

## General Description:

The LWS6T10AM uses 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 SOT23, which accords with the ROHS standard and Halogen Free standard.

## Features:

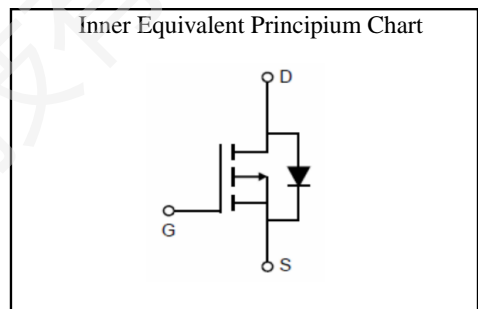
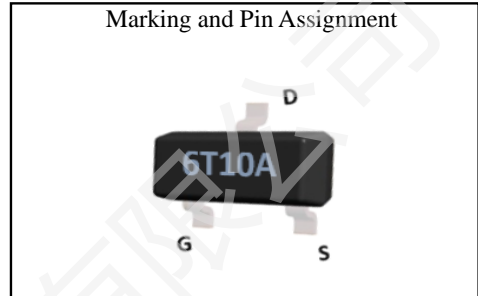
- Fast Switching
- Low Gate Charge and  $R_{DS(ON)}$
- Low Reverse transfer capacitances

## Applications:

- DC-DC Converter
- Portable Equipment
- Power Management



$V_{DSS}$	-60	V
$I_D$	-0.30	A
$P_D$	0.35	W
$R_{DS(ON)}$ TYPE	1.5	$\Omega$



## Package Marking and Ordering Information:

Marking	Part Number	Package	Packing	Qty.
6T10A	LWS6T10AM	SOT23	Reel	3000 Pcs

## Absolute Maximum Ratings:

Symbol	Parameter	Value	Units
$V_{DSS}$	Drain-to-Source Voltage	-60	V
$I_D$	Continuous Drain Current	$T_A=25^\circ\text{C}$	-0.30
	Continuous Drain Current	$T_A=100^\circ\text{C}$	-0.19
$I_{DM}^{a1}$	Pulsed Drain Current	-1.20	A
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	V
$P_D$	Power Dissipation	0.35	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
$R_{\theta JA}^{a2}$	Thermal Resistance, Junction-to-Ambient	357	$^\circ\text{C}/\text{W}$

**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	$V_{GS}=0V, I_D=-250\mu A$	-60	--	--	V
$I_{DSS}$	Drain to Source Leakage Current	$V_{DS}=-60V, V_{GS}=0V$	--	--	-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	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.1	-1.6	-2.1	V
$R_{DS(ON)1}$	Drain-to-Source On-Resistance	$V_{GS}=-10V, I_D=-0.2A$	--	1.5	2.5	$\Omega$
$R_{DS(ON)2}$	Drain-to-Source On-Resistance	$V_{GS}=-4.5V, I_D=-0.1A$	--	2.0	4.0	$\Omega$

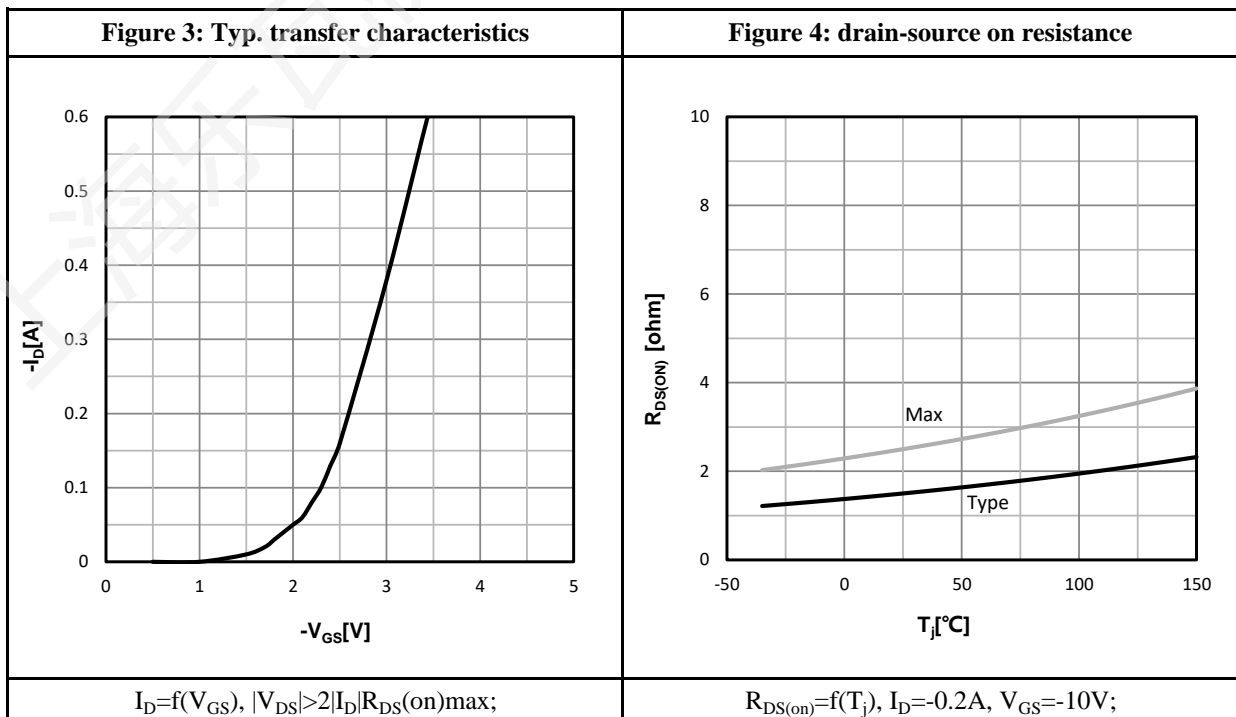
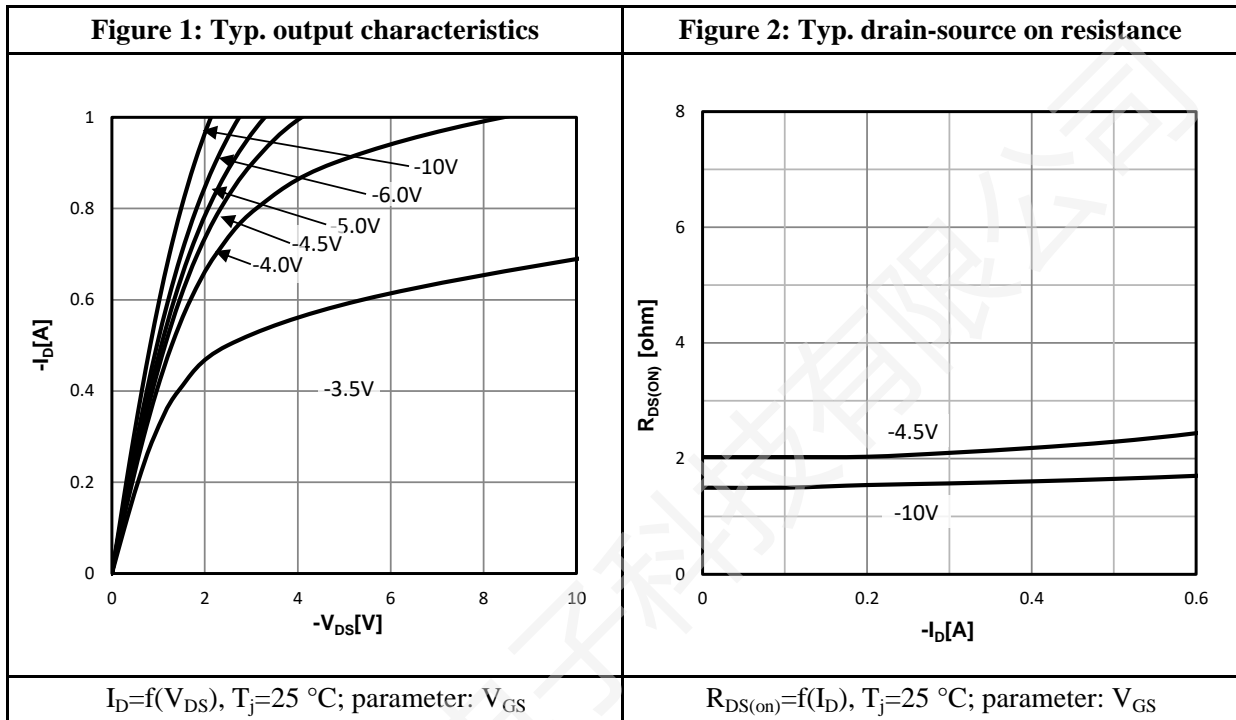
Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
$C_{iss}$	Input Capacitance	$V_{GS}=0V$	--	13.8	--	pF
$C_{oss}$	Output Capacitance	$V_{DS}=-30V$	--	3.7	--	
$C_{rss}$	Reverse Transfer Capacitance	$f=1.0MHz$	--	1.4	--	

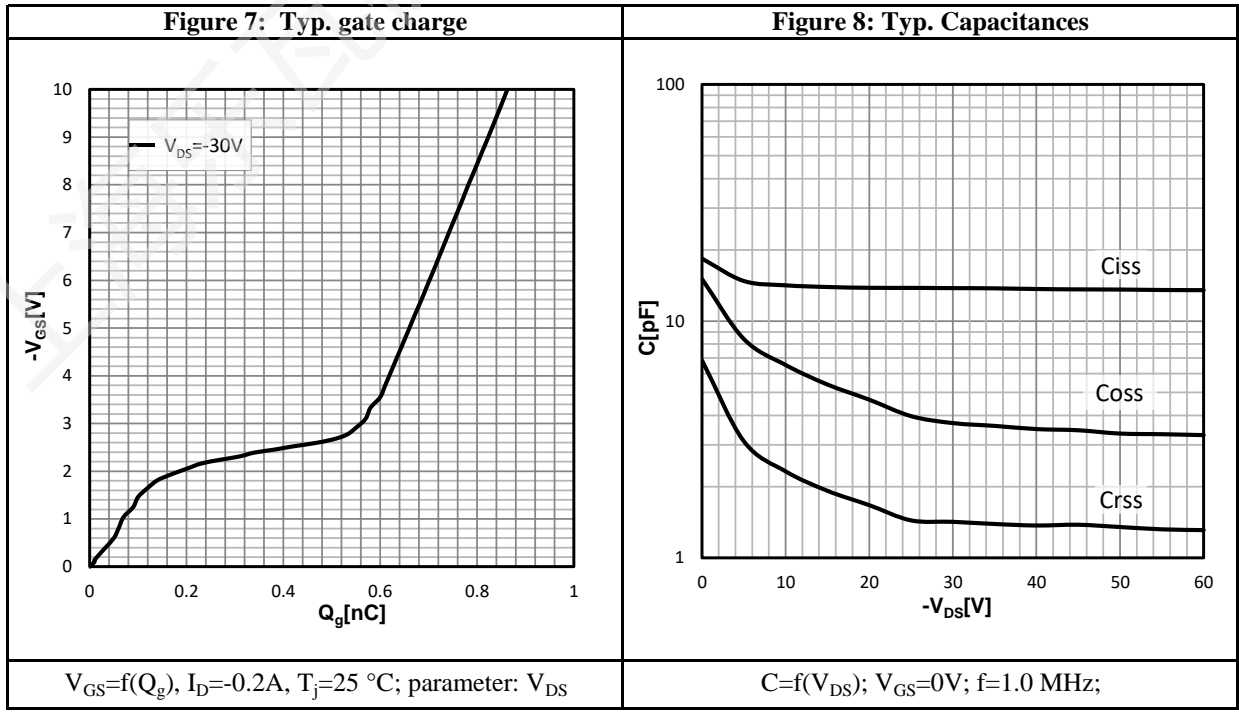
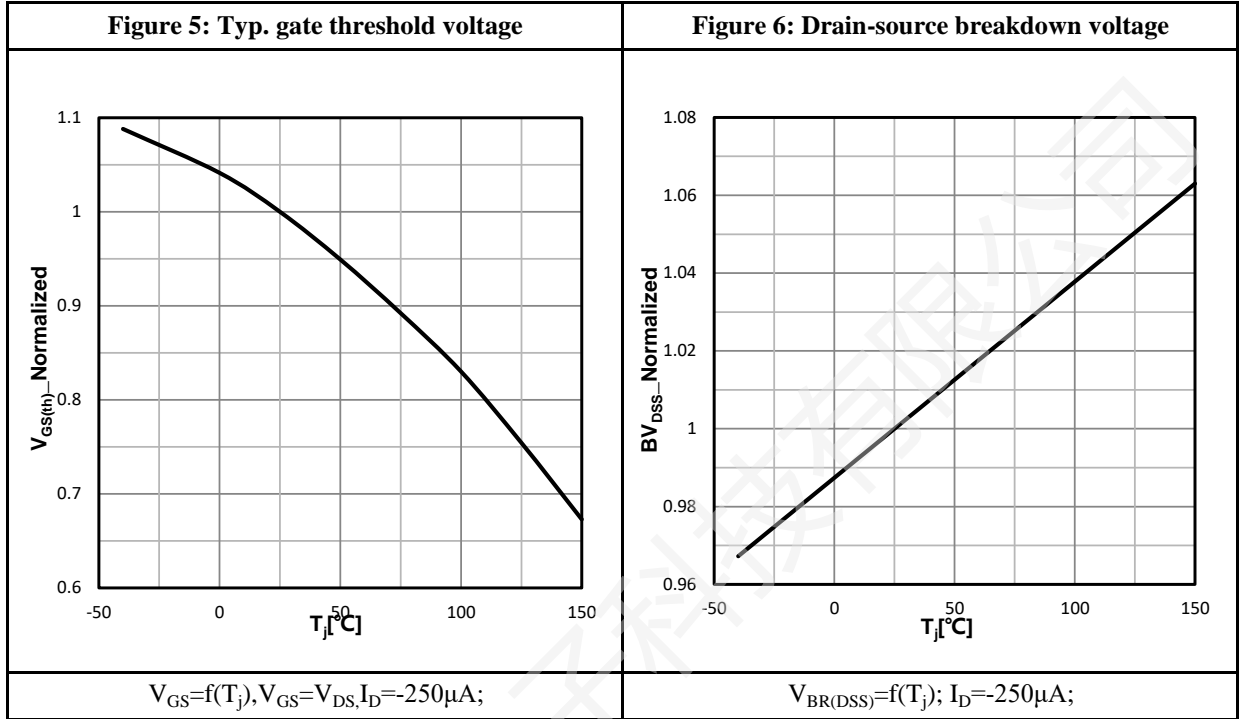
Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	$I_D=-0.2A$	--	6.0	--	ns
$t_r$	Rise Time	$V_{DS}=-30V$	--	5.0	--	
$t_{d(OFF)}$	Turn-Off Delay Time	$V_{GS}=-10V$	--	26	--	
$t_f$	Fall Time	$R_G=3.9\Omega$	--	14	--	
$Q_g$	Total Gate Charge	$V_{GS}=-10V$	--	0.87	--	nC
$Q_{gs}$	Gate to Source Charge	$V_{DS}=-30V$	--	0.20	--	
$Q_{gd}$	Gate to Drain Charge	$I_D=-0.2A$	--	0.35	--	

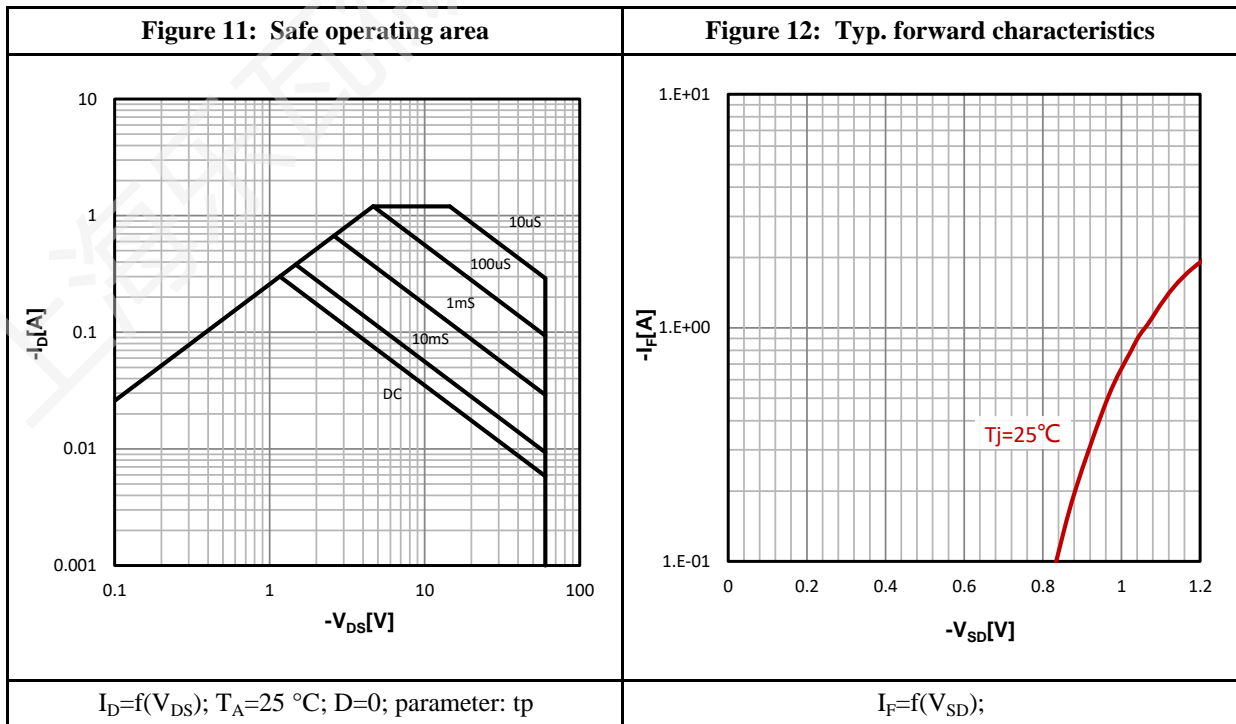
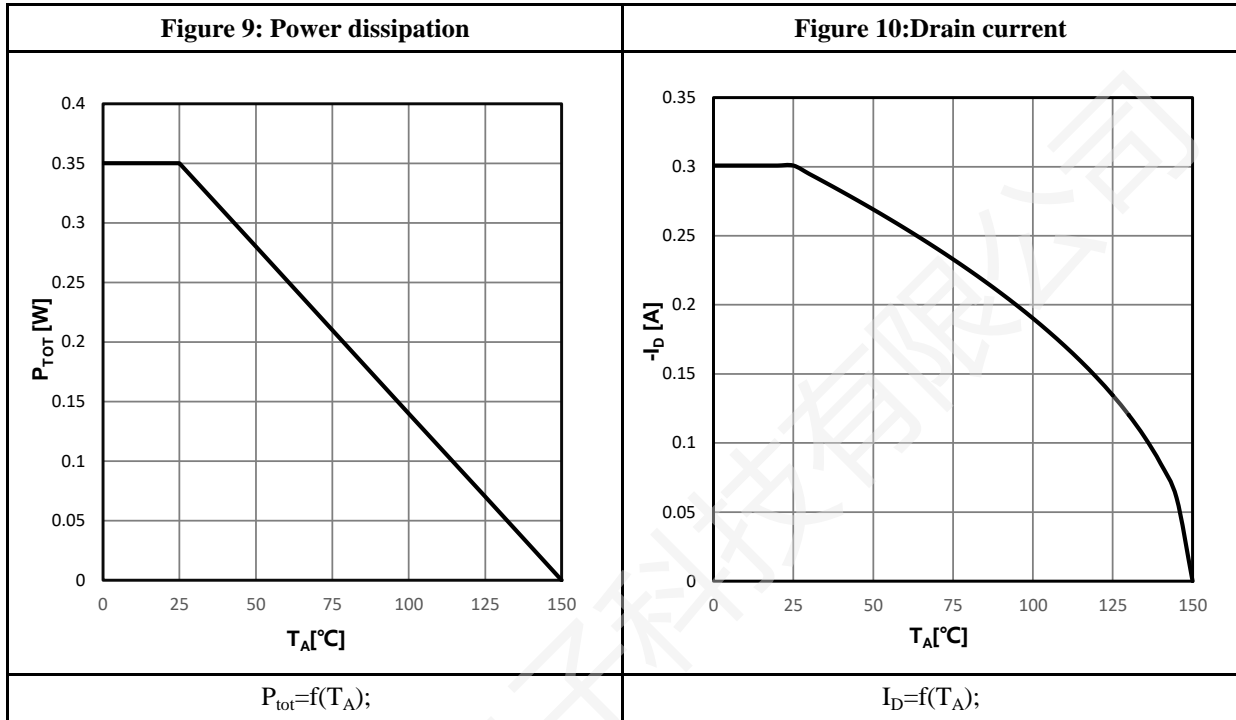
Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
$I_S$	Diode Forward Current	$T_A=25\text{ }^\circ\text{C}$	--	--	-0.30	A
$V_{SD}$	Diode Forward Voltage	$I_S=-0.2A, V_{GS}=0V$	--	--	-1.2	V

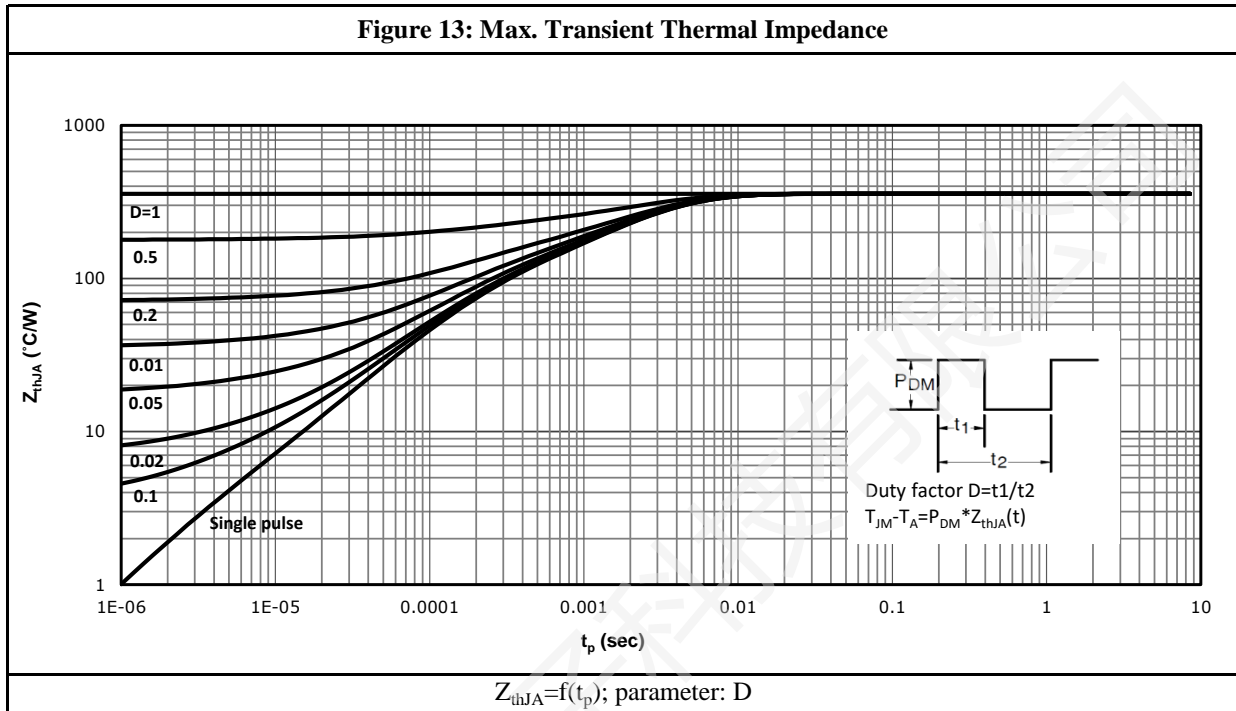
a1: Repetitive rating; pulse width limited by maximum junction temperature

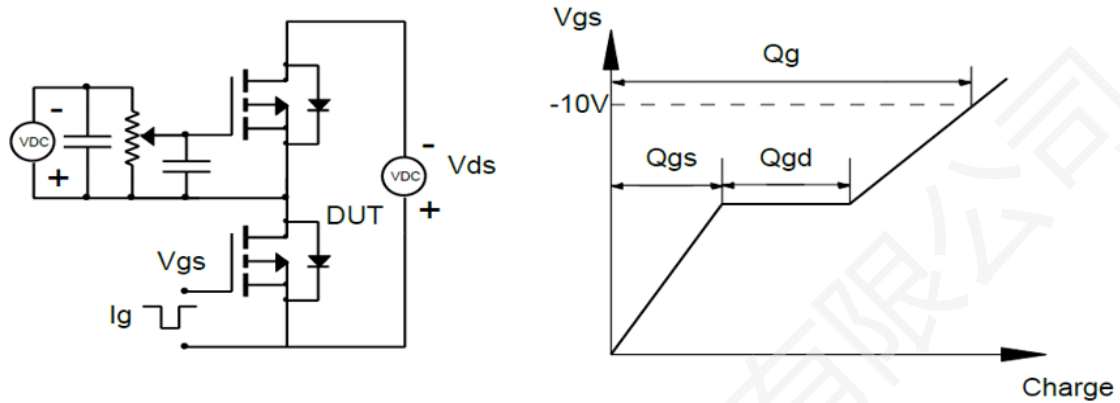
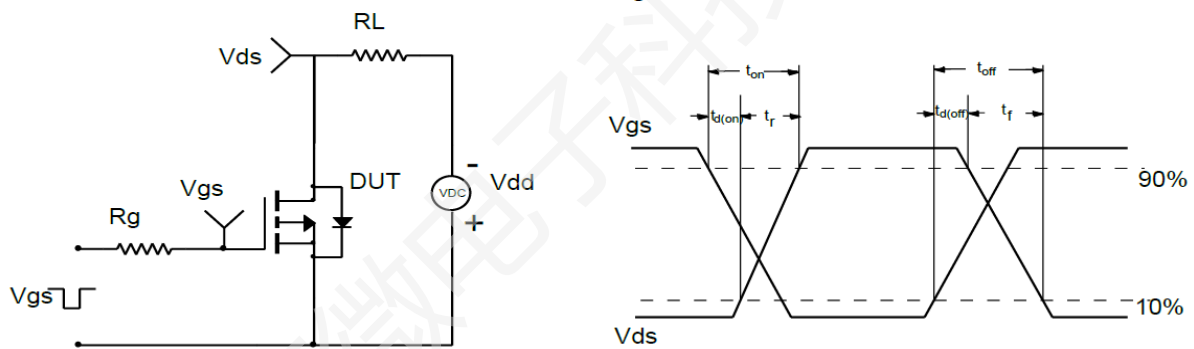
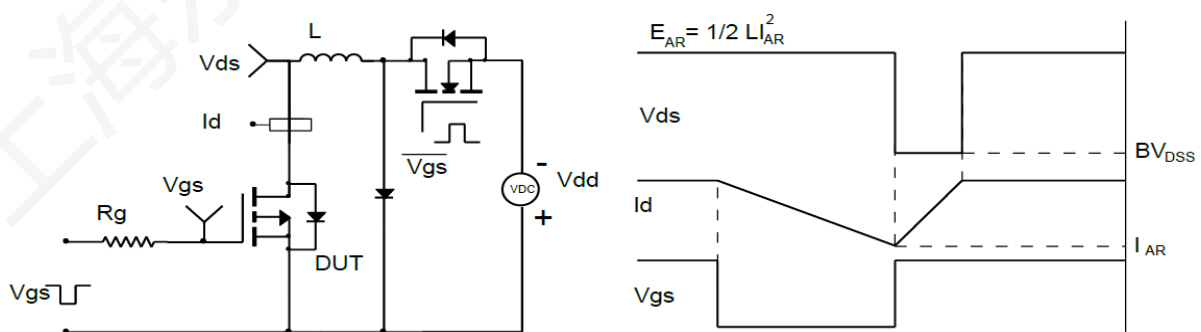
a2: Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm<sup>2</sup> (one layer, 70  $\mu\text{m}$  thick) copper area for drain connection.

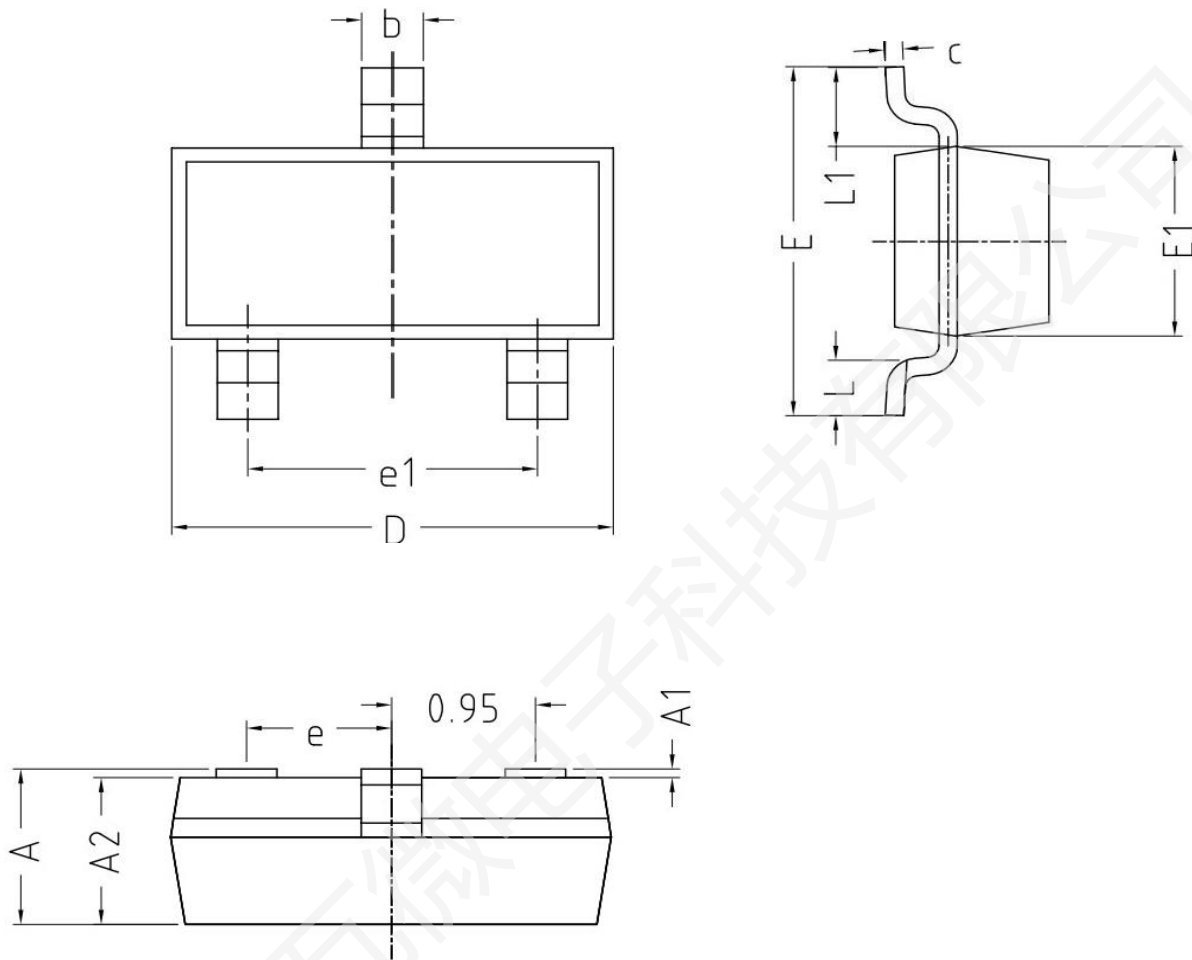
**Characteristics Curve:**








**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 IN DIMENSION (MM)**

Symbol	Min.	Nom.	Max.
<b>A</b>	0.900	1.050	1.150
<b>A1</b>	0.000	0.050	0.100
<b>A2</b>	0.900	1.000	1.050
<b>b</b>	0.300	0.400	0.500
<b>C</b>	0.100	0.130	0.200
<b>D</b>	2.800	2.900	3.000
<b>E</b>	2.250	2.400	2.550
<b>E1</b>	1.200	1.300	1.400
<b>e</b>	0.950 TYP		
<b>e1</b>	1.800	1.900	2.000
<b>L</b>	0.290	0.390	0.490
<b>L1</b>	0.550REF		

**Revision History:**

<b>Revison</b>	<b>Date</b>	<b>Descriptions</b>
Rev 1.0	Mar.2025	Initial Version

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