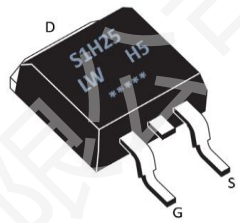
General Description:

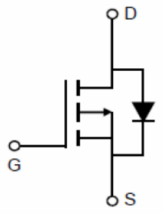
The LWS1H25H5 uses advanced SGT technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications. The package form is TO-263, which accords with the ROHS standard and Halogen Free standard.

V_{DSS}	-100	V
I_D	-65	A
P_D	250	W
$R_{DS(ON)\ TYPE}$	22	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

Package Marking and Ordering Information:

Marking	Part Number	Package	Packing	Qty.
S1H25/LW H5/D.C.	LWS1H25H5	TO-263	Reel	800 Pcs

Absolute Maximum Ratings (T_C = 25 °C, unless otherwise specified):

Symbol	Parameter		Value	Units
V_{DSS}	Drain-to-Source Voltage		-100	V
I_D	Continuous Drain Current	T_C=25℃	-65	A
	Continuous Drain Current	T_C=100℃	-41	A
I_{DM}[a1]	Pulsed Drain Current		-260	A
E_{AS}[a2]	Single pulse avalanche energy		462	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	62	℃/W

Electrical Characteristic (T_A = 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	-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=-250μA	-2.0	-3.0	-4.0	V
$R_{DS(ON)1}$	Drain-to-Source On-Resistance	V_{GS}=-10V, I_D=-10A	--	22	28	mΩ

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
C_{iss}	Input Capacitance	V_{GS} = 0V V_{DS} =-50V f = 1.0MHz	--	4276	--	pF
C_{oss}	Output Capacitance		--	336	--	
C_{rss}	Reverse Transfer Capacitance		--	25	--	
R_G	Gate resistance	V_{GS}=0V,V_{DS}=0V,f=1MHz	--	19	--	Ω

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	I_D =-10A V_{DS} =-50V V_{GS} =-10V R_G = 5.0Ω	--	15	--	ns
t_r	Rise Time		--	18	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	50	--	
t_f	Fall Time		--	19	--	
Q_g	Total Gate Charge	V_{GS} =-10V V_{DS} = -50V I_D =-10A	--	52.1	--	nC
Q_{gs}	Gate to Source Charge		--	16.7	--	
Q_{gd}	Gate to Drain Charge		--	7.1	--	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
I_S	Diode Forward Current	T_C =25 °C	--	--	-65	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 dI/dt=100A/μs	--	53	--	ns
Q_{rr}	Reverse Recovery Charge		--	107	--	nC

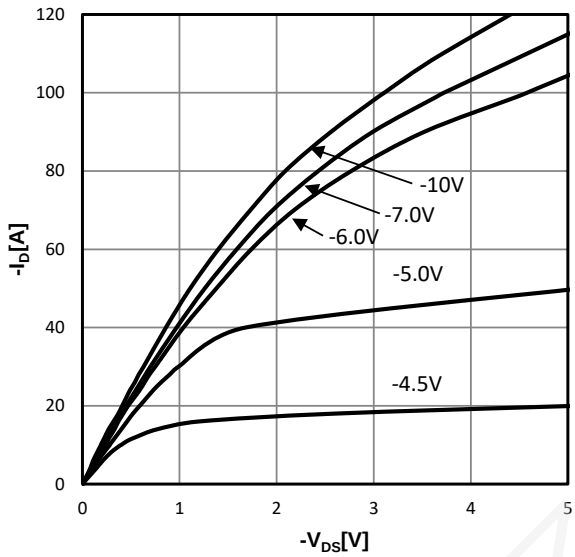
a1：Repetitive rating; pulse width limited by maximum junction temperature

a2：V_{DD}=-50V, L=0.5mH, R_G=25Ω, Starting T_J=25 ℃

a3：Surface Mounted on FR4 Board, t ≤ 10 sec.

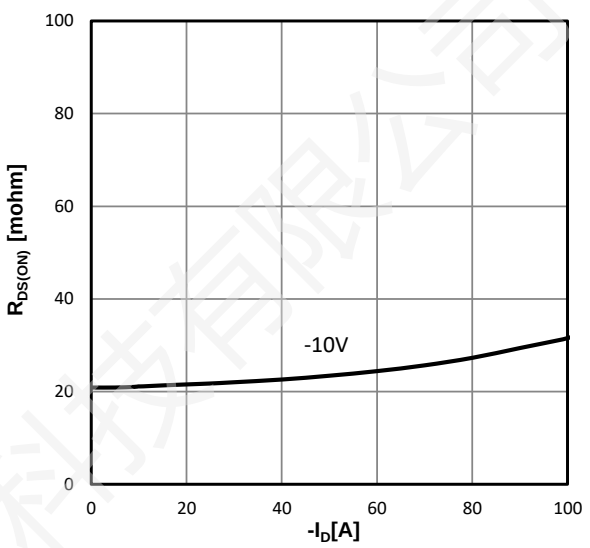
Characteristics Curve：

Figure 1: Typ. output characteristics



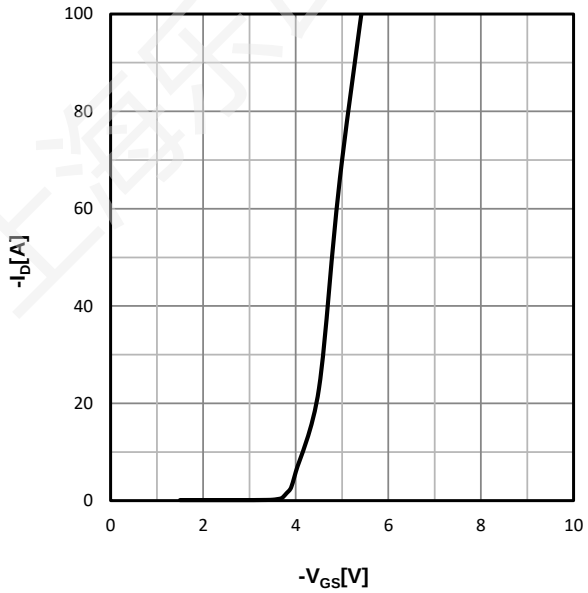
$I_D=f(V_{DS})$, T_j=25 °C; parameter: V_{GS}

Figure 2: Typ. drain-source on resistance



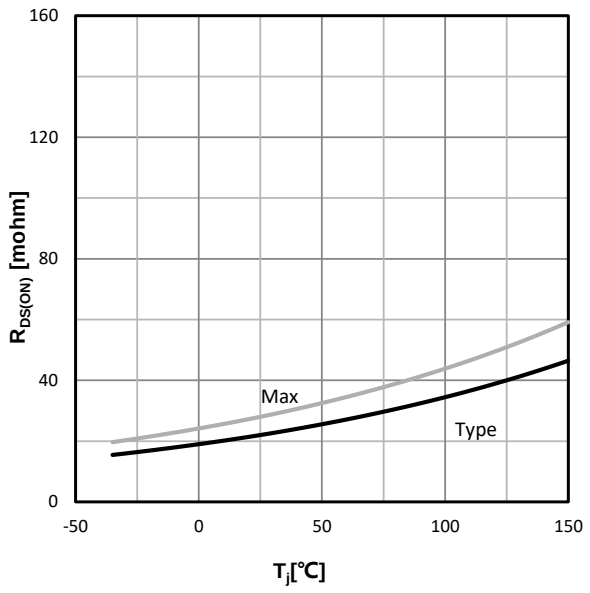
$R_{DS(on)}=f(I_D)$, T_j=25 °C; parameter: V_{GS}

Figure 3: Typ. transfer characteristics



$I_D=f(V_{GS})$, $|V_{DS}|>2|I_D|R_{DS}(on)max$;

Figure 4: drain-source on resistance



$R_{DS(on)}=f(T_j)$, I_D=-10A, V_{GS}=-10V;

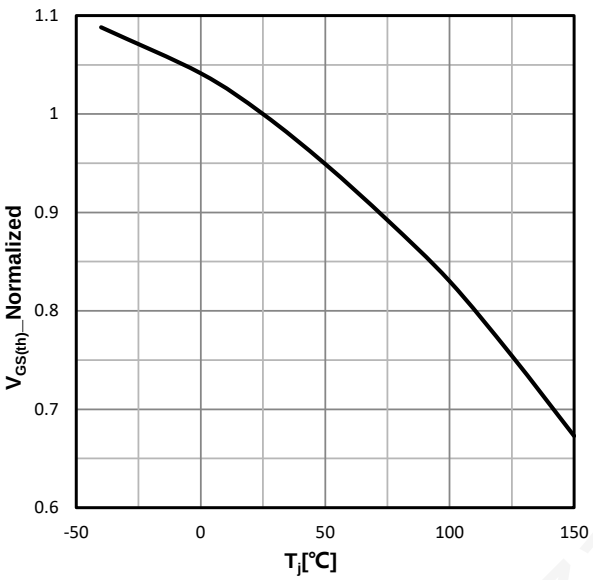
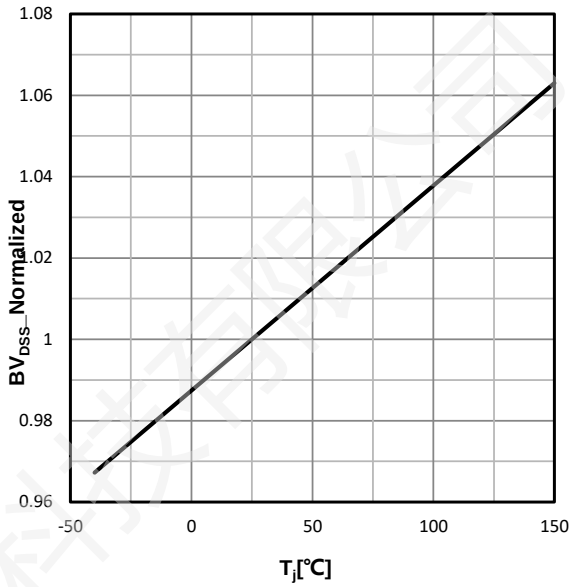
Figure 5: Typ. gate threshold voltage	Figure 6: Drain-source breakdown voltage
	
V_{GS}=f(T_j), V_{GS}=$V_{DS,}$ I_D=-250μA;	$V_{BR(DSS)}$=f(T_j); I_D=-250μA;

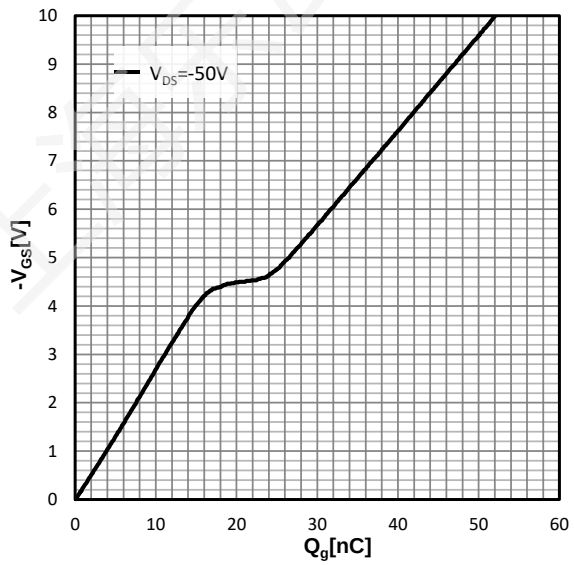
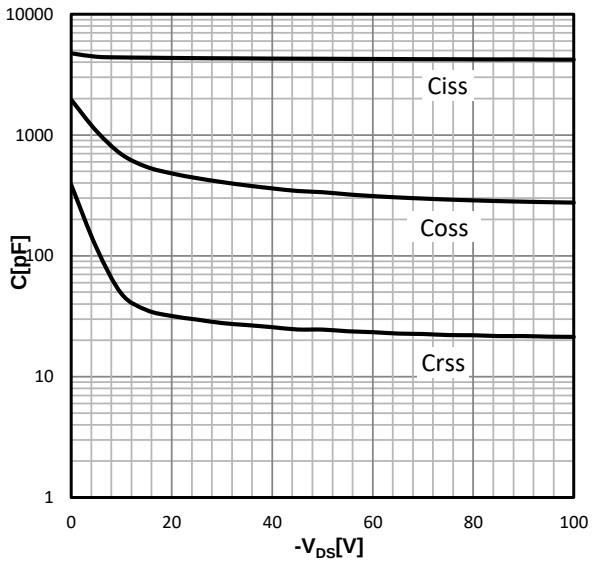
Figure 7: Typ. gate charge	Figure 8: Typ. Capacitances
	
V_{GS}=f(Q_g), I_D=-10A, T_j=25 °C; parameter: V_{DS}	C=f(V_{DS}); V_{GS}=0V; f=1.0 MHz;

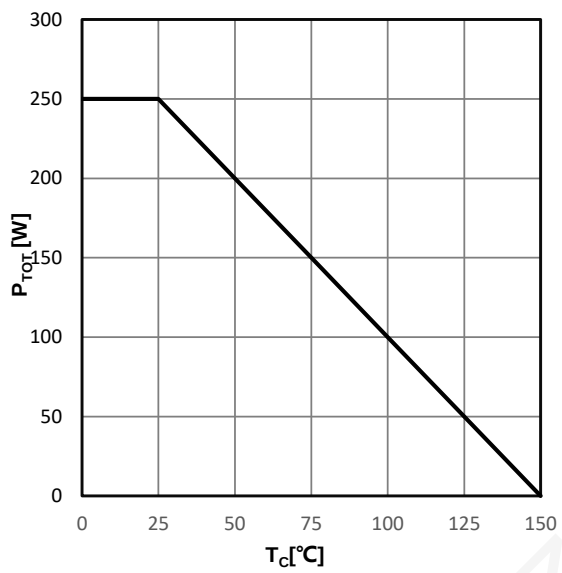
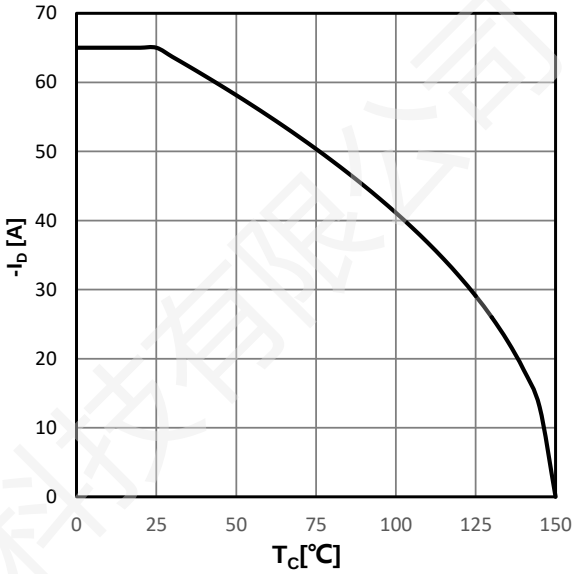
Figure 9: Power dissipation	Figure 10:Drain current
	
$P_{tot}=f(T_C)$;	$I_D=f(T_C)$;

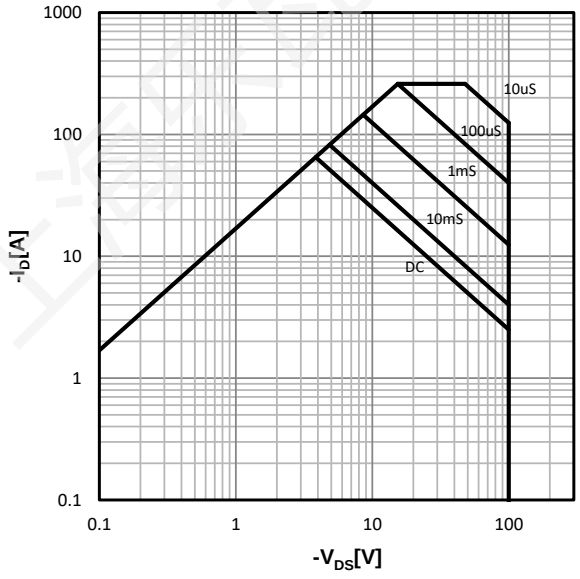
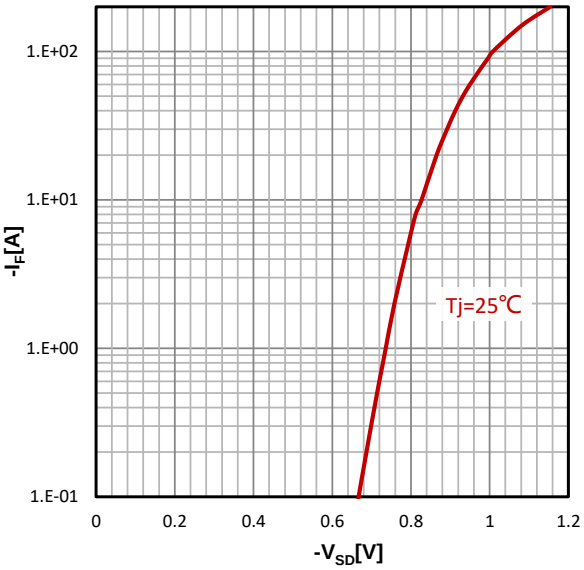
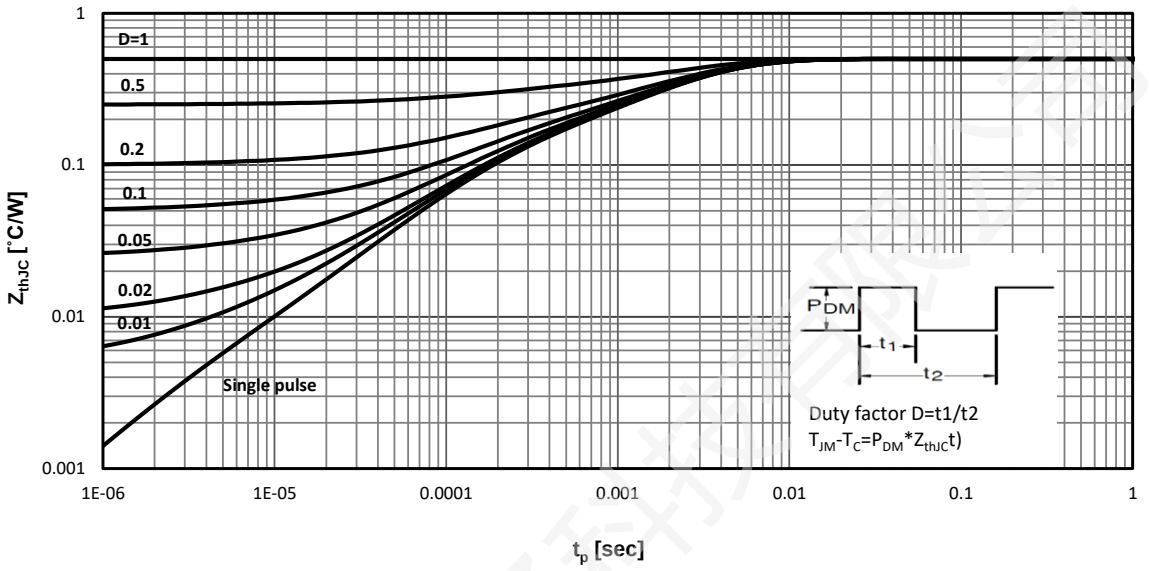
Figure 11: Safe operating area	Figure 12: Typ. forward characteristics
	
$I_D=f(V_{DS})$; T_C=25 °C; D=0; parameter: tp	$I_F=f(V_{SD})$;

Figure 13: Max. Transient Thermal Impedance



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

Test Circuit & Waveform:

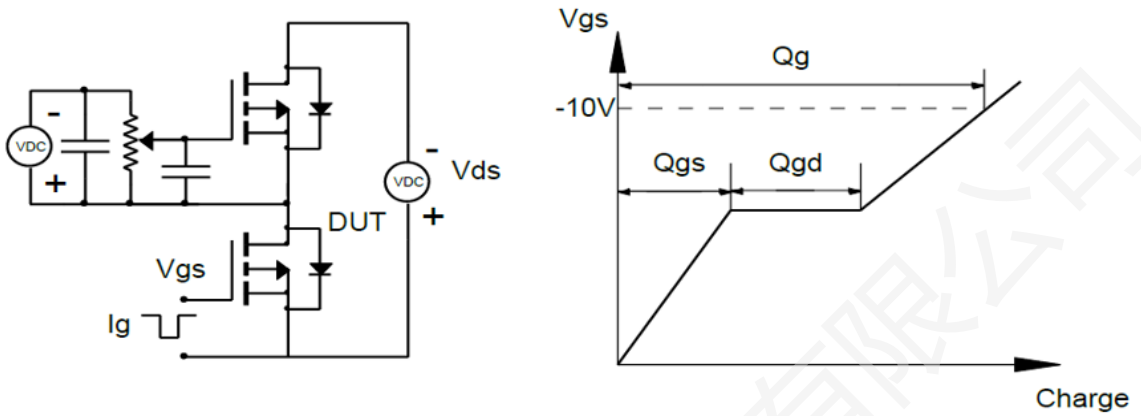


Figure 14: Gate Charge Test Circuit & Waveform

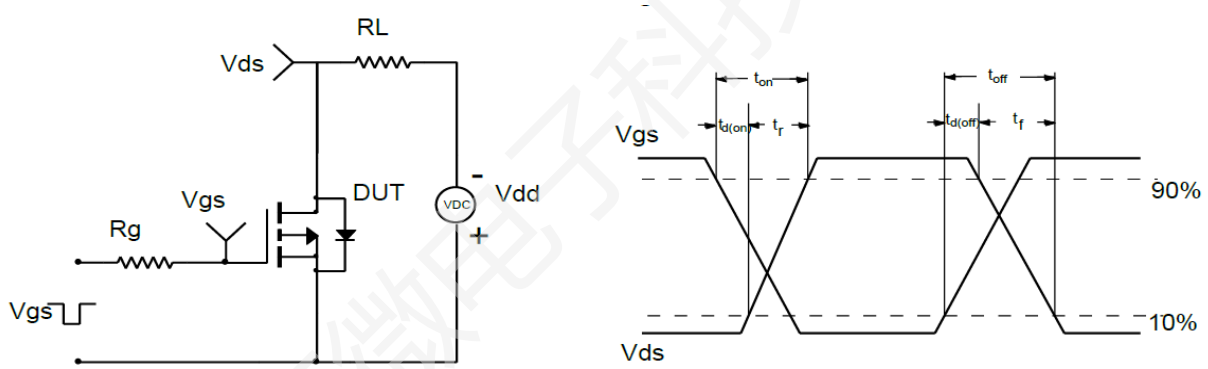


Figure 15: Resistive Switching Test Circuit & Waveforms

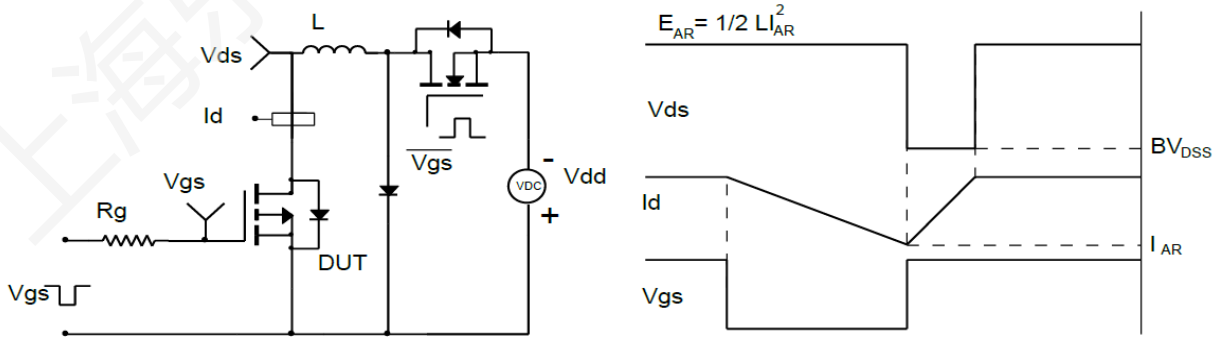
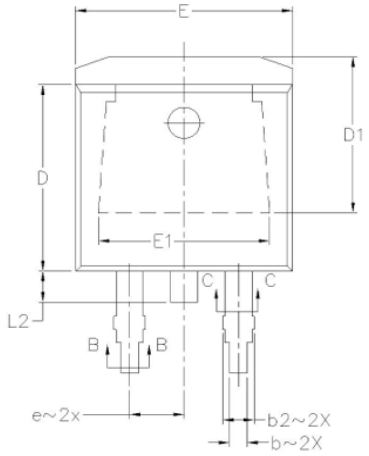
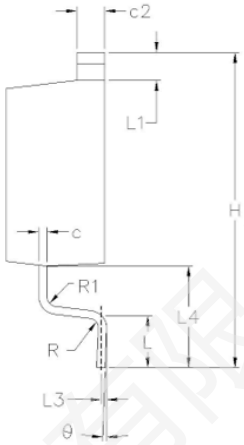
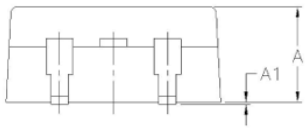


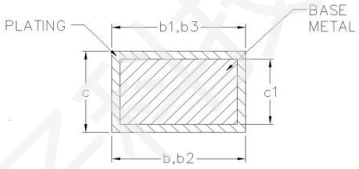
Figure 16: Unclamped Inductive Switching Test Circuit & Waveforms

Package Outline:









Symbol	COMMON			
	MM		INCH	
	Min	Max	Min	Max
A	4.064	4.826	0.160	0.190
A1	0.000	0.254	0.000	0.010
b	0.508	0.991	0.020	0.039
b1	0.508	0.889	0.020	0.035
b2	1.143	1.778	0.045	0.070
b3	1.143	1.727	0.045	0.068
c	0.381	0.737	0.015	0.029
c1	0.381	0.584	0.015	0.023
c2	1.143	1.651	0.045	0.065
D	8.382	9.652	0.330	0.380
D1	6.858	——	0.270	——
E	9.652	10.668	0.380	0.420
E1	6.223	——	0.245	——
e	2.540 BSC		0.100 BSC	
H	14.605	15.875	0.575	0.625
L	1.778	2.794	0.070	0.110
L1	——	1.676	——	0.066
L2	——	1.778	——	0.070
L3	0.254 BSC		0.010 BSC	
L4	4.780	5.280	0.188	0.208
R	0.460 TYP		0.018 TYP	
R1	0.461 TYP		0.019 TYP	
θ	0°	8°	0°	8°

Revision History:

Revison	Date	Descriptions
Rev 1.0	Dec, 2022	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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