

General Description:

The LWP2025AD3D uses trench 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.

Features:

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

Applications:

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

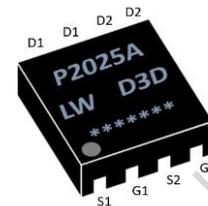
100% DVDS Tested

100% Avalanche Tested

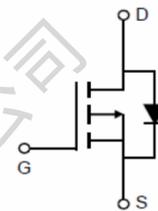


| | | |
|-------------------|-----|------------|
| V_{DSS} | -20 | V |
| I_D | -21 | A |
| P_D | 22 | W |
| $R_{DS(ON)}$ TYPE | 20 | m Ω |

Marking and Pin Assignment



Inner Equivalent Principium Chart



Package Marking and Ordering Information:

| Marking | Part Number | Package | Packing | Qty. |
|--------------------|-------------|----------------|---------|----------|
| P2025A/LW D3D/D.C. | LWP2025AD3D | PDFN3.3*3.3-8L | Reel | 5000 Pcs |

Absolute Maximum Ratings:

| Symbol | Parameter | Value | Units |
|----------------|--|-------------------------|------------------|
| V_{DSS} | Drain-to-Source Voltage | -20 | V |
| I_D | Continuous Drain Current | $T_C=25^\circ\text{C}$ | -21 |
| | Continuous Drain Current | $T_C=100^\circ\text{C}$ | -13 |
| I_{DM}^{a1} | Pulsed Drain Current | -62 | A |
| E_{AS}^{a2} | Single pulse avalanche energy | 72 | mJ |
| V_{GS} | Gate-to-Source Voltage | ± 12 | V |
| P_D | Power Dissipation | 22 | 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 | 5.6 | $^\circ\text{C}/\text{W}$ |

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

| Static Characteristics | | | | | | |
|------------------------|-----------------------------------|--------------------------------|-------|------|------|------------|
| Symbol | Parameter | Test Conditions | Value | | | Units |
| | | | Min. | Typ. | Max. | |
| V_{DSS} | Drain to Source Breakdown Voltage | $V_{GS}=0V, I_D=-250\mu A$ | -20 | -- | -- | V |
| I_{DSS} | Drain to Source Leakage Current | $V_{DS}=-20V, V_{GS}=0V$ | -- | -- | 1.0 | μA |
| $I_{GSS(F)}$ | Gate to Source Forward Leakage | $V_{GS}=-10V, V_{DS}=0V$ | -- | -- | 100 | nA |
| $I_{GSS(R)}$ | Gate to Source Reverse Leakage | $V_{GS}=+10V, V_{DS}=0V$ | -- | -- | -100 | nA |
| $V_{GS(TH)}$ | Gate Threshold Voltage | $V_{DS}=V_{GS}, I_D=-250\mu A$ | -0.4 | -0.6 | -1.0 | V |
| $R_{DS(ON)1}$ | Drain-to-Source On-Resistance | $V_{GS}=-4.5V, I_D=-5.0A$ | -- | 20 | 25 | m Ω |
| $R_{DS(ON)2}$ | Drain-to-Source On-Resistance | $V_{GS}=-2.5V, I_D=-5.0A$ | -- | 25 | 40 | m Ω |

| Dynamic Characteristics | | | | | | |
|-------------------------|------------------------------|-----------------|-------|------|------|-------|
| Symbol | Parameter | Test Conditions | Value | | | Units |
| | | | Min. | Typ. | Max. | |
| C_{iss} | Input Capacitance | $V_{GS} = 0V$ | -- | 1012 | -- | pF |
| C_{oss} | Output Capacitance | $V_{DS} = -10V$ | -- | 165 | -- | |
| C_{rss} | Reverse Transfer Capacitance | $f = 1.0MHz$ | -- | 159 | -- | |

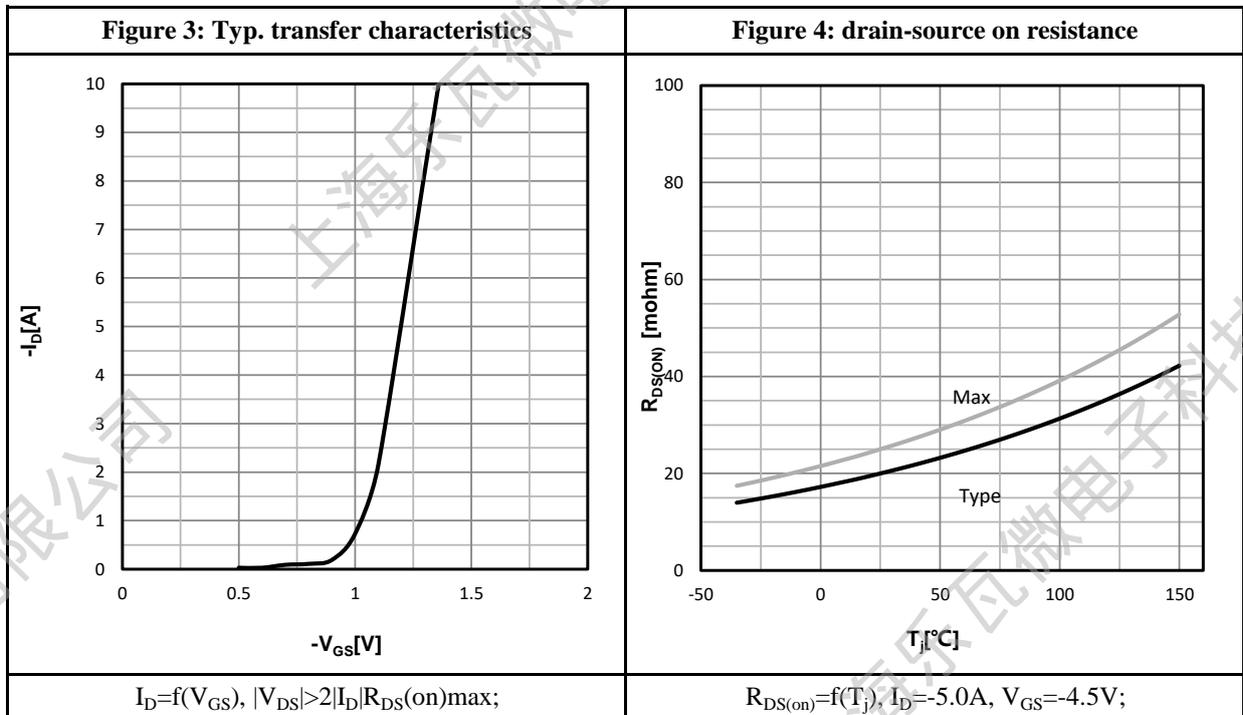
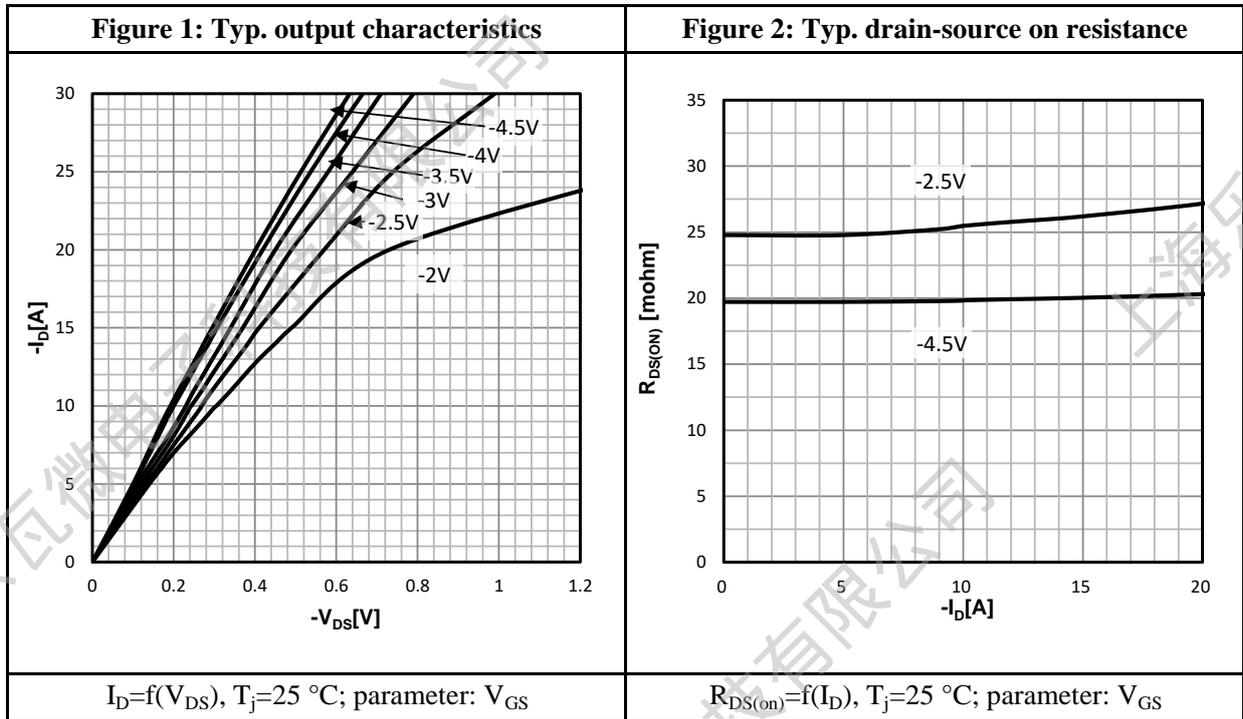
| Resistive Switching Characteristics | | | | | | |
|-------------------------------------|---------------------|-------------------|-------|------|------|-------|
| Symbol | Parameter | Test Conditions | Value | | | Units |
| | | | Min. | Typ. | Max. | |
| $t_{d(ON)}$ | Turn-on Delay Time | $I_D = -5.0A$ | -- | 25 | -- | ns |
| t_r | Rise Time | $V_{DS} = -10V$ | -- | 30 | -- | |
| $t_{d(OFF)}$ | Turn-Off Delay Time | $V_{GS} = -4.5V$ | -- | 60 | -- | |
| t_f | Fall Time | $R_G = 3.0\Omega$ | -- | 45 | -- | |
| Q_g | Total Gate Charge | $V_{GS} = -10V$ | -- | 29 | -- | nC |
| Q_{gs} | Gate Source Charge | $V_{DS} = -10V$ | -- | 1.7 | -- | |
| Q_{gd} | Gate Drain Charge | $I_D = -5.0A$ | -- | 3.3 | -- | |

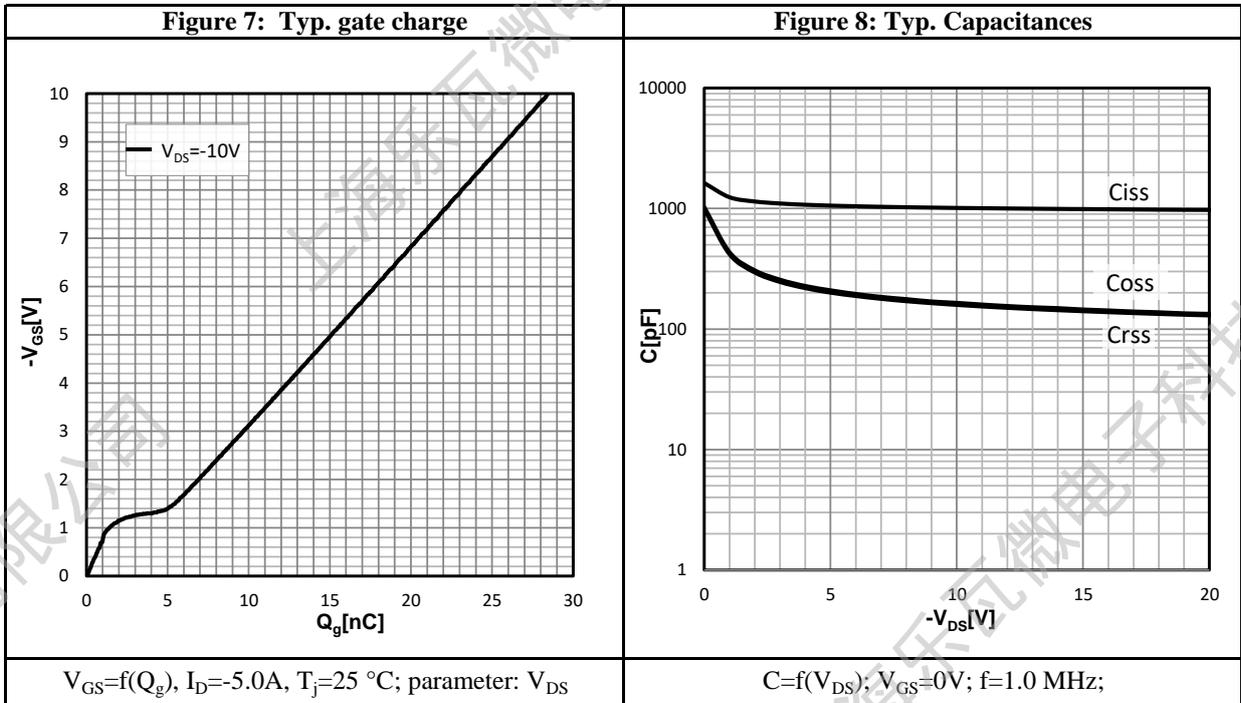
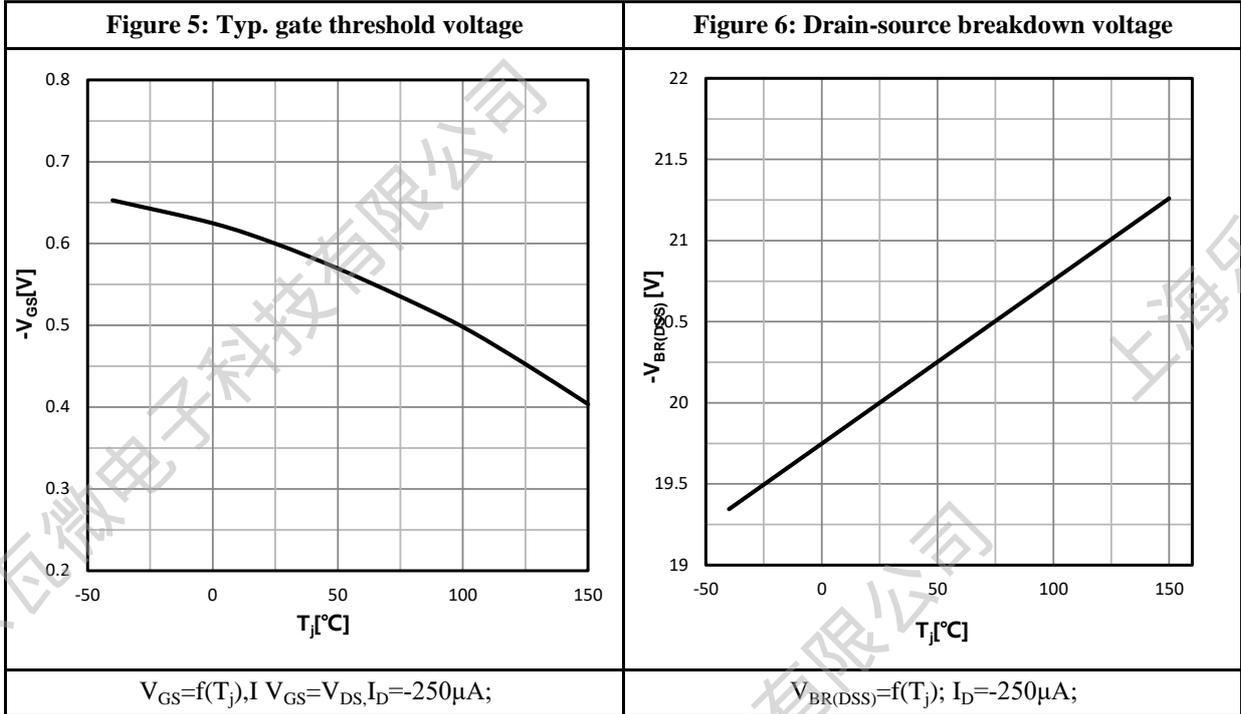
| Source-Drain Diode Characteristics | | | | | | |
|------------------------------------|-----------------------|----------------------------------|-------|------|------|-------|
| Symbol | Parameter | Test Conditions | Value | | | Units |
| | | | Min. | Typ. | Max. | |
| I_S | Diode Forward Current | $T_A = 25\text{ }^\circ\text{C}$ | -- | -- | -21 | A |
| V_{SD} | Diode Forward Voltage | $I_S = -5.0A, V_{GS} = 0V$ | -- | -- | -1.2 | V |

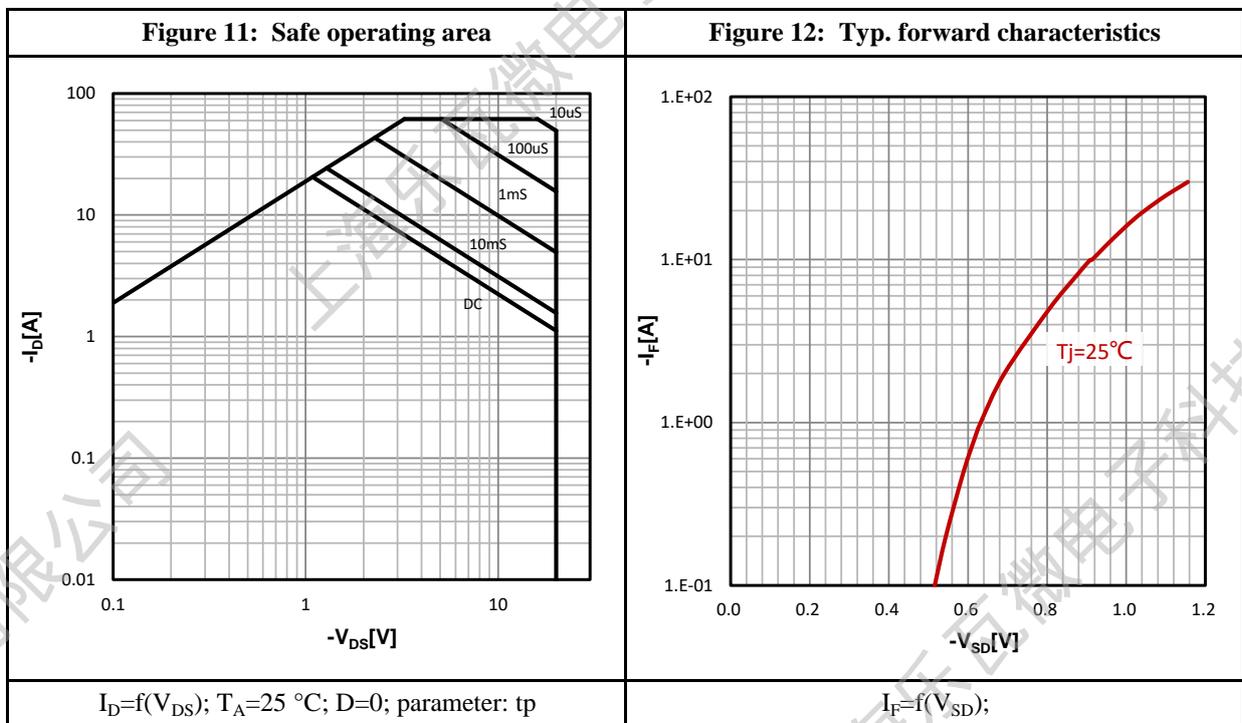
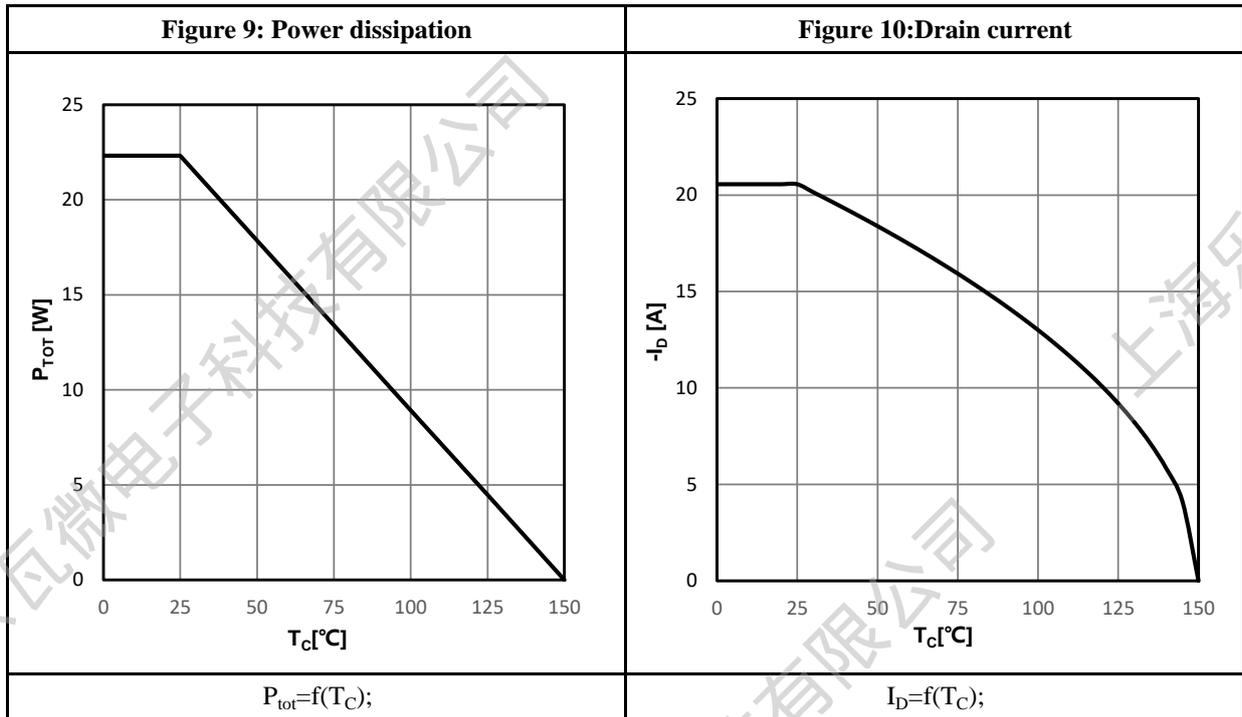
a1: Repetitive rating; pulse width limited by maximum junction temperature

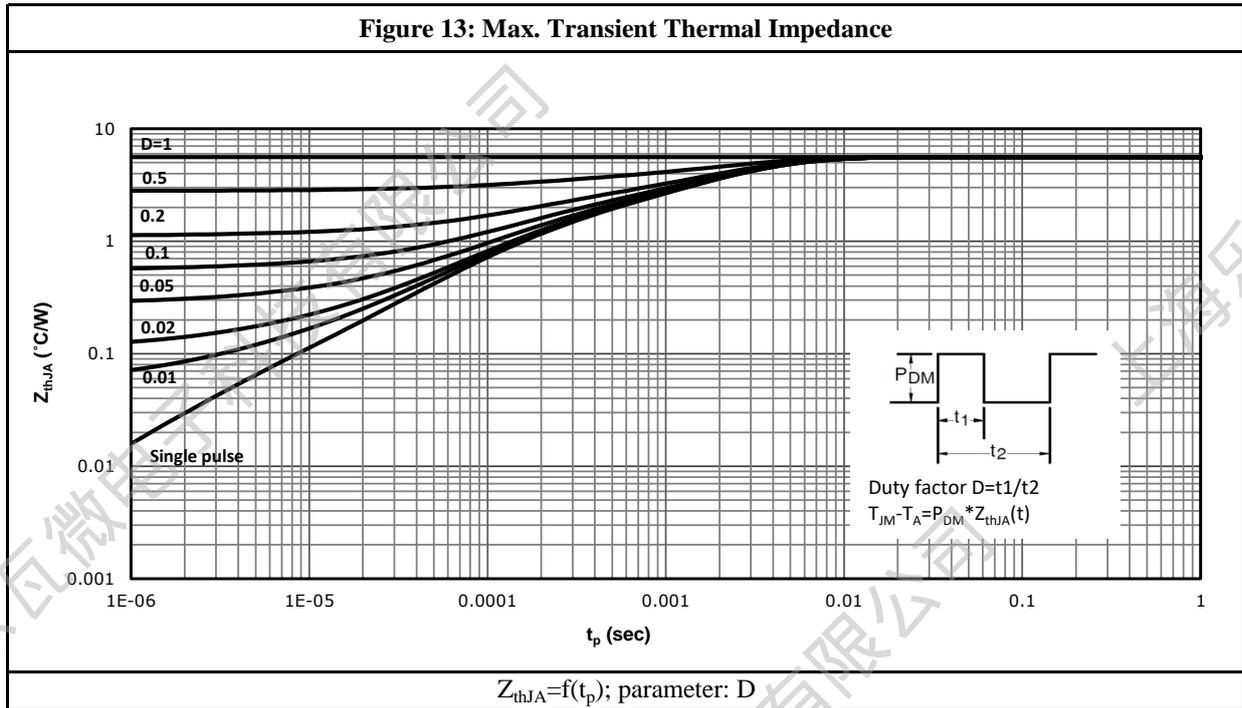
a2: $V_{DD} = -10V, L = 1.0mH, R_G = 25\Omega$, Starting $T_j = 25\text{ }^\circ\text{C}$

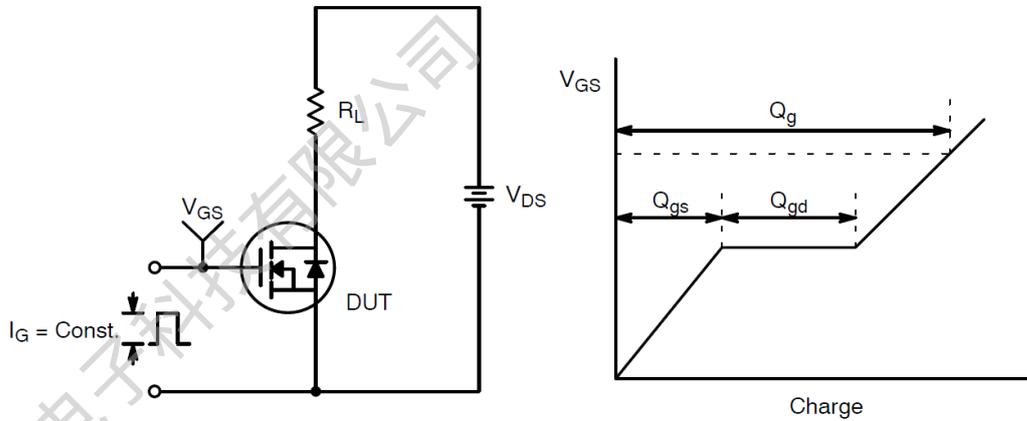
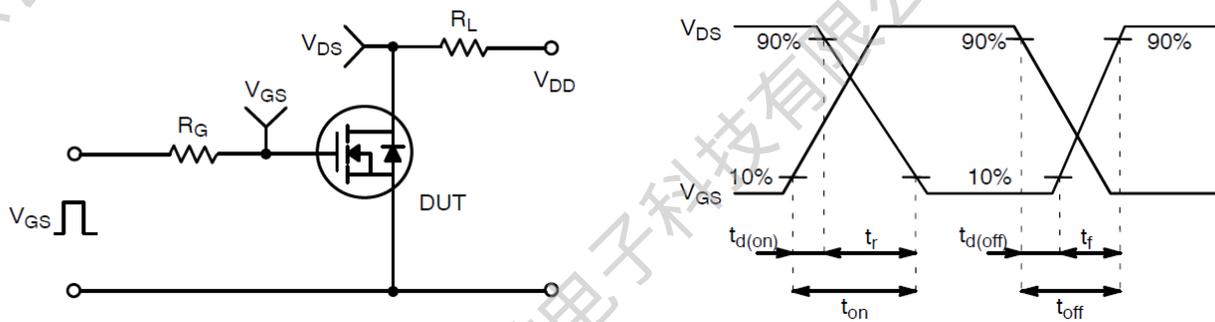
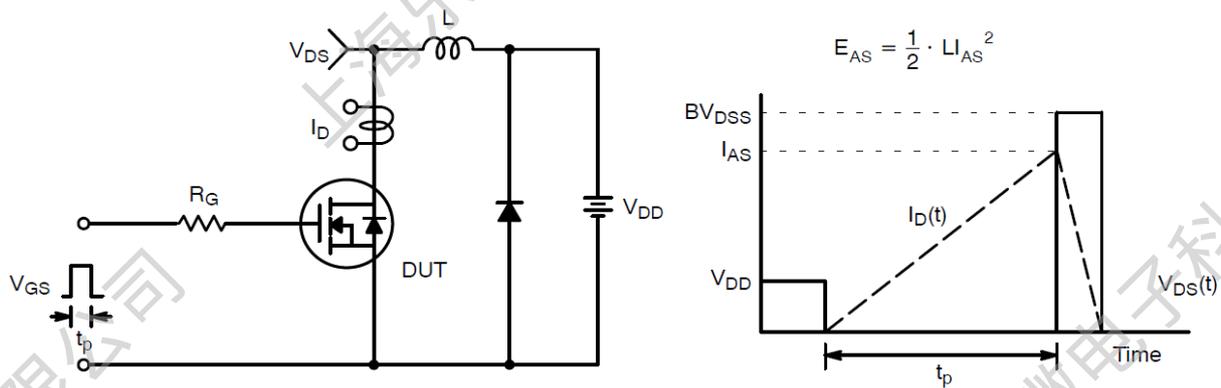
Characteristics Curve:

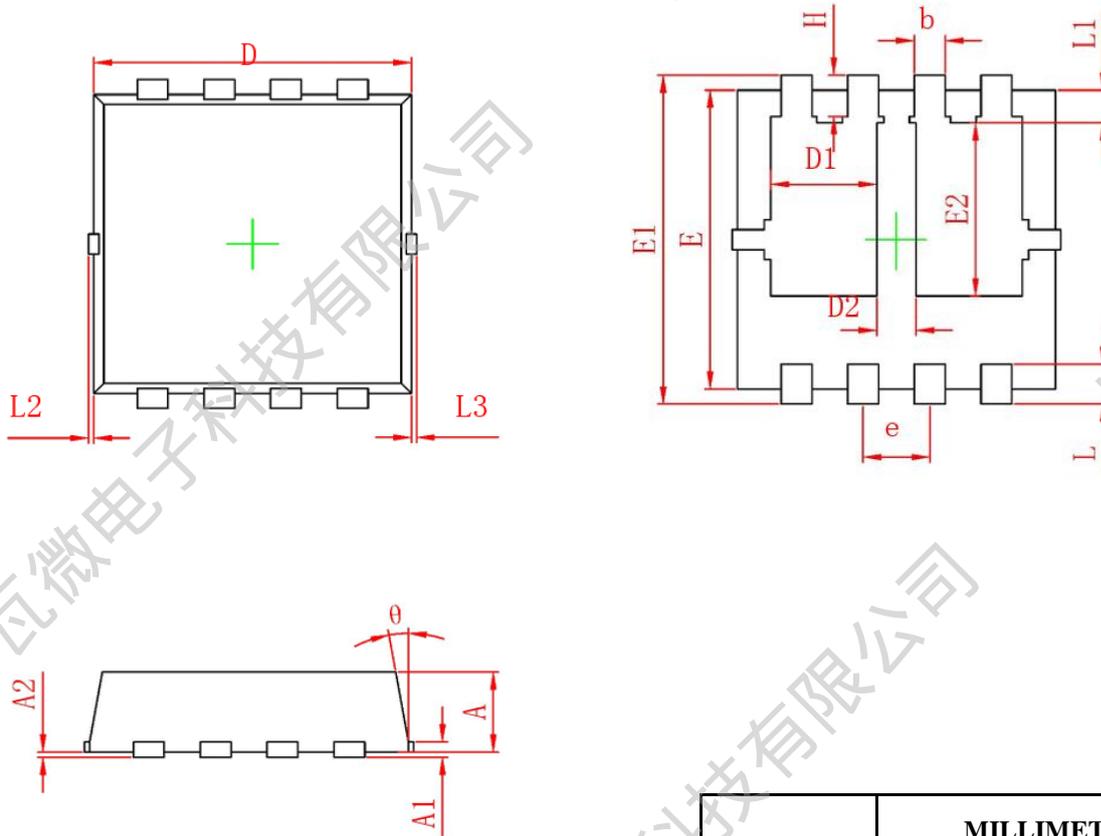








Test Circuit & Waveform:

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 | 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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