

General Description:

The LWD3005AD3 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:

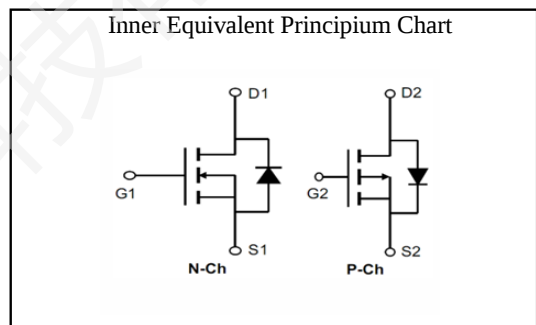
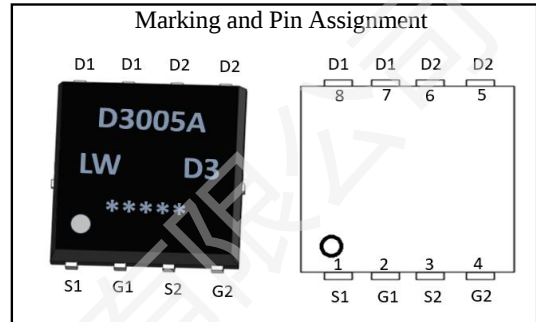
- DC-DC Converter
- Portable Equipment
- Power Management

100% DVDS Tested

100% Avalanche Tested



Symbol	N-Ch	P-Ch	Units
V_{DSS}	30	-30	V
I_D	25	-20	A
$R_{DS(ON) \text{ TYPE}}$	8.5	18.5	$m\Omega$



Package Marking and Ordering Information:

Marking	Part Number	Package	Packing	Qty.
D3005A/LW D3/D.C.	LWD3005AD3	PDFN3.3*3.3-8L	Reel	5000 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 $T_C=25^\circ\text{C}$	25	-20	A
	Continuous Drain Current $T_C=100^\circ\text{C}$	16	-13	A
I_{DM}^{a1}	Pulsed Drain Current	100	-80	A
E_{AS}^{a2}	Single pulse avalanche energy	45	42	mJ
V_{GS}	Gate-to-Source Voltage	± 20	± 20	V
P_D	Power Dissipation	16	16	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	
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	7.8	7.8	$^\circ\text{C/W}$
$R_{\theta JA}^{a3}$	Thermal Resistance, Junction-to-Ambient	45	45	$^\circ\text{C/W}$

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	$V_{DS}=V_{GS}, I_D=250\mu A$	1.1	1.6	2.1	V
$R_{DS(ON)1}$	Drain-to-Source On-Resistance	$V_{GS}=10V, I_D=20A$	--	8.5	11	$m\Omega$
$R_{DS(ON)2}$	Drain-to-Source On-Resistance	$V_{GS}=4.5V, I_D=15A$	--	12	18	$m\Omega$

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
C_{iss}	Input Capacitance	$V_{GS}=0V$	--	871	--	pF
C_{oss}	Output Capacitance	$V_{DS}=15V$	--	132	--	
C_{rss}	Reverse Transfer Capacitance	$f=1.0MHz$	--	119	--	
R_G	Gate resistance	$V_{GS}=0V, V_{DS}=0V, f=1MHz$	--	1.8	--	Ω

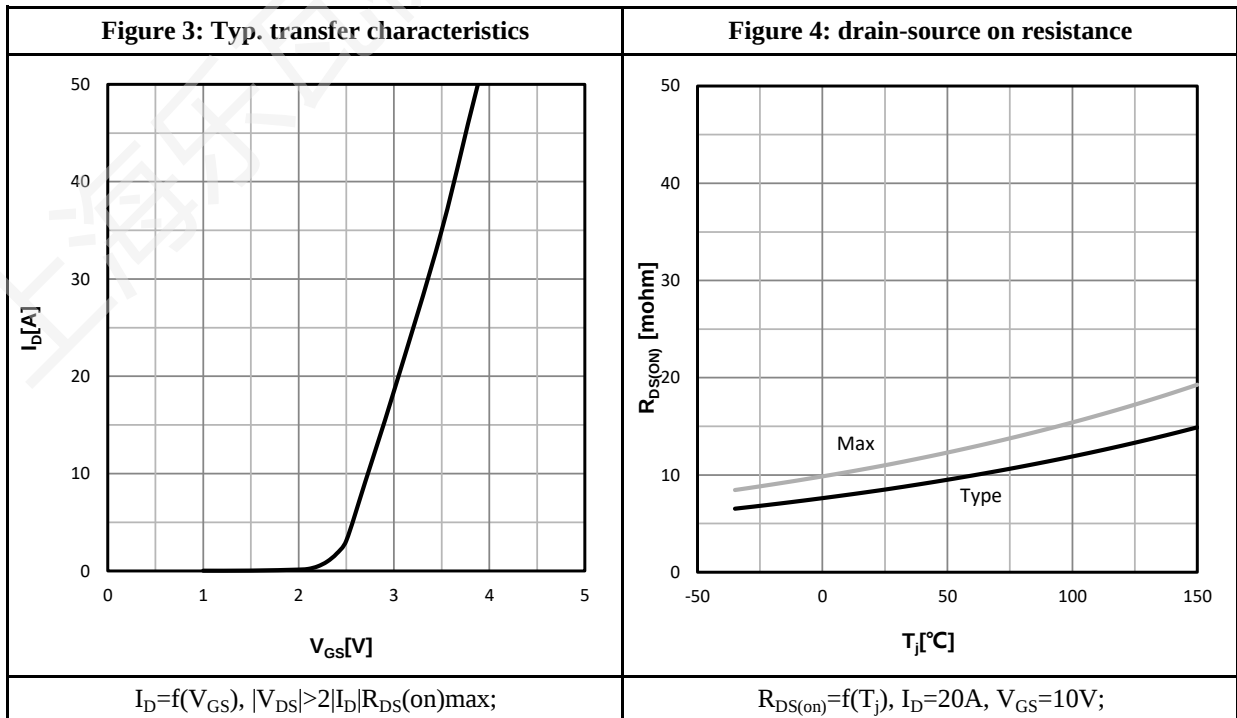
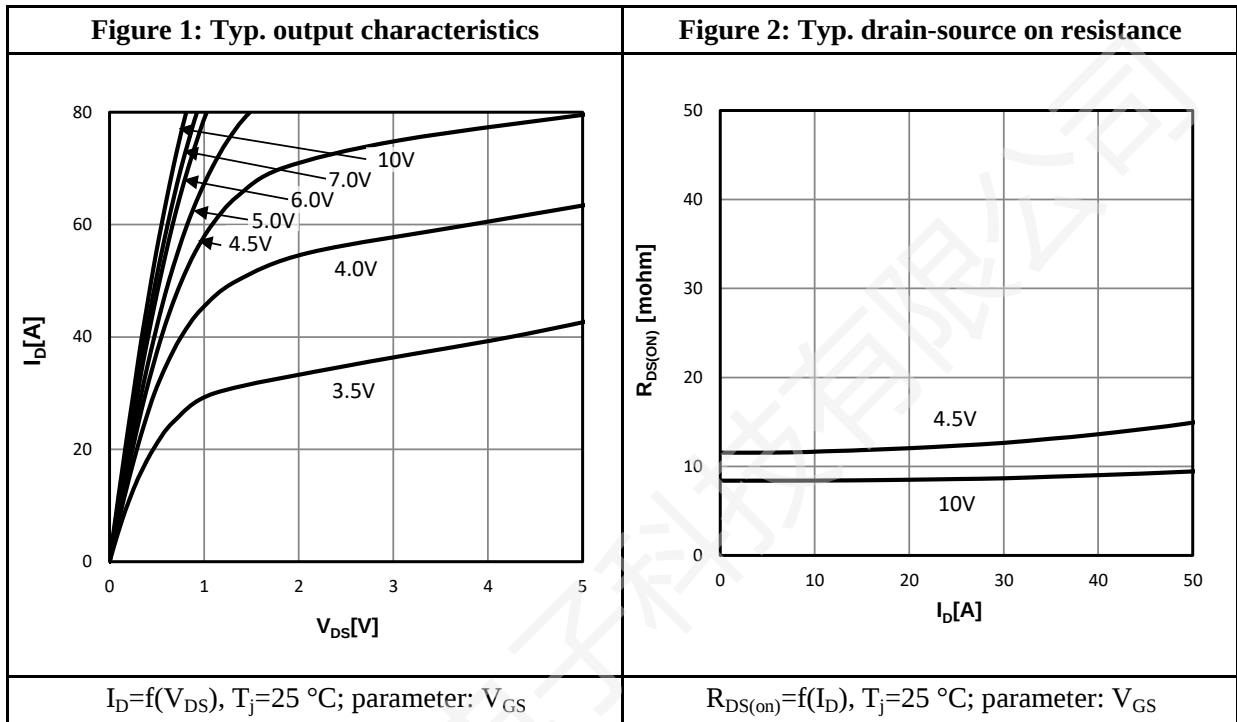
Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	$I_D=20A$	--	5.0	--	ns
t_r	Rise Time	$V_{DS}=15V$	--	10	--	
$t_{d(OFF)}$	Turn-Off Delay Time	$V_{GS}=10V$	--	20	--	
t_f	Fall Time	$R_G=6.0\Omega$	--	6.0	--	
Q_g	Total Gate Charge	$V_{GS}=10V$	--	20	--	nC
Q_{gs}	Gate to Source Charge	$V_{DS}=15V$	--	3.0	--	
Q_{gd}	Gate to Drain Charge	$I_D=20A$	--	4.3	--	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
I_S	Diode Forward Current	$T_C=25\text{ }^{\circ}\text{C}$	--	--	25	A
V_{SD}	Diode Forward Voltage	$I_S=20A, V_{GS}=0V$	--	--	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:


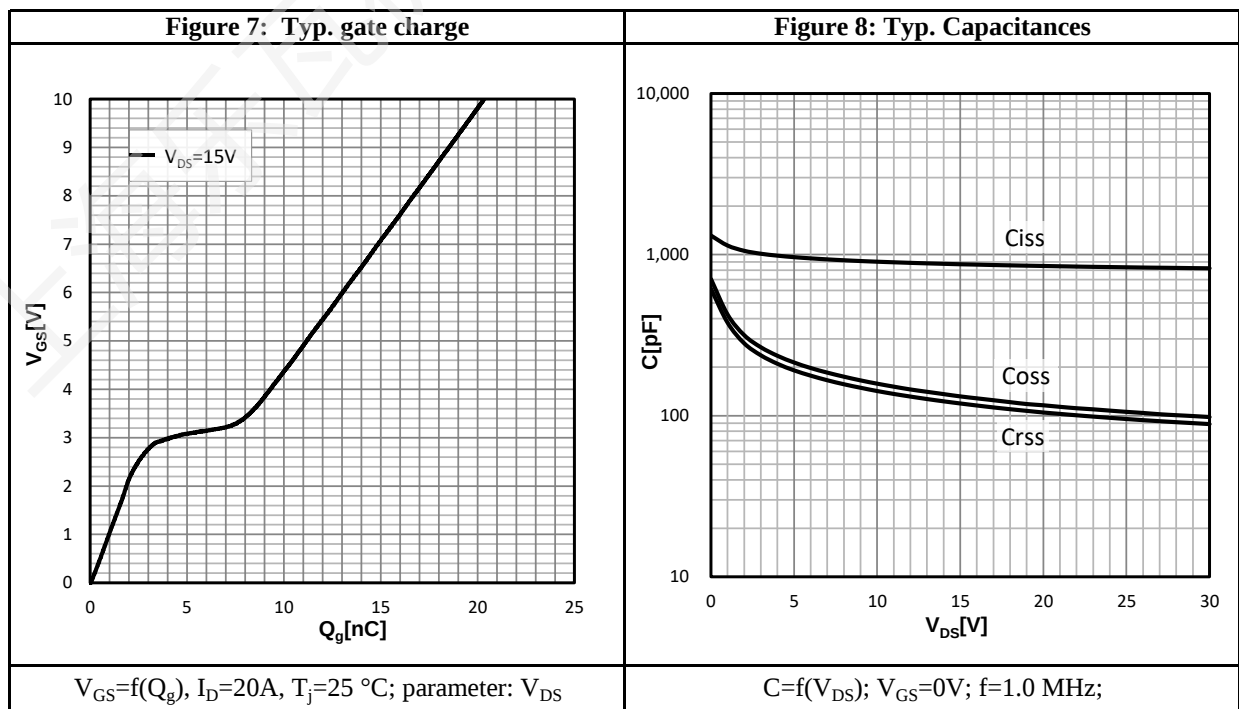
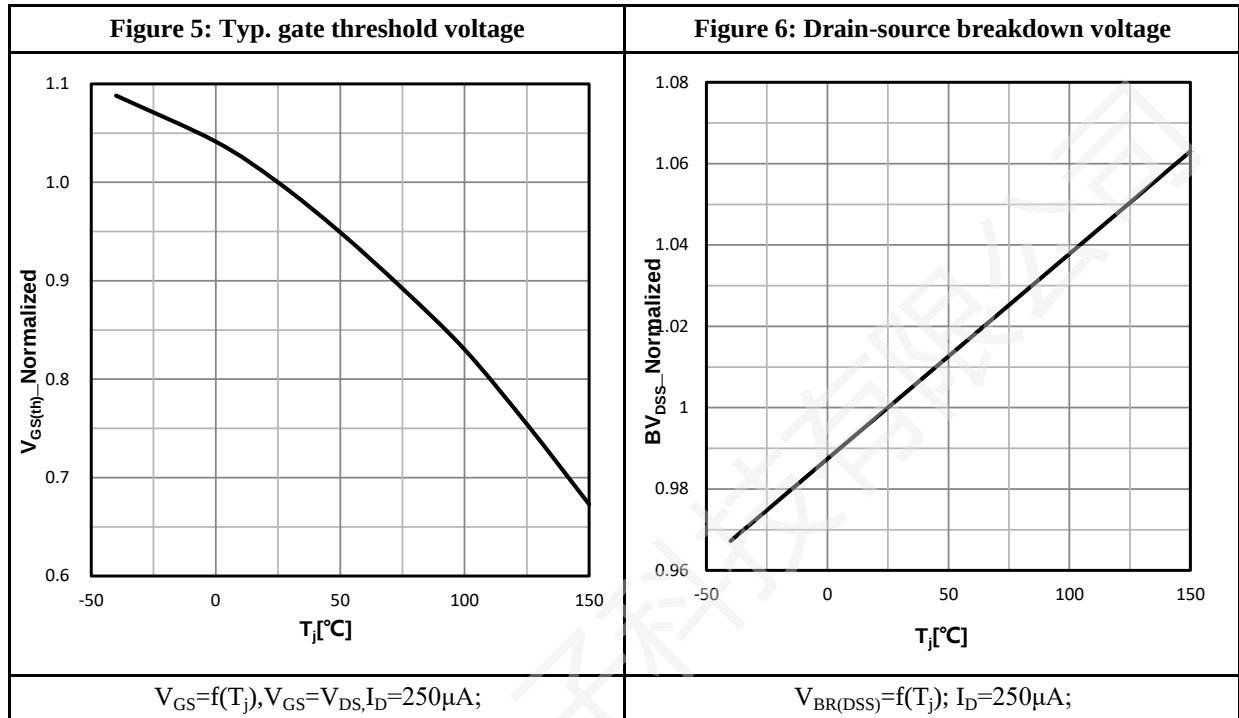
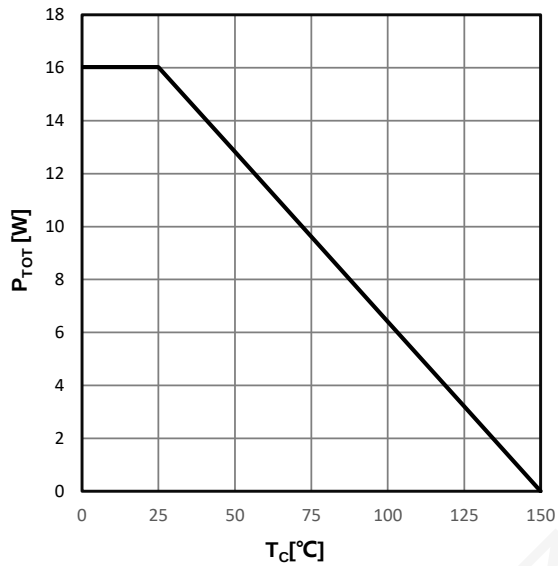
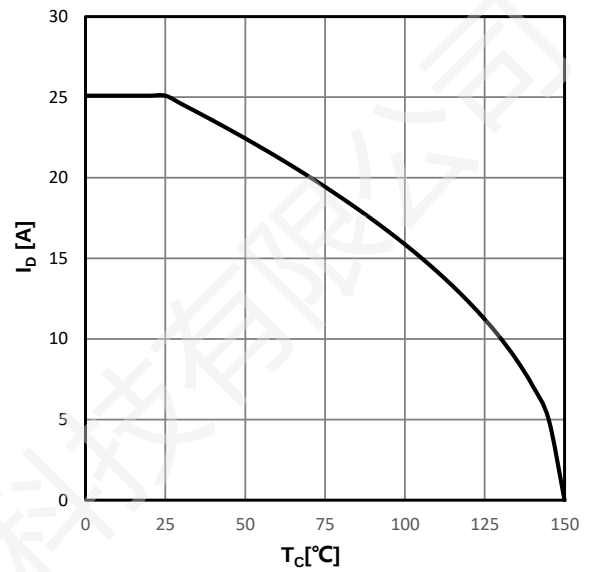
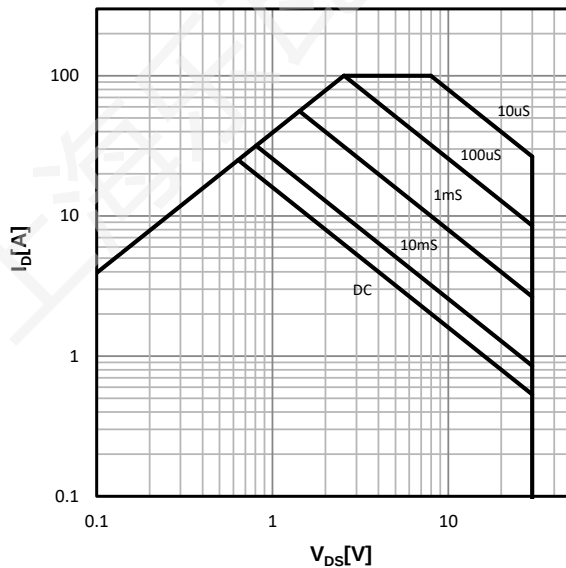


Figure 9: Power dissipation


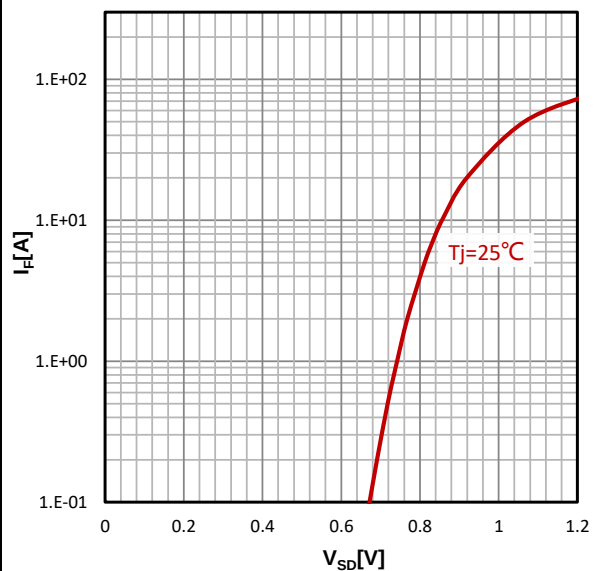
$$P_{tot}=f(T_C);$$

Figure 10: Drain current


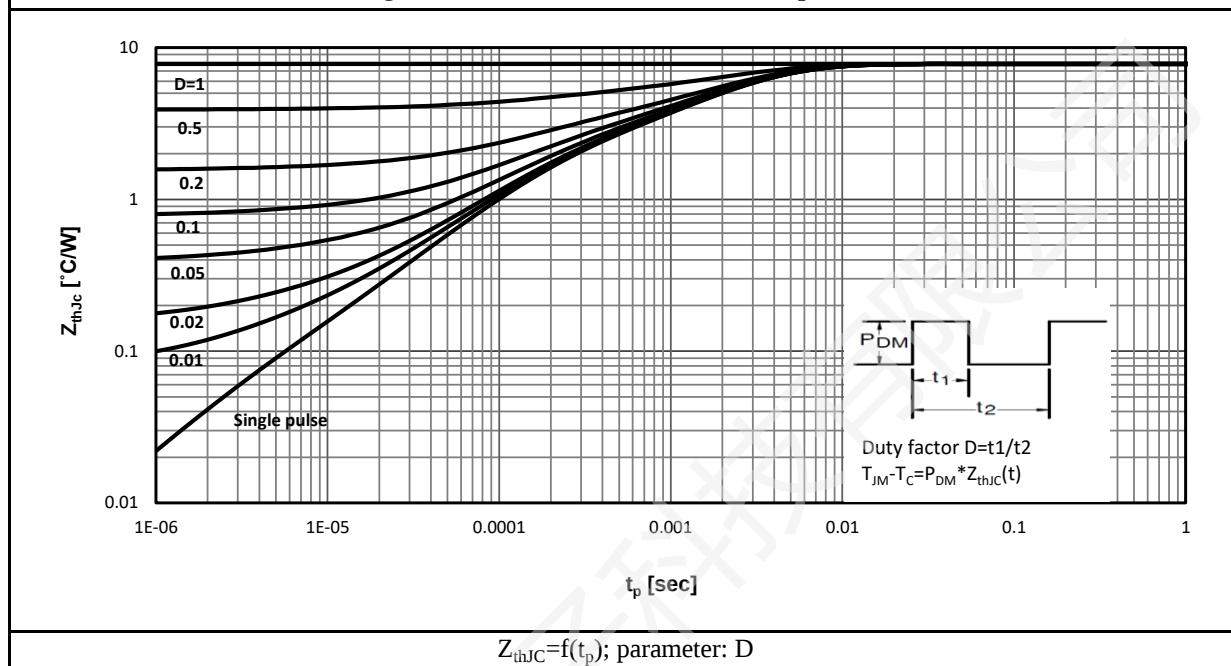
$$I_D=f(T_C);$$

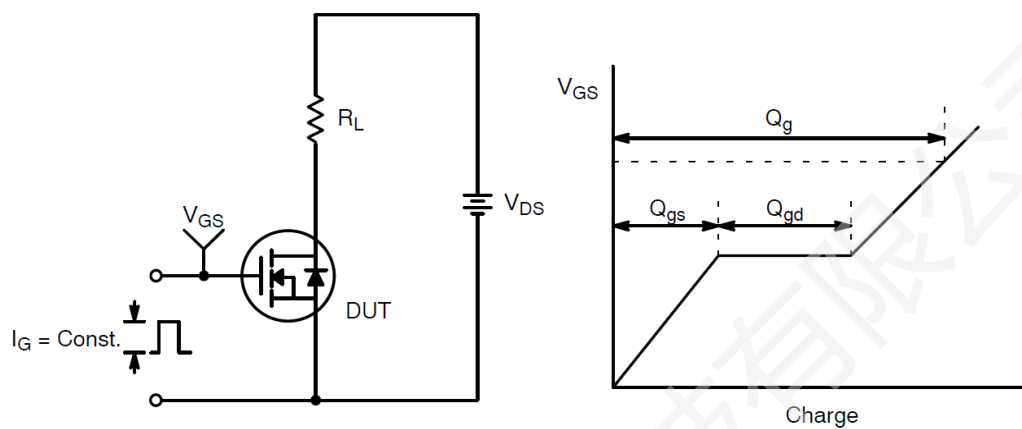
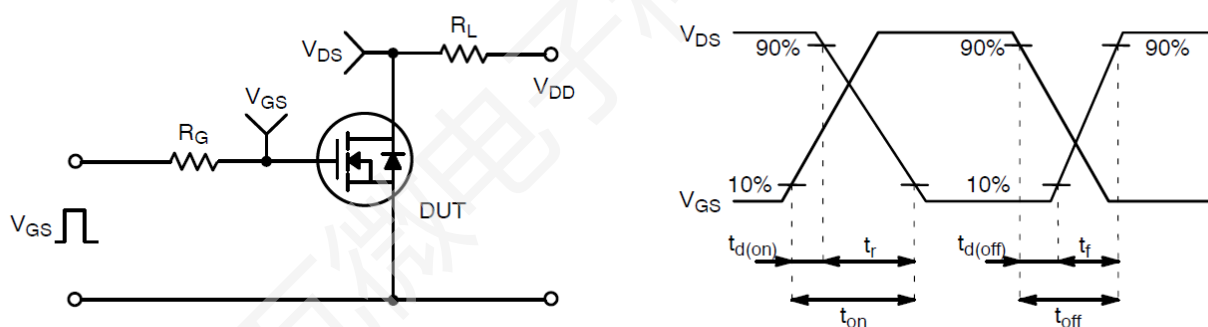
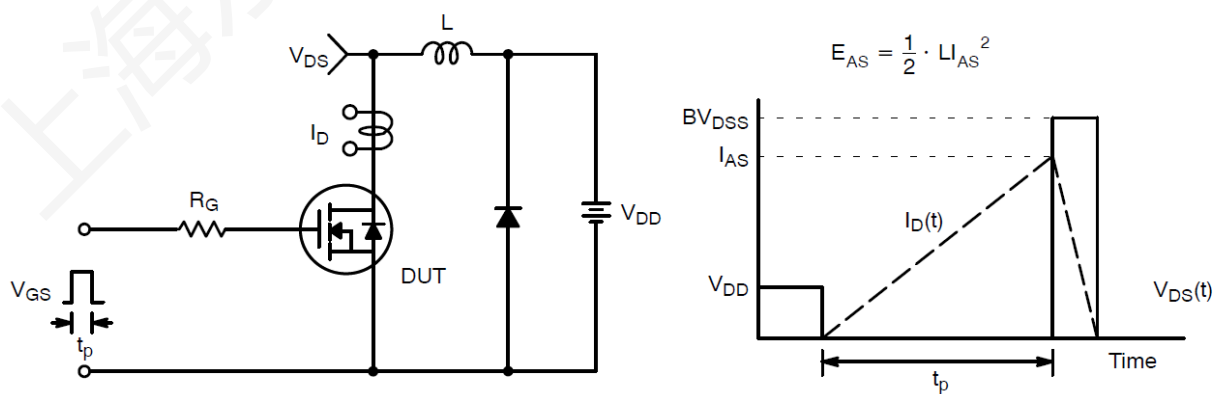
Figure 11: Safe operating area


$$I_D=f(V_{DS}); T_C=25\text{ }^{\circ}\text{C}; D=0; \text{ parameter: tp}$$

Figure 12: Typ. forward characteristics


$$I_F=f(V_{SD});$$

Figure 13: Max. Transient Thermal Impedance


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	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.2	-1.5	-2.0	V
$R_{DS(ON)1}$	Drain-to-Source On-Resistance	$V_{GS}=-10V, I_D=-12A$	--	18.5	23	$m\Omega$
$R_{DS(ON)2}$	Drain-to-Source On-Resistance	$V_{GS}=-4.5V, I_D=-10A$	--	26	32	$m\Omega$

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
C_{iss}	Input Capacitance	$V_{GS}=0V$	--	864	--	pF
C_{oss}	Output Capacitance	$V_{DS}=-15V$	--	133	--	
C_{rss}	Reverse Transfer Capacitance	$f=1.0MHz$	--	122	--	
R_G	Gate resistance	$V_{GS}=0V, V_{DS}=0V, f=1MHz$	--	10	--	Ω

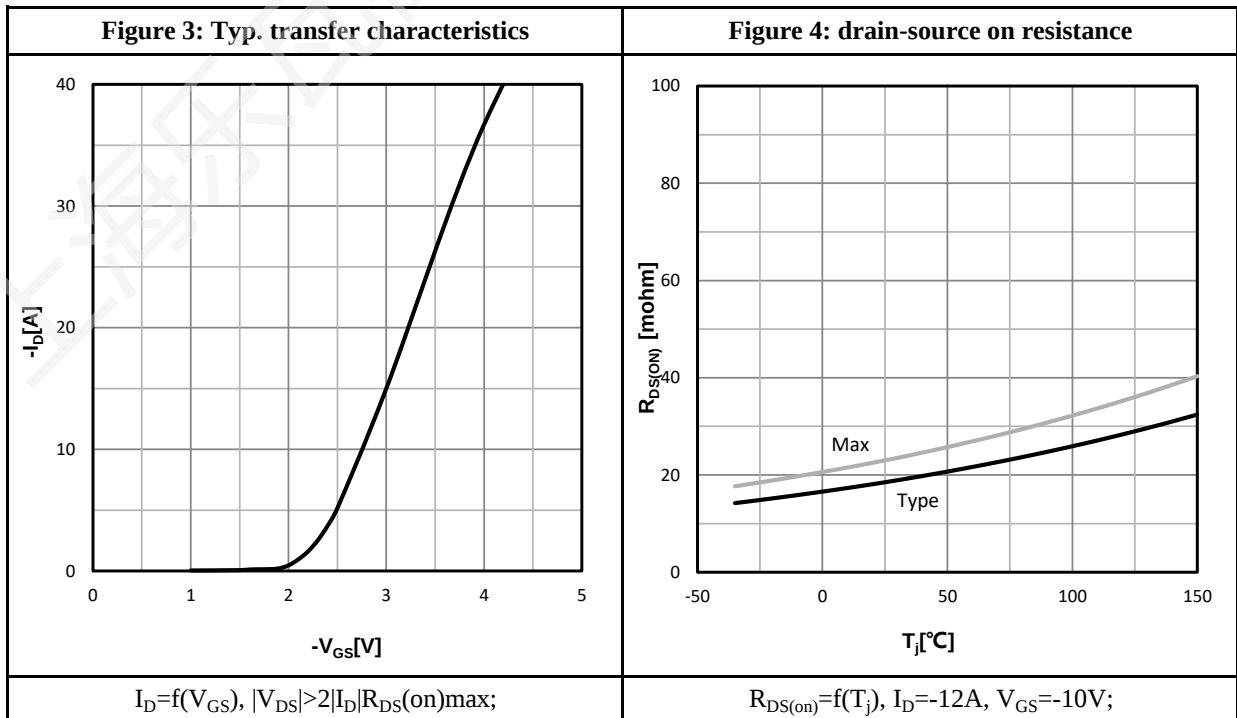
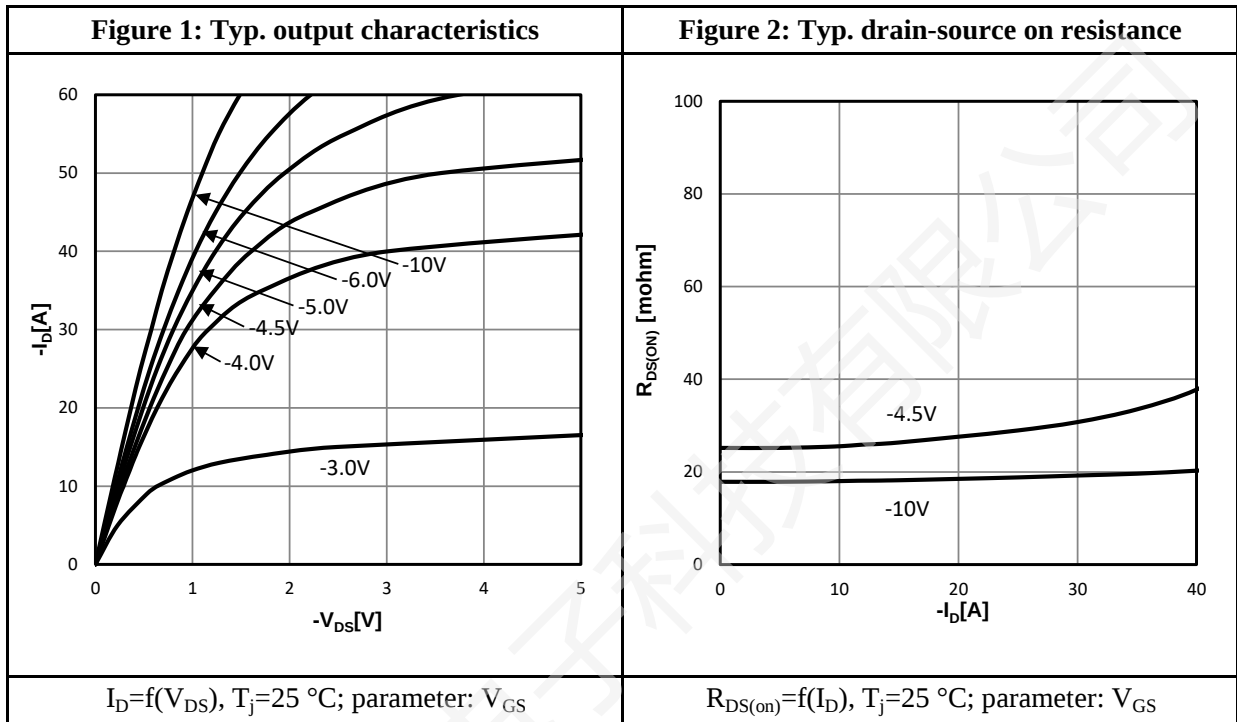
Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	$I_D=-12A$	--	8.0	--	ns
t_r	Rise Time	$V_{DS}=-15V$	--	5.0	--	
$t_{d(OFF)}$	Turn-Off Delay Time	$V_{GS}=-10V$	--	30	--	
t_f	Fall Time	$R_G=3.0\Omega$	--	13	--	
Q_g	Total Gate Charge	$V_{GS}=-10V$	--	21	--	nC
Q_{gs}	Gate to Source Charge	$V_{DS}=-15V$	--	2.6	--	
Q_{gd}	Gate to Drain Charge	$I_D=-12A$	--	4.3	--	

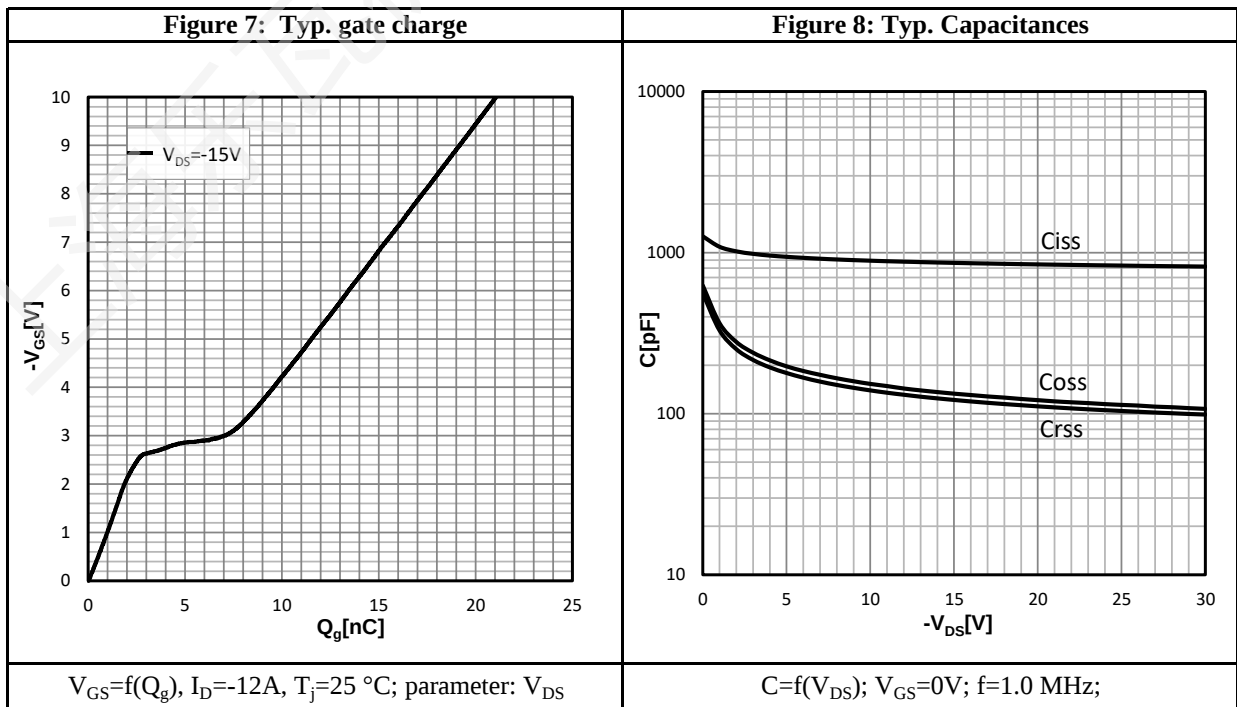
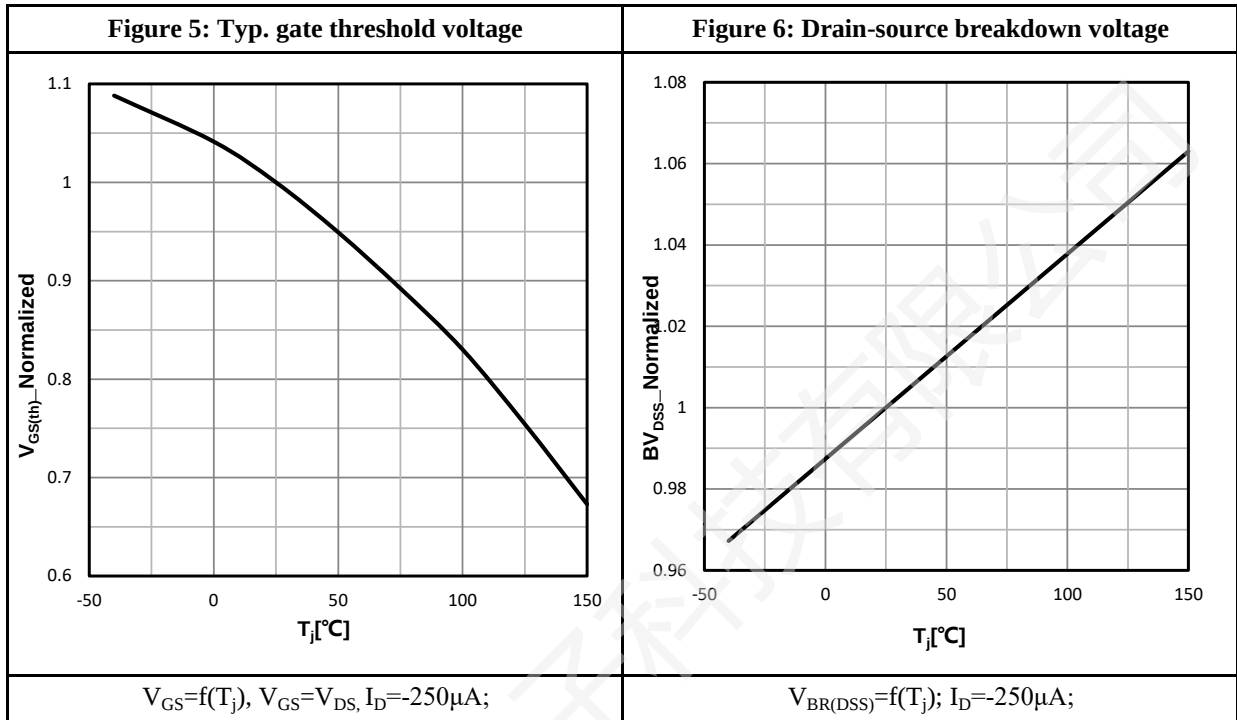
Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
I_S	Diode Forward Current	$T_C=25\text{ }^{\circ}\text{C}$	--	--	-20	A
V_{SD}	Diode Forward Voltage	$I_S=-12A, V_{GS}=0V$	--	--	-1.2	V

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:




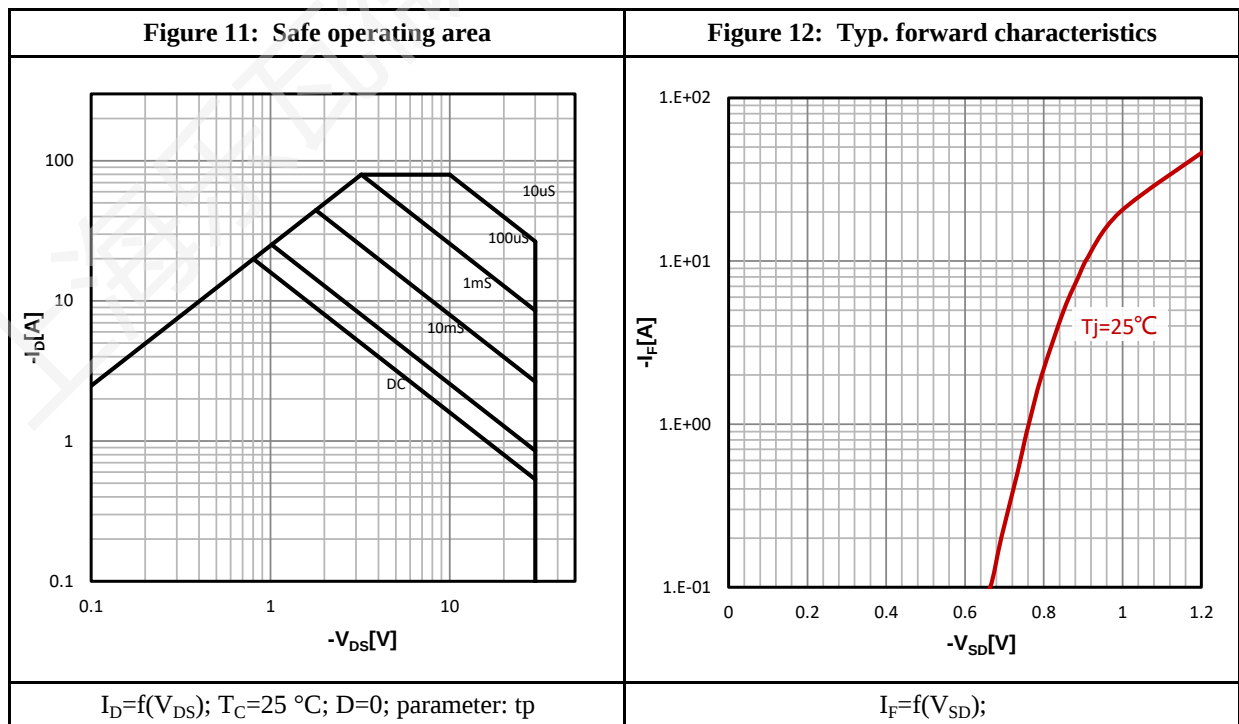
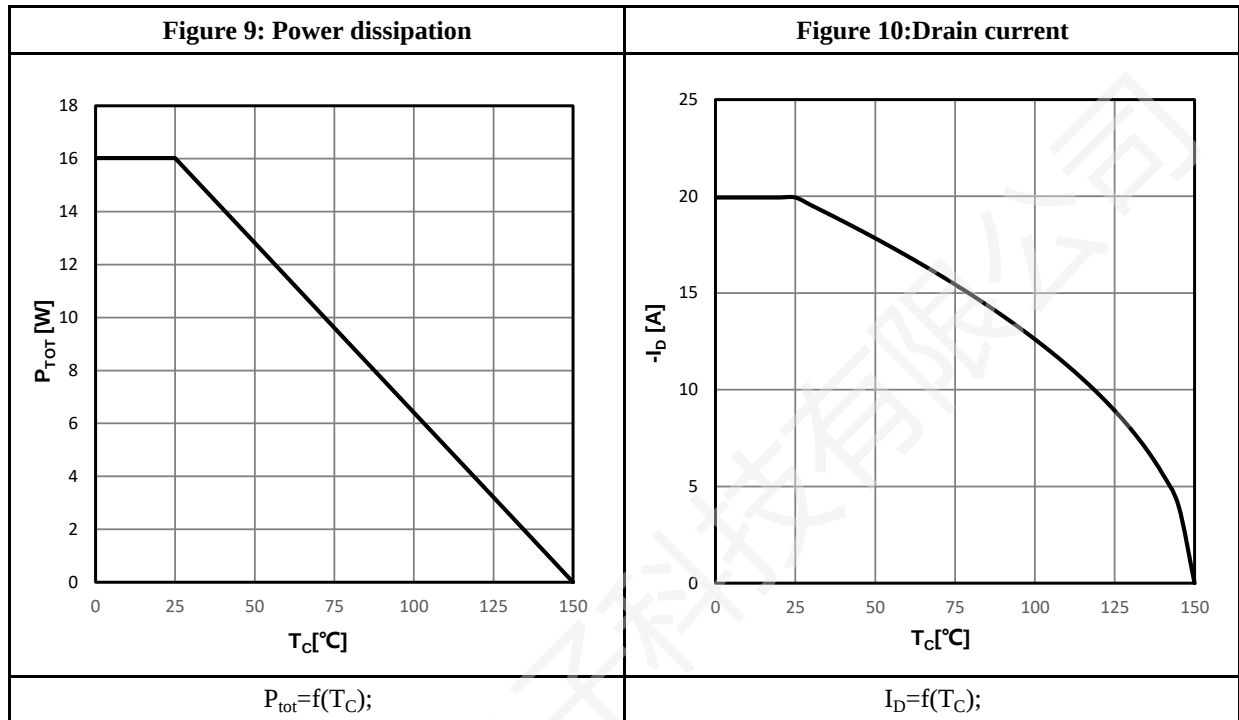
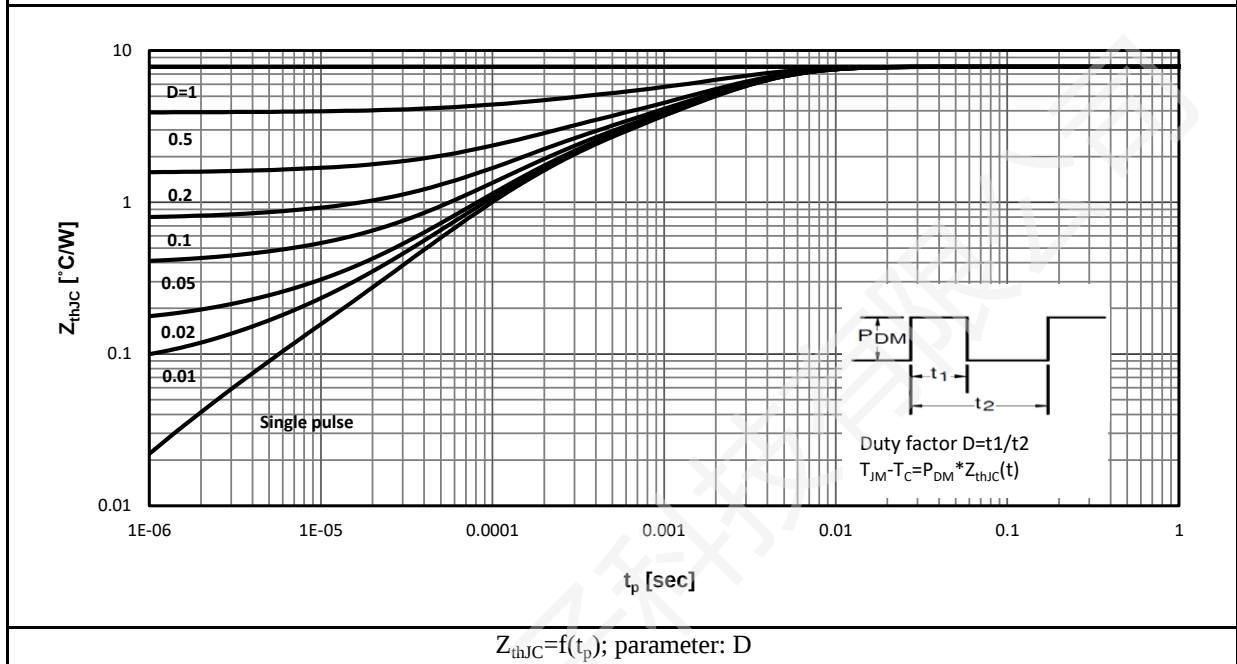


Figure 13: Max. Transient Thermal Impedance


P-Channel Test Circuit & Waveform:

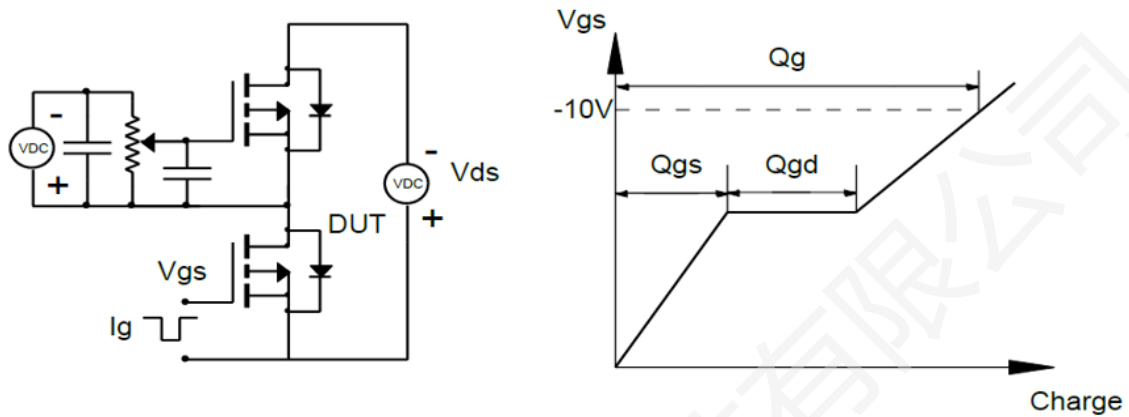


Figure 14: Gate Charge Test Circuit & Waveform

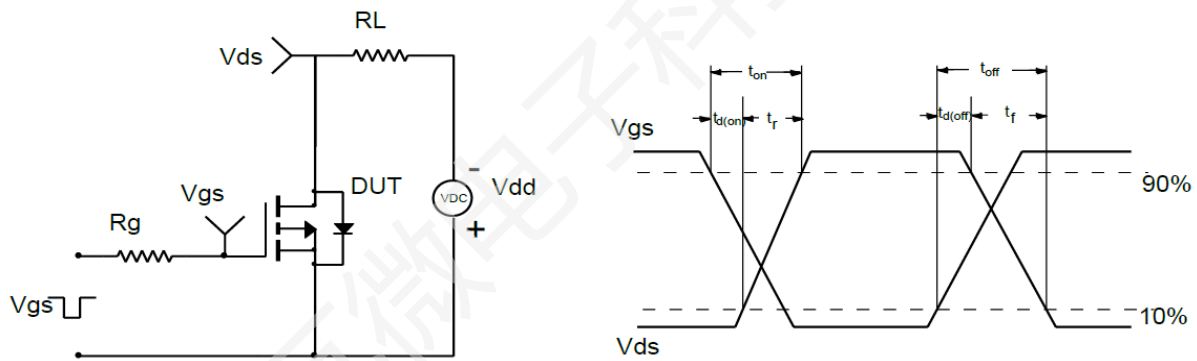


Figure 15: Resistive Switching Test Circuit & Waveforms

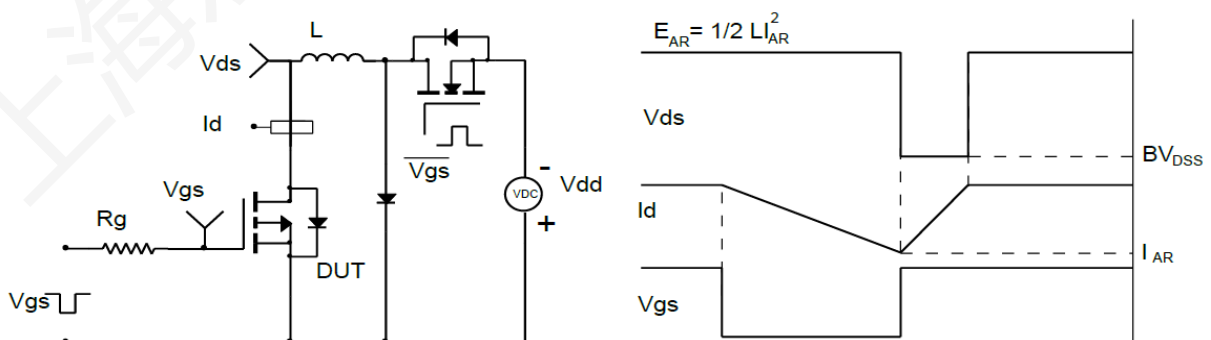
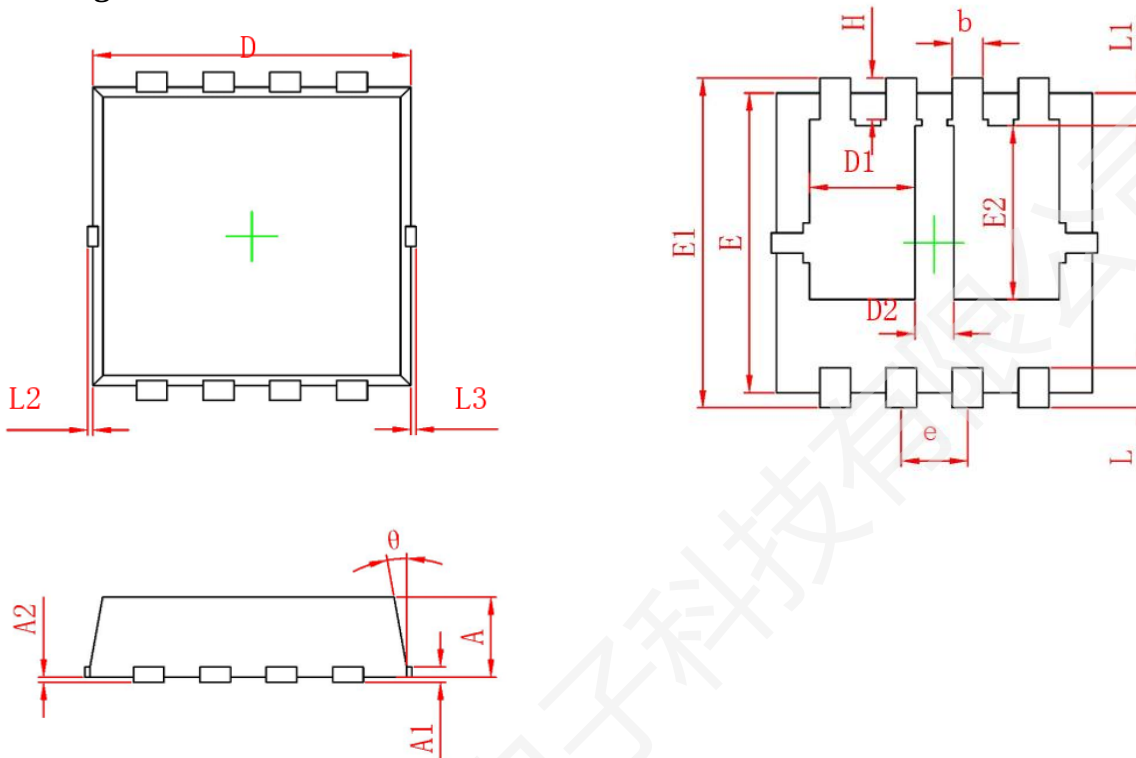


Figure 16: Unclamped Inductive Switching Test Circuit & Waveforms

Package Outline:


Symbol	MILLIMETER	
	MIN	MAX
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:

Revision	Date	Descriptions
Rev 1.1	Jun.2025	Initial Version

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