Wuxi Unigroup Microelectronics CO.,LTD.

85V N-Channel Trench MOSFET(Preliminary)

General Description

- Trench Power technology
- Low $R_{DS(ON)}$
- Low Gate Charge
- Optimized for fast-switching applications

Applications

- Synchronous Rectification in DC/DC and AC/DC Converters
- Isolated DC/DC Converters in Telecom and Industrial

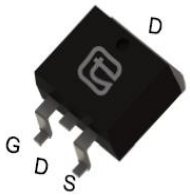
Product Summary

V_{DS}	85V
I_D (at V_{GS} =10V)	145A
$R_{DS(ON)}$ (at V_{GS} =10V)	< 5.9mΩ

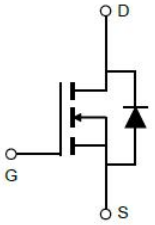
100% UIS Tested
100% DVDS Tested

RoHS

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 =25ºC unless otherwise noted)

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

Thermal Characteristics

Parameter		Symbol	Maximum	Units
Maximum Junction-to-Case	Steady-State	$R_{\theta JC}$	0.55	ºC/W
Maximum Junction-to-Ambient	Steady-State	$R_{\theta JA}$	100	

Electrical Characteristics(T_J =25ºC unless otherwise noted)							
Symbol	**Parameter**	**Conditions**		**Value**			**Units**
				Min	**Typ**	**Max**	
STATIC PARAMETERS							
BV_{DSS}	Drain-Source Breakdown Voltage	I_D =250μA,V_{GS} =0V		85	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} =85V, V_{GS} =0V	T_J =25ºC	--	--	1	μA
			T_J =125ºC	--	--	100	
I_{GSS}	Gate-Body Leakage Current	V_{DS} =0V, V_{GS} =±20V		--	--	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} =V_{GS}, I_D =250μA		2	3	4	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS} =10V, I_D =30A		--	4.8	5.9	mΩ
g_{FS}	Forward Transconductance	V_{DS} =5V, I_D =20A		--	45	--	S
V_{SD}	Diode Forward Voltage	I_S =30A, V_{GS} =0V		--	--	1	V
I_S	Maximum Body-Diode Continuous Current [B]			--	--	105	A
DYNAMIC PARAMETERS							
C_{iss}	Input Capacitance	V_{GS} =0V, V_{DS} =45V, f =1MH_Z		--	9532	--	pF
C_{oss}	Output Capacitance			--	397	--	
C_{rss}	Reverse Transfer Capacitance			--	362	--	
R_g	Gate Resistance	f =1MH_Z		--	2.1	--	Ω
SWITCHING PARAMETERS							
Q_g	Total Gate Charge	V_{GS} =10V,V_{DS} =45V, I_D =20A		--	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} =10V,V_{DS} =45V, I_D =20A, R_G =1.6Ω		--	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 =20A, di/dt =100A/μs		--	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 $T_{J(MAX)}$ =175ºC, 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

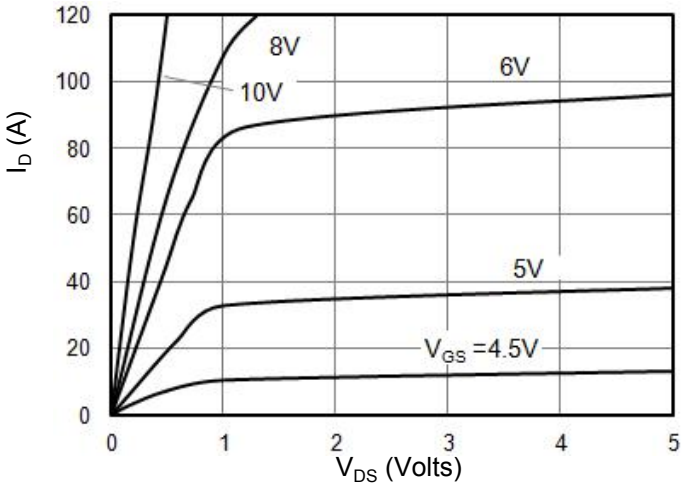


Figure 1: On-Region Characteristics Characteristics

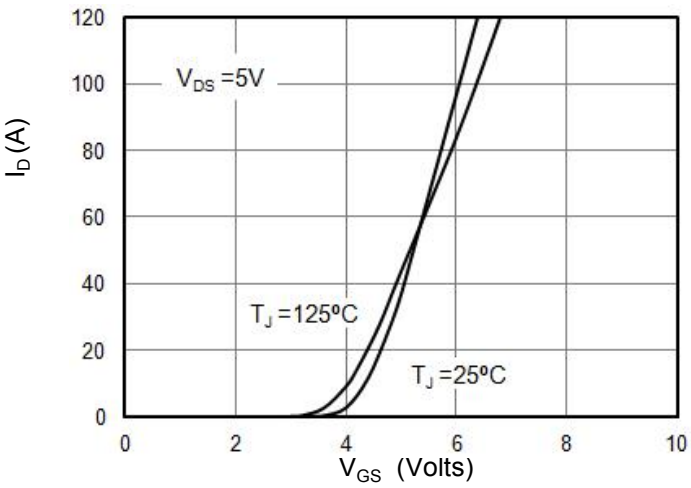


Figure 2: Transfer

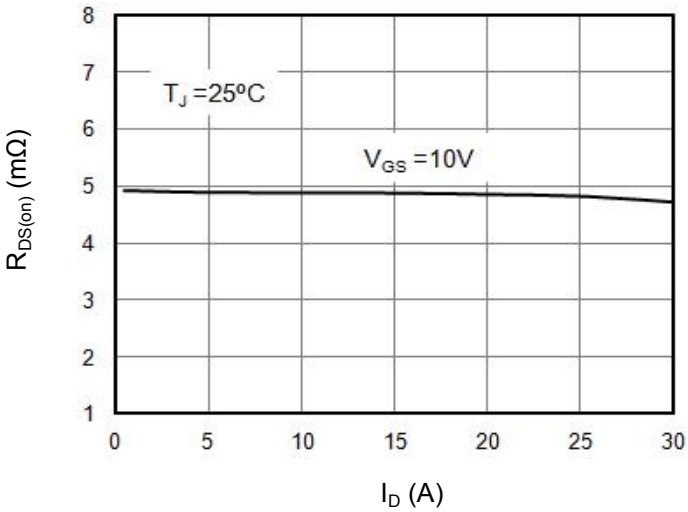


Figure 3: On-Resistance vs. Drain Current

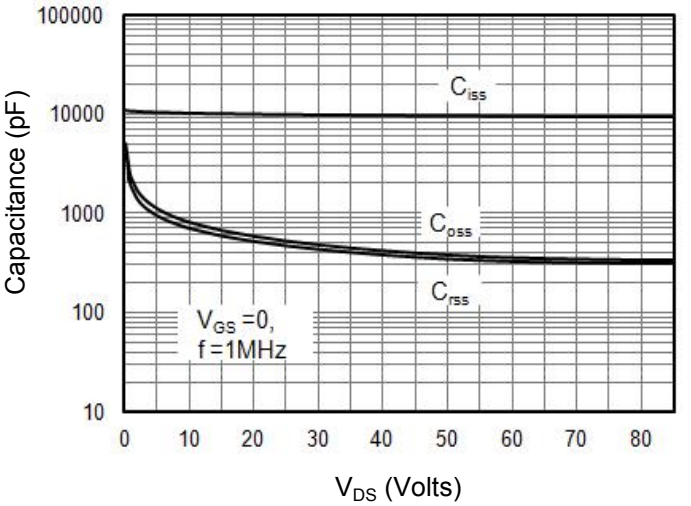


Figure 4: Capacitance Characteristics

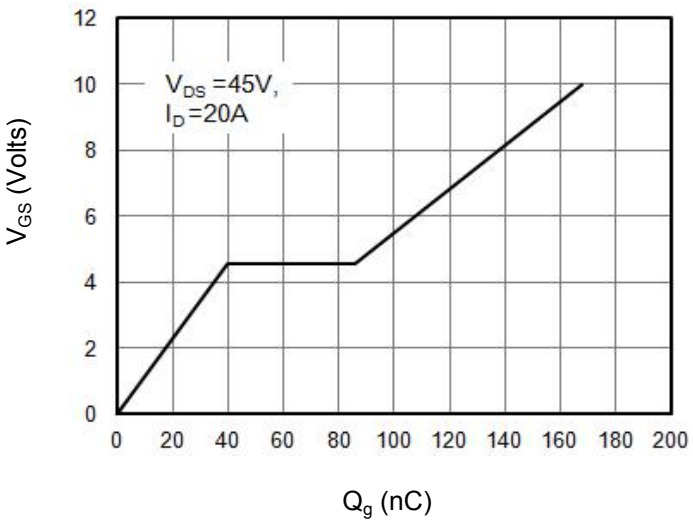


Figure 5: Gate Charge Characteristics

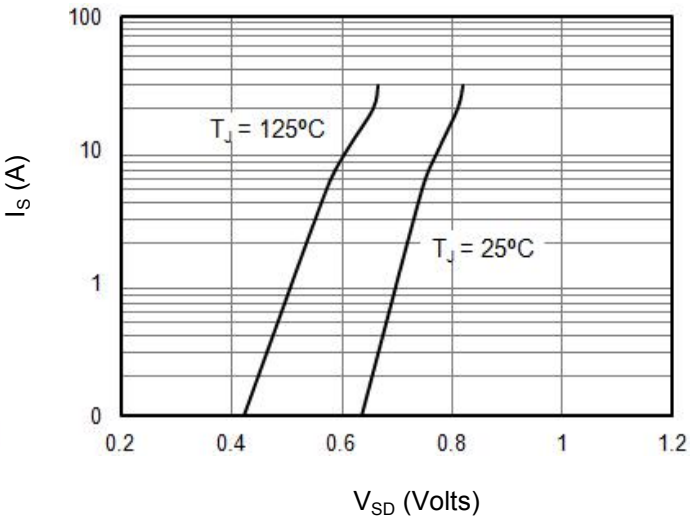


Figure 6: Body Diode Forward Voltage

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

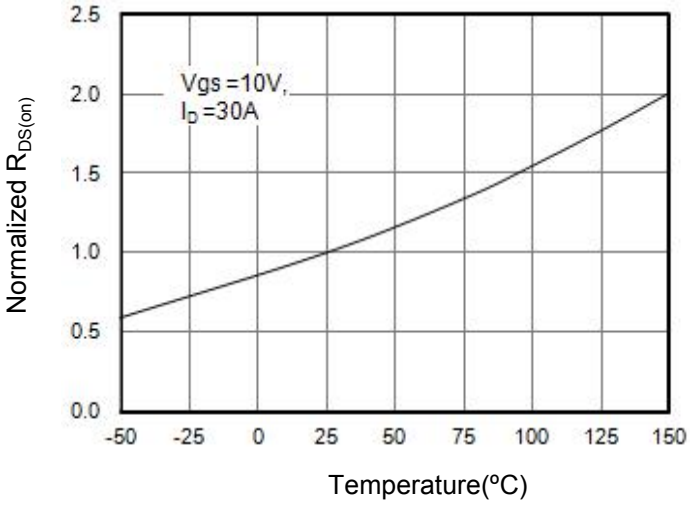


Figure 7: On-Resistance vs. Junction Temperature

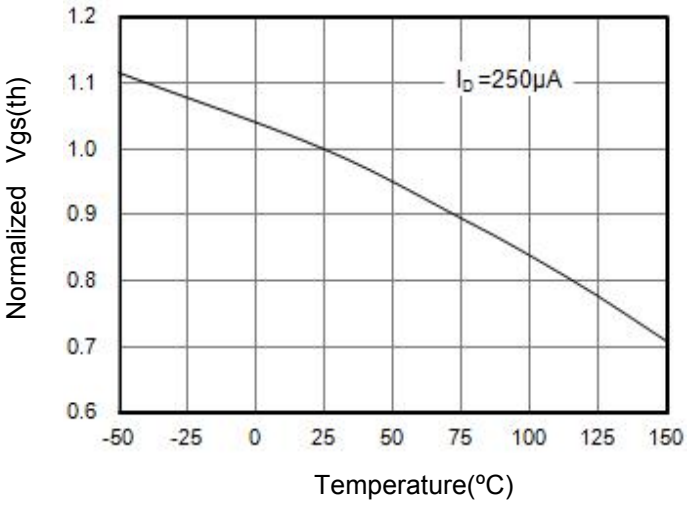


Figure 8: Vgs(th) vs. Junction Temperature

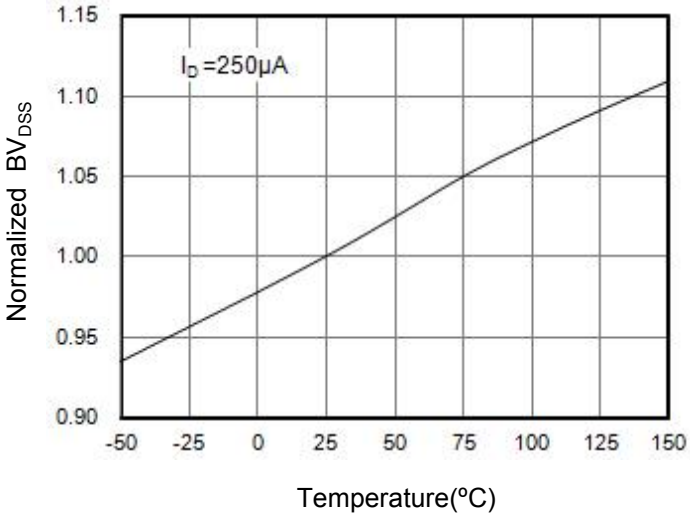


Figure 9: BV_{DSS} vs. Junction Temperature

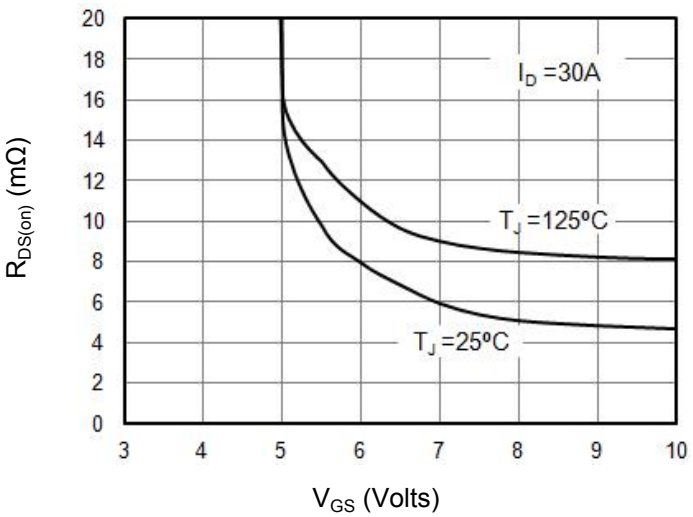


Figure 10: On-Resistance vs. Gate-Source Voltage

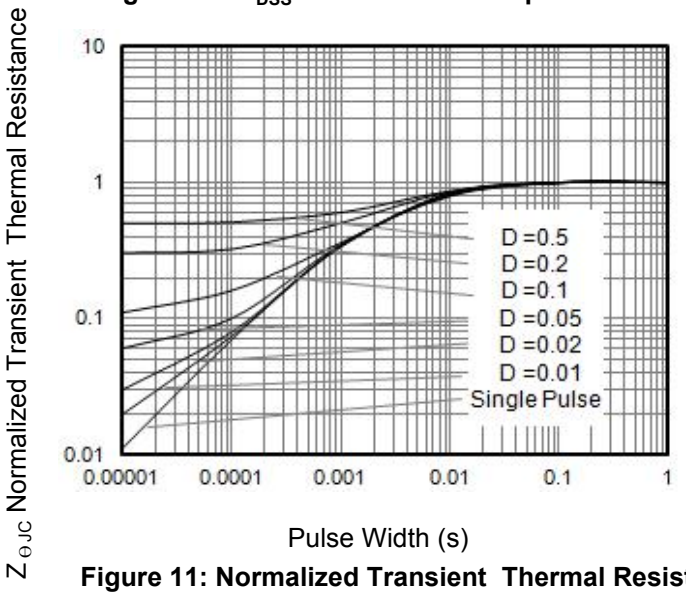


Figure 11: Normalized Transient Thermal Resistance

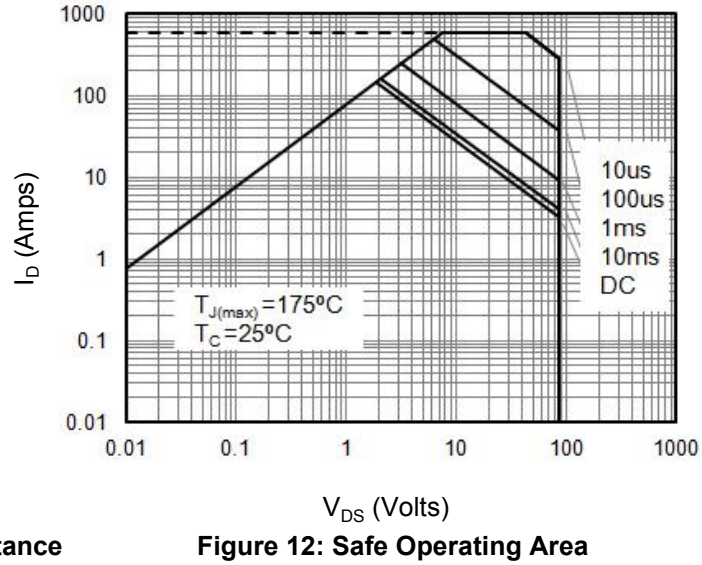


Figure 12: Safe Operating Area

Figure A：Gate Charge Test Circuit and Waveforms

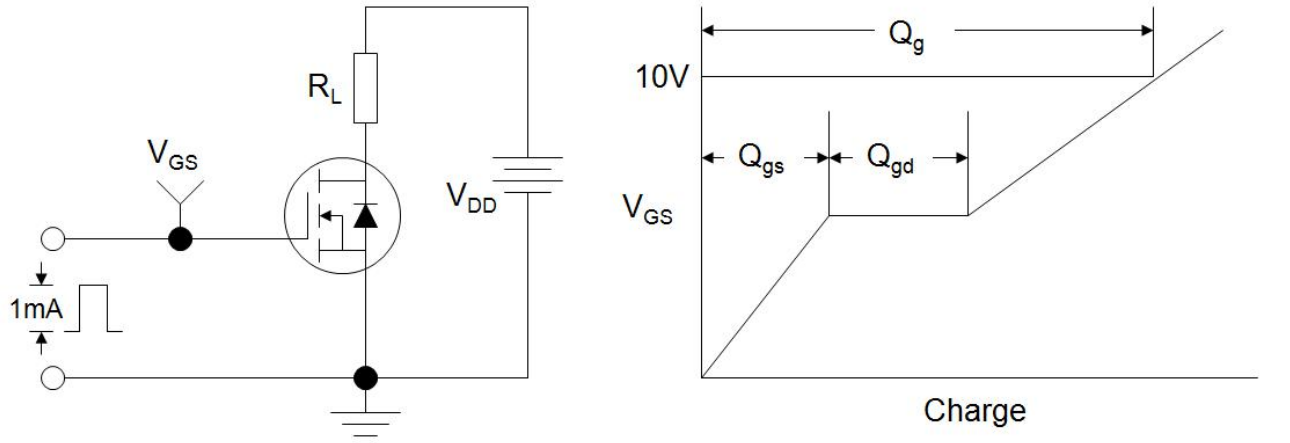


Figure B：Resistive Switching Test Circuit and Waveforms

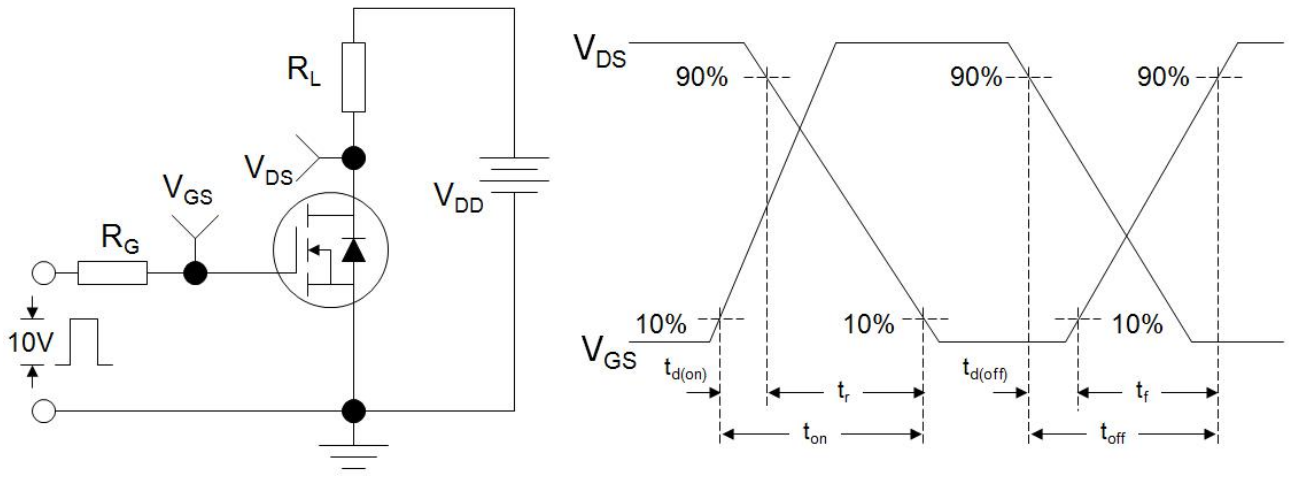
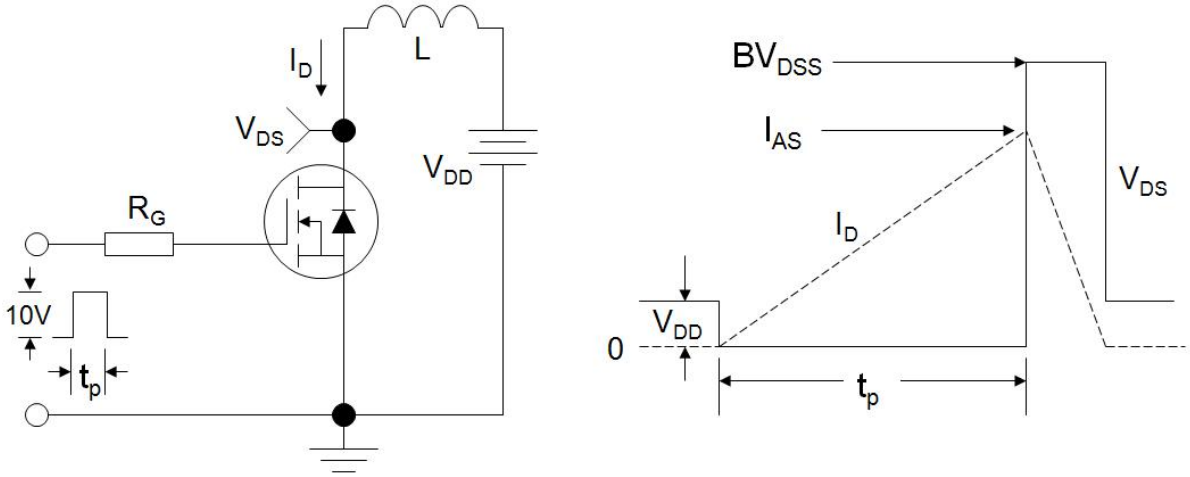
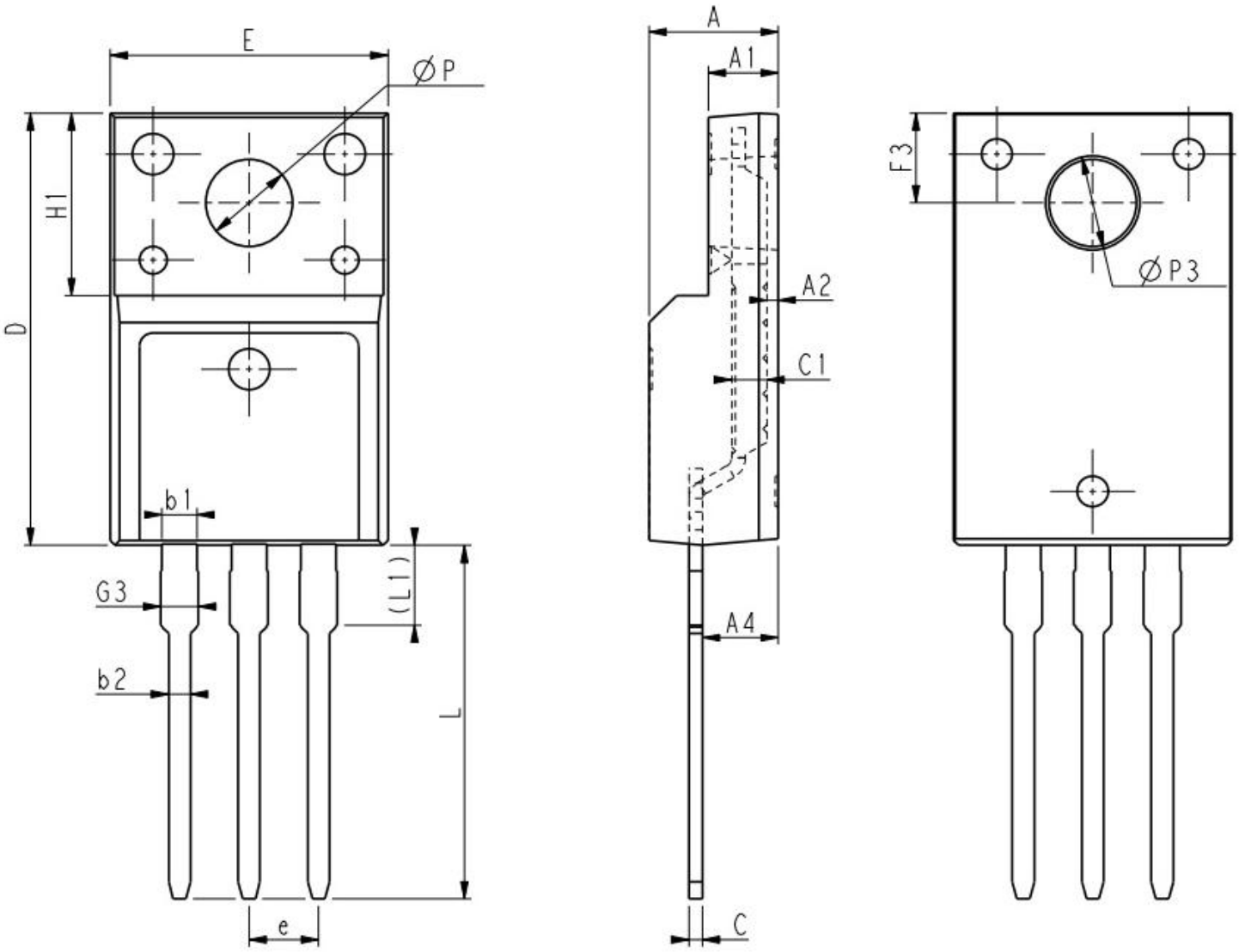


Figure C：Unclamped Inductive Switching (UIS) Test Circuit and Waveforms



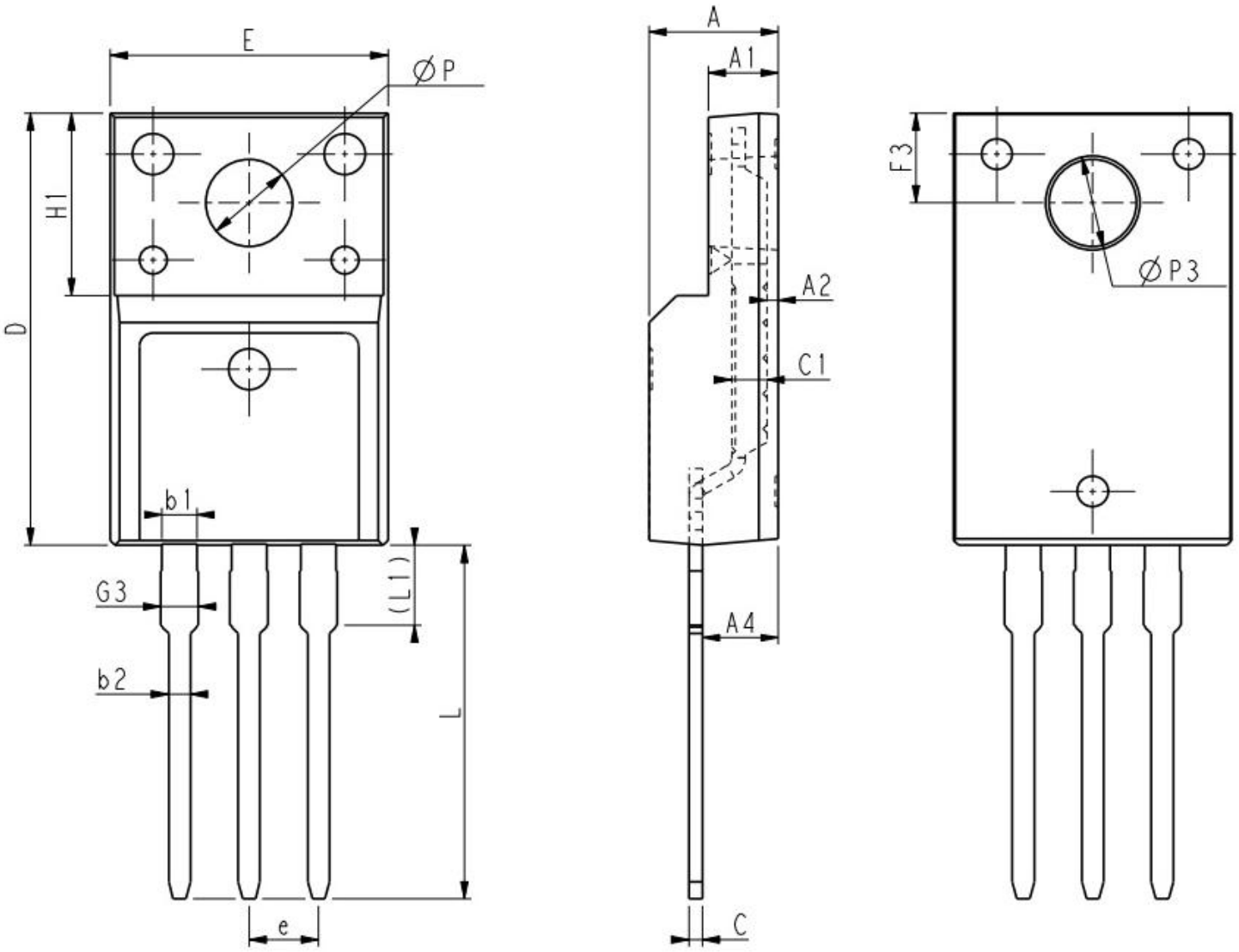
TO-220F（华羿）



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
ΦP	3.03	3.18	3.38
ΦP3	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

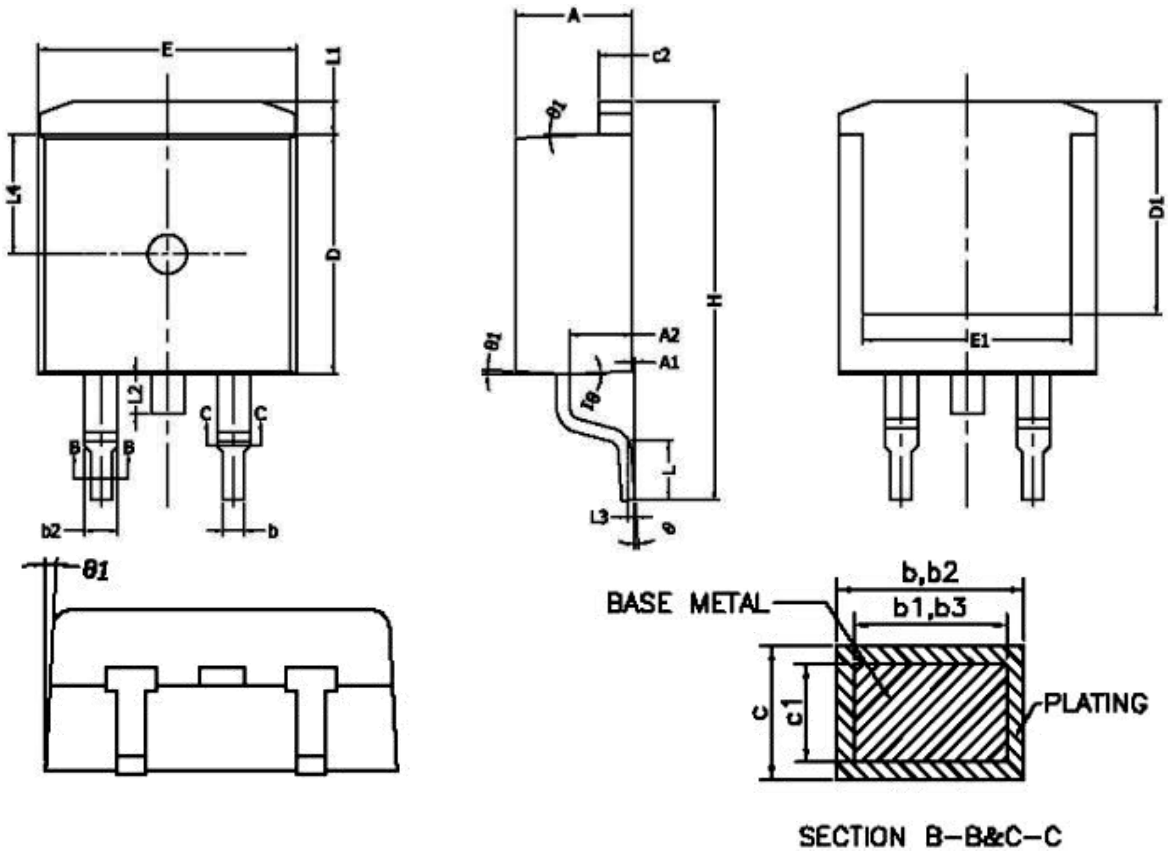
TO-220F（华羿）



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		

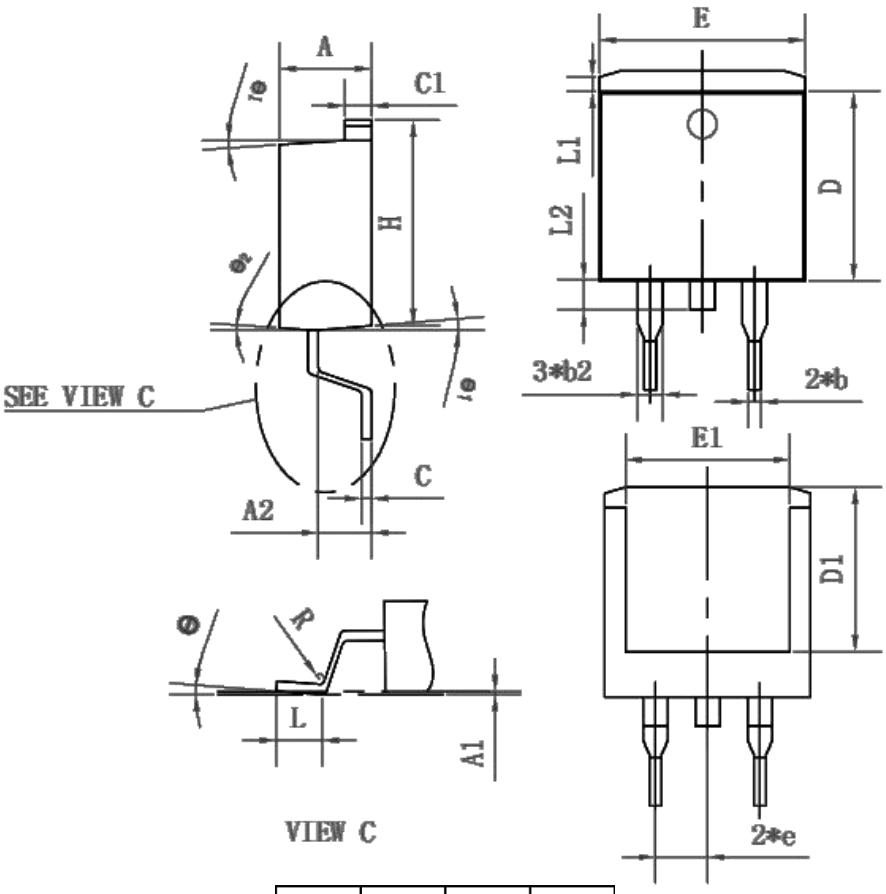
Unit:mm			
Symbol	Min.	Nom	Max.
e	2.54BSC		
L	12.68	12.98	13.28
L1	2.93	3.03	3.13
ΦP	3.03	3.18	3.38
ΦP3	3.15	3.45	3.65
F3	3.15	3.30	3.45
G3	1.25	1.35	1.55
b1	1.18	1.28	1.43
b2	0.70	0.80	0.95

TO-263（集佳）



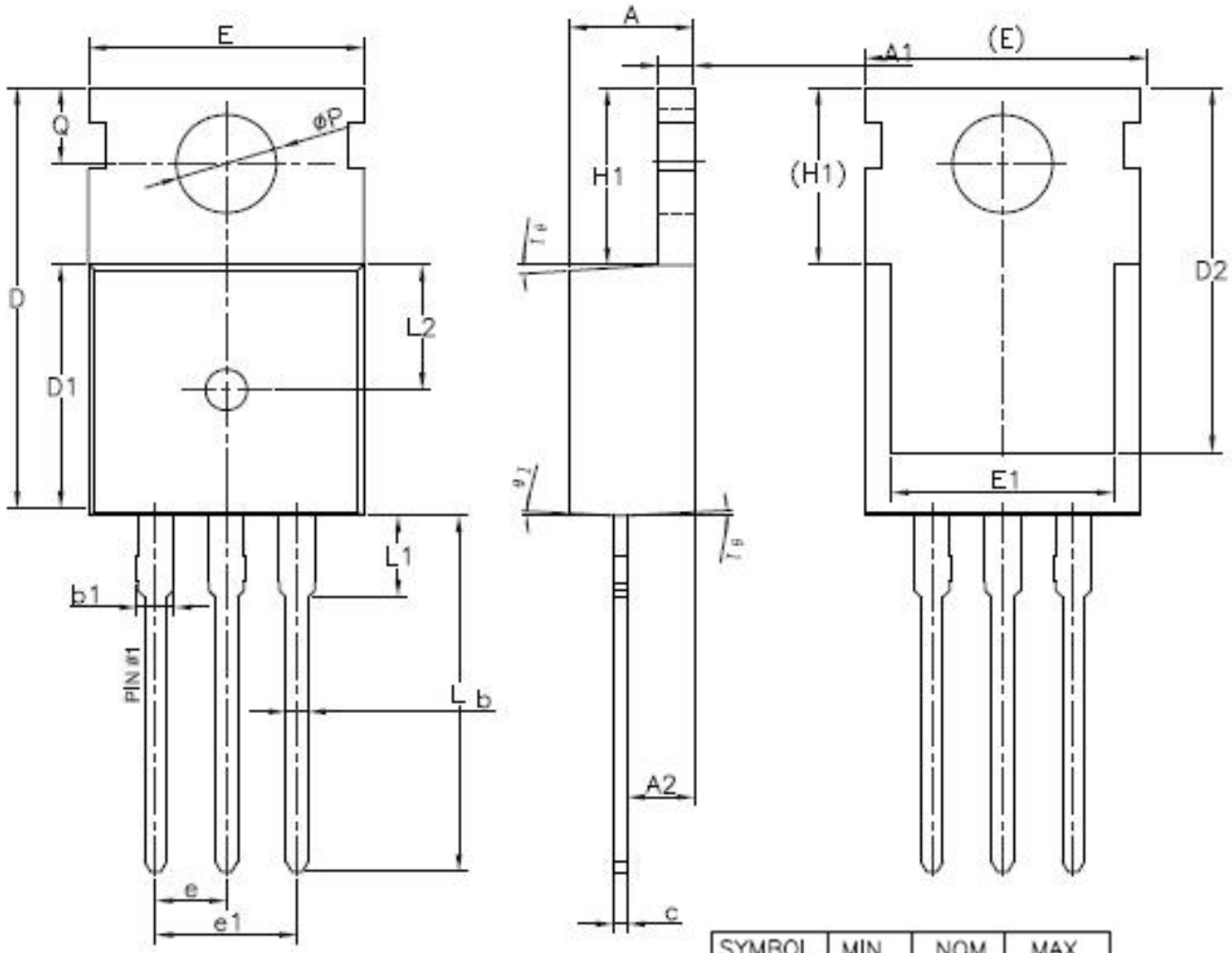
SYMBOL	MIN	NOM	MAX
A	4.40	4.50	4.60
A1	0	0.10	0.25
A2	2.20	2.40	2.60
b	0.76	---	0.89
b1	0.75	0.80	0.85
b2	1.23	---	1.37
b3	1.22	1.27	1.32
c	0.47	---	0.60
c1	0.46	0.51	0.56
c2	1.25	1.30	1.35
D	9.10	9.20	9.30
D1	8.00	---	---
E	9.80	9.90	10.00
E1	7.80	---	---
e	2.54 BSC		
H	14.90	15.30	15.70
L	2.00	2.30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

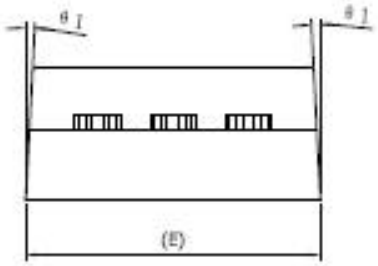
TO-263（赛力康）



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
θ	0°	4°	8°
θ1	4°	7°	10°
θ2	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		
ΦP	3.55	3.60	3.65
Q	2.73	–	2.87
θ1	1°	3°	5°

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