

**General Description:**

The LWN1H5160A23 uses advanced trench technology and design to provide excellent  $R_{DS(ON)}$ . It can be used in a wide variety of applications. The package form is SOT-223, 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.
N1H5160A/D.C.	LWN1H5160A23	SOT-223	Reel	2500 Pcs

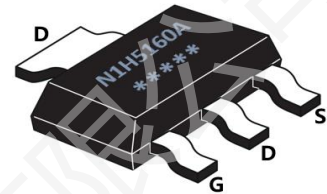
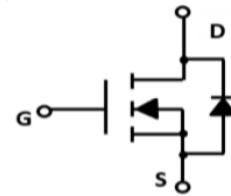
**Absolute Maximum Ratings:**

Symbol	Parameter	Value	Units
$V_{DSS}$	Drain-to-Source Voltage	150	V
$I_D$	Continuous Drain Current	$T_A=25^\circ\text{C}$	4.0
	Continuous Drain Current	$T_A=100^\circ\text{C}$	2.5
$I_{DM}^{a1}$	Pulsed Drain Current	16	A
$E_{AS}^{a2}$	Single pulse avalanche energy	13	mJ
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	V
$P_D$	Power Dissipation	2.7	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
$R_{\theta JA}^{a3}$	Thermal Resistance, Junction-to-Ambient	46.3	$^\circ\text{C}/\text{W}$

$V_{DSS}$	150	V
$I_D$	4.0	A
$P_D$	2.7	W
$R_{DS(ON) \text{ TYPE}}$	110	$\text{m}\Omega$

**Marking and Pin Assignment**

**Inner Equivalent Principium Chart**


**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	$V_{GS}=0V, I_D=250\mu A$	150	--	--	V
$I_{DSS}$	Drain to Source Leakage Current	$V_{DS}=150V, V_{GS}=0V$	--	--	1.0	$\mu A$
$I_{GSS(F)}$	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	$V_{DS}=V_{GS}, I_D=250\mu A$	1.4	1.9	2.4	V
$R_{DS(ON)}$	Drain-to-Source On-Resistance	$V_{GS}=10V, I_D=4.0A$	--	110	160	$m\Omega$

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
$C_{iss}$	Input Capacitance	$V_{GS}=0V$	--	896	--	pF
$C_{oss}$	Output Capacitance	$V_{DS}=75V$	--	35	--	
$C_{rss}$	Reverse Transfer Capacitance	$f=1.0MHz$	--	25	--	
$R_G$	Gate resistance	$V_{GS}=0V, V_{DS}=0V, f=1MHz$	--	0.7	--	$\Omega$

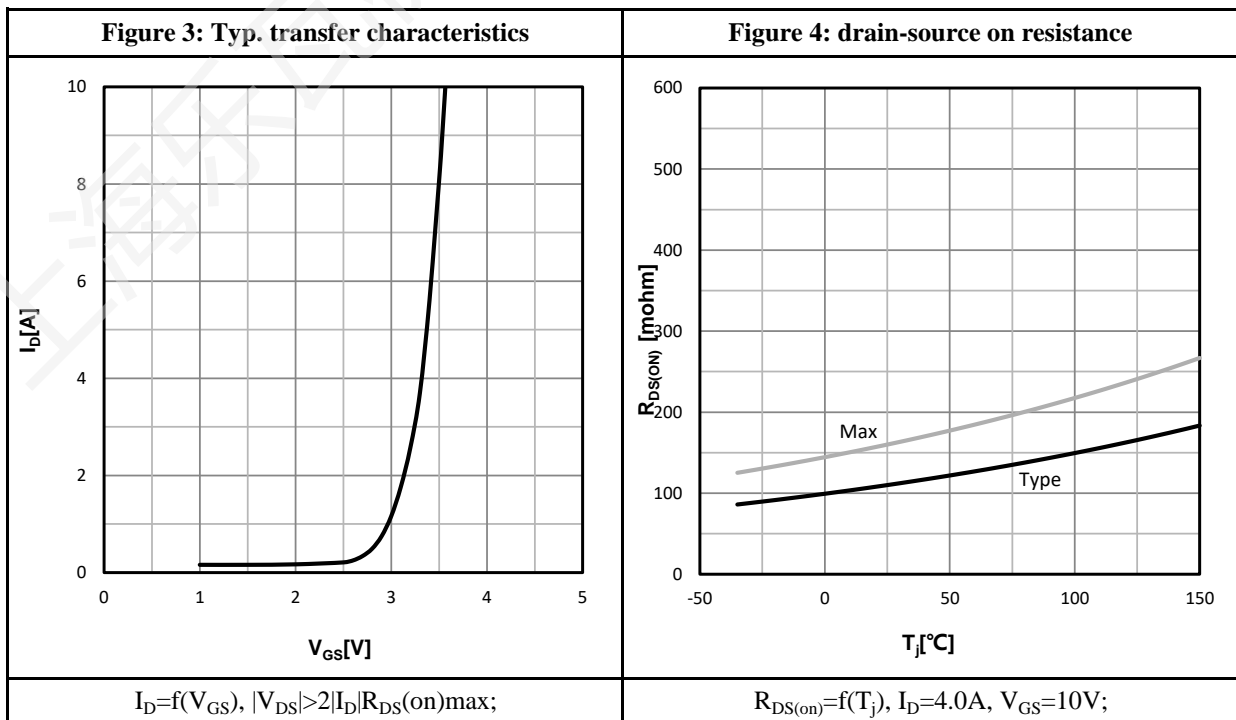
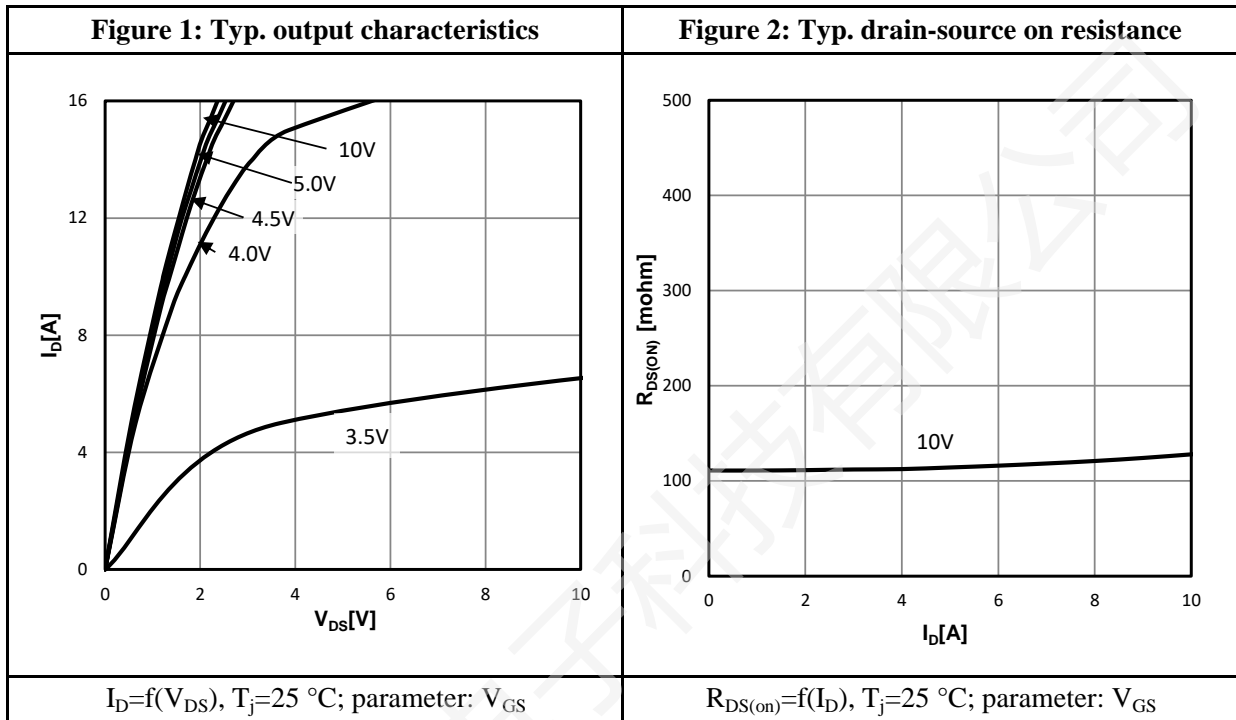
Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	$I_D=4.0A$	--	6.9	--	ns
$t_r$	Rise Time	$V_{DS}=75V$	--	22	--	
$t_{d(OFF)}$	Turn-Off Delay Time	$V_{GS}=10V$	--	31	--	
$t_f$	Fall Time	$R_G=8.2\Omega$	--	10	--	
$Q_g$	Total Gate Charge	$V_{GS}=10V$	--	25	--	nC
$Q_{gs}$	Gate to Source Charge	$V_{DS}=75V$	--	3.2	--	
$Q_{gd}$	Gate to Drain Charge	$I_D=4.0A$	--	7.7	--	

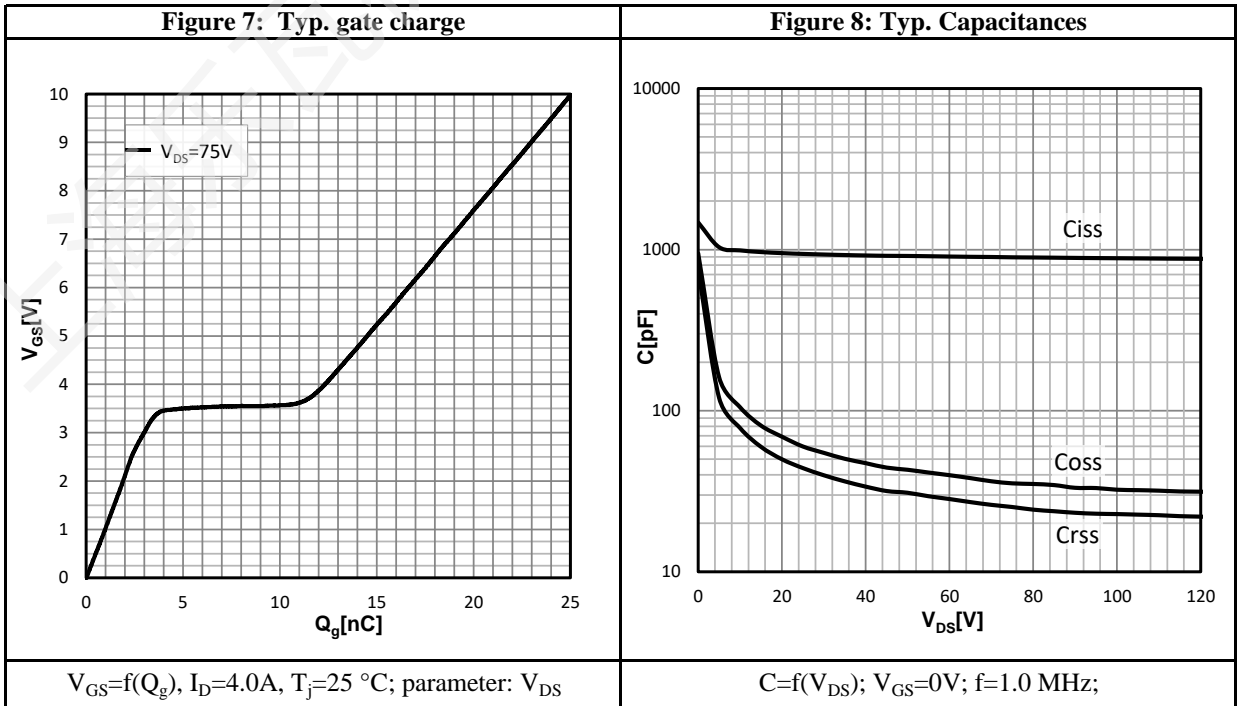
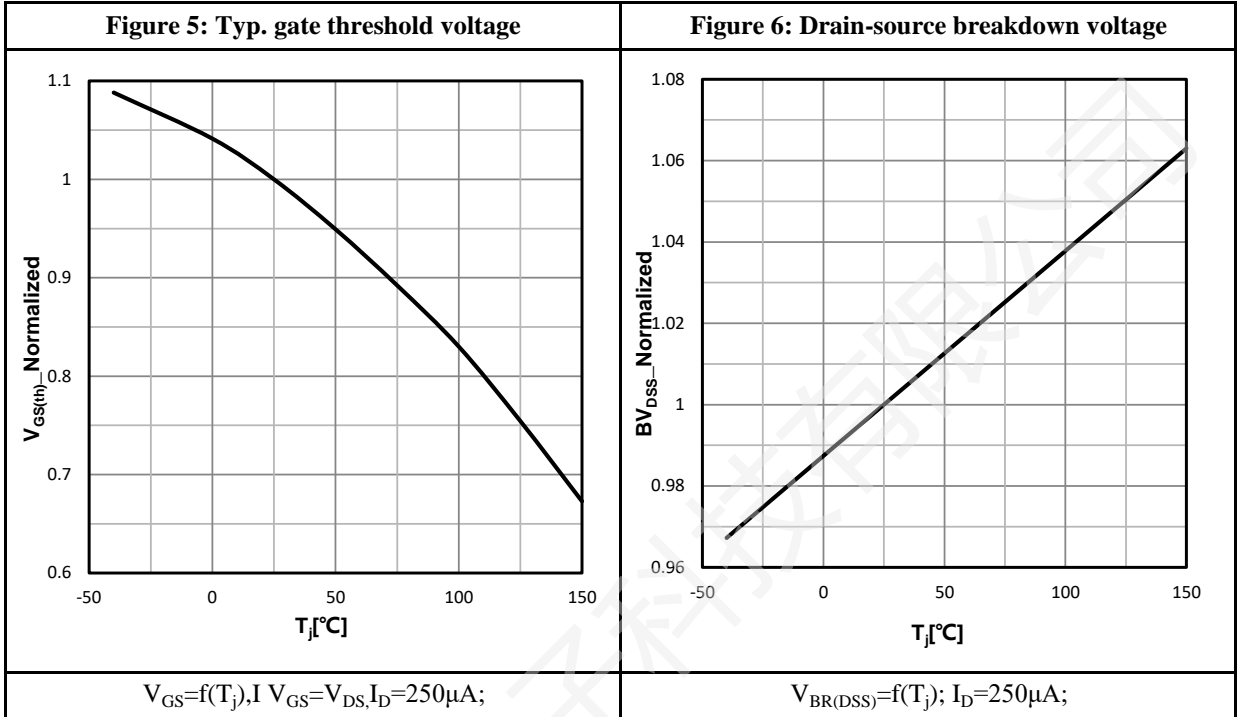
Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
$I_S$	Diode Forward Current	$T_A=25\text{ }^\circ\text{C}$	--	--	4.0	A
$V_{SD}$	Diode Forward Voltage	$I_S=4.0A, V_{GS}=0V$	--	--	1.2	V
$t_{rr}$	Reverse Recovery Time	$I_S=4.0A, V_{DD}=75V$	--	47	--	ns
$Q_{rr}$	Reverse Recovery Charge	$dI/dt=100A/\mu s$	--	57	--	nC

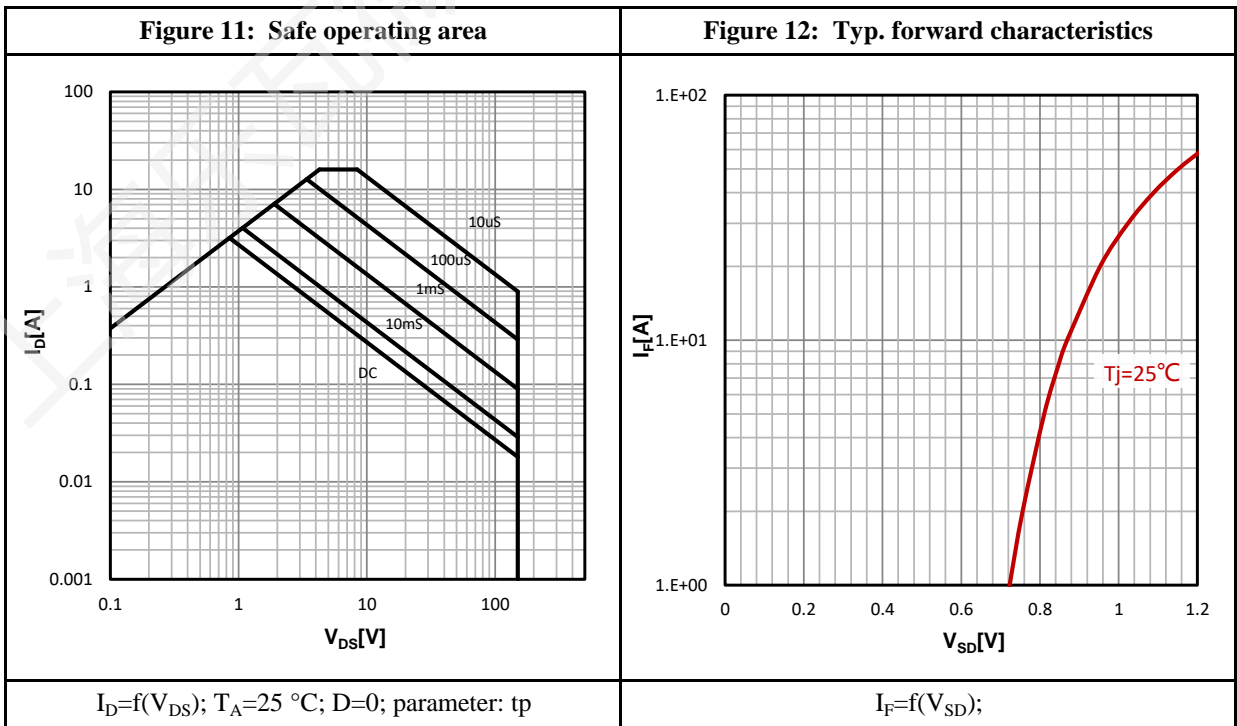
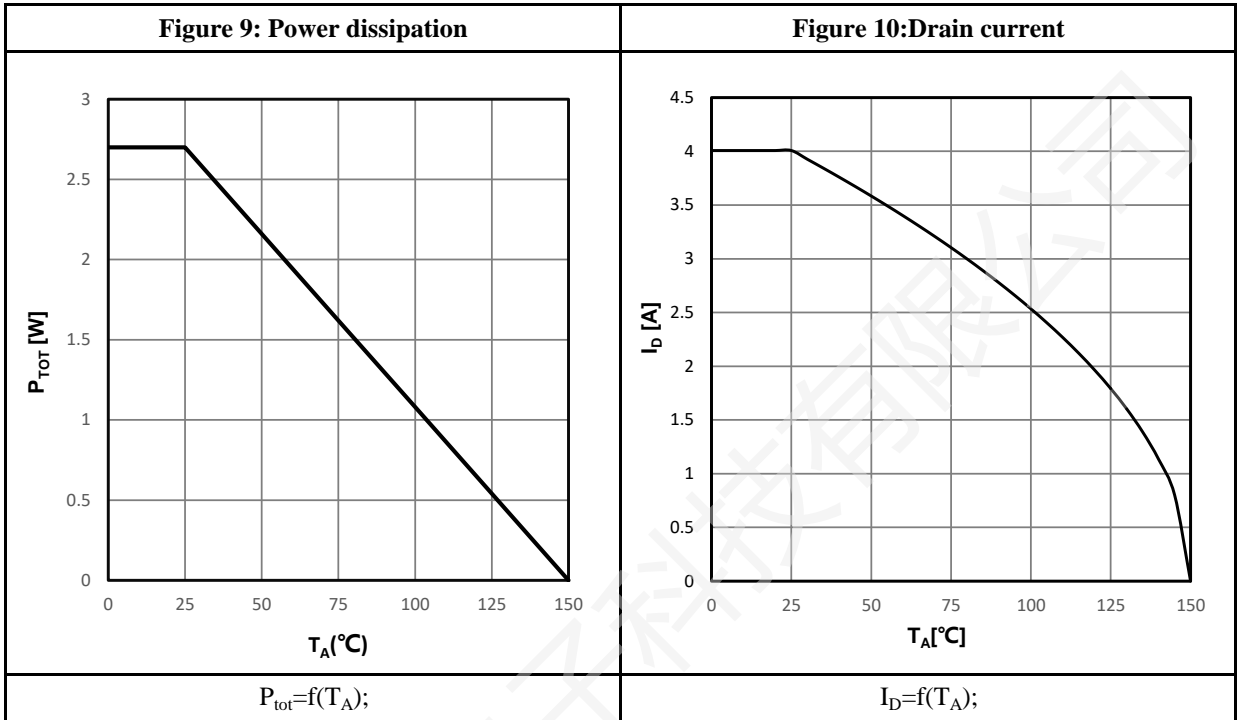
a1: Repetitive rating; pulse width limited by maximum junction temperature

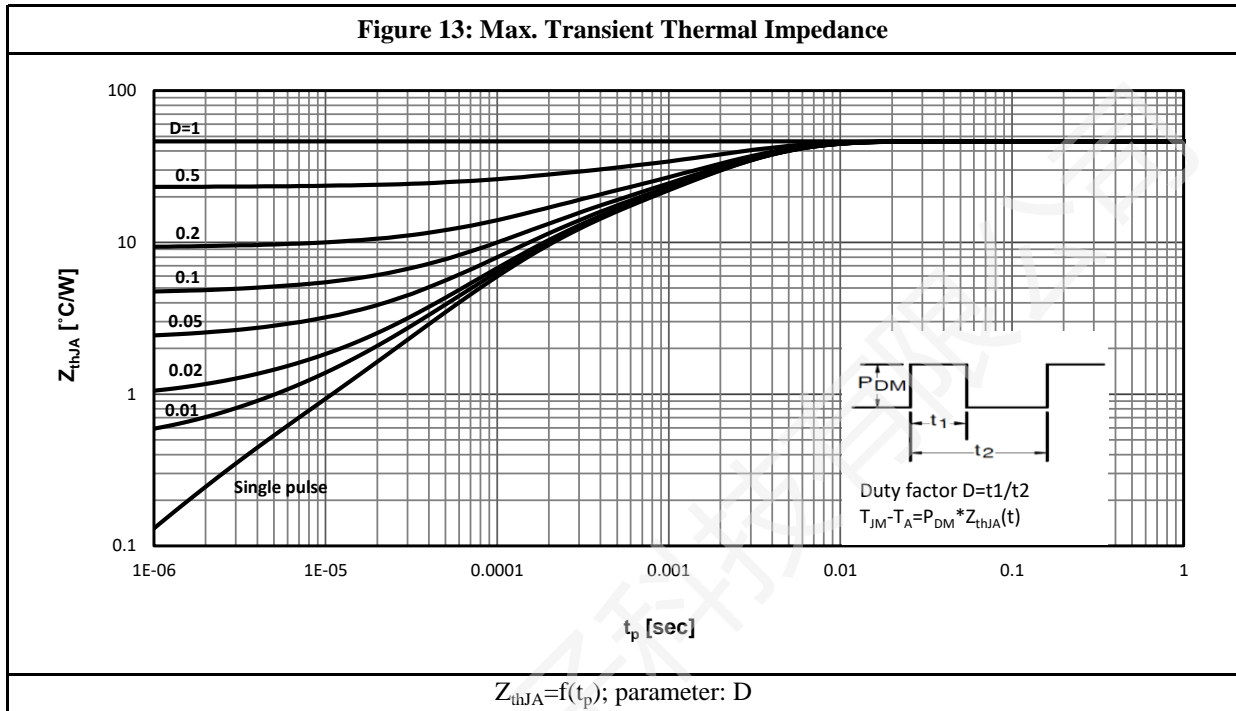
a2:  $V_{DD}=100V, L=0.5mH, R_G=25\Omega$ , Starting  $T_J=25\text{ }^\circ\text{C}$

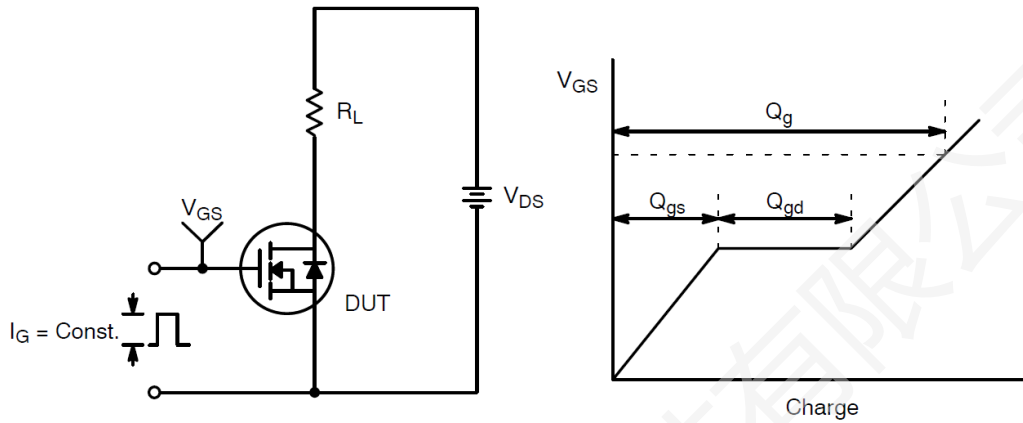
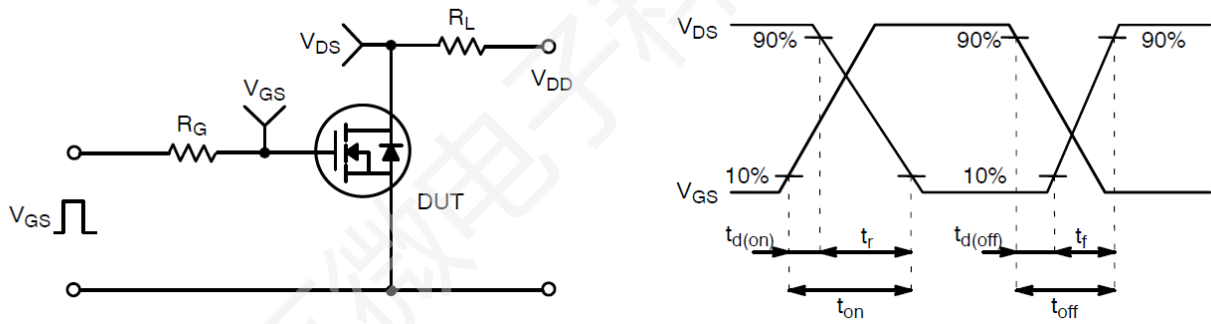
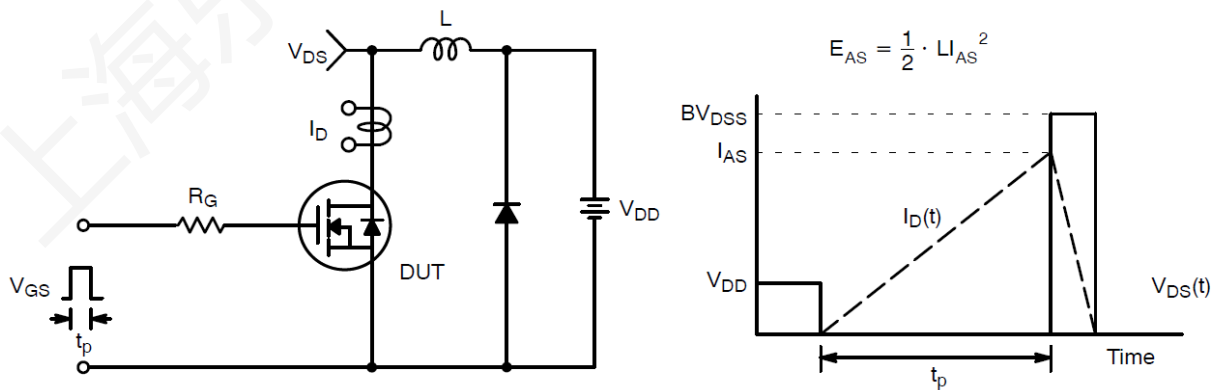
a3: Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm<sup>2</sup> (one layer, 70  $\mu m$  thick) copper area for drain connection.

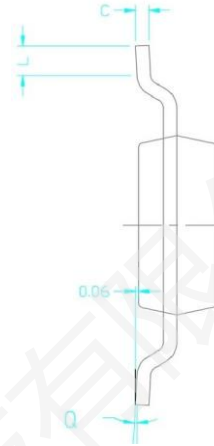
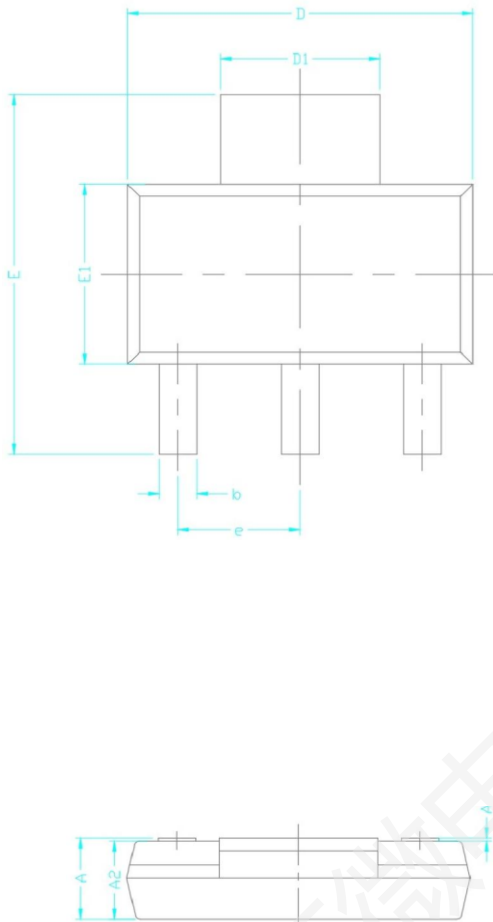
**Characteristics Curve:**








**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:**


COMMON DIMENSION (MM)			
PKG	TO-223		
Symbol	MIN	NOM	MAX
A	1.520	1.580	1.720
A1	0.010	0.060	0.150
A2	1.470	1.520	1.570
b	0.660	0.710	0.800
C	0.250	0.280	0.350
D	6.500	6.600	6.750
D1	2.900	3.000	3.100
E	6.700	7.000	7.300
E1	3.300	3.500	3.700
L	0.750 REF		
e	2.300 REF		
Q	0°	4°	10°

**Revision History:**

<b>Revison</b>	<b>Date</b>	<b>Descriptions</b>
Rev 1.1	July.2025	Initial Version

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