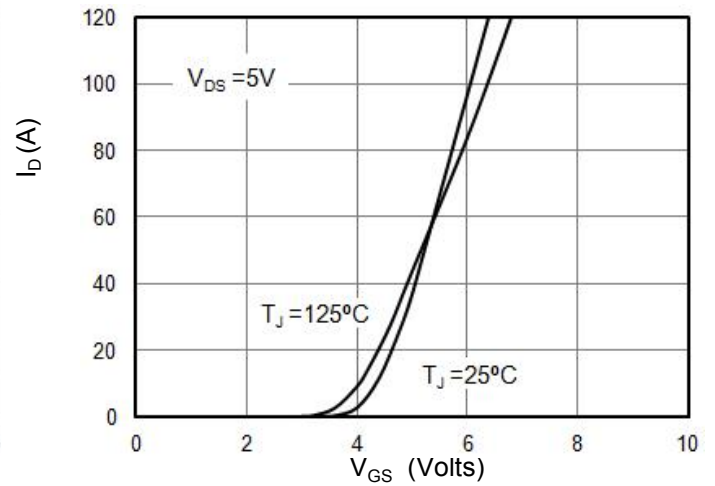


Figure 2: Transfer

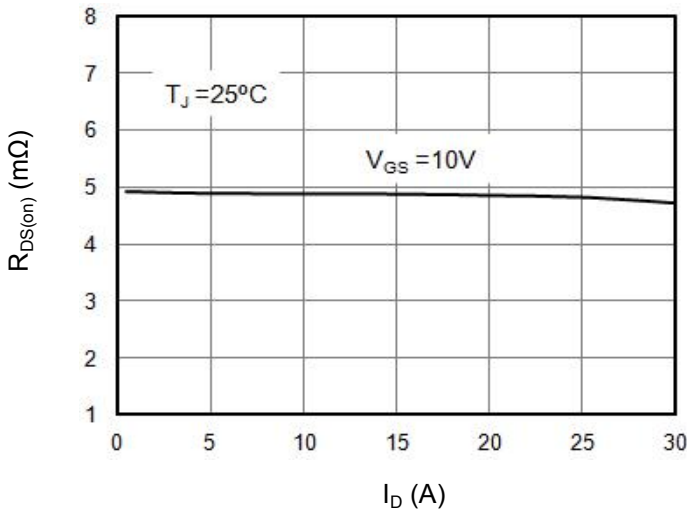


Figure 3: On-Resistance vs. Drain Current

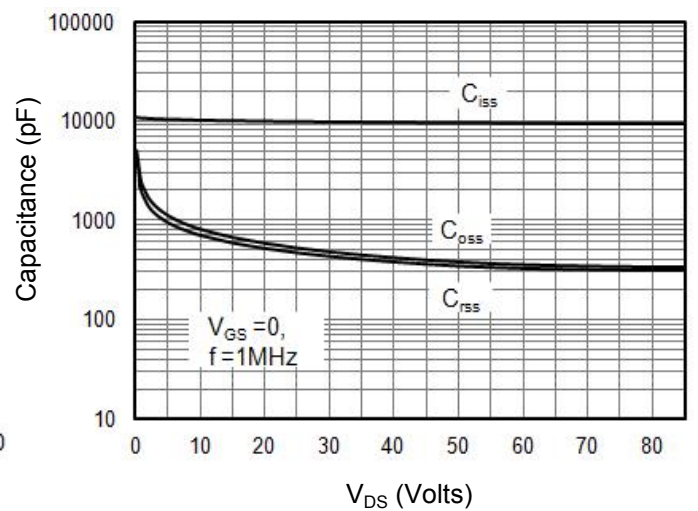


Figure 4: Capacitance Characteristics

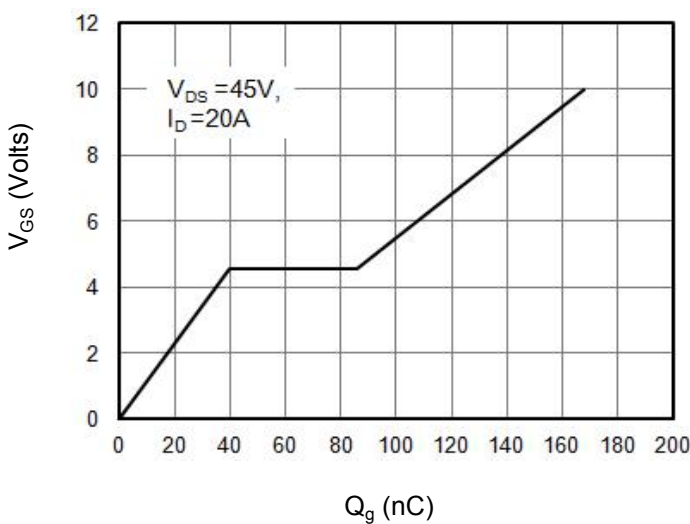


Figure 5: Gate Charge Characteristics

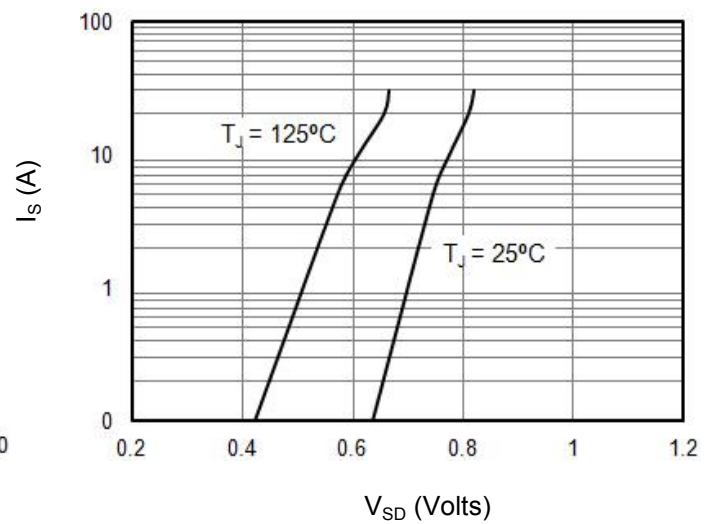
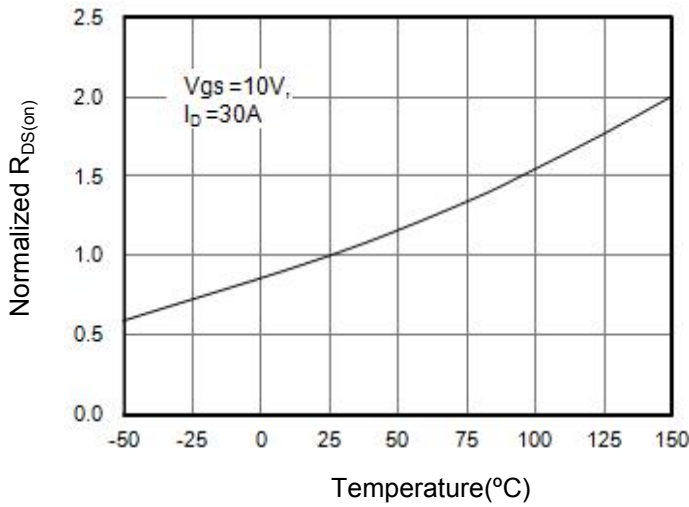


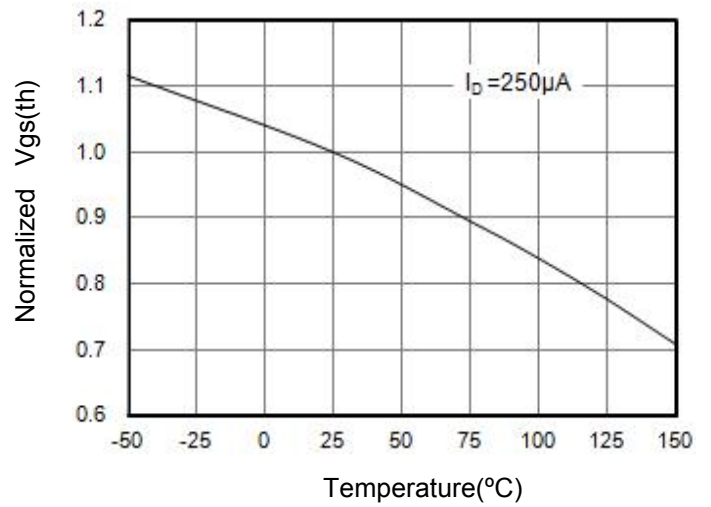
Figure 6: Body Diode Forward Voltage



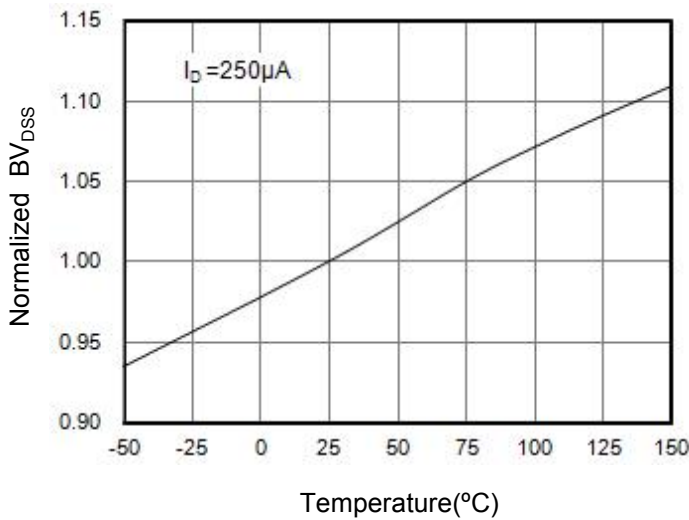
**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**



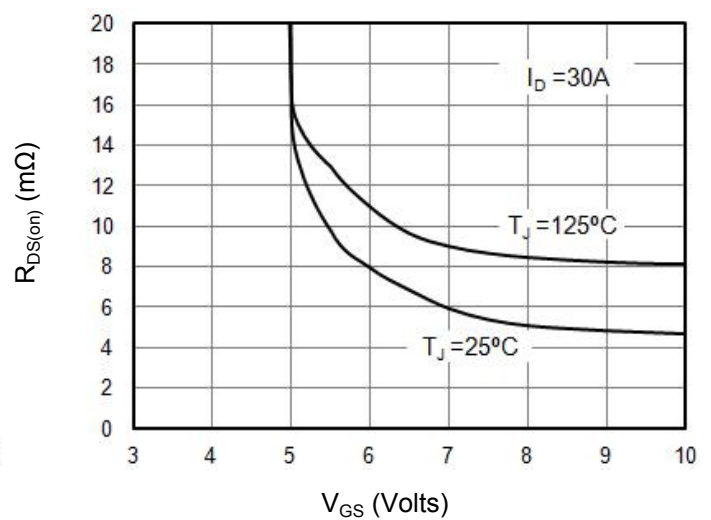
**Figure 7: On-Resistance vs. Junction Temperature**



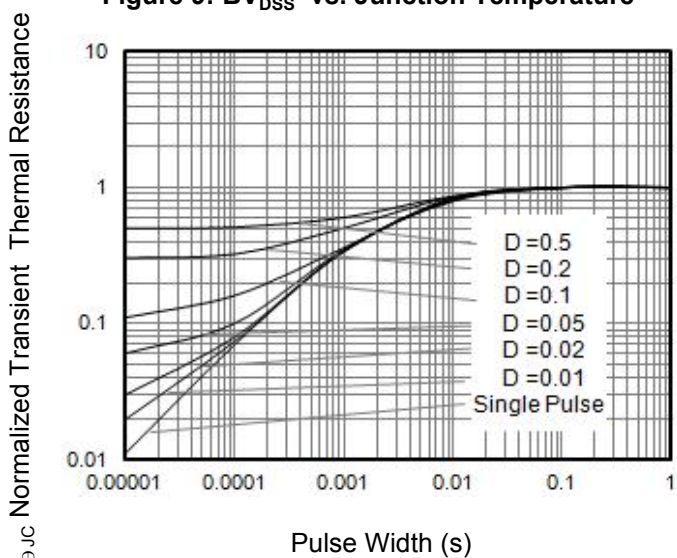
**Figure 8: Vgs(th) vs. Junction Temperature**



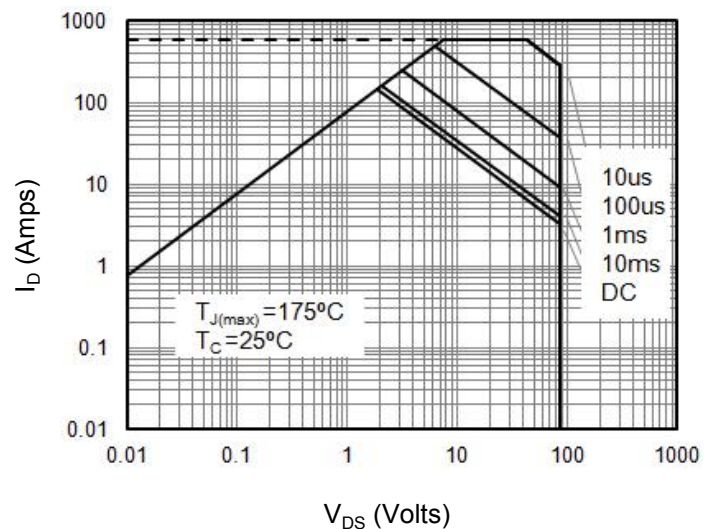
**Figure 9: BV\_DS vs. Junction Temperature**



**Figure 10: On-Resistance vs. Gate-Source Voltage**



**Figure 11: Normalized Transient Thermal Resistance**



**Figure 12: Safe Operating Area**



Figure A: Gate Charge Test Circuit and Waveforms

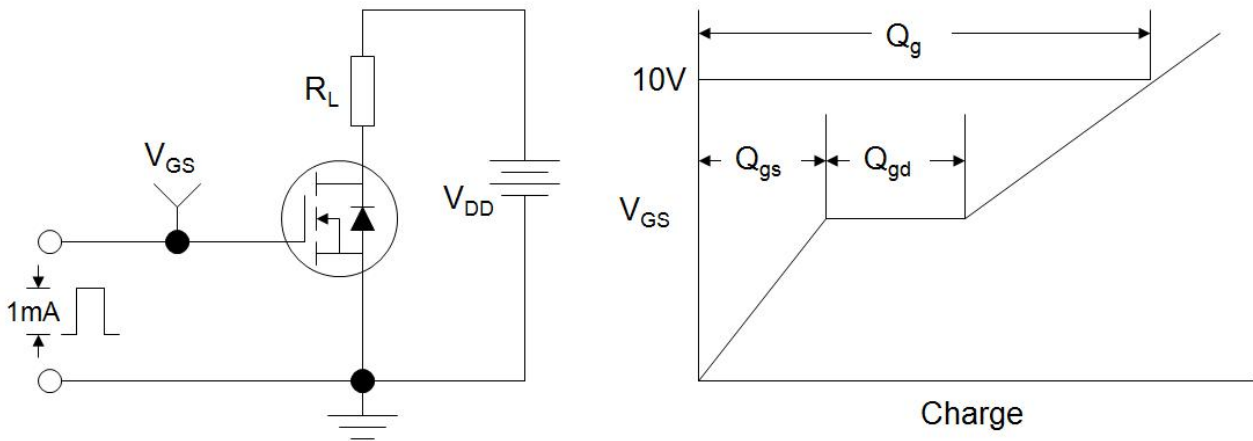


Figure B: Resistive Switching Test Circuit and Waveforms

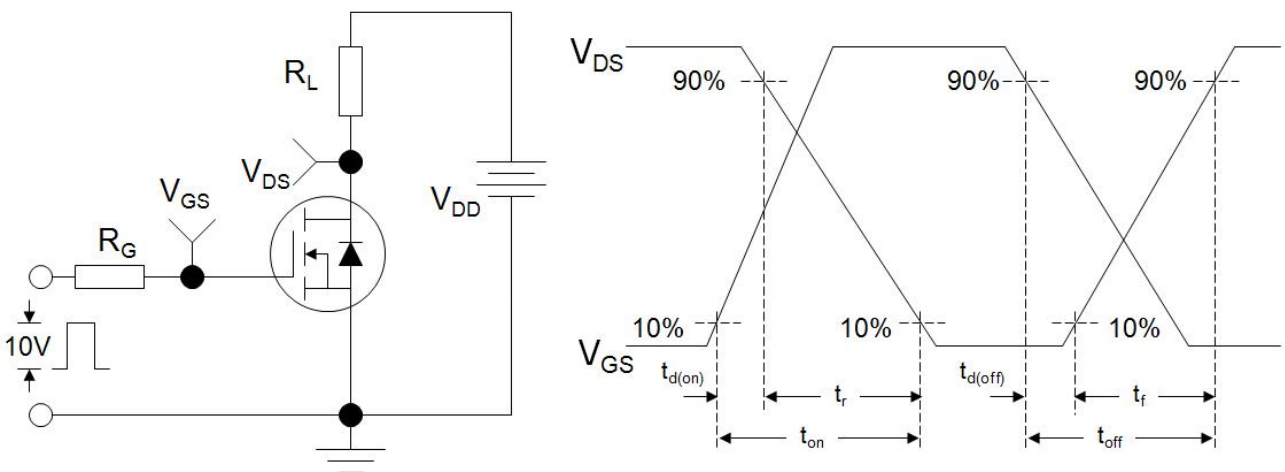
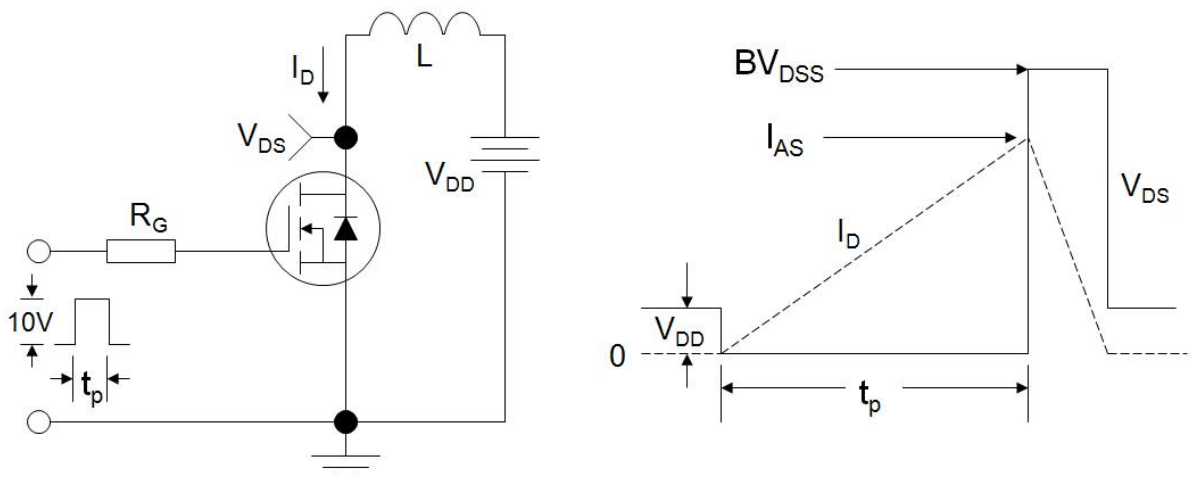
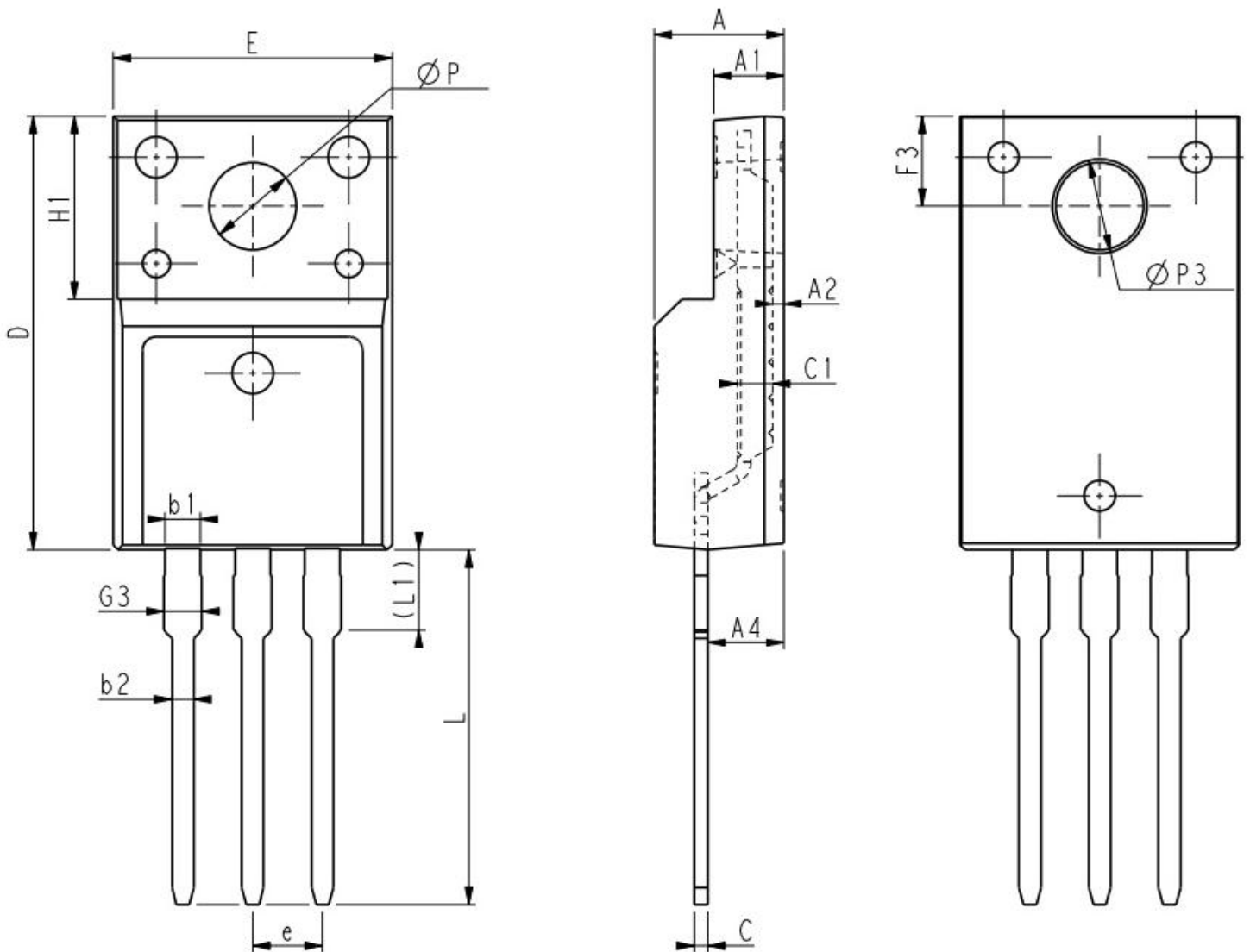


Figure C: Unclamped Inductive Switching (UIS) Test Circuit and Waveforms





TO-220F (华羿)



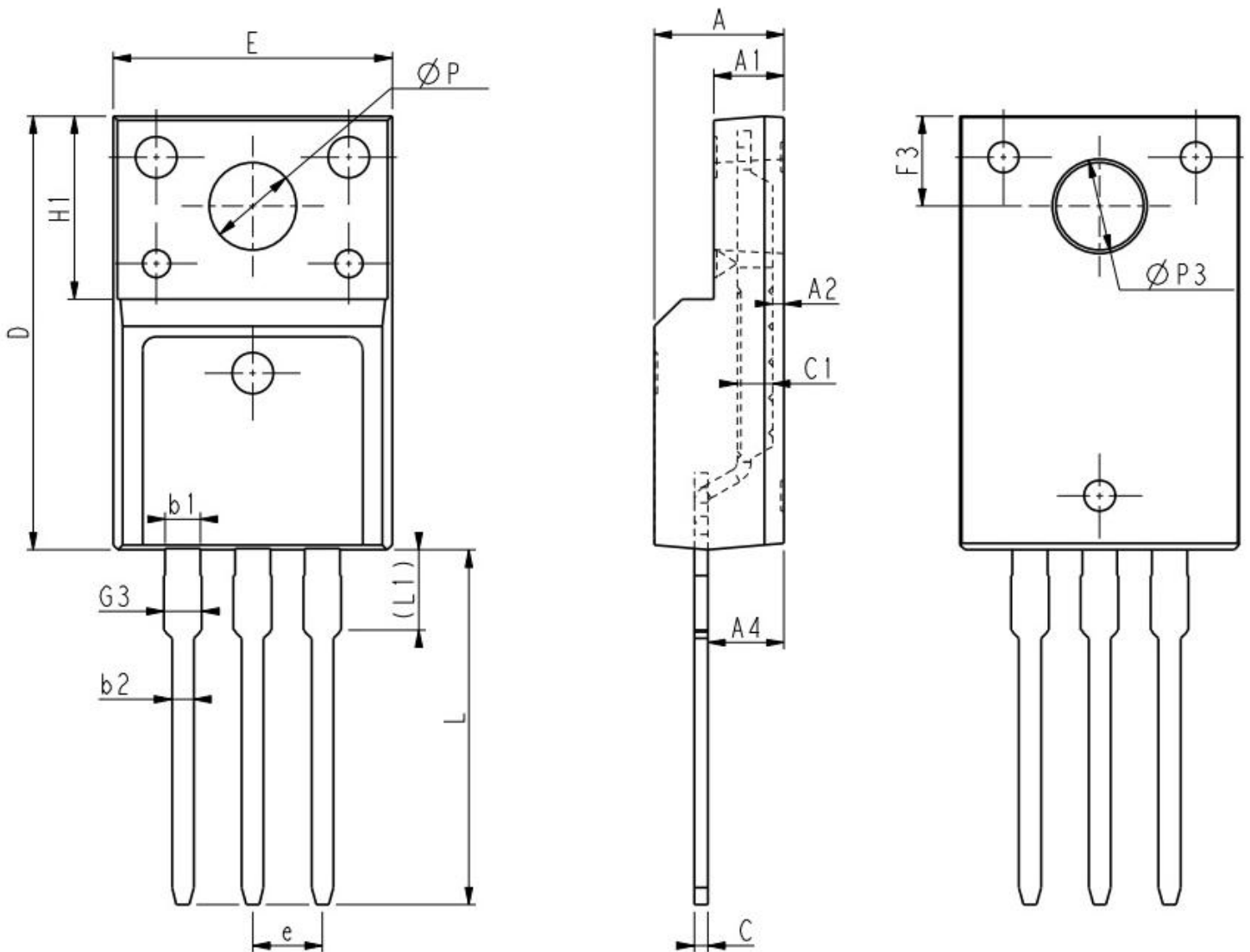
Unit:mm			
Symbol	Min.	Nom	Max.
E	9.96	10.16	10.36
A	4.50	4.70	4.90
A1	2.34	2.54	2.74
A2	0.30	0.45	0.60
A4	2.56	2.76	2.96
c	0.40	0.50	0.65
c1	1.20	1.30	1.35
D	15.57	15.87	16.17
H1	6.70REF		

Unit:mm			
Symbol	Min.	Nom	Max.
e	2.54BSC		
L	12.68	12.98	13.28
L1	2.93	3.03	3.13
$\Phi P$	3.03	3.18	3.38
$\Phi P3$	3.15	3.45	3.65
F3	3.15	3.30	3.45
G3	1.25	1.35	1.55
b1	1.18	1.28	1.43
b2	0.70	0.80	0.95





TO-220F (华羿)

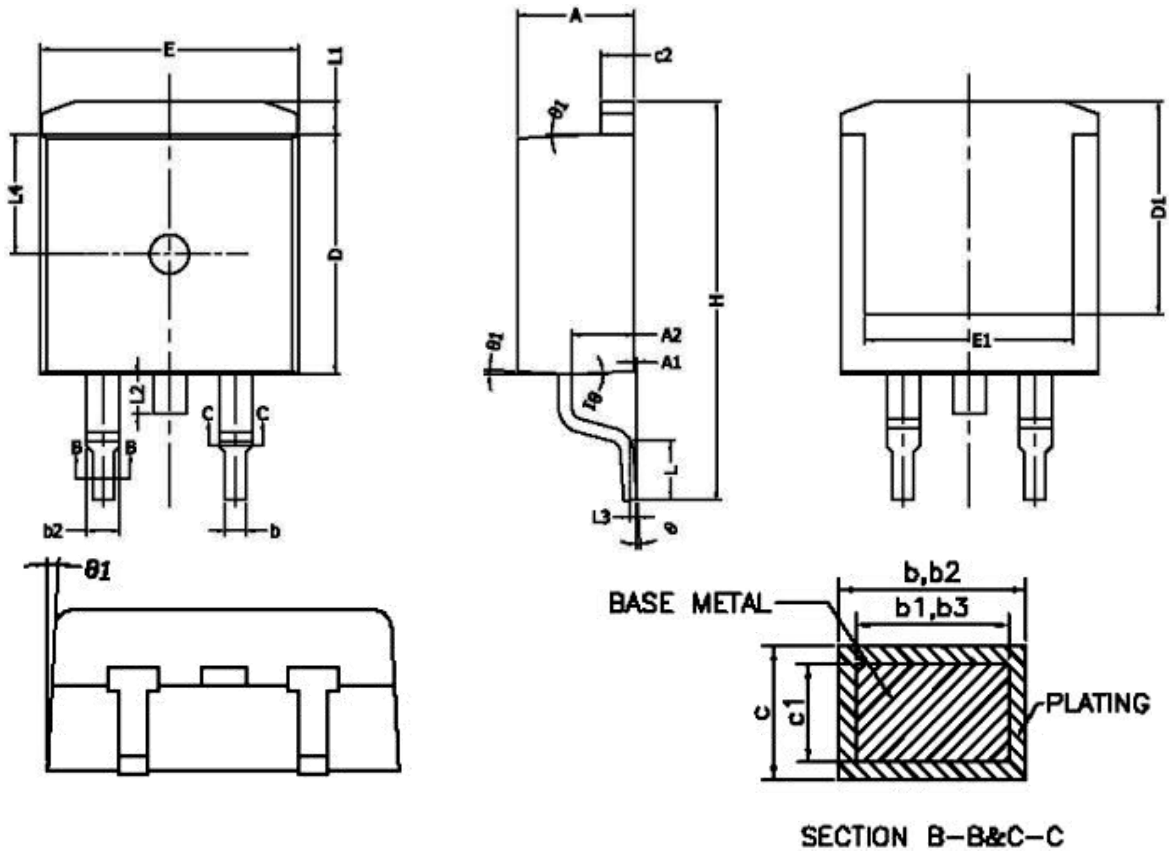


Unit:mm			
Symbol	Min.	Nom	Max.
E	9.96	10.16	10.36
A	4.50	4.70	4.90
A1	2.34	2.54	2.74
A2	0.30	0.45	0.60
A4	2.56	2.76	2.96
c	0.40	0.50	0.65
c1	1.20	1.30	1.35
D	15.57	15.87	16.17
H1	6.70REF		

Unit:mm			
Symbol	Min.	Nom	Max.
e	2.54BSC		
L	12.68	12.98	13.28
L1	2.93	3.03	3.13
$\Phi P$	3.03	3.18	3.38
$\Phi P3$	3.15	3.45	3.65
F3	3.15	3.30	3.45
G3	1.25	1.35	1.55
b1	1.18	1.28	1.43
b2	0.70	0.80	0.95



### TO-263 (集佳)

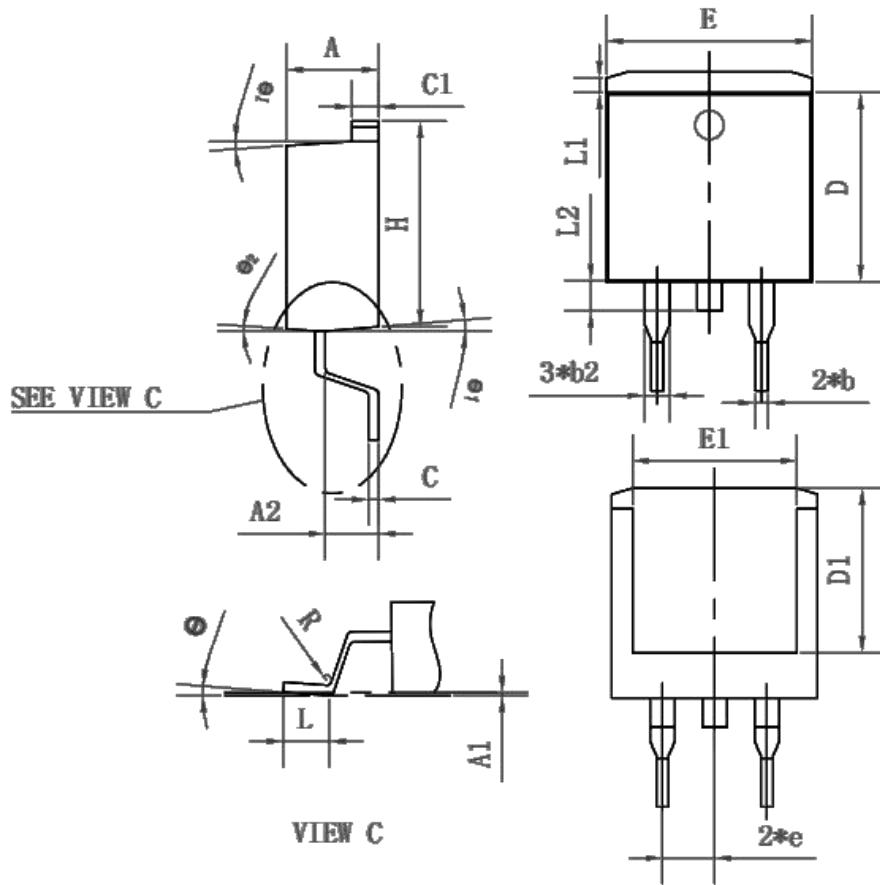


SYMBOL	MIN	NOM	MAX
A	4.40	4.50	4.60
A1	0	0.10	0.25
A2	2.20	2.40	2.60
b	0.76	--	0.89
b1	0.75	0.80	0.85
b2	1.23	--	1.37
b3	1.22	1.27	1.32
c	0.47	--	0.60
c1	0.46	0.51	0.56
c2	1.25	1.30	1.35
D	9.10	9.20	9.30
D1	8.00	--	--
E	9.80	9.90	10.00
E1	7.80	--	--
e	2.54 BSC		
H	14.90	15.30	15.70
L	2.00	2.30	2.60
L1	1.17	1.27	1.40
L2	--	--	1.75
L3	0.25BSC		
L4	4.60 REF		
θ	0°	--	8°
θ1	1°	3°	5°





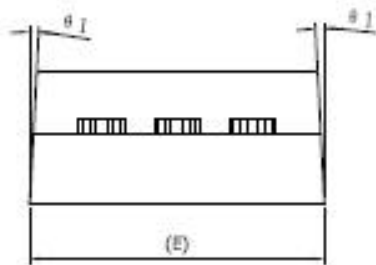
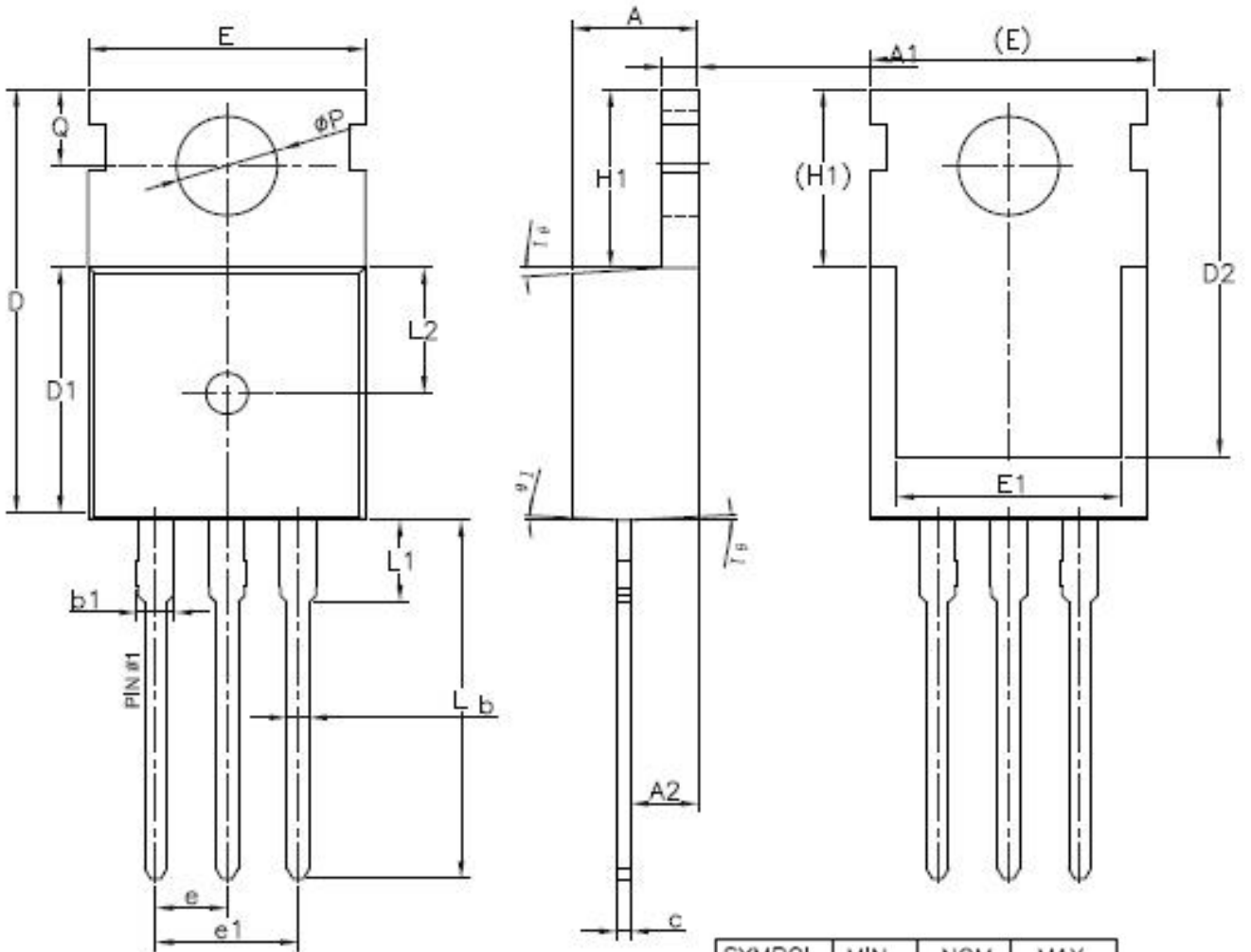
### TO-263 (赛力康)



SYMBOL	MIN	NOM	MAX
A	4.35	4.47	4.60
A1	0.09	0.10	0.11
A2	2.30	2.40	2.50
b	0.70	0.80	1.00
b2	1.25	1.36	1.38
C	0.45	0.50	0.55
C1	1.29	1.30	1.31
D	9.10	9.20	9.30
D1	7.90	8.00	8.10
E	9.85	10.00	10.20
E1	7.90	8.00	8.10
H	15.30	15.50	15.70
e	-	2.54	-
L	2.34	2.54	2.74
L1	1.00	1.10	1.20
L2	1.30	1.40	1.50
R	0.24	0.25	0.26
e	0°	4°	8°
e1	4°	7°	10°
e2	0°	3°	6°



TO-220(集佳)



SYMBOL	MIN	NOM	MAX
A	4.40	4.50	4.60
A1	1.27	1.30	1.33
A2	2.30	2.40	2.50
b	0.70	-	0.90
b1	1.27	-	1.40
c	0.45	0.50	0.60
D	15.30	15.70	16.10
D1	9.10	9.20	9.30
D2	13.10	-	13.70
E	9.70	9.90	10.20
E1	7.80	8.00	8.20
e	2.54BSC		
e1	5.08BSC		
H1	6.30	6.50	6.70
L	12.78	13.08	13.38
L1	-	-	3.50
L2	4.60REF		
phi P	3.55	3.60	3.65
Q	2.73	-	2.87
phi 1	1*	3*	5*



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