
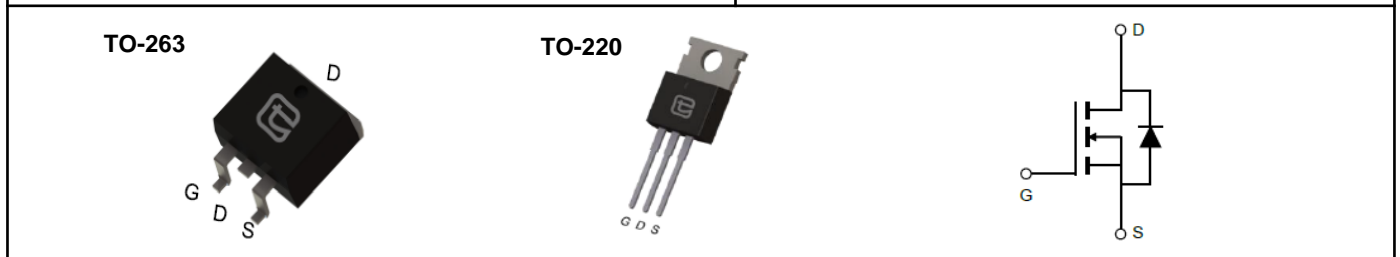




85V N-Channel Trench MOSFET(Preliminary)

<p>General Description</p> <ul style="list-style-type: none"> ● Trench Power technology ● Low $R_{DS(ON)}$ ● Low Gate Charge ● Optimized for fast-switching applications <p>Applications</p> <ul style="list-style-type: none"> ● Synchronous Rectification in DC/DC and AC/DC Converters ● Isolated DC/DC Converters in Telecom and Industrial 	<p>Product Summary</p> <table border="0"> <tr> <td>V_{DS}</td> <td>85V</td> </tr> <tr> <td>I_D (at $V_{GS}=10V$)</td> <td>115A</td> </tr> <tr> <td>$R_{DS(ON)}$ (at $V_{GS}=10V$)</td> <td>< 7.8mΩ</td> </tr> </table> <p>100% UIS Tested</p> 	V_{DS}	85V	I_D (at $V_{GS}=10V$)	115A	$R_{DS(ON)}$ (at $V_{GS}=10V$)	< 7.8m Ω
V_{DS}	85V						
I_D (at $V_{GS}=10V$)	115A						
$R_{DS(ON)}$ (at $V_{GS}=10V$)	< 7.8m Ω						



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

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}	± 20	V
Continuous Drain Current ^B	I_D	$T_C = 25^\circ\text{C}$	105
		$T_C = 100^\circ\text{C}$	80
Pulsed Drain Current ^A	I_{DM}	345	A
Avalanche Current ^A	I_{AS}	57	A
Single Pulse Avalanche Energy $L = 0.3\text{mH}$ ^A	E_{AS}	487	mJ
Power Dissipation ^C	P_D	$T_C = 25^\circ\text{C}$	200
		$T_C = 100^\circ\text{C}$	100
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	$R_{\theta JC}$	0.75	$^\circ\text{C/W}$
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	
STATIC PARAMETERS						
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	μA
			$T_J = 100^\circ\text{C}$		25	
I_{GSS}	Gate-Body Leakage Current	$V_{DS} = 0\text{V}, V_{GS} = \pm 20\text{V}$			± 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	$V_{GS} = 10\text{V}, I_D = 30\text{A}$		6.4	7.8	$\text{m}\Omega$
g_{FS}	Forward Transconductance	$V_{DS} = 5\text{V}, I_D = 20\text{A}$		80		S
V_{SD}	Diode Forward Voltage	$I_S = 20\text{A}, V_{GS} = 0\text{V}$			1.2	V
I_S	Maximum Body-Diode Continuous Current ^B				105	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	$V_{GS} = 0\text{V}, V_{DS} = 40\text{V}, f = 1\text{MHz}$		6650		pF
C_{oss}	Output Capacitance			302		
C_{rss}	Reverse Transfer Capacitance			261		
R_g	Gate Resistance	$f = 1\text{MHz}$		2.5		Ω
SWITCHING PARAMETERS						
Q_g	Total Gate Charge	$V_{GS} = 10\text{V}, V_{DS} = 40\text{V}, I_D = 20\text{A}$		112		nC
Q_{gs}	Gate Source Charge			35		
Q_{gd}	Gate Drain Charge			23		
$t_{D(on)}$	Turn-On Delay Time	$V_{GS} = 10\text{V}, V_{DS} = 40\text{V}, I_D = 20\text{A}, R_G = 2.5\Omega$		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	$I_F = 20\text{A}, di/dt = 100\text{A}/\mu\text{s}$		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 $T_{J(MAX)} = 175^\circ\text{C}$, 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

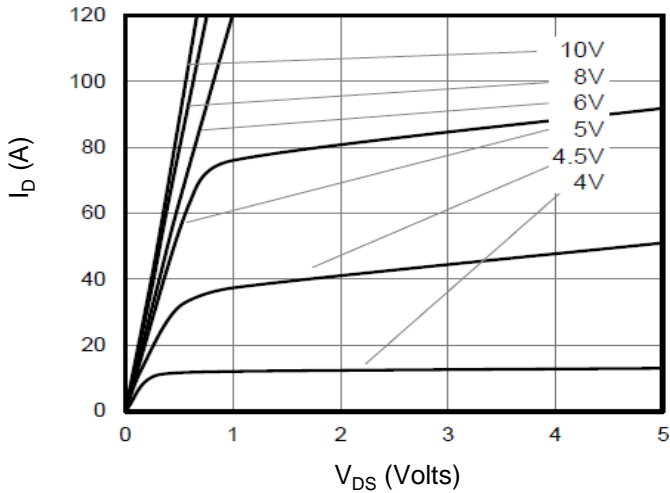


Figure 1: On-Region Characteristics

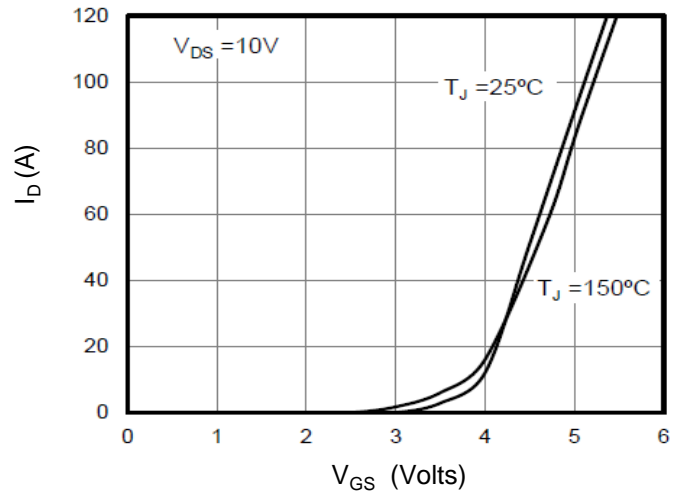


Figure 2: Transfer Characteristics

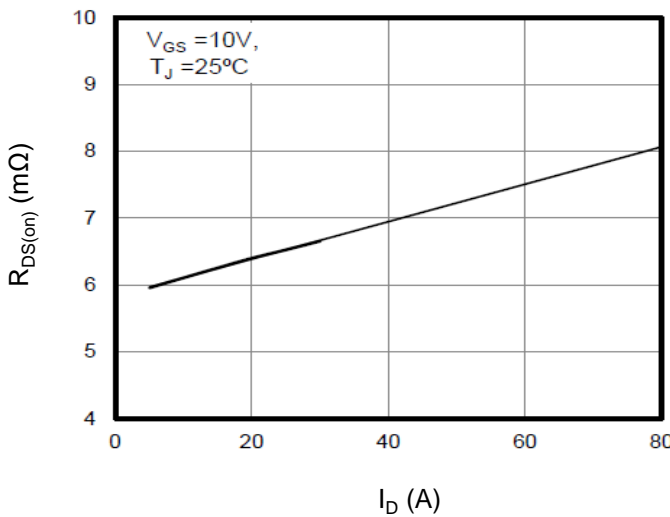


Figure 3: On-Resistance vs. Drain Current

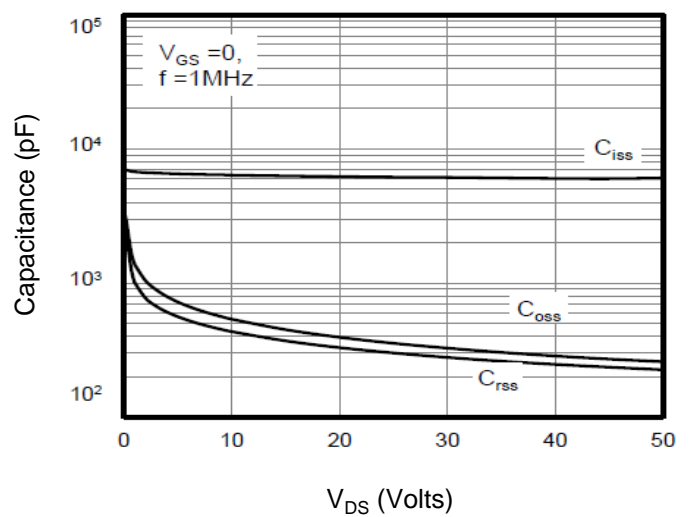


Figure 4: Capacitance Characteristics

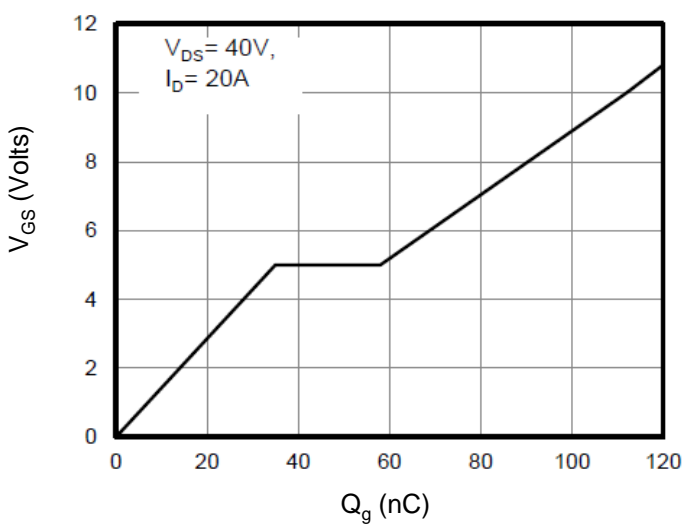


Figure 5: Gate Charge Characteristics

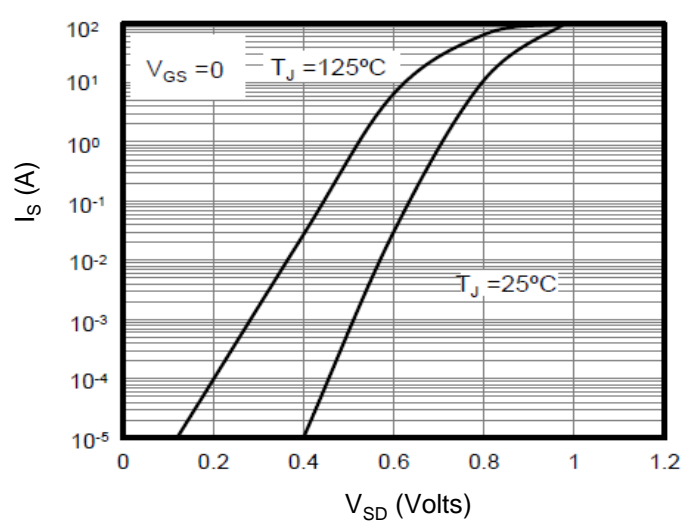


Figure 6: Body Diode Forward Voltage



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

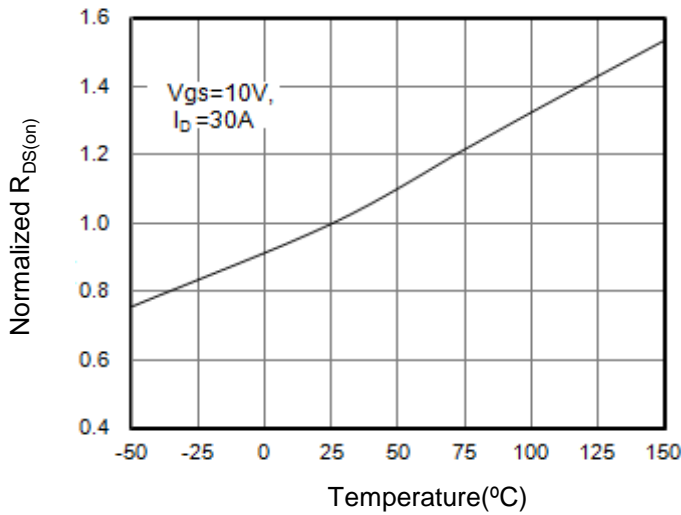


Figure 7: On-Resistance vs. Junction Temperature

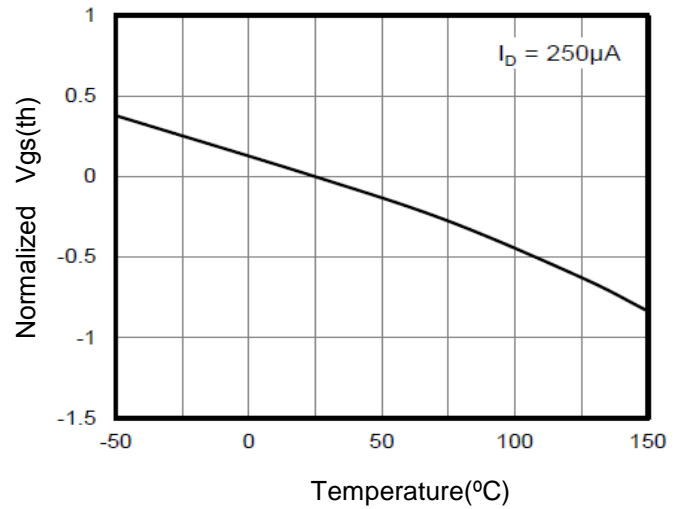


Figure 8: Vgs(th) vs. Junction Temperature

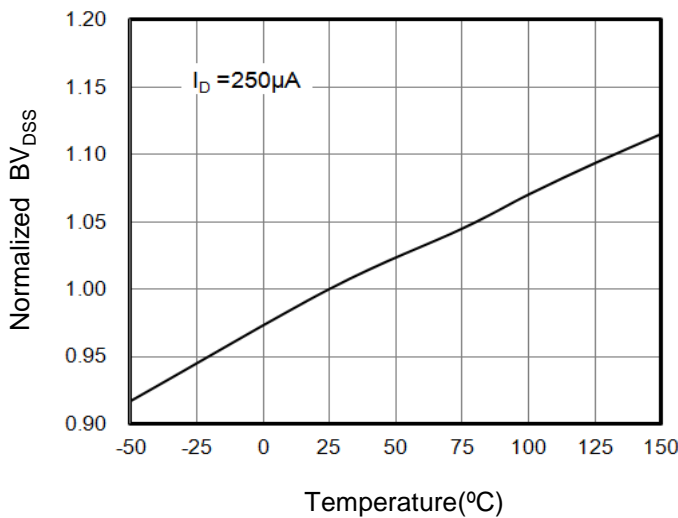


Figure 9: BV_{DSS} vs. Junction Temperature

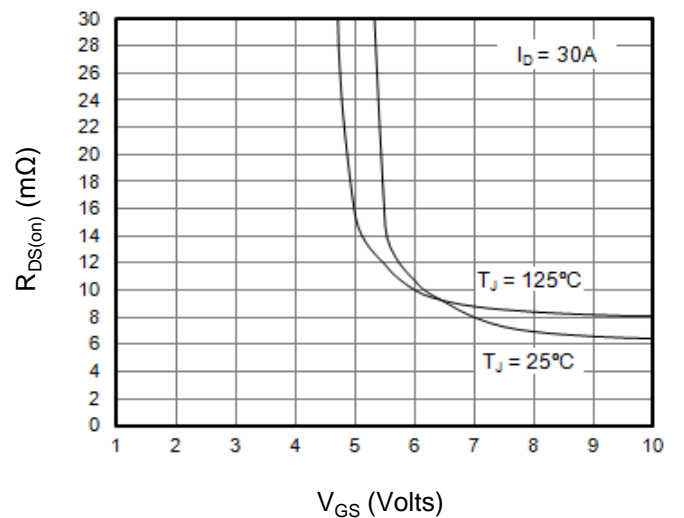


Figure 10: On-Resistance vs. Gate-Source Voltage

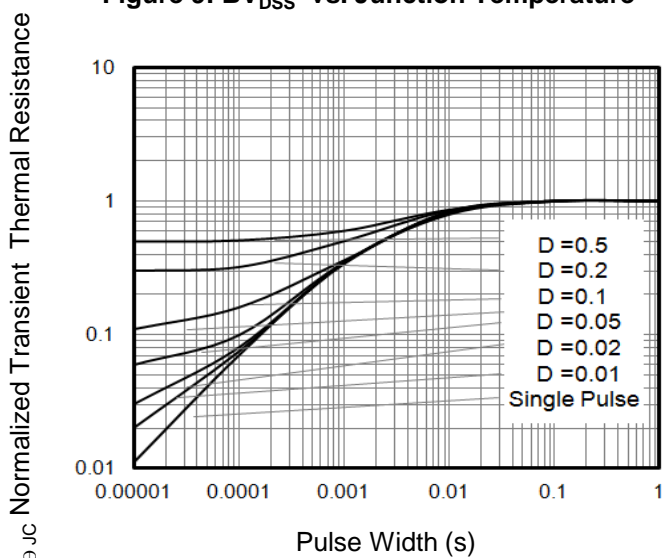


Figure 11: Normalized Transient Thermal Resistance

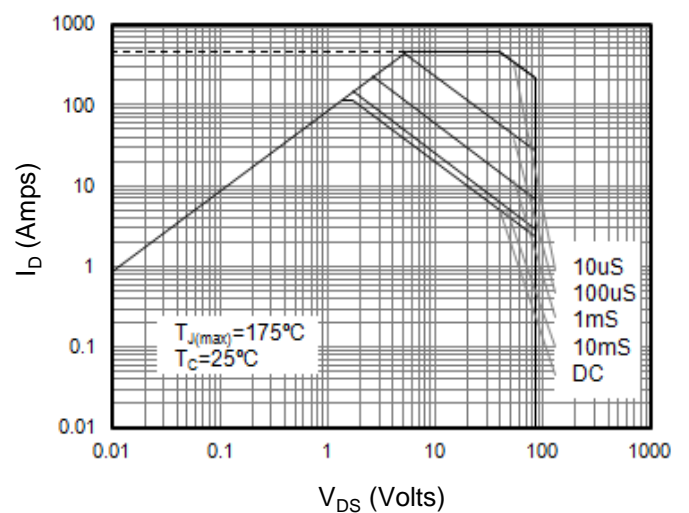


Figure 12: Safe Operating Area



Figure A: Gate Charge Test Circuit and Waveforms

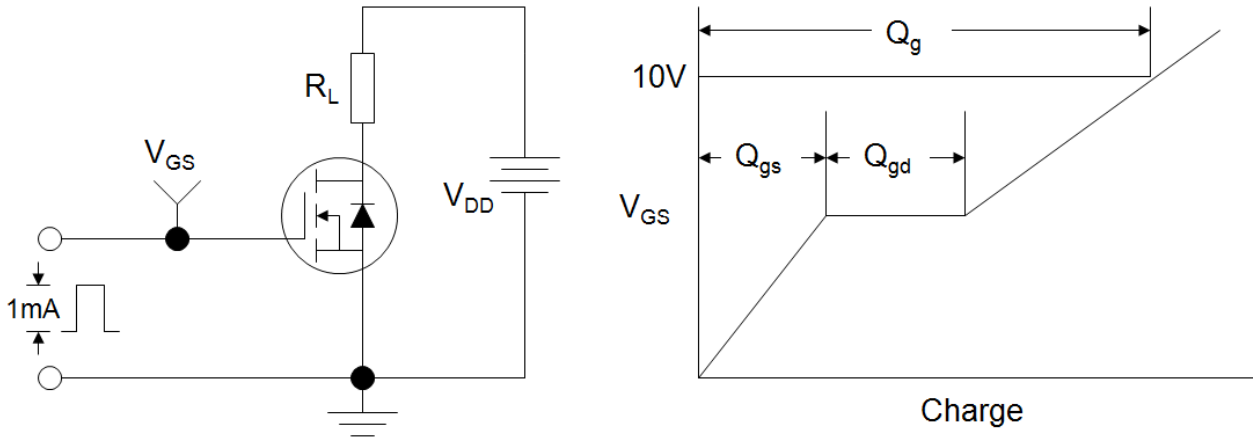


Figure B: Resistive Switching Test Circuit and Waveforms

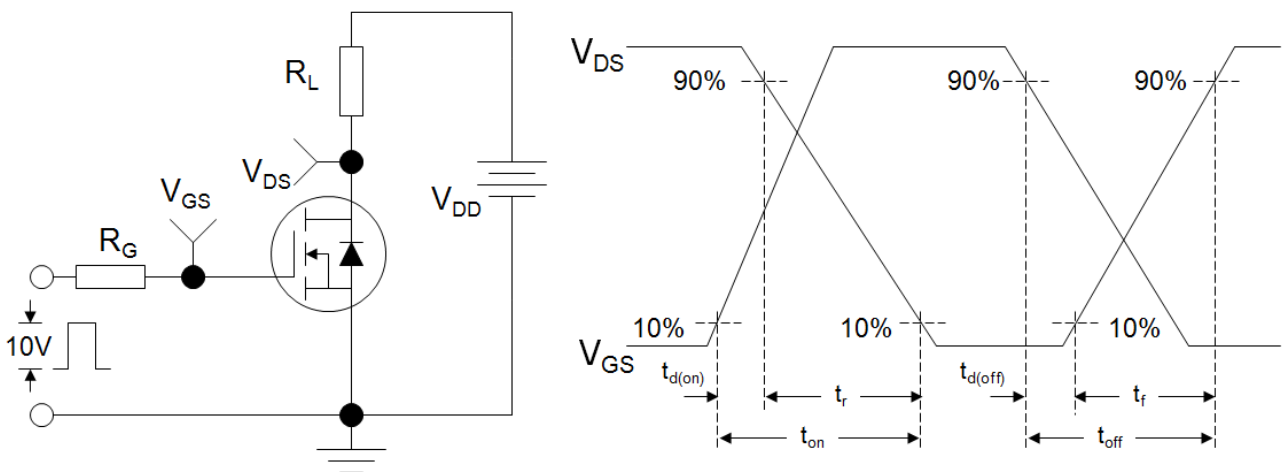
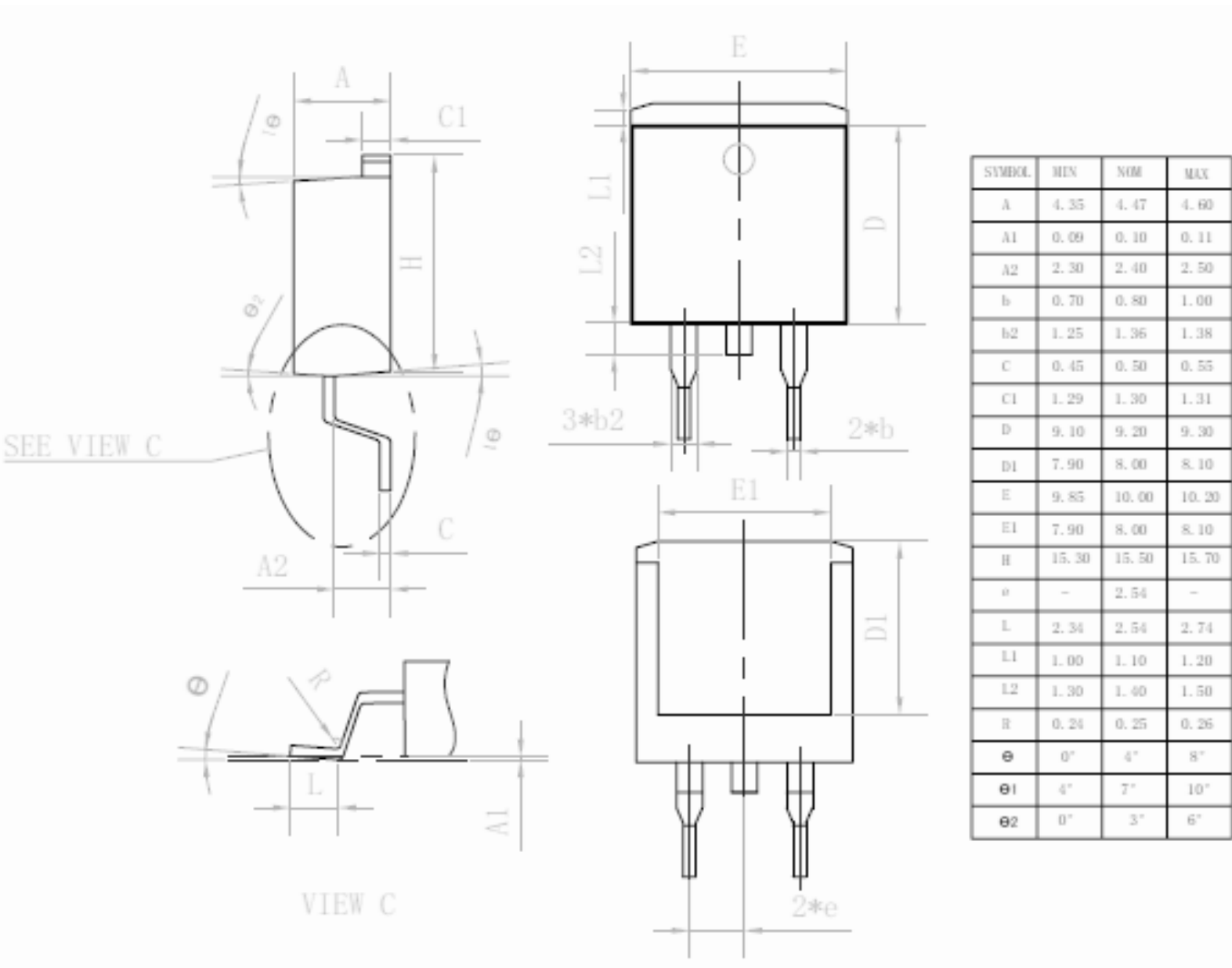


Figure C: Unclamped Inductive Switching (UIS) Test Circuit and Waveforms



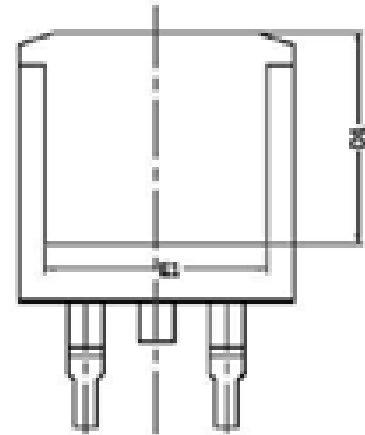
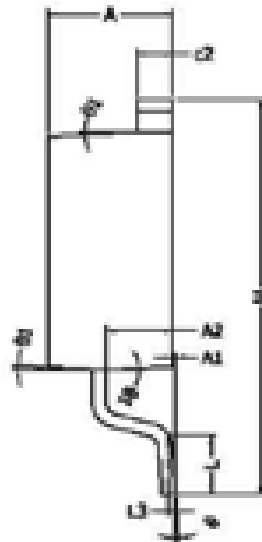
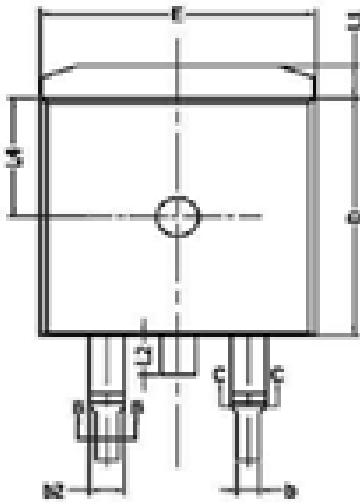


TO-263(E)



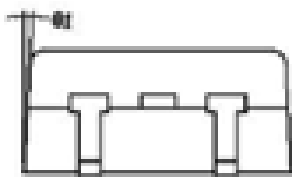


TO-263(I)



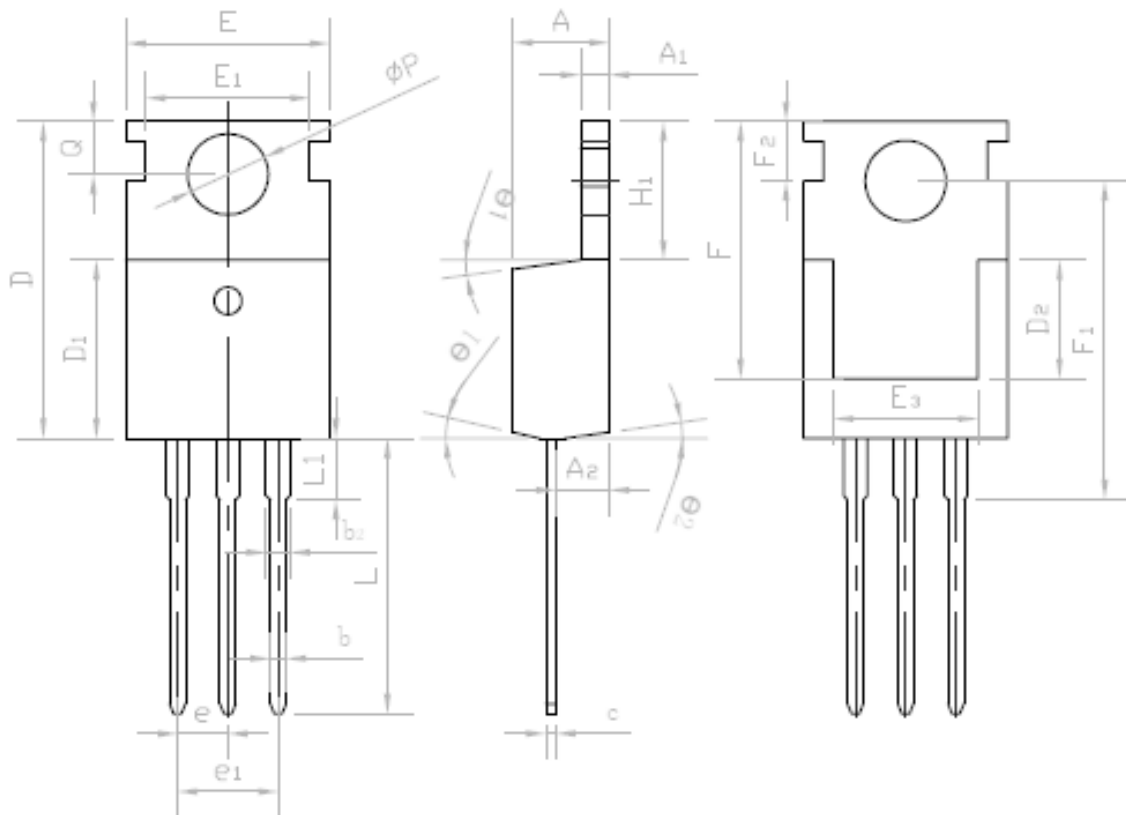
COMMON DIMENSIONS
(UNITS OF MEASURE -MILLIMETER)

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°





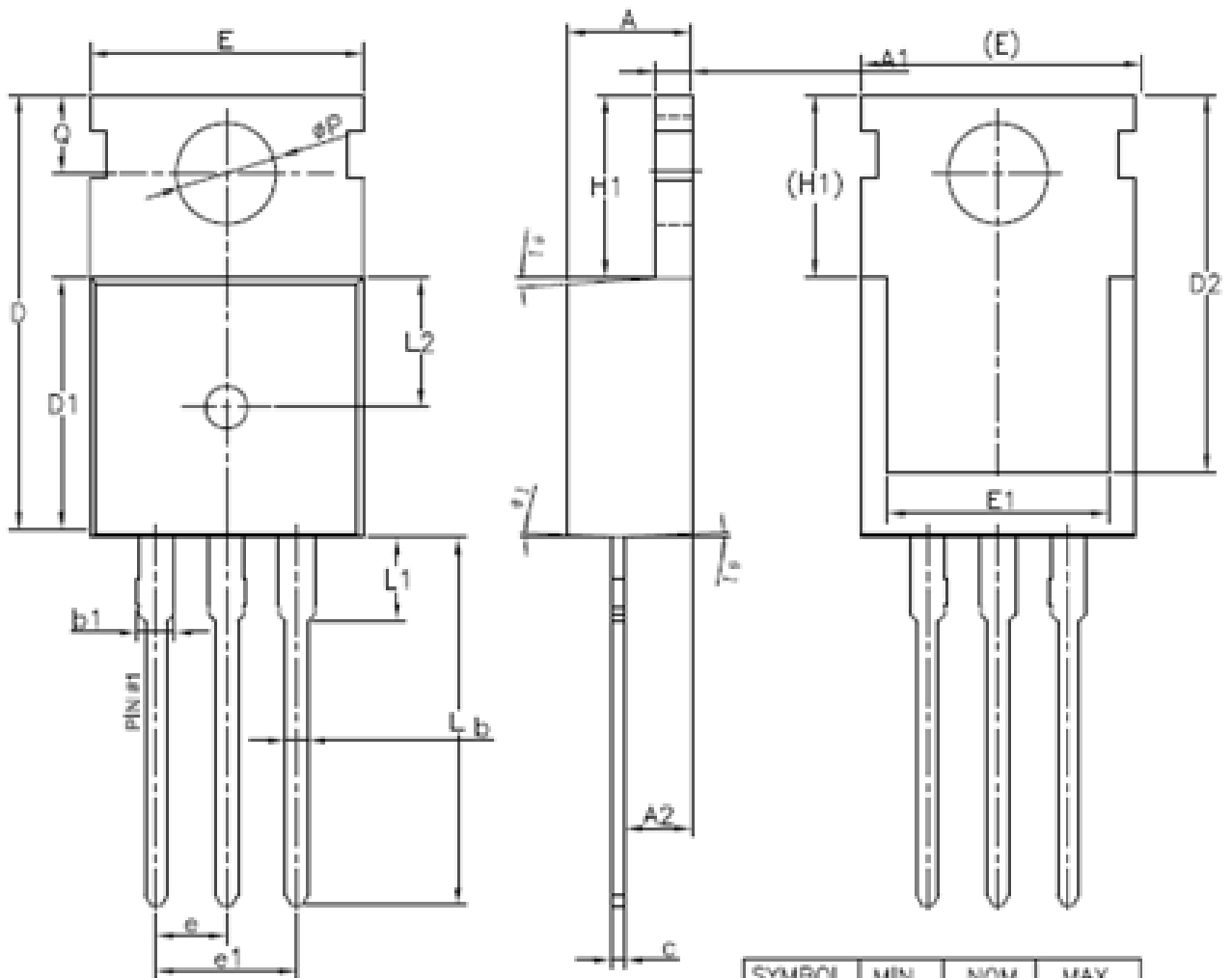
TO-220(E)



SYMBOL	MIN	NOM	MAX
A	4.27	4.57	4.97
A ₁	1.15	1.30	1.45
A ₂	2.10	2.40	2.70
b	0.70	0.80	1.00
b ₂	1.17	1.27	1.50
c	0.40	0.50	0.65
D	15.10	15.60	16.10
D ₁	8.00	9.10	9.40
D ₂	5.70	6.70	7.00
E	9.70	10.00	10.30
E ₁	-	8.70	-
E ₂	9.63	10.00	10.35
E ₃	7.00	8.00	8.40
e	2.54 BSC		
e ₁	5.08 BSC		
H ₁	6.00	6.50	6.85
L	12.75	13.50	13.90
L ₁	-	3.10	3.40
ϕP	3.45	3.60	3.75
ϕ	2.60	2.80	3.00
θ_1	4°	7°	10°
θ_2	0°	3°	6°
F	13.30	13.50	13.70
F ₁	15.50	15.90	16.30
F ₂	2.00	3.00	3.20



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		
ϕP	3.55	3.60	3.65
ϕ	2.73	-	2.87
$\phi 1$	1"	3"	5"



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