

General Description:

The LWP2004AD5 uses advanced 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 PDFN5*6-8L, 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:

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

100% DVDS Tested

100% Avalanche Tested



Package Marking and Ordering Information:

Marking	Part Number	Package	Packing	Qty.
P2004A/LW D5/D.C.	LWP2004AD5	PDFN5*6-8L	Reel	5000 Pcs

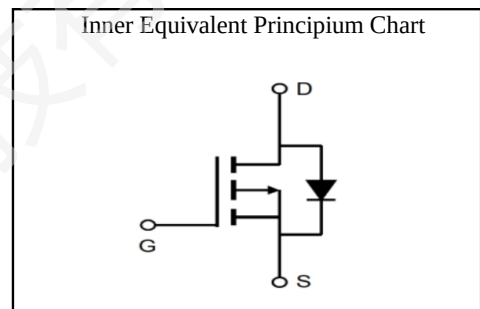
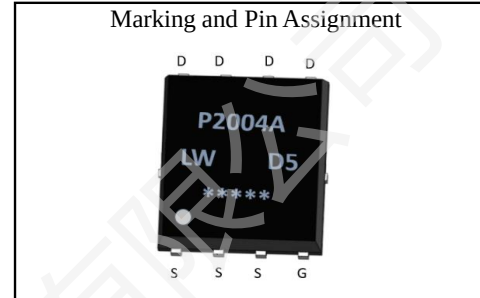
Absolute Maximum Ratings:

Symbol	Parameter		Value	Units
V_{DSS}	Drain-to-Source Voltage		-20	V
I_D	Continuous Drain Current	$T_C=25^{\circ}\text{C}$	-75	A
	Continuous Drain Current	$T_C=100^{\circ}\text{C}$	-47	A
I_{DM}^{a1}	Pulsed Drain Current		-300	A
E_{AS}^{a2}	Single pulse avalanche energy		242	mJ
V_{GS}	Gate-to-Source Voltage		± 10	V
P_D	Power Dissipation		120	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	1.04	$^{\circ}\text{C}/\text{W}$
$R_{\theta JA}^{a3}$	Thermal Resistance, Junction-to-Ambient	43	$^{\circ}\text{C}/\text{W}$

V_{DSS}	-20	V
I_D	-75	A
P_D	120	W
$R_{DS(ON) \text{ TYPE}}$	2.4	$\text{m}\Omega$



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	$V_{GS}=0V, I_D=-250\mu A$	-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	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.45	-0.6	-1.0	V
$R_{DS(ON)1}$	Drain-to-Source On-Resistance	$V_{GS}=-4.5V, I_D=-20A$	--	2.4	3.0	m Ω
$R_{DS(ON)2}$	Drain-to-Source On-Resistance	$V_{GS}=-2.5V, I_D=-15A$	--	3.0	5.0	m Ω

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
C_{iss}	Input Capacitance	$V_{GS}=0V$	--	6132	--	pF
C_{oss}	Output Capacitance	$V_{DS}=-10V$	--	1170	--	
C_{rss}	Reverse Transfer Capacitance	$f=1.0MHz$	--	888	--	
R_G	Gate resistance	$V_{GS}=0V, V_{DS}=0V, f=1MHz$	--	9.3	--	Ω

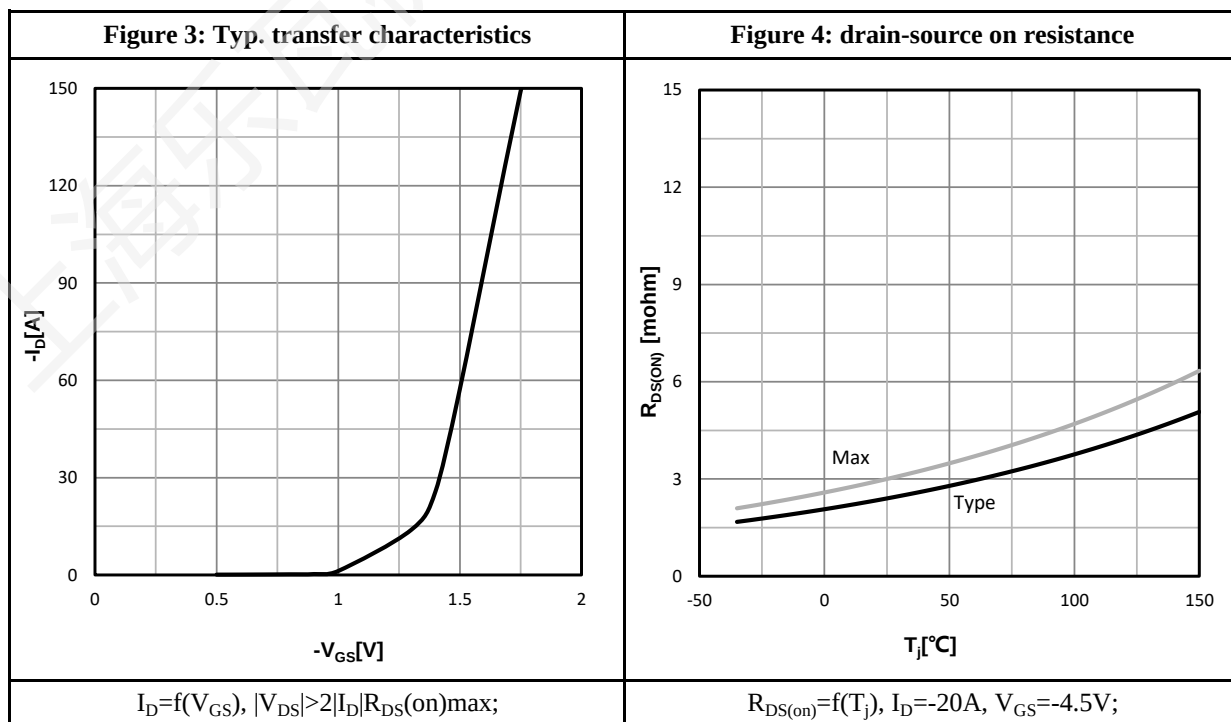
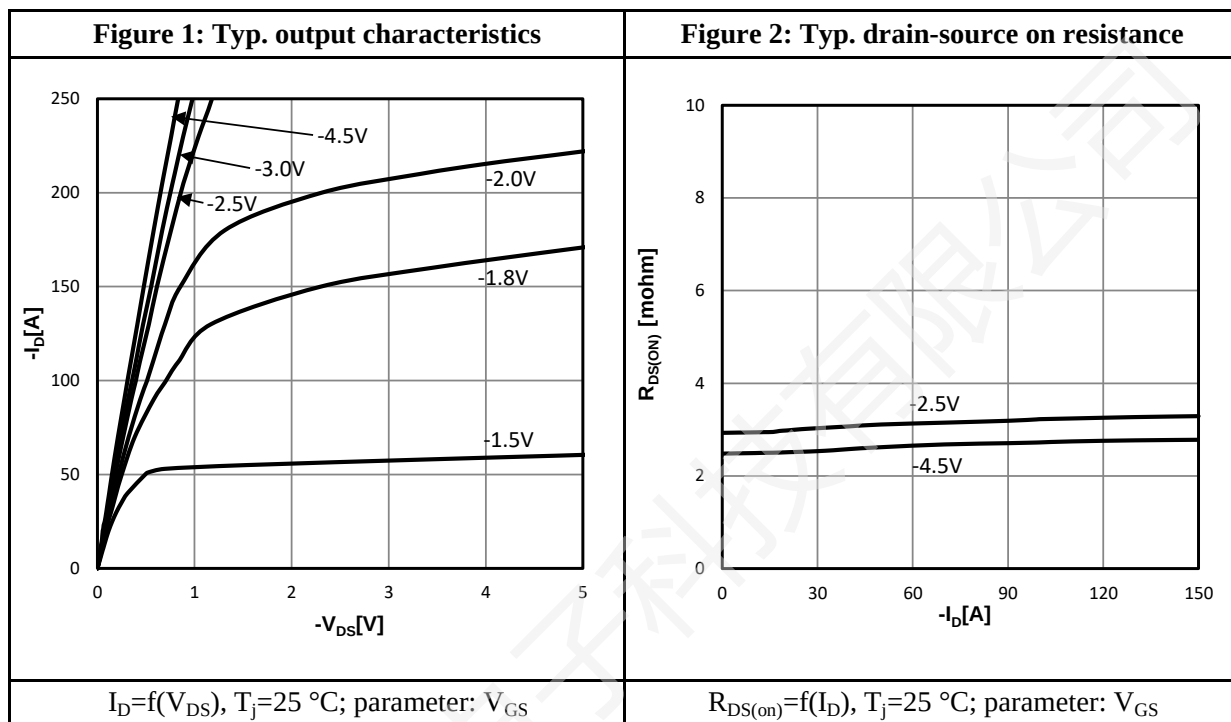
Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	$I_D=-20A$	--	21.6	--	ns
t_r	Rise Time	$V_{DS}=-10V$	--	118	--	
$t_{d(OFF)}$	Turn-Off Delay Time	$V_{GS}=-4.5V$	--	565	--	
t_f	Fall Time	$R_G=3.0\Omega$	--	202	--	
Q_g	Total Gate Charge	$V_{GS}=-4.5V$	--	107	--	nC
Q_{gs}	Gate to Source Charge	$V_{DS}=-10V$	--	9.1	--	
Q_{gd}	Gate to Drain Charge	$I_D=-12A$	--	29	--	

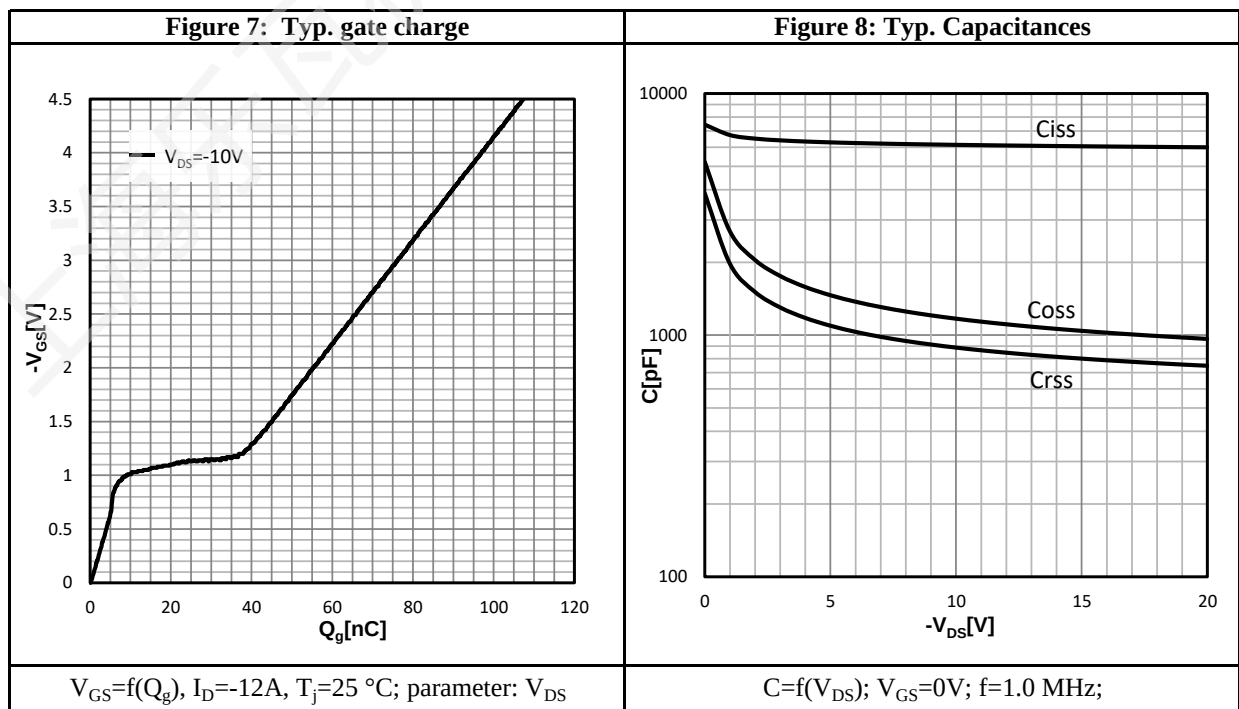
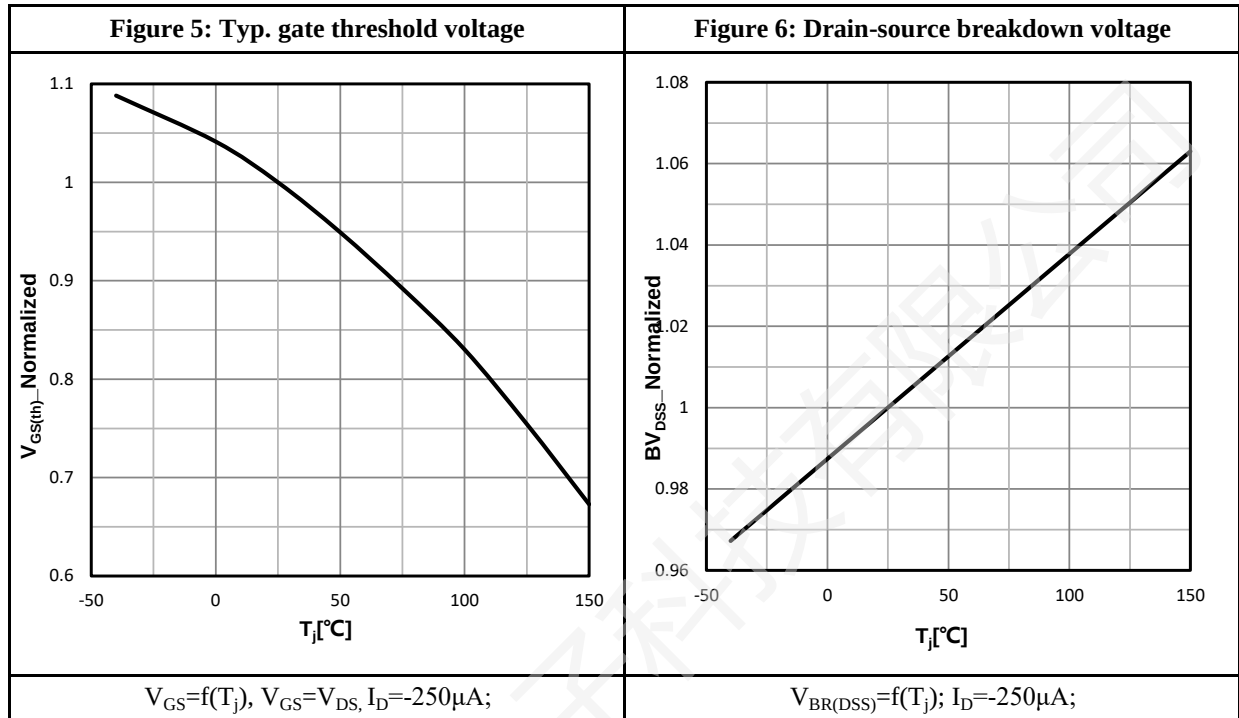
Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
I_S	Diode Forward Current	$T_C=25\text{ }^{\circ}\text{C}$	--	--	-75	A
V_{SD}	Diode Forward Voltage	$I_S=-20A, V_{GS}=0V$	--	--	-1.2	V
t_{rr}	Reverse Recovery Time	$I_S=-20A, V_{DD}=-10V$	--	240	--	ns
Q_{rr}	Reverse Recovery Charge	$dI/dt=-100A/\mu s$	--	554	--	nC

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

a2: $V_{DD}=-20V, L=0.1mH, R_G=25\Omega$, Starting $T_J=25^{\circ}\text{C}$

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.

Characteristics Curve:




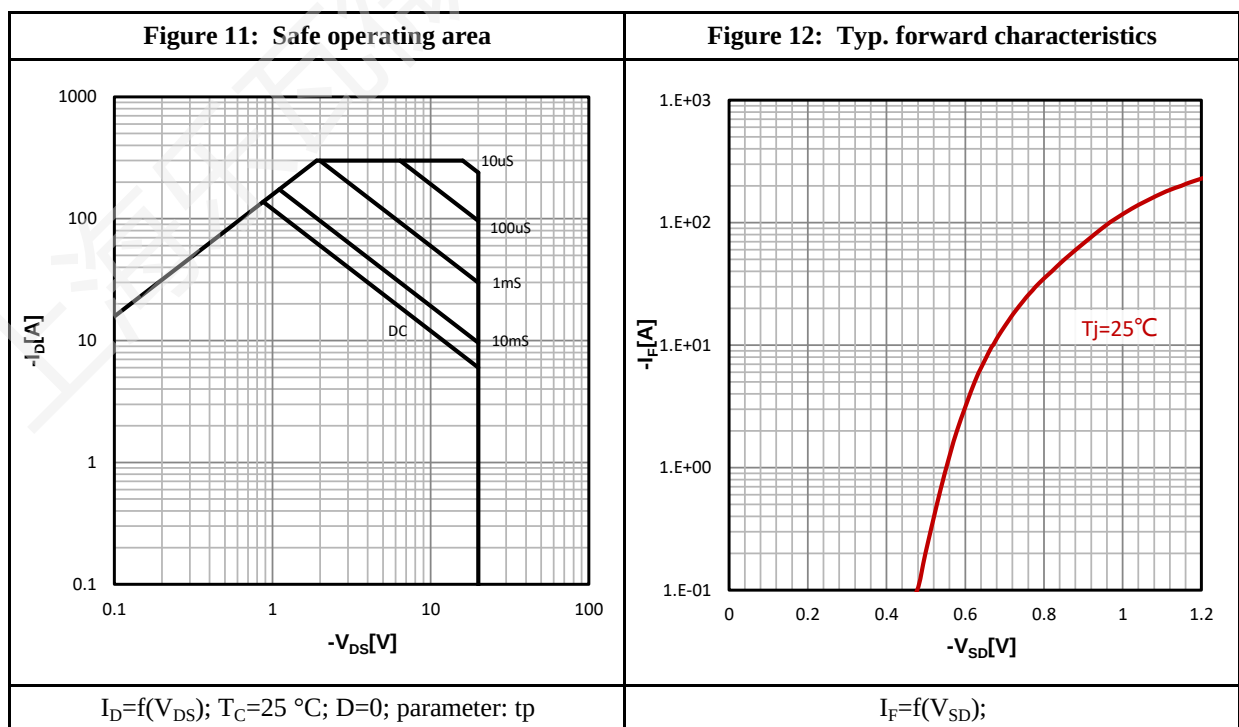
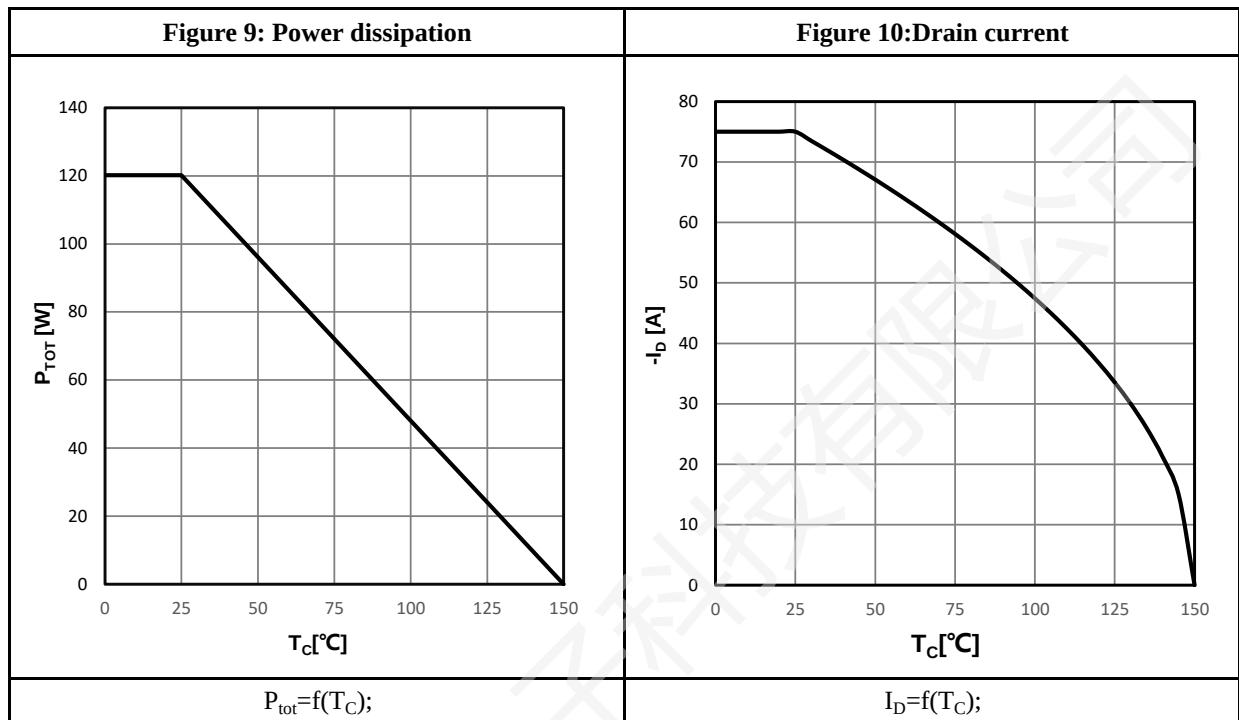
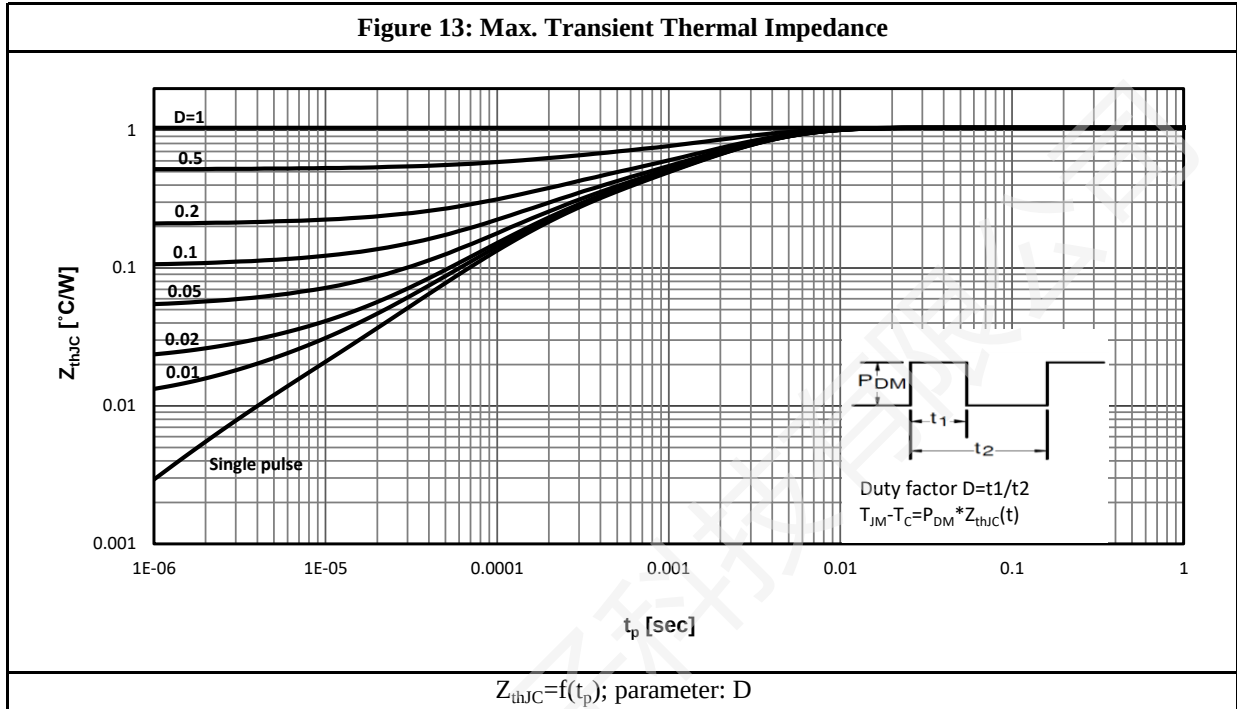
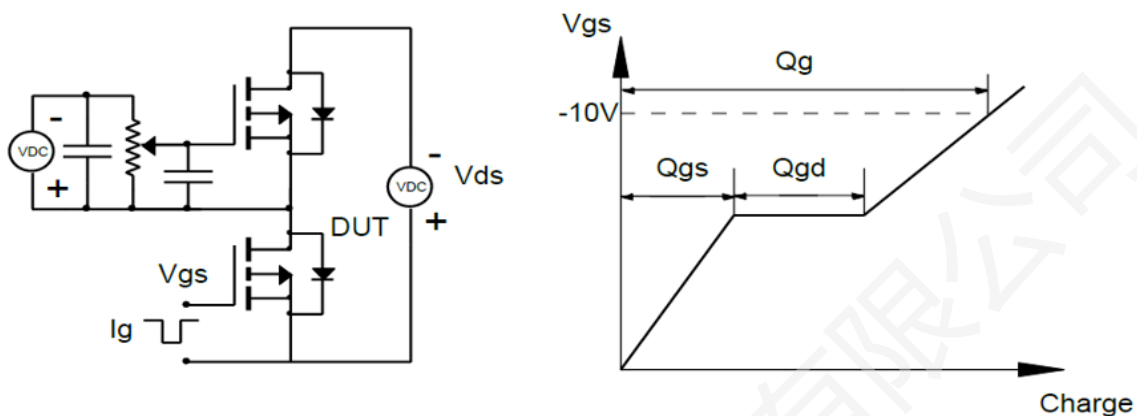
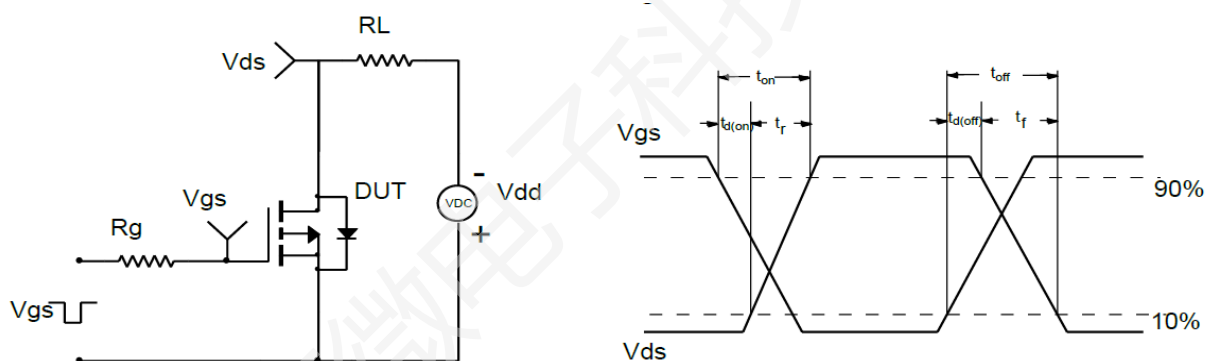
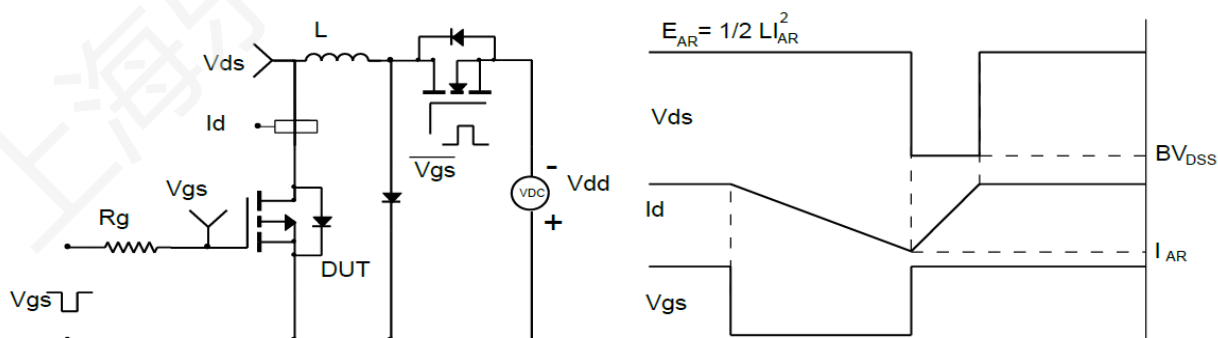
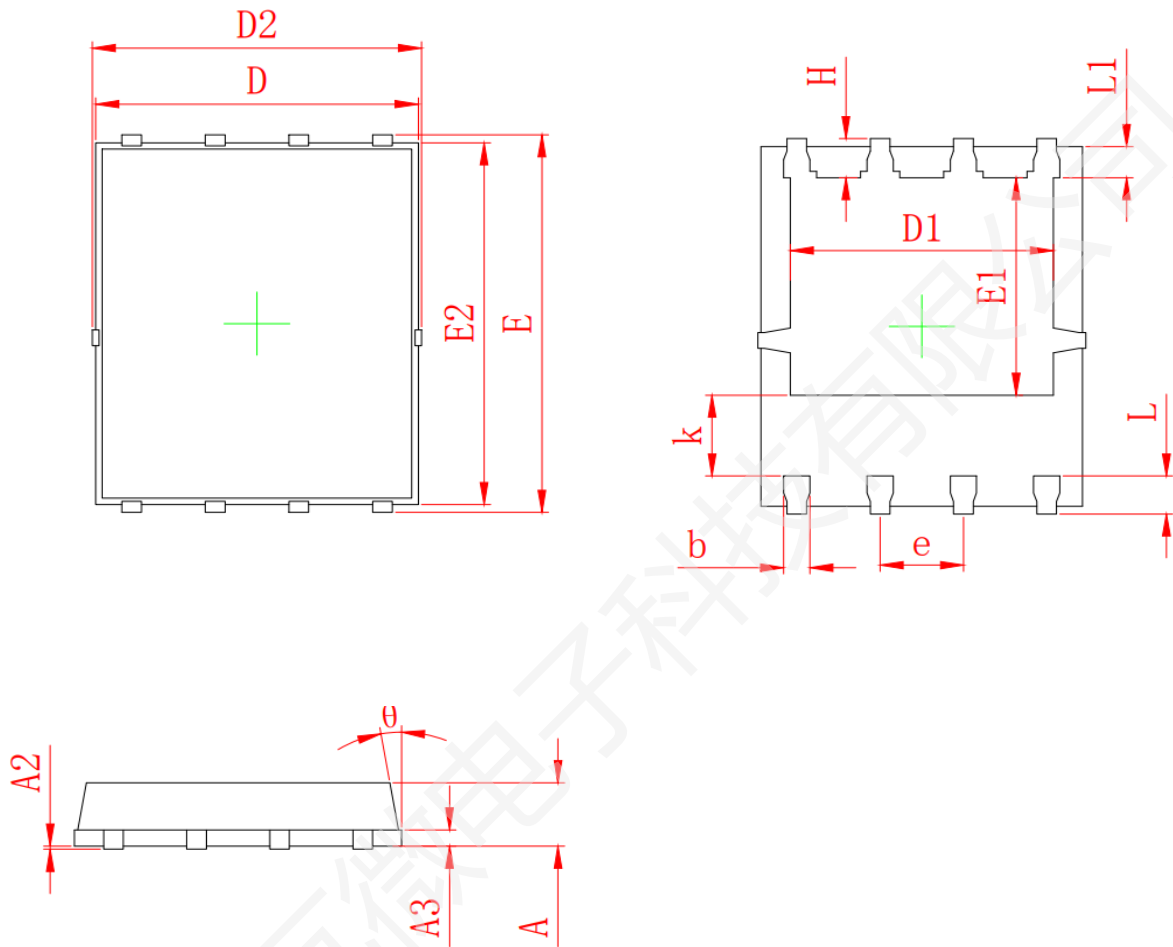


Figure 13: Max. Transient Thermal Impedance


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

Package Outline:


Symbol	MILLIMETER	
	Min	Max
A	0.900	1.200
A1	0.254 REF	
A2	0~0.050	
D	4.824	4.976
D1	3.910	4.110
D2	4.944	5.076
E	5.924	6.076
E1	3.375	3.575
E2	5.674	5.826
b	0.350	0.450
e	1.270 TYP	
L	0.534	0.686
L1	0.424	0.576
k	1.190	1.390
H	0.549	0.701
θ	8°	12°

Revision History:

Revison	Date	Descriptions
Rev 1.1	July.2025	Initial Version

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