

General Description:

The LWD3003AS 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 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:

- DC-DC Converter
- Portable Equipment
- Power Management

100% DVDS Tested

100% Avalanche Tested


Package Marking and Ordering Information:

| Marking | Part Number | Package | Packing | Qty. |
|------------------|-------------|---------|---------|----------|
| D3003/LW AS/D.C. | LWD3003AS | SOP-8 | Reel | 4000 Pcs |

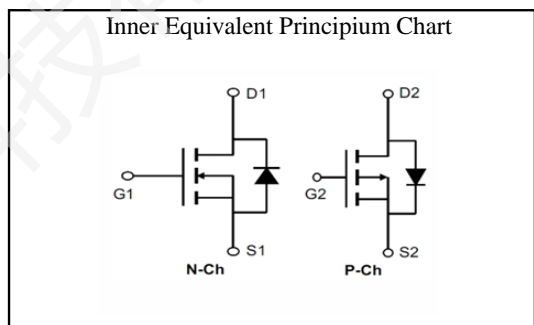
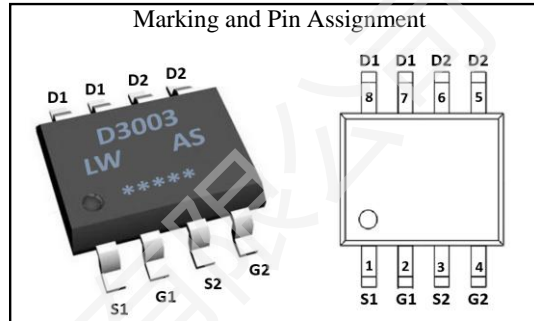
Absolute Maximum Ratings:

| Symbol | Parameter | Value | | Units | |
|----------------|--|-------------------------|-----------------|----------|------------------|
| | | N-Ch | P-Ch | | |
| V_{DSS} | Drain-to-Source Voltage | 30 | -30 | V | |
| I_D | Continuous Drain Current | $T_A=25^\circ\text{C}$ | 8.5 | -6.5 | A |
| | Continuous Drain Current | $T_A=100^\circ\text{C}$ | 5.4 | -4.1 | A |
| I_{DM}^{a1} | Pulsed Drain Current | | 34 | -26 | A |
| E_{AS}^{a2} | Single pulse avalanche energy | | 20 | 20 | mJ |
| V_{GS} | Gate-to-Source Voltage | | ± 20 | ± 20 | V |
| P_D | Power Dissipation | | 2.0 | 2.0 | 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 |
|----------------------|---|-------|------|---------------------------|
| | | N-Ch | P-Ch | |
| $R_{\theta JA}^{a3}$ | Thermal Resistance, Junction-to-Ambient | 62.5 | 62.5 | $^\circ\text{C}/\text{W}$ |

| Symbol | N-Ch | P-Ch | Units |
|---------------------------|------|------|------------------|
| V_{DSS} | 30 | -30 | V |
| I_D | 8.5 | -6.5 | A |
| $R_{DS(ON) \text{ TYPE}}$ | 10 | 24 | $\text{m}\Omega$ |



N-Channel Electrical Characteristic ($T_j = 25\text{ }^\circ\text{C}$, unless otherwise specified):

| Static Characteristics | | | | | | |
|------------------------|-----------------------------------|-------------------------------|-------|------|------|-----------|
| Symbol | Parameter | Test Conditions | Value | | | Units |
| | | | Min. | Typ. | Max. | |
| V_{DSS} | Drain to Source Breakdown Voltage | $V_{GS}=0V, I_D=250\mu A$ | 30 | -- | -- | V |
| I_{DSS} | Drain to Source Leakage Current | $V_{DS}=30V, V_{GS}=0V$ | -- | -- | 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 | $V_{DS}=V_{GS}, I_D=250\mu A$ | 1.0 | 1.5 | 2.0 | V |
| $R_{DS(ON)1}$ | Drain-to-Source On-Resistance | $V_{GS}=10V, I_D=8.0A$ | -- | 10 | 13 | $m\Omega$ |
| $R_{DS(ON)2}$ | Drain-to-Source On-Resistance | $V_{GS}=4.5V, I_D=5.0A$ | -- | 15 | 25 | $m\Omega$ |

| Dynamic Characteristics | | | | | | |
|-------------------------|------------------------------|--------------------------------|-------|------|------|----------|
| Symbol | Parameter | Test Conditions | Value | | | Units |
| | | | Min. | Typ. | Max. | |
| C_{iss} | Input Capacitance | $V_{GS}=0V$ | -- | 637 | -- | pF |
| C_{oss} | Output Capacitance | $V_{DS}=15V$ | -- | 98 | -- | |
| C_{rss} | Reverse Transfer Capacitance | $f=1.0MHz$ | -- | 85 | -- | |
| R_G | Gate resistance | $V_{GS}=0V, V_{DS}=0V, f=1MHz$ | -- | 2.0 | -- | Ω |

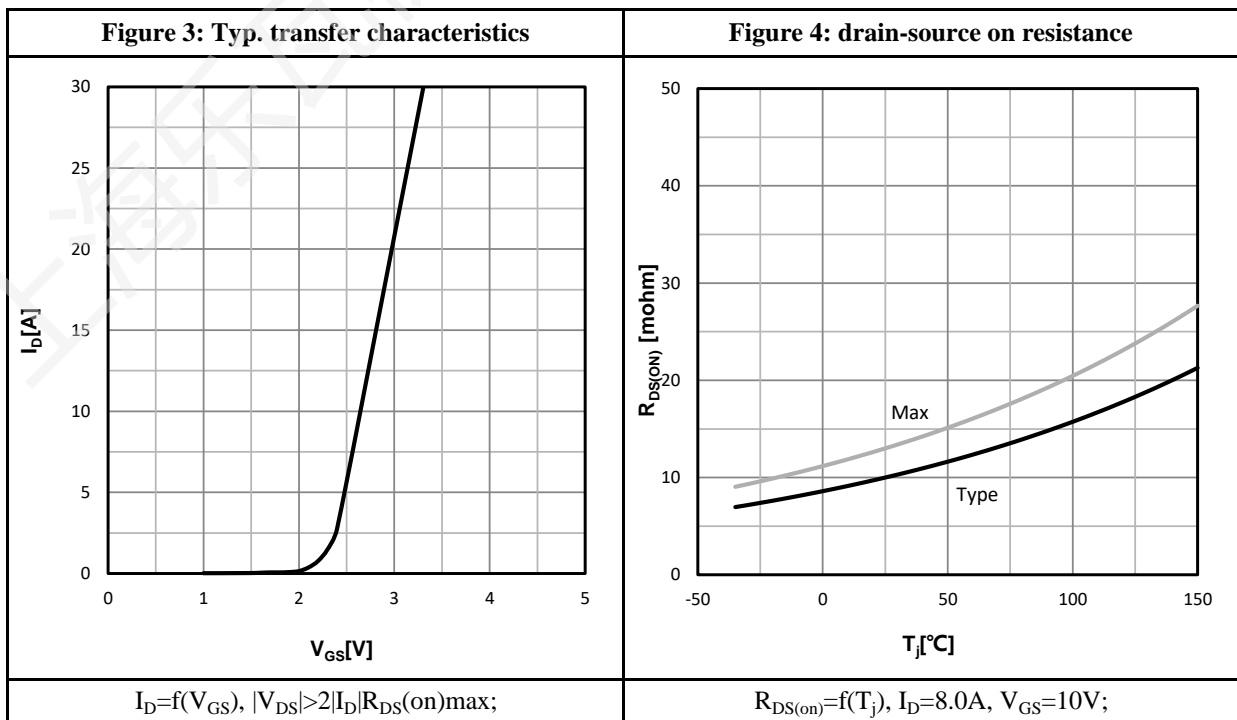
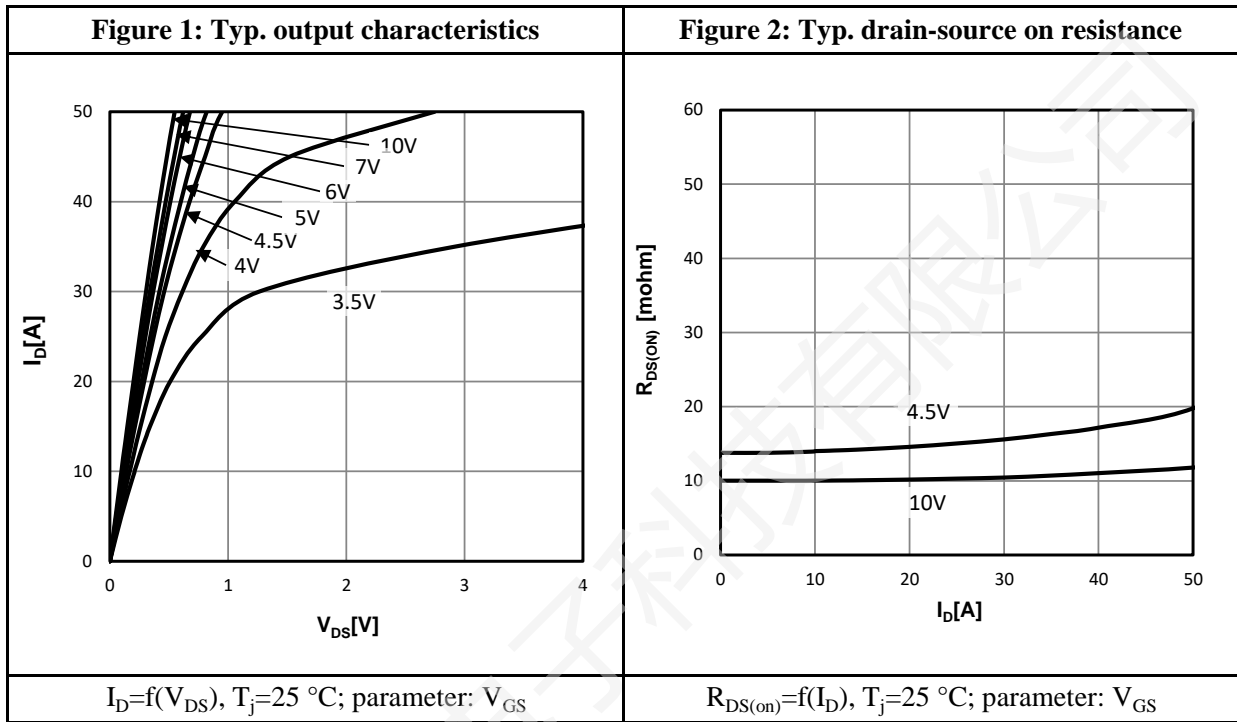
| Resistive Switching Characteristics | | | | | | |
|-------------------------------------|-----------------------|-----------------|-------|------|------|-------|
| Symbol | Parameter | Test Conditions | Value | | | Units |
| | | | Min. | Typ. | Max. | |
| $t_{d(ON)}$ | Turn-on Delay Time | $I_D=8.0A$ | -- | 5.0 | -- | ns |
| t_r | Rise Time | $V_{DS}=15V$ | -- | 2.0 | -- | |
| $t_{d(OFF)}$ | Turn-Off Delay Time | $V_{GS}=10V$ | -- | 13 | -- | |
| t_f | Fall Time | $R_G=6.0\Omega$ | -- | 3.0 | -- | |
| Q_g | Total Gate Charge | $V_{GS}=10V$ | -- | 15 | -- | nC |
| Q_{gs} | Gate to Source Charge | $V_{DS}=15V$ | -- | 2.0 | -- | |
| Q_{gd} | Gate to Drain Charge | $I_D=8.0A$ | -- | 2.9 | -- | |

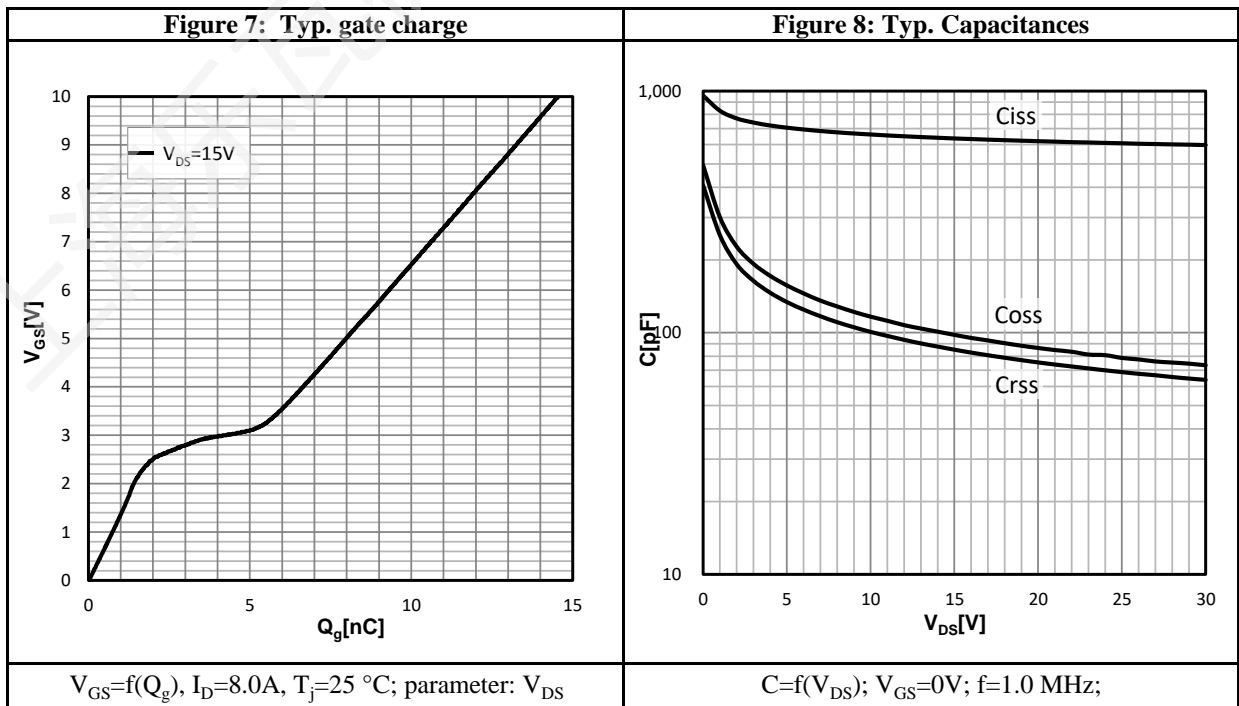
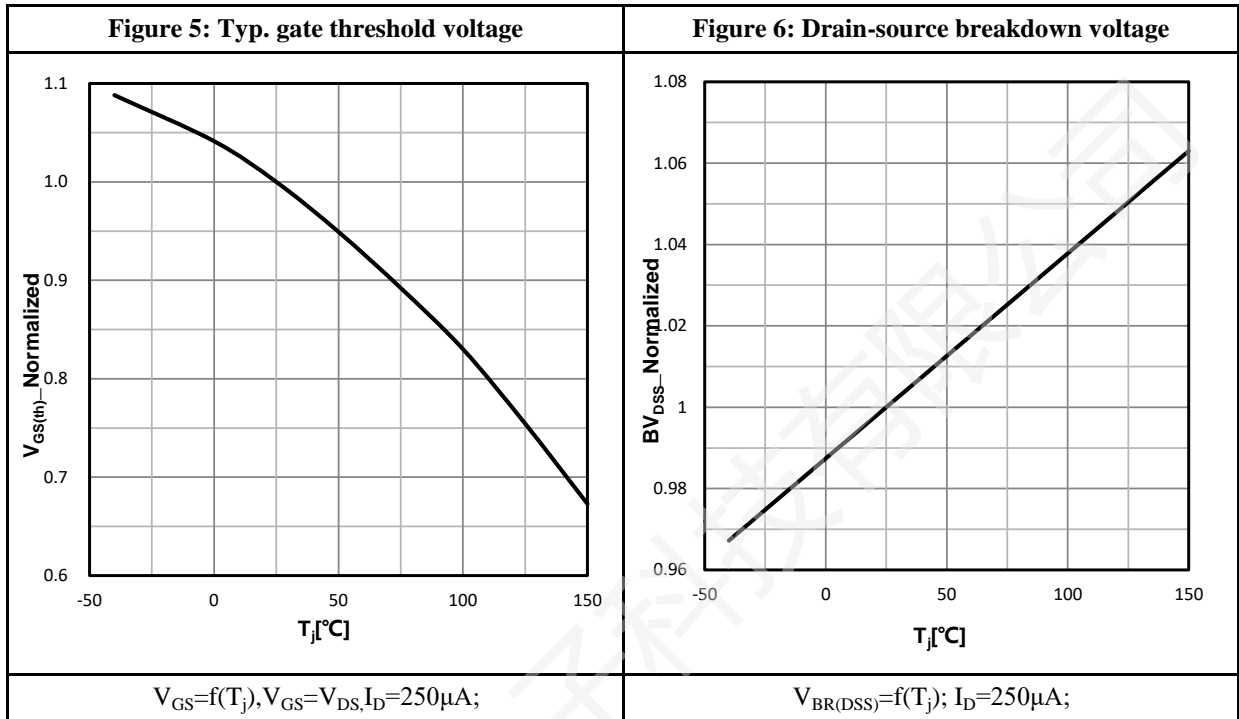
| Source-Drain Diode Characteristics | | | | | | |
|------------------------------------|-----------------------|--------------------------------|-------|------|------|-------|
| Symbol | Parameter | Test Conditions | Value | | | Units |
| | | | Min. | Typ. | Max. | |
| I_S | Diode Forward Current | $T_A=25\text{ }^\circ\text{C}$ | -- | -- | 8.5 | A |
| V_{SD} | Diode Forward Voltage | $I_S=8.0A, V_{GS}=0V$ | -- | -- | 1.2 | V |

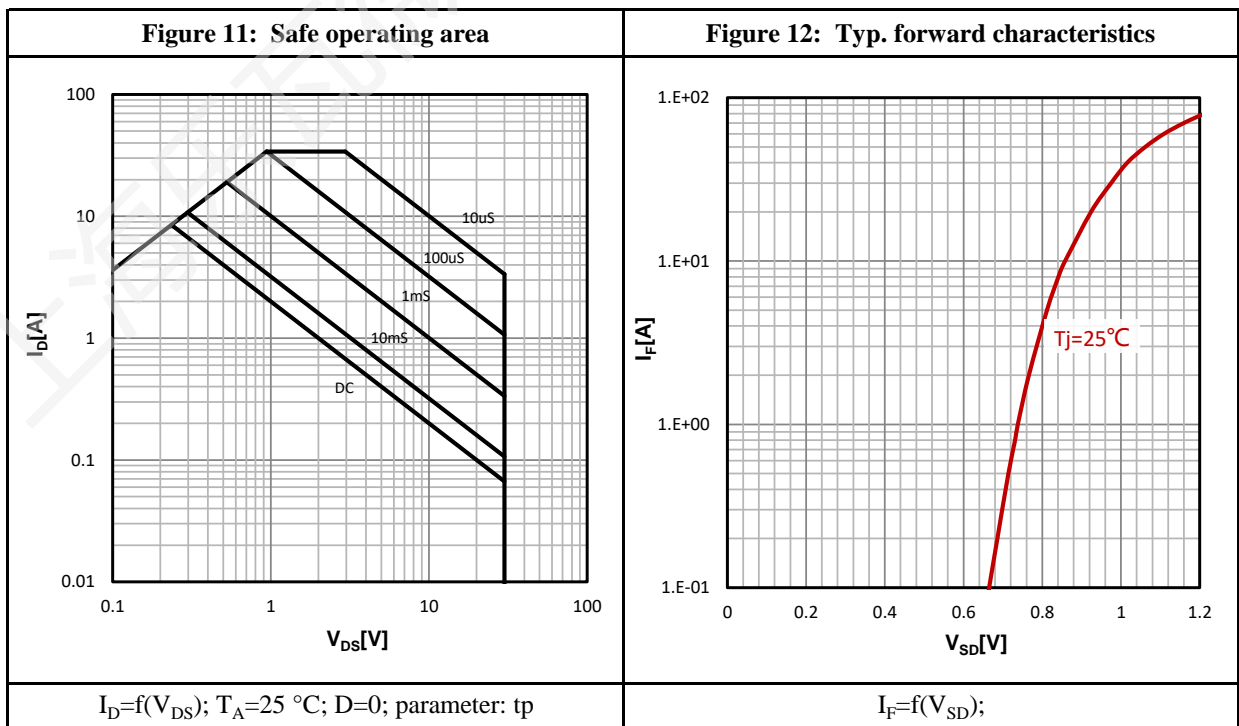
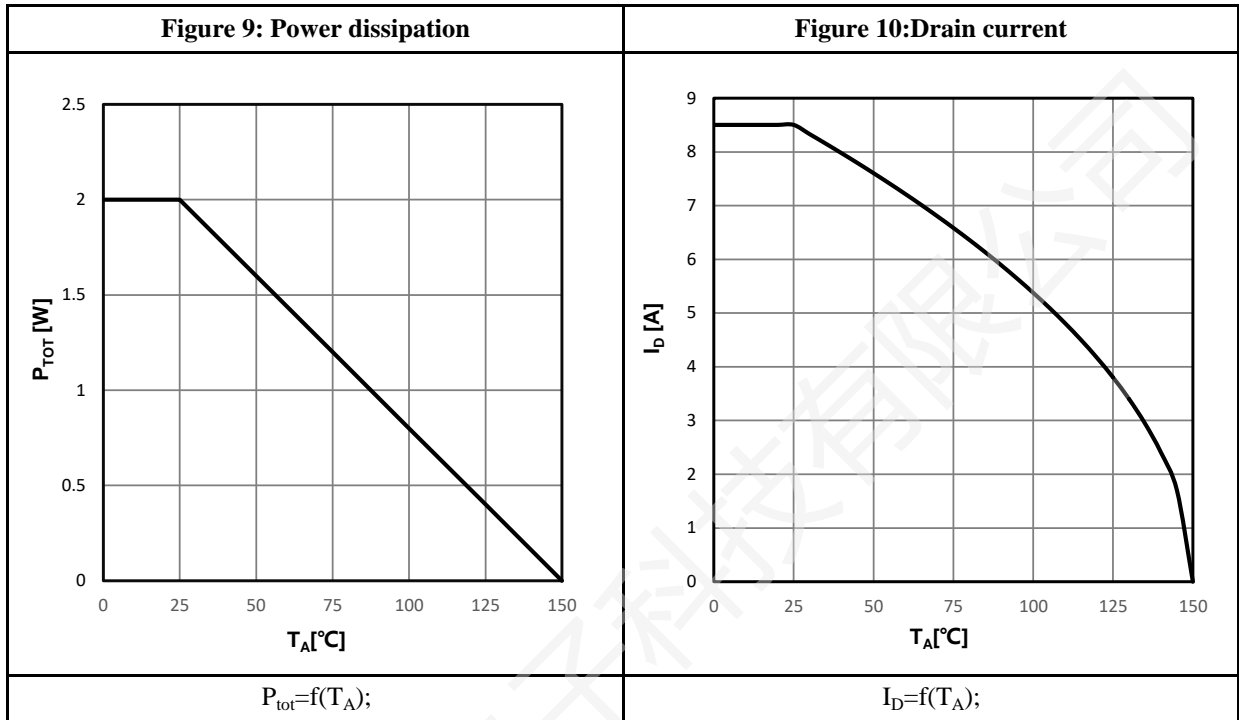
a1: Repetitive rating; pulse width limited by maximum junction temperature

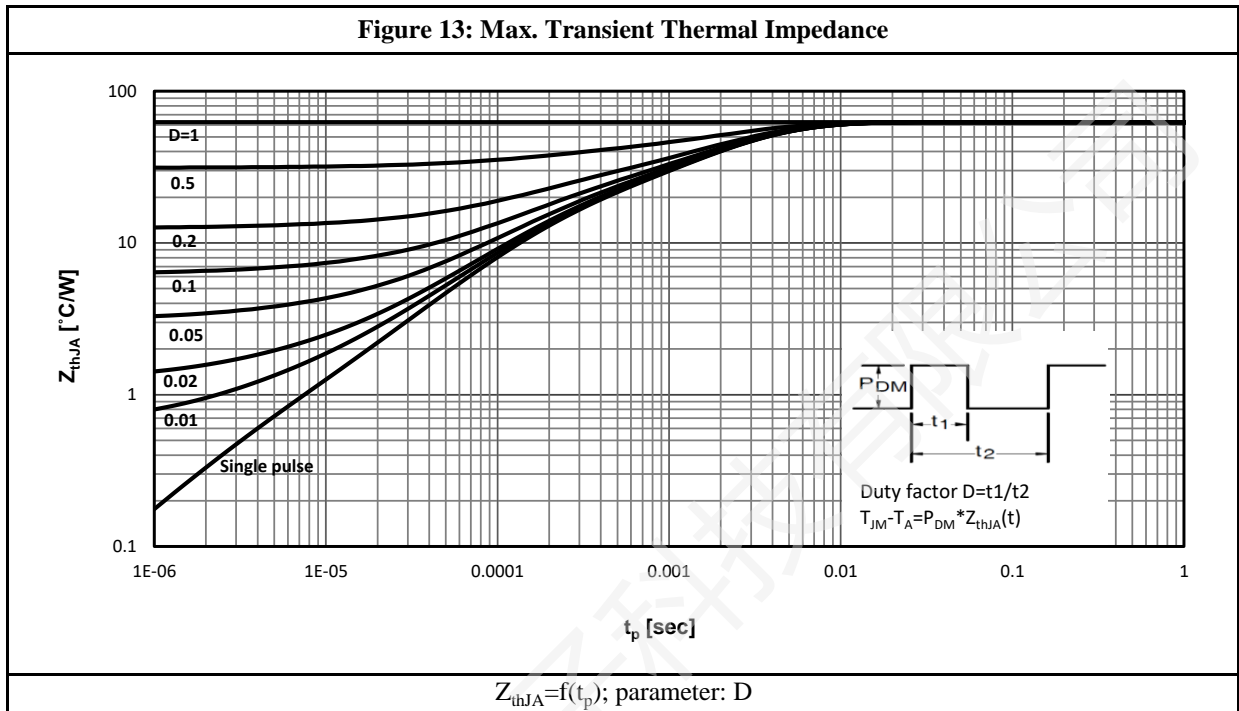
a2: $V_{DD}=15V, L=0.1mH, R_G=25\Omega$, Starting $T_j=25\text{ }^\circ\text{C}$

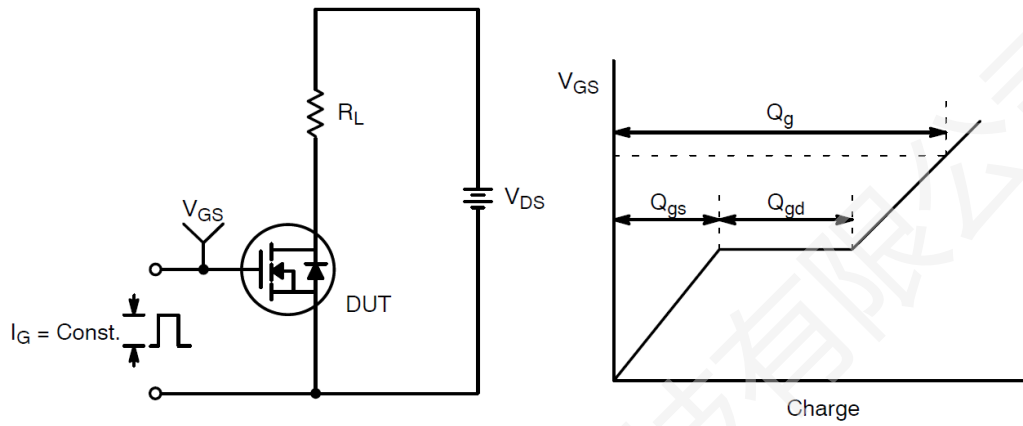
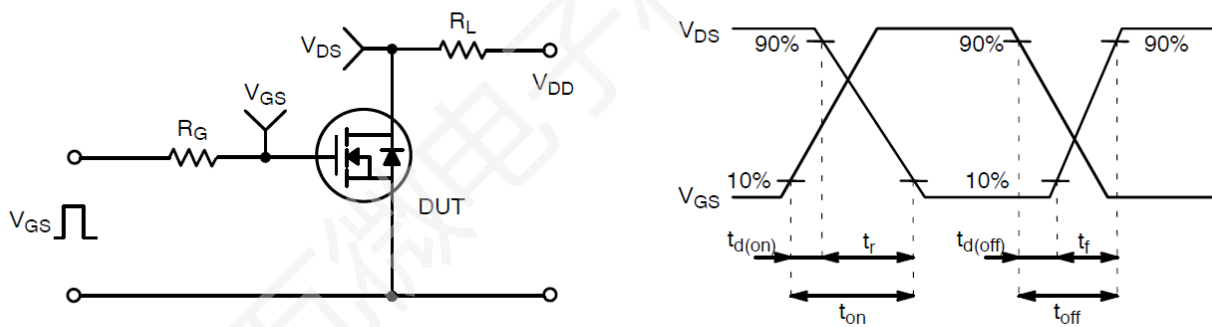
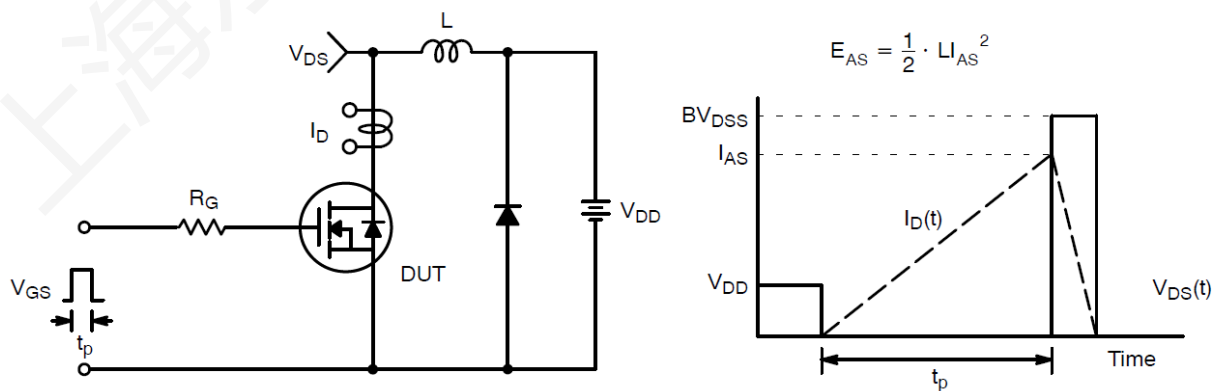
a3: Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm² (one layer, 70 μm thick) copper area for drain connection.

N-Channel 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

P-Channel Electrical Characteristic ($T_J = 25\text{ }^\circ\text{C}$, unless otherwise specified):

| Static Characteristics | | | | | | |
|------------------------|-----------------------------------|--------------------------------|-------|------|------|------------|
| Symbol | Parameter | Test Conditions | Value | | | Units |
| | | | Min. | Typ. | Max. | |
| V_{DSS} | Drain to Source Breakdown Voltage | $V_{GS}=0V, I_D=-250\mu A$ | -30 | -- | -- | V |
| I_{DSS} | Drain to Source Leakage Current | $V_{DS}=-30V, V_{GS}=0V$ | -- | -- | -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 | $V_{DS}=V_{GS}, I_D=-250\mu A$ | -1.1 | -1.6 | -2.1 | V |
| $R_{DS(ON)1}$ | Drain-to-Source On-Resistance | $V_{GS}=-10V, I_D=-6.0A$ | -- | 24 | 31 | m Ω |
| $R_{DS(ON)2}$ | Drain-to-Source On-Resistance | $V_{GS}=-4.5V, I_D=-5.0A$ | -- | 34 | 47 | m Ω |

| Dynamic Characteristics | | | | | | |
|-------------------------|------------------------------|--------------------------------|-------|------|------|----------|
| Symbol | Parameter | Test Conditions | Value | | | Units |
| | | | Min. | Typ. | Max. | |
| C_{iss} | Input Capacitance | $V_{GS}=0V$ | -- | 685 | -- | pF |
| C_{oss} | Output Capacitance | $V_{DS}=-15V$ | -- | 97 | -- | |
| C_{rss} | Reverse Transfer Capacitance | $f=1.0MHz$ | -- | 88 | -- | |
| R_G | Gate resistance | $V_{GS}=0V, V_{DS}=0V, f=1MHz$ | -- | 11 | -- | Ω |

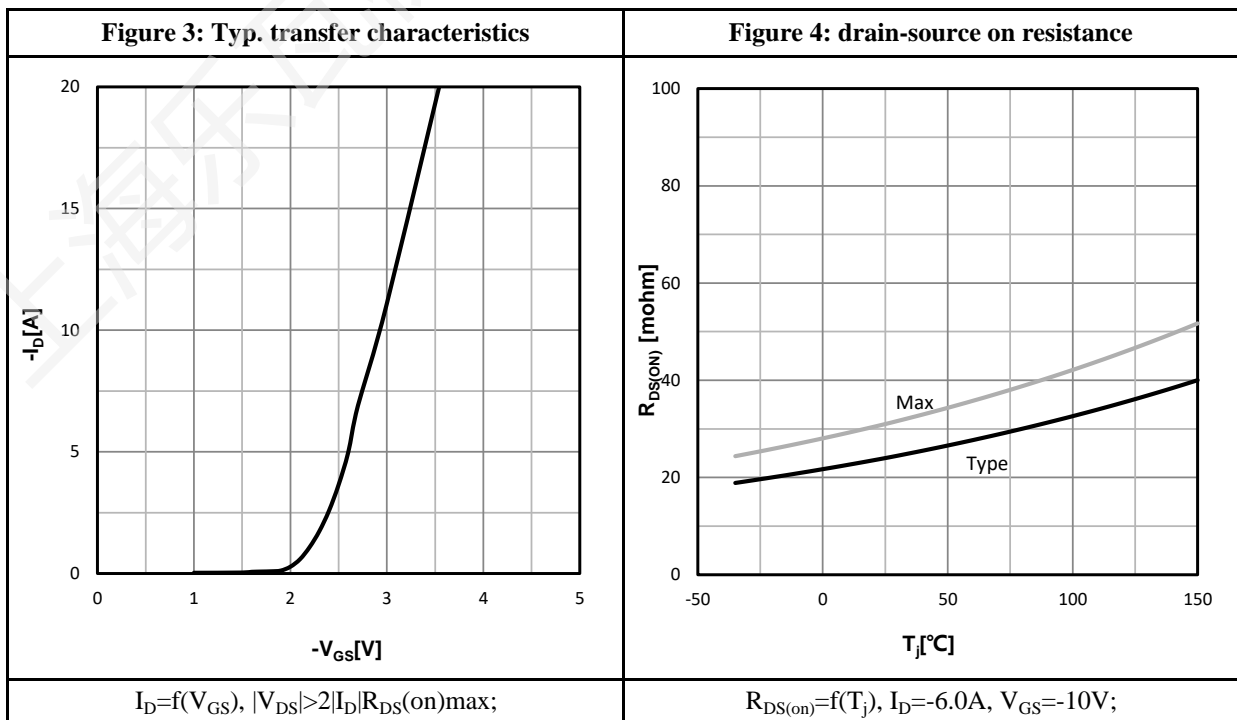
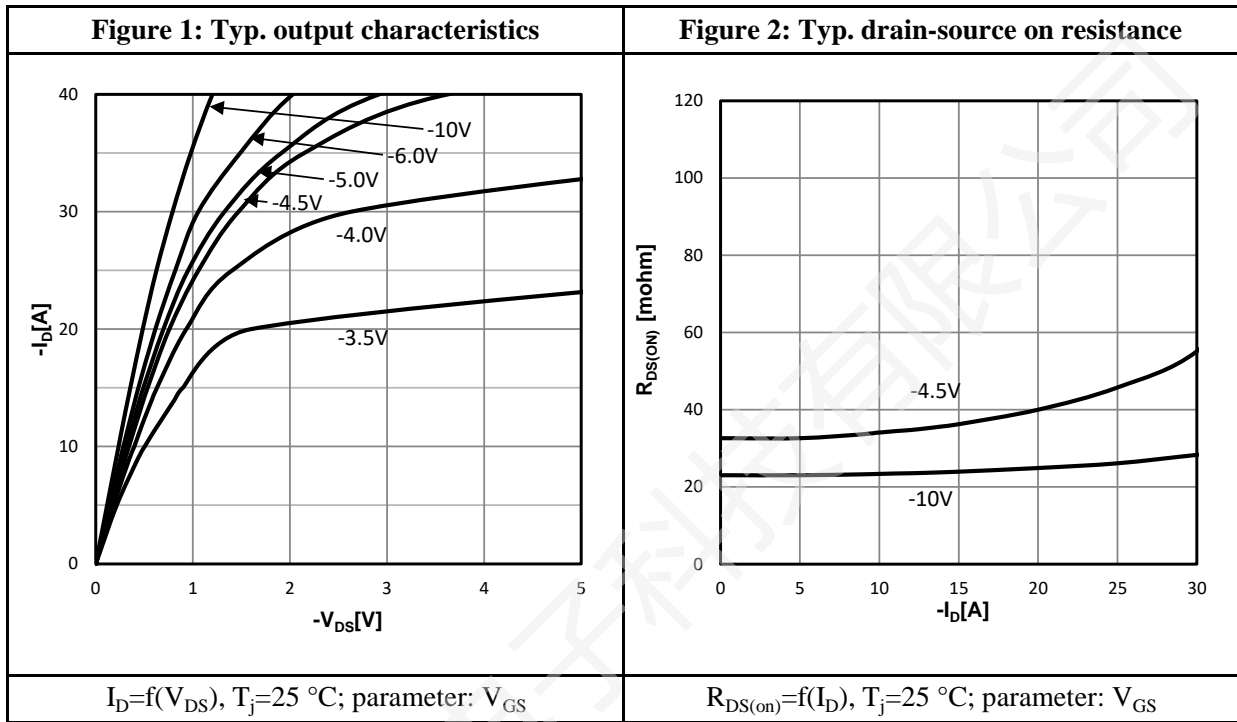
| Resistive Switching Characteristics | | | | | | |
|-------------------------------------|-----------------------|-----------------|-------|------|------|-------|
| Symbol | Parameter | Test Conditions | Value | | | Units |
| | | | Min. | Typ. | Max. | |
| $t_{d(ON)}$ | Turn-on Delay Time | $I_D=-6.0A$ | -- | 7.0 | -- | ns |
| t_r | Rise Time | $V_{DS}=-15V$ | -- | 6.0 | -- | |
| $t_{d(OFF)}$ | Turn-Off Delay Time | $V_{GS}=-10V$ | -- | 17 | -- | |
| t_f | Fall Time | $R_G=3.0\Omega$ | -- | 5.0 | -- | |
| Q_g | Total Gate Charge | $V_{GS}=-10V$ | -- | 16 | -- | nC |
| Q_{gs} | Gate to Source Charge | $V_{DS}=-15V$ | -- | 2.0 | -- | |
| Q_{gd} | Gate to Drain Charge | $I_D=-6.0A$ | -- | 3.0 | -- | |

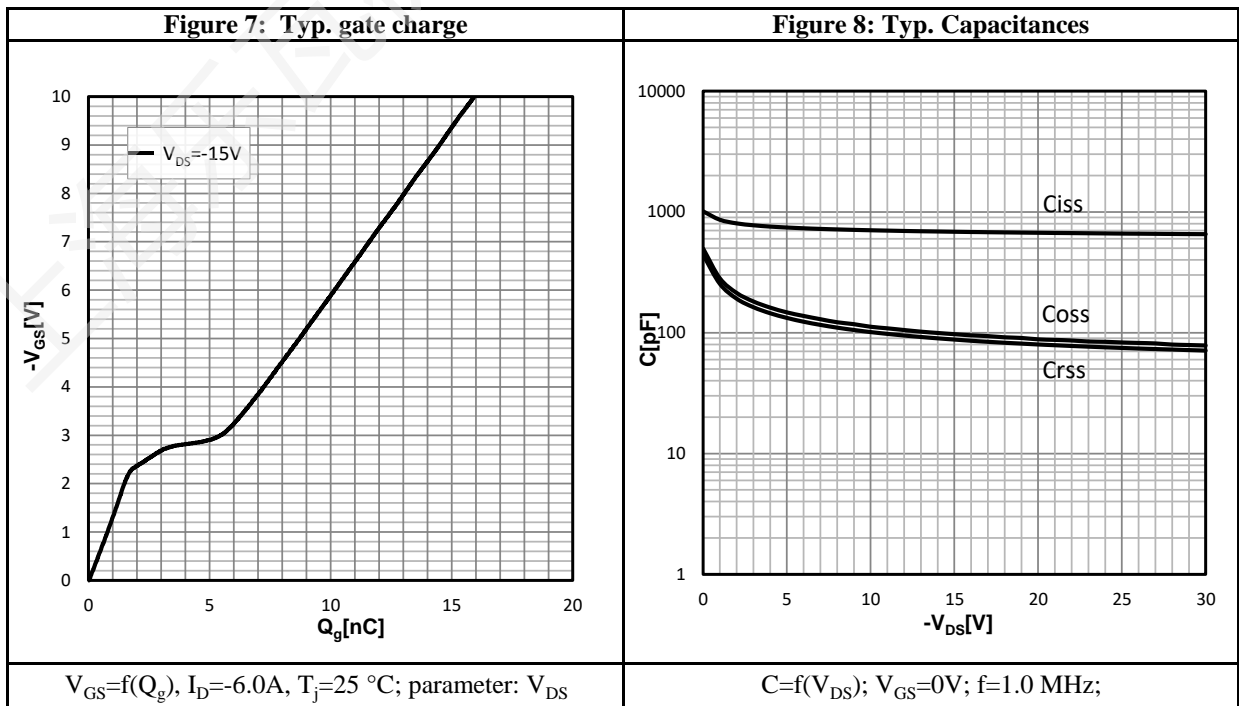
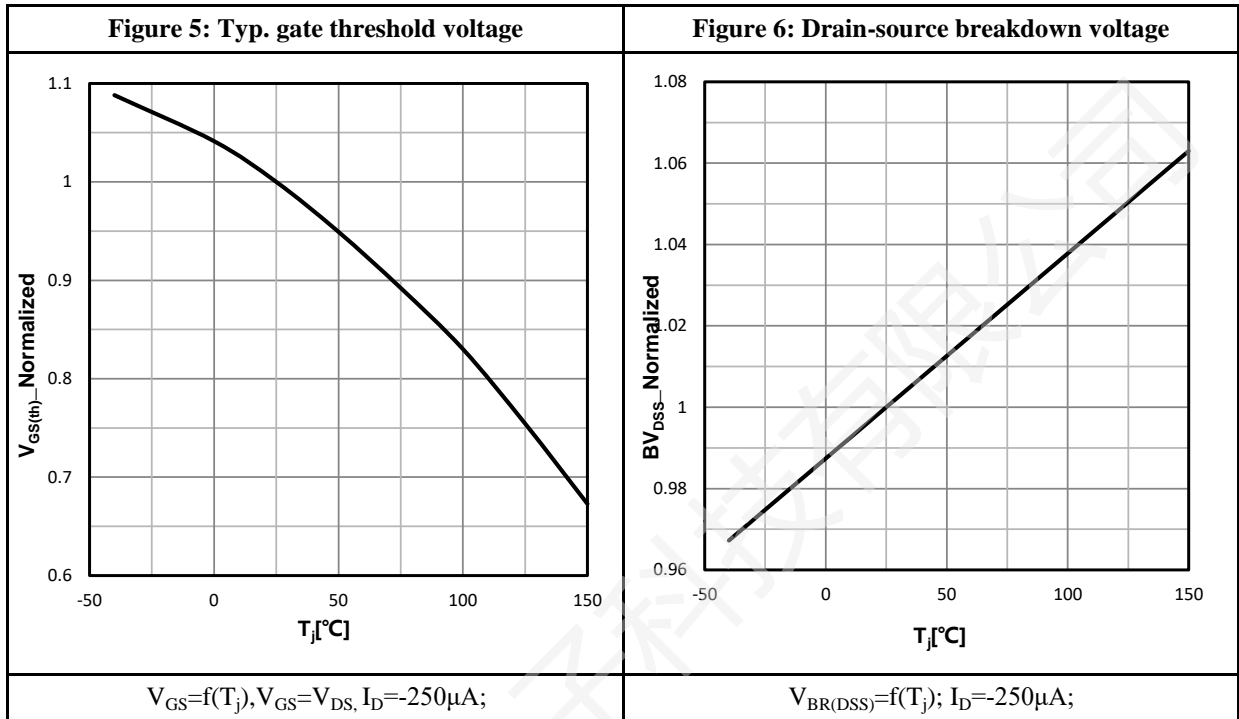
| Source-Drain Diode Characteristics | | | | | | |
|------------------------------------|-----------------------|--------------------------------|-------|------|------|-------|
| Symbol | Parameter | Test Conditions | Value | | | Units |
| | | | Min. | Typ. | Max. | |
| I_S | Diode Forward Current | $T_A=25\text{ }^\circ\text{C}$ | -- | -- | -6.5 | A |
| V_{SD} | Diode Forward Voltage | $I_S=-6.0A, V_{GS}=0V$ | -- | -- | -1.2 | V |

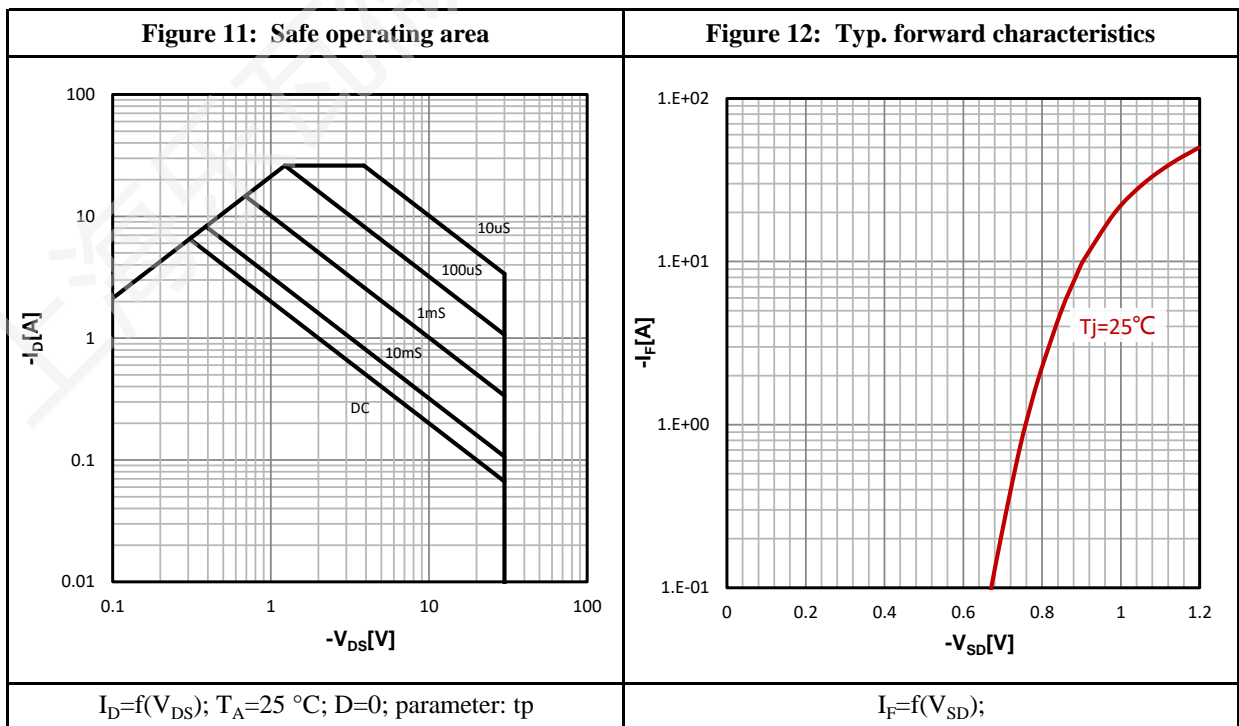
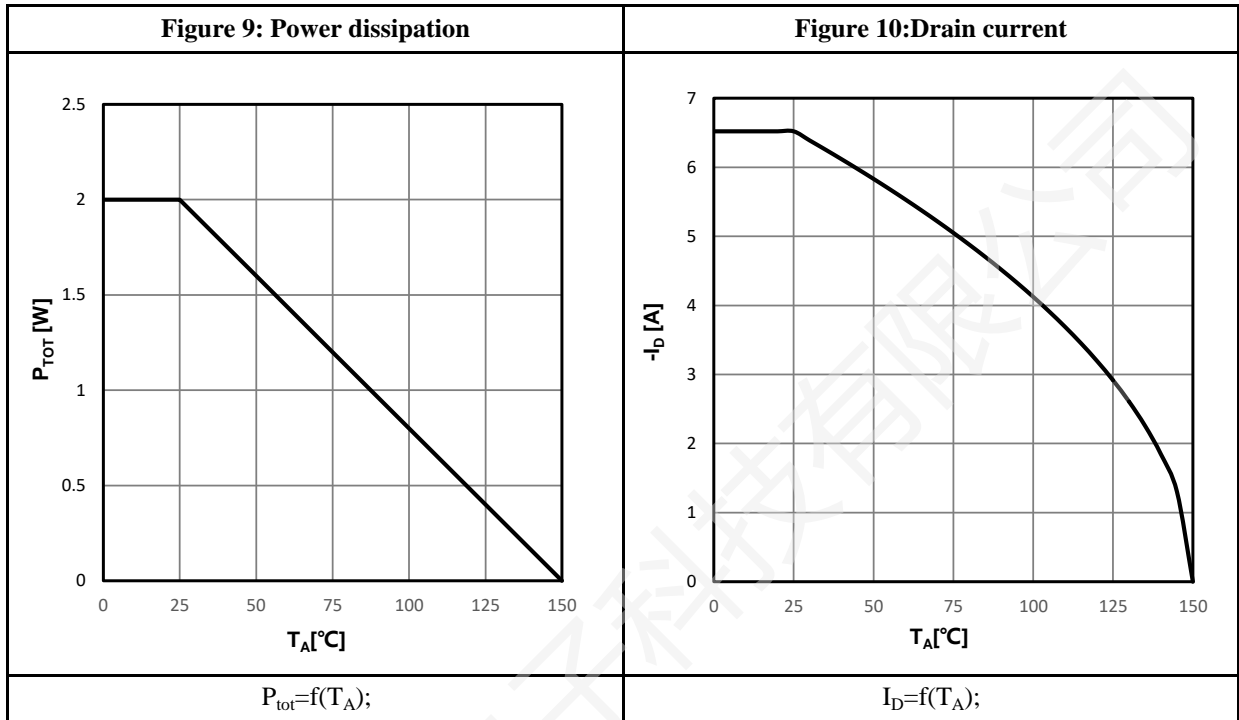
a1: Repetitive rating; pulse width limited by maximum junction temperature

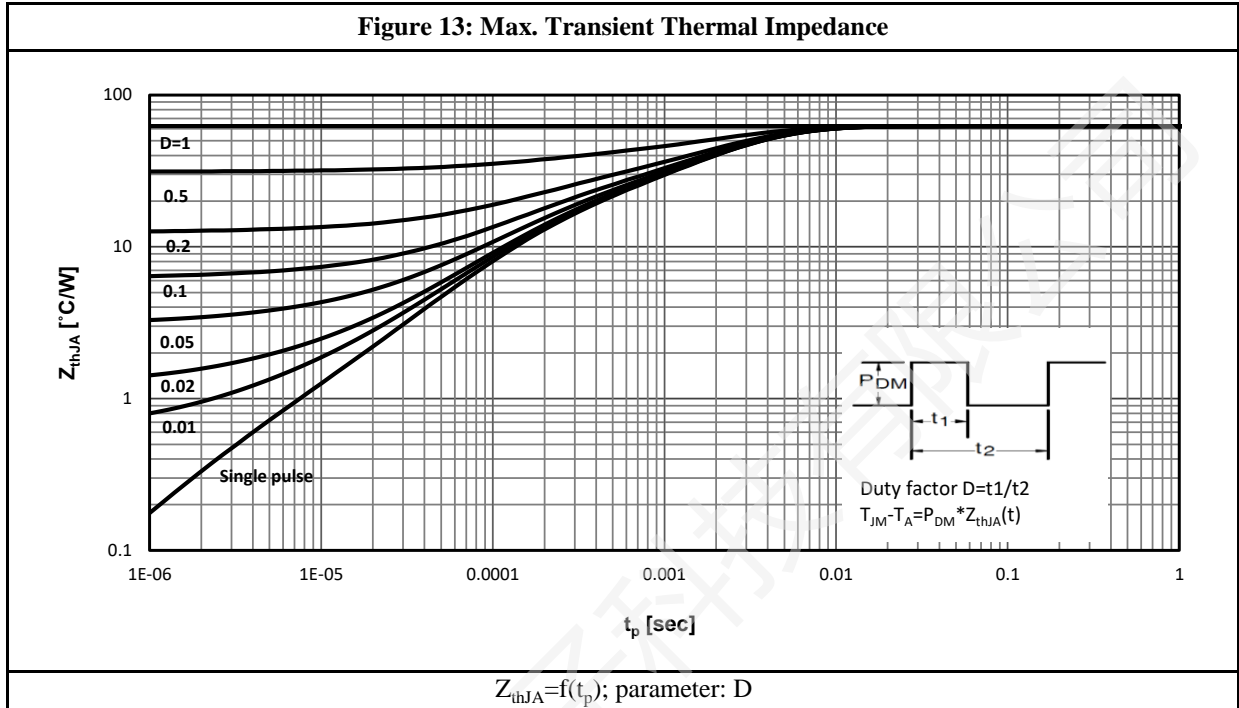
a2: $V_{DD}=-15V, L=0.1mH, R_G=25\Omega$, Starting $T_J=25\text{ }^\circ\text{C}$

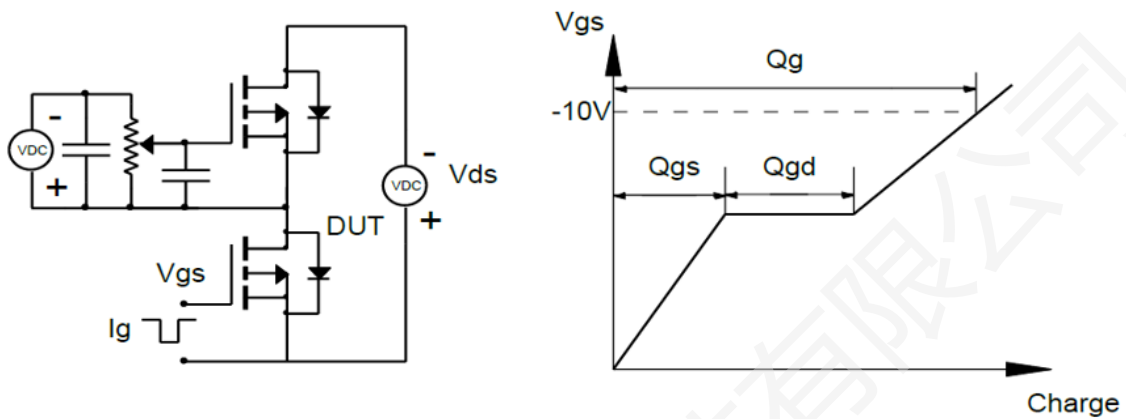
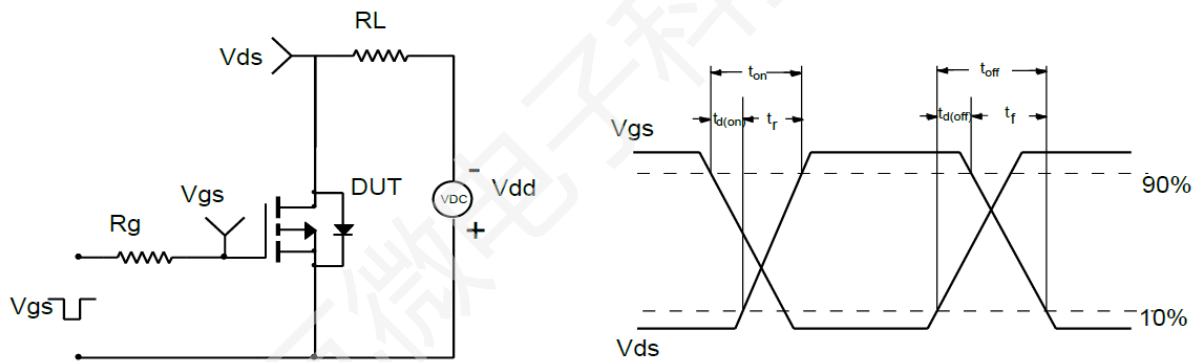
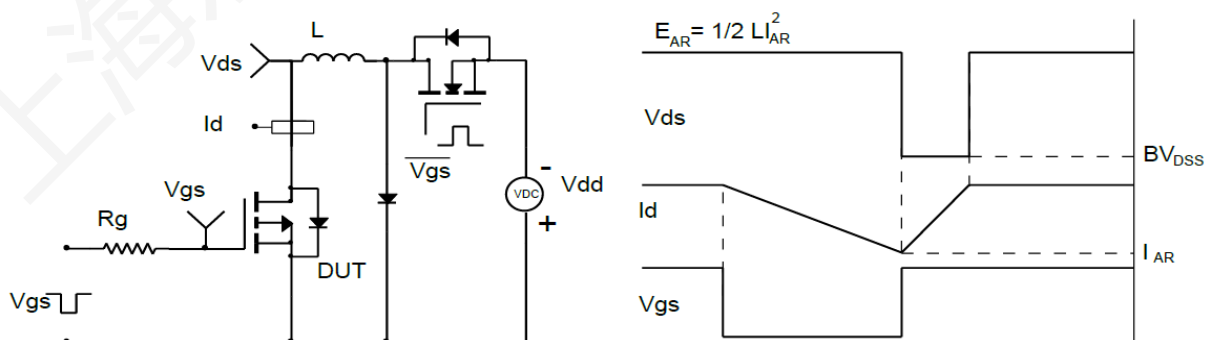
a3: Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm² (one layer, 70 μm thick) copper area for drain connection.

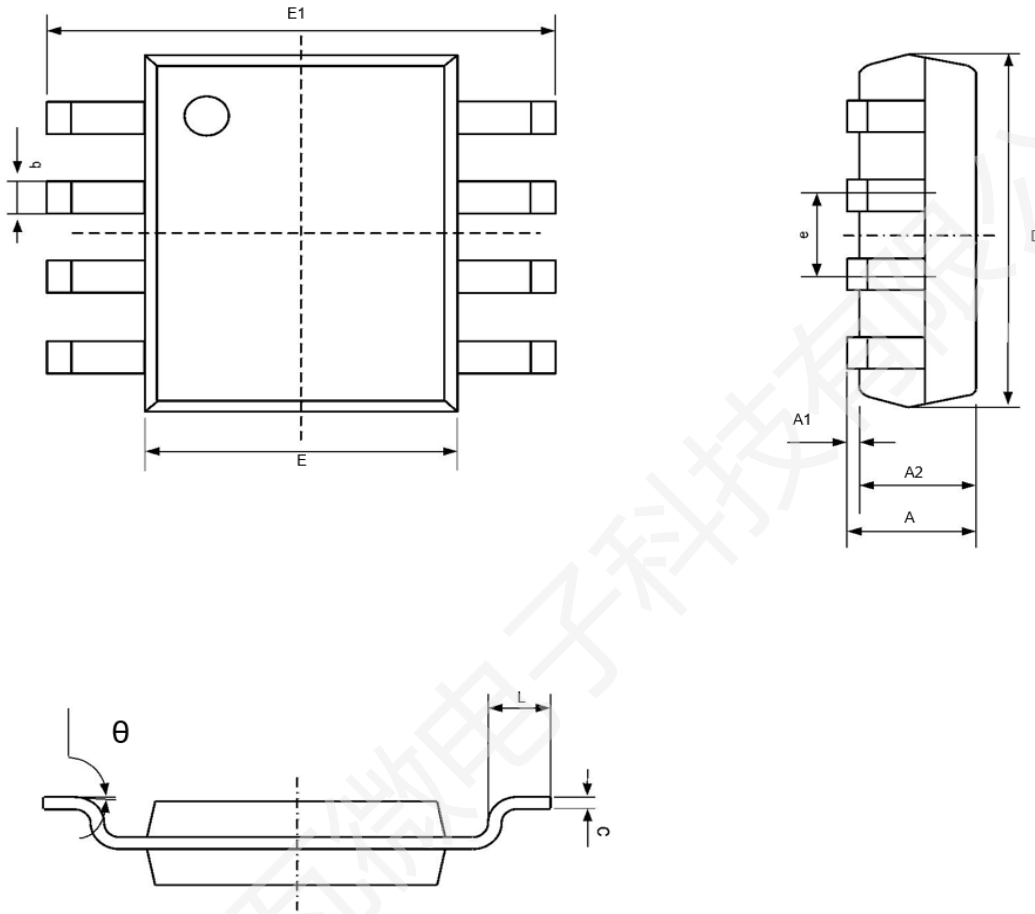
P-Channel Characteristics Curve:








P-Channel 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 | 0.030 | 0.140 | 0.250 |
| A2 | 1.350 | 1.450 | 1.550 |
| b | 0.330 | 0.430 | 0.530 |
| 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 | July.2025 | Initial Version |

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