

General Description:

The LW3139BW 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 SOT-323, which accords with the ROHS standard and Halogen Free standard.

Features:

- Fast Switching
- Low Gate Charge and $R_{DS(ON)}$
- Low Reverse transfer capacitances
- ESD Rating: HBM $\geq 2000V$

Applications:

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

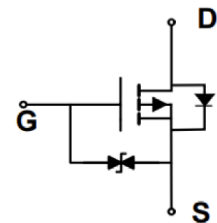


V_{DSS}	-20	V
I_D	-0.66	A
P_D	0.20	W
$R_{DS(ON)}$ TYPE	335	m Ω

Marking and Pin Assignment



Inner Equivalent Principium Chart



Package Marking and Ordering Information:

Marking	Part Number	Package	Packing	Qty.
3139B	LW3139BW	SOT-323	Reel	3000 Pcs

Absolute Maximum Ratings:

Symbol	Parameter		Value	Units
V_{DSS}	Drain-to-Source Voltage		-20	V
I_D	Continuous Drain Current	$T_A=25^\circ\text{C}$	-0.66	A
	Continuous Drain Current	$T_A=100^\circ\text{C}$	-0.42	A
I_{DM}^{a1}	Pulsed Drain Current		-2.64	A
V_{GS}	Gate-to-Source Voltage		± 10	V
P_D	Power Dissipation		0.20	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	625	$^\circ\text{C/W}$

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	$V_{GS}=0V, I_D=-250\mu A$	-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	$V_{GS}=-10V, V_{DS}=0V$	--	--	-5.0	μA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	$V_{GS}=+10V, V_{DS}=0V$	--	--	5.0	μA
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.4	-0.75	-1.0	V
$R_{DS(ON)1}$	Drain-to-Source On-Resistance	$V_{GS}=-4.5V, I_D=-0.66A$	--	335	450	$m\Omega$
$R_{DS(ON)2}$	Drain-to-Source On-Resistance	$V_{GS}=-2.5V, I_D=-0.6A$	--	480	650	$m\Omega$
$R_{DS(ON)3}$	Drain-to-Source On-Resistance	$V_{GS}=-1.8V, I_D=-0.5A$	--	730	1100	$m\Omega$

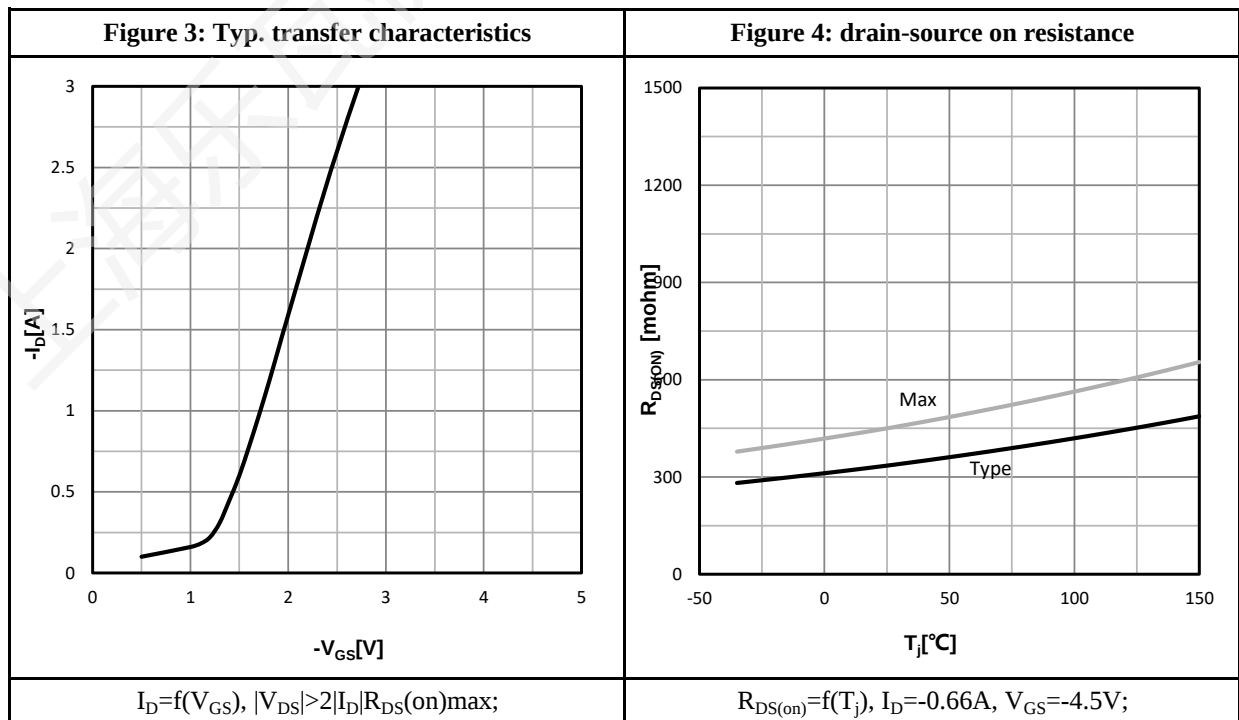
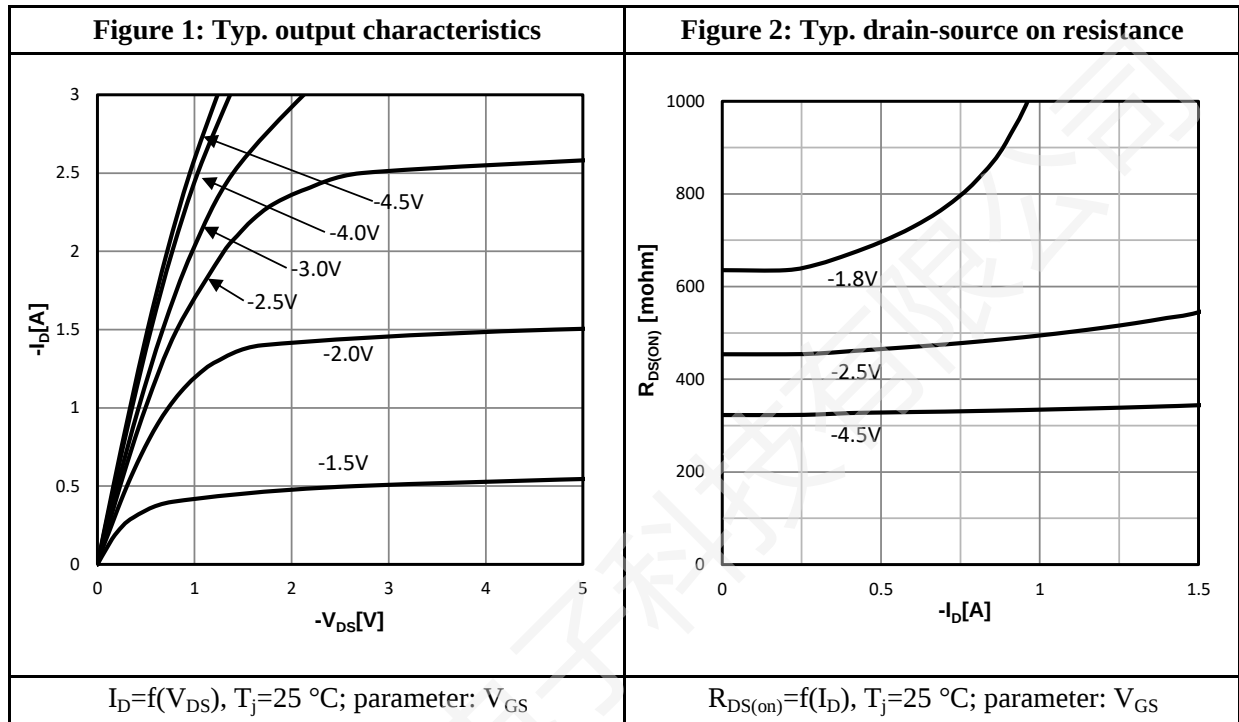
Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
C_{iss}	Input Capacitance	$V_{GS}=0V$	--	90	--	pF
C_{oss}	Output Capacitance	$V_{DS}=-10V$	--	13	--	
C_{rss}	Reverse Transfer Capacitance	$f=1.0MHz$	--	10	--	
R_G	Gate resistance	$V_{GS}=0V, V_{DS}=0V, f=1MHz$	--	9.0	--	Ω

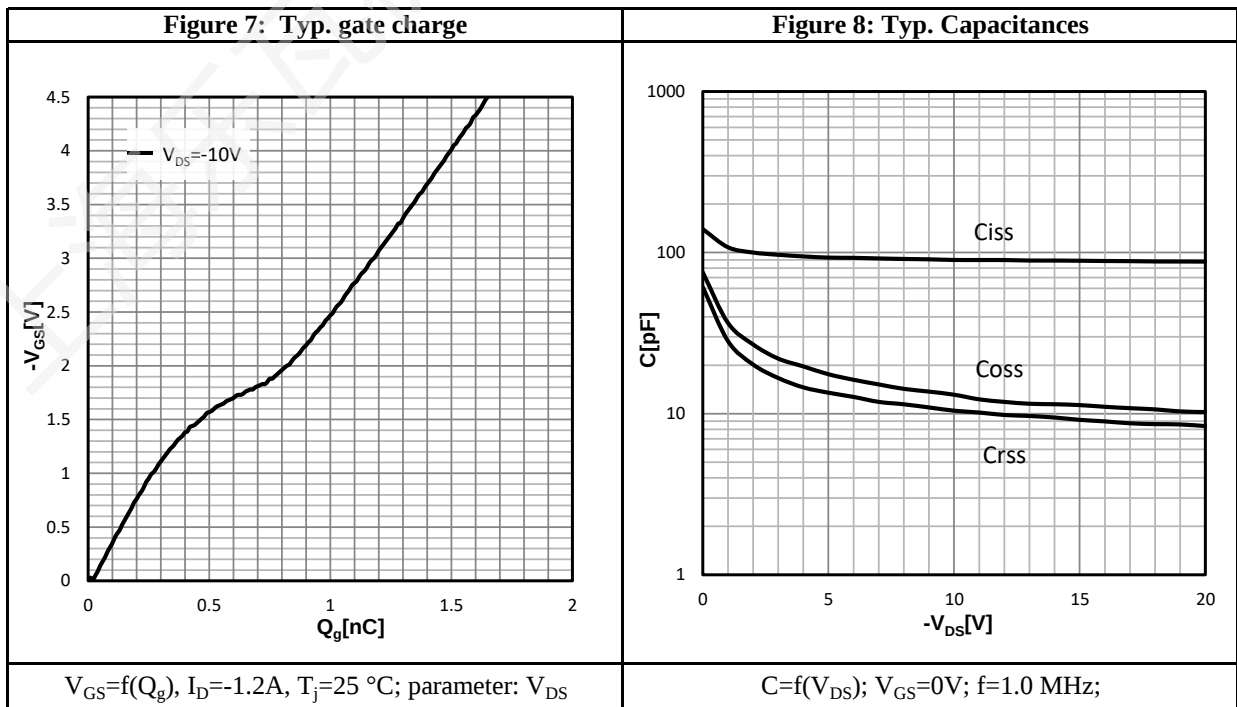
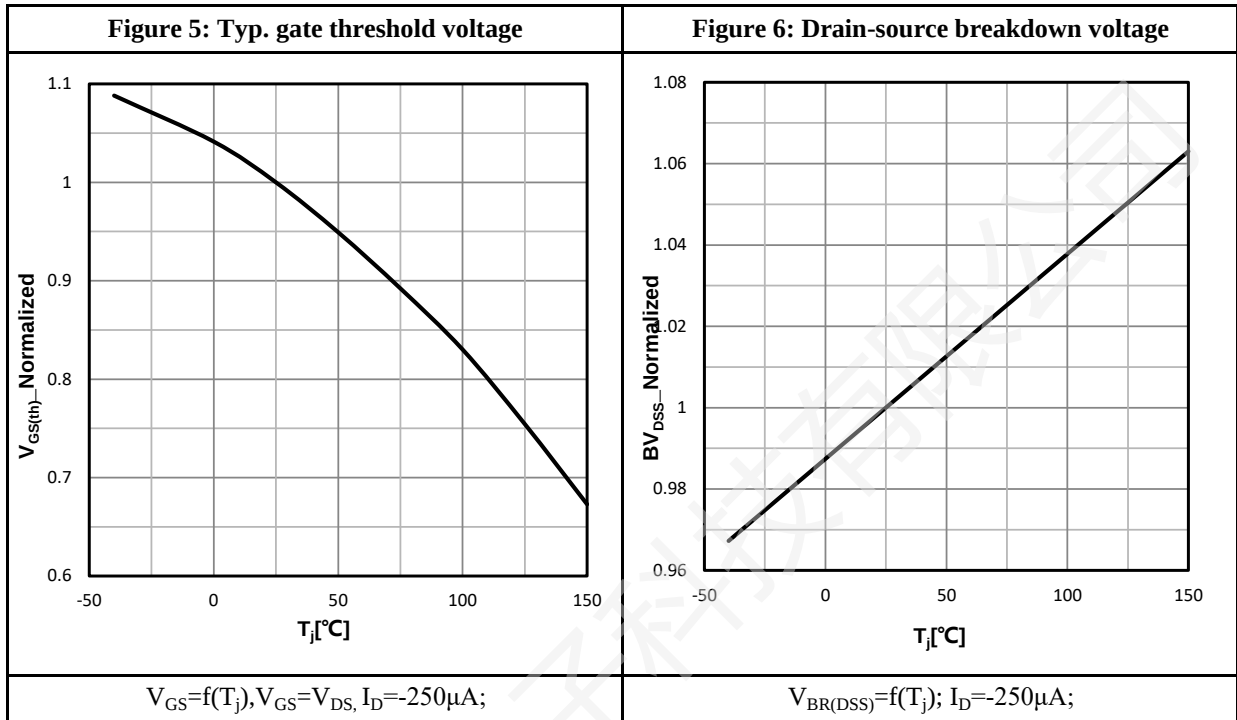
Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	$I_D=-0.66A$	--	8.0	--	ns
t_r	Rise Time	$V_{DS}=-10V$	--	5.0	--	
$t_{d(OFF)}$	Turn-Off Delay Time	$V_{GS}=-4.5V$	--	30	--	
t_f	Fall Time	$R_G=10\Omega$	--	21	--	
Q_g	Total Gate Charge	$V_{GS}=-4.5V$	--	1.65	--	nC
Q_{gs}	Gate to Source Charge	$V_{DS}=-10V$	--	0.49	--	
Q_{gd}	Gate to Drain Charge	$I_D=-1.2A$	--	0.27	--	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
I_S	Diode Forward Current	$T_A=25\text{ }^{\circ}\text{C}$	--	--	-0.66	A
V_{SD}	Diode Forward Voltage	$I_S=-0.66A, V_{GS}=0V$	--	--	-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 cm² (one layer, 70 μm thick) copper area for drain connection.

Characteristics Curve:




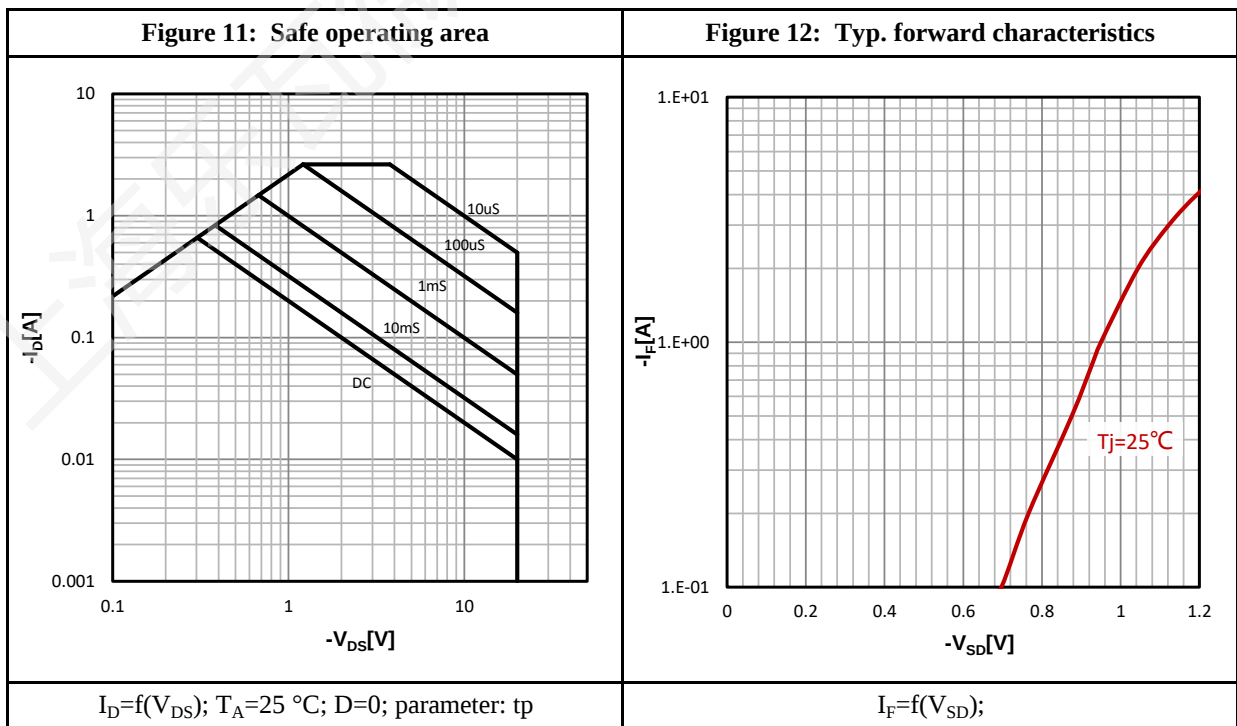
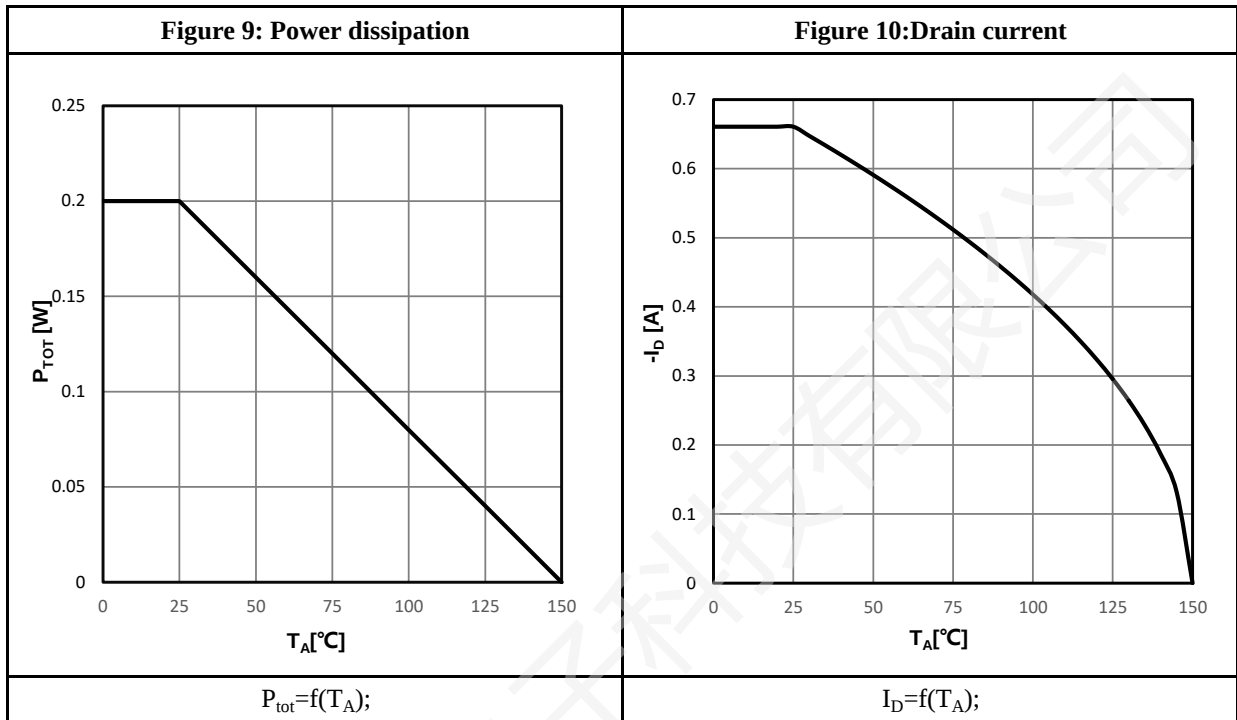
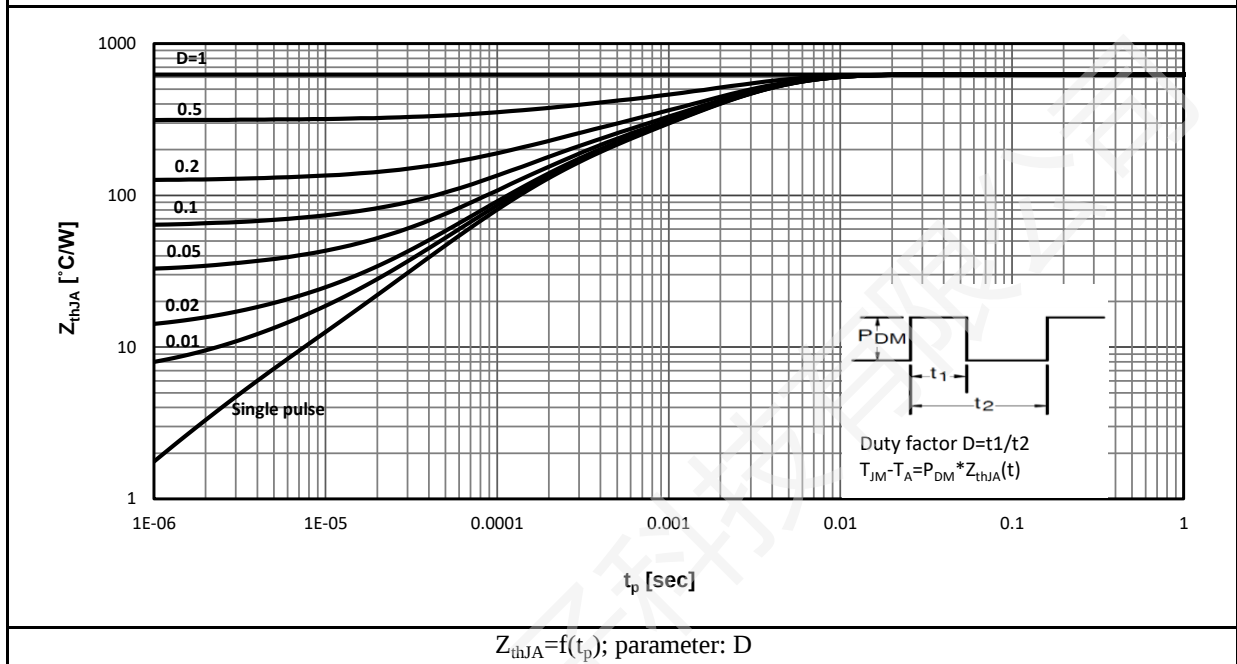
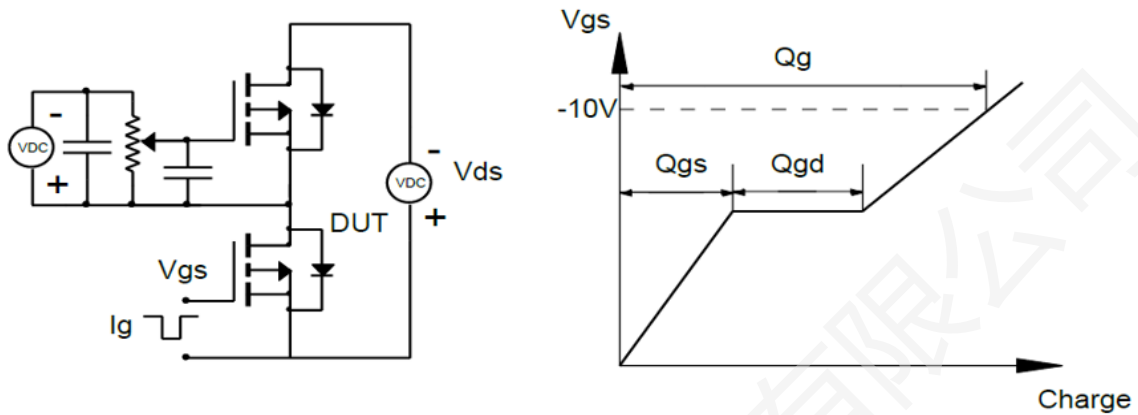
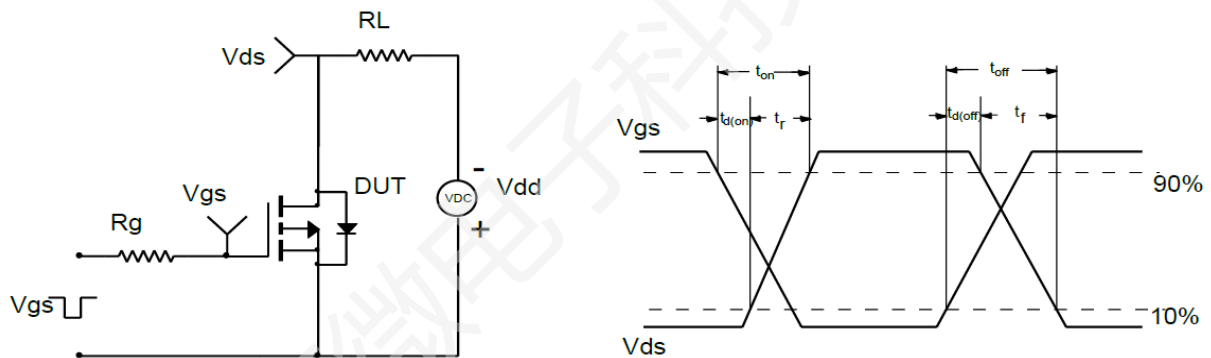
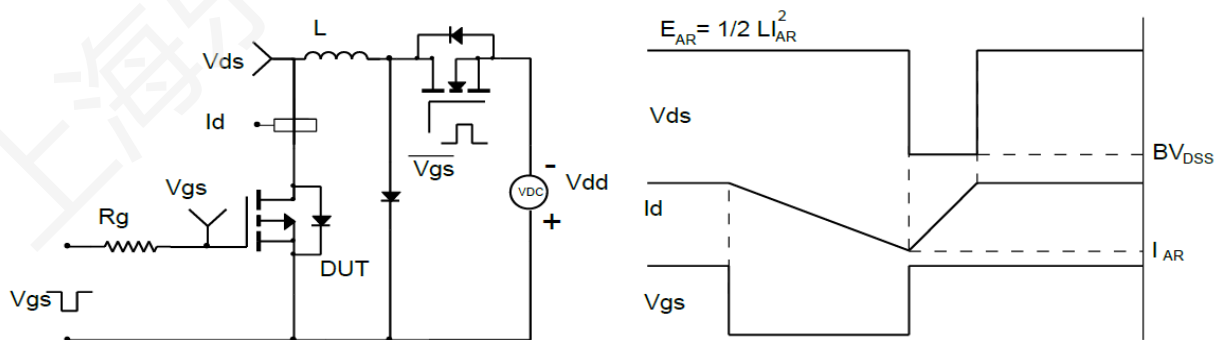
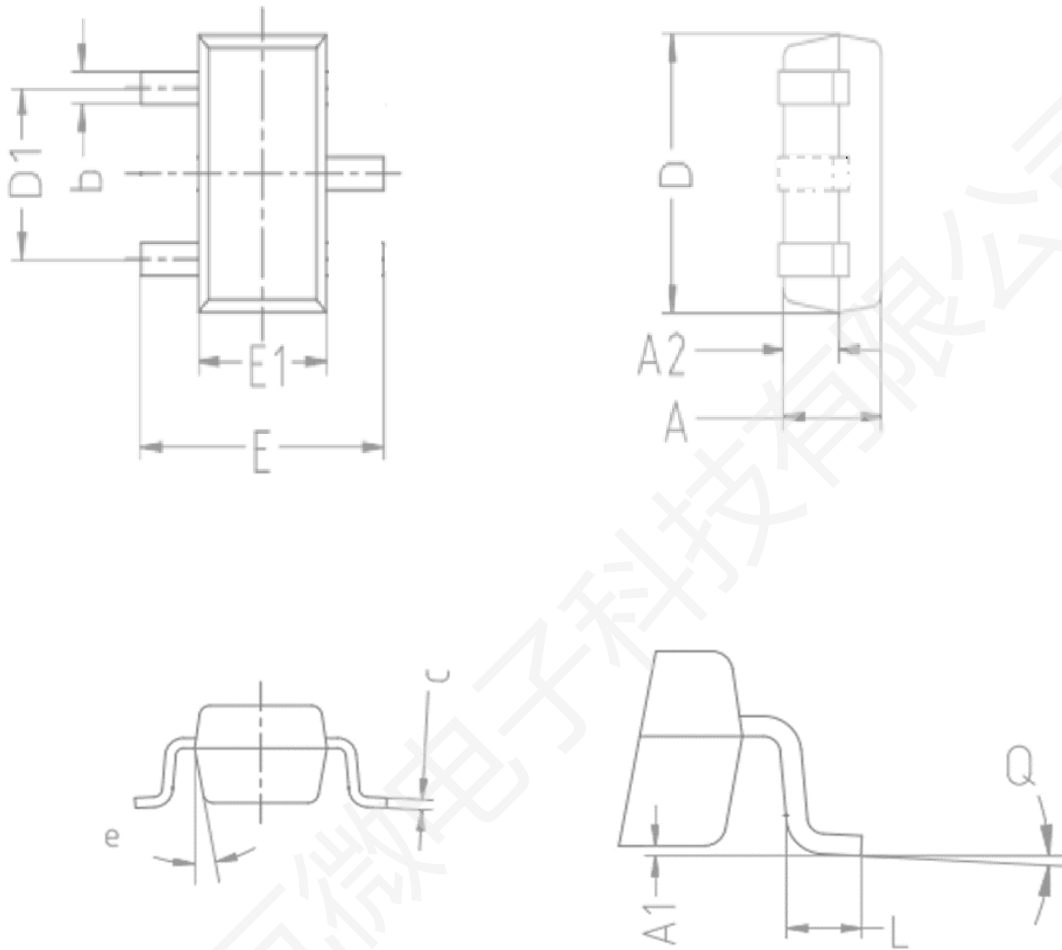


Figure 13: Max. Transient Thermal Impedance


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:

COMMON IN DIMENSION (MM)

PKG	SOT-323		
Symbol	Min	Nom	Max
A	0.910	0.960	1.010
A1	0.010	0.060	0.150
A2	0.500	0.540	0.600
b	0.200	0.250	0.310
C	0.100	0.110	0.120
D	2.050	2.100	2.250
D1	1.250	1.300	1.350
E	2.300	2.400	2.500
E1	1.200	1.260	1.350
L	0.260	0.360	0.460
e	10°		
Q	0°	4°	8°

Revision History:

Revison	Date	Descriptions
Rev 1.0	Mar, 2025	Initial Version

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