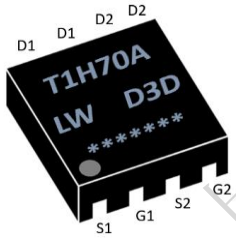
## General Description:

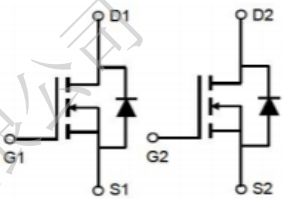
The LWT1H70AD3D uses advanced SGT technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications. The package form is PDFN3.3*3.3-8L, which accords with the ROHS standard and Halogen Free standard.

| | | |
|---|---|---|
| $V_{DSS}$ | 100 | V |
| $I_D$ | 15 | A |
| $P_D$ | 31 | W |
| $R_{DS(ON)\ TYPE}$ | 60 | 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 H F

## Package Marking and Ordering Information:

| Marking | Part Number | Package | Packing | Qty. |
|---|---|---|---|---|
| T1H70A/LW D3D/D.C. | LWT1H70AD3D | PDFN3.3*3.3-8L | Reel | 5000 Pcs |

## Absolute Maximum Ratings:

| Symbol | Parameter | | Value | Units |
|---|---|---|---|---|
| $V_{DSS}$ | Drain-to-Source Voltage | | 100 | V |
| $I_D$ | Continuous Drain Current | $T_C$=25℃ | 15 | A |
| | Continuous Drain Current | $T_C$=100℃ | 10 | A |
| $I_{DM}$[a1] | Pulsed Drain Current | | 60 | A |
| $E_{AS}$[a2] | Single pulse avalanche energy | | 22 | mJ |
| $V_{GS}$ | Gate-to-Source Voltage | | ±20 | V |
| $P_D$ | Power Dissipation | | 31 | 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 | 4 | ℃/W |
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient | 52 | ℃/W |

**Electrical Characteristic** ($T_C$= 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 | 1.3 | 1.8 | 2.3 | V |
| $R_{DS(ON)1}$ | Drain-to-Source On-Resistance | $V_{GS}$=10V, $I_D$=5.0A | -- | 60 | 75 | mΩ |
| $R_{DS(ON)2}$ | Drain-to-Source On-Resistance | $V_{GS}$=4.5V, $I_D$=4.A | -- | 80 | 95 | mΩ |

| **Dynamic Characteristics** | | | | | | |
|---|---|---|---|---|---|---|
| Symbol | Parameter | Test Conditions | Value | | | Units |
| | | | Min. | Typ. | Max. | |
| $C_{iss}$ | Input Capacitance | $V_{GS}$ = 0V<br>$V_{DS}$ = 50V<br>f = 1.0MHz | -- | 171 | -- | pF |
| $C_{oss}$ | Output Capacitance | | -- | 58 | -- | |
| $C_{rss}$ | Reverse Transfer Capacitance | | -- | 1.9 | -- | |

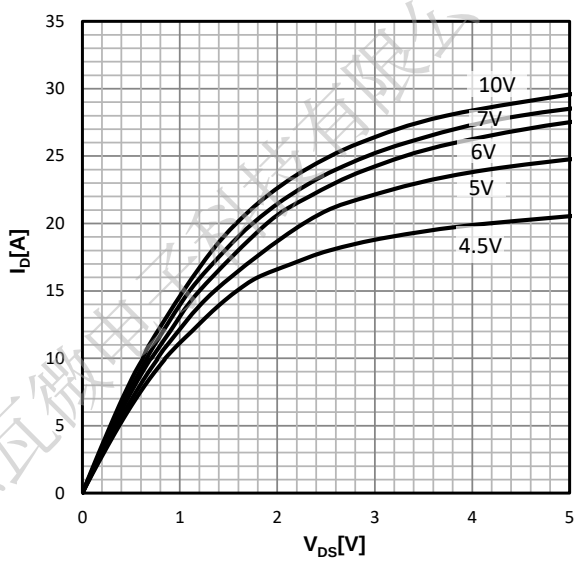
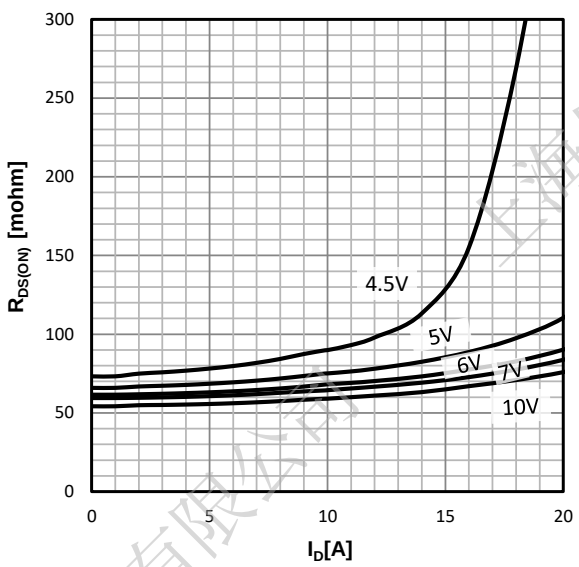
| **Resistive Switching Characteristics** | | | | | | |
|---|---|---|---|---|---|---|
| Symbol | Parameter | Test Conditions | Value | | | Units |
| | | | Min. | Typ. | Max. | |
| $t_{d(ON)}$ | Turn-on Delay Time | $I_D$ =10A<br>$V_{DS}$ =50V<br>$V_{GS}$ = 10V<br>$R_G$ = 3.0Ω | -- | 8 | -- | ns |
| $t_r$ | Rise Time | | -- | 16 | -- | |
| $t_{d(OFF)}$ | Turn-Off Delay Time | | -- | 17 | -- | |
| $t_f$ | Fall Time | | -- | 14 | -- | |
| $Q_g$ | Total Gate Charge | $V_{GS}$ =10V<br>$V_{DS}$ = 50V<br>$I_D$ =10A | -- | 5.0 | -- | nC |
| $Q_{gs}$ | Gate Source Charge | | -- | 0.8 | -- | |
| $Q_{gd}$ | Gate Drain Charge | | -- | 1.0 | -- | |

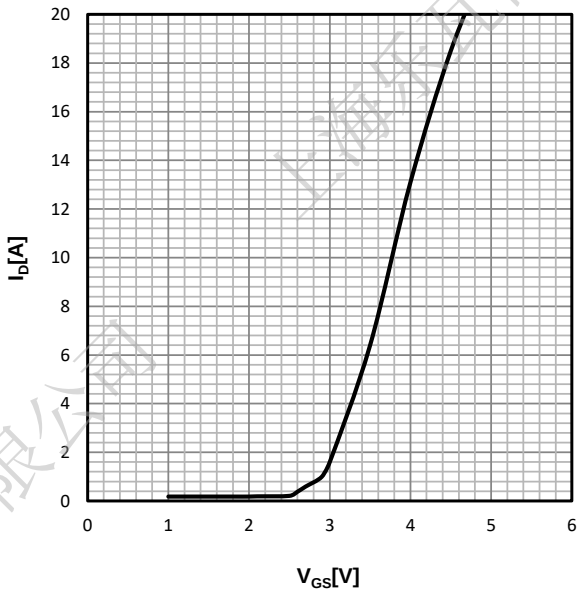
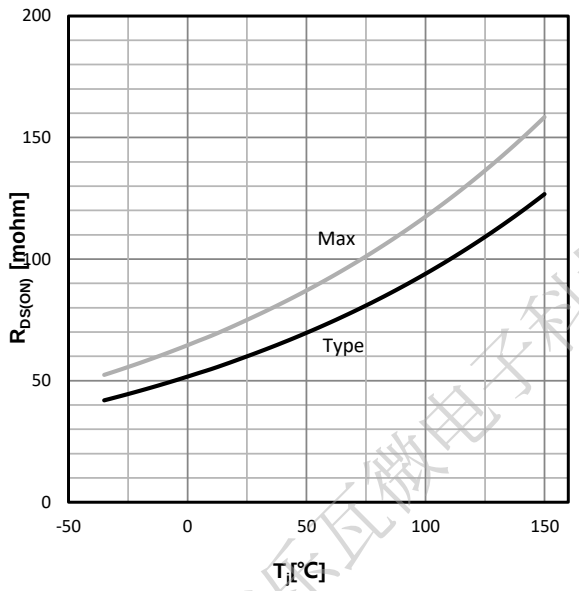
| **Source-Drain Diode Characteristics** | | | | | | |
|---|---|---|---|---|---|---|
| Symbol | Parameter | Test Conditions | Value | | | Units |
| | | | Min. | Typ. | Max. | |
| $I_S$ | Diode Forward Current | $T_C$ =25 °C | -- | -- | 15 | A |
| $V_{SD}$ | Diode Forward Voltage | $I_S$=5.0A, $V_{GS}$=0V | -- | -- | 1.2 | V |
| $t_{rr}$ | Reverse Recovery time | $I_S$=10A, $V_{DD}$=50V<br>dI/dt=100A/μs | -- | 22 | -- | ns |
| $Q_{rr}$ | Reverse Recovery Charge | | -- | 18 | -- | nC |

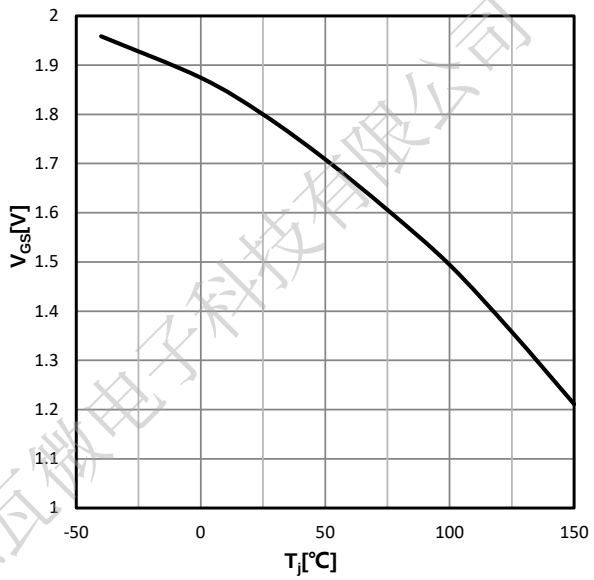
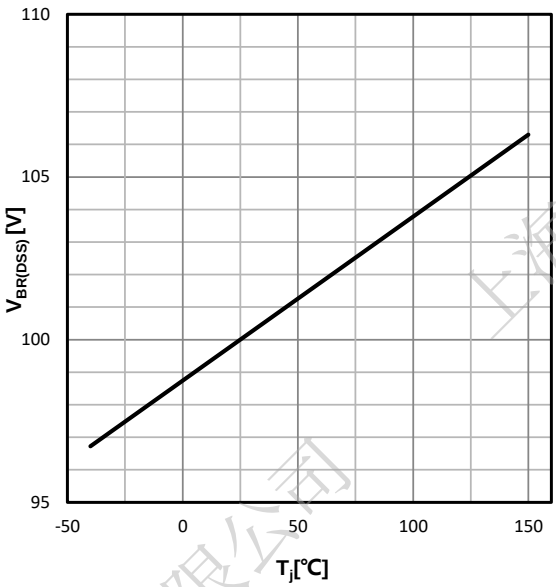
a1：Repetitive rating; pulse width limited by maximum junction temperature

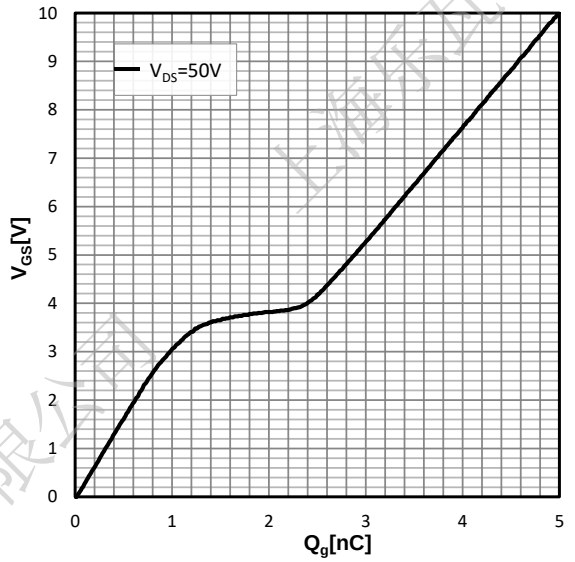
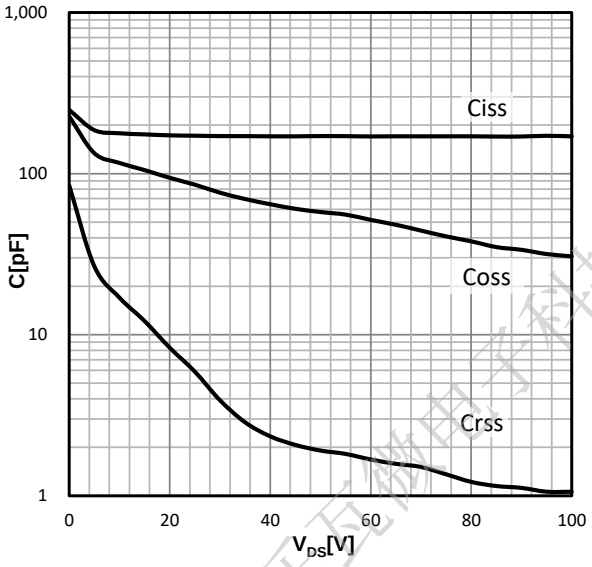
a2：$V_{DD}$=50V, L=5.0mH, $R_G$=25Ω, Starting $T_J$=25 °C

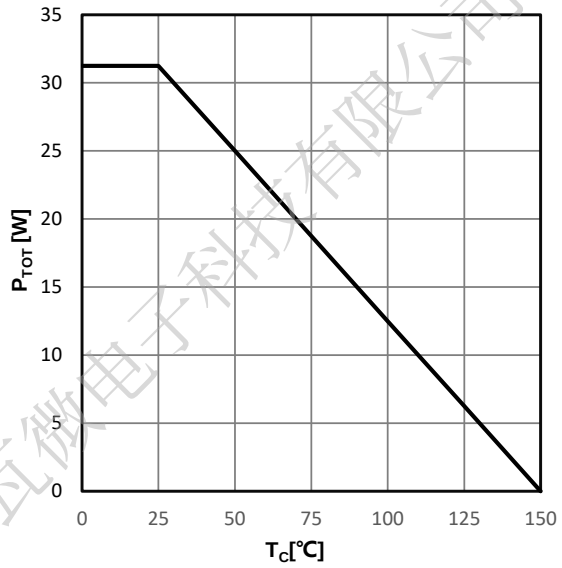
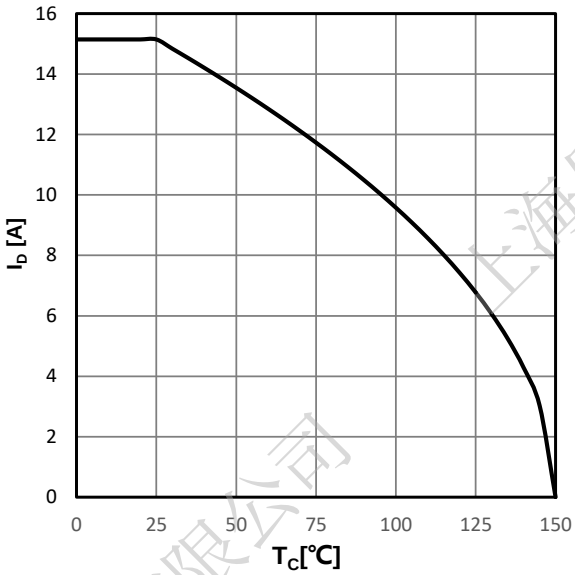
## Characteristics Curve：

| 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 |
|---|---|
|  |  |
| $I_D=f(V_{GS})$, $\|V_{DS}\|>2\|I_D\|R_{DS}(on)max$; | $R_{DS(on)}=f(T_j)$, $I_D$=5.0A, $V_{GS}$=10V; |

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

| 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 |
|---|---|
|  |  |
| $P_{tot}=f(T_C)$; | $I_D=f(T_C)$; |

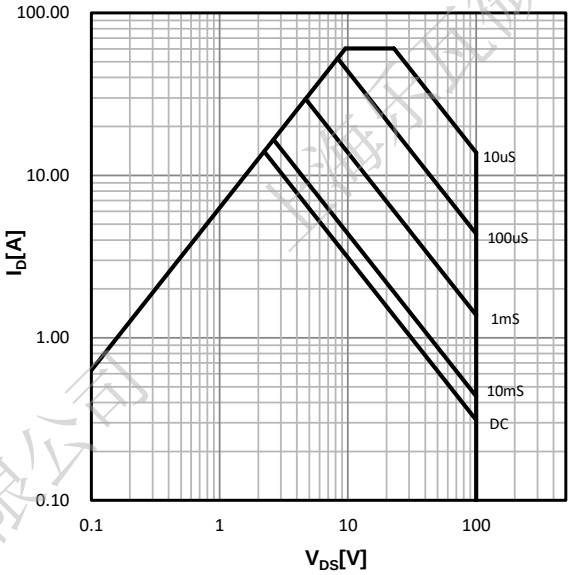
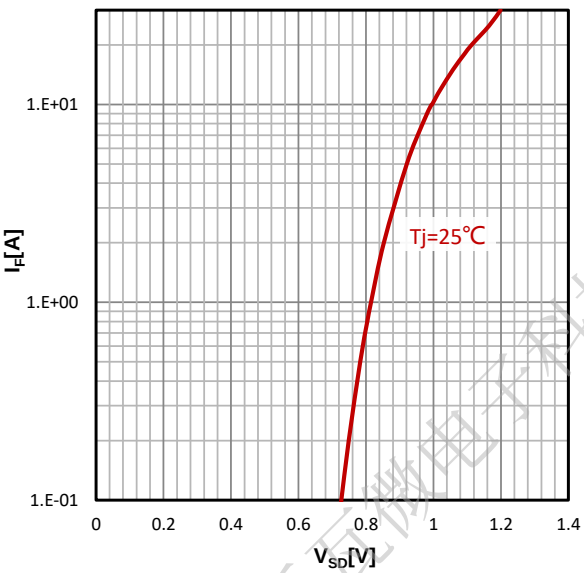
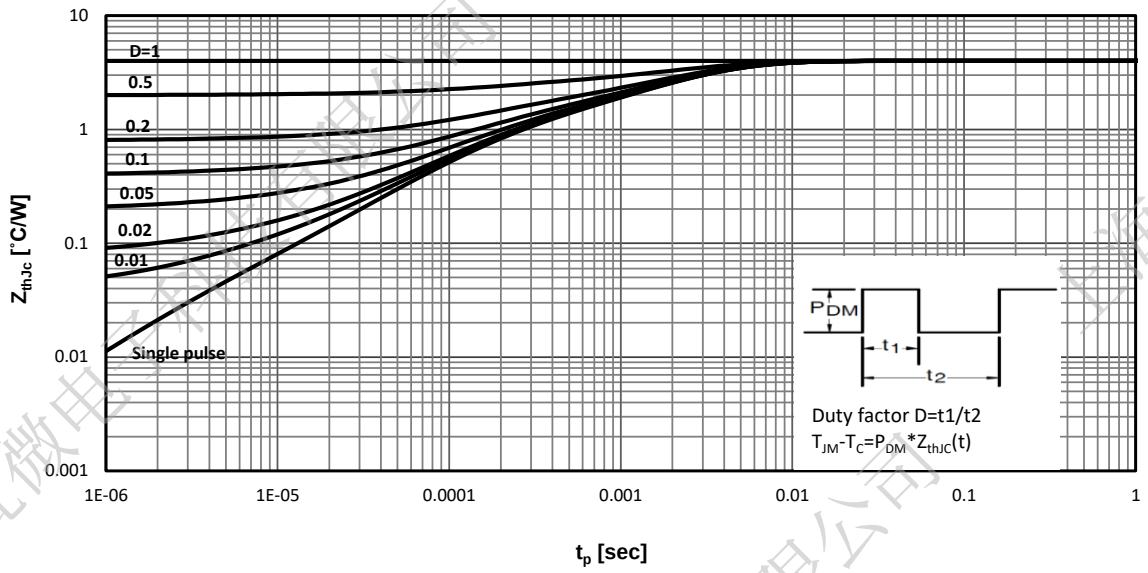
| Figure 11: Safe operating area | Figure 12: Typ. forward characteristics |
|---|---|
|  |  |
| $I_D=f(V_{DS})$; $T_C$=25 °C; D=0; parameter: tp | $I_F=f(V_{SD})$; |

**Figure 13: Max. Transient Thermal Impedance**




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

## Test Circuit & Waveform:

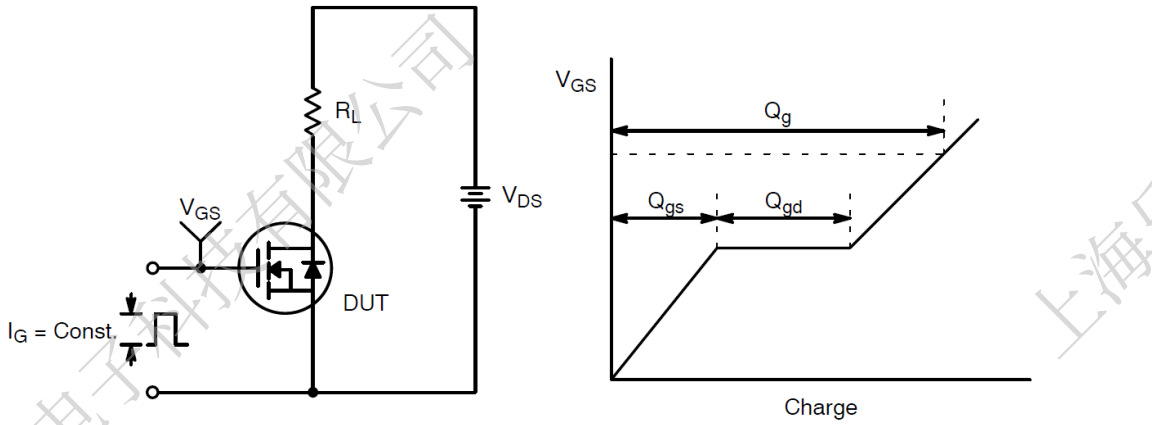



**Figure 14: Gate Charge Test Circuit & Waveform**

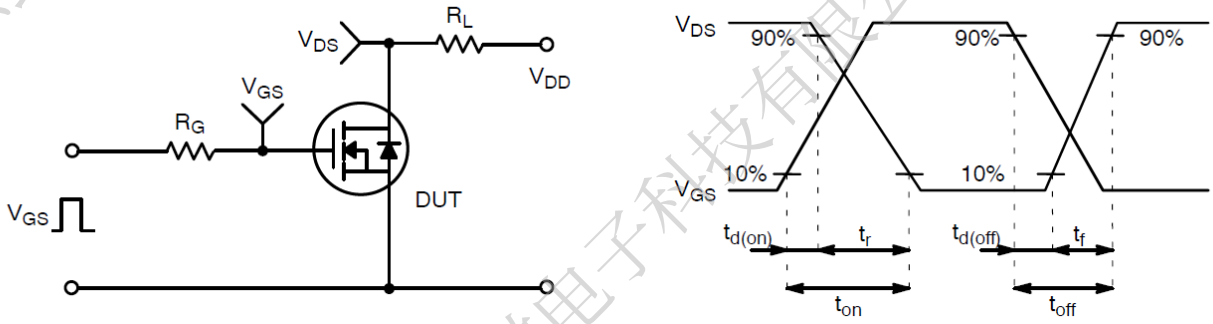



**Figure 15: Resistive Switching Test Circuit & Waveforms**

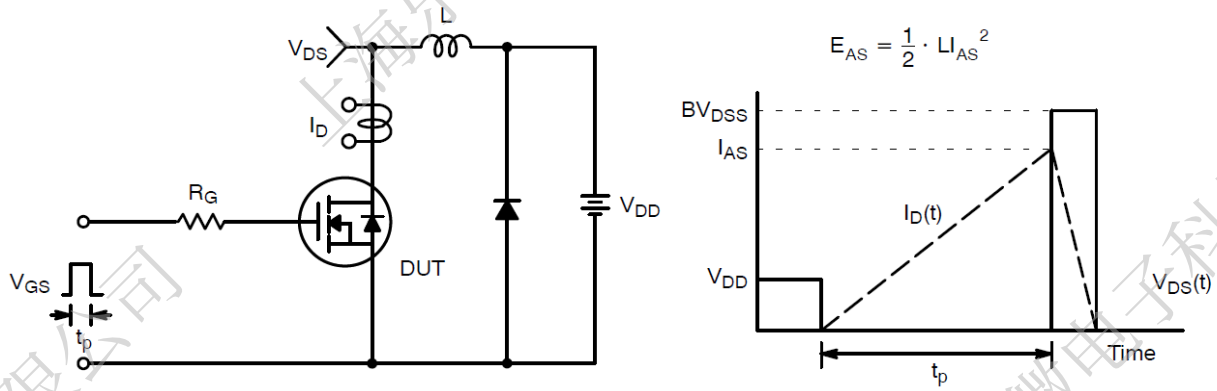
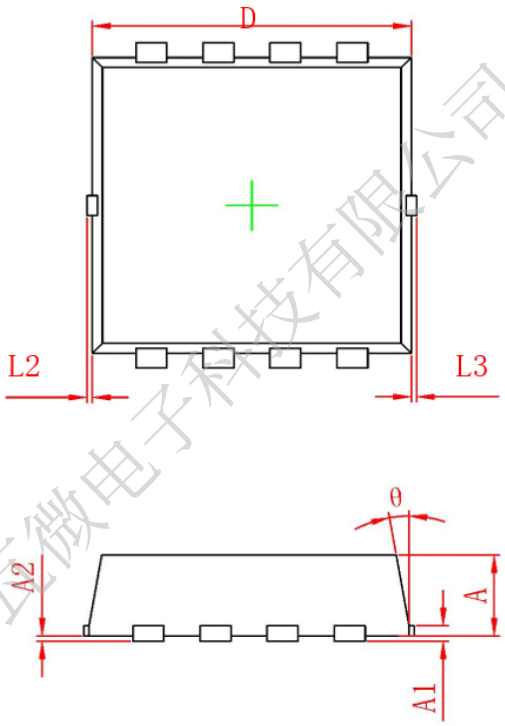
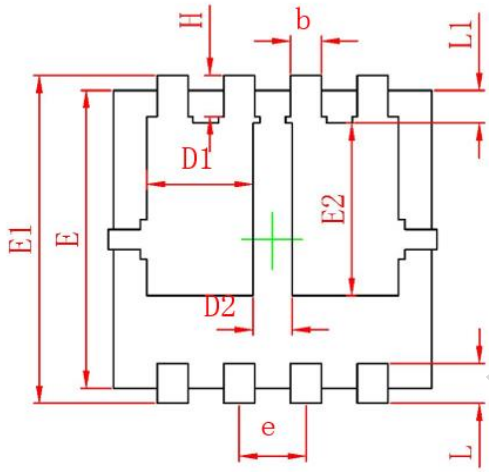



**Figure 16: Unclamped Inductive Switching Test Circuit & Waveforms**

**Package Outline:**




| Symbol | MILLIMETER | |
|---|---|---|
| | MIN | MIN |
| **A** | 0.700 | 0.900 |
| **A1** | 0.152 REF | |
| **A2** | 0~0.05 | |
| **D** | 3.000 | 3.200 |
| **D1** | 0.935 | 1.135 |
| **D2** | 0.280 | 0.480 |
| **E** | 2.900 | 3.100 |
| **E1** | 3.150 | 3.450 |
| **E2** | 1.535 | 1.935 |
| **b** | 0.200 | 0.400 |
| **e** | 0.550 | 0.750 |
| **L** | 0.300 | 0.500 |
| **L1** | 0.180 | 0.480 |
| **L2** | 0~0.100 | |
| **L3** | 0~0.100 | |
| **H** | 0.315 | 0.515 |
| **θ** | 8° | 12° |

## Revision History:

| Revison | Date | Descriptions |
|---|---|---|
| Rev 1.0 | Feb.2024 | Initial Version |

**Disclaimer:**

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