

General Description:

The LWT1H13A8 uses 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.

Features:

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

Applications:

- DC-DC Converter
- Portable Equipment
- Power Management

100% DVDS Tested

100% Avalanche Tested


Package Marking and Ordering Information:

Marking	Part Number	Package	Packing	Qty.
T1H13/LW A8/D.C.	LWT1H13A8	TO-220AB	Tube	50 Pcs

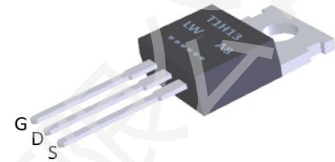
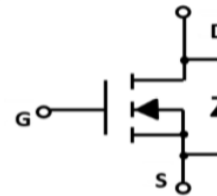
Absolute Maximum Ratings:

Symbol	Parameter	Value	Units
V_{DSS}	Drain-to-Source Voltage	100	V
I_D	Continuous Drain Current	$T_C=25^\circ\text{C}$	60
	Continuous Drain Current	$T_C=100^\circ\text{C}$	38
I_{DM}^{a1}	Pulsed Drain Current	240	A
E_{AS}^{a2}	Single pulse avalanche energy	121	mJ
V_{GS}	Gate-to-Source Voltage	± 20	V
P_D	Power Dissipation	100	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range	150, -55 to 150	$^\circ\text{C}$
T_L	Maximum Temperature for Soldering	260	$^\circ\text{C}$

Thermal Characteristics:

Symbol	Parameter	Value	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	1.25	$^\circ\text{C}/\text{W}$
$R_{\theta JA}^{a3}$	Thermal Resistance, Junction-to-Ambient	68	$^\circ\text{C}/\text{W}$

V_{DSS}	100	V
I_D	60	A
P_D	100	W
$R_{DS(ON) \text{ TYPE}}$	10.5	$\text{m}\Omega$

Marking and Pin Assignment

Inner Equivalent Principium Chart


Electrical Characteristic ($T_j = 25\text{ }^\circ\text{C}$, unless otherwise specified):

Static Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
V_{DSS}	Drain to Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	100	--	--	V
I_{DSS}	Drain to Source Leakage Current	$V_{DS}=100V, V_{GS}=0V$	--	--	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	$V_{DS}=V_{GS}, I_D=250\mu A$	1.3	1.8	2.3	V
$R_{DS(ON)1}$	Drain-to-Source On-Resistance	$V_{GS}=10V, I_D=20A$	--	10.5	13	m Ω
$R_{DS(ON)2}$	Drain-to-Source On-Resistance	$V_{GS}=4.5V, I_D=10A$	--	12	15	m Ω

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
C_{iss}	Input Capacitance	$V_{GS}=0V$	--	1202	--	pF
C_{oss}	Output Capacitance	$V_{DS}=50V$	--	462	--	
C_{rss}	Reverse Transfer Capacitance	$f=1.0MHz$	--	8.7	--	
R_G	Gate resistance	$V_{GS}=0V, V_{DS}=0V, f=1MHz$	--	11	--	Ω

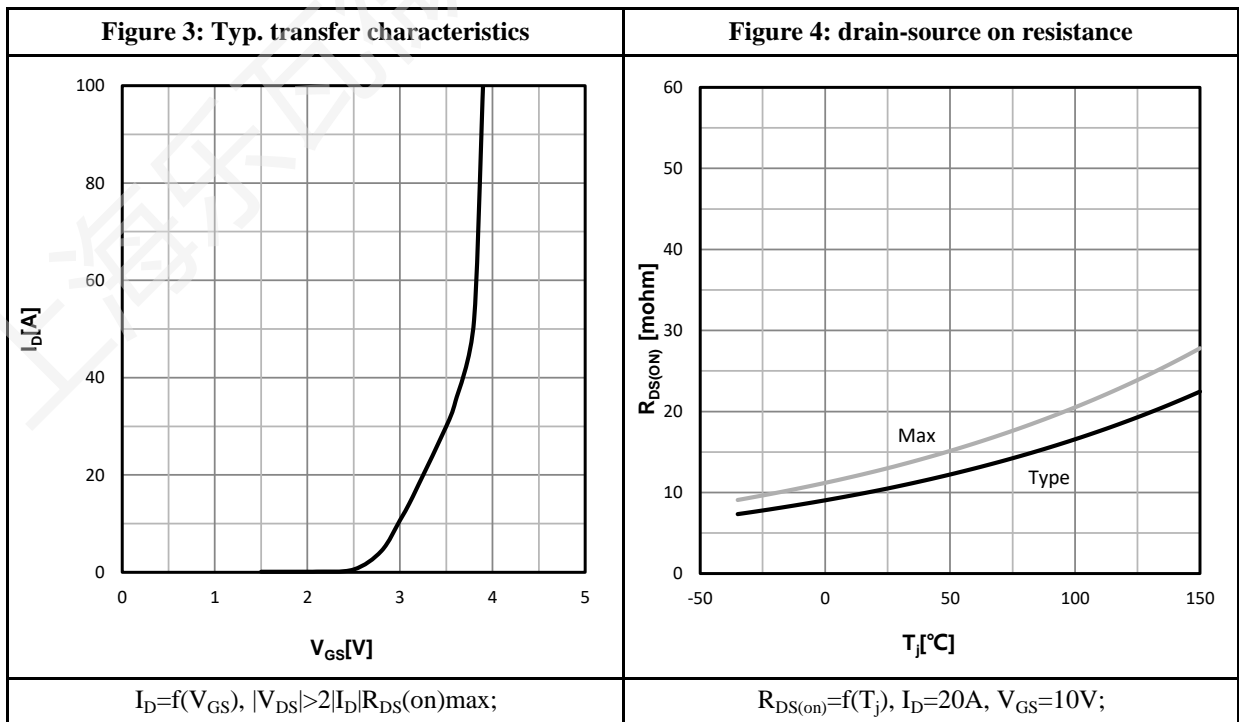
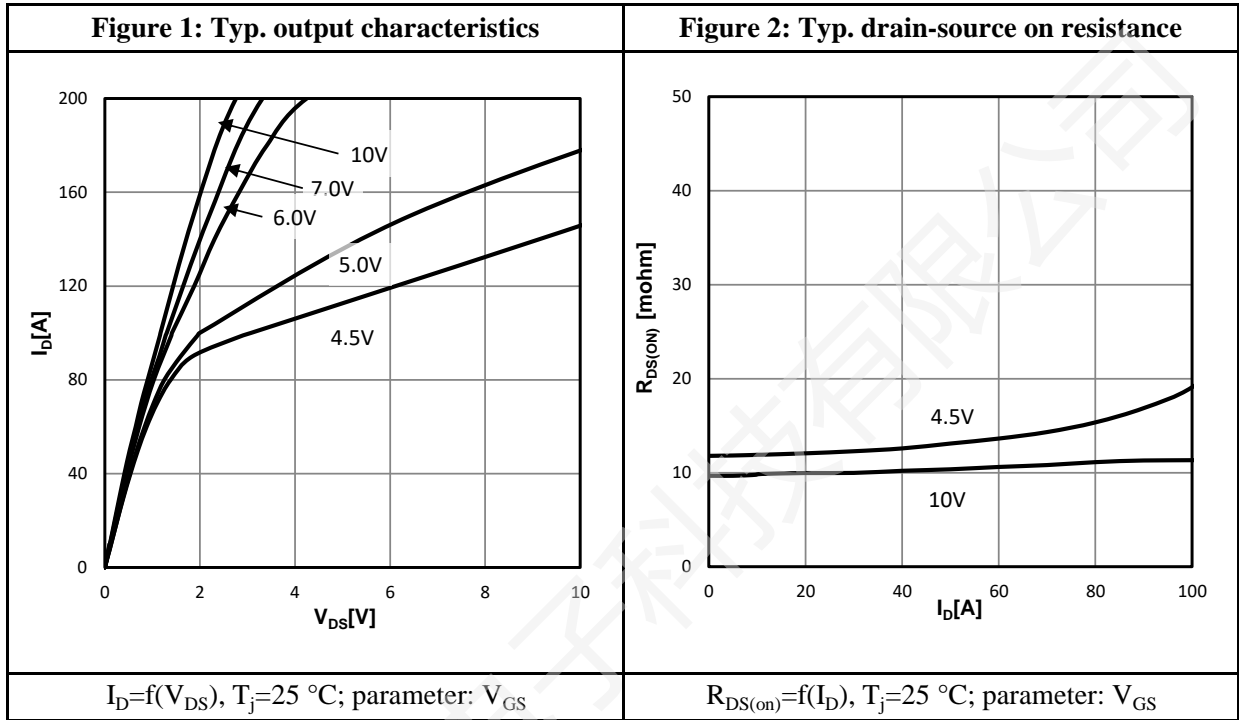
Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	$I_D=10A$	--	3.5	--	ns
t_r	Rise Time	$V_{DS}=50V$	--	25	--	
$t_{d(OFF)}$	Turn-Off Delay Time	$V_{GS}=10V$	--	61	--	
t_f	Fall Time	$R_G=5.0\Omega$	--	36	--	
Q_g	Total Gate Charge	$V_{GS}=10V$	--	23	--	nC
Q_{gs}	Gate to Source Charge	$V_{DS}=50V$	--	4.1	--	
Q_{gd}	Gate to Drain Charge	$I_D=10A$	--	4.7	--	

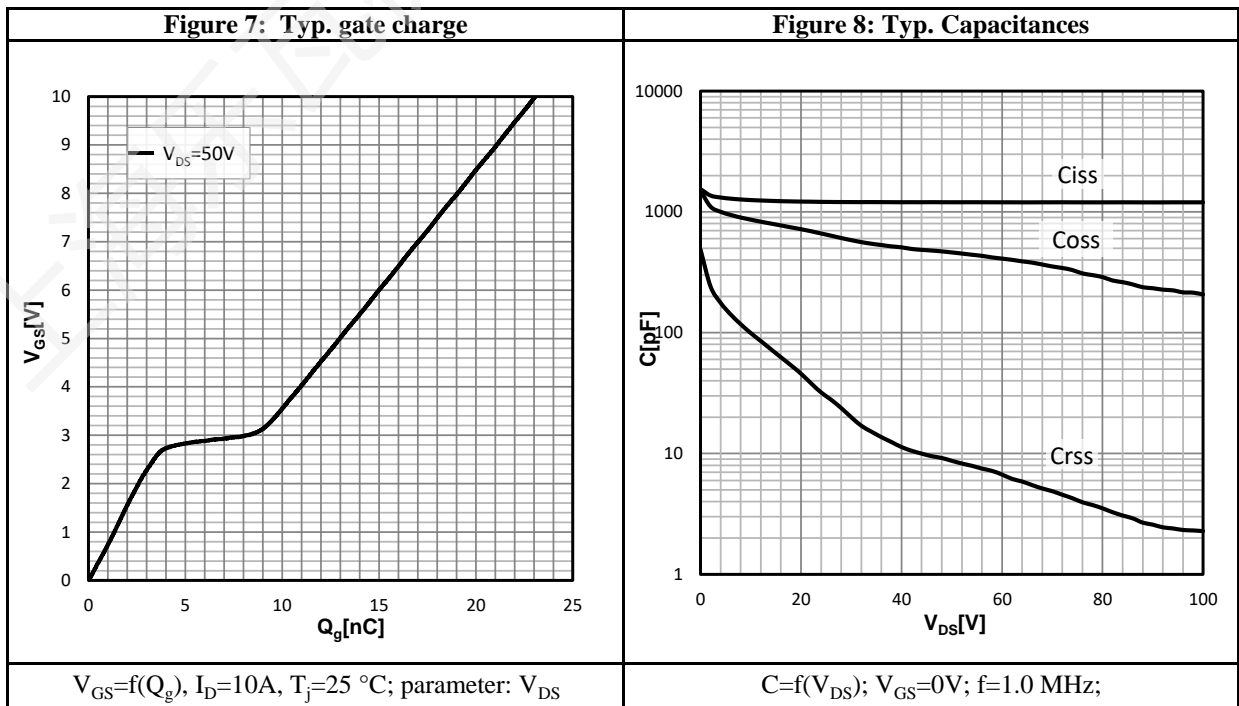
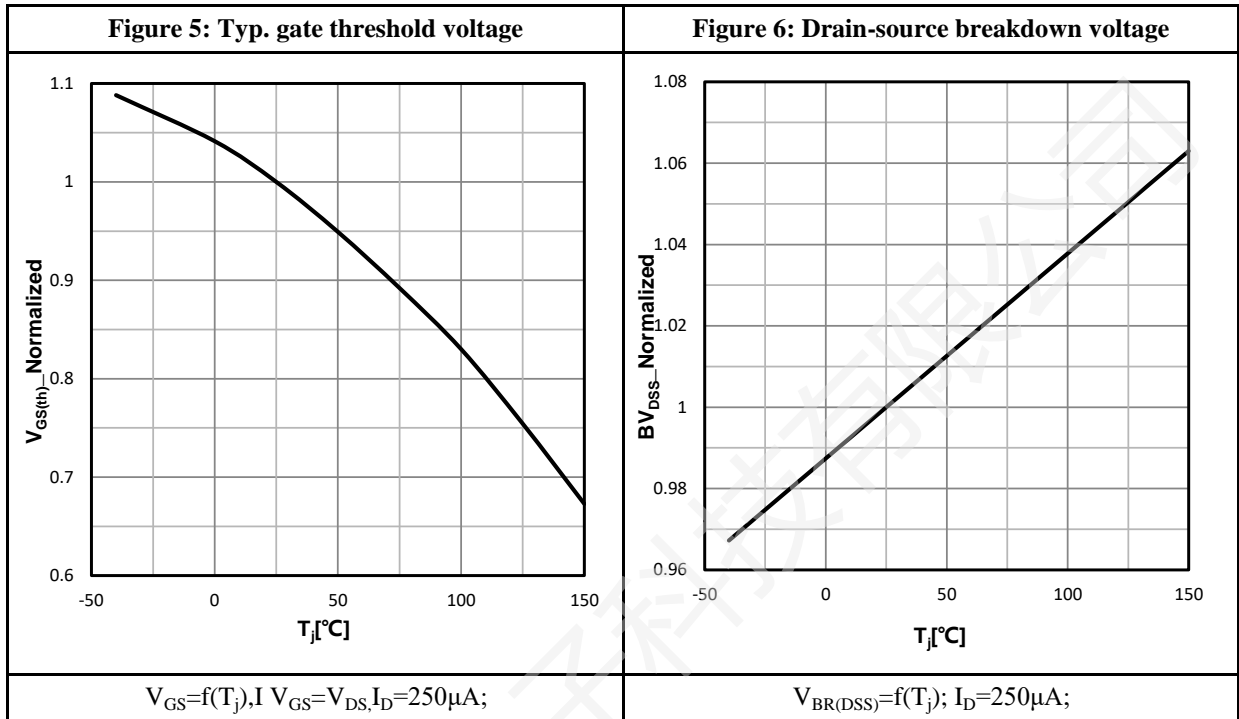
Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
I_S	Diode Forward Current	$T_C=25\text{ }^\circ\text{C}$	--	--	60	A
V_{SD}	Diode Forward Voltage	$I_S=10A, V_{GS}=0V$	--	--	1.2	V
t_{rr}	Reverse Recovery Time	$I_S=10A, V_{DD}=50V$	--	43	--	ns
Q_{rr}	Reverse Recovery Charge	$dI/dt=100A/\mu s$	--	90	--	nC

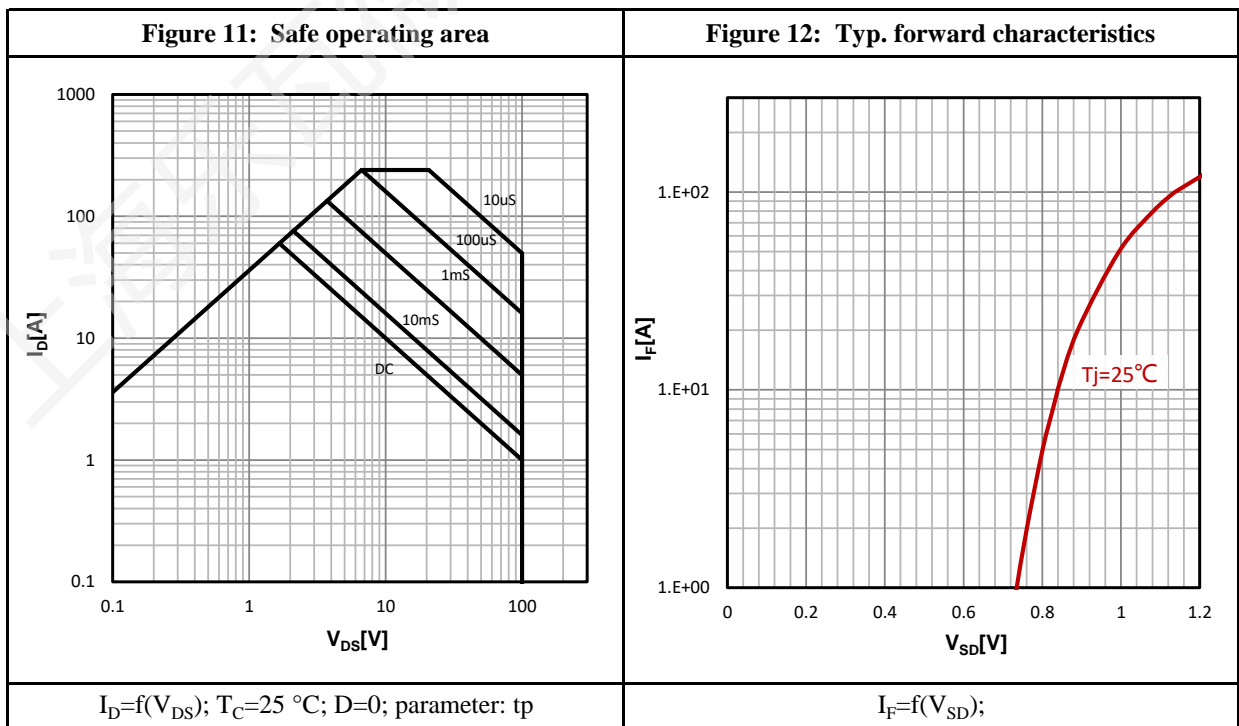
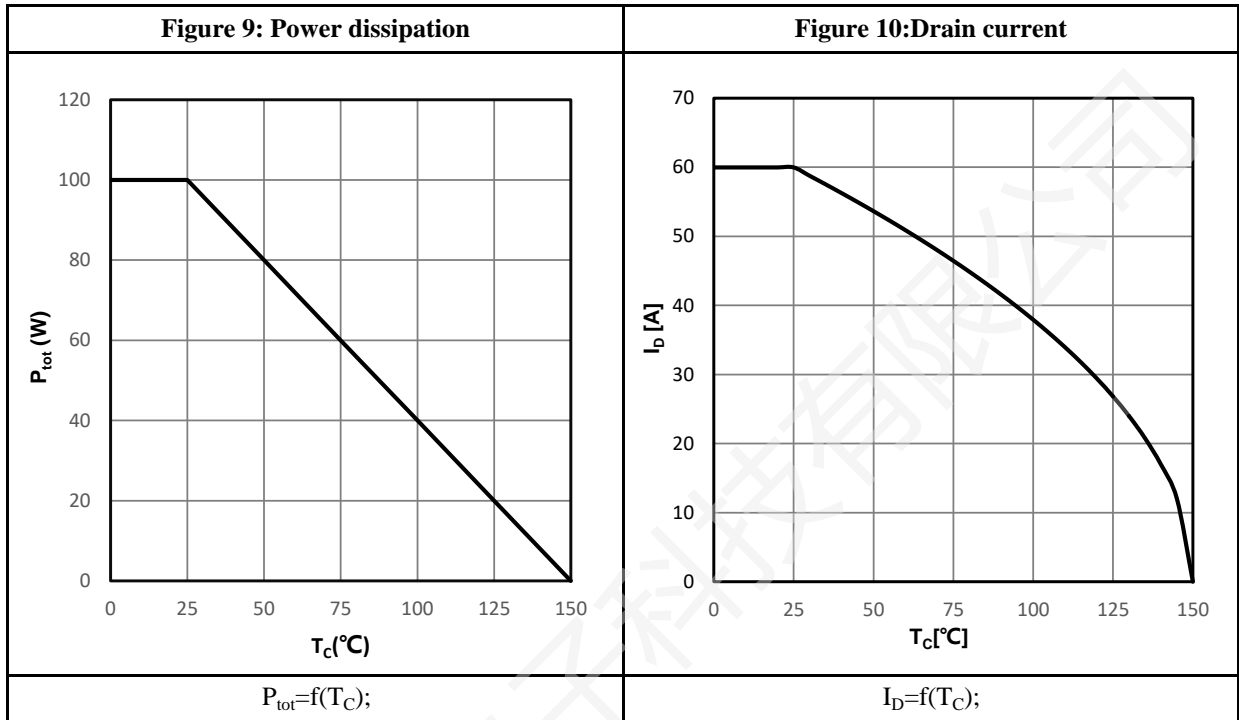
a1: Repetitive rating; pulse width limited by maximum junction temperature

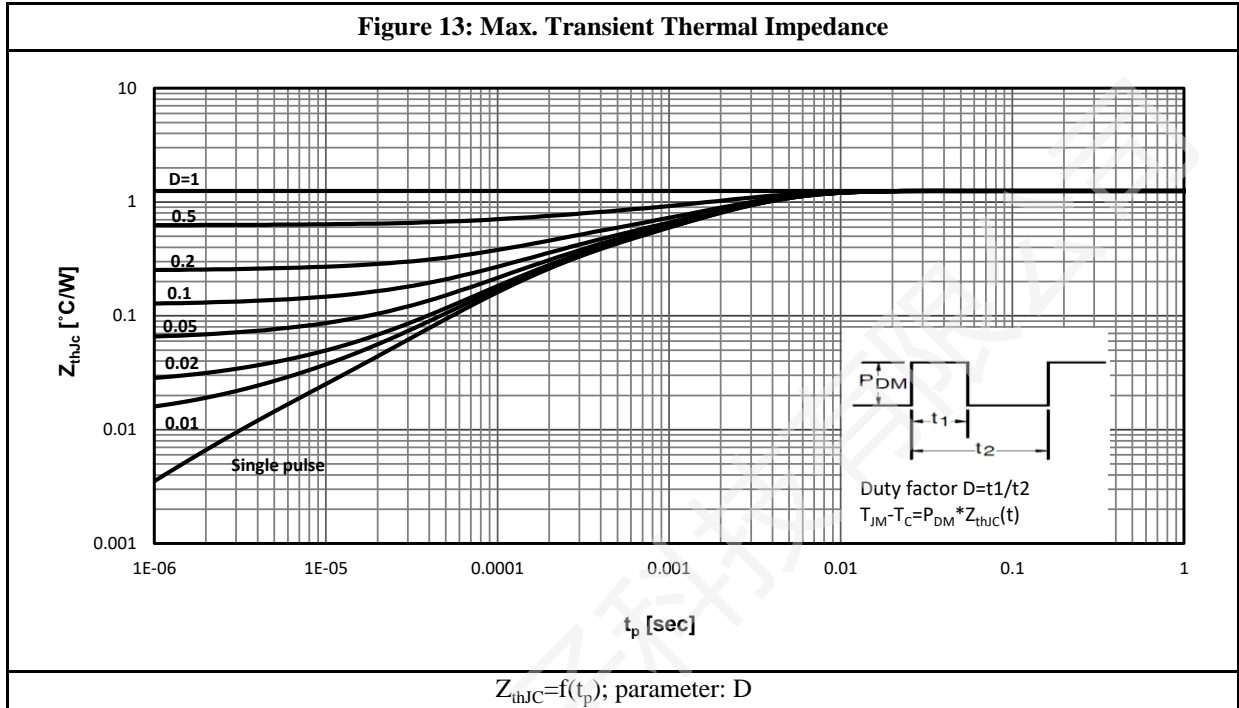
a2: $V_{DD}=50V, L=0.5mH, R_G=25\Omega$, Starting $T_j=25\text{ }^\circ\text{C}$

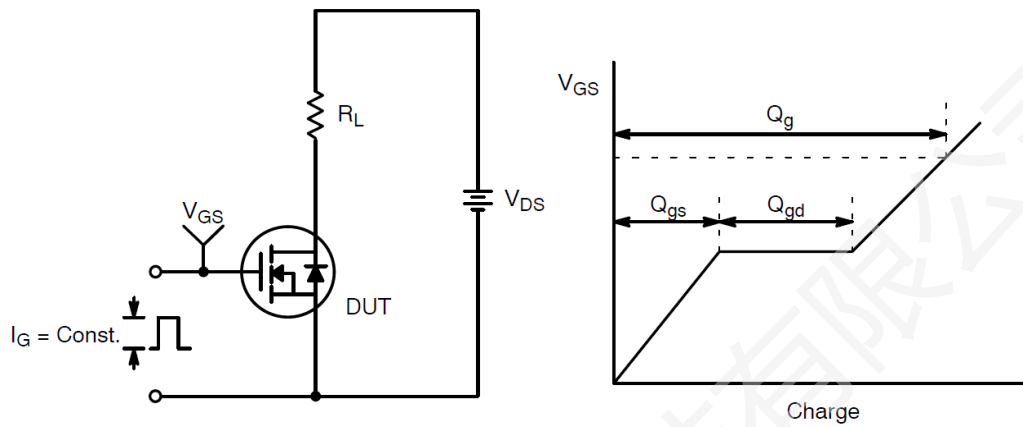
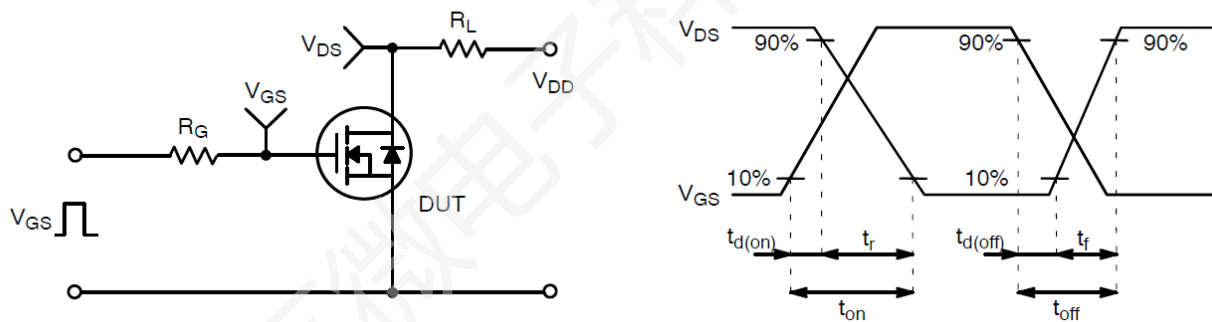
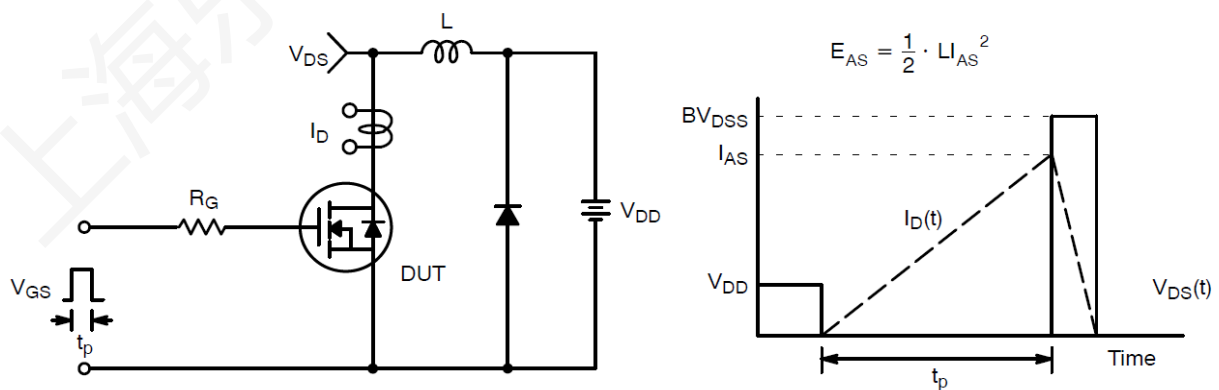
a3: Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm² (one layer, 70 μm thick) copper area for drain connection.

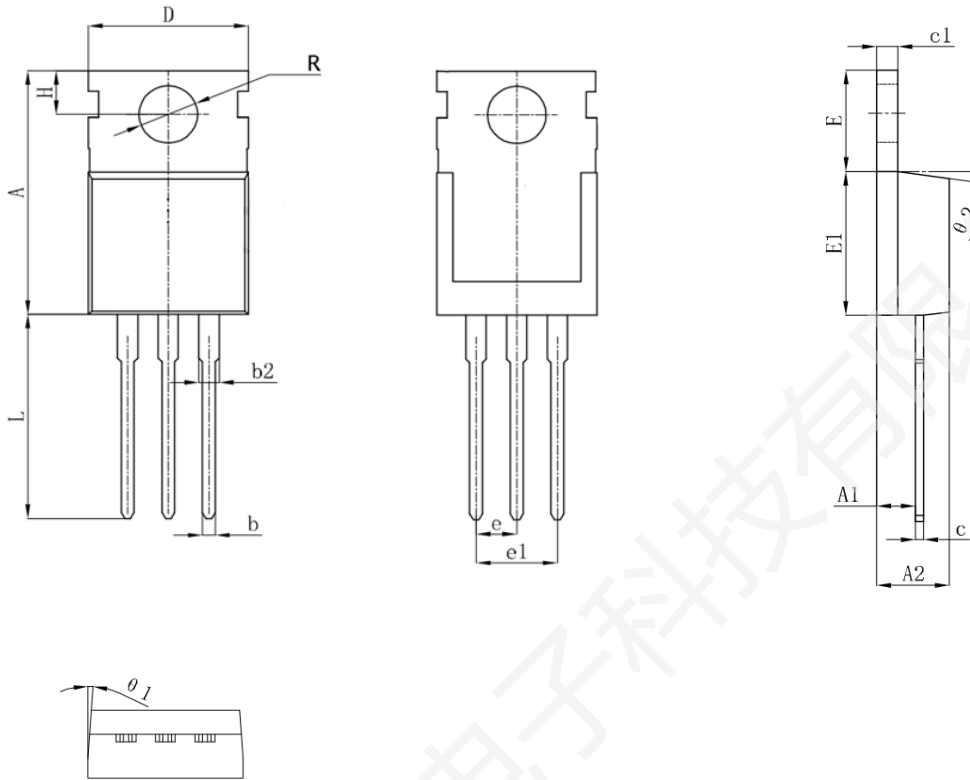
Characteristics Curve:








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	Apr.2023	Initial Version

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