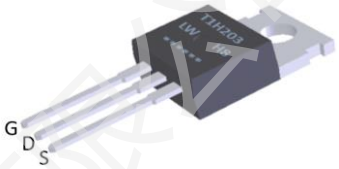
General Description:

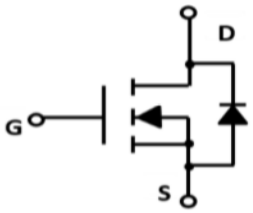
The LWT1H203H8 uses advanced SGT technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications. The package form is TO-220AB, which accords with the ROHS standard and Halogen Free standard.

V_{DSS}	120	V
I_D	195	A
P_D	250	W
$R_{DS(ON)\ TYPE}$	2.95	mΩ

Marking and Pin Assignment



Inner Equivalent Principium Chart



Features:

- Fast Switching
- Low Gate Charge and $R_{DS(ON)}$
- Low Reverse transfer capacitances

Applications:

- Battery switching application
- Hard switched and high frequency circuits
- Power Management

100% DVDS Tested

100% Avalanche Tested

RoHS HF

Package Marking and Ordering Information:

Marking	Part Number	Package	Packing	Qty.
T1H203/LW H8/D.C.	LWT1H203H8	TO-220AB	Tube	50 Pcs

Absolute Maximum Ratings:

Symbol	Parameter		Value	Units
V_{DSS}	Drain-to-Source Voltage		120	V
I_D	Continuous Drain Current	T_C=25℃	195	A
	Continuous Drain Current	T_C=100℃	124	A
I_{DM}[a1]	Pulsed Drain Current		780	A
E_{AS}[a2]	Single pulse avalanche energy		1822	mJ
V_{GS}	Gate-to-Source Voltage		±20	V
P_D	Power Dissipation		250	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range		150, -55 to 150	℃
T_L	Maximum Temperature for Soldering		260	℃

Thermal Characteristics:

Symbol	Parameter	Value	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	0.5	℃/W
$R_{\theta JA}$[a3]	Thermal Resistance, Junction-to-Ambient	60	℃/W

Electrical Characteristic (T_J = 25 °C, unless otherwise specified):

Static Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
V_{DSS}	Drain to Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	120	--	--	V
I_{DSS}	Drain to Source Leakage Current	V_{DS}=120V, V_{GS}=0V	--	--	1.0	μA
$I_{GSS(F)}$	Gate to Source Forward Leakage	V_{GS}=+20V, V_{DS}=0V	--	--	100	nA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	V_{GS}=-20V, V_{DS}=0V	--	--	-100	nA
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA	2.8	3.3	3.8	V
$R_{DS(ON)}$	Drain-to-Source On-Resistance	V_{GS}=10V, I_D=20A	--	2.95	3.5	mΩ

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
C_{iss}	Input Capacitance	V_{GS} =0V V_{DS} =60V f =1.0MHz	--	8289	--	pF
C_{oss}	Output Capacitance		--	862	--	
C_{rss}	Reverse Transfer Capacitance		--	18	--	
R_G	Gate resistance	V_{GS}=0V,V_{DS}=0V,f=1MHz	--	1.0	--	Ω

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	I_D =20A V_{DS} =60V V_{GS} =10V R_G =5.0Ω	--	30	--	ns
t_r	Rise Time		--	25	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	75	--	
t_f	Fall Time		--	30	--	
Q_g	Total Gate Charge	V_{GS} =10V V_{DS} =60V I_D =20A	--	114	--	nC
Q_{gs}	Gate to Source Charge		--	34	--	
Q_{gd}	Gate to Drain Charge		--	23	--	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
I_S	Diode Forward Current	T_C =25 °C	--	--	195	A
V_{SD}	Diode Forward Voltage	I_S=20A, V_{GS}=0V	--	--	1.2	V
t_{rr}	Reverse Recovery Time	I_S=20A, V_{DD}=60V dI/dt=100A/μs	--	99	--	ns
Q_{rr}	Reverse Recovery Charge		--	305	--	nC

a1：Repetitive rating; pulse width limited by maximum junction temperature

a2：V_{DD}=100V, L=5.0mH, R_G=25Ω, Starting T_J=25 ℃

a3：Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm^2 (one layer, 70 μm thick) copper area for drain connection.

Characteristics Curve：

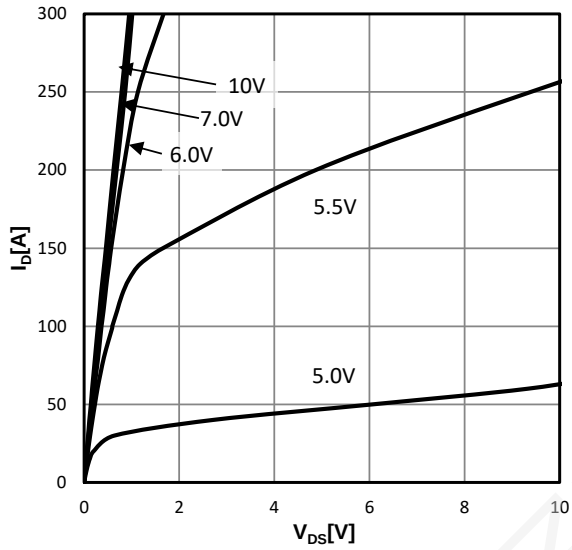
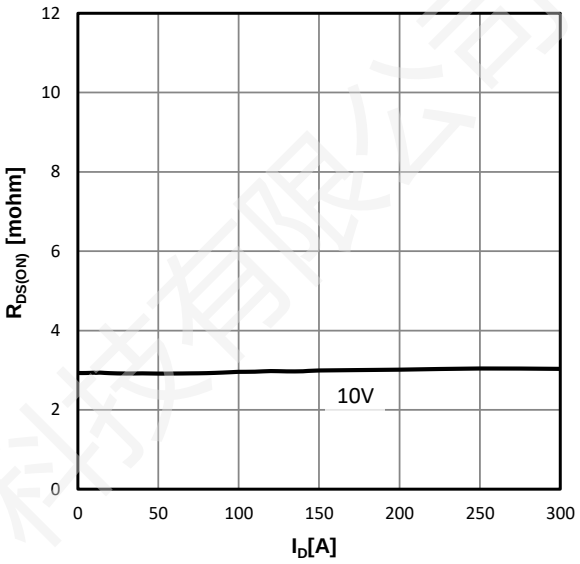
Figure 1: Typ. output characteristics	Figure 2: Typ. drain-source on resistance
	
$I_D=f(V_{DS})$, T_j=25 °C; parameter: V_{GS}	$R_{DS(on)}=f(I_D)$, T_j=25 °C; parameter: V_{GS}

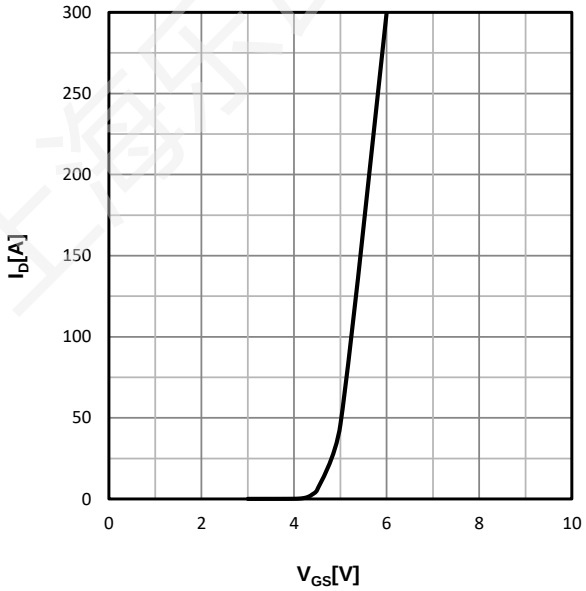
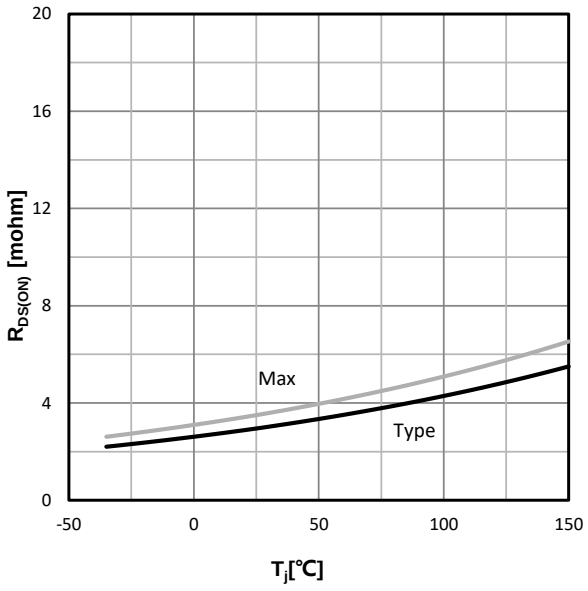
Figure 3: Typ. transfer characteristics	Figure 4: drain-source on resistance
	
$I_D=f(V_{GS})$, $\|V_{DS}\|>2\|I_D\|R_{DS}(on)max$;	$R_{DS(on)}=f(T_j)$, I_D=20A, V_{GS}=10V;

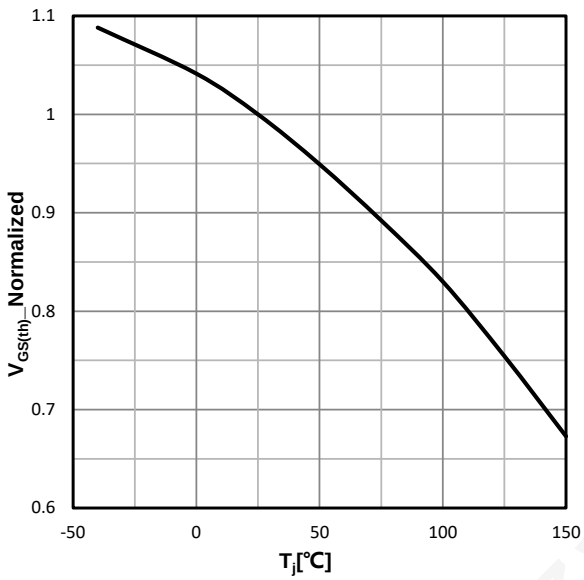
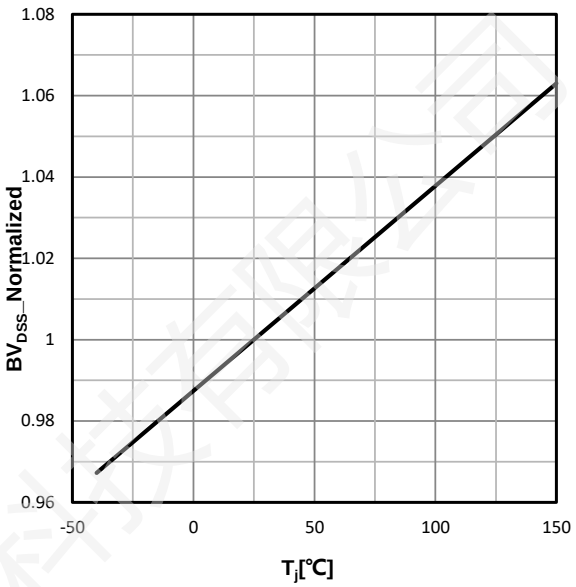
Figure 5: Typ. gate threshold voltage	Figure 6: Drain-source breakdown voltage
	
$V_{GS}=f(T_j)$,I $V_{GS}=V_{DS}$,I_D=250μA;	$V_{BR(DSS)}=f(T_j)$; I_D=250μA;

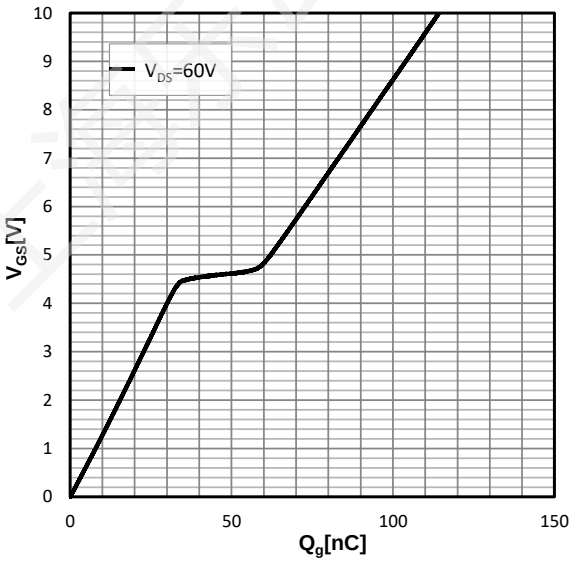
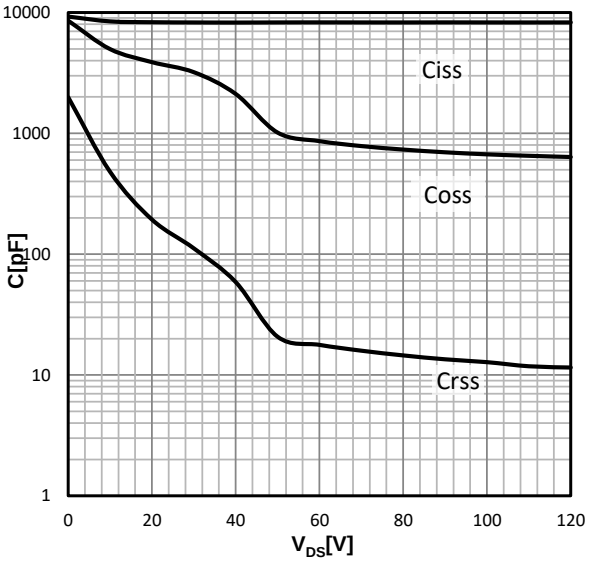
Figure 7: Typ. gate charge	Figure 8: Typ. Capacitances
	
$V_{GS}=f(Q_g)$, I_D=20A, T_j=25 °C; parameter: V_{DS}	$C=f(V_{DS})$; V_{GS}=0V; f=1.0 MHz;

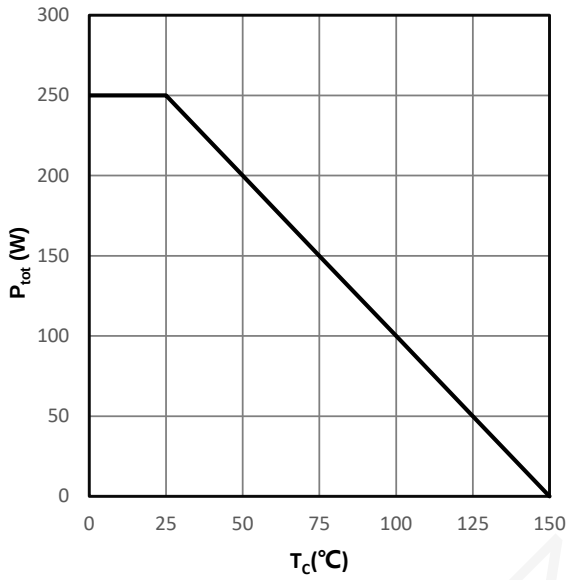
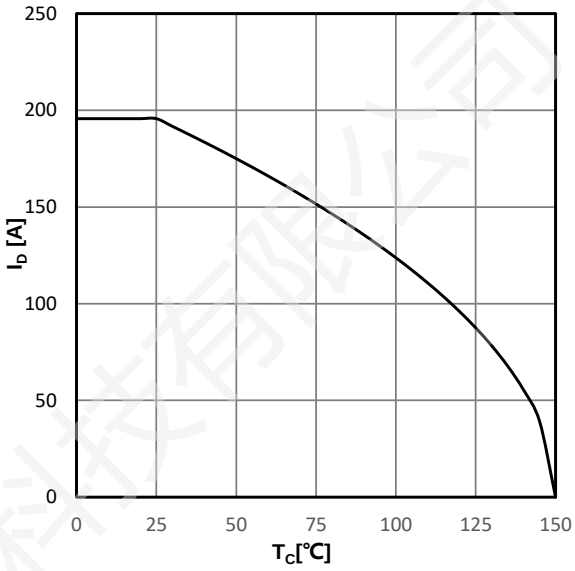
Figure 9: Power dissipation	Figure 10:Drain current
	
$P_{tot}=f(T_C)$;	$I_D=f(T_C)$;

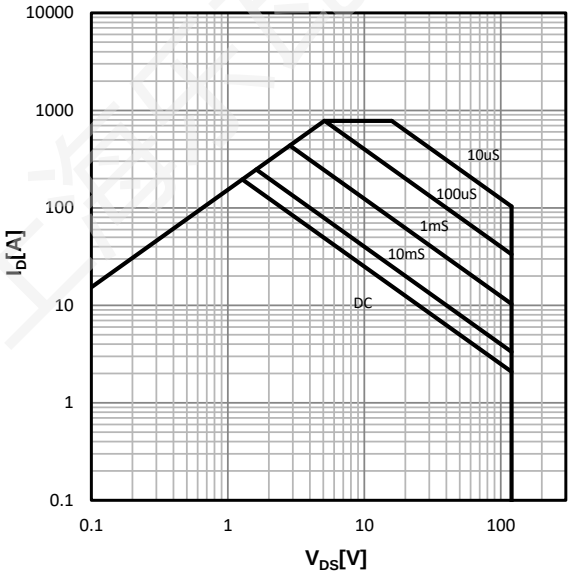
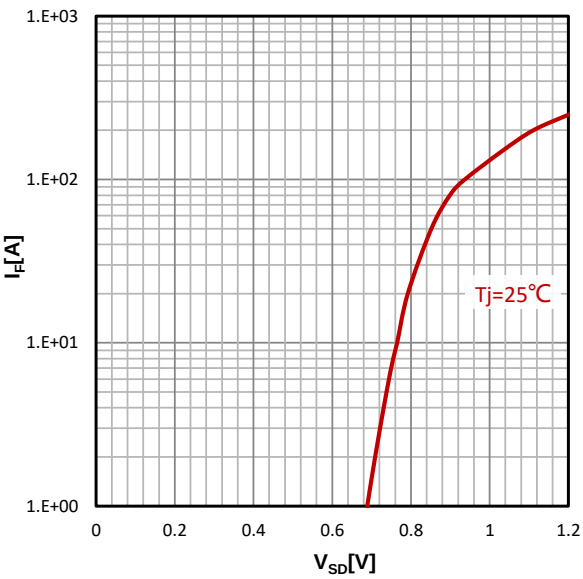
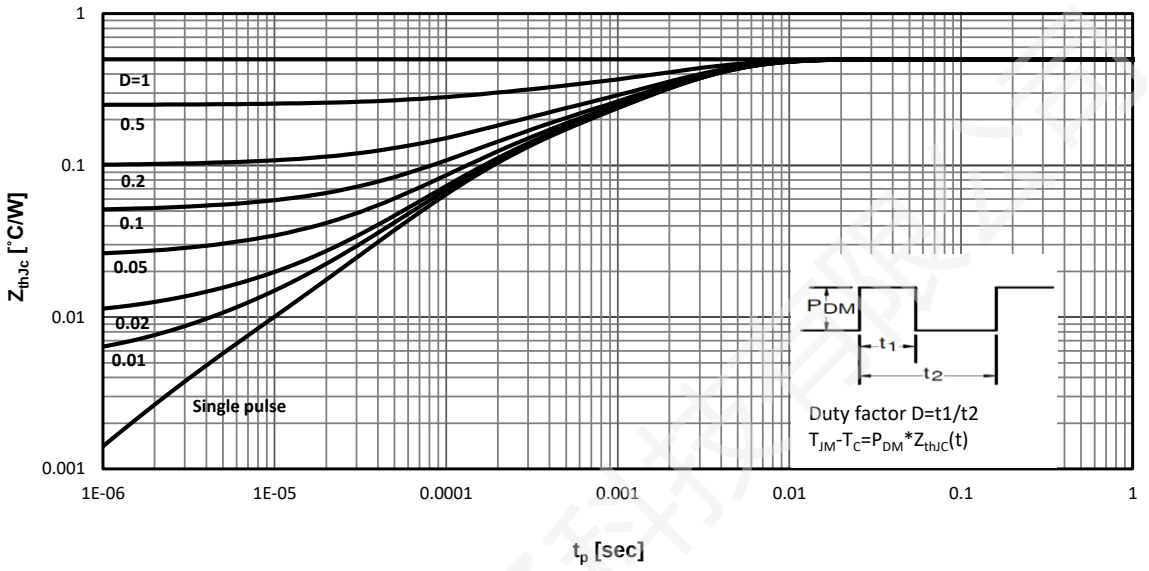
Figure 11: Safe operating area	Figure 12: Typ. forward characteristics
	
$I_D=f(V_{DS})$; T_C=25 °C; D=0; parameter: tp	$I_F=f(V_{SD})$;

Figure 13: Max. Transient Thermal Impedance



$Z_{thJC}=f(t_p)$; parameter: D

Test Circuit & Waveform:

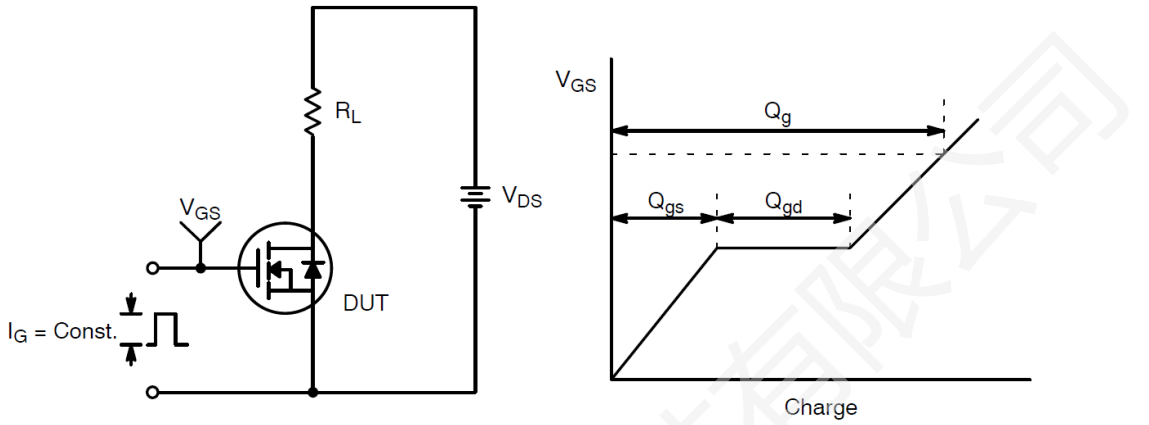


Figure 14: Gate Charge Test Circuit & Waveform

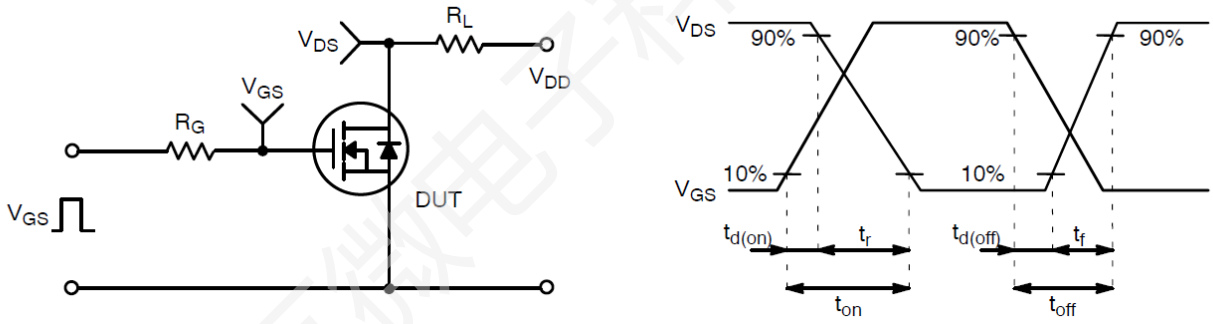


Figure 15: Resistive Switching Test Circuit & Waveforms

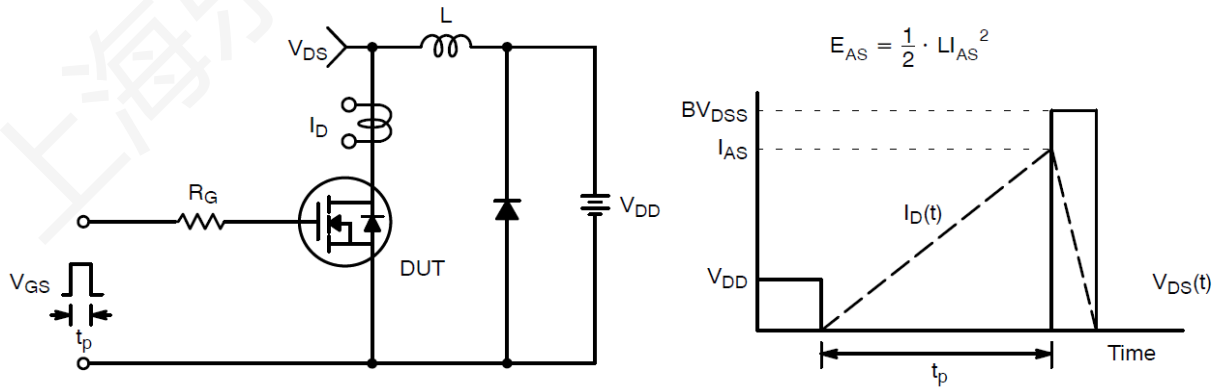
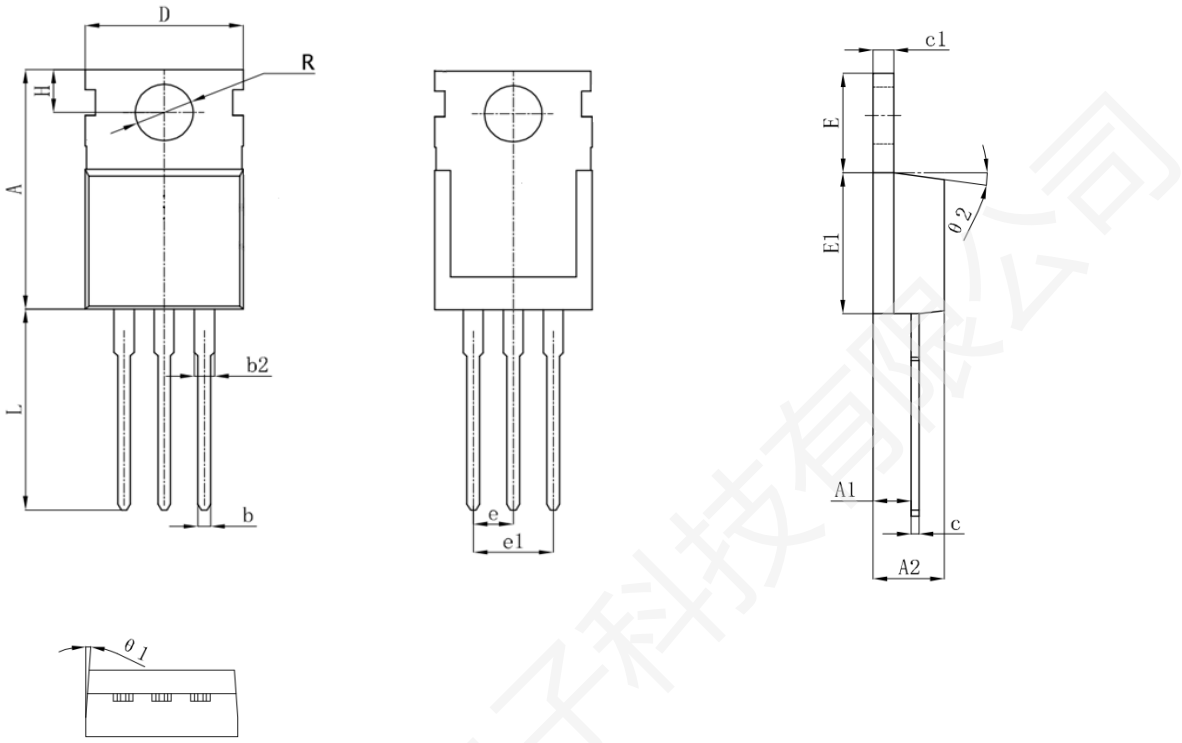


Figure 16: Unclamped Inductive Switching Test Circuit & Waveforms

Package Outline:



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	15.3	15.55	15.8
A1	2.3	2.4	2.5
A2	4.4	4.5	4.7
b	0.7	0.8	0.9
b2	1.18	1.31	1.44
c	0.44	0.5	0.56
c1	1.28	1.3	1.33
D	9.8	10	12.2
E	6.4	6.5	6.6
E1	8.9	9.05	9.2
e	2.42	2.54	2.66
e1	4.84	5.08	5.32
H	2.73	2.8	2.87
H1	2.4	2.5	2.6
L	13.02	13.42	13.82
R	3.5	3.6	3.63
θ1	2°	2.5°	3°
θ2	6.5°	7°	7.5°

Revision History:

Revison	Date	Descriptions
Rev 1.0	Jul.2023	Initial Version

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