

1.Description

The SOT-223 package is designed for surface-mounting using vapor phase, infrared, or wave soldering techniques. Its unique package design allows for easy automatic pick-and-place as with other SOT or SOIC packages but has the added advantage of improved thermal performance due to an enlarged tab for heatsinking.

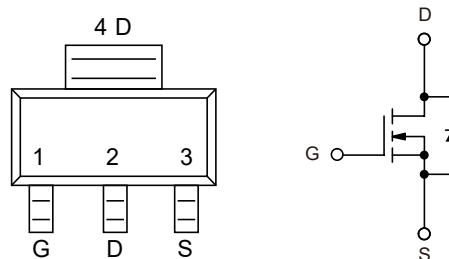
2.Features

- $V_{DS(V)}=100V$
- $R_{DS(ON)}<54m\Omega(V_{GS}=5V)$
- $R_{DS(ON)}<76m\Omega(V_{GS}=4V)$

3.Pinning information

Pin	Symbol	Description
1	G	GATE
2,4	D	DRAIN
3	S	SOURCE

SOT-223
top view



4.Absolute Maximum Ratings $T_c=25^{\circ}C$ unless otherwise noted

Parameter		Symbol	Rating	Units
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	± 10	V
Continuous Drain Current(V_{GS} at 5V)	$T_c=25^{\circ}C$	I_D	1.5	A
	$T_c=100^{\circ}C$		0.93	A
Pulsed Drain Current ^a		I_{DM}	12	A
Linear Derating Factor			0.025	W/ $^{\circ}C$
Linear Derating Factor (PCB Mount) ^e			0.017	W/ $^{\circ}C$
Single Pulse Avalanche Energy ^b		E_{AS}	50	mJ
Repetitive Avalanche Current ^a		I_{AR}	1.5	A
Repetitive Avalanche Energy ^a		E_{AR}	0.31	mJ
Maximum Power Dissipation	$T_c=25^{\circ}C$	P_D	3.1	W
	$T_A=25^{\circ}C$		2	W
Maximum Power Dissipation (PCB Mount) ^e				



Peak Diode Recovery dV/dt^c	dv/dt	5.5	V/ns
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C
Soldering Recommendations (Peak Temperature) ^d	for 10 s	300	°C

Notes:

- a. Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).
- b. $V_{DD}=25\text{ V}$, starting $T_J=25^\circ\text{C}$, $L=25\text{mH}$, $R_g=25\Omega$, $I_{AS}=1.5\text{A}$ (see fig. 12).
- c. $I_{SD}\leq 5.6\text{A}$, $dI/dt\leq 75\text{A}/\mu\text{s}$, $V_{DD}\leq V_{DS}$, $T_J\leq 150^\circ\text{C}$.
- d. 1.6 mm from case.
- e. When mounted on 1" square PCB (FR-4 or G-10 material).

5. Thermal resistance rating

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient (PCB Mount) ^a	R_{thJA}		60	°C/W
Maximum Junction-to-Case (Drain)	R_{thJC}		40	°C/W

Notes:

- a. When mounted on 1" square PCB (FR-4 or G-10 material).



6. Electrical Characteristics $T_J=25^\circ\text{C}$

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	V_{DS}	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	100			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D=1\text{mA}$, Reference to 25°C		0.12		V/ $^\circ\text{C}$
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	1		2	V
Gate-Source Leakage	I_{GSS}	$V_{GS}=\pm 10\text{V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=100\text{V}$, $V_{GS}=0\text{V}$			25	μA
		$V_{DS}=80\text{V}$, $V_{GS}=0\text{V}$, $T_J=125^\circ\text{C}$			250	μA
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=5\text{V}$, $I_D=0.9\text{A}^b$			54	m Ω
		$V_{GS}=4\text{V}$, $I_D=0.75\text{A}^b$			76	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=25\text{V}$, $I_D=0.9\text{A}$	0.57			S
Input Capacitance	C_{iss}	$V_{GS}=0\text{V}$, $V_{DS}=25\text{V}$ $f=1\text{MHz}$, see fig. 5		250		pF
Output Capacitance	C_{oss}			80		pF
Reverse Transfer Capacitance	C_{rss}			15		pF
Total Gate Charge	Q_g	$V_{GS}=5\text{V}$, $I_D=5.6\text{A}$			6.1	nC
Gate-Source Charge	Q_{gs}	$V_{DS}=80\text{V}$			2.6	nC
Gate-Drain Charge	Q_{gd}	see fig. 6 and 13 ^b			3.3	nC
Turn-On Delay Time	$t_{D(on)}$	$V_{DD}=50\text{V}$, $I_D=5.6\text{A}$ $R_G=12\Omega$, $R_D=8.4\Omega$		9.3		ns
Rise Time	t_r			47		ns
Turn-Off Delay Time	$t_{D(off)}$			16		ns
Fall Time	t_f			18		ns
Internal Drain inductance	L_D	Between lead, 6mm (0.25in.) from package and center of die contact		4		nH
Internal Source inductance	L_S			6		nH



Source-Drain Ratings and Characteristics						
Continuous Source Current (Body Diode)	I_S	MOSFET symbol showing the integral reverse p-n junction diode.			1.5	A
Pulsed Source Current (Body Diode) ^a	I_{SM}				12	
Diode Forward Voltage	V_{SD}		$T_J=25^{\circ}\text{C}, I_S=1.5\text{A}, V_{GS}=0\text{V}^b$		2.5	V
Reverse Recovery Time	t_{rr}	$T_J=25^{\circ}\text{C}, I_F=5.6\text{A}$		110	130	ns
Reverse Recovery Charge	Q_{rr}	$dI/dt=100\text{A}/\mu\text{s}^b$		0.5	0.65	μC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by L_S+L_D)				

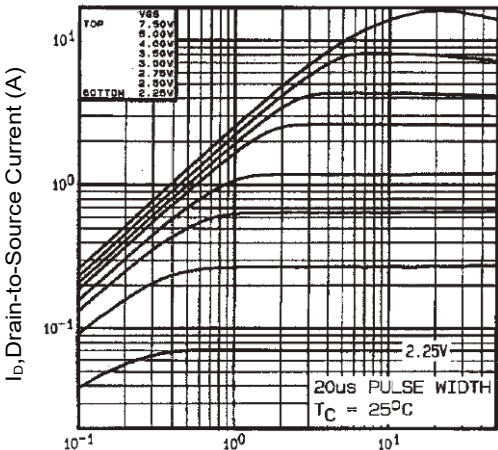
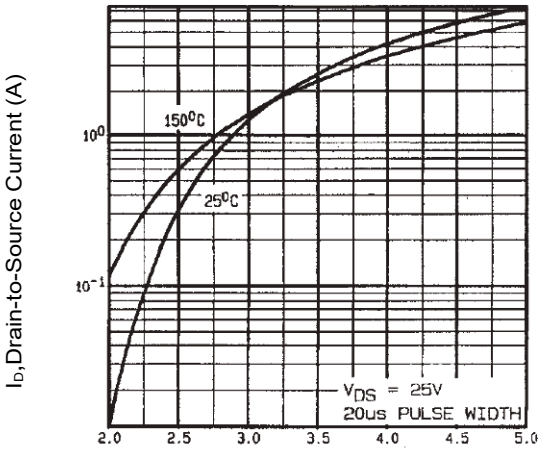
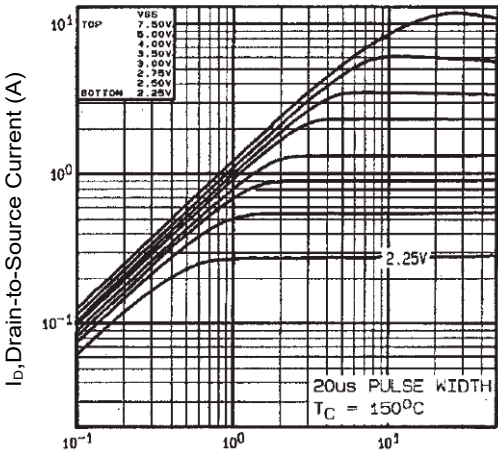
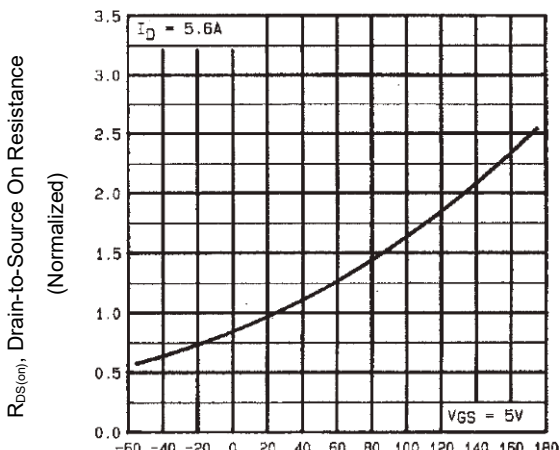
Notes:

a. Repetitive rating; pulse width limited by maximum junction temperature

b. Pulse width $\leq 300 \mu\text{s}$; duty cycle $\leq 2\%$.

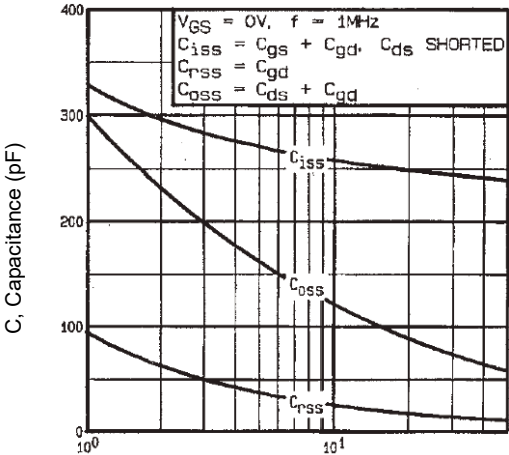
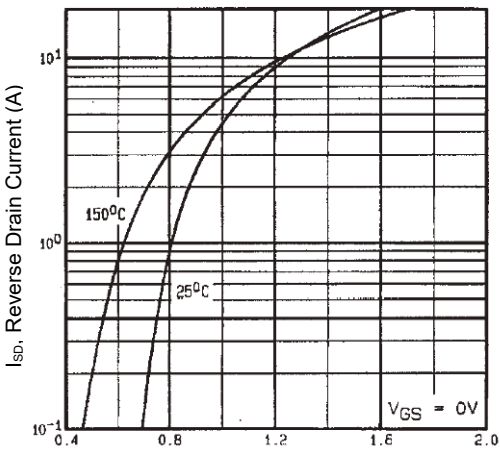
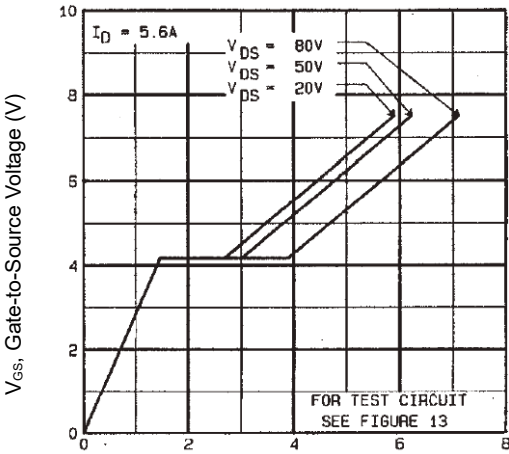
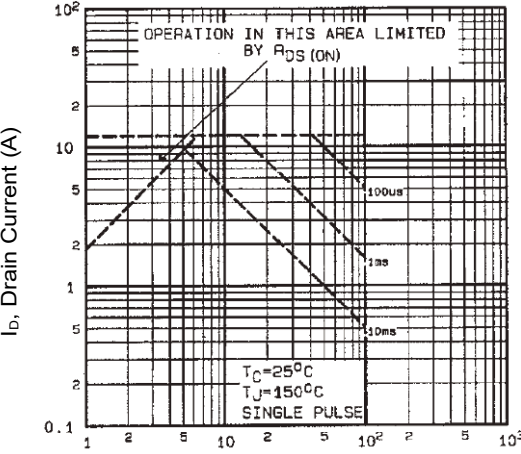


7.1Typical Characteristics

 $I_{D, \text{ Drain-to-Source Current (A)}}$ $V_{DS, \text{ Drain-to-Source Voltage (V)}}$	 $I_{D, \text{ Drain-to-Source Current (A)}}$ $V_{DS, \text{ Drain-to-Source Voltage (V)}}$
Fig 1. Typical Output Characteristics	Fig 2. Typical Output Characteristics
 $I_{D, \text{ Drain-to-Source Current (A)}}$ $V_{GS, \text{ Gate-to-Source Voltage (V)}}$	 $R_{DS(on), \text{ Drain-to-Source On Resistance (Normalized)}}$ $T_J, \text{ Junction Temperature (°C)}$
Fig 3. Typical Transfer Characteristics	Fig 4. Normalized On-ResistanceVs. Temperature

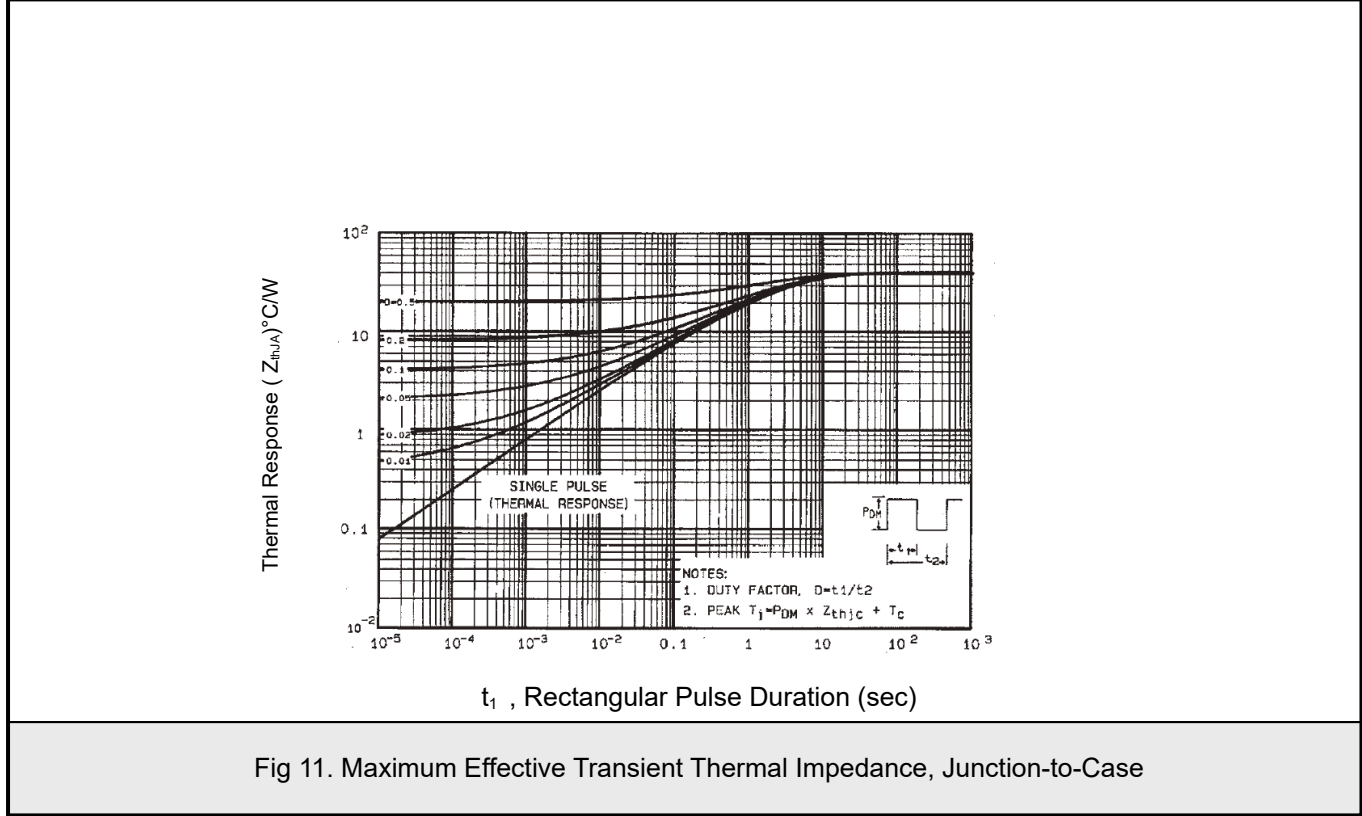
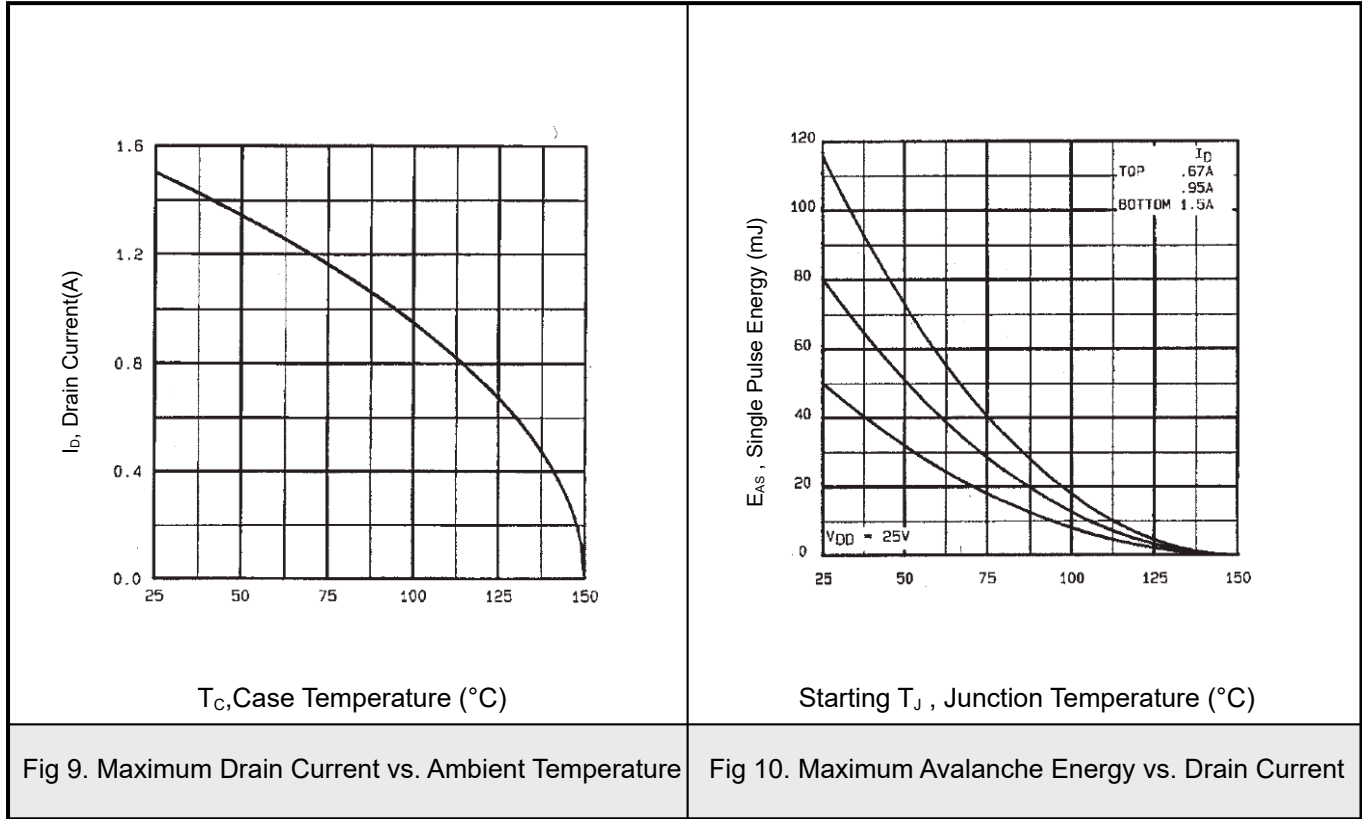


7.2Typical Characterisitics

 V_{DS}, Drain to Source Voltage (V)	 V_{SD}, Source-to-Drain Voltage (V)
Fig 5. Capacitance vs V_{DS}	Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage
 Q_G, Total Gate Charge (nC)	 V_{DS}, Drain-to-Source Voltage (V)
Fig 7. Typical Source-Drain Diode Forward Voltage	Fig 8. Maximum Safe Operating Area



7.3Typical Characterisitics





7.4 Typical Characteristics

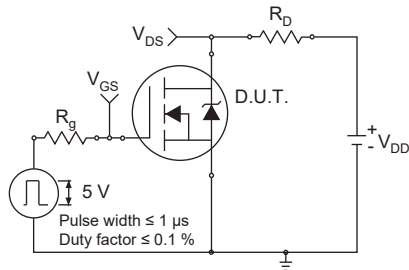


Figure 12a: Switching Time Test Circuit

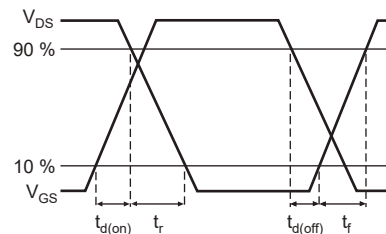


Figure 12b: Switching Time Waveforms

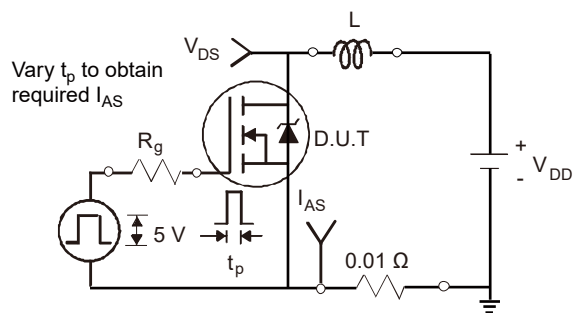


Figure 13a: Unclamped Inductive Test Circuit

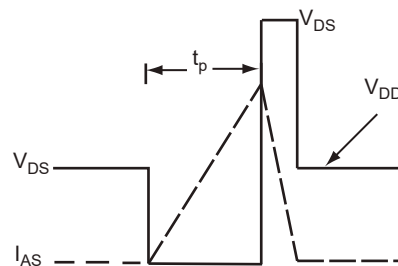


Figure 13b: Unclamped Inductive Waveforms

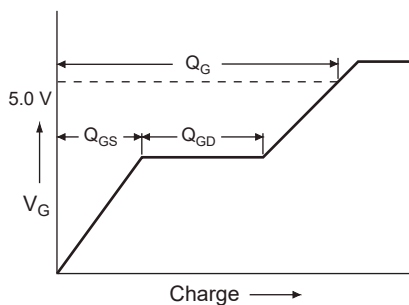


Figure 14a: Basic Gate Charge Waveform

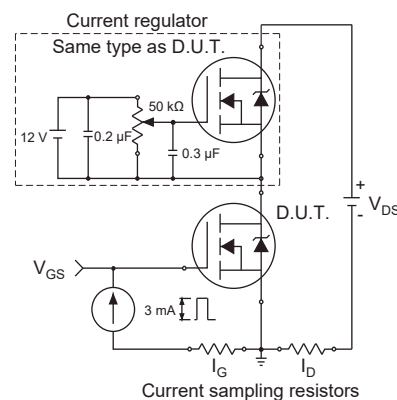
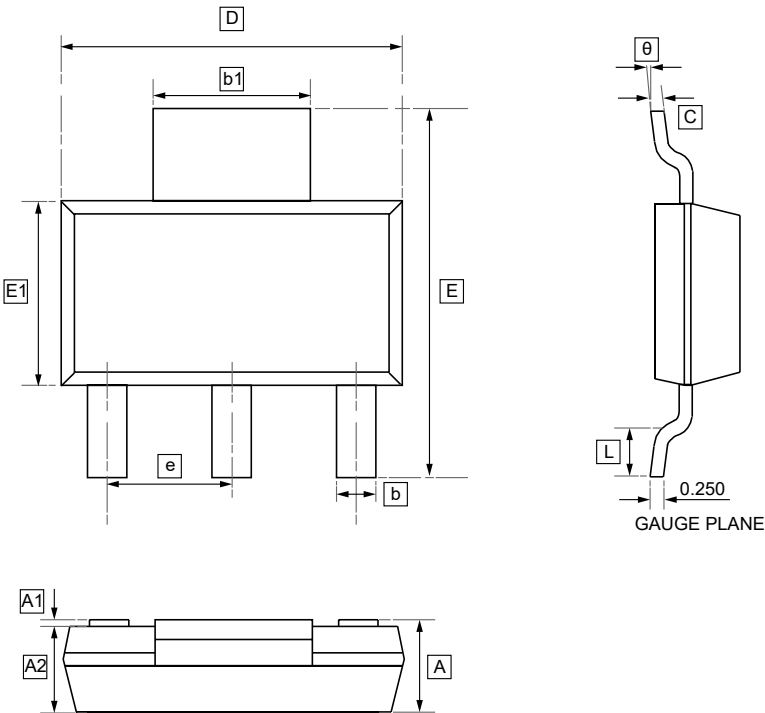


Figure 14b: Gate Charge Test Circuit



8.SOT-223 Package Outline Dimensions

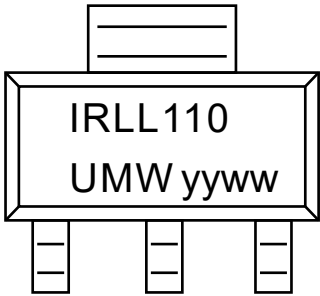


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	b1	c	D	E	E1	e	L	θ
Min	-	0.020	1.500	0.660	2.900	0.230	6.300	6.700	3.300	2.300	0.750	0°
Max	1.800	0.100	1.700	0.840	3.100	0.350	6.700	7.300	3.700	BSC	-	10°



9.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW IRLL110TR	SOT-223	2500	Tape and reel



10.Disclaimer

UMW reserves the right to make changes to all products, specifications. Customers should obtain the latest version of product documentation and verify the completeness and currency of the information before placing an order.

When applying our products, please do not exceed the maximum rated values, as this may affect the reliability of the entire system. Under certain conditions, any semiconductor product may experience faults or failures. Buyers are responsible for adhering to safety standards and implementing safety measures during system design, prototyping, and manufacturing when using our products to prevent potential failure risks that could lead to personal injury or property damage.

Unless explicitly stated in writing, UMW products are not intended for use in medical, life-saving, or life-sustaining applications, nor for any other applications where product failure could result in personal injury or death. If customers use or sell the product for such applications without explicit authorization, they assume all associated risks.

When reselling, applying, or exporting, please comply with export control laws and regulations of China, the United States, the United Kingdom, the European Union, and other relevant countries, regions, and international organizations.

This document and any actions by UMW do not grant any intellectual property rights, whether express or implied, by estoppel or otherwise. The product names and marks mentioned herein may be trademarks of their respective owners.