

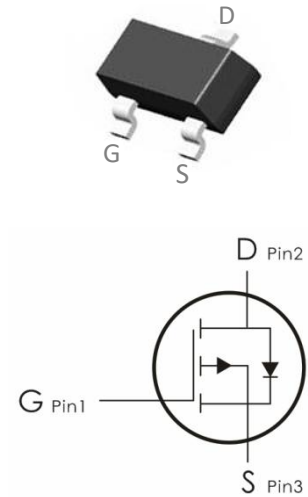
## Description:

This P-Channel MOSFET 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.

## Features:

- 1)  $V_{DS}=-20V, I_D=-3.5A, R_{DS(on)}<45m\Omega @V_{GS}=-4.5V$  (Typ:  $35m\Omega$ )
- 2) Low gate charge.
- 3) Green device available.
- 4) Advanced high cell density trench technology for ultra low  $R_{DS(on)}$ .
- 5) Excellent package for good heat dissipation.
- 6) MSL3



## Package Marking and Ordering Information:

Part NO.	Marking	Package	Packing
DO2303A	2303A	SOT-23	3000 pcs/Reel

## Absolute Maximum Ratings: ( $T_A=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Ratings	Units
$V_{DS}$	Drain-Source Voltage	-20	V
$V_{GS}$	Gate-Source Voltage	$\pm 12$	V
$I_D$	Continuous Drain Current- $T_A=25^\circ\text{C}^1$	-3.5	A
	Continuous Drain Current- $T_A=100^\circ\text{C}^1$	-2.5	
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	-14	
$P_D$	Power Dissipation	1	W
$T_J, T_{STG}$	Operating and Storage Junction Temperature Range	-55-+150	$^\circ\text{C}$

## Thermal Characteristics:

Symbol	Parameter	Max	Units
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	125	$^\circ\text{C}/\text{W}$

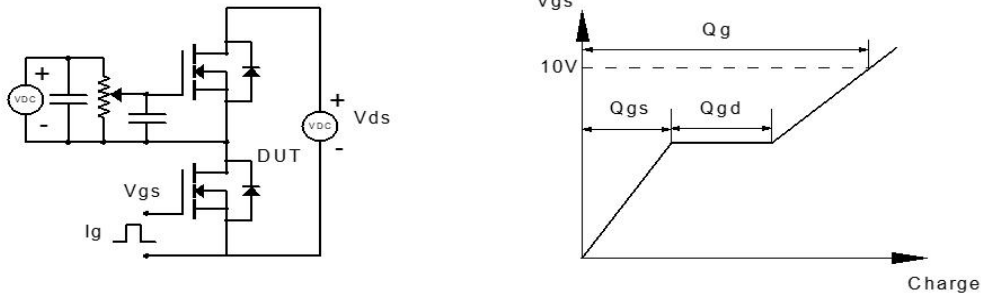
**Electrical Characteristics:** ( $T_A=25^\circ\text{C}$  unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>Off Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\ \mu A$	-20	---	---	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{GS}=0V, V_{DS}=-20V$	---	---	-1	$\mu A$
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 12V, V_{DS}=0A$	---	---	$\pm 100$	nA
<b>On Characteristics</b>						
$V_{GS(th)}$	Gate-Source Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\ \mu A$	-0.4	-0.6	-1	V
$R_{DS(on)}$	Drain-Source On Resistance <sup>3</sup>	$V_{GS}=-4.5V, I_D=-3.4A$	---	35	45	$m\Omega$
		$V_{GS}=-2.5V, I_D=-3A$	---	44	55	$m\Omega$
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS}=-10V, V_{GS}=0V, f=1MHz$	---	440	---	pF
$C_{oss}$	Output Capacitance		---	79.8	---	
$C_{rss}$	Reverse Transfer Capacitance		---	65	---	
<b>Switching Characteristics</b>						
$t_{d(on)}$	Turn-On Delay Time	$V_{DS}=-10V, I_D=-2.3A,$ $R_{ENG}=3\ \Omega, V_{GS}=-4.5V$	---	7.6	---	ns
$t_r$	Rise Time		---	32.5	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	42	---	ns
$t_f$	Fall Time		---	48	---	ns
$Q_g$	Total Gate Charge	$V_{GS}=-4.5V, V_{DS}=-10V,$ $I_D=-2.3A$	---	5	---	nC
$Q_{gs}$	Gate-Source Charge		---	1.45	---	nC
$Q_{gd}$	Gate-Drain "Miller" Charge		---	1.15	---	nC
<b>Drain-Source Diode Characteristics</b>						
$V_{SD}$	Diode Forward Voltage	$V_{GS}=0V, I_{SD}=-3.4A$	---	---	-1.2	V
$I_S$	Continuous Drain Current	$V_D=V_G=0V$	---	---	-2.9	A
$I_{SM}$	Pulsed Drain Current		---	---	-11.6	A
$T_{rr}$	Reverse Recovery Time	$I_F=2.3A, T_J=25^\circ\text{C}$	---	11.5	---	ns
$Q_{rr}$	Reverse Recovery Charge	$dI/dt=100A/\mu s$	---	1.85	---	nC

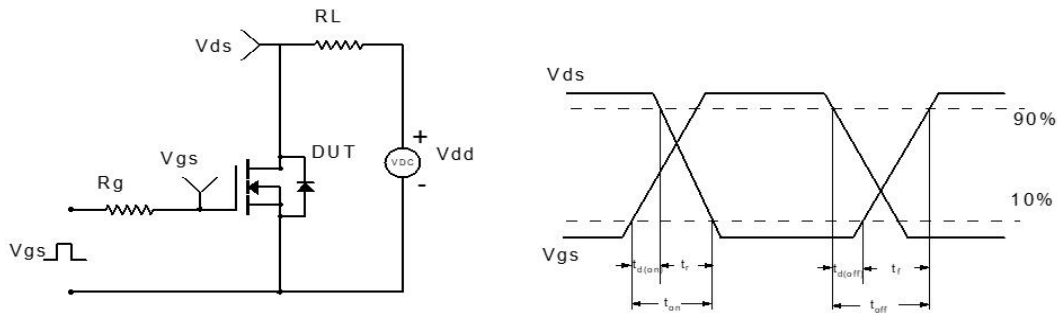
## Notes:

1. Computed continuous current assumes the condition of  $T_{j,Max}$  while the actual continuous current depends on the thermal & electro-mechanical application board design
2. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 0.5\%$

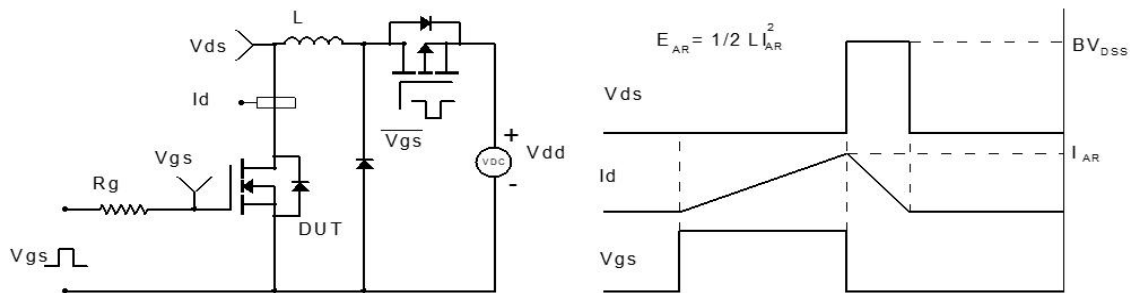
## Test Circuit



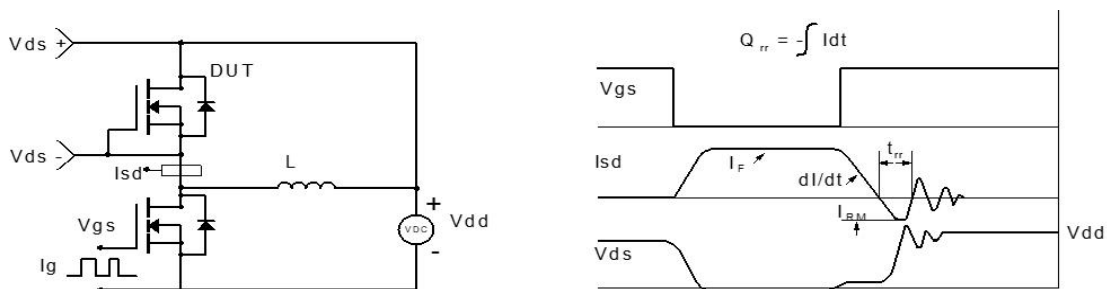
**Figure 1: Gate Charge Test Circuit & Waveform**



**Figure 2: Resistive Switching Test Circuit & Waveform**

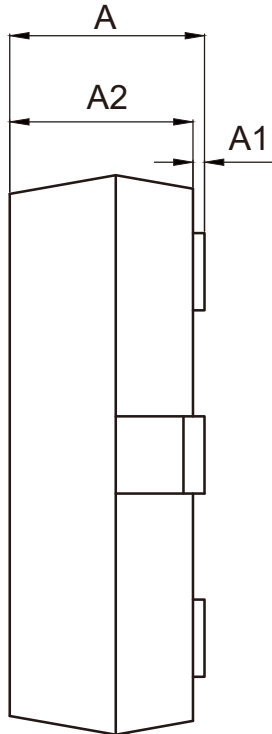
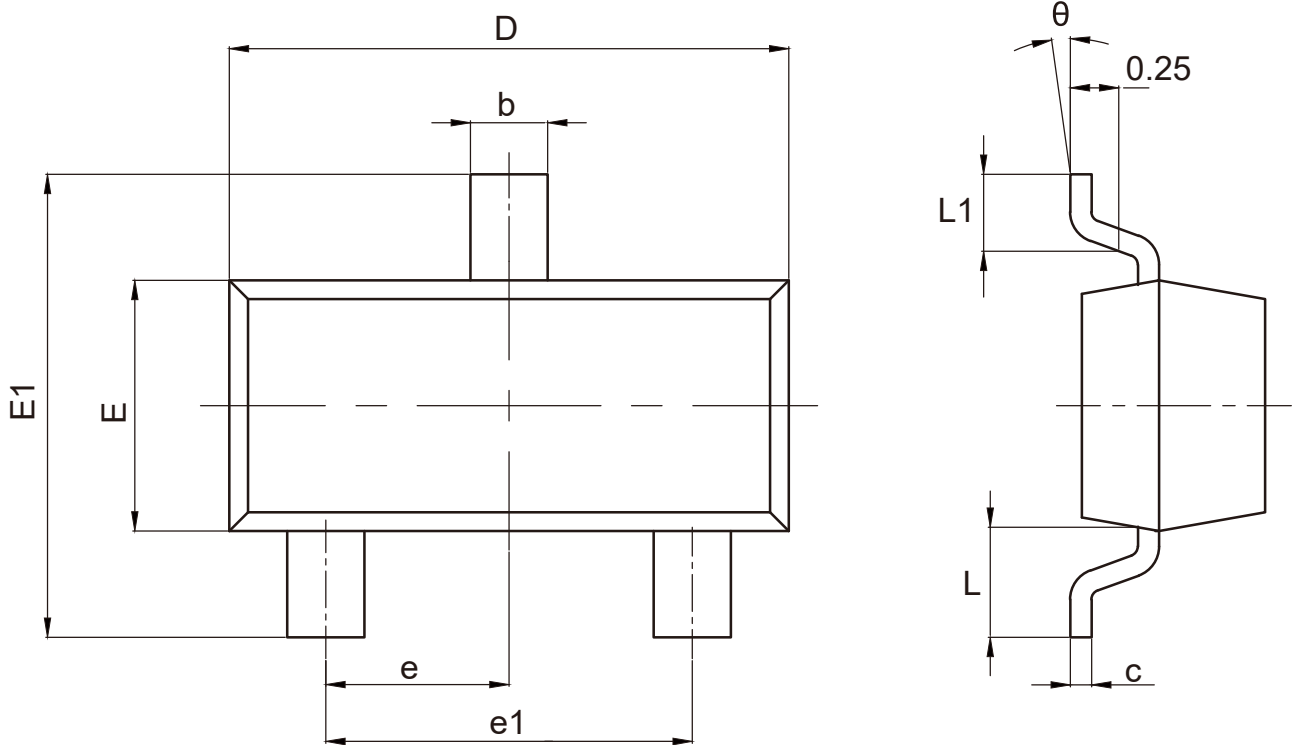


**Figure 3: Unclamped Inductive Switching Test Circuit & Waveform**



**Figure 4: Diode Recovery Test Circuit & Waveform**

## SOT-23 Package Outline Data

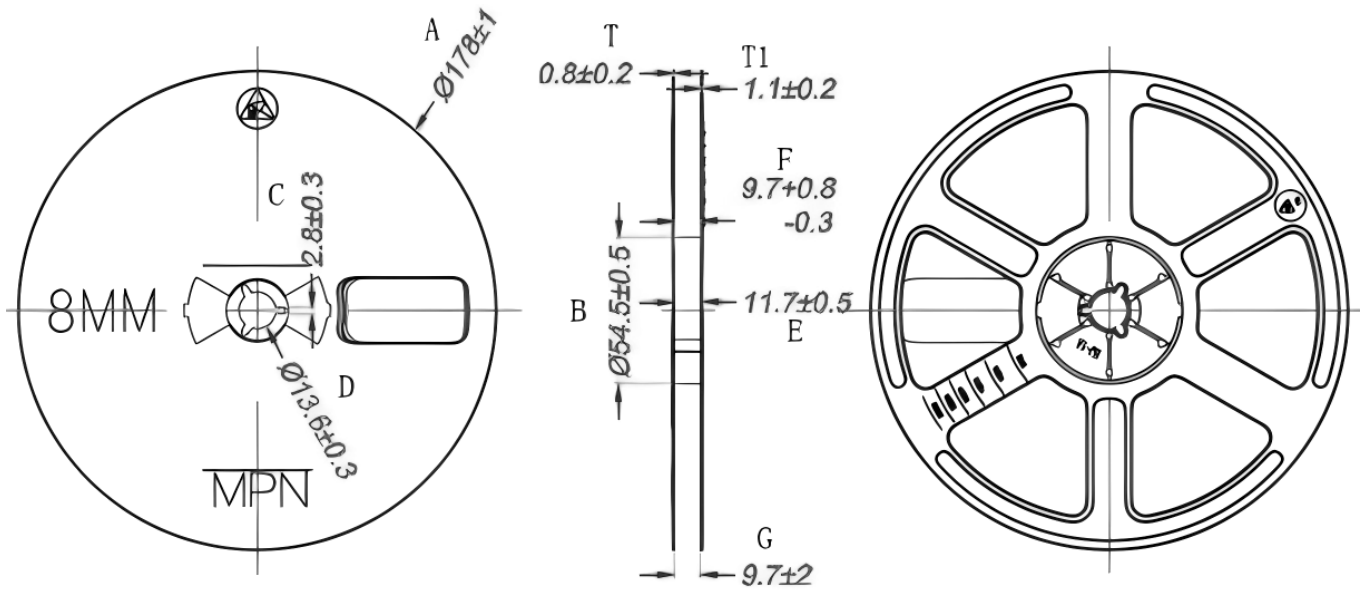


COMMON DIMENSIONS			
CUNITS MEASURE=MILLIMETER			
SYMBOL	MIN	NOM	MAX
A	0.900	--	1.150
A1	0.000	--	0.100
A2	0.900	--	1.050
c	0.100	--	0.200
b	0.300	0.400	0.500
D	2.800	2.900	3.000
E	1.200	--	1.400
E1	2.250	--	2.550
e	0.950TYP		
e1	1.800	1.900	2.000
L	0.550REF		
L1	0.300	0.400	0.500
θ	0°	--	8°

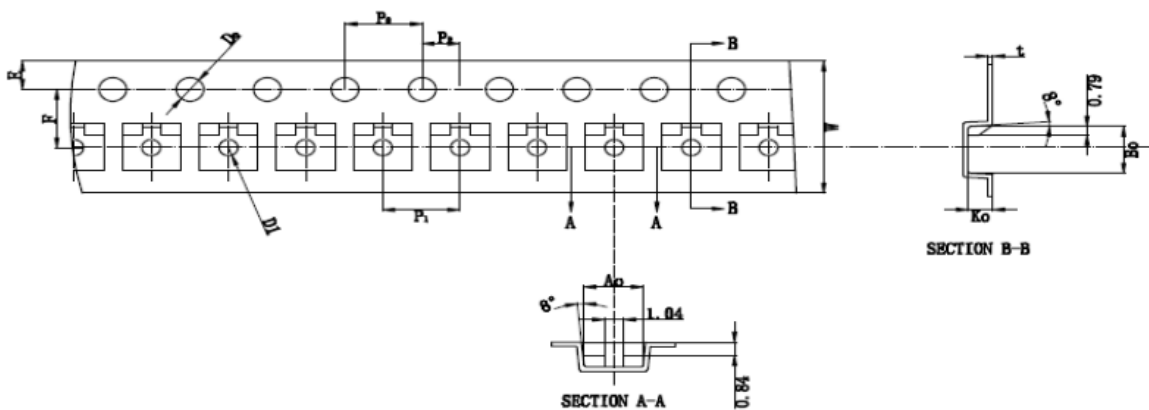
Unit:mm

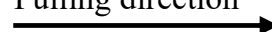
## Tape & Reel Information

Dimensions in mm

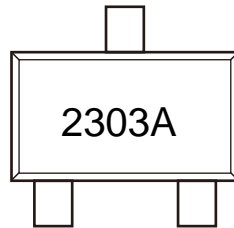


PKG TYPE	W	P	E	F	D	D1	Po	Po10	P2	A0	B0	K0	T
SOT-23	8.00	4.00	1.75	3.50	1.55	1.00	4.00	40.00	2.00	3.17	2.77	1.28	0.20
Tolerance	+0.3/-0.1	$\pm 0.1$	$\pm 0.1$	$\pm 0.05$	$\pm 0.1$	$\pm 0.1$	$\pm 0.1$	$\pm 0.2$	$\pm 0.05$	$\pm 0.1$	$\pm 0.1$	$\pm 0.1$	$\pm 0.03$



Pulling direction 


## Marking Information:



## Previous Version

Version	Date	Subjects (major changes since last revision)
1.0	2025-09-26	Release of final version

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