

Description:

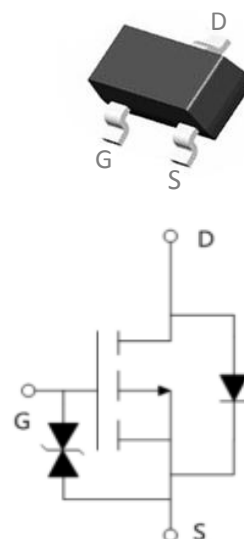
This P-Channel MOSFET uses advanced trench technology and

design to provide excellent $R_{DS(on)}$ with low gate charge.

It can be used in a wide variety of applications.

Features:

- 1) $V_{DS}=-20V, I_D=-0.6A, R_{DS(on)}<420m\Omega$ @ $V_{GS}=-4.5V$ (Typ: $320m\Omega$)
- 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) ESD Protection



Package Marking and Ordering Information:

Part NO.	Marking	Package	Packing
DO3139A	3139A	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	± 10	V
I_D	Continuous Drain Current- $T_A=25^\circ\text{C}^1$	-0.6	A
	Continuous Drain Current- $T_A=100^\circ\text{C}^1$	-0.42	
	Pulsed Drain Current ²	-2.4	
P_D	Power Dissipation	0.35	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	357	$^\circ\text{C}/\text{W}$

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV _{DSS}	Drain-Sourtce Breakdown Voltage	V _{GS} =0V,I _D =250 μ A	-20	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =-20V	---	---	-1	μ A
I _{GSS}	Gate-Source Leakage Current	V _{GS} =± 10V, V _{DS} =0A	---	---	± 10	μ A
On Characteristics						
V _{GS(th)}	Gate-Source Threshold Voltage	V _{GS} =V _{DS} , I _D =250 μ A	-0.4	-0.6	-1	V
R _{DS(ON)}	Drain-Source On Resistance ³	V _{GS} =-4.5V,I _D =-0.5A	---	320	420	m Ω
		V _{GS} =-2.5V,I _D =-0.4A	---	430	560	m Ω
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =-10V, V _{GS} =0V, f=1MHz	---	65.3	---	pF
C _{oss}	Output Capacitance		---	14.7	---	
C _{rss}	Reverse Transfer Capacitance		---	8.4	---	
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{DS} =-10V, I _D =-0.5A, R _{ENG} =3 Ω ,V _{GS} =-4.5V	---	4.2	---	ns
t _r	Rise Time		---	19.9	---	ns
t _{d(off)}	Turn-Off Delay Time		---	16.8	---	ns
t _f	Fall Time		---	26.2	---	ns
Q _g	Total Gate Charge	V _{GS} =-4.5V, V _{DS} =-10V, I _D =-0.5A	---	1.1	---	nC
Q _{gs}	Gate-Source Charge		---	0.3	---	nC
Q _{gd}	Gate-Drain “Miller” Charge		---	0.2	---	nC
Drain-Source Diode Characteristics						
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _{SD} =-0.5A	---	---	-1.2	V
I _S	Continuous Drain Current	V _D =V _G =0V	---	---	-0.5	A
I _{SM}	Pulsed Drain Current		---	---	-2	A

Notes:

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. $I_{SD} \leq -4A$, $di/dt = 100A/\mu s$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ C$
3. Pulse Test : Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$
4. Essentially independent of operating temperature

Typical Characteristics: ($T_A = 25^\circ C$ unless otherwise noted)

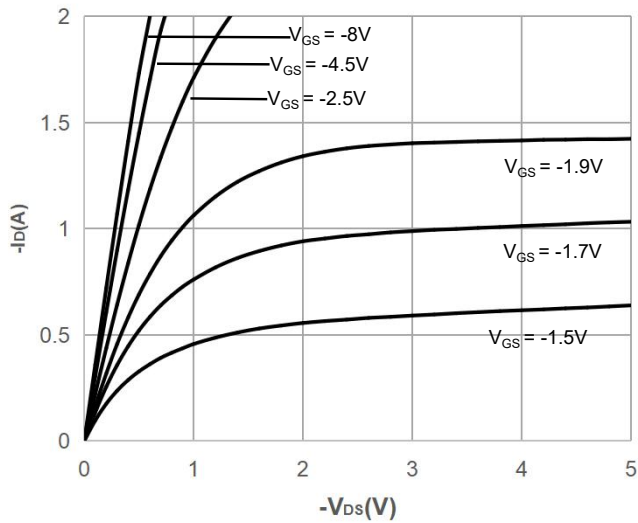


Figure 1: Output Characteristics

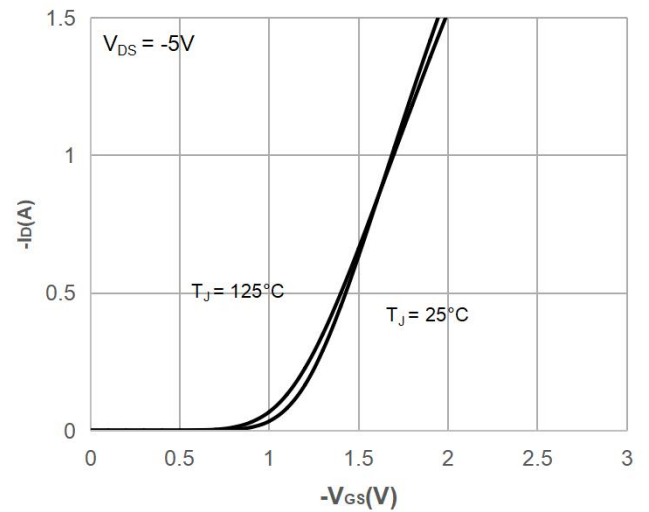


Figure 2: Typical Transfer Characteristics

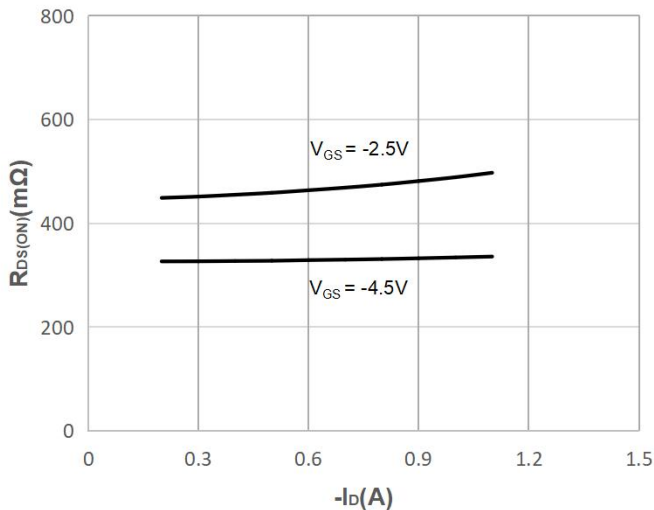


Figure 3: On-resistance vs. Drain Current

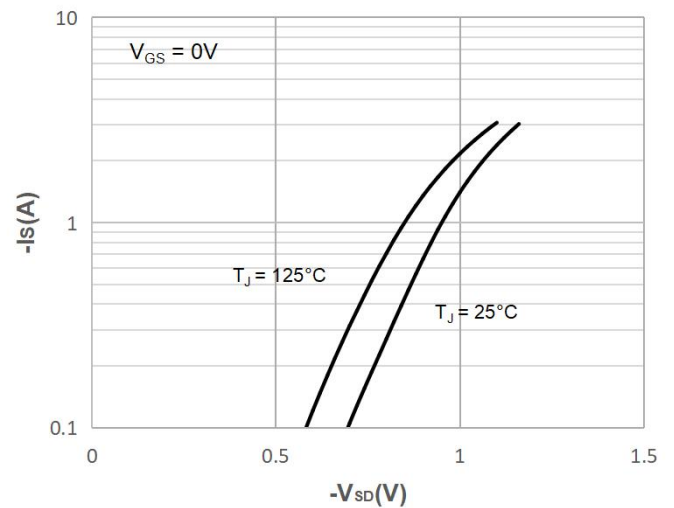


Figure 4: Body Diode Characteristics

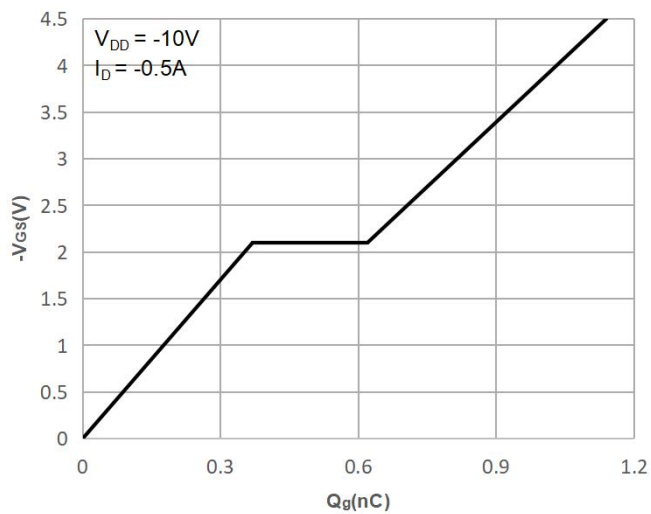


Figure 5: Gate Charge Characteristics

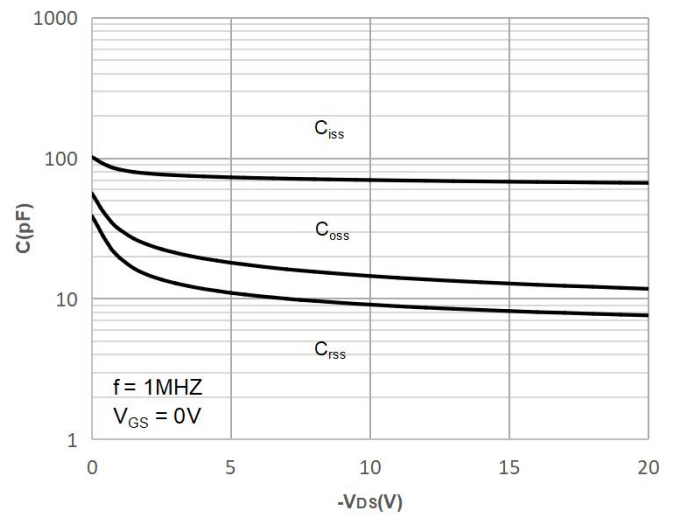


Figure 6: Capacitance Characteristics

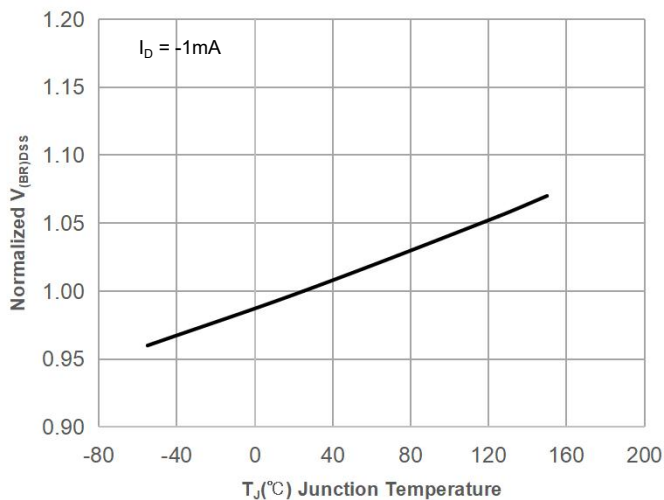


Figure 7: Normalized Breakdown voltage vs. Junction Temperature

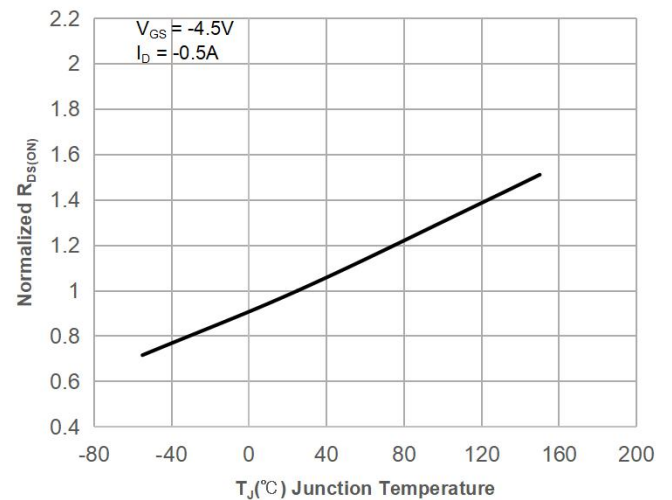


Figure 8: Normalized on Resistance vs. Junction Temperature

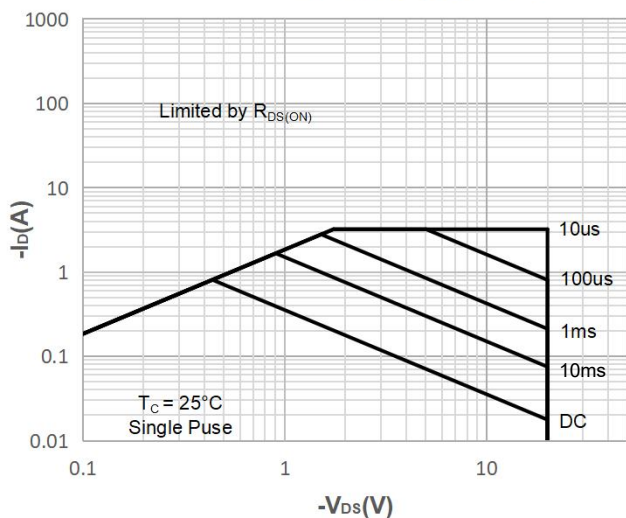


Figure 9: Maximum Safe Operating Area

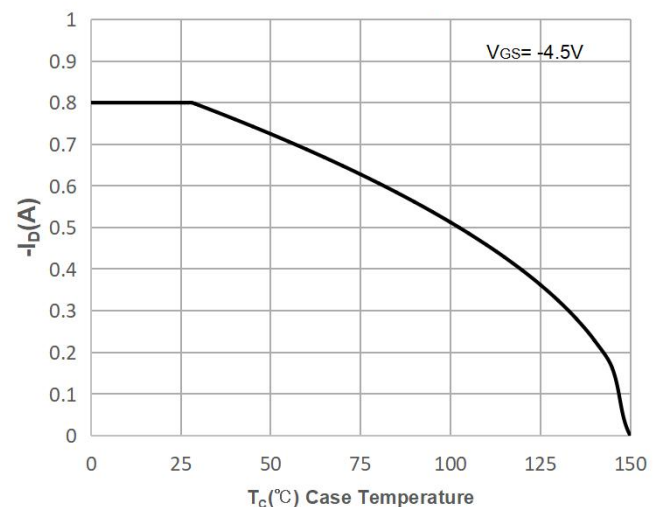


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

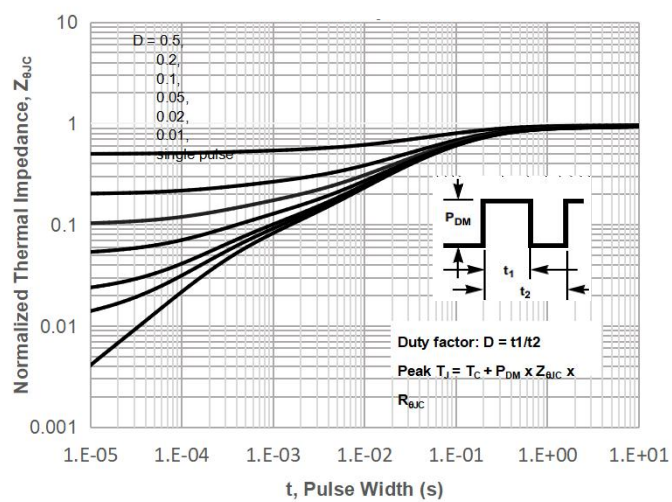


Figure 11: Normalized Maximum Transient Thermal Impedance

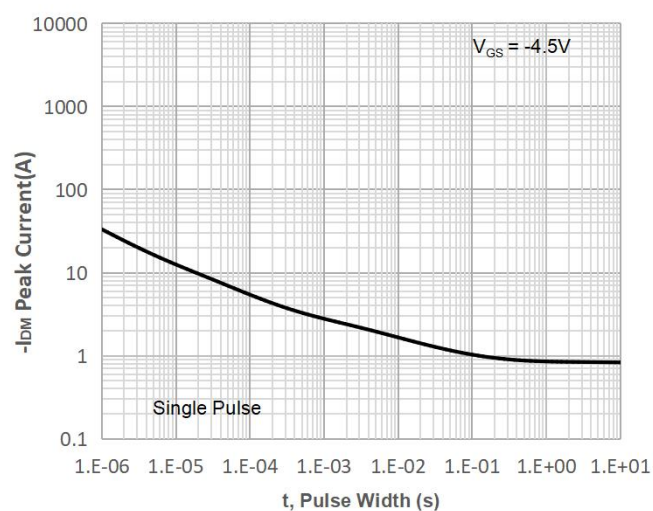
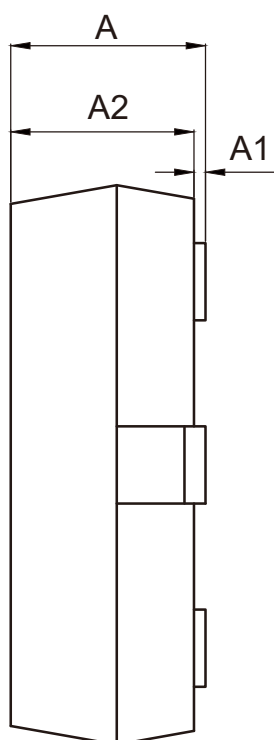
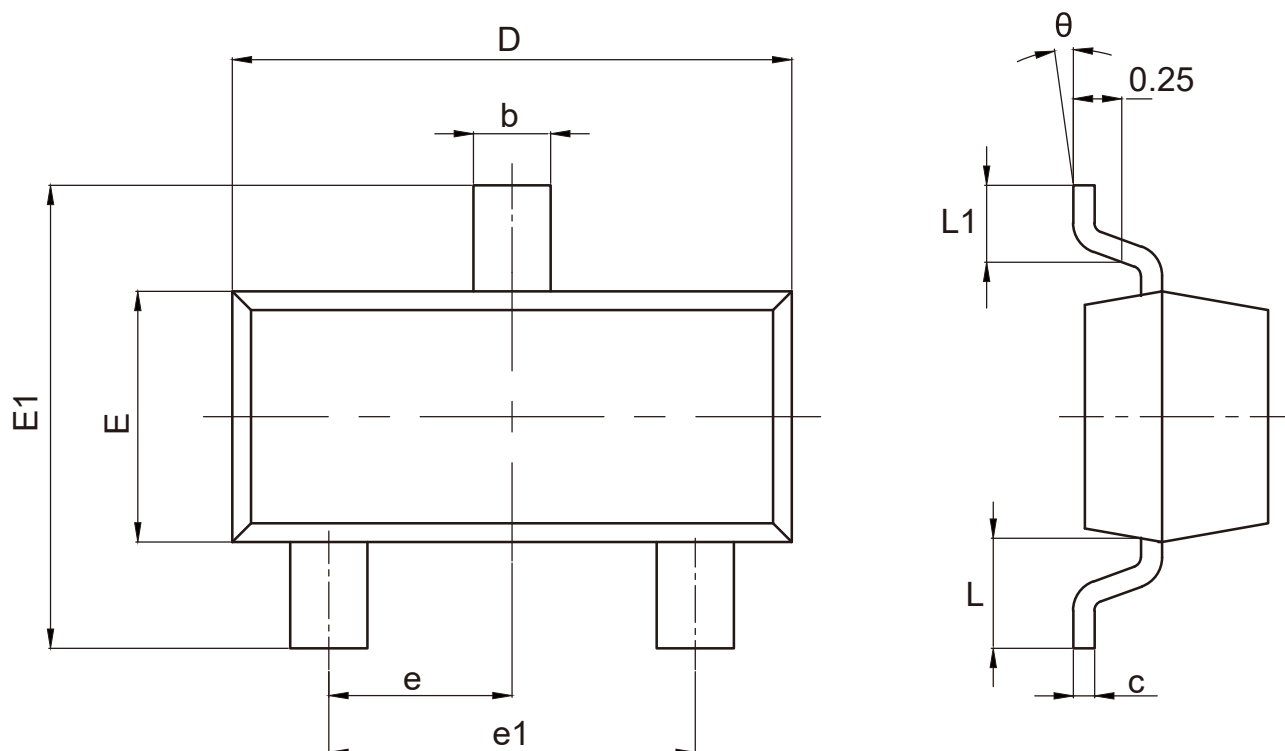


Figure 12: Peak Current Capacity

SOT-23Package Outline Data

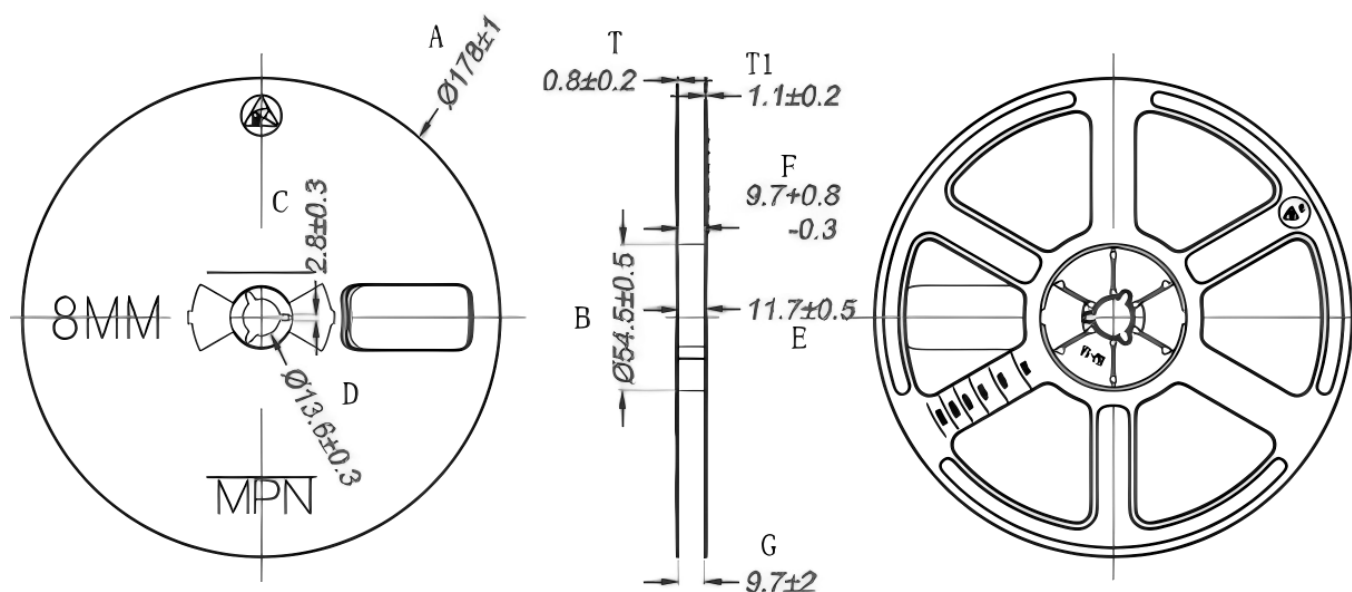


COMMON DIMENSIONS CUNITS MEASURE=MILLIMETER			
SYMBOL	MIN	NOM	MAX
A	0.900	--	1.150
A1	0.000	--	0.100
A2	0.900	--	1.050
c	0.100	--	0.200
b	0.300	0.400	0.500
D	2.800	2.900	3.000
E	1.200	--	1.400
E1	2.250	--	2.550
e	0.950TYP		
e1	1.800	1.900	2.000
L	0.550REF		
L1	0.300	0.400	0.500
θ	0°	--	8°

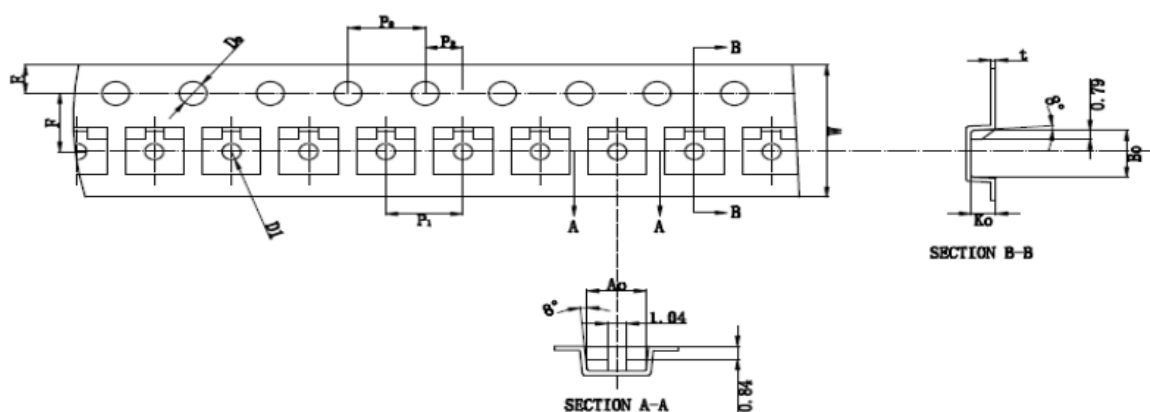
Unit:mm

Tape & Reel Information

Dimensions in mm

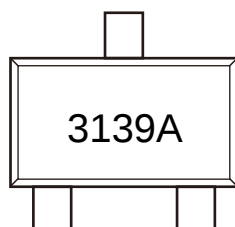


PKG TYPE	W	P	E	F	D	D1	Po	Po10	P2	A0	B0	K0	T
SOT-23	8.00	4.00	1.75	3.50	1.55	1.00	4.00	40.00	2.00	3.17	2.77	1.28	0.20
Tolerance	+0.3/-0.1	± 0.1	± 0.1	± 0.05	± 0.1	± 0.1	± 0.1	± 0.2	± 0.05	± 0.1	± 0.1	± 0.1	± 0.03



Pulling direction 

Marking Information:



Previous Version

Version	Date	Subjects (major changes since last revision)
1.0	2026-03-06	Release of final version

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