

General Description:

The LWS1H5AL 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 SOT23-3L, 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:

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

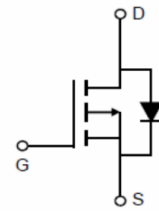


V_{DSS}	-100	V
I_D	-3.0	A
P_D	1.5	W
$R_{DS(ON)}$ TYPE	140	mΩ

Marking and Pin Assignment



Inner Equivalent Principium Chart



Package Marking and Ordering Information:

Marking	Part Number	Package	Packing	Qty.
S1H5A	LWS1H5AL	SOT23-3L	Reel	3000 Pcs

Absolute Maximum Ratings ($T_C = 25^\circ\text{C}$, unless otherwise specified):

Symbol	Parameter		Value	Units
V_{DSS}	Drain-to-Source Voltage		-100	V
I_D	Continuous Drain Current	$T_C=25^\circ\text{C}$	-3.0	A
	Continuous Drain Current	$T_C=100^\circ\text{C}$	-1.8	A
I_{DM}^{a1}	Pulsed Drain Current		-12	A
V_{GS}	Gate-to-Source Voltage		± 20	V
P_D	Power Dissipation		1.5	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	80	$^\circ\text{C/W}$
$R_{\theta JA}^{a2}$	Thermal Resistance, Junction-to-Ambient	125	$^\circ\text{C/W}$

Electrical Characteristic ($T_A = 25\text{ }^{\circ}\text{C}$, 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	$V_{GS}=-10V, I_D=-3.0A$	--	140	200	m Ω
$R_{DS(ON)2}$	Drain-to-Source On-Resistance	$V_{GS}=-4.5V, I_D=-2.0A$	--	170	250	m Ω

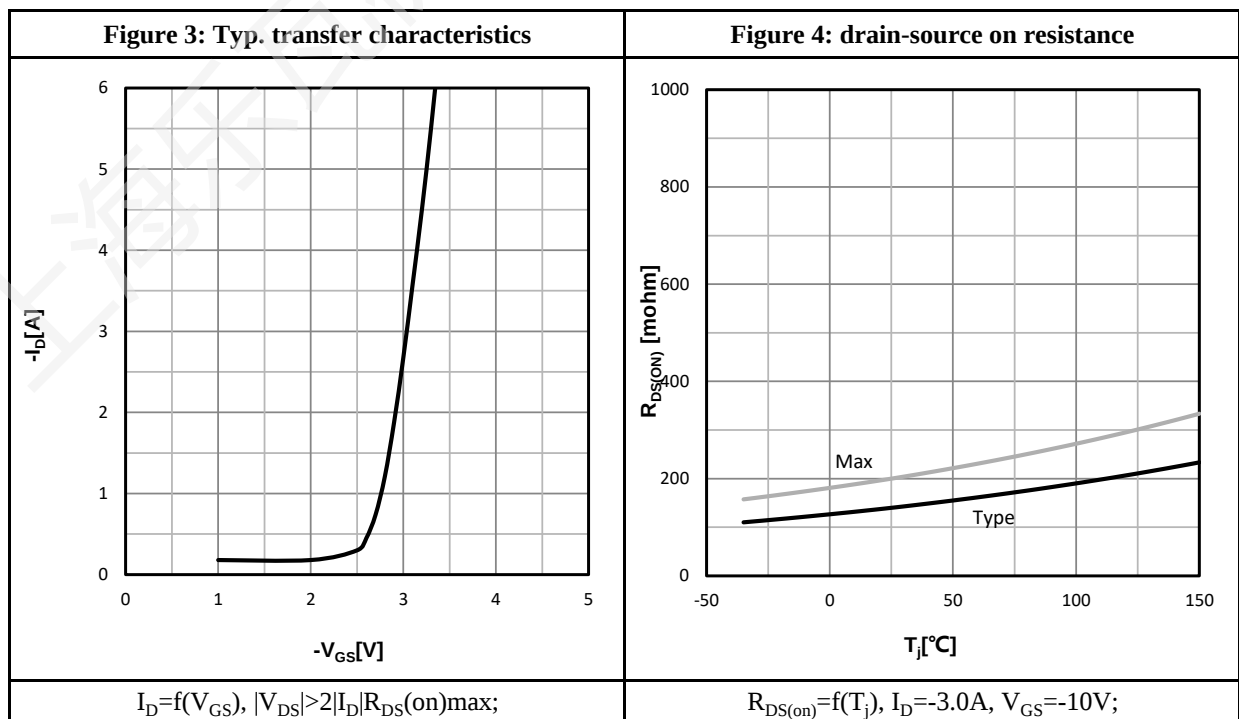
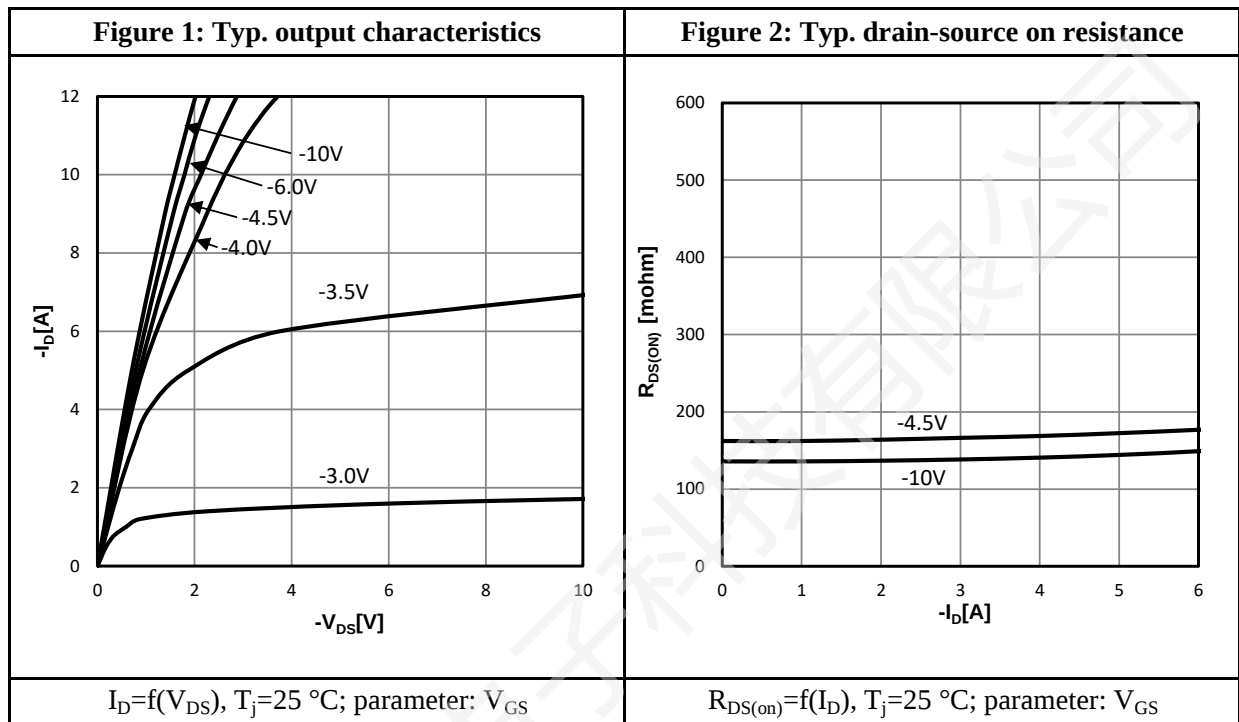
Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
C_{iss}	Input Capacitance	$V_{GS} = 0V$	--	451	--	pF
C_{oss}	Output Capacitance	$V_{DS} = -50V$	--	40	--	
C_{rss}	Reverse Transfer Capacitance	$f = 1.0MHz$	--	5.9	--	
R_G	Gate resistance	$V_{GS}=0V, V_{DS}=0V, f=1MHz$	--	23	--	Ω

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	$I_D = -3.0A$	--	15	--	ns
t_r	Rise Time	$V_{DS} = -50V$	--	35	--	
$t_{d(OFF)}$	Turn-Off Delay Time	$V_{GS} = -10V$	--	100	--	
t_f	Fall Time	$R_G = 1.0\Omega$	--	35	--	
Q_g	Total Gate Charge	$V_{GS} = -10V$	--	9.9	--	nC
Q_{gs}	Gate to Source Charge	$V_{DS} = -50V$	--	1.9	--	
Q_{gd}	Gate to Drain Charge	$I_D = -3.0A$	--	1.8	--	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
I_S	Diode Forward Current	$T_C = 25\text{ }^{\circ}\text{C}$	--	--	-3.0	A
V_{SD}	Diode Forward Voltage	$I_S = -3.0A, V_{GS} = 0V$	--	--	-1.2	V

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

a2: Surface Mounted on FR4 Board, $t \leq 10\text{ sec.}$

Characteristics Curve:


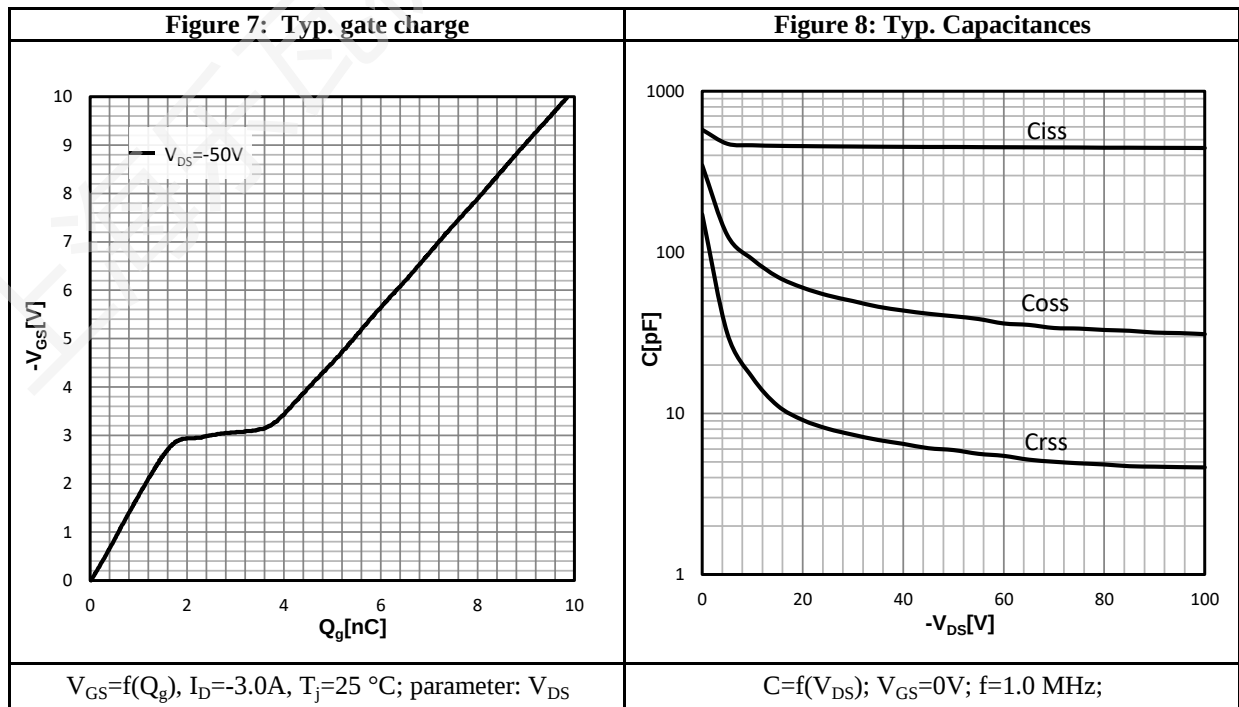
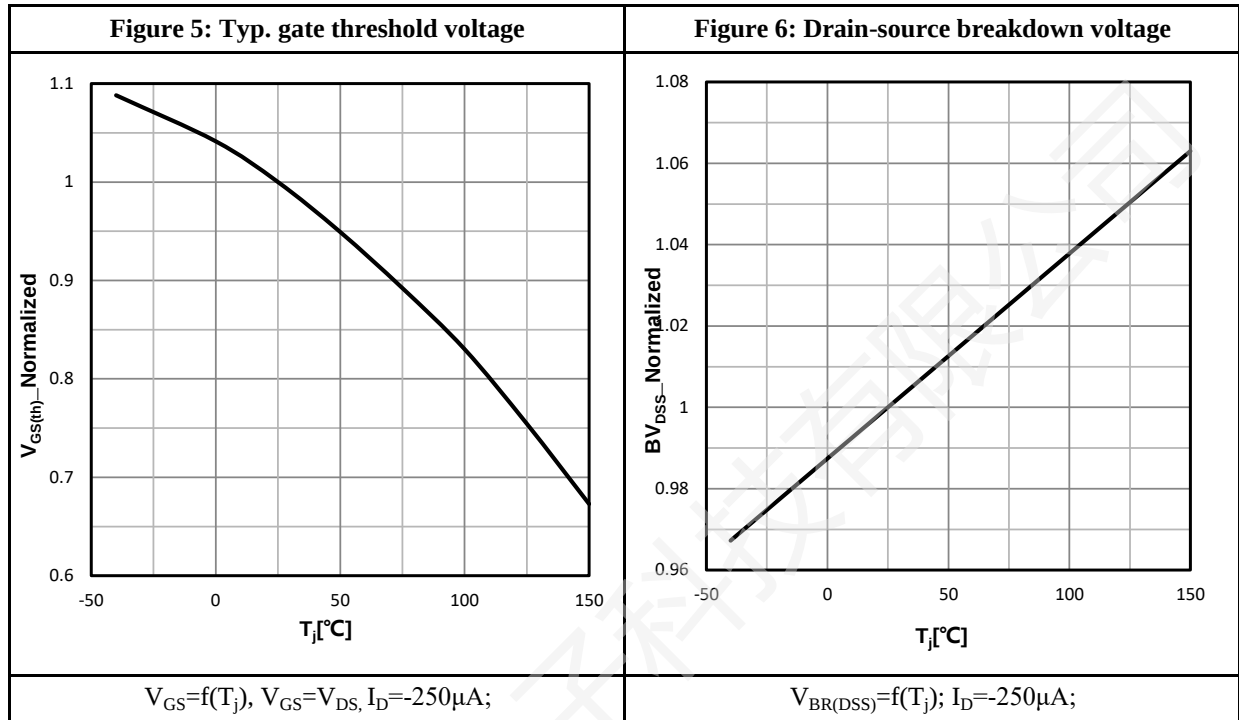
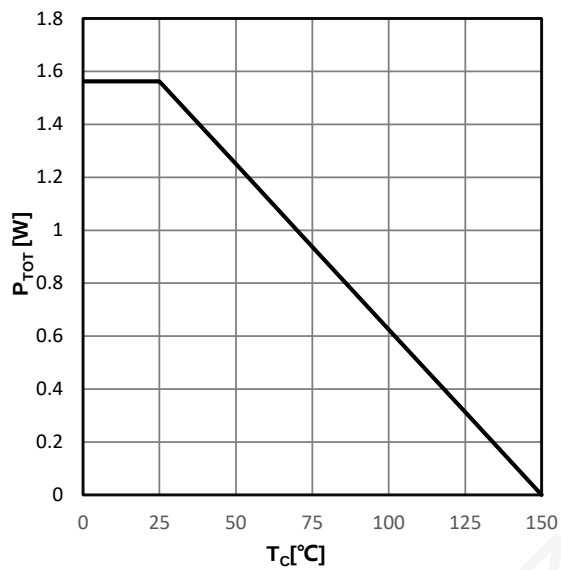
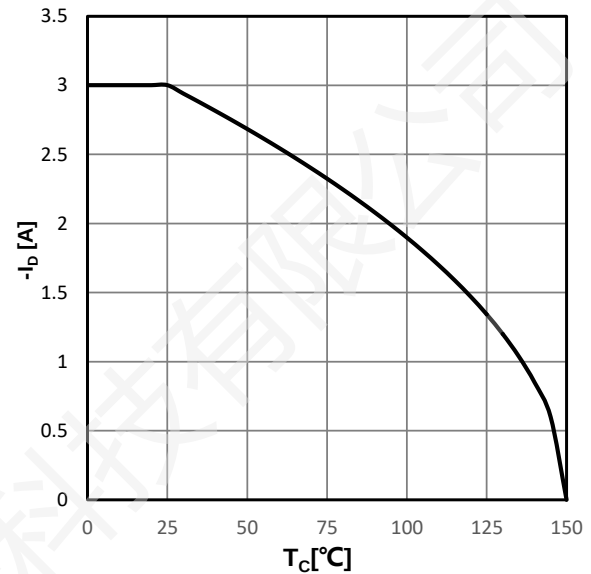
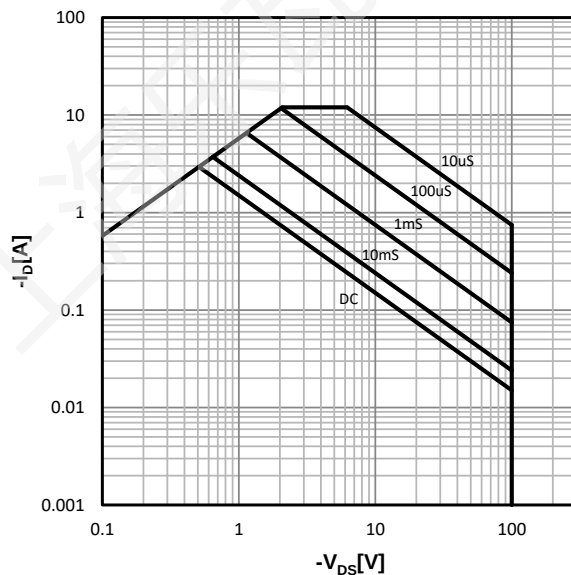


Figure 9: Power dissipation


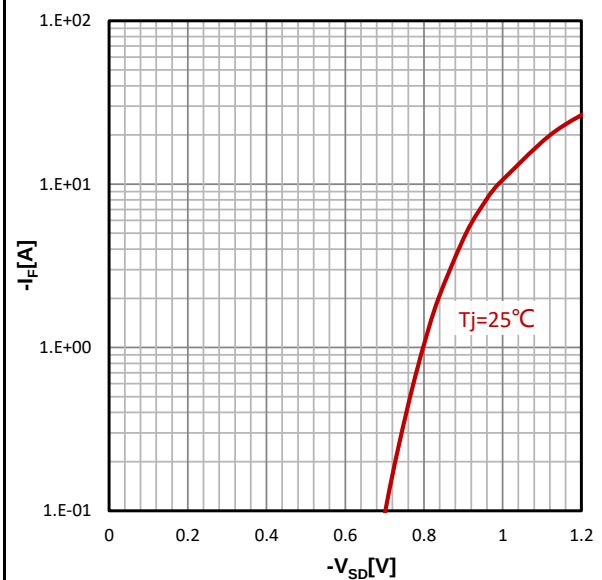
$$P_{tot}=f(T_C);$$

Figure 10: Drain current


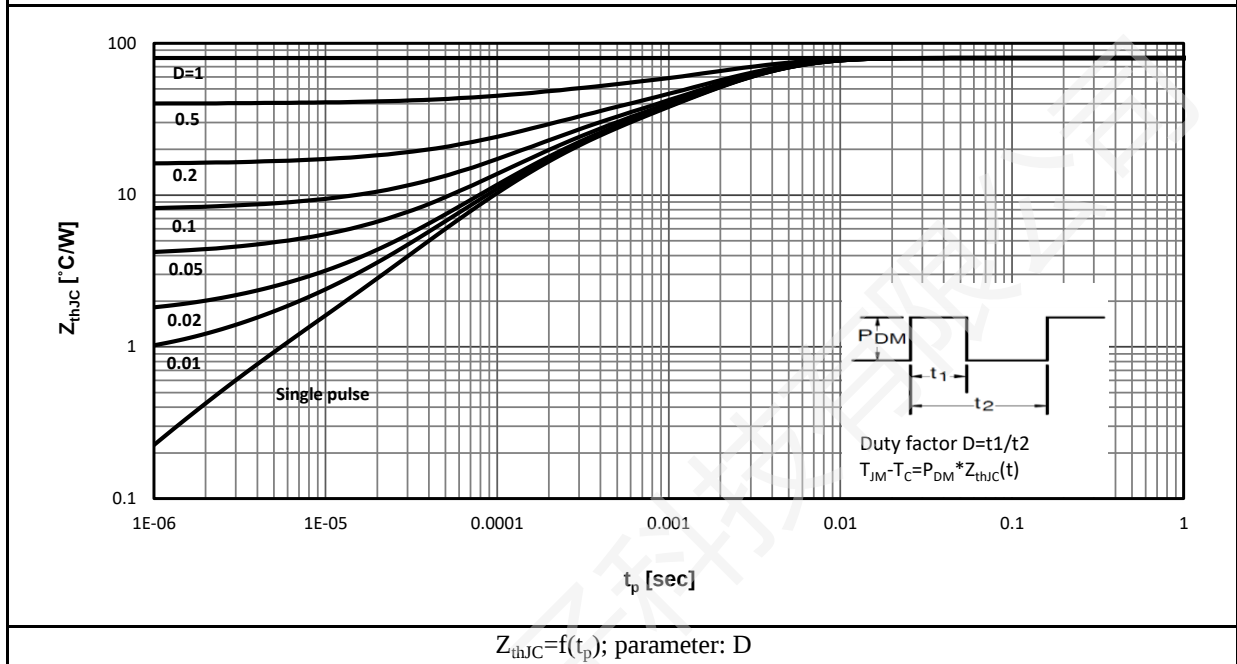
$$I_D=f(T_C);$$

Figure 11: Safe operating area


$$I_D=f(V_{DS}); T_C=25\text{ }^{\circ}\text{C}; D=0; \text{ parameter: tp}$$

Figure 12: Typ. forward characteristics


$$I_F=f(V_{SD});$$

Figure 13: Max. Transient Thermal Impedance


Test Circuit & Waveform:

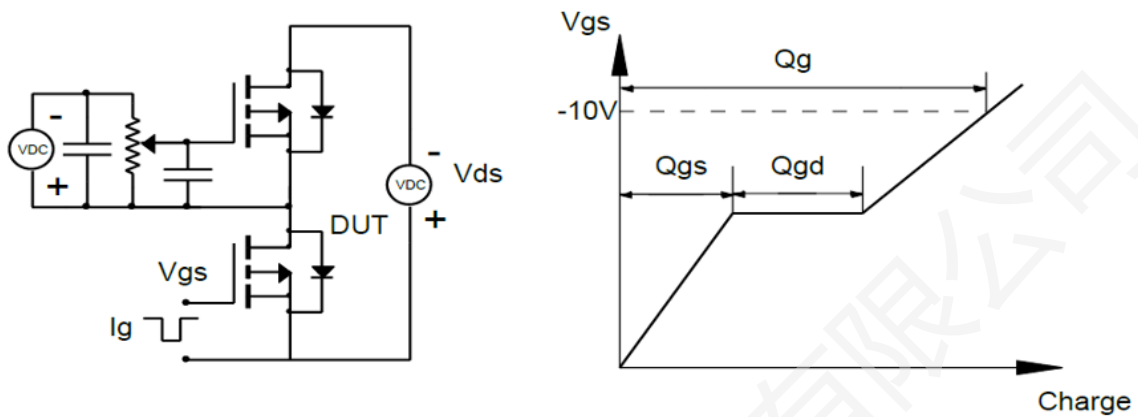


Figure 14: Gate Charge Test Circuit & Waveform

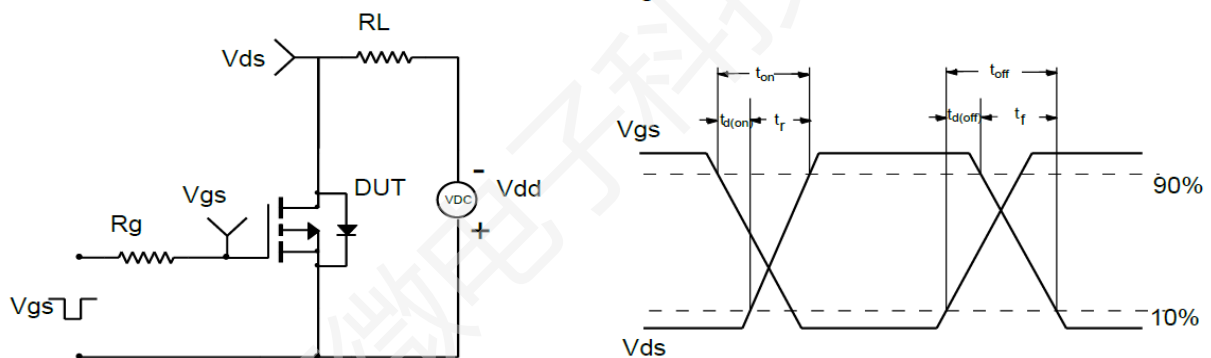


Figure 15: Resistive Switching Test Circuit & Waveforms

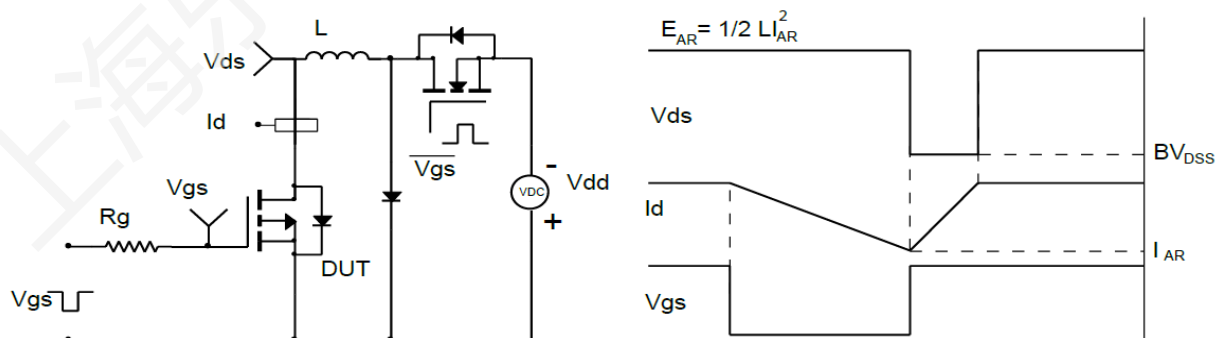
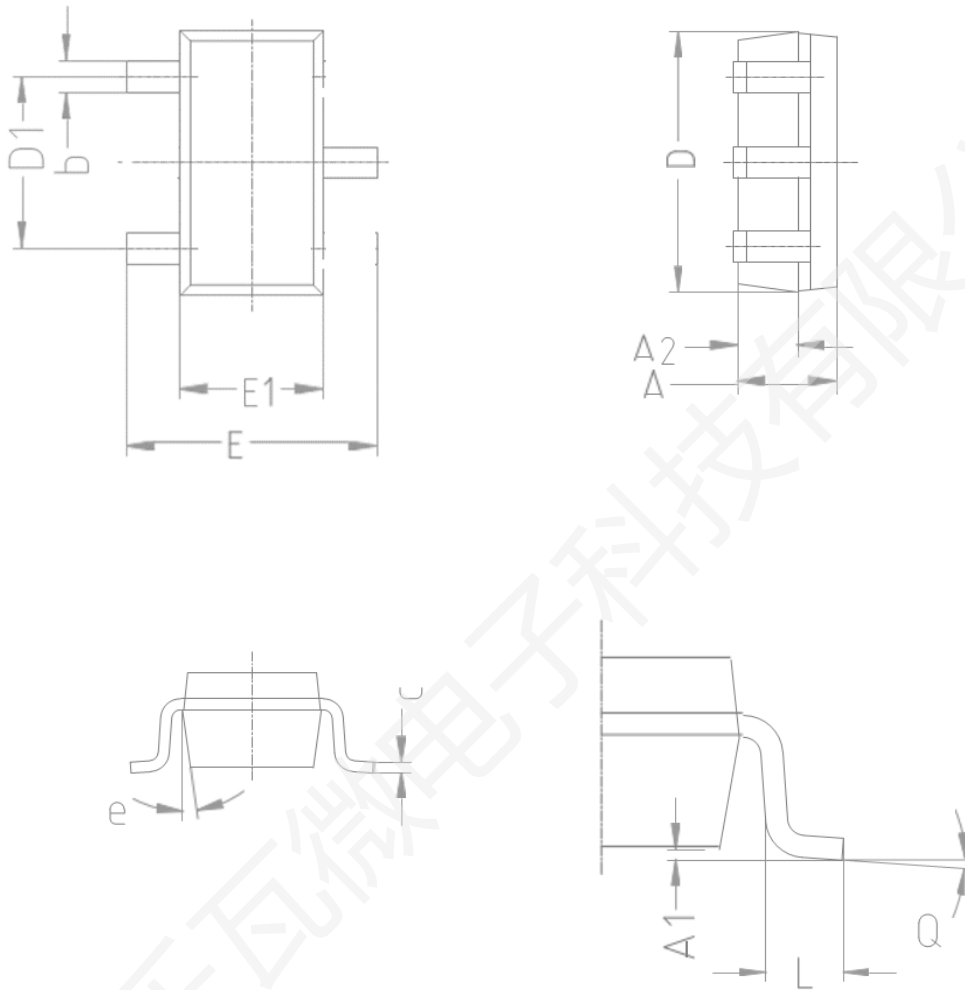


Figure 16: Unclamped Inductive Switching Test Circuit & Waveforms

Package Outline:


COMMON DIMENSION (MM)			
PKG	SOT23-3L		
Symbol	MIN	NOM	MAX
A	1.050	1.100	1.150
A1	0.010	0.060	0.150
A2	0.640	0.670	0.700
b	0.300	0.350	0.400
c	0.125	0.150	0.175
D	2.870	2.925	2.980
D1	1.800	1.900	2.000
E	2.650	2.825	3.000
E1	1.550	1.610	1.670
L	0.300	0.450	0.600
e	8°		
Q	0°	4°	8°

Revision History:

Revison	Date	Descriptions
Rev 1.2	July, 2025	“Electrical Characteristic ” Update
Rev 1.1	Jan, 2025	Initial Version

Disclaimer:

The information in this document is believed to be accurate and reliable. However, no responsibility is assumed by LW-Micro for its use. All operating parameters must be designed, validated and tested to ensure they meet the requirements of your application. LW-Micro reserves the right to make any specification and/or circuitry changes without prior notification. Before starting a brand-new project, please contact LW-Micro Sales to get the most recent relevant information.

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