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

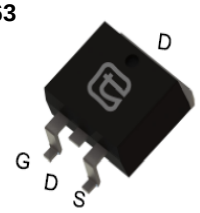
Product Summary

V_{DS}	85V
I_D (at V_{GS}=10V)	115A
$R_{DS(ON)}$ (at V_{GS}=10V)	< 7.8mΩ

100% UIS Tested

RoHS

TO-263



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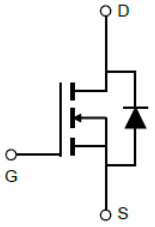


Part Number	Package Type	Form	Marking
TTB115N08AA	TO-263	Tape&Reel	TTB115N08AA
TTP115N08AA	TO-220	Tube	TTP115N08AA

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		80	
Pulsed Drain Current [A]		I_{DM}	345	A
Avalanche Current [A]		I_{AS}	57	A
Single Pulse Avalanche Energy L =0.3mH [A]		E_{AS}	487	mJ
Power Dissipation [C]	T_C =25ºC	P_D	200	W
	T_C =100ºC		100	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	$R_{\theta JC}$	0.75	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 =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			6.4	7.8	mΩ
g_{FS}	Forward Transconductance	V_{DS} =5V, I_D =20A			80		S
V_{SD}	Diode Forward Voltage	I_S =20A, V_{GS} =0V				1.2	V
I_S	Maximum Body-Diode Continuous Current [B]					105	A
DYNAMIC PARAMETERS							
C_{iss}	Input Capacitance	V_{GS} =0V, V_{DS} =40V, f =1MH_Z			6650		pF
C_{oss}	Output Capacitance				302		
C_{rss}	Reverse Transfer Capacitance				261		
R_g	Gate Resistance	f =1MH_Z			2.5		Ω
SWITCHING PARAMETERS							
Q_g	Total Gate Charge	V_{GS} =10V,V_{DS} =40V, I_D =20A			112		nC
Q_{gs}	Gate Source Charge				35		
Q_{gd}	Gate Drain Charge				23		
$t_{D(on)}$	Turn-On Delay Time	V_{GS} =10V,V_{DS} =40V, I_D =20A, R_G =2.5Ω			24		ns
t_r	Turn-On Rise Time				19		
$T_{D(off)}$	Turn-Off Delay Time				70		
t_f	Turn-Off Fall Time				30		
t_{rr}	Body Diode Reverse Recovery Time	I_F =20A, di/dt =100A/μs			37		ns
Q_{rr}	Body Diode Reverse Recovery Charge				58		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

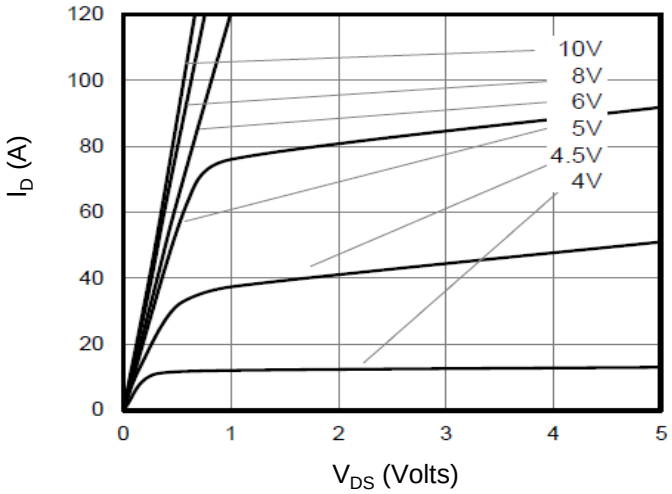


Figure 1: On-Region Characteristics

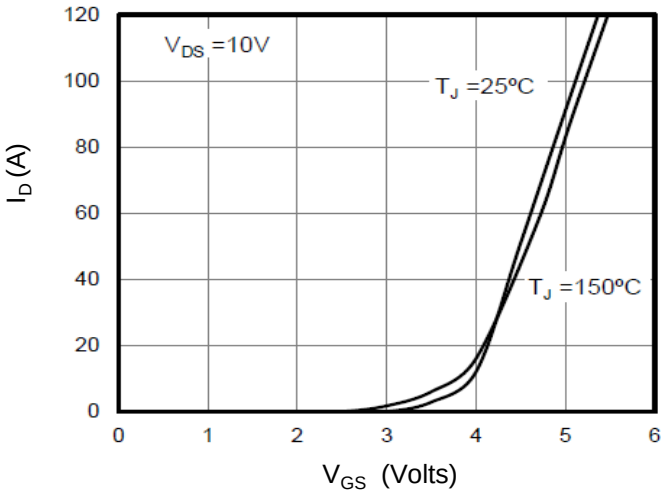


Figure 2: Transfer Characteristics

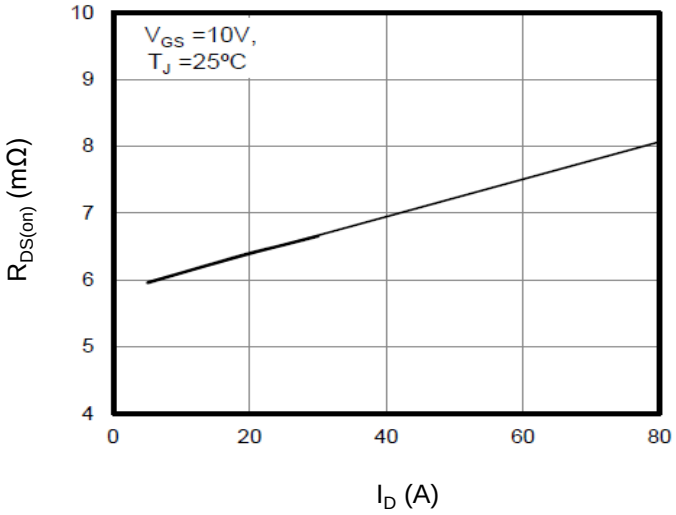


Figure 3: On-Resistance vs. Drain Current

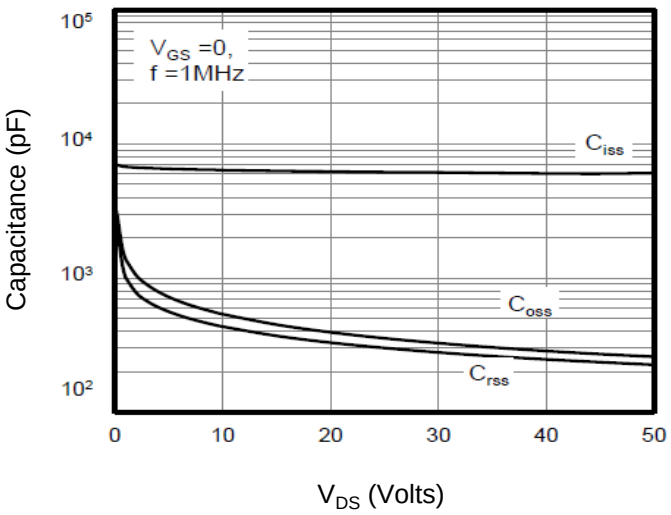


Figure 4: Capacitance Characteristics

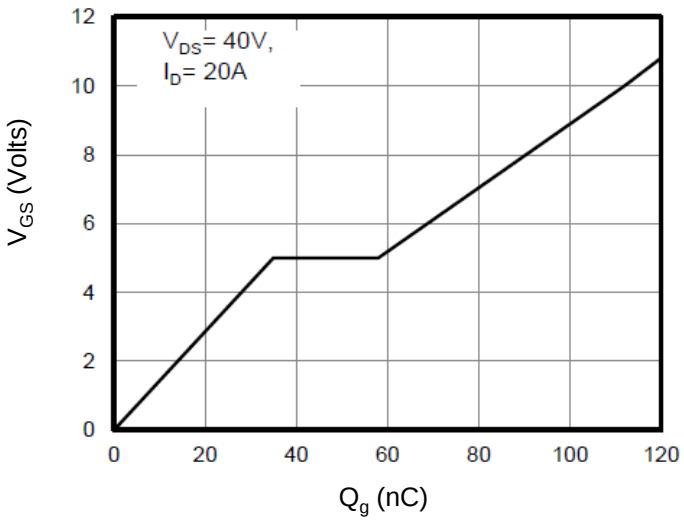


Figure 5: Gate Charge Characteristics

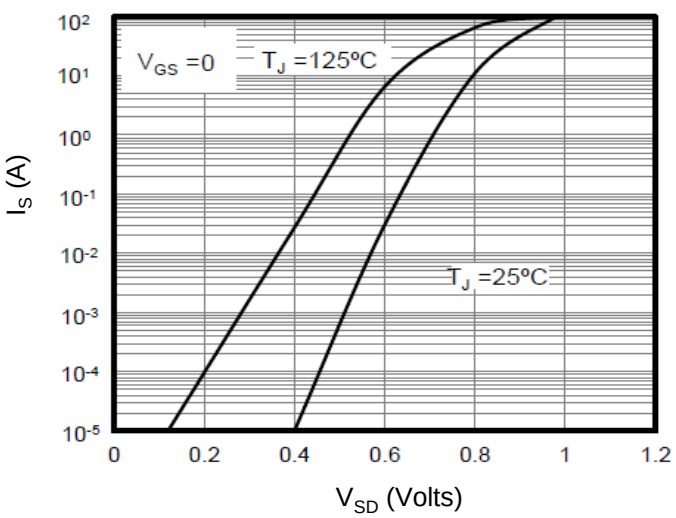


Figure 6: Body Diode Forward Voltage

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

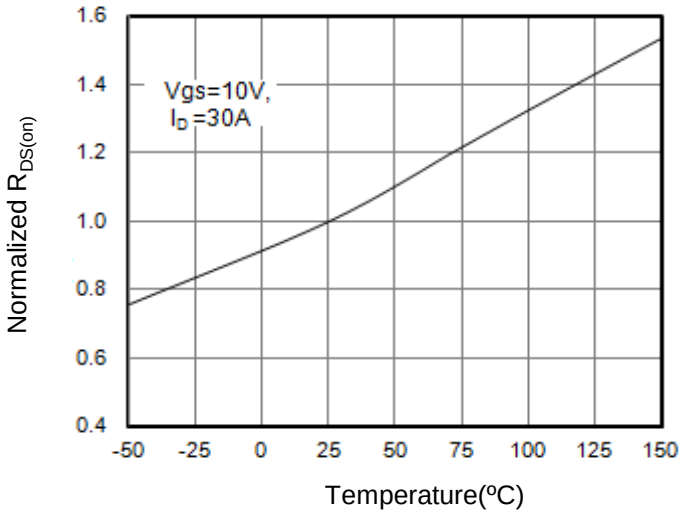


Figure 7: On-Resistance vs. Junction Temperature

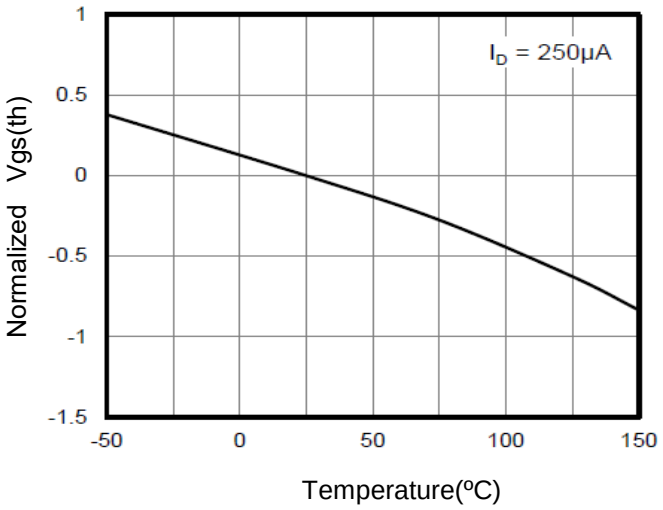


Figure 8: Vgs(th) vs. Junction Temperature

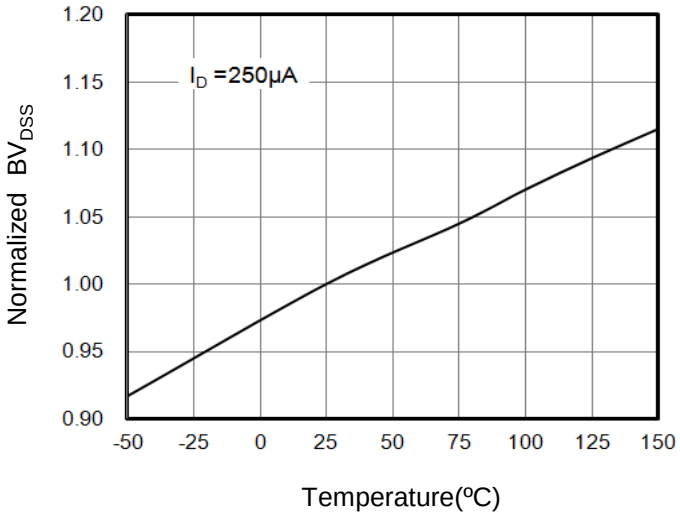


Figure 9: BV_{DSS} vs. Junction Temperature

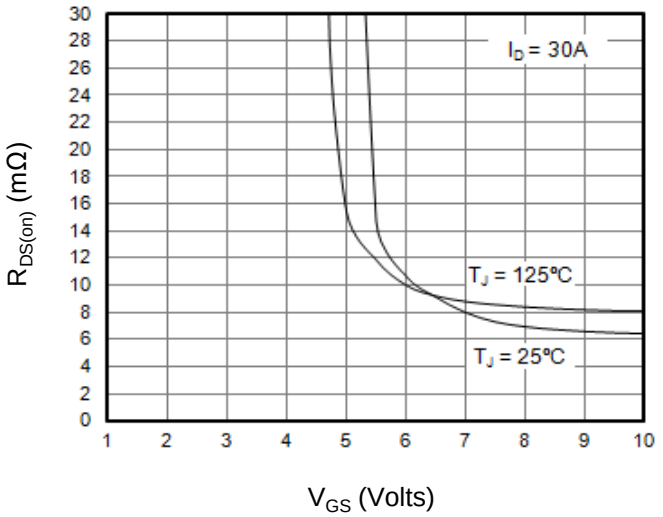


Figure 10: On-Resistance vs. Gate-Source Voltage

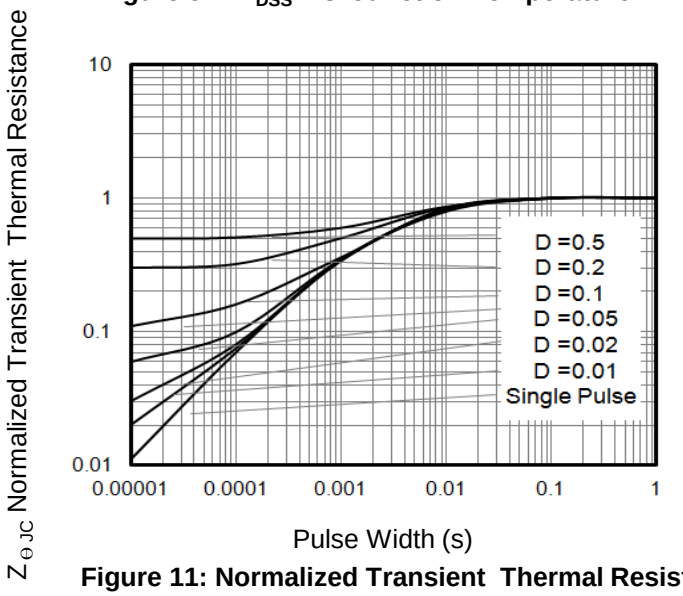


Figure 11: Normalized Transient Thermal Resistance

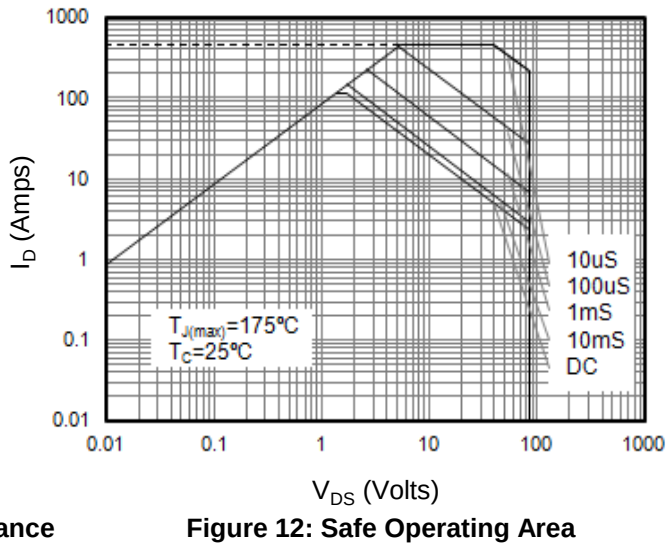


Figure 12: Safe Operating Area

Figure A：Gate Charge Test Circuit and Waveforms

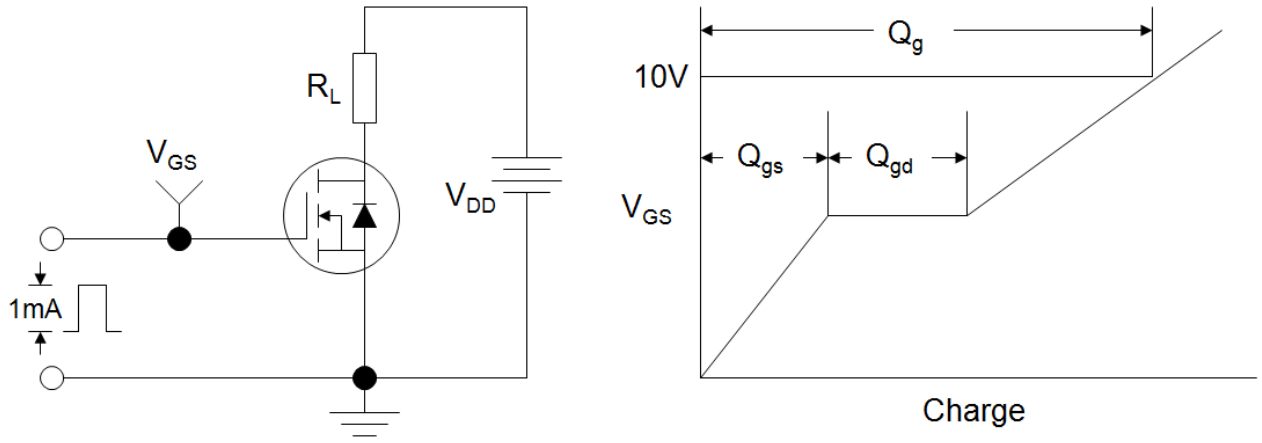


Figure B：Resistive Switching Test Circuit and Waveforms

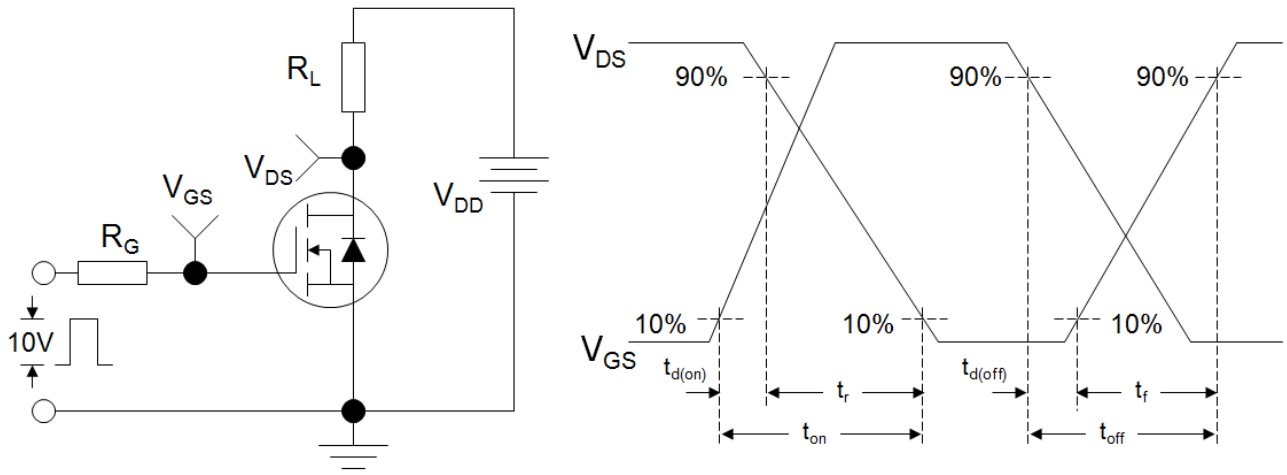
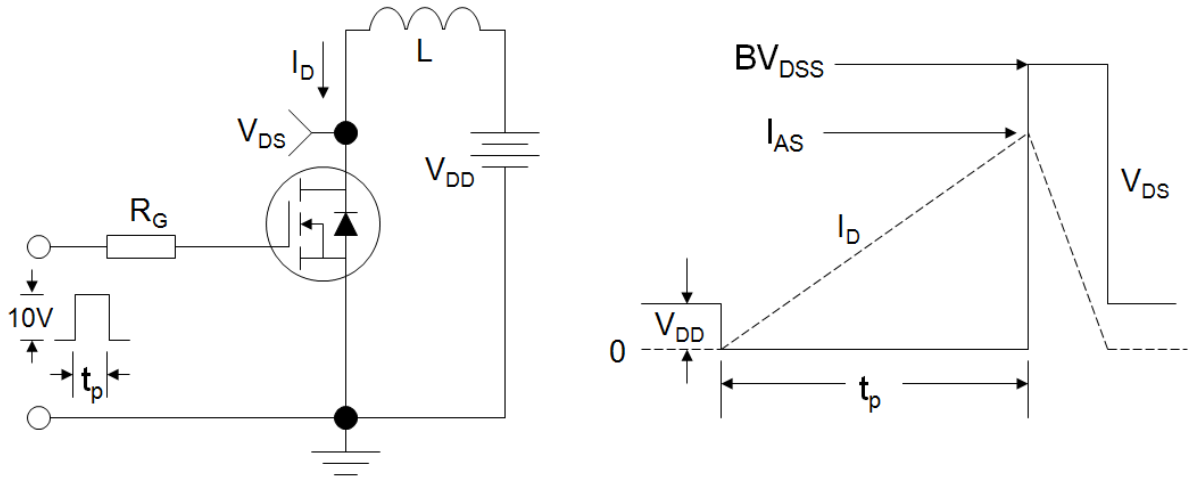


Figure C：Unclamped Inductive Switching (UIS) Test Circuit and Waveforms



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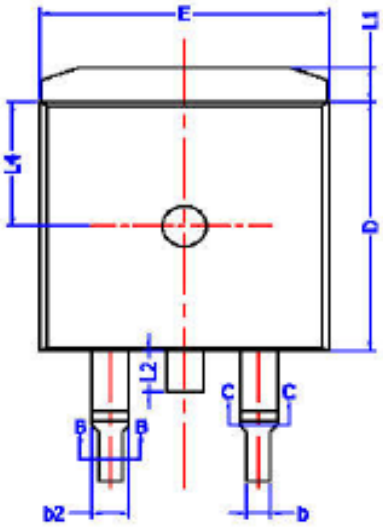
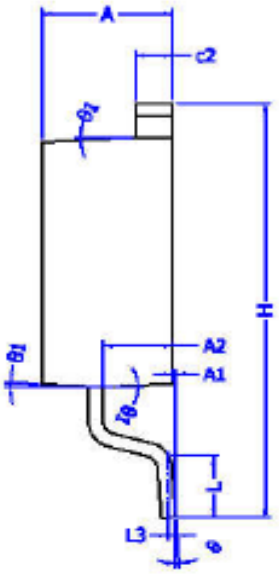
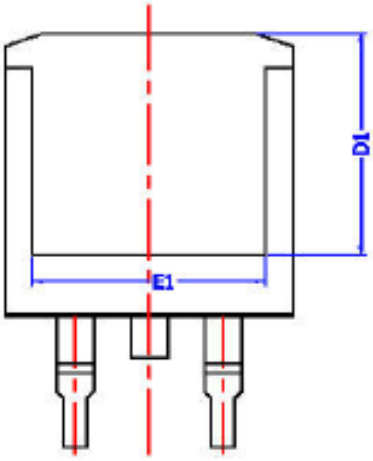
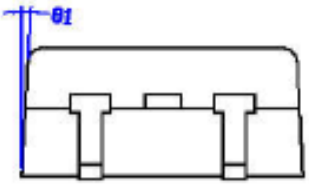




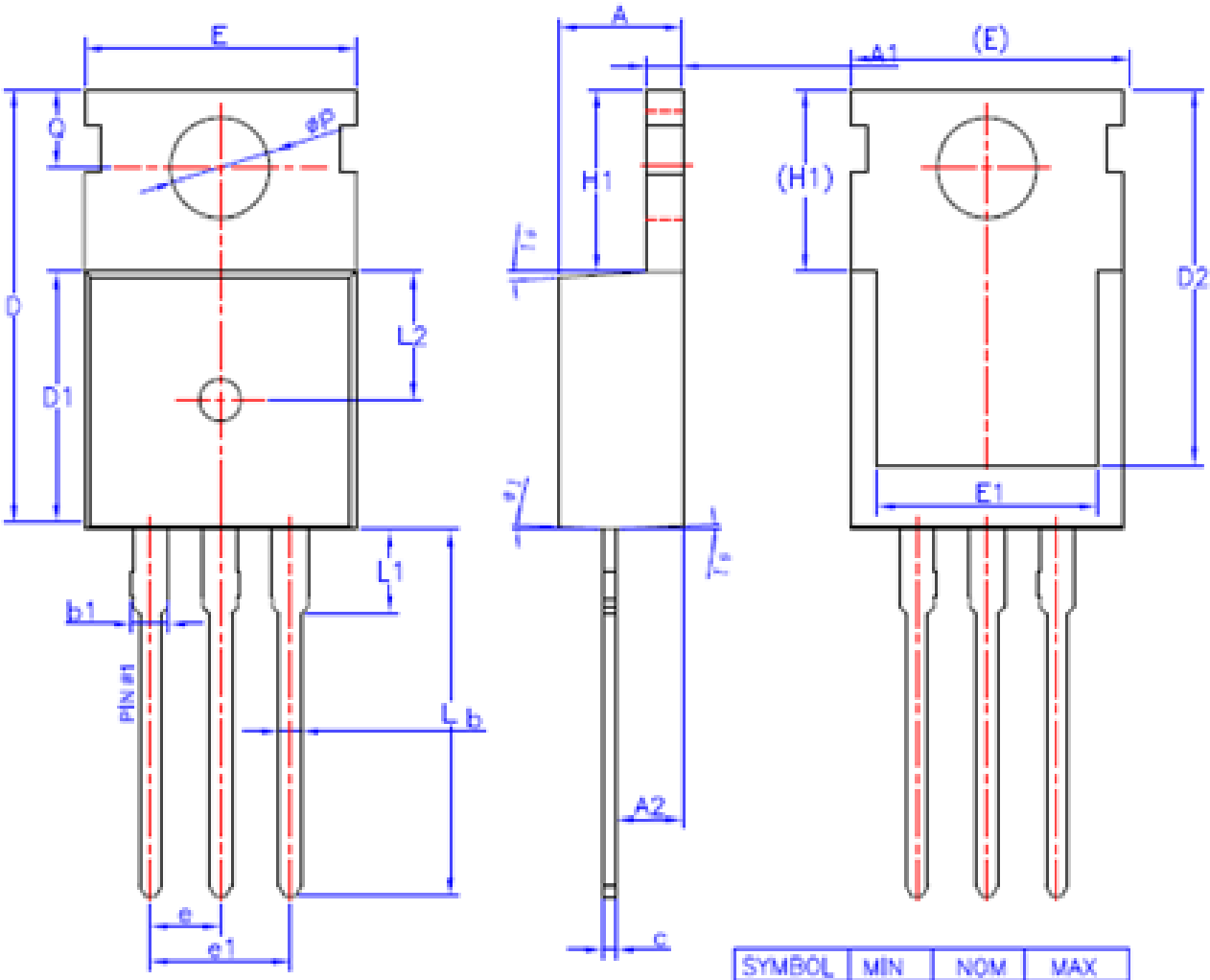


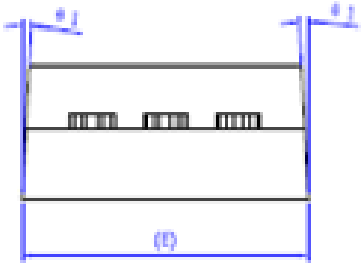


COMMON DIMENSIONS
(UNITS OF MEASURE =MILLIMETER)

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

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