Wuxi Unigroup Microelectronics CO.,LTD.

100V 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

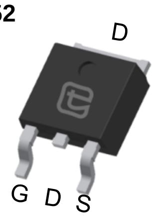
Product Summary

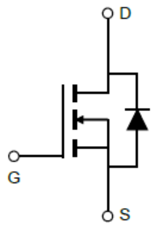
V_{DS}	100V
I_D (at V_{GS} =10V)	30A
$R_{DS(ON)}$ (at V_{GS} =10V)	< 27mΩ
$R_{DS(ON)}$ (at V_{GS} =4.5V)	< 29mΩ

100% UIS Tested

RoHS

TO-252





Part Number	Package Type	Form	Marking
TTD30N10AT	TO-252	Tape &Reel	30N10AT

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

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current [B]	T_C =25ºC	I_D	30	A
	T_C =100ºC		20	
Pulsed Drain Current [A]		I_{DM}	120	A
Avalanche Current [A]		I_{AS}	23	A
Single Pulse Avalanche Energy	L =0.3mH [A]	E_{AS}	80	mJ
Power Dissipation [C]	T_C =25ºC	P_D	75	W
	T_C =100ºC		37.5	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	$R_{\Theta JC}$	2	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		100	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} =100V, 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		1	1.6	2.4	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS} =10V, I_D =15A		--	22	27	mΩ
		V_{GS} =4.5V, I_D =15A		--	24	29	mΩ
g_{FS}	Forward Transconductance	V_{DS} =5V, I_D =20A		--	28		S
V_{SD}	Diode Forward Voltage	I_S =30A, V_{GS} =0V		--	--	1.2	V
I_S	Maximum Body-Diode Continuous Current [B]			--	--	30	A
DYNAMIC PARAMETERS								
C_{iss}	Input Capacitance	V_{GS} =0V, V_{DS} =50V, f =1MH_Z		--	4530	--	pF
C_{oss}	Output Capacitance			--	85	--	
C_{rss}	Reverse Transfer Capacitance			--	81	--	
R_g	Gate Resistance	f =1MH_Z		--	1.1	--	Ω
SWITCHING PARAMETERS								
Q_g	Total Gate Charge	V_{GS} =10V,V_{DS} =50V, I_D =30A		--	76	--	nC
Q_{gs}	Gate Source Charge			--	15	--	
Q_{gd}	Gate Drain Charge			--	10	--	
$t_{D(on)}$	Turn-On Delay Time	V_{GS} =10V,V_{DS} =50V, I_D =30A, R_G =3.3Ω		--	12	--	ns
t_r	Turn-On Rise Time			--	10	--	
$T_{D(off)}$	Turn-Off Delay Time			--	32	--	
t_f	Turn-Off Fall Time			--	11	--	
t_{rr}	Body Diode Reverse Recovery Time	I_F =30A, di/dt =100A/μs		--	31	--	ns
Q_{rr}	Body Diode Reverse Recovery Charge			--	48	--	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

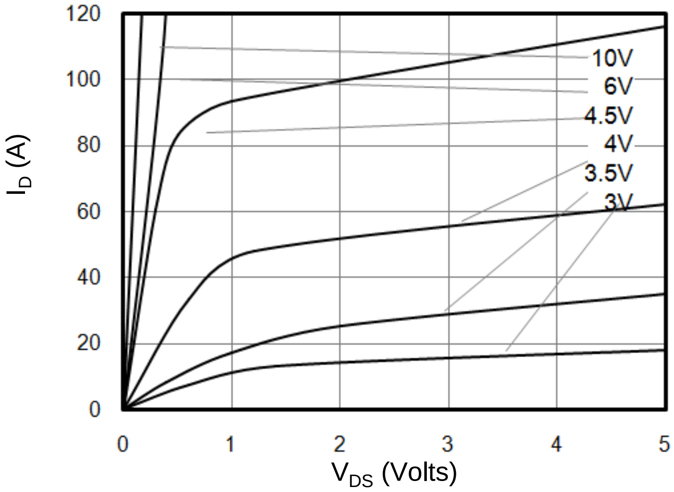


Figure 1: On-Region Characteristics

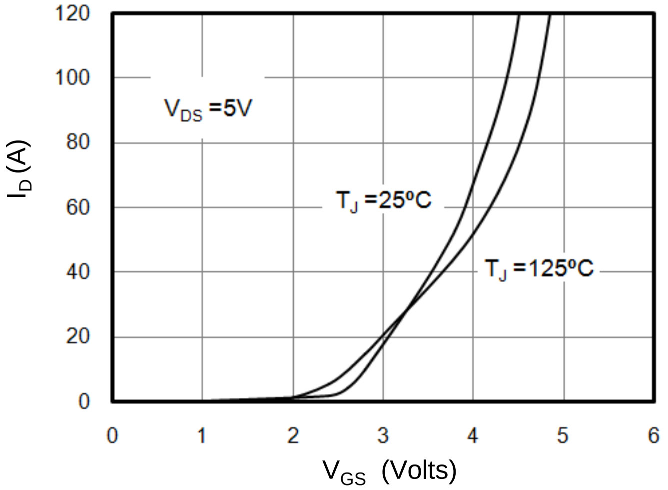


Figure 2: Transfer Characteristics

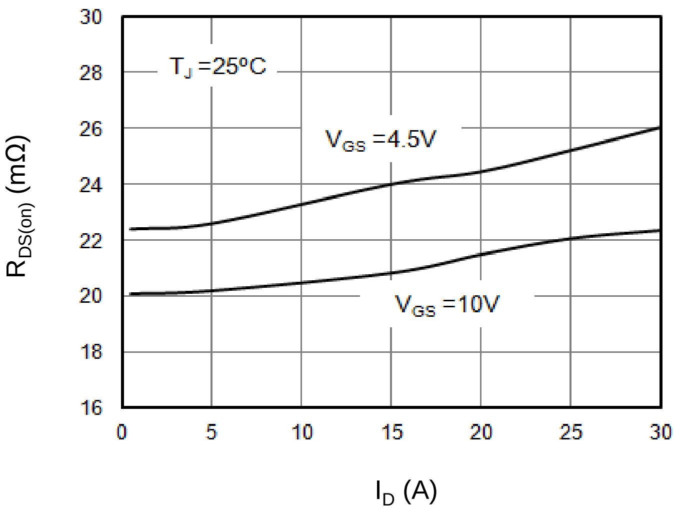


Figure 3: On-Resistance vs. Drain Current

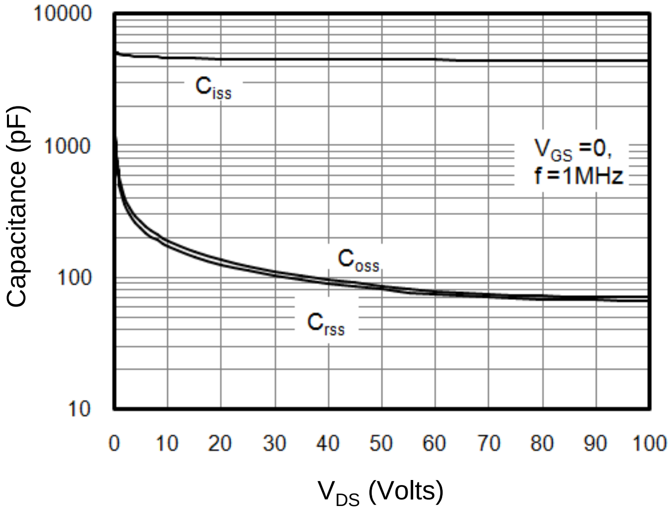


Figure 4: Capacitance Characteristics

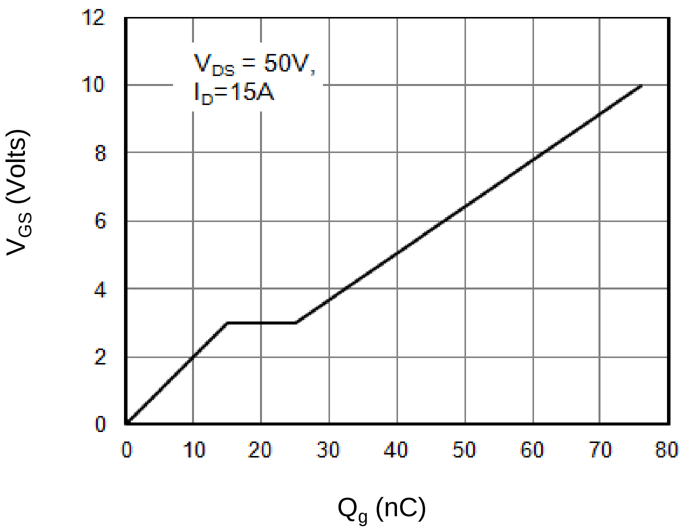


Figure 5: Gate Charge Characteristics

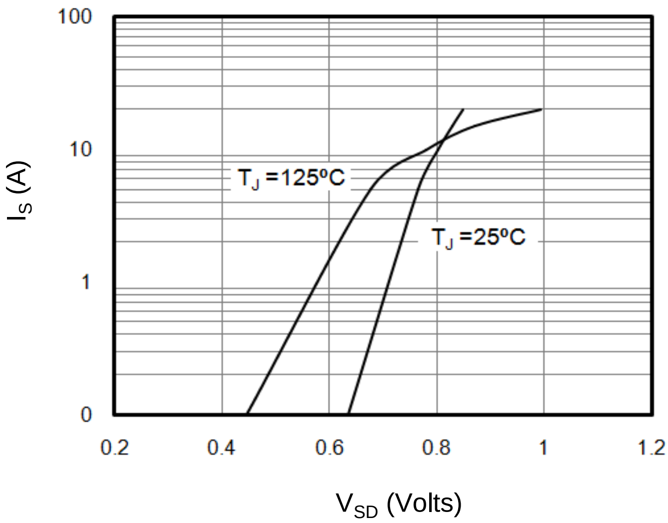


Figure 6: Body Diode Forward Voltage

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

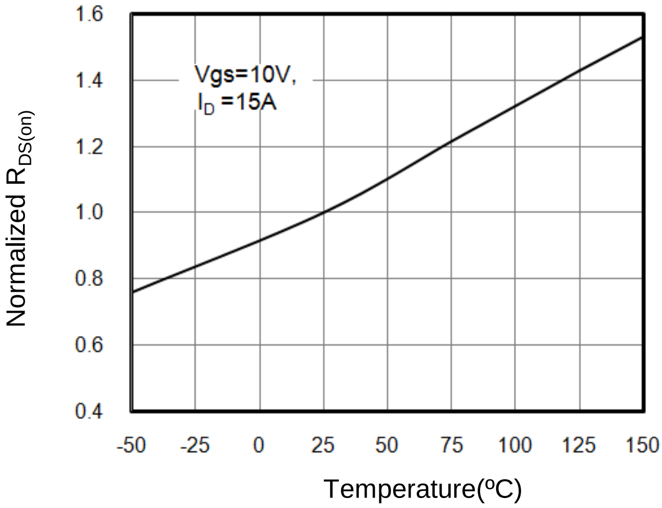


Figure 7: On-Resistance vs. Junction Temperature

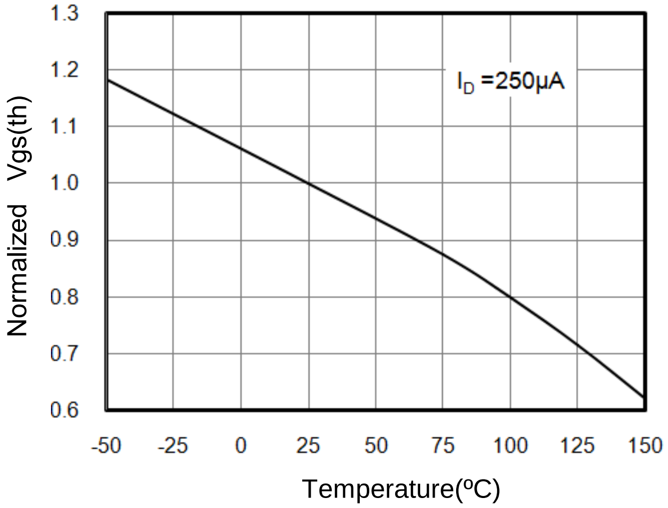


Figure 8: Vgs(th) vs. Junction Temperature

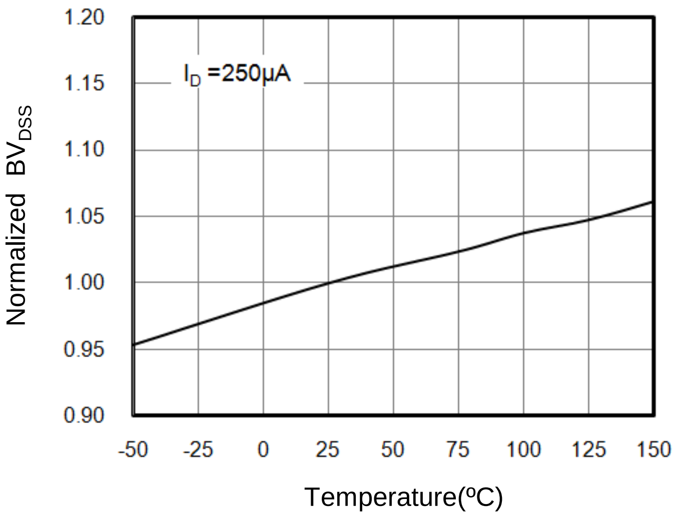


Figure 9: BV_{DSS} vs. Junction Temperature

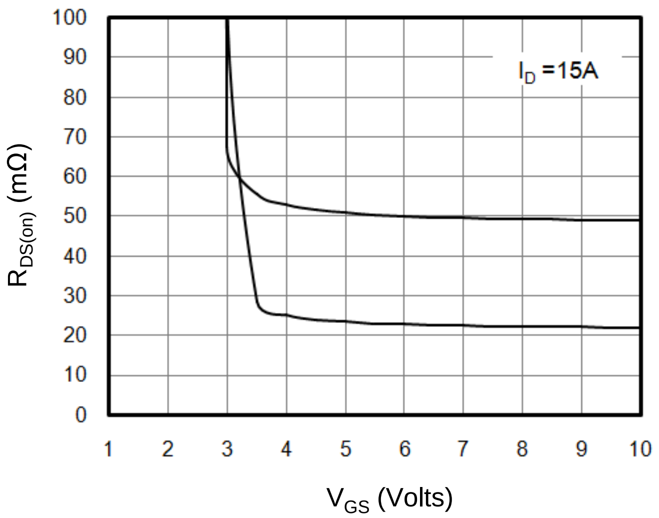


Figure 10: On-Resistance vs. Gate-Source Voltage

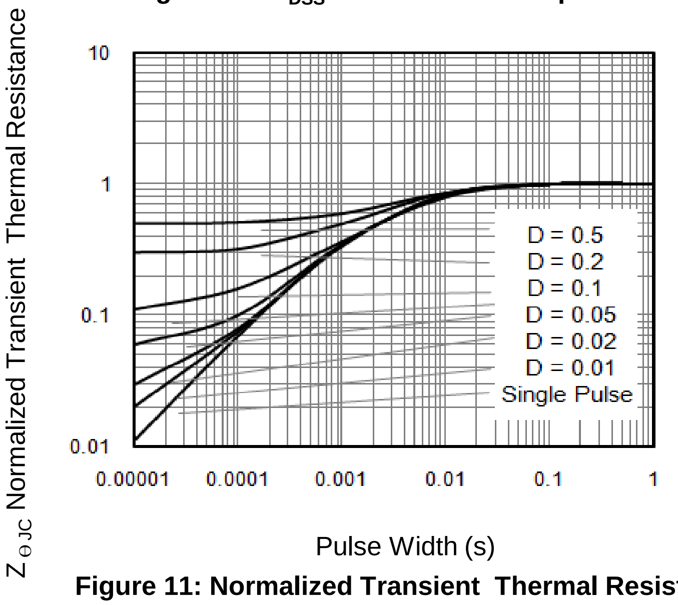


Figure 11: Normalized Transient Thermal Resistance

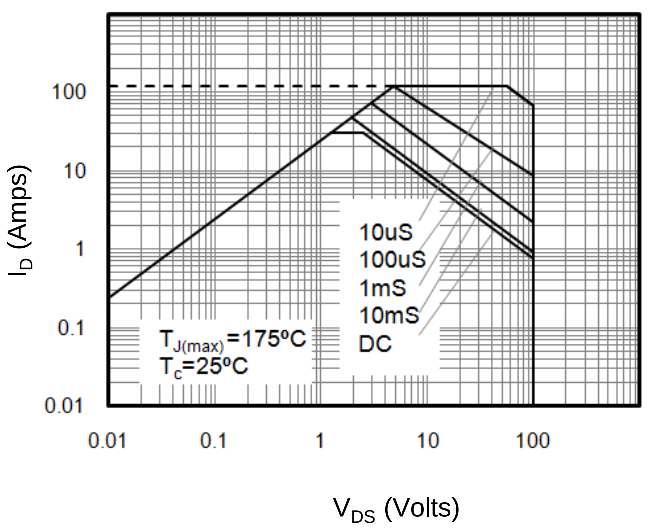


Figure 12: Safe Operating Area

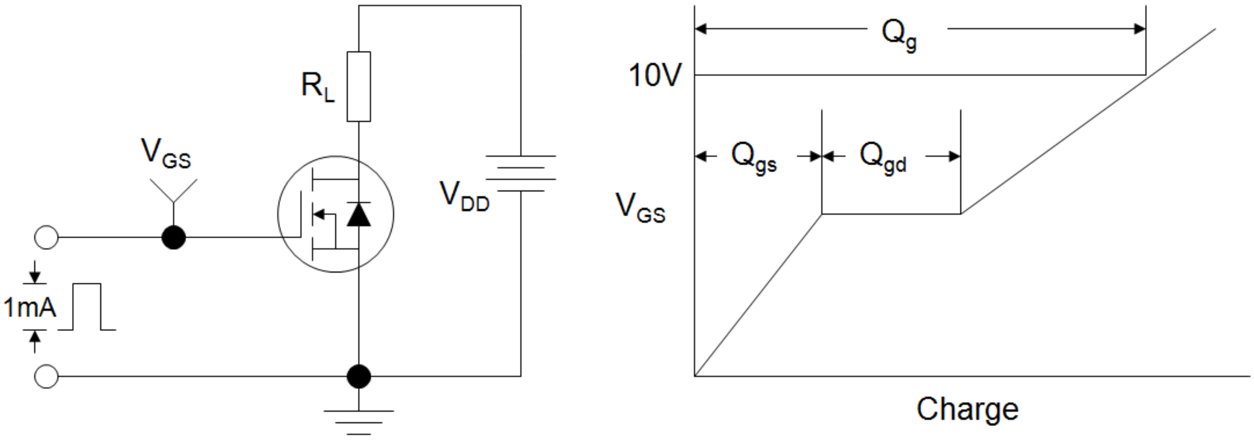


Figure A：Gate Charge Test Circuit and Waveforms

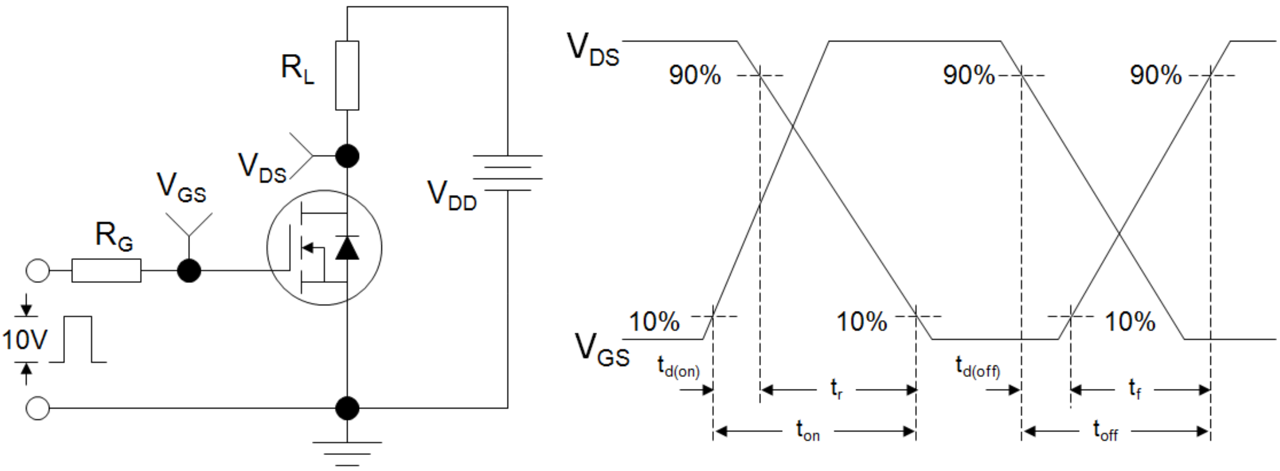


Figure B：Resistive Switching Test Circuit and Waveforms

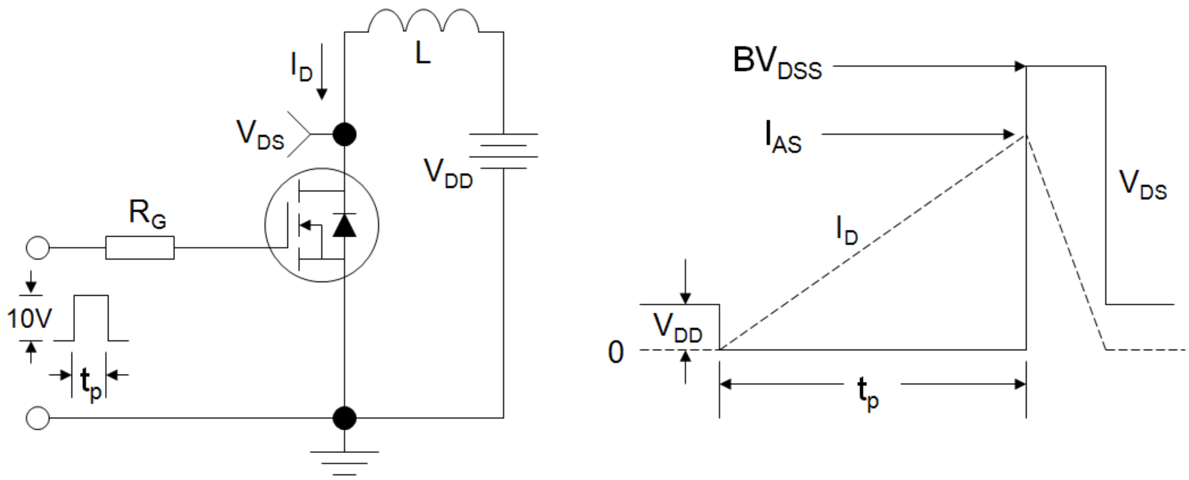
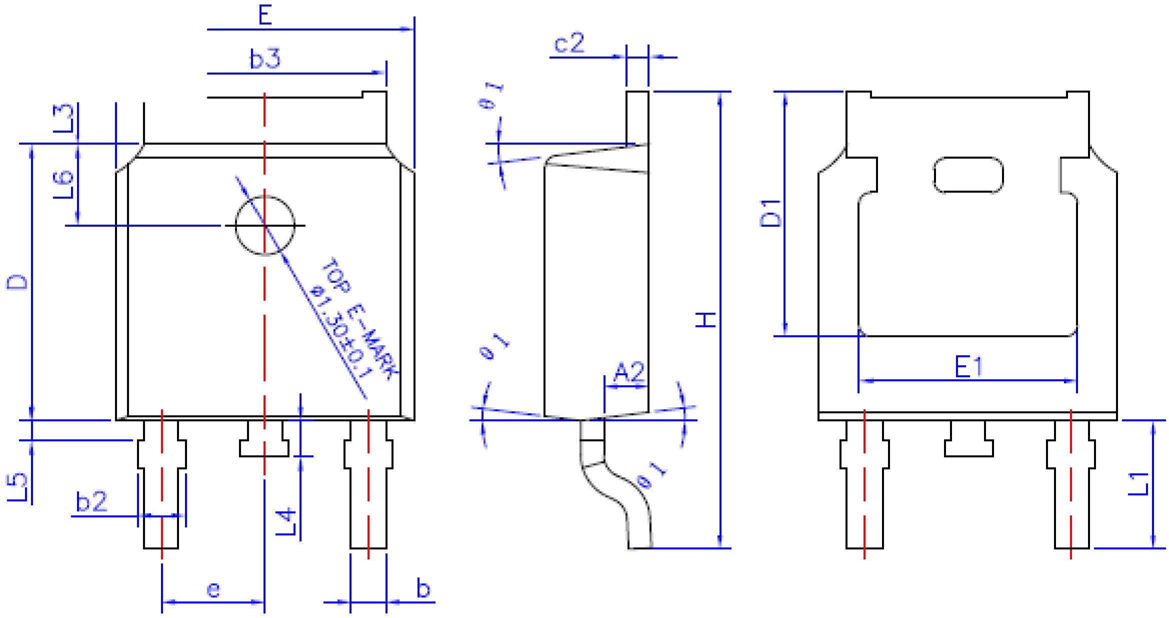
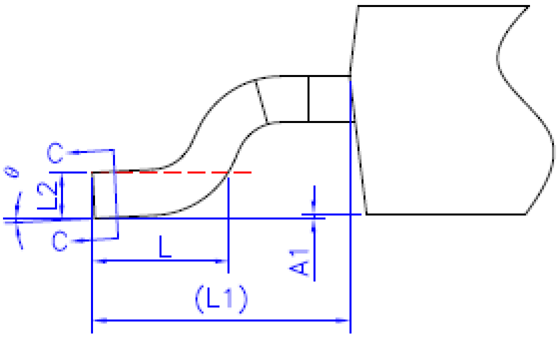
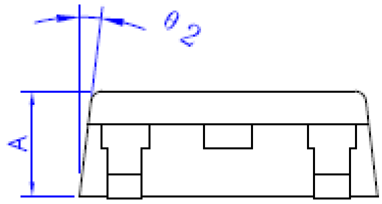


Figure C：Unclamped Inductive Switching (UIS) Test Circuit and Waveforms

TO-252







COMMON DIMENSIONS
(UNITS OF MEASURE =MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	2.20	2.30	2.38
A1	0	—	0.10
A2	0.90	1.01	1.10
b	0.72	—	0.85
b1	0.71	0.76	0.81
b2	0.72	—	0.90
b3	5.13	5.33	5.46
c	0.47	—	0.60
c1	0.46	0.51	0.56
c2	0.47	—	0.60
D	6.00	6.10	6.20
D1	5.25	—	—
E	6.50	6.60	6.70
E1	4.70	—	—
e	2.186	2.286	2.386
H	9.80	10.10	10.40
L	1.40	1.50	1.70
L1	2.90 REF		
L2	0.508 BSC		
L3	0.90	—	1.25
L4	0.60	0.80	1.00
L5	0.15	—	0.75
L6	1.80 REF		
θ	0°	—	8°
θ1	5°	7°	9°
θ2	5°	7°	9°

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