Wuxi Unigroup Microelectronics CO.,LTD.

68V N-Channel Trench MOSFET

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

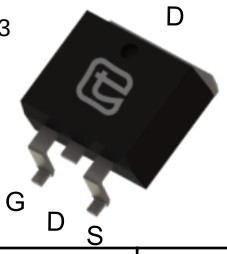
Product Summary

V_{DS}	68V
I_D (at V_{GS}=10V)	95A
$R_{DS(ON)}$ (at V_{GS}=10V)	< 7.5mΩ

100% UIS Tested

RoHS

TO-263



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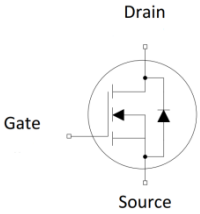


Device	Package	Form	Marking
TTB95N68A	TO-263	Tape&Reel	95N68A
TTP95N68A	TO-220	Tube	95N68A

Absolute Maximum Ratings (T_A =25ºC unless otherwise noted)

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	68	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_C = 25ºC	I_D	95	A
	T_C = 100ºC		66	
Pulsed Drain Current [A]		I_{DM}	285	A
Avalanche Current [A]		I_{AS}	37	A
Single Pulse Avalanche Energy L =0.3mH [A]		E_{AS}	380	mJ
Power Dissipation [C]	T_C = 25ºC	P_D	130.5	W
	T_C = 100ºC		65.5	W
Operating 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_{thJC}	1.15	ºC/W
Maximum Junction-to-Ambient	Steady-State	R_{thJA}	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		68	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} =68V, V_{GS} =0V	T_J =25ºC	--	--	1	μA
			T_J =100ºC	--	--	25	
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		--	6.5	7.5	mΩ
g_{FS}	Forward Transconductance	V_{DS} = 5V, I_D =20A		--	30	--	S
V_{SD}	Diode Forward Voltage	I_S =20A, V_{GS} =0V		--	--	1	V
I_S	Maximum Body-Diode Continuous Current [B]			--	--	95	A
DYNAMIC PARAMETERS							
C_{iss}	Input Capacitance	V_{GS} =0V, V_{DS} =30V, f =1MH_Z		--	4169	--	pF
C_{oss}	Output Capacitance			--	274	--	
C_{rss}	Reverse Transfer Capacitance			--	222	--	
SWITCHING PARAMETERS							
Q_g(10V)	Total Gate Charge	V_{GS} =10V,V_{DS} =30V, I_D =30A		--	70	--	nC
Q_{gs}	Gate Source Charge			--	20	--	
Q_{gd}	Gate Drain Charge			--	18	--	
$t_{D(on)}$	Turn-On Delay Time	V_{GS} =10V,V_{DS} =30V, I_D =30A, R_G =3Ω		--	15	--	ns
t_r	Turn-On Rise Time			--	94	--	
$T_{D(off)}$	Turn-Off Delay Time			--	46	--	
t_f	Turn-Off Fall Time			--	32	--	
t_{rr}	Body Diode Reverse Recovery Time	I_F =20A, di/dt =100A/μs		--	78	--	ns
Q_{rr}	Body Diode Reverse Recovery Charge			--	51	--	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 Characteristics T_J = 25ºC, unless otherwise noted

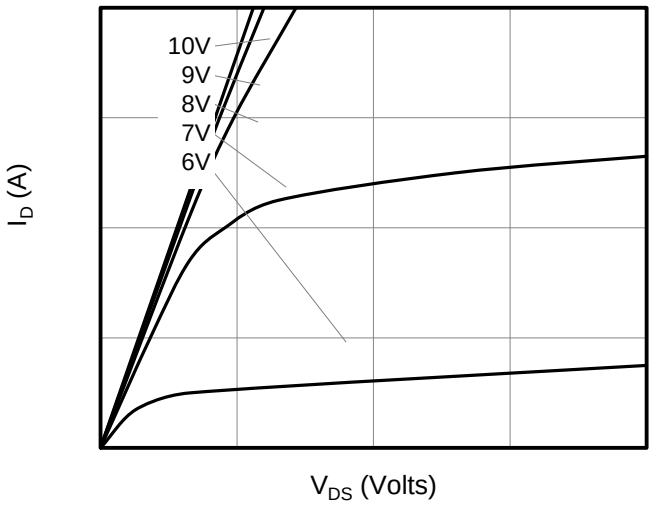


Figure 1: On-Region Characteristics

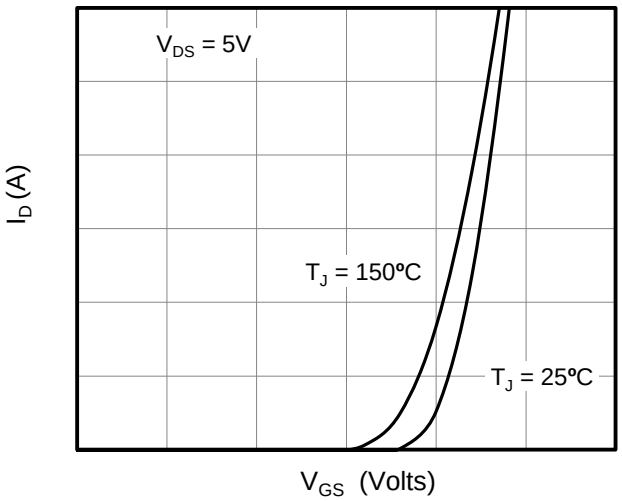


Figure 2: Transfer Characteristics

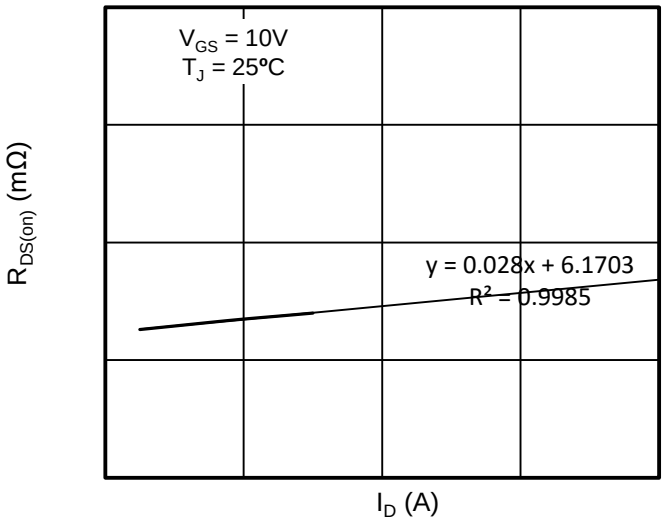


Figure 3: On-Resistance vs. Drain Current

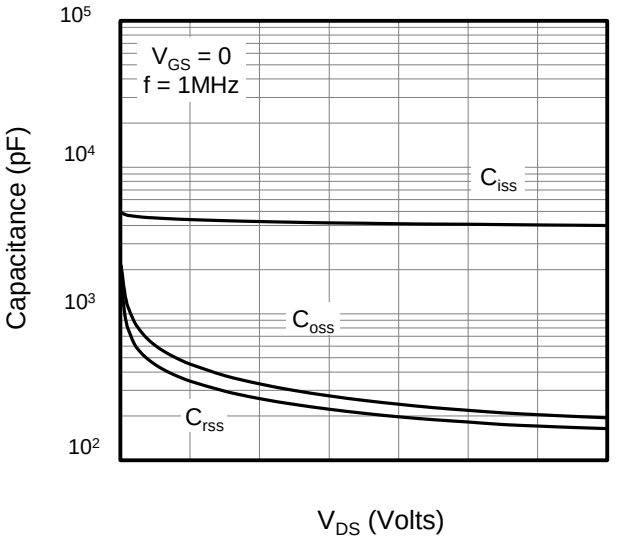


Figure 4: Capacitance Characteristics

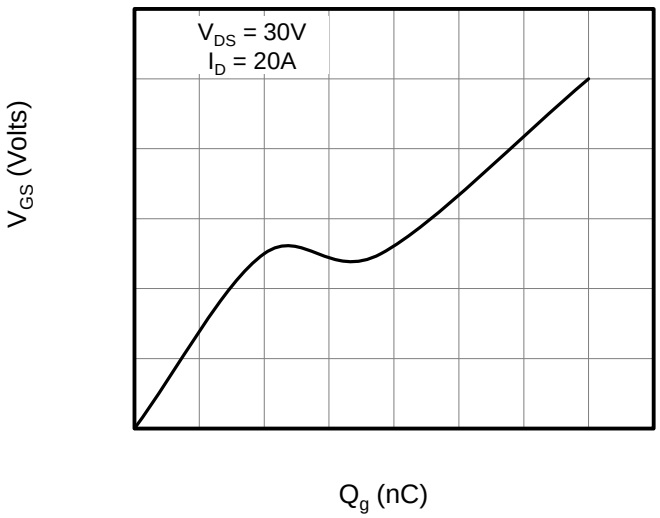


Figure 5: Gate Charge Characteristics

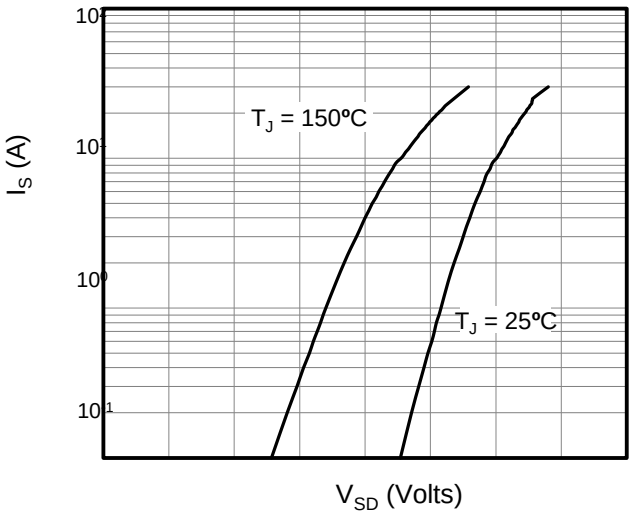


Figure 6: Body Diode Forward Voltage

Typical Characteristics T_J = 25ºC, unless otherwise noted

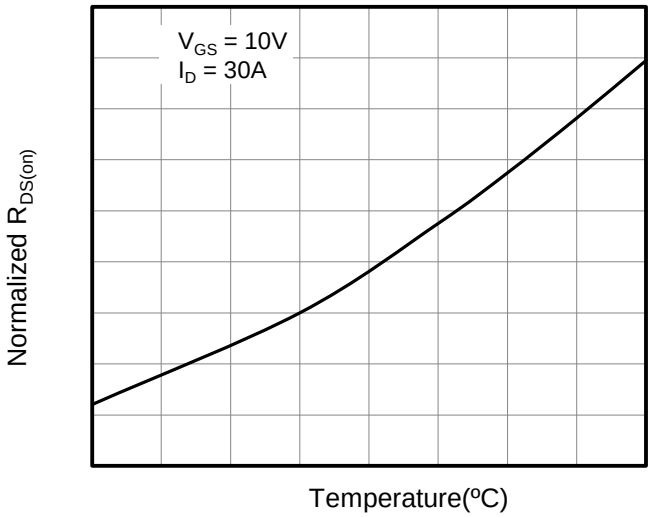


Figure 7: On-Resistance vs. Junction Temperature

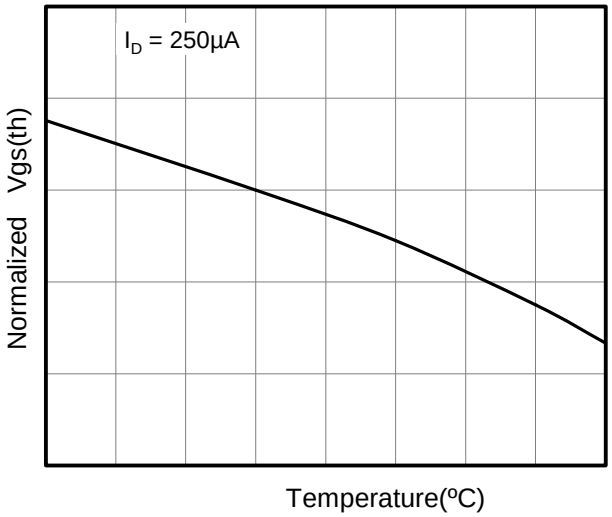


Figure 8: Vgs(th) vs. Junction Temperature

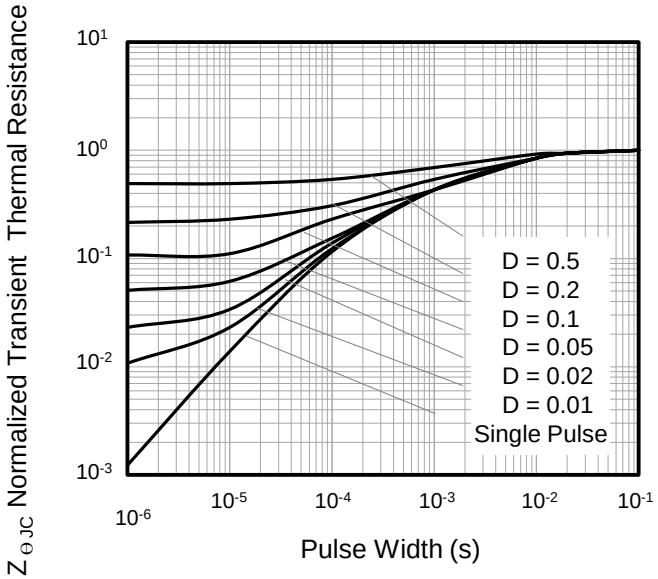


Figure 9: Normalized Transient Thermal Resistance

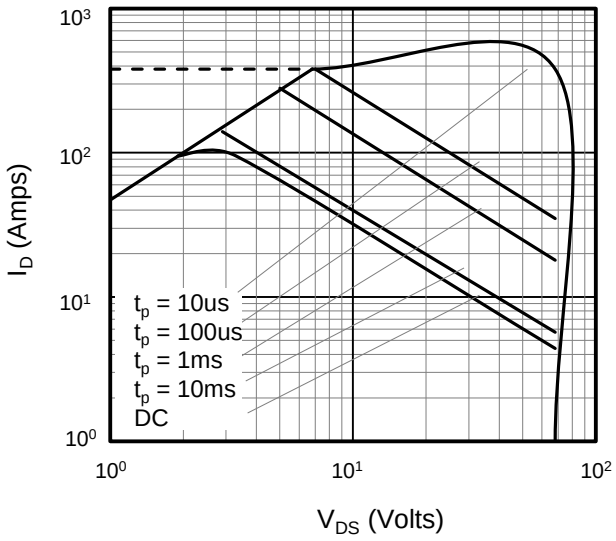


Figure 10: Safe Operating Area

Figure A：Gate Charge Test Circuit and Waveform

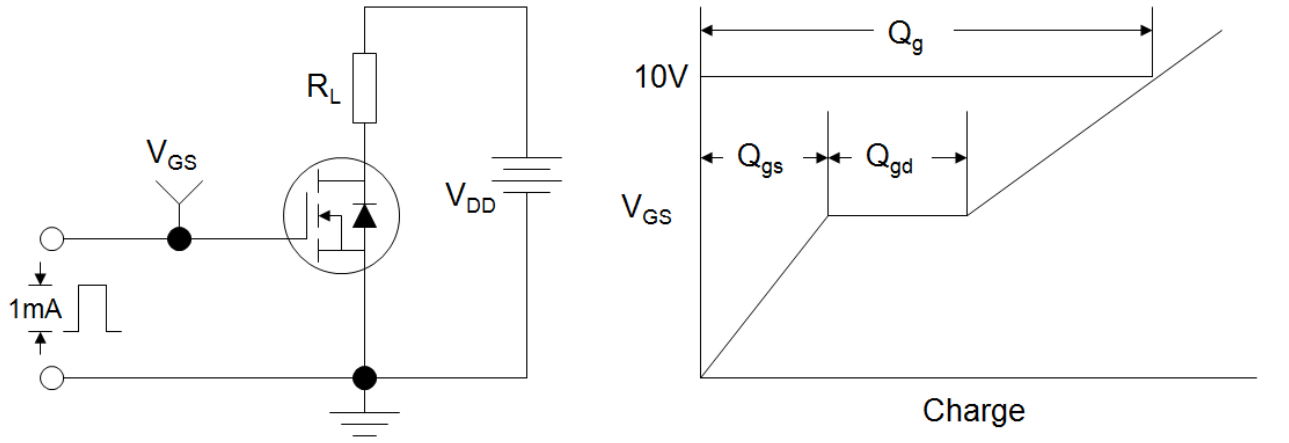


Figure B：Resistive Switching Test Circuit and Waveform

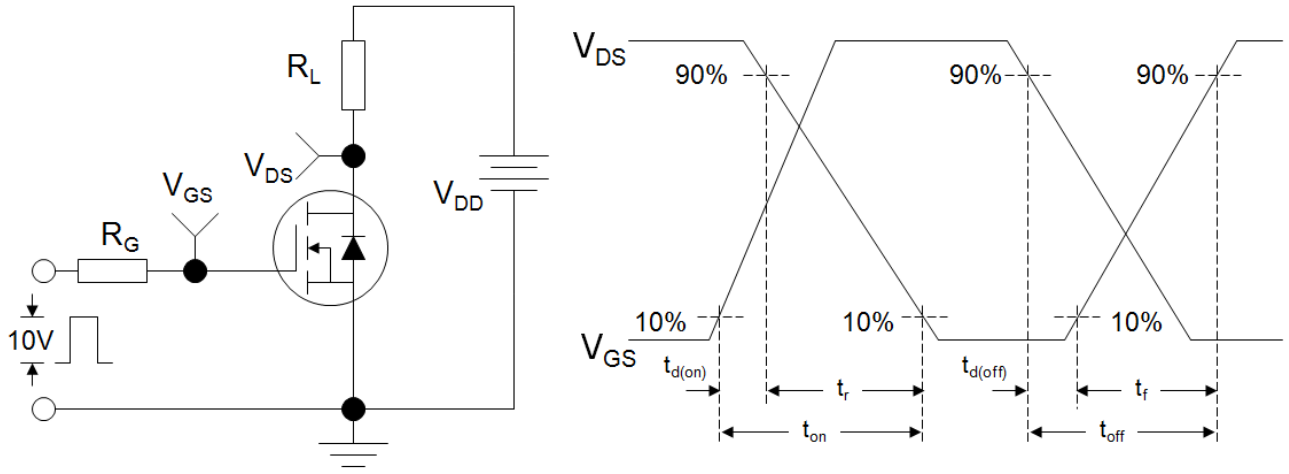
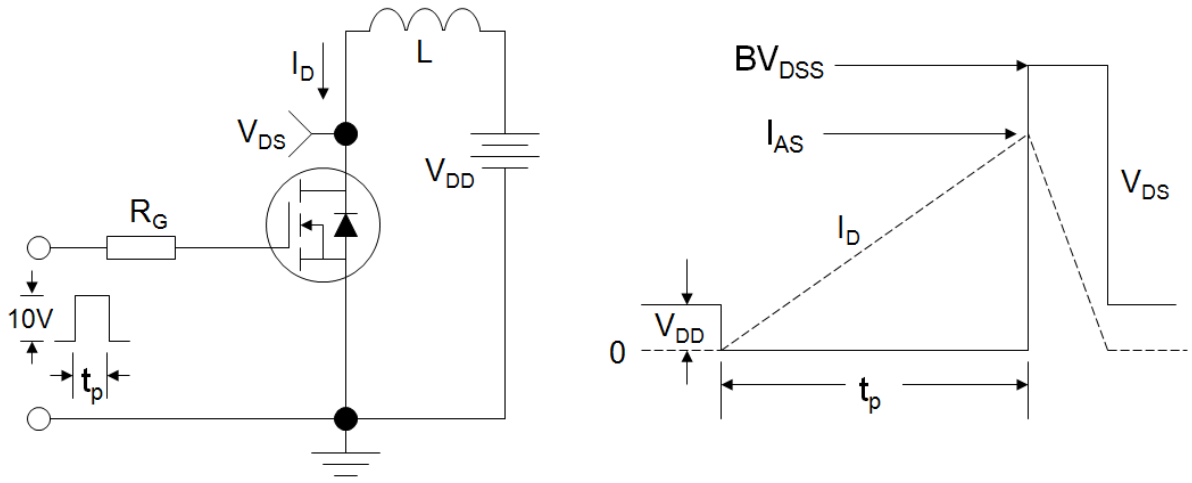
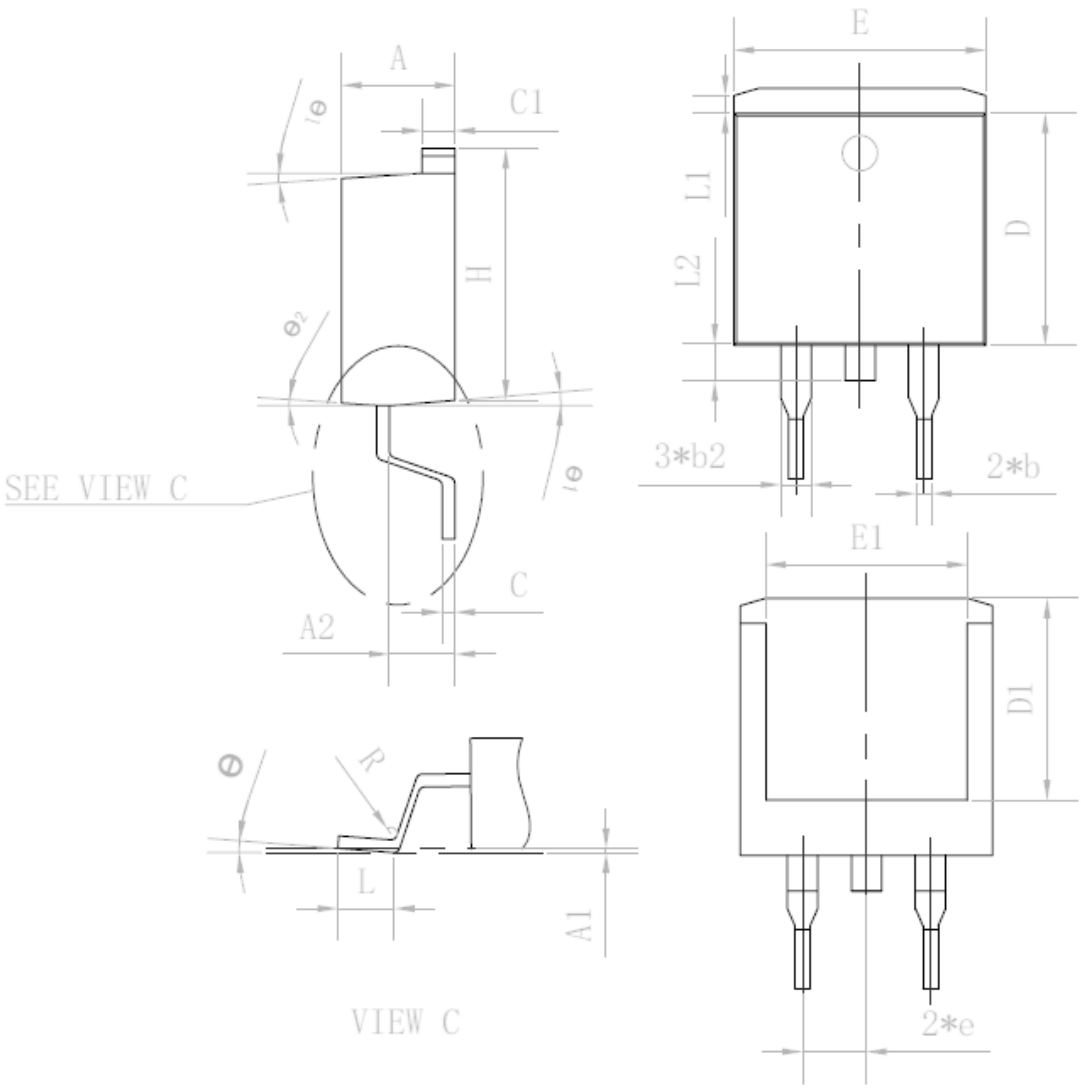


Figure C：Unclamped Inductive Switching Test Circuit and Waveform

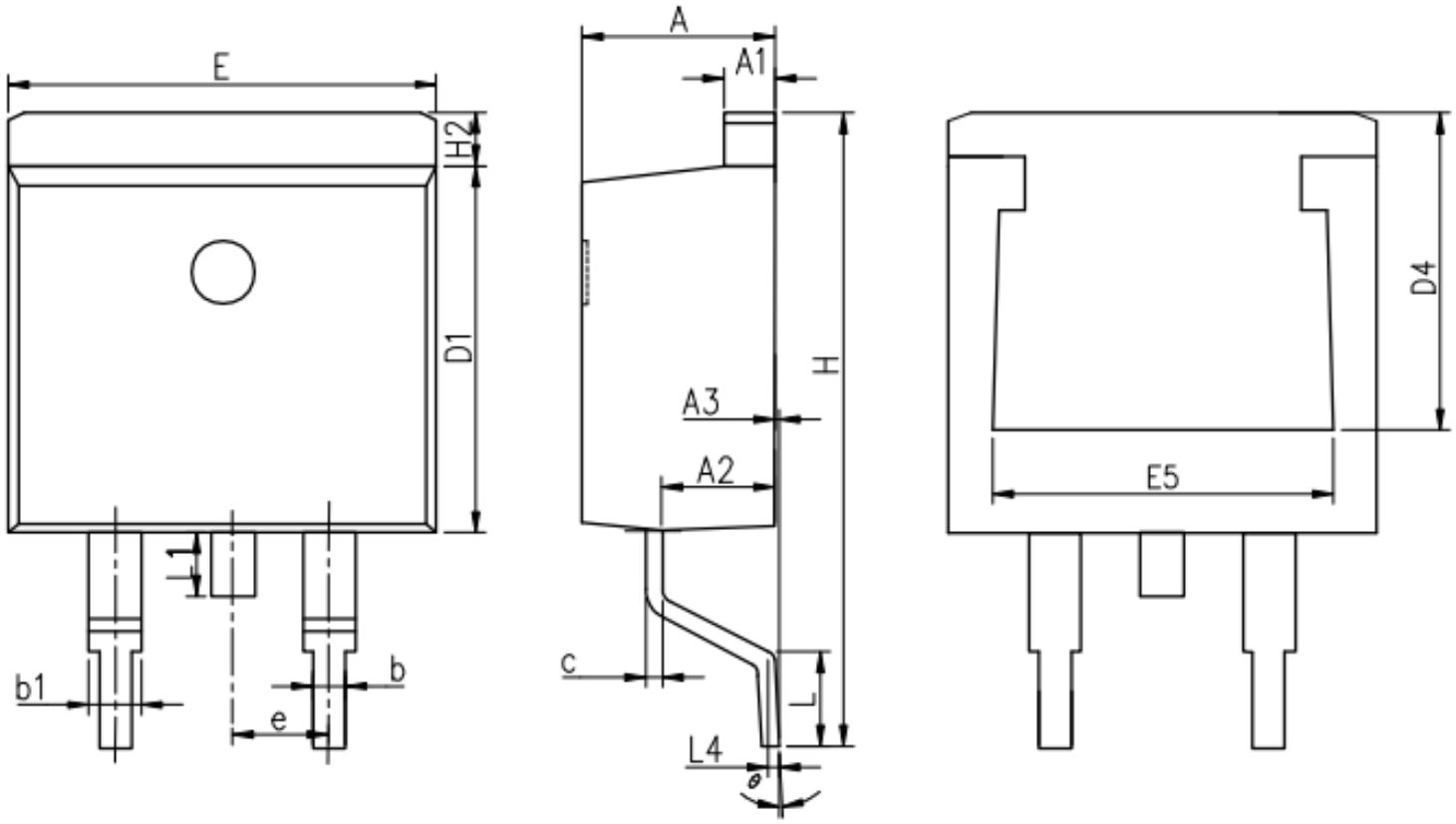


TO-263（E）



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°

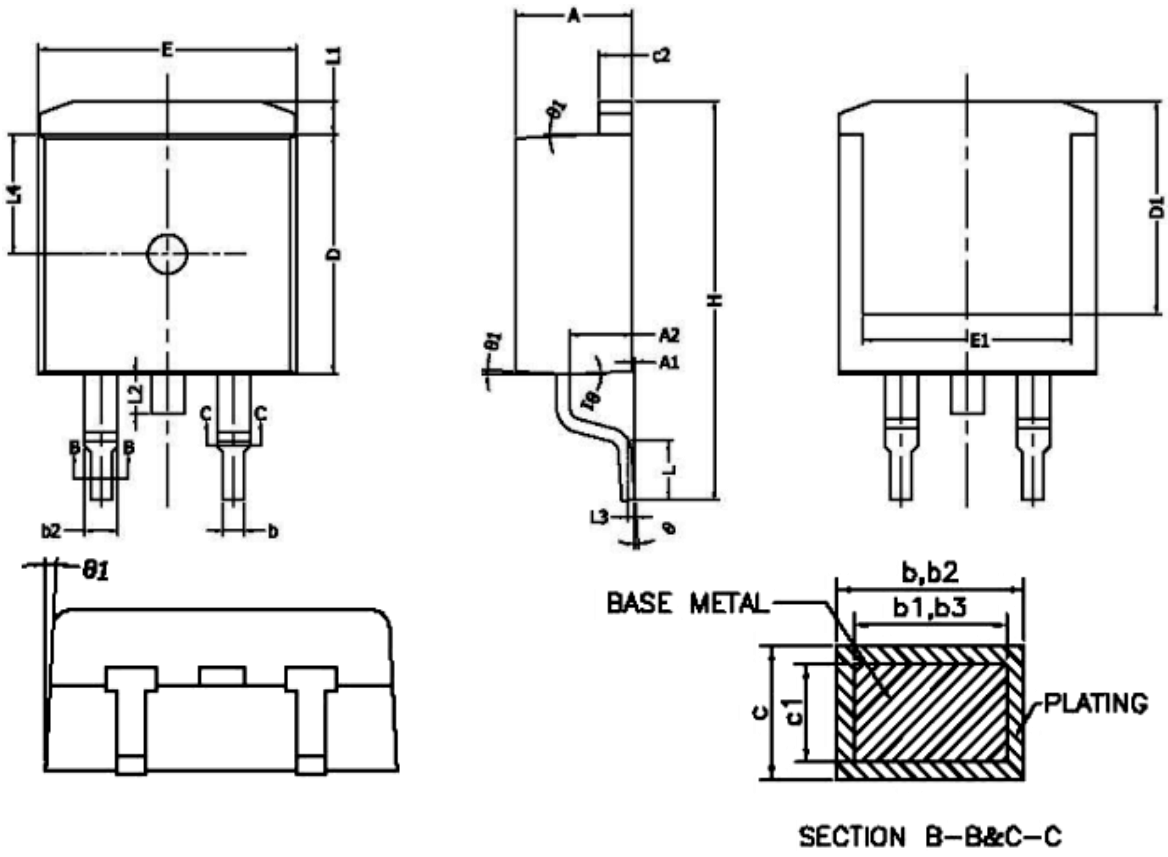
TO-263（H）



Unit:mm			
Symbol	Min.	Nom	Max.
A	4.37	4.57	4.77
A1	1.22	1.27	1.42
A2	2.49	2.69	2.89
A3	0.00	0.13	0.25
b	0.70	0.81	0.96
b1	1.17	1.27	1.47
c	0.30	0.38	0.53
D1	8.50	8.70	8.90
D4	6.60	-	-

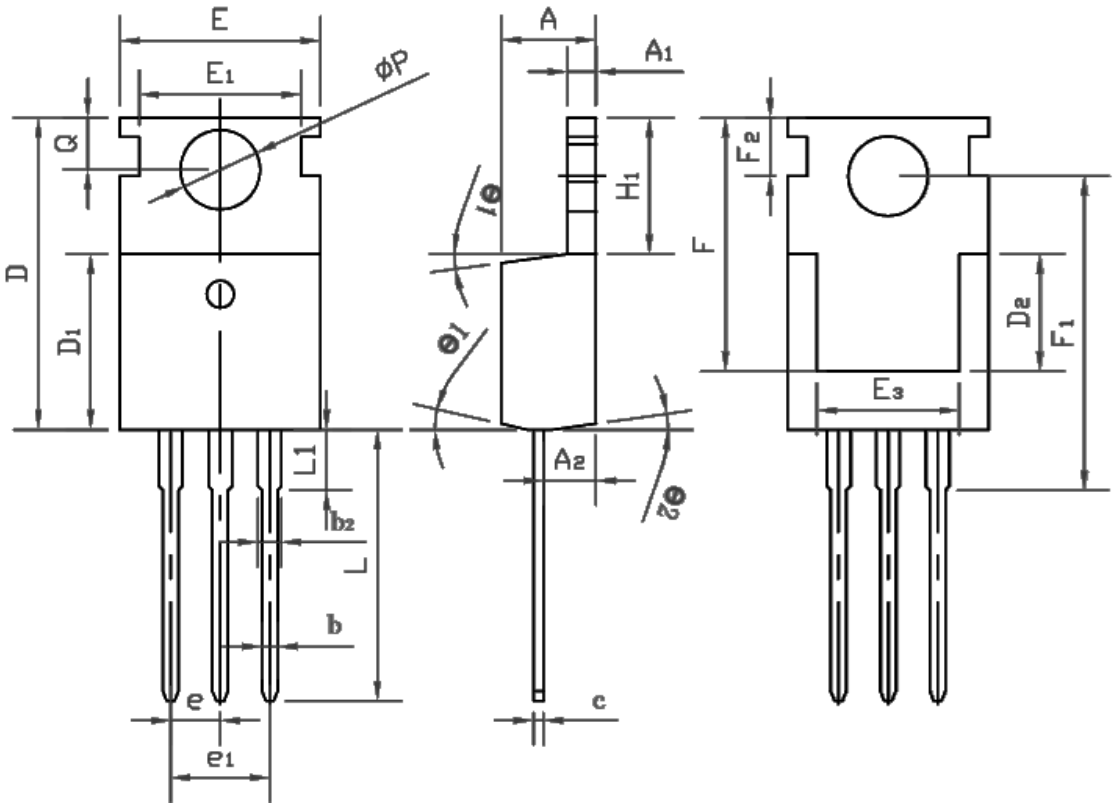
Unit:mm			
Symbol	Min.	Nom	Max.
E	9.86	10.16	10.36
E5	7.06	-	-
e	2.54BSC		
H	14.70	15.10	15.50
H2	1.07	1.27	1.47
L	2.00	2.30	2.60
L1	1.40	1.55	1.70
L4	0.25BSC		
θ	0°	5°	9°

TO-263（I）



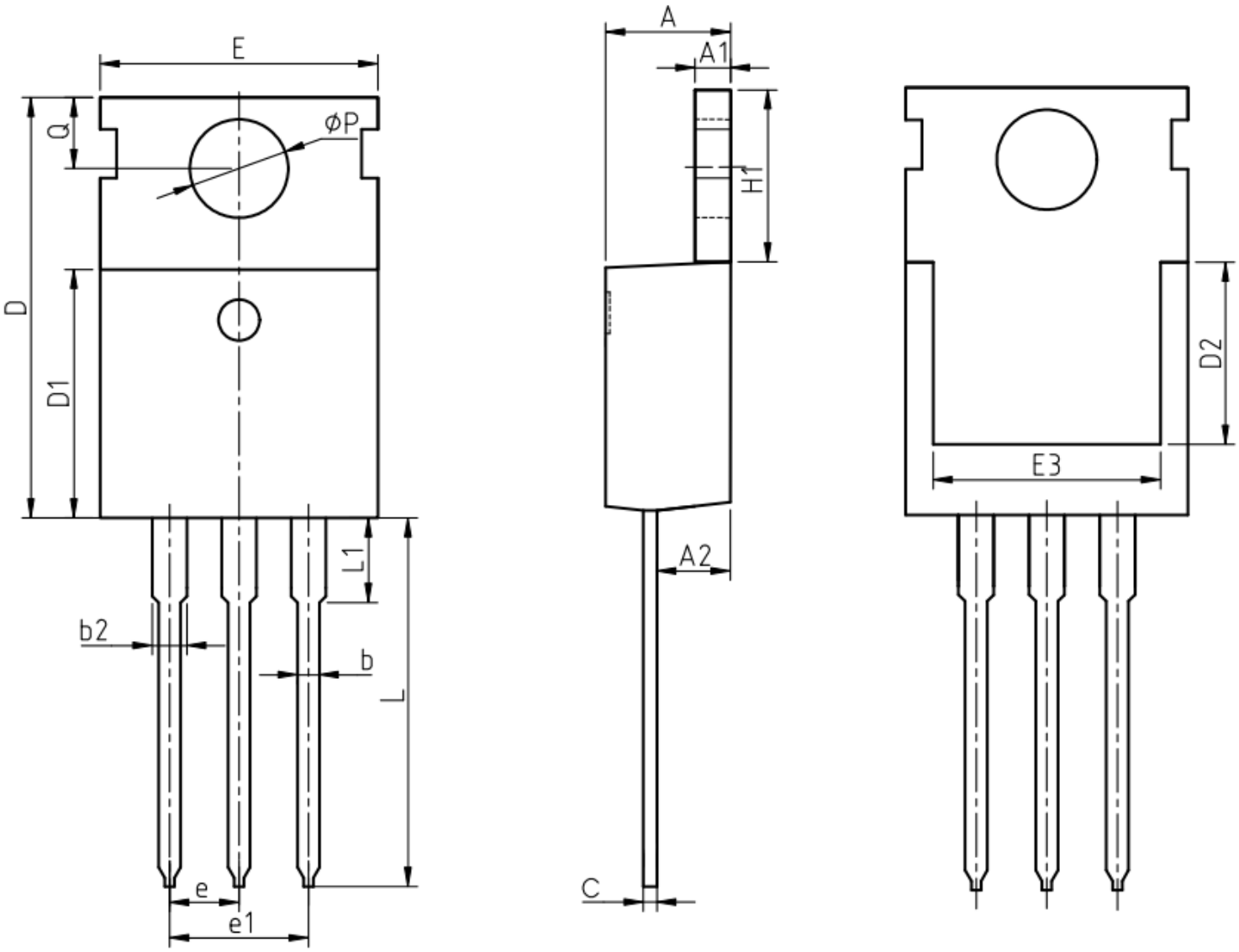
SYMBOL	MIN	NOM	MAX
A	4.40	4.50	4.60
A1	0	0.10	0.25
A2	2.20	2.40	2.60
b	0.76	---	0.89
b1	0.75	0.80	0.85
b2	1.23	---	1.37
b3	1.22	1.27	1.32
c	0.47	---	0.60
c1	0.46	0.51	0.56
c2	1.25	1.30	1.35
D	9.10	9.20	9.30
D1	8.00	---	---
E	9.80	9.90	10.00
E1	7.80	---	---
e	2.54 BSC		
H	14.90	15.30	15.70
L	2.00	2.30	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-220（E）



SYMBOL	MIN	NOM	MAX
A	4.27	4.57	4.87
A1	1.15	1.30	1.45
A2	2.10	2.40	2.70
b	0.70	0.80	1.00
b2	1.17	1.27	1.50
c	0.40	0.50	0.65
D	15.10	15.60	16.10
D1	8.80	9.10	9.40
D2	5.70	6.70	7.00
E	9.70	10.00	10.30
E1	–	8.70	–
E2	9.63	10.00	10.35
E3	7.00	8.00	8.40
e	2.54 BSC		
e1	5.08 BSC		
H1	6.00	6.50	6.85
L	12.75	13.50	13.90
L1	–	3.10	3.40
ΦP	3.45	3.60	3.75
Q	2.60	2.80	3.00
θ1	4°	7°	10°
θ2	0°	3°	6°
F	13.30	13.50	13.70
F1	15.50	15.90	16.30
F2	2.80	3.00	3.20

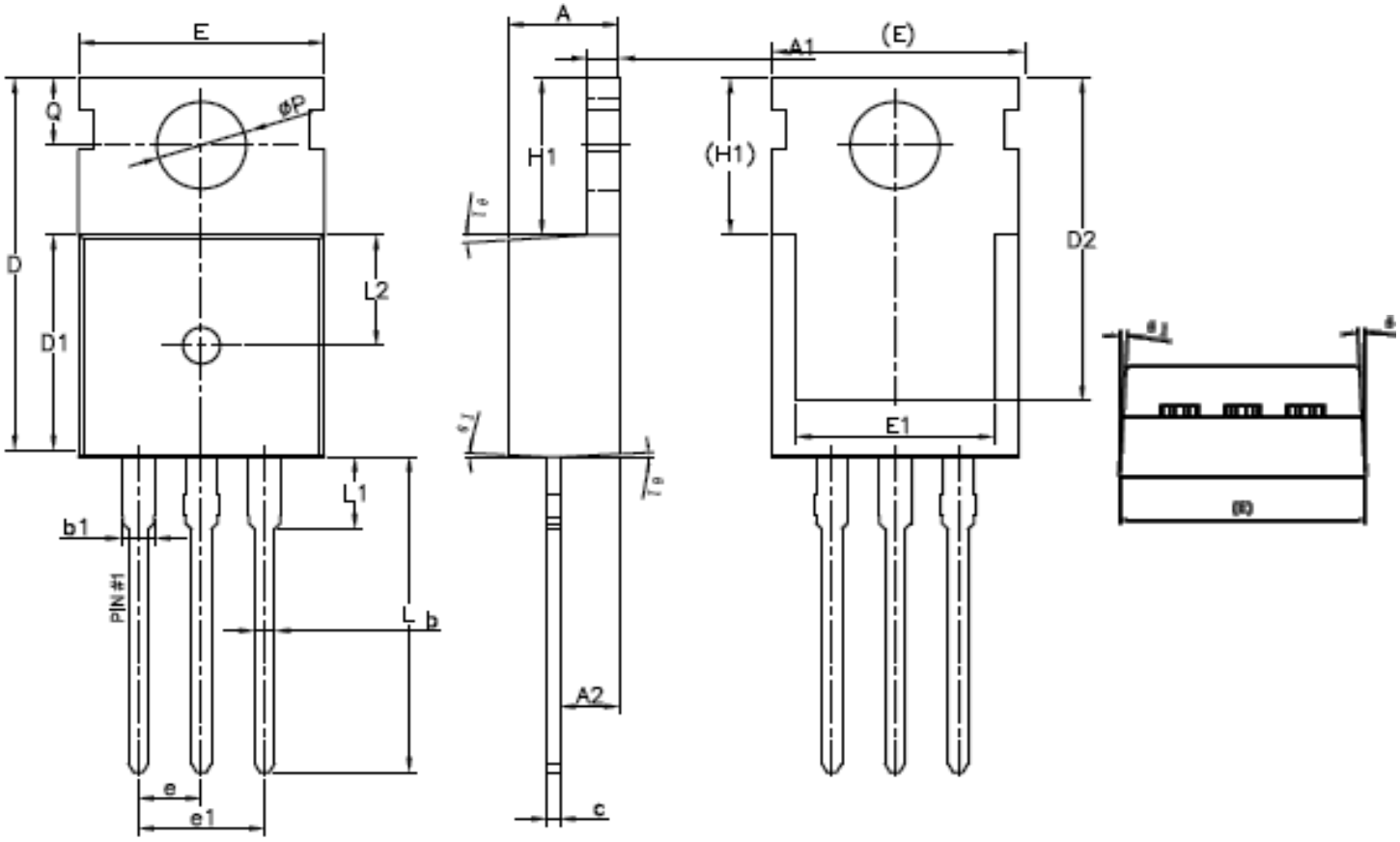
TO-220（H）



Unit:mm			
Symbol	Min.	Nom	Max.
A	4.37	4.57	4.70
A1	1.25	1.30	1.40
A2	2.20	2.40	2.60
b	0.70	0.80	0.95
b2	1.17	1.27	1.47
c	0.45	0.50	0.60
D	15.10	15.60	16.10
D1	8.80	9.10	9.40
D2	5.50	-	-

Unit:mm			
Symbol	Min.	Nom	Max.
E	9.70	10.00	10.30
E3	7.00	-	-
e	2.54 BSC		
e1	5.08 BSC		
H1	6.25	6.50	6.85
L	12.75	13.50	13.80
L1	-	3.10	3.40
ΦP	3.40	3.60	3.80
Q	2.60	2.80	3.00

TO-220（I）



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		
øP	3.55	3.60	3.65
Q	2.73	–	2.87
θ1	1°	3°	5°

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