

General Description:

The LWS60110AS 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 SOP-8, 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

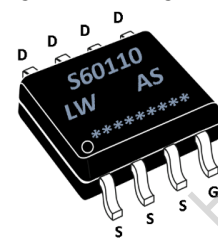
100% DVDS Tested

100% Avalanche Tested

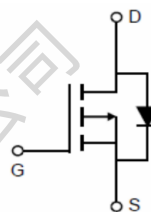


| | | |
|-------------------|------|------------|
| V_{DSS} | -60 | V |
| I_D | -4.0 | A |
| P_D | 3.0 | W |
| $R_{DS(ON)}$ TYPE | 90 | m Ω |

Marking and Pin Assignment



Inner Equivalent Principium Chart


Package Marking and Ordering Information:

| Marking | Part Number | Package | Packing | Qty. |
|-------------------|-------------|---------|---------|----------|
| S60110/LW AS/D.C. | LWS60110AS | SOP-8 | Reel | 4000 Pcs |

Absolute Maximum Ratings:

| Symbol | Parameter | Value | Units |
|----------------|--|-------------------------|------------------|
| V_{DSS} | Drain-to-Source Voltage | -60 | V |
| I_D | Continuous Drain Current | $T_C=25^\circ\text{C}$ | -4.0 |
| | Continuous Drain Current | $T_C=100^\circ\text{C}$ | -2.5 |
| I_{DM}^{a1} | Pulsed Drain Current | -16 | A |
| V_{GS} | Gate-to-Source Voltage | ± 20 | V |
| P_D | Power Dissipation | 3.0 | W |
| E_{AS}^{a2} | Single pulse avalanche energy | 30 | mJ |
| 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 |
|-----------------|---|-------|---------------------------|
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient | 41.6 | $^\circ\text{C}/\text{W}$ |

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 | $V_{GS}=0V, I_D=-250\mu A$ | -60 | -- | -- | V |
| I_{DSS} | Drain to Source Leakage Current | $V_{DS}=-60V, V_{GS}=0V$ | -- | -- | 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 | $V_{DS}=V_{GS}, I_D=-250\mu A$ | -1.2 | -1.6 | -2.0 | V |
| $R_{DS(ON)1}$ | Drain-to-Source On-Resistance | $V_{GS}=-10V, I_D=-3.0A$ | -- | 90 | 110 | $m\Omega$ |
| $R_{DS(ON)2}$ | Drain-to-Source On-Resistance | $V_{GS}=-4.5V, I_D=-2.0A$ | -- | 110 | 150 | $m\Omega$ |

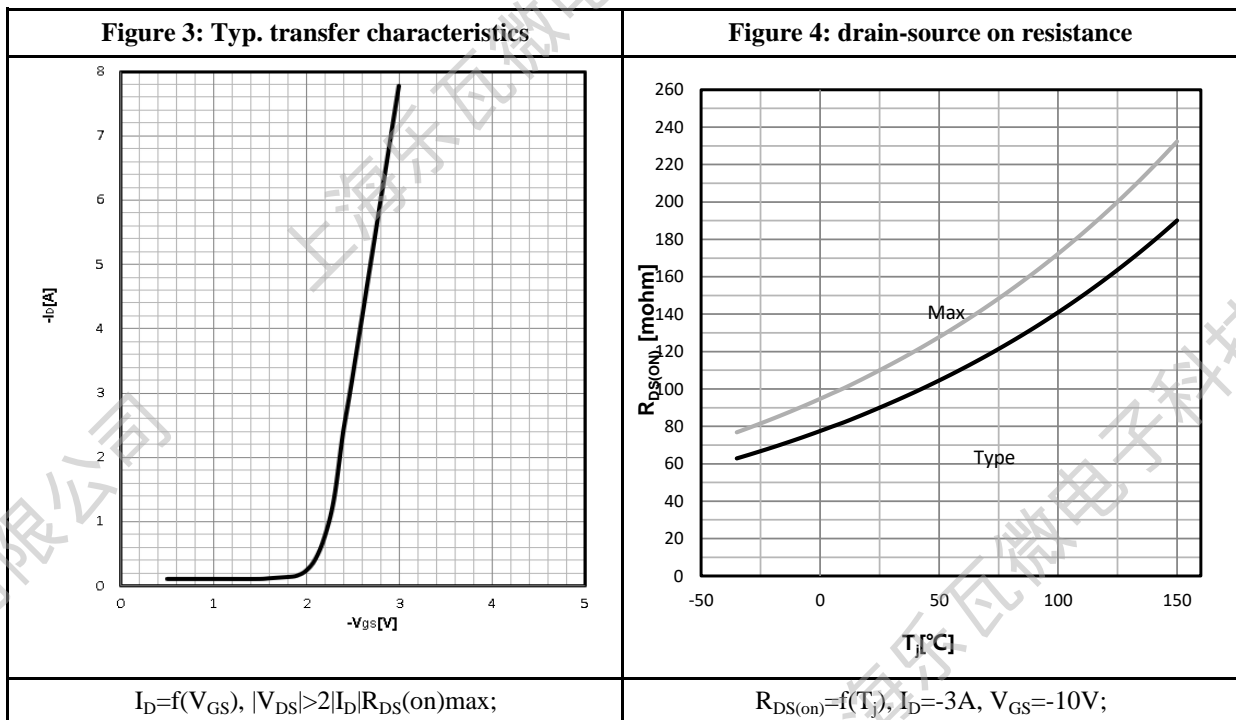
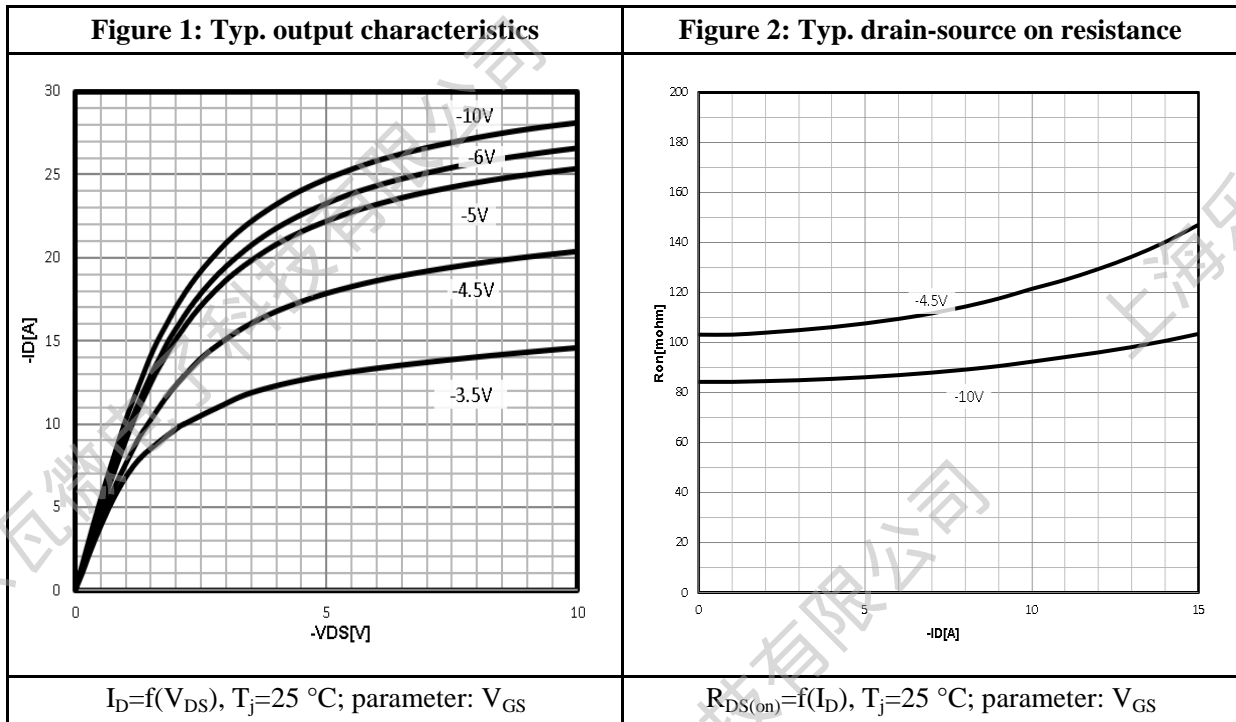
| Dynamic Characteristics | | | | | | |
|-------------------------|------------------------------|-----------------|-------|------|------|-------|
| Symbol | Parameter | Test Conditions | Value | | | Units |
| | | | Min. | Typ. | Max. | |
| C_{iss} | Input Capacitance | $V_{GS} = 0V$ | -- | 315 | -- | pF |
| C_{oss} | Output Capacitance | $V_{DS} = -30V$ | -- | 58 | -- | |
| C_{rss} | Reverse Transfer Capacitance | $f = 1.0MHz$ | -- | 2.9 | -- | |

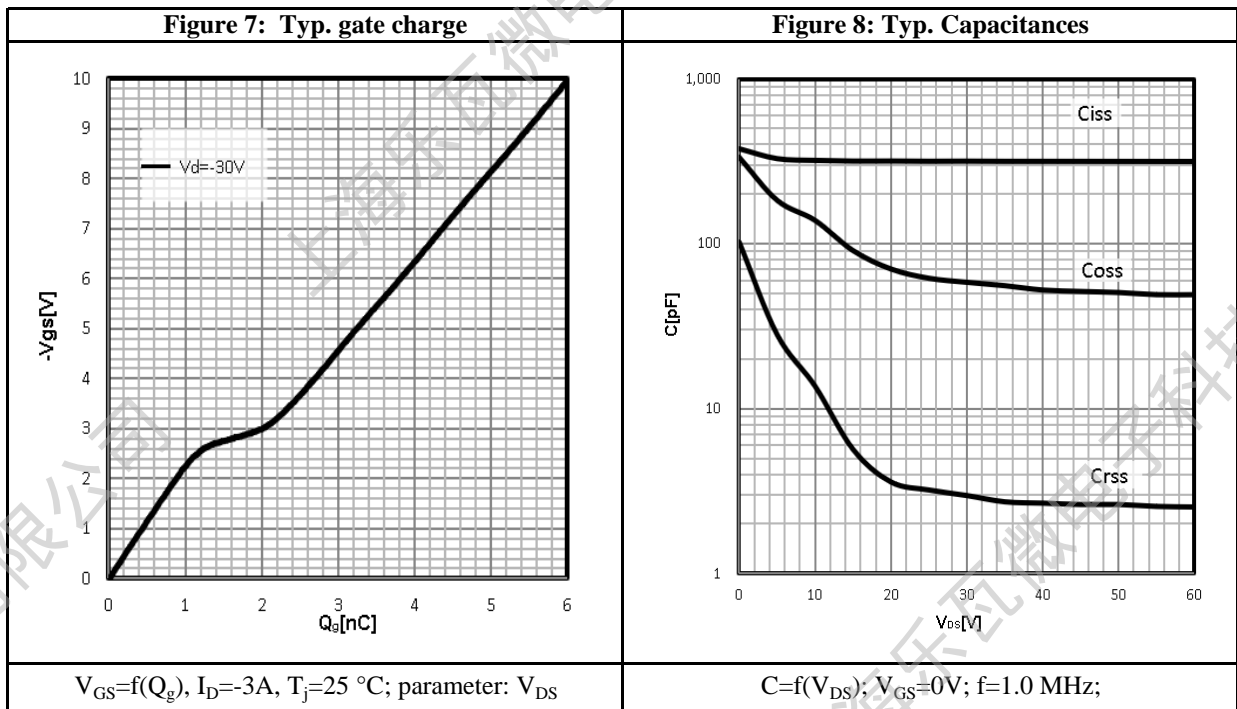
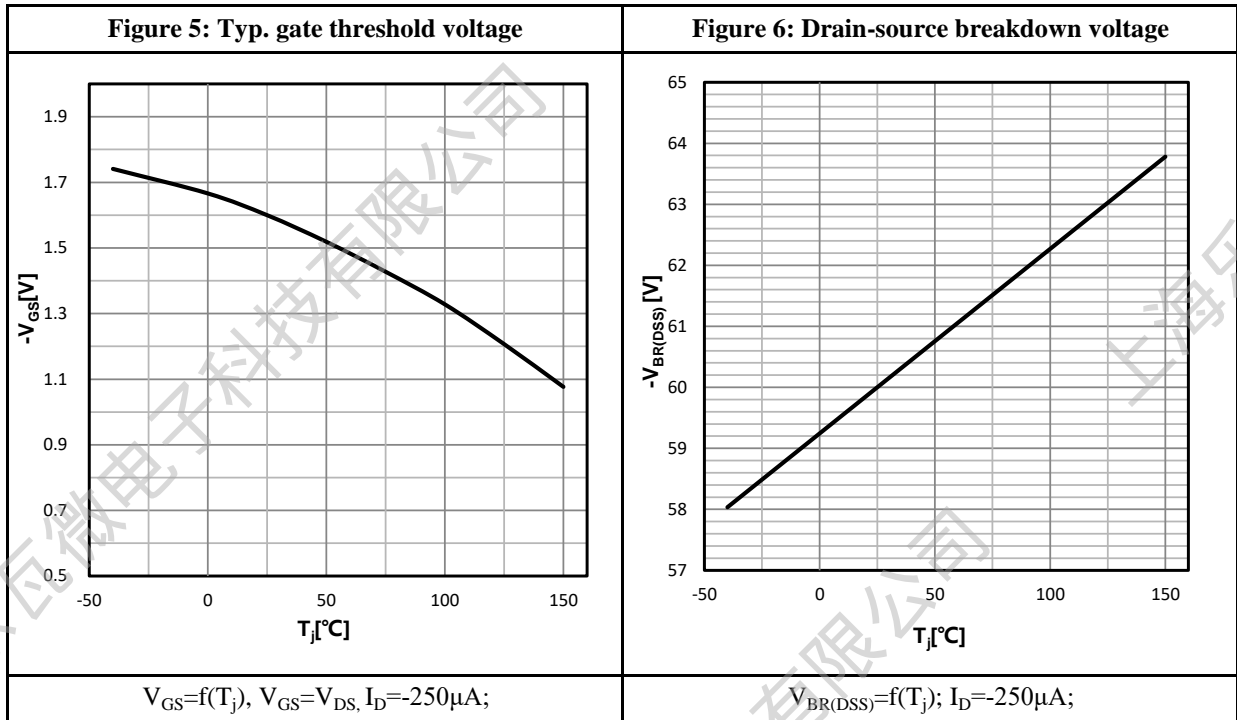
| Resistive Switching Characteristics | | | | | | |
|-------------------------------------|---------------------|-----------------|-------|------|------|-------|
| Symbol | Parameter | Test Conditions | Value | | | Units |
| | | | Min. | Typ. | Max. | |
| $t_{d(ON)}$ | Turn-on Delay Time | $I_D = -3A$ | -- | 7 | -- | ns |
| t_r | Rise Time | $V_{DS} = -30V$ | -- | 8 | -- | |
| $t_{d(OFF)}$ | Turn-Off Delay Time | $V_{GS} = -10V$ | -- | 16 | -- | |
| t_f | Fall Time | $R_G = 3\Omega$ | -- | 4 | -- | |
| Q_g | Total Gate Charge | $V_{GS} = -10V$ | -- | 4.9 | -- | nC |
| Q_{gs} | Gate Source Charge | $V_{DS} = -30V$ | -- | 0.97 | -- | |
| Q_{gd} | Gate Drain Charge | $I_D = -3A$ | -- | 0.72 | -- | |

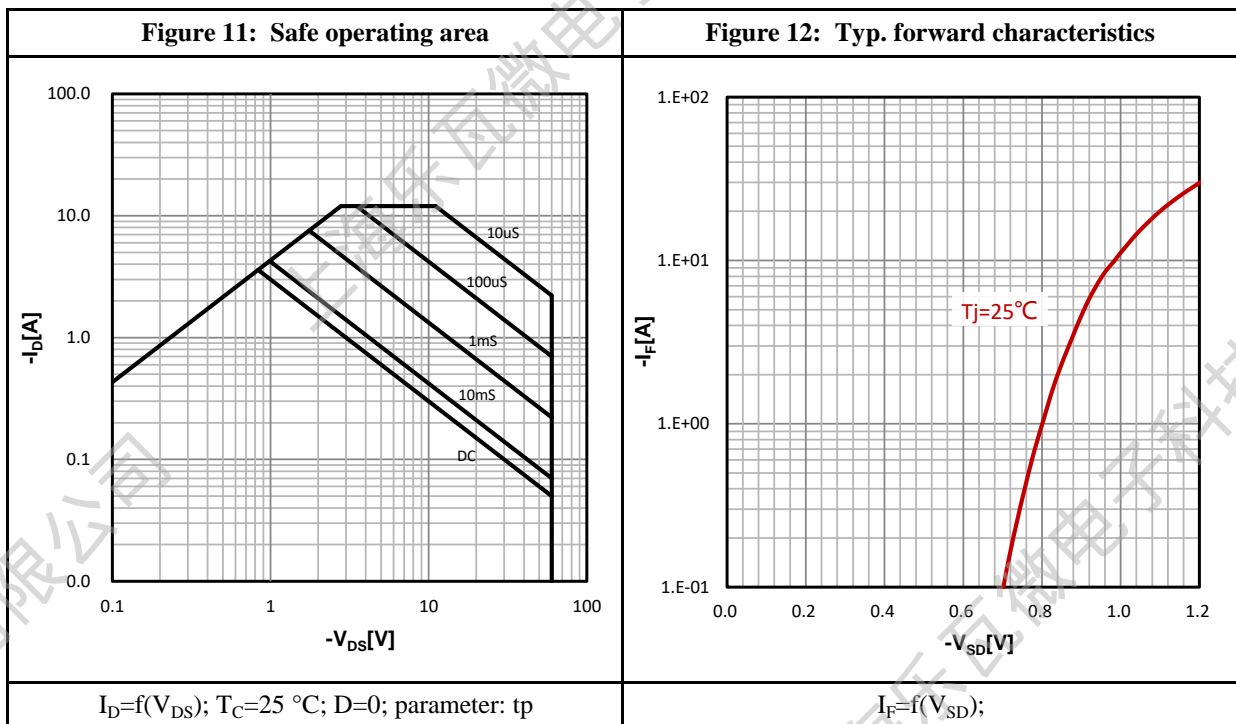
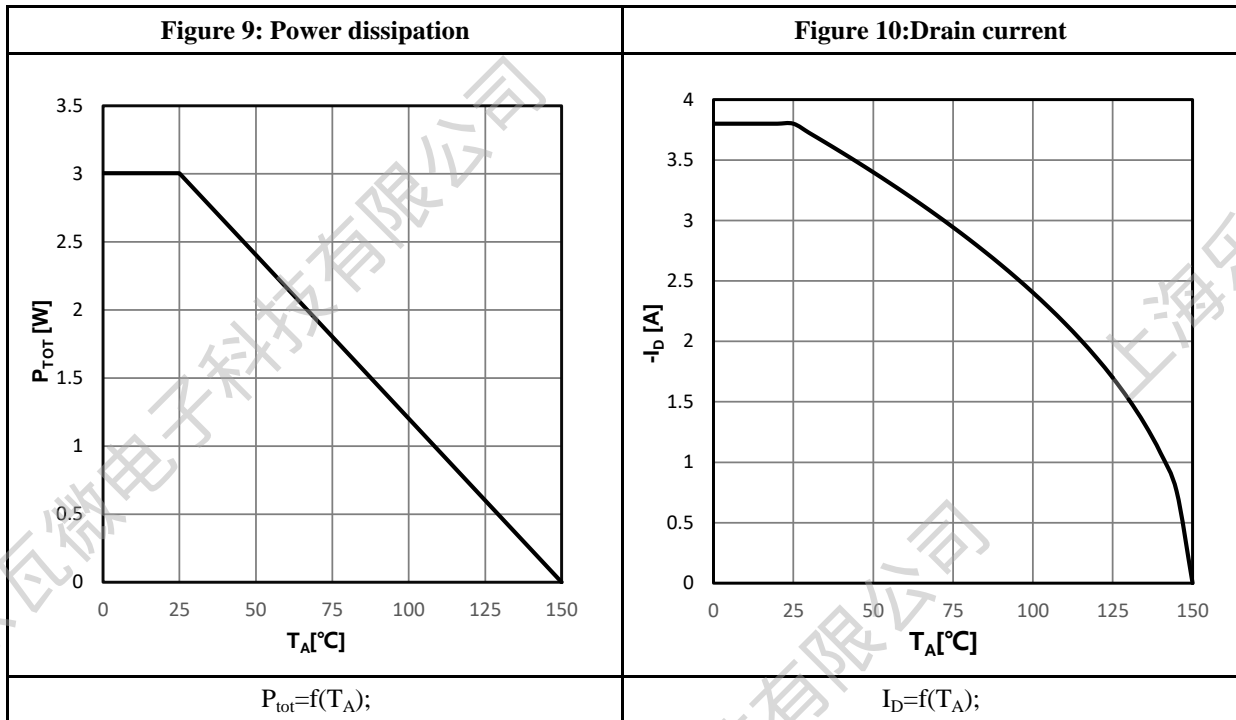
| Source-Drain Diode Characteristics | | | | | | |
|------------------------------------|-----------------------|----------------------------------|-------|------|------|-------|
| Symbol | Parameter | Test Conditions | Value | | | Units |
| | | | Min. | Typ. | Max. | |
| I_S | Diode Forward Current | $T_C = 25\text{ }^\circ\text{C}$ | -- | -- | -4.0 | A |
| I_{SM} | Diode Pluse Current | | -- | -- | -16 | A |
| V_{SD} | Diode Forward Voltage | $I_S = -3A, V_{GS} = 0V$ | -- | -- | -1.2 | V |

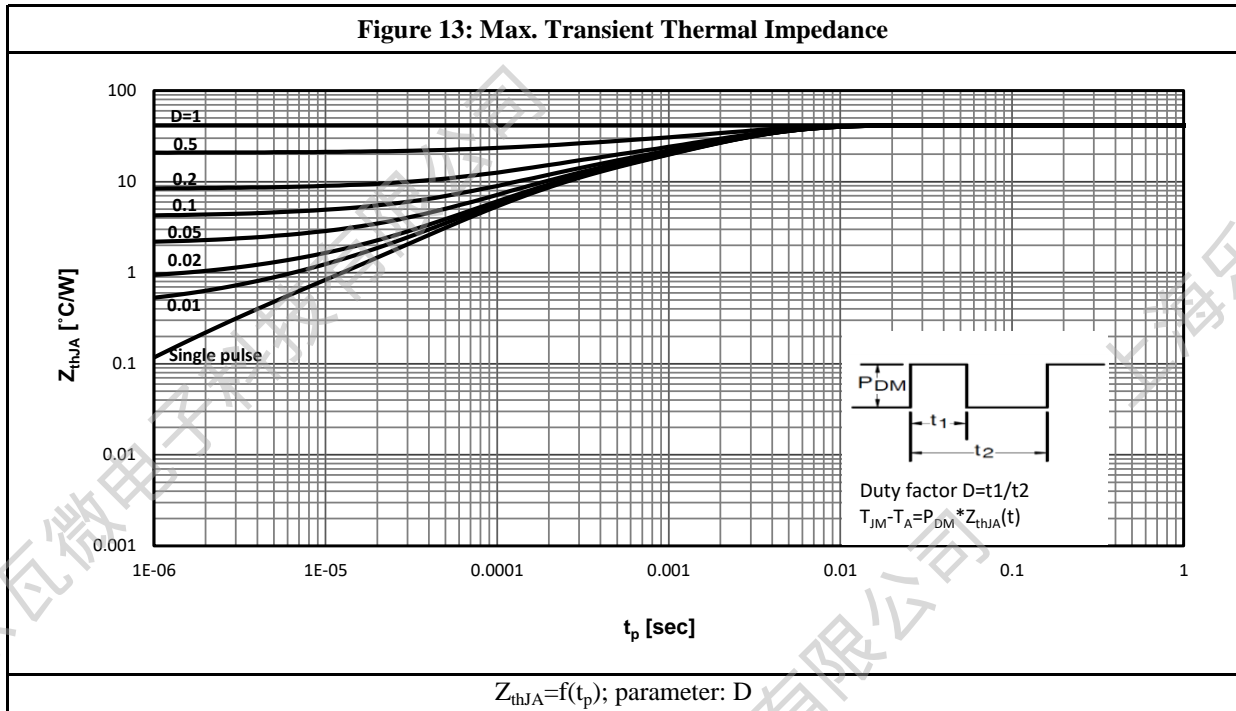
a1: Repetitive rating; pulse width limited by maximum junction temperature

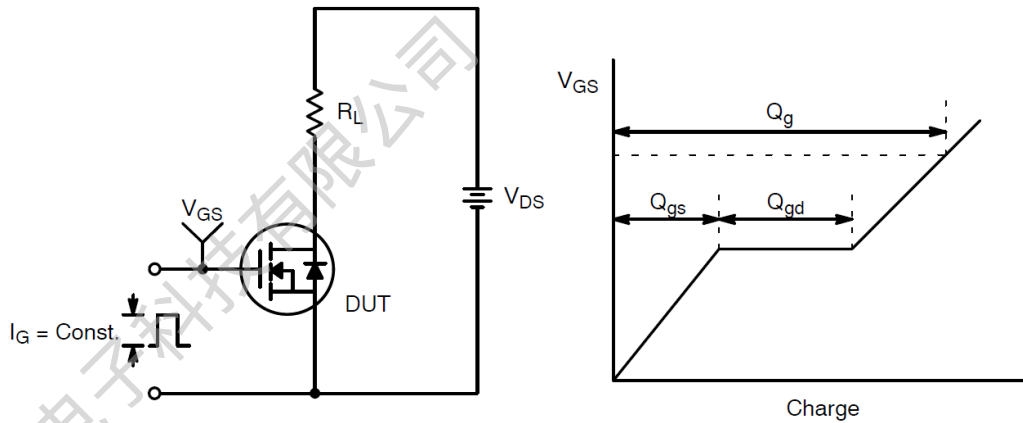
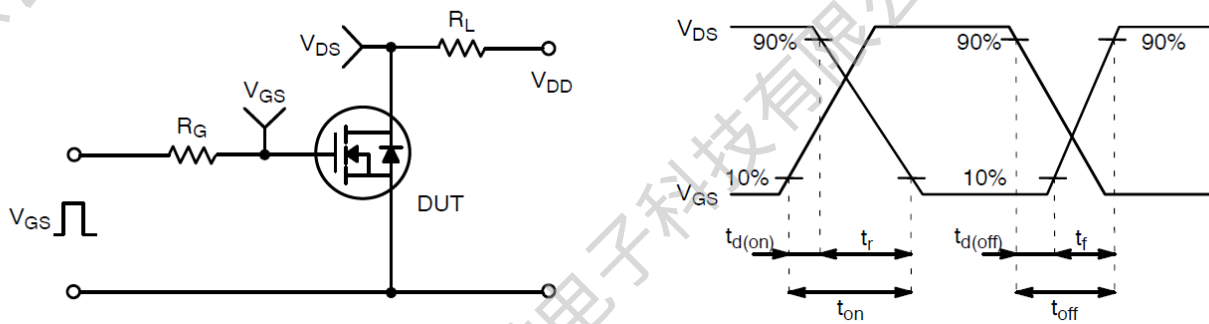
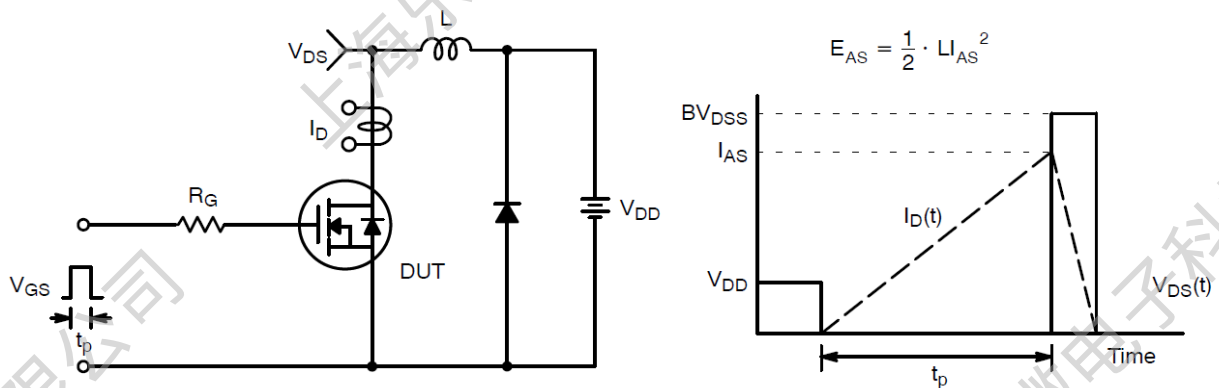
a2: $V_{DD} = -30V, L = 1.0mH, R_G = 25\Omega$, Starting $T_j = 25\text{ }^\circ\text{C}$

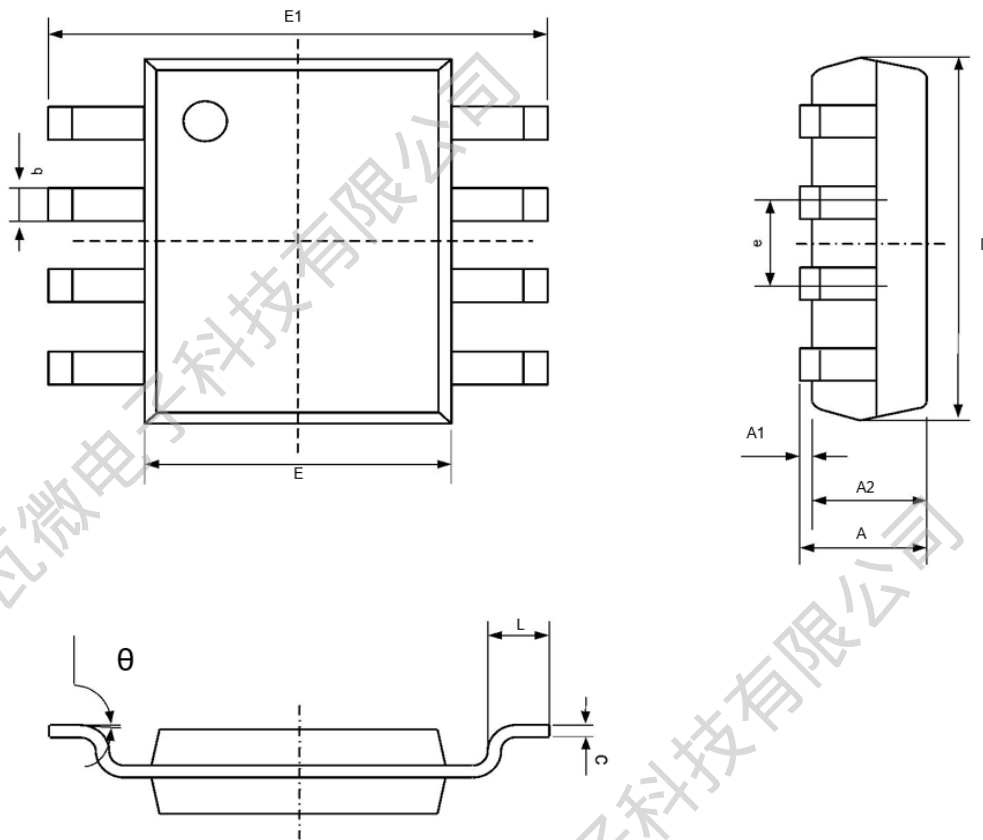
Characteristics Curve:








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 | Dimensions In Millimeters | | |
|----------|---------------------------|-------|-------|
| | Min | Ref | Max |
| A | 1.350 | 1.550 | 1.750 |
| A1 | 0.050 | 0.150 | 0.250 |
| A2 | 1.350 | 1.450 | 1.550 |
| b | 0.330 | 0.420 | 0.510 |
| c | 0.160 | 0.205 | 0.250 |
| D | 4.700 | 5.000 | 5.300 |
| E | 3.800 | 3.900 | 4.000 |
| E1 | 5.800 | 6.000 | 6.200 |
| e | 1.270(BSC) | | |
| L | 0.400 | 0.835 | 1.270 |
| θ | 0° | 4° | 8° |

Revision History:

| Revison | Date | Descriptions |
|----------------|-------------|---------------------|
| Rev 1.0 | Apr.2023 | Initial Version |

Disclaimer:

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